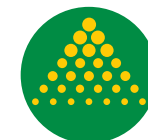




# G6 Crop Cruiser Series 2

OPERATOR'S MANUAL MY20

GA8701177 REV 4  
JUNE 2024  
FROM SERIAL NO 203000



**GOLDACRES**





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Under: Parts & Service > Owner-Operator Manuals:

<u>Model</u>	<u>Year</u>	<u>Revision</u>	<u>Part Number</u>
Crop Cruiser G6 Series 2	2024	4	GA8701177

Under: Parts & Service > Parts Manuals:

<u>Model</u>	<u>Year</u>	<u>Revision</u>	<u>Part Number</u>
Crop Cruiser G6 Series 2	2022	3	GA8701178





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## Welcome

Congratulations on your Selection of the Goldacres G6 Series 2 Crop Cruiser.

Goldacres has been designing, building, supplying and servicing Australian farmers with high quality, innovative & technologically advanced spraying solutions for over 40 years.

Our advanced equipment is specifically designed & developed in Australia for Australian conditions.

Goldacres produce Australia's finest range of spraying equipment and we keenly value the unique relationships we develop and enjoy with the owners of our equipment.

We welcome you as a Goldacres Owner and look forward to assisting you to make your spraying applications as easy and efficient as possible.

This Operators Manual outlines all you need to know about the operation of your sprayer, along with operating guidance and the overall maintenance & care of your machine.

Our Customer Care booklet, called the Delivery & Warranty Registration Manual (supplied separately) explains in simple, easy to understand terms the Pre-Delivery, Post-Delivery, Warranty, Servicing and Maintenance of your Sprayer.

Please read, understand and use these comprehensive manuals to gain complete understanding of your sprayer for its reliable, safe, accurate & efficient operation.

Do not hesitate to contact your Goldacres Dealer or Goldacres for further information as explained in these manuals.

**Roger Richards**  
General Manager

## About this Manual

This manual provides instructions for some items requiring assembly on delivery, setting up instructions, calibration procedures, pre-operation requirements, operating instructions and maintenance requirements to achieve the best performance of this G6 Series 2 Crop Cruiser.

Some options explained in this manual may not be installed on your sprayer. Other options fitted may require another operator manual for instructions.

Please ensure this manual and other relevant manual are passed onto the new owner if the sprayer is sold.

## How to Use/Read this Manual

This manual includes a Contents page and 10 Chapters - with each Chapter beginning with a list of Headings & Subheadings.

Each page contains written instructions with pictures, illustrations, decal & symbol instructions, above & below providing visual support and information to each instruction.

Numerical values & settings shown in the manual are instructional examples only and may not be representative for your machine or local situation.

## Decal/Symbol Instructions

Danger, Warning, Caution & Note symbols & decals are used throughout this manual and on your G6 Series 2 Crop Cruiser instructing you of risks, procedures & operator safety.

It is important to familiarise yourself with these & understand their meaning to be able to quickly identify risks, procedures, operator safety & safety of others, as outlined below:

### DANGER

- Conveys highest risk of injury or death to convey that action must be taken to protect personal health.
- Serious injury or death may occur if you don't follow instructions!

- **Danger Symbol** - used for areas where the highest personal risk of injury or death is present.

Always read the information on these decals and ensure you are taking the precautions necessary to prevent risk of injury or death.

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

### CAUTION

- Conveys the potential for personal injury and/or damage to the machine itself.
- Injury and/or damage your machine, if you don't follow instructions!

- **Caution Symbol** - used where there is potential for personal injury and/or damage to the machine itself.

Injury and/or damage your machine may occur if you don't follow instructions

### WARNING

- Conveys risk of injury highlighting the need for action to be taken to protect personal health.
- Serious injury may occur if you don't follow instructions!

- **Warning Symbol** - used in areas where there is potential for risk or injury highlighting the need for action to be taken to protect personal health.

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

### NOTE

- Conveys useful operating information and procedures.
- It is not hazard related.

- **Note Symbol** - is used to inform the operator of installation, operation or maintenance information & procedures that are important for the best ways of operating this sprayer.

The Note symbol is not hazard related.

## Operator Responsibilities

All operators of the G6 Series 2 Crop Cruiser 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 operators of this Crop Cruiser must **read all Operator Manuals** for this machine including but not limited to:

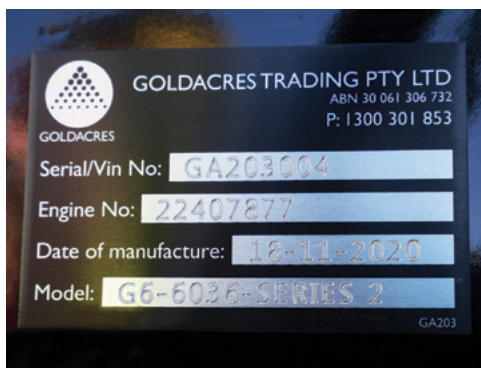
- This G6 Series 2 Crop Cruiser Operators Manual
- Delivery & Warranty Registration Manual
- G6 Series 2 Crop Cruiser Parts Manual (available online only).
- Raven Rate Control Module Operation Manual
- Other Manuals as required,

**and fully understand:**

- All risks & safety concerns
- Installation & assembly
- Pre-operation checks
- Calibration of the sprayer
- Operating the sprayer
- Sprayer lubrication & maintenance
- Use of protective clothing
- Risks of using chemicals & spraying.

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





The serial number plate located on the chassis at the front left hand side by the cabin access ladder.

## Identification & Parts Ordering

When ordering parts or requesting service information for your sprayer it is important to quote the serial number of your machine in order to receive accurate information.

The serial number plate on your machine is located on the chassis at the front left hand side by the cabin access ladder.

When ordering parts from your Goldacres dealer, please quote:

- Machine serial number
- Part number required
- Part description
- Quantity required.

The Goldacres Parts Manual (available online) includes the relevant information you need when ordering parts from your dealer.

When returning parts to a Goldacres dealer for service or repair, all parts **MUST** be cleaned thoroughly before sending them.

Dealers will not expose their service technicians to the many potentially hazardous pesticides & substances that may have been used.

Use only Genuine Goldacres parts on Goldacres equipment.

Tyre Size	Load Index	Recommended Pressures @	
		30km/hr (kPa/PSI)	50km/hr (kPa/PSI)
480/80R46	166A8/159D	240 / 35	283 / 41
480/80R50	177A8/166D	220 / 32	240 / 35
520/80R46	173A8/169D	220 / 32	180 / 26

The Crop Cruiser G6 Series 2 has three tyre options.

## Wheels & Tyres

Tyre pressures need to be checked **regularly** - **check every 8 to 12 hours of operation.**

There are many factors concerning the appropriate tyre pressure for a particular tyre and load. The many factors include:

- Tyre size,
- Rim type,
- Tyre status (driven or free rolling),
- Load,
- Speed,
- Haul length and
- Load Index.

All factors need to be considered when determining the tyre pressure.

For information on wheel maintenance please refer to Chapter 8 "Lubrication & Maintenance".

### NOTE

To identify the exact options fitted to your particular sprayer, refer to the original quotation and/or build sheet. If needed, a copy of the build sheet may be obtained by contacting your dealer and quoting your machine serial number as described above.

### NOTE

Please ensure all parts are clearly labelled with the owner's details and a brief description of the fault. Dealers are not liable for the return of any goods to a Goldacres Dealer. Goods must be returned to point of sale.

### NOTE

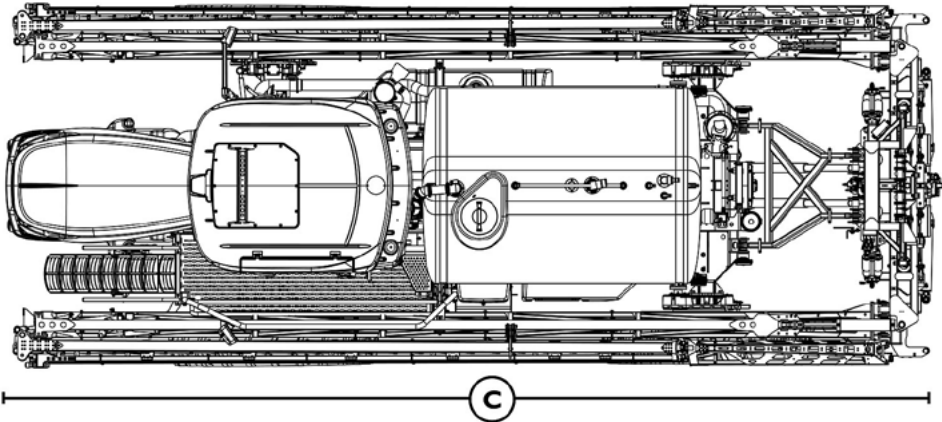
If a tyre is replaced with a different brand or size, please contact the supplier for correct air pressures to suit the load carrying capacity of this machine.

### NOTE

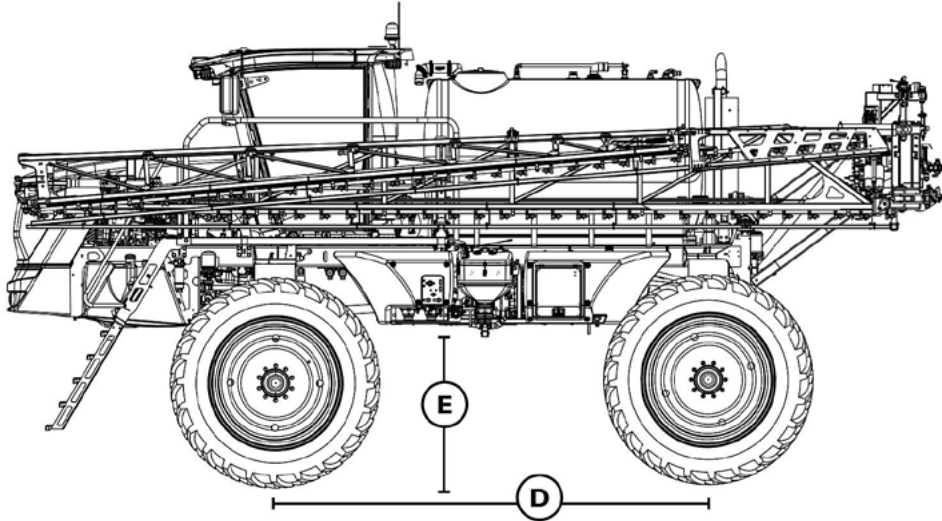
Converting Kilopascals (Kpa) to Pounds per Square Inch (PSI):

PSI = Kpa x 0.145

Eg. 282 Kpa x 0.145 = 40.9 PSI



	A		B		C	D	E
Boom Size	Height		Width		Length	Wheel-base	Ground Clearance
	Airbags Inflated	Airbags Deflated	Tyres Outside	Folded Boom			
36m	4.15 m	4.05 m	3.5 m	3.4 m	9.315 m	4.2m	1.46 m
42m	4.15 m	4.05 m	3.5 m	3.4 m	10.585 m	4.2m	1.46 m
48m	4.15 m	4.05 m	3.5 m	4.2 m	9.350 m	4.2m	1.46 m



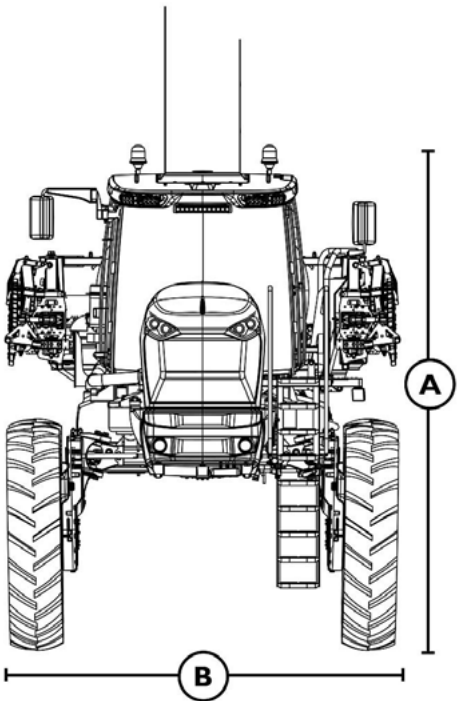
Sprayer Dimensions

The following G6 Series 2 Crop Cruiser dimensions are provided as a guide only. Variations in dimensions may occur without notification.

Dimensions show here do not include aerials and other attachments.

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

**Aerials on the roof may also need to be removed** to meet clearance requirements for over head power lines, while on the road and also in some paddocks.



NOTE

Sprayer dimension are based on 480/85 R50 tyres fitted with airbags deflated.  
Be aware dimensions given have no aerials fitted.

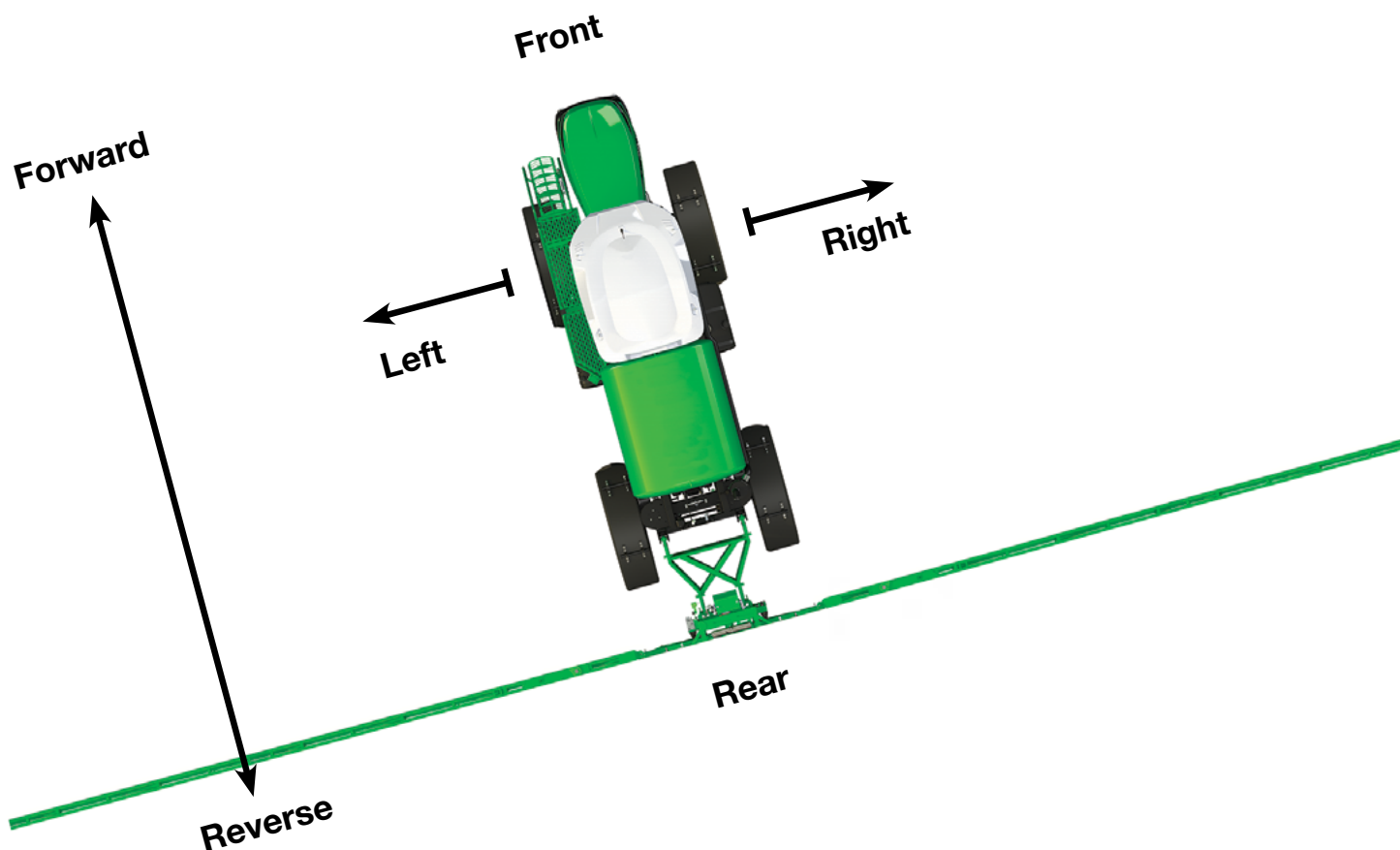
NOTE

The Crop Cruiser sprayer is approximately 4.15m in height and with aerials on the roof, can be much higher.  
Check regulations in your state for maximum vehicle height restrictions. When driving on roads it may be necessary to remove aerials to meet the required height restrictions.

NOTE

Aerials on the roof may also need to be removed to meet clearance requirements for over head power lines, while on the road and also in some paddocks.





## Sprayer Orientation

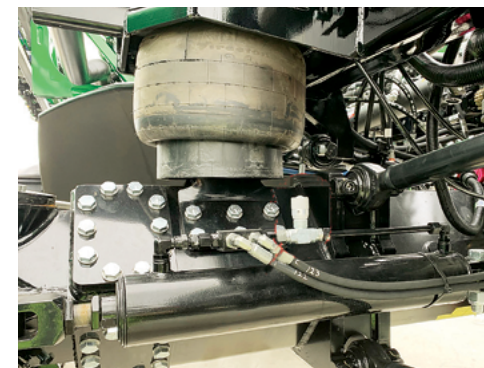
Throughout this manual instructions are given with reference to the front, rear, left and right of the sprayer including moving forward and reversing.

To avoid any confusion or misunderstandings these are given using the orientation of the sprayer as illustrated (above).

## Paint Codes

For repairs or touching up damaged paintwork use Australian Standards AS2700 codes:

- Wheels: N23 Neutral Grey
- Steel (Green): G13 Emerald Green
- Steel (Black): N61 Black



*The Adjustable Axle Track (3-4m) option.*

## Axle Driveline Options

Three Axle Drive Line options are available for the Crop Cruiser G6:

- 2 Wheel Drive (2WD) Fixed 3m Track
- 4 Wheel Drive (4WD) Fixed 3m Track
- 2 Wheel Drive (2WD) 3-4m Adjustable

Fitted with standard 480 wide wheel & tyres, the axle track setting (for each Axle Driveline option) is 2970mm on the ground. This keeps overall vehicle width to under 3500mm to comply with Australian road regulations.

Wheel track manufacturing tolerance is  $\pm 25$ mm.

If the 3-4m adjustable axle option is fitted, the wheel track can be adjusted and set from 2970mm to 3970mm.

Refer to 'Chapter 6 'Operation' for instructions to adjust & set adjustable wheel tracks.

## NOTE

Tyres wider than 480mm will increase total machine width to over 3500mm.

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Crop Cruiser G6 Series 2.

**Critical safety information to keep you free from danger, injury or death is outlined in the following pages.**

**Safety is a very high priority of Goldacres and must be for all operators. All safety and warning instructions MUST be followed to ensure the safe operation of your sprayer.**

## 1 Operator Safety

Always read and understand the operator manuals provided with your sprayer prior to its operation.

It is the responsibility of the operator to ensure there are no damaged or missing decals on the equipment and that any damaged or missing decals are replaced prior to operation.

### Training & Certification

Operational training for your sprayer will be given by your dealer or at the point of sale. If required, please ask for this training again.

Chemical certification through a local government body is recommended for all those working with chemicals.

### Not Okay to Operate!

**Do not operate** this sprayer if you are:

- Intoxicated (Never operate a sprayer while under the influence of any drugs or alcohol)
- Fatigued (Never operate a sprayer if you are excessively tired)
- Untrained (Never operate a sprayer if you are not qualified)
- Stressed or mentally unfit for work!

### First Aid

Before spraying make sure you are aware of first aid requirements relative to the chemicals being used.

Read the appropriate Chemical Safety Data Sheets( CSDS) and know the location of an appropriate First Aid Kit.

Make sure you have a first aid action plan in place whenever chemical handling/spraying.

It is recommended an appropriate First Aid Kit be kept with your sprayer.



Front cover of Australian Standard for Chemical protective clothing AS3765 publication.

### Personal Protective Equipment (PPE)

Chemicals can be extremely harmful to humans so the use of appropriate PPE when handling chemicals is essential.

Ensure the correct Personal Protective Equipment (PPE) is available & worn before using agricultural chemicals & operating the sprayer.

PPE must be appropriate to both chemicals and sprayer.

**Always refer to the chemical manufacturer's label for the guidelines on the appropriate PPE for the chemical(s) you are using.**

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

Goldacres strongly recommends 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)

### Minimum PPE

Minimum Personal Protective Equipment requires:

- Coveralls
- Elbow length rubber gloves
- Approved respirator &
- Face shield.

### Passengers

Your sprayer is equipped with one training seat with a seatbelt. To minimize the risk of injury in the event of an accident, the operator and anyone in the training seat must wear the seat belts at all times.

Any other passengers (not recommended) will not be protected by the roll-over protection system and must not be on the machine.

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

### Avoid Excessive Noise Exposure

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

Be pro-active in conservation of your hearing and wear appropriate hearing protection at all times.



*Do not operate or make alterations to the sprayer outside the guidelines or limitations given in all the manuals.*

## Machine Alterations

Any unauthorised modifications to this sprayer may affect its function and create a serious safety risk.

Any part of a Goldacres sprayer that is altered or operated outside the guidelines or limitations given may not be warranted by Goldacres for successful operation or performance.

Operators working outside standard specifications & limitations do so at their own risk, unless specific advice has been sought from, and approved by Goldacres in writing.

## 2 Chemical Safety

The safe use of Agricultural (Ag) chemicals with this equipment is the responsibility of the owner/operators. Owners & operators should be trained in the safe use of Ag-chemicals.

### Safe Chemical Usage

Agricultural chemicals can cause serious illness and even death if they are handled incorrectly or enter the body.

Risks of chemical entering the body include:

- Orally -** Drinking, splashing into mouth, eating/drinking with dirty hands
  - Never attempt to clean parts or nozzles by blowing with your mouth
  - Never attempt to siphon chemicals or substances by sucking.
- Inhalation -** Inhaling chemical vapours &/or spray droplets as Airborne Particles
  - Always stand well clear of equipment during operation
  - Any spray drift is dangerous and may be hazardous to humans & other animals.

**Dermal Absorption –** Absorption of chemical through the skin. Risks are increased if your skin is broken.

Make sure your PPE is appropriate for the chemicals to be used.

Goldacres recommends a relevant spraying course is completed by owners and operators prior to operating the sprayer.

Always read & follow chemical manufacturer's guidelines for safe application as per the chemical labels & Material Safety Data Sheets.

Particular attention should be given to the recommended target application rate of the chemical being applied as per chemical guidelines.

### Keep Operator Areas Clean

Use disposable gloves or triple rinse multiple-use gloves.

Carefully remove all potentially contaminated PPE & clothing before entering the Cabin (if applicable) to ensure no chemical enters your working environment.

If chemical contacts your body, rinse with fresh water immediately & seek medical attention.



*Personal Protective Equipment (PPE) must be appropriate to both chemicals and sprayer.*

## Chemical Handling

You should have all relevant Chemical Labels, Material Safety Data Sheets (MSDS) and technical guides available to you.

These can be found on the manufacturer's website if you do not have hard copies.

Ensure you have familiarised yourself with all documentation - including chemical labels & Material Safety Data Sheets, before opening & mixing chemicals.

Always understand the complexities of the chemical you are using, the safety measures & have an appropriate safety plan in place.

### Safe Spraying Application

Safe application starts with being familiar with the safety requirements of the chemical being used.

Be sure to familiarise yourself with all the documentation supplied with your chemical drum or shuttle before you start mixing and spraying.



*Crop Cruiser G6 Series 2.*

In addition to operator safety, it's important that the chemical being sprayed hits the target and drift is minimised.

The following conditions are generally unsuitable for spraying:

- Rain
- High winds above 15km/h
- Excessive humidity
- Cold air and low pressure systems that increase the risk of inversion

Delta T has become a widely used measure for acceptable spraying conditions with regards to temperature and humidity.

Observe all weather conditions, temperature, humidity, wind direction & speed before you start spraying & for the duration of the job.

Take all steps necessary to minimise spray drift and the risk of inversion.

If you have any doubt consult with a qualified advisor or agronomist.

## Spray Application Risk Assessment

Answer the following risk questions to assess risks & safety before spraying:

### Weather Conditions?

### Yes / No

Are winds or gusts likely to present risk of drift? .....	<input type="checkbox"/>	<input type="checkbox"/>
Are humidity and Delta T in the appropriate operating range? .....	<input type="checkbox"/>	<input type="checkbox"/>
Are weather conditions likely to change before the task is complete? .....	<input type="checkbox"/>	<input type="checkbox"/>
Have all pre-start checks been undertaken? .....	<input type="checkbox"/>	<input type="checkbox"/>
Is the sprayer in good working order? .....	<input type="checkbox"/>	<input type="checkbox"/>
Is the operator fit for work? .....	<input type="checkbox"/>	<input type="checkbox"/>
Has the operator been trained in the use of this machine & the chemicals? .....	<input type="checkbox"/>	<input type="checkbox"/>
Have all appropriate PPE items been made readily available? .....	<input type="checkbox"/>	<input type="checkbox"/>
Is the operator aware of the risks posed by the chemical(s) being used? .....	<input type="checkbox"/>	<input type="checkbox"/>

### Physical risks and the work environment

Is there any danger posed by power lines? .....	<input type="checkbox"/>	<input type="checkbox"/>
Is there any uneven terrain to be considered? .....	<input type="checkbox"/>	<input type="checkbox"/>
Is there any likelihood of untrained bystanders or children in the area? .....	<input type="checkbox"/>	<input type="checkbox"/>
Is there a first aid station nearby? .....	<input type="checkbox"/>	<input type="checkbox"/>

## Disposal of Chemicals & Containers

Flush all chemicals from the sprayer immediately after use.

When draining fluids from the sprayer, use appropriate, leak proof containers.

Do not use food or beverage containers because someone may consume the contents by mistake.

Dispose of unused chemicals & empty chemical containers in the correct manner..

For information on correct disposal of unwanted farm chemicals, visit [ChemClear.org.au](http://ChemClear.org.au) or call 1800 008 182.

Label the product for disposal and store it securely away until it is able to be collected for disposal.

Disposal must be carried out by a licensed waste disposal company or chemical collection program.





## Personal Safety

Change out of protective clothing and shower as soon as possible after working with chemicals.

Wash hands and face thoroughly before eating, drinking or smoking.

Provide clean water at all filling sites and on the sprayer in case of emergency.

Wash & clean respirators regularly & replace respirator cartridges at recommended intervals.

## Goldacres Equipment

Our equipment uses several materials that may be harmful to the environment.

Potentially harmful waste used includes such items as oil, fuel, coolant and batteries.

If disposed of incorrectly these can threaten the surrounding environment and ecology. 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 required.

## 3 Maintenance Safety

Correct sprayer maintenance is an important part of eliminating the risk of incorrect spraying applications and ensuring overall safety.

Always maintain the sprayer to ensure it is in good working order for its next use.

Keep the sprayer clean - inside & out to minimise wear and allow easier recognition & identification of problems that might arise.

### Hydraulic Inspection, Adjustment & Repair

Periodic inspection & assessment of hydraulic systems and especially hoses is recommended and should include:

- 1 The age of hoses
- 2 Condition of hose fittings
- 3 Rub marks and potential wear points from hose contact
- 4 Unexplained hydraulic oil leaks
- 5 Excessive corrosion of fittings

If any faults are found, do not operate the machinery until the issues have been rectified.

Where practicable, all inspections and maintenance/servicing work should be conducted by a person competent in hydraulics systems and maintenance, including testing & commissioning.

Maintenance and routine checks should be conducted to ensure adequate hydraulic fluid levels and filter cleanliness are fully maintained.

Manufacturer's recommendations should be adhered to as excessive or inadequate fluid levels can cause system failure and present serious risks.

### Injury Risks

Encumbent with all sprayer maintenance is the risk of injury from:

#### Cuts, Stabs & Punctures:

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

### Crush Hazards:

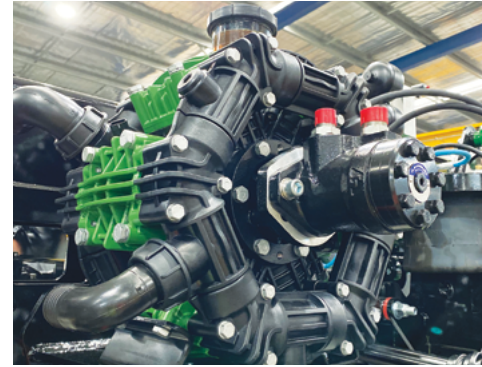
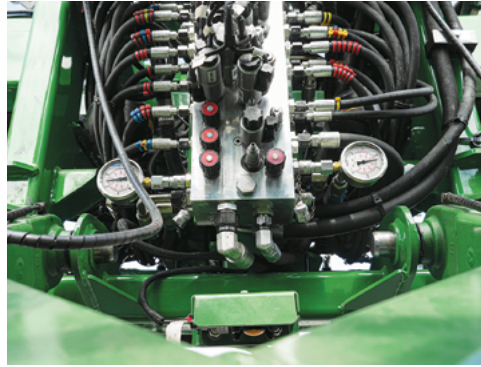
- Never attempt maintenance on axles, wheels or components within the vicinity of the wheels with the engine running.
- Never attempt to do maintenance under any hydraulically raised boom or structure.

### Pinch Hazards:

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

### Burn Hazards:

- Hydraulic oil increases in temperature with pressure and use
- Components may be very hot to touch and could result in contact burns
- Oil leaks may spray hot oil and cause eye injury & burns
- Avoid any contact of the entire exhaust system of the machine when at operating temperature



- Avoid contacting the hydraulic tank and all hydraulic lines when at operating temperature.
- Full coverage clothing minimises the risk of oil burns and is recommended with this type of equipment.

### Injection Injury

- Injection injuries occur when a jet of hydraulic fluid pierces the skin and enters the blood stream.
- This may occur if a hydraulic line is pierced or damaged. Be aware that injection injuries are extremely dangerous and have the potential to cause death.

### Hose Whip/Striking

- Hose whip or striking injuries may occur when an unrestrained hose releases oil pressure quickly causing whipping back & forth until the oil and energy is fully released.
- The most common point for failure in a hydraulic hose is at the fittings, where corrosion and stress related damage is most likely to occur.

### Fluids Under Pressure

Fluids escaping from high pressure lines can cause serious injury to skin. High pressure hydraulic oil can easily penetrate human skin.

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.

Pressure in the fluid lines must be released before any maintenance is undertaken.

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.

Such equipment poses two major risks:

- Equipment may easily cut through lines
- Heat generated may cause line to rupture and/or burn.

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

### Pumps, Pressure Lines & Valves

It is important that the liquid flow systems of this sprayer are understood and well maintained because liquids under pressure create serious risks of injury.

Pressurised spraying and hydraulic systems operate at pressures up to 20 bar (284 psi) for spraying and (3000 psi) for hydraulics.

To avoid risks of injury, it is important to:

- Read and understand the operator's manual
- Never undo fittings, cut hoses or carry out maintenance when a pump is running or when a system is under pressure
- Do not exceed maximum pressures as stated in operators manual.

### Coolant filling instructions

1. Before filling, ensure heater hose taps are open.
2. Turn key on, but leave engine off.
3. Turn heater on.
4. Fill header tank at 13 l/min.
5. Turn engine on and run at idle for 5 minutes.
6. Top up header tank as required.

**Total system volume 42L**

GA8701219

### Cooling System

At operating temperature, liquid in the cooling system is under pressure. Only remove the radiator cap when the engine is turned off and the engine has cooled down.

Loosen the radiator cap slowly to relieve the pressure before removing the cap completely.

Coolant should be added only when the engine is cool and turned off.

### Stored Energy Hazard

Even when a machine is not running, energy can be stored in components such as hydraulic accumulators, air tanks, tyres, air conditioning hoses and springs.

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.

### **CAUTION**

When adding engine coolant following filling instructions:

- Be sure the engine has cooled down (not hot).
- Before adding coolant, ensure the engine Off.

Failure to follow instructions can result in injury.



## Batteries

The sprayer is supplied with sealed, non-serviceable batteries.

The battery electrolyte contains sulfuric acid which is an highly dangerous liquid. Batteries therefore should be handled with the greatest degree of care. Sulfuric acid can cause blindness, burn skin and dissolve clothing.

Batteries also produce flammable hydrogen gas (especially when charging), so keep them separated from any sources of sparks & flames.

An operator can avoid these hazards by:

- Wearing the correct personal protective equipment
- Avoid spilling or dripping electrolyte
- Place the battery into a plastic collection tray ready for disposal if its case is found to be damaged.

## Emergency Procedure

If an electrolyte gets in your eyes, flush your eyes with clean water for at least 15 minutes, then get immediate medical assistance.

Also thoroughly wash all other affected areas on your body with water & remove all clothing. If you swallow any electrolyte seek medical attention immediately.

## Lifting a Sprayer

Before raising a sprayer off the ground:

- Ensure that the boom is in its closed position.
- Park on a flat level, firm area and engage the park brake.
- Empty the spray tank where possible.
- Chock all wheels that remain on the ground.
- Securely lift the sprayer 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 machine 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 the machine 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. Rapid inflation of a tyre may cause separation and/or explosion of the rim. Such an event can inflict serious or fatal injuries to the operator or close bystanders.

Always use a tyre inflation gauge.

Be pro-active and continually check the condition of your tyres during operations.

Do not weld, heat or modify a tyre rim.



*Never get underneath a suspended machine or suspended part of a machine.*

## Working Heights above Ground

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

Do not climb on machine to get access. There is a risk a falling if a person has climbed onto the machine.

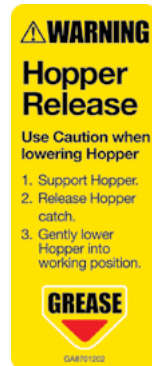
Use ladder or work platform to get access to parts or areas of the machine above local government restrictions.

## Working On or Underneath the Sprayer

When working on or underneath a sprayer, always take measures to make sure that the sprayer cannot move.

Never get underneath a suspended machine or suspended part of a machine.

If you must work under the machine ensure the machine or machine part is solidly supported.



### Slippery Surfaces

The surface of the sprayer platform has raised portions to minimise the risk of slipping.

Keep platform surface clean of mud and other material to avoid risks of slipping.

### Main Spray Tank

**Danger** – The main spray tank is a confined space and you must not enter because the lack of oxygen and chemicals can cause asphyxiation and death..

Do not enter the tank for any purpose.

### 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 a machine with covers, shrouds, or guards removed.

### Decals

Decals are an important part of making operators aware of risks and correct operations.

Understand the safety decals and their purpose to assist the safe operation of your machine.

It is the responsibility of the owner operator to replace damaged and/or missing decals.

All decals on the sprayer must be maintained in good order and replaced if damaged or missing.

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

Decals have a part number to assist in their identification & replacement.

Replacement decals can be ordered from your Goldacres' dealer.

Part numbers and descriptions of the decals on this machine can be found on the Goldacres website.

### Safety Guards

All safety guards should be replaced if damaged to ensure that risks of injury are controlled as intended.

Some examples of safety guards includes fan blade guards, PTO guards and hydraulic hose covers.

### Exhaust Fumes

Diesel engine exhaust fumes are harmful and can cause severe sickness or death.

If it is necessary to run the engine in an enclosed area use an exhaust pipe extension.

If an exhaust pipe extension is unavailable ensure that all doors are fully open and the room is very well ventilated.

### Refuelling

Handle fuel with extreme caution.

Do not refuel the machine while smoking or near open flames or sparks.

Always stop the engine before refueling.

To prevent fires always keep the machine clean of grease, debris and dirt.

Do not use electronic devices when re-fuelling.

### Before Operating

Inspect all equipment thoroughly for damage and wear before operating.

Lubricate the sprayer as recommended before operating.

### Reversing

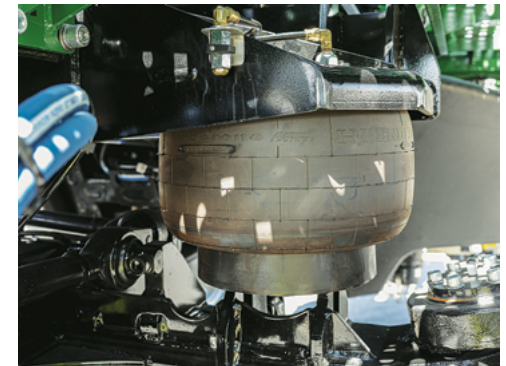
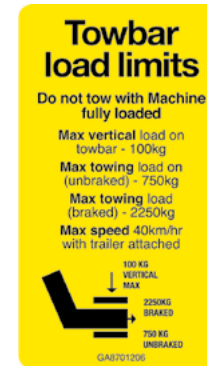
The machine is fitted with a reverse warning beeper and a reversing screen (camera) when the machine is put into reverse.

Be vigilant and aware of bystanders and other obstacles when attempting to reverse.

### Sprayer Lighting

Keep lighting and signs in good order and replace any damaged or faulty fixtures.





Deflate the air-bag suspension system for more load stability when loading & transporting the sprayer.

## 4 Transport Safety

Check the wheel nut tension on a regular basis, especially before and when travelling on roads.

The torque and inspection frequency is outlined in the maintenance section.

Brake performance should be checked regularly. The inspection frequency is outlined in the maintenance section.

Always ensure that the boom is securely supported when travelling on roads.

### Collision Risk & Warning Lights

Before driving the sprayer check with the relevant road management authorities for information regarding safe and legal transport on public roads in the state where the machine is being operated.

To assist in the prevention of collisions with other road users the sprayer is fitted with warning lights and signs in accordance with national road regulations.

### Public Roads

In your locality there may be special vehicle licencing conditions that govern the use and movement of your self-propelled sprayer.

Check with relevant government authorities for the relevant road laws in your area (these can vary from area to area). It is the responsibility of the operator to know these laws.

Depending on the width of the machine, a pilot or escort vehicle may be required. Any wide vehicle must display an "Oversize" sign.

Most self-propelled sprayers driven on public roads have requirements for flashing lights.

Make sure the sprayer complies with all relevant road regulations before travelling or transporting on public roads.

Always follow the laws requiring pilot vehicles, escorts and signage when traveling with oversized loads.

Even if a pilot vehicle is not legally required, if vision or manoeuvrability is limited, it is strongly recommended that an escort accompanies the equipment for road transport

Always ensure a vehicle load does not exceed loads allowed for the towing vehicle (consult operators manual).

Where possible travel with your sprayer and tow when tanks are empty or near empty.

This sprayer can only be driven on public roads during daylight hours. However, there are some exceptions for night driving. Always check for your locality.

Always use safety chains when towing a trailed vehicle.

### Towing the Sprayer

A disabled sprayer must not be towed unless the engine is running (as the steering and brakes require engine power to operate).

Before towing, front & rear tail shafts should be disconnected due to the risk of damage to the transmission.

While towing do not travel at a speed greater than 10 Km/h.

An operator must be in the cabin to steer and brake the sprayer under tow.

The park brake must be manually released if engine is not able to run. Refer to Chapter 8, Service & Maintenance for instructions.

### Transporting the Sprayer

A disabled sprayer is best transported on a drop deck trailer.

Use chains to secure the machine via the tie down attachment point located under the front and rear axles.

### Loading & Unloading

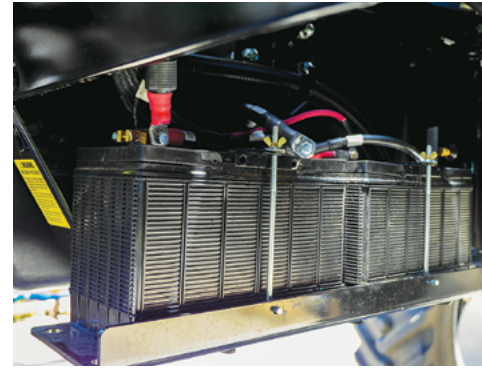
Off loading a sprayer from a truck is an especially dangerous task. Similarly, loading a sprayer onto a truck.

This is not a one-person job and must be performed by people qualified for the task at hand and with equipment of sufficient capacity.

When loading onto a truck, always use the tie downs point provided.

Deflate the sprayer air-bag suspension system to provide more load stability.

Secure all components of the sprayer that might come loose or move during transport.



## 5 Operating Safety

### Ladders & Steps

Ladders present a number of risks to an operator. Therefore use them appropriately.

Not all ladders are configured the same. Familiarise yourself with the steps, handles, rails of your ladder.

Be mindful of wearing appropriate, enclosed foot wear with good grip when operating a sprayer and working with chemical.

### Diaphragm spray pump

Care should be taken to never overfill a diaphragm pump with oil or operate at speeds exceeding 540 rpm.

### Centrifugal spray pump

Running the pump dry will cause failure.

Care should be not to operate at speeds exceeding 4200 rpm.

Do not exceed the maximum spraying pressure of 8 Bar.

### Electrical Safety

Only qualified persons should disassemble or service electric components of the sprayer.

If an electrical device or accessory is supplied with a three-pronged, earthed plug, ensure it is used correctly with a compatible earthed 240V power source.

Electrical looms should be checked on a regular basis for fraying and any signs of wear, damage or defects.

Do not use an electrical device in or near an area where it may fall or be pulled into water, other liquids or in the rain.

Do not touch an electrical device that has fallen into water.

In case of an electrical fire, shut off the power and use a suitable fire extinguisher.

Never use water to put out an electrical fire. Water used on an electrical fire may result in fatal shock.

### Battery Safety

Lead acid batteries generate flammable and explosive gases. Keep sparks and flames away from batteries. Injury or death can occur.

When disconnecting the battery, do not ground out the (red) positive side of the battery as electrocution or shock can occur.

Wear safety goggles or a face shield when inspecting or cleaning lead acid batteries.

If acid enters an eye, immediately flood the eye with running water for at least 15 minutes. See a doctor as soon as possible.

If acid contacts the skin, wash the affected area immediately with plenty of water.

Smoking or naked flames should never be present in battery area.

Be aware that poor connections to a battery may spark and be an ignition source for a fire.

### Battery Jumper Lead Tips

If it is necessary to use jumper leads, it is important to follow the correct procedure.

Improper jumper cable connections can cause an explosion resulting in personal injury.

Ensure the donor battery is the same voltage as the Goldacre 12V system if a battery is flat.

If vehicles are involved, make sure the vehicles are in either Neutral or Park, with the handbrake on and/or have the wheels chocked. Ensure the vehicles are not touching.

Then follow this procedure:

- 1 Select the clamp of the red positive (+ive) jumper lead and attach it to the positive terminal on the dead battery.
- 2 Select the other end of the red positive (+ive) clamp and secure it to the positive terminal on the good battery.
- 3 Select one end of the black negative (-ive) jumper lead and attach it to the negative terminal on the good battery.



- 4 Select the other end of the black negative (-ive) clamp and connect it to a spot of clean, unpainted metal part of the dead vehicle but not near the battery.
- 5 Disconnect the jumper leads in the reverse order of connection.  
  
Remove the black negative (-ive) lead from the grounding point, then from the donor vehicle.

## Hydraulic Safety

Hydraulic systems used on the Crop Cruiser include hydraulic cylinders, motors, pumps, manifolds, accumulators and oil coolers.

Various hydraulic hoses, fittings and couplings used are all specific for purpose and rated to take the pressures used in the system.

Hydraulic system components are sometimes operated at very high pressures and temperatures.

For these reasons it's very important that the operator be familiar with the functions and limitations of the system.

Read and understand the operator's manual carefully before operating any of the sprayer's hydraulic systems.

## Connecting Hoses

Hydraulic systems are colour coded to aid in correct identification of hydraulic hoses.

Always double check hose connections, after maintenance work, especially the return line.

Failure to properly connect the return line will result in "dead heading" the system and can lead to a pressure failure.

Refer to the sprayer operator manuals for full details.



**CAUTION  
HOT EXHAUST**

## Engines

Be aware of warning labels on your engine which highlight operating risks.

Risks include:

- Burns from hot engines and exhausts
- Fire while filling an engine with fuel or flammable material contacting a hot exhaust
- Entanglement in belt-drive components and moving parts.
- Carbon monoxide poisoning from operating an engine in an enclosed space

To minimise risk:

- Do not touch hot exhaust and engine components.
- Do not refuel engines near naked flames or ignition sources. Be especially vigilant when refuelling the engine.
- Always clear away flammable materials (such as dry grass) that might come into contact with the engines exhaust.

- Do not wear loose clothing when operating equipment.
- Keep hands well away from moving parts.
- Do not operate the engine in an enclosed area.

Be aware of the risk of fire due when flammable materials are present.

Keep firefighting equipment nearby if necessary.

Always follow the engine manufacturer's instructions.

## Hydraulic functions

Hydraulically controlled moving parts should never be touched whilst in operation.

Hydraulically controlled components should be isolated and released of any hydraulic pressure before they are worked on or serviced.

This applies to all hydraulic cylinders.





### Working with Fans

Cooling fans for the engine and oil systems simply move air to cool liquid.

It is vital all supplied guards remain in place and are replaced if damaged or fatigued.

Be mindful the air inlet side is often the most dangerous side because the suction created by fans can quickly and unexpectedly pull in hands, hair or objects such as loose clothing or tools.

On the downwind side of a fan, the most common danger is loose objects being propelled at high speed.

Serious injury or death may occur if the warnings below are not followed:

- Keep body parts and loose objects away from rotating fans
- Never try to adjust or clean the fan while it is engaged and operating
- Never allow untrained personnel or children near the fans while in operation
- Always ensure fans are stopped completely before repairing, cleaning or inspecting fans.

**Diesel only**

DIESEL TANK FILL POINT

**Battery Isolator**



STOP ENGINE BEFORE  
SWITCHING TO "OFF" POSITION

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### Boom Height Control System

If a boom height control system is fitted, keep clear of the boom as it could potentially move without notice.

### Bogged Sprayer

The Goldacres mechanical drive system delivers efficient, positive power to the ground for superior traction.

If your sprayer becomes bogged and the wheels subsequently locked, **do not engage first gear and maximise engine revs.**

With the wheels 'locked' in a bog situation, transmitting full power **WILL DAMAGE the driveline.**

Goldacres strongly recommends that bogged sprayer's situations are addressed prudently by **using the assistance of a tow vehicle.**

Failure to heed this advice and doing otherwise can cause significant driveline damage and **VOID WARRANTY.**

### Operating Tips

- 1 Before leaving the sprayer the engine must be shut off, the transmission placed in neutral and the park brake engaged.
- 2 **Never engage the Park Brake while the sprayer is moving.** Damage to the transmission may result.
- 3 When leaving the machine always isolate the batteries by turning the isolator key off and removing the key.
- 4 A supply of fresh water should be maintained on the sprayer at all times.
- 5 Water tanks are not designed for use with diesel fuel or any other flammable liquid.
- 6 Do not use this machine in ambient temperatures exceeding 40 degrees Celsius.
- 7 Ensure that all bolts are tightened and secured before operation.





Take notice of warning signs for overhead power lines.

<p><b>⚠ WARNING</b></p> <ul style="list-style-type: none"> <li>Do not stand on the access platform when the sprayer is in motion.</li> <li>Do not enter main product tank or climb on main product tank.</li> <li>Do not lift sprayer with jack unless the main product tank is empty.</li> <li>Always support the sprayer with a suitable stand if removing the wheels.</li> <li>Induction Hopper must be raised and locked into position when sprayer is moving. Do not store chemicals in induction hopper.</li> <li>Use relevant safety protection clothing and equipment (PPE) when handling chemicals. Refer to chemical manufacturers label for requirements.</li> <li>If operated incorrectly this machine could cause serious injury or death. Read the operators manual for all safety procedures.</li> <li>Check wheel nuts daily.</li> </ul>	<p><b>DANGER</b></p> <p><b>KEEP CLEAR OF OVERHEAD POWERLINES, CONTACT CAN CAUSE DEATH. CHECK THE HEIGHT OF THE SPRAYER BEFORE TRAVELLING UNDER OBSTACLES.</b></p> <p><b>⚠ Whenever you see this symbol it means</b></p> <p>Warning be alert your safety may be involved. The information below explains these and other items requiring your attention. Read the important information below before operating the sprayer. If in doubt consult operator's manual.</p>	<p><b>⚠ CAUTION</b></p> <ul style="list-style-type: none"> <li>Do not fold booms whilst the sprayer is moving. Ensure booms are lowered on the boom rests before moving. Always raise booms off boom rests before unfolding.</li> <li>Keep bystanders clear when opening booms.</li> <li>The water contained in the rinse water tank is not suitable for drinking.</li> <li>Before working under the boom, close the hydraulic taps at the bottom of the lift cylinders and place stands under the boom wings.</li> <li>Flush chemicals from the sprayer after use.</li> <li>To avoid boom damage. Speed must be reduced when directional changes are made.</li> <li>Drain the air tanks daily.</li> </ul>
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Be aware of unsafe & safe distances from power lines.

## 6 In-field Safety

Each paddock or field presents its own risks which must be assessed correctly to ensure safe spraying application.

### Sloping or Uneven Ground

Operating machinery on sloping or uneven ground creates risk of machine roll overs.

There is also a risk of towed vehicles sliding and/or pulling the towing vehicle sideways.

Always be aware of the ground conditions and grip levels of both personal footing and the sprayer.

When operating the sprayer:

- Slow down for slopes exceeding 10 degrees
- Do not operate on slopes exceeding 15 degrees
- Slow down when operating the sprayer on irregular or uneven country.

Pay special attention to ground surface conditions while operating as these will vary throughout the area and the duration of the work.

Be especially mindful when turning corners on sloping ground. Due to forces involved when turning corners it's very easy to exceed safe operating limits.

### Hazard identification

#### Power Lines

Operating the sprayer too close to power lines can have serious consequences. The operator is responsible to maintain a safe distance from powerlines and its supporting structures.

Keep in mind a sprayer with a high potential to conduct electricity such as a wet spray boom does not need to touch a power line for it to arc down through the sprayer to reach the ground.

Minimum safe distance from power lines, for equipment or operators will vary from 1 to 6 metres depending on the transmission voltage (240 to 220,000 volts).

High humidity and dusty air will increase the danger of high voltage power lines.

Turn off automatic height control systems when under a power line to avoid the boom unexpectedly lifting up.

Changing weather conditions such as high temperatures will cause lines to sag & high winds will cause lines to move - changing the position of the power cables.

See your local authority for further information.

<https://www.safeworkaustralia.gov.au> has useful, comprehensive information as do most state safety offices.

Most Shires or Councils can assist with risk assessment and how to best manage the risk of power lines.

#### Large booms

The end of large booms can be difficult to judge whilst spraying.

Be mindful hitting power poles, trees or other objects with boom tips because this can cause damage to the boom, the power pole as well as risking electrocution.

## Potential Risks

- Proximity of the work to the overhead power lines and the height of the overhead power lines.
- Environmental conditions, such as rain, wind, high humidity and uneven terrain may bring an increased risk.
- Visibility of the overhead power lines and their supporting structures.
- Location of overhead power lines and supporting structures such as poles & towers.
- Frequency of work to be done near overhead power lines.
- Proximity of operating plant and equipment to the overhead power lines.
- Boom lift &/or tilt & radio antenna may be in danger of striking power lines.
- Walking on the sprayer platform may put you in danger of electrocution when near power lines.



### Control measures

Once the risks and hazards of spraying near overhead power lines have been assessed, control measures should be taken to eliminate the risks.

- 1 Using a spotter to decrease the risk of striking the power lines accidentally.
- 2 Planning a different travel/spray route so the sprayer does not travel close to the power lines.
- 3 Use barriers or fences, if possible, so that no one can drive in the high risk areas identified.
- 4 Where practical have low lying power lines replaced with lines underground.
- 5 Do NOT walk on the machine platform when near power lines.
- 6 Do NOT use boom lift &/or tilt and radio antenna near dangerous power lines.

A combination of these control measures is recommended as best practice.

Keep clear of overhead obstructions, especially power lines, as contact can be fatal.

### Chemical & Water Densities

Care should be taken when transferring liquid into the sprayer tank to ensure the gross weight of the vehicle does not exceed the specified safe braking and carrying capacity of the vehicle.

**1 Litre water = 1 Kg.**

Water weighs 1kg per litre. However conversion factors must be used when spray liquids are heavier or lighter than water.

For example: Liquid nitrogen has a density of 1.28 kg/L. It will therefore significantly increase vehicle load if the tank were to be filled completely, ie, 6000 litres of water weighs 6000kg. 6000 litres of liquid nitrogen weighs 7680kg. 6000kg of liquid nitrogen is only 4687.5 litres.

**The total weight of a tank full of chemical, should not exceed that of a tank full tank of water only.**

Sprayer damage can result if the vehicle is over-weight.

For more information, refer to Chapter 6 'Operation', 'Filling the Sprayer' instructions.



### Operating & Travelling Speed

Check with Goldacres' specifications and follow the instructions for operating, transporting and/or towing.

Ensure that the maximum speed of the vehicle, when loaded is within recommended limits.

The sprayer is designed for a maximum speed of 50 km/h. This speed must only be used with suitable terrain & conditions.

All components i.e. tyres, brakes, suspension, steering and chassis are designed and built this for maximum speed.

However, high speed turning places severe stress on the wheels and axles and should be avoided.

It is also essential to be aware of the stresses of turning impose on an open spray boom.

**Excessive turning speeds** transmit great stresses to the spray boom and **will cause boom damage.**

**Maximum speed** when cornering or turning **at an angle greater than 45° or driving on a slope or uneven terrain is 5km/h.**



**Modification** of the sprayer to increase maximum speed is **Strictly Prohibited.**

When fitted with narrow wheel track with high centre of gravity, the machine may become unstable when turning at excessive speed or when operating on excessively steep terrain.

Do not ride on the sprayer when moving.

Stand well clear of sprayer when operating.

Ensure equipment is securely fastened or attached to vehicle at all times

Never stand within the radius of the boom wings.



## Opening & Closing Booms

Be attentive to opening, closing & parking of hydraulically controlled booms at all times:

- Always check for clear and available space before operating booms
- Be especially vigilant of bystanders or power lines
- Regularly check for loose or damaged structures or components. These can be snagged or fail during operation
- Be sure a folded boom is properly positioned and locked into position before driving. A loose boom arm can be very dangerous.
- Be aware that in opening or closing a boom, it also changes the weight distribution of a sprayer
- Never allow the boom to be operated by untrained personnel.

## Transporting the Cruiser

### 1 Loading onto a Truck

Before loading:

- Rinse & drain product tanks
- Fold the boom & close the boom lift cylinder taps
- Strap the booms ends in
- Remove cabin roof beacons & antennae.

Drive the Cruiser onto the truck, then:

- Release air pressure from the airbags by opening the dump valves & air drain valve
- Fasten the Cruiser with chain to all tie-down points.

### 2 Unloading

Before unloading:

- Remove tie-down chains
- Check airbag dump valves & the air drain valve are closed
- Inflate the airbags.

Drive the Cruiser off the truck, then:

- Remove the boom tie-straps
- Refit the cabin roof beacons & antennae
- Open the boom lift cylinder taps
- Check the product tank drain valves are closed.



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## Know Your Cabin

Learn all of the Cabin controls for safe and efficient sprayer operation.

Cabin controls are identified (right) with a reference page shown for further information and operating instructions.

**Front Sunvisor Guides**  
- refer P. 35

**Pressure Gauges**  
- refer P. 35

**Multifunction Lever:**  
- Horn  
- Windscreen Wiper  
- Windscreen Washer  
- Right Turn Indicator  
- Left Turn Indicator  
- High/Low Beam  
- Headlight Flasher  
- refer P. 33

**Steering Column**  
- refer P. 32

**Foot Rest**  
- refer P. 34

**Foot Brake & Accelerator**  
- refer P. 34

**Overhead Console**  
- refer P. 36

**Rear Vision Mirror (RHS)** -  
refer P. 36

**UHF Two Way Radio**  
- refer P. 35

**Controller Screens - Optional**

**Cup Holder**  
- refer P. 35

**Ignition Switch / Rear Corner Console**  
- refer P. 34 & 36

**G-Hub Touch Screen**  
- refer P. 42 & 47

**Armrest Control Console** -  
refer P. 42

**Joystick Controller**  
- refer P. 43

**Operator's Seat**  
- refer P. 30



*Cabin photo - information on each item (shown above) is given on the following pages using the item heading).*





Cabin photo - information on each item (shown above) is given on the following pages using the item heading).

## Your Sprayer at a Glance - **Cabin**



The folding stairway & walkway platform provide cabin access.



Use the stairway & walkway platform to enter the cabin. Understand its Warning decal before operating.



Use the cabin's external lockable door handle to open the cabin door.



Squeeze the door handle lever to open the cabin door latch, then push the door handle to open the door.

### Folding Ladder

Entrance to the cabin is via a folding ladder which is pneumatically:

- Raised for transport & spraying.  
It is lifted up to its transport position only when the ignition key is on and the park brake is released.
- Lowered into position when parking.  
It is lowered into park position only when the park brake is applied &/or the ignition key is turned off.

The operator must take extra care applying & releasing the park brake to ensure no person is standing on or near the folding ladder.

In emergency, the ladder can be lowered by applying the park brake, turning off the ignition or removing the supply hose from the air cylinder.

### Entering the Cabin

To enter the cabin:

- 1 Carefully climb up the lowered ladder - retaining three points of contact with the steps and rails at all times.  
Understand the implications of the Warning decal (located on the step) before operating the sprayer.
- 2 Walk along the walkway platform, past the cabin door.

- 3 Unlock the door (if locked) & open the door to enter the cabin.
- 4 Close the door after entering by firmly pulling the door handle inwards.

The steps and walkway platform must be kept clean from mud & other substances that may cause a person to slip and incur injury.

Always wear appropriate footwear and clothing to ensure easy, safe movement in and out of the cabin.

### NOTE

The cabin door will open wider if the left hand boom rest is in its outer position.

### Exiting the Cabin

To exit the cabin:

- 1 Squeeze the door handle lever to release the cabin door latch.
- 2 Use the door handle to push the door open and exit the cabin
- 3 Once out of the cabin, close the cabin door and walk along the walkway platform to the ladder stairs.  
Always lock the cabin door if finished & leaving the sprayer.
- 4 Carefully climb down the lowered ladder - retaining three points of contact with the steps and rails at all times.

### ⚠ WARNING

The operator must take extra care to ensure no person is standing on or near the folding ladder when applying or releasing the sprayer's park brake (as folding is started by releasing & unfolding is started by applying the park brake). Failure to follow instructions may cause serious injury.

### ⚠ WARNING

## Keep clear folding ladder

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### ⚠ CAUTION

Care must be taken climbing the ladder:

- Always face the ladder and
- Retain three points of contact with steps & rails at all times when ascending or descending the ladder.

Failure to follow these instructions may cause injury.

### ⚠ CAUTION

To prevent injury to individual operators, all seat settings for position, weight, height and comfort must be adjusted and checked for each operator before driving.  
All adjustments must be made while the vehicle is stationary. Failure to follow these instructions may result in injury.



## Cabin Seats

The cabin is equipped with an Operator's seat and a fold-up Training seat.

### Operator's Seat

The Operator's Seat has its own air compressor - operating as soon as the ignition is On. Adjustments are shown right.

To make adjustments:

#### 1 Fore/Aft Adjustment Lever

First release the Fore/Aft Locking lever (2).

Then lift the Fore/Aft Adjustment lever (1) & slide the seat back or forth to the position desired.

Finally, lock the seat into position with the Fore/Aft Locking lever (2).

#### 2 Fore/Aft Locking Lever

Releasing the lever enables Seat Fore/Aft Adjustment (1) and engaging the lever locks the seat to its desired position.

#### 3 Seat Height & Weight Adjustment Weight Adjustment

The seat must be adjusted for the driver's weight by briefly pulling the actuator lever of the automatic weight height adjuster with the vehicle at a standstill and the driver sitting on the seat. The driver must sit absolutely still during adjustment.

To avoid injury to individual operators, all seat settings for the operator's weight & comfort must be checked and adjusted for each operator before driving.

#### Height adjustment

With ignition key On, seat height is set pneumatically & is continuously adjustable.

Adjust seat height by pulling or pushing the adjustment lever fully up or down.

Lift the lever to raise the seat (air is pumped into the airbag suspension).

Push the lever down to lower the seat (air is release from the air bag).

If the adjustment reaches the top or bottom endstop, the height is adjusted automatically in order to guarantee a minimum spring travel.

To avoid mechanism damage, do not operate adjustment lever/compressor for more than 1 minute at a time.

#### 4 Absorber Lever

The Absorber Lever setting of the seat can be varied to suit the on & off-road driving conditions. The cushioning effect can be individually adjusted for this purpose.

Turn the lever to the desired position & release: 1- Soft 2- Medium 3- Hard.

#### 5 Lap Seat Belt

Clip the Lap Seat Belt into position whenever seated in the cabin.

#### 6 Seat Tilt Lever

Lift the Seat Tilt Lever to tilt the back of the seat forward or rearward to suit, then release the lever to lock it into position.

#### 7 Armrest Height Adjustment

Both armrests can be folded up if required & armrest height individually adjusted.

To adjust armrest height, remove the round cap, then loosen the hexagon nut (13 mm) and adjust the armrest to the desired height (5 steps). Tighten the nut (25Nm) & replace the cap into the nut.

#### 8 Lumbar Adjustment Knob (behind seat)

By rotating the Lumbar Adjustment Knob left or right, both the height & curvature of the backrest cushion can be adjusted to increase operator's seating comfort.

#### 9 Armrest Inclination Adjustment

Each Armrest Inclination can be altered by turning its adjustment knob.

Rotating the knob outward, lifts the front part of the armrest. Rotating the knob inwards, lowers the front of the armrest.



Location of the Operator Seat settings (refer to numbered information & headings on this page for instruction).  
All position, weight, height & comfort adjustments must be made before driving.

#### 10 Seat Pan Angle Adjustment

Pull the Seat Pan Angle Adjustment Lever upwards and exert pressure on the front or rear part of the seat pan to move the seat pan into its desired position, then release the lever to lock its position.

#### 11 Seat Cushion Depth Adjustment

The Seat Cushion Depth can be adjusted. To adjust the seat cushion depth, pull the right handle upwards, then by moving the seat cushion backwards or forwards the desired cushion position can be reached. Release the lever on completion.



The cabin is equipped with an Operator's seat (left) and a fold-up Training seat (right - folded up).

### Training Seat

The Training Seat is fitted with a lap seat belt which must be worn at all times when operating with a trainee or passenger present.

A storage area/fridge option facility is directly underneath the training seat. It is easily accessed by lifting up the training seat, then lifting the storage area lid.

The Training Seat with the lap seat belt (shown left) and underneath, a storage area/fridge option facility (shown right).



### Steering Column

The Steering Column provides three adjustments to quickly & easily position the steering wheel for the operator.

#### 1 Foot Lever - Fore/Aft Column Adjustment

This adjustment allows the steering column to be quickly moved forward or rearward as required.

To make adjustment:

- While sitting in the operator's seat, hold the steering wheel with both hands, press the foot lever downwards (left hand side column base) with your foot to release the column lock.
- With the foot lever pressed down, move the steering column with your hands **forward or rearward as desired**.
- Release the foot lever to lock the steering column in the desired position.

Use the Foot Lever Fore/Aft Column Adjustment to quickly & easily move the steering wheel away for exiting and entering the operator seat.



Steering Column/Steering Wheel Adjustment points (refer to numbered information & headings on this page for instruction).

#### 2 Tilt Lever Adjustment

This adjustment further refines the closeness and angle of the steering wheel for operator comfort & steering efficiency.

To make adjustment:

- While seated in the operator's seat with the Foot Lever Fore/Aft Adjustment completed, hold the steering wheel with your right hand and use your left hand to lift the Tilt Lever upwards to release the tilt adjustment lock.

- With the Tilt Lever held up, move the upper steering column & steering wheel to the desired position.

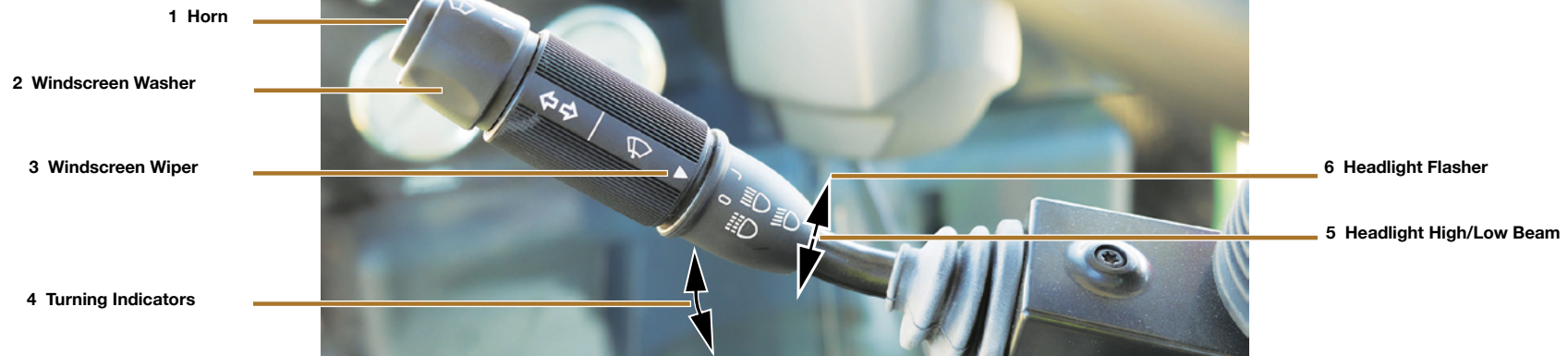
- Release the Tilt Lever to lock the upper steering column in the desired position.

#### 3 Steering Wheel Height Adjustment

This adjustment allows the height of the steering wheel to be raised or lowered to suit the operator.

To make adjustment:

- While seated in the operator's seat, hold the steering wheel with one hand and with other hand, grasp the steering wheel Centre Cap & rotate it 90 degrees anti-clockwise (quarter turn) to unlock the height adjustment.
- Now lift or lower the steering wheel to the desired height.
- Grasp the steering wheel Centre Cap again & rotate it 90 degrees clockwise (quarter turn) to lock the desired steering wheel height.



## Multifunction Lever

The Multifunction Lever is located on the left hand side of the steering column below the steering wheel.

This lever has seven functions:

- 1 Horn
- 2 Windscreen Washer
- 3 Windscreen Wiper
- 4 Turning Indicators
- 5 Headlight High/Low Beam
- 6 Headlight Flasher

### 1 Horn

The Horn button is located on the outer end of the Multifunction Lever.

Use a left hand fingertip to press the Horn button inwards (toward the steering column) to sound the Horn.

Stop pressing the button to stop the horn sounding.

### 2 Windscreen Washer

The Windscreen Washer control is located next to the Horn button close to the end of the Multifunction Lever.

*The Multifunction Lever (located on the left hand side of the steering column below the steering wheel) controls seven functions as shown. Refer to numbered information & headings on this page for instruction.*

Use the left thumb and fingers to grasp the Windscreen Washer button and push the button inwards (toward the steering column) to activate water through the windscreen washers.

To stop water flowing through the windscreen washers, release the button.

### 3 Windscreen Wiper

The Windscreen Wiper rotating barrel switch is located next to the windscreen washer button.

Use the left thumb and fingers to rotate the barrel switch (top forward) to the desired setting (aligning the arrow with):

- J - Intermittent wiper function
- I - Constant wiper function.

Rotate the barrel switch in the opposite direction (top rearward) to return the wiper function to:

- J - Intermittent wiper function or
- O - Wiper function Off.

### 4 Turning Indicators

Pull the Multifunction Lever counter-clockwise around the steering column to activate the Left Turning Indicator.

Push the Multifunction Lever clockwise around the steering column to activate the Right Turning Indicator.

Return the Multifunction Lever to neutral off position after turning.

6 Headlight Flasher

5 Headlight High/Low Beam

### 5 Headlight High/Low Beam

The headlights must first be turned On at the Overhead Console headlight switch (see page 37 for instructions).

In the centre position (horizontally) the headlights will be on high beam.

Using the left hand, the Multifunction Lever downward to move to low beam.

Move the Multifunction lever upwards back to high beam as required.

### 6 Headlight Flasher

Use left hand to lift the Multifunction Lever fully upwards/intermittently to flash the headlights On/Off for a warning.

The flasher function works with or without the overhead console light switch On.



## Your Sprayer at a Glance - **Cabin**



The Ignition Switch has 3 functions: Stop, On/Accessories (lightning symbol) & Engine Start (rotating arrow symbol).



The Ignition Switch is located on the right hand side, rear corner console of the cabin.

### Ignition Switch

The Ignition Switch, located on the right hand side rear corner console of the cabin, is used to start and stop the engine and all electrical functions of the Sprayer.

The Ignition Switch has three functions:

- Stop/Off (top position)
- On/Accessories (lightning symbol)

Insert the key and rotate the key clockwise to the On/Accessories (lightning symbol) position to energise all cabin functions.

- Engine Start

The transmission must be in neutral to start the engine.

Rotate the key further to the Engine Start position (rotating arrow emblem) to crank & start the engine.

Release the key when the engine starts. The key automatically returns to the On/Accessories position.

To stop the engine, rotate the ignition key counter clockwise to its vertical Stop/Off position.



The Foot Brake (left) & Accelerator (right) located on the floor on the right hand side of the steering column.

### Foot Brake & Accelerator

The Foot Brake & Accelerator are located on the floor of the cabin at the right hand side of the steering column. On the left hand side of the steering column is a fixed Foot Rest.

The Foot Brake & Accelerator are used:

- Drive
- Stop



The plastic coated Quick Start Guide attached to the right hand safety door rail of the cabin

### Quick Start Guide

A plastic coated Quick Start Guide is attached to the right hand safety door rail of the cabin for a quick reference for the Starting, Driving and Shut Down procedures of the sprayer.

The guide diagrammatically presents the steps for:

- Start Up
- Drive
- Shut Down.

### NOTE

Before starting the engine:

- All fluid levels must be checked.
- Ensure the battery isolator switch is engaged - to provide power to the sprayer systems.
- Ensure the transmission in neutral. Otherwise the engine will not start.

The Foot Rest located on the floor on the left hand side of the steering column.





The RapidFire air pressure and Hydraulic Oil pressure gauges in the console in front of the steering column.

## Pressure Gauges

Three pressure gauges are located in the console at front of the steering wheel for current operating information:

- 1 Rapid Fire Air Pressure - operating air pressure of the Rapid Fire system.
- 2 Hydraulic Oil Pressure - operating oil pressure of the closed centre pump.
- 3 Spray Pressure - operating liquid pressure of the sprayline.

The Sprayline pressure gauge in the console in front of the steering column.



The Front Sunvisor shown in a lowered position.

## Sunvisors - Front & Rear

The sprayer is fitted with Sunvisors at the front and the rear of the cabin to reduce sunglare when required.

To lower the Front Sunvisor, use your hand and pull the bottom rail of the sunvisor down to the level required.

To raise the sunvisor, pull down on the cord at the top right hand side of the sunvisor. The spring-loaded sunvisor automatically returns to its rolled-up position.

Pull downwards on the cord on the right hand side of the Front Sunvisor to roll it up.



The Rear Sunvisor shown in a lowered position.

To lower the Rear Sunvisor, turn to the rear of the cabin and use your hand and pull the bottom rail of the sunvisor down to the level required.

To raise the sunvisor, pull down on the cord at the top right hand side of the sunvisor (facing the sunvisor). The spring-loaded sunvisor automatically returns to its rolled-up position.

Pull downwards on the cord on the right hand side of the Rear Sunvisor to roll it up.



The hand piece of the Two Way Radio located in the right hand rear corner of the cabin.

## UHF Two Way Radio

A UHF Two Way Radio is located in the Overhead Console of the cabin. The hand piece is located in the right hand rear corner of the cabin.

Operating instructions for UHF two way radio are provided in the UHF Two Way Radio manual supplied with this manual.

## Cup Holder

A convenient fold-up/fold-down cupholder is located in the rear right hand corner of the cabin.





## Your Sprayer at a Glance - Cabin

### Overhead Console

The cabin ceiling and Overhead Console (shown right) conveniently locates air vents, speakers, mirror adjustment knob, light switches, air conditioning controls & vents, AM/FM radio/CD player, UHF two way radio and storage area.

### Windscreen Air Vent

Adjust the Windscreen Air Vent to direct the airflow onto to the desire area of the windscreen.

### Adjustable Air Vent

Two Adustable Air Vents located in the Overhead Console (above and each side of the operator) allows operators to adjust the airflow to suit their needs.

### Mirror Adjustment Knob

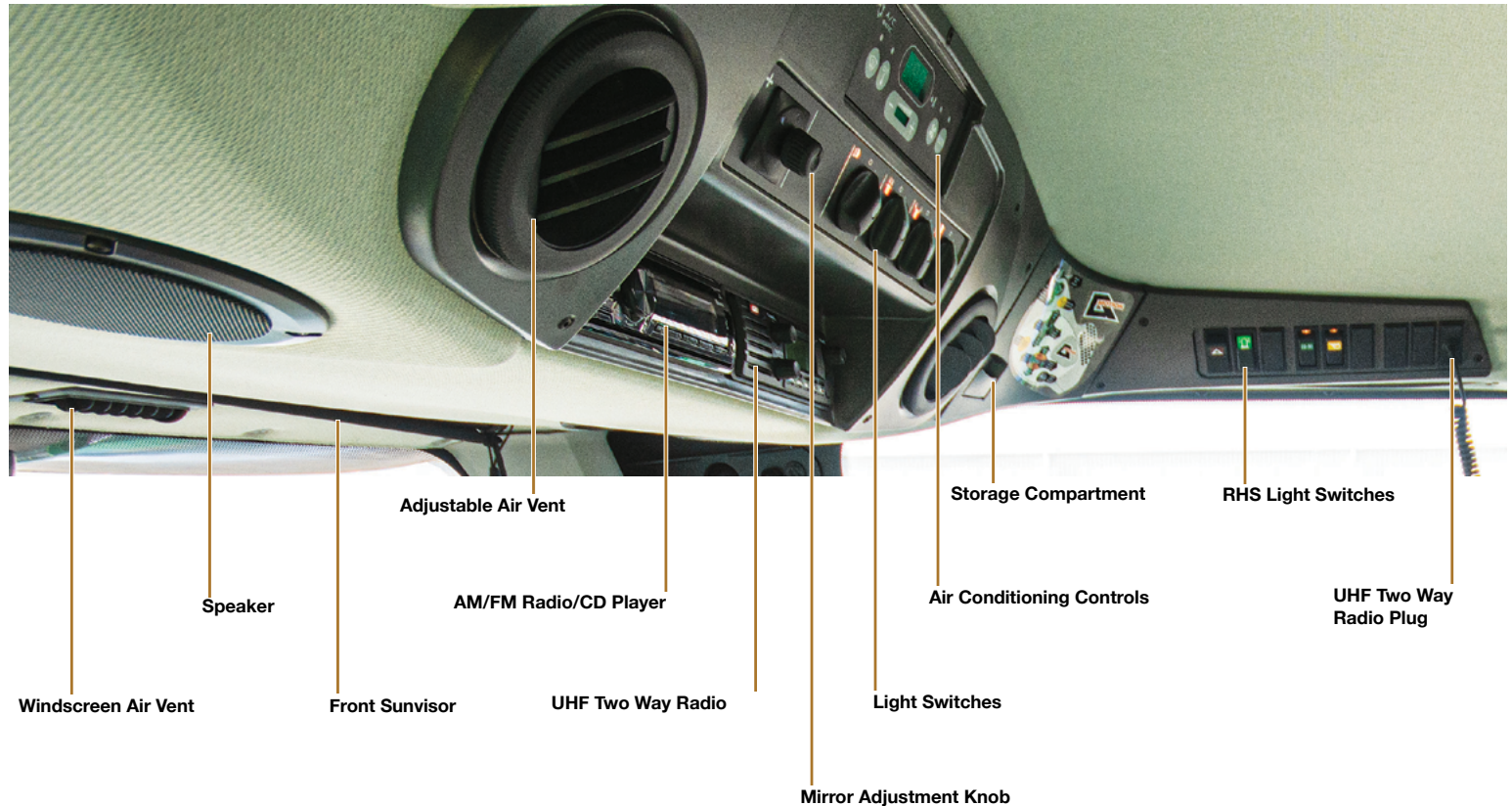
The Mirror Adjustment Knob allows the operator to personally adjust the rear vision mirrors from inside the cabin.

#### To adjust the left hand side mirror:

- 1 Rotate the Mirror Adjustment Knob anti-clockwise to the left hand mirror position.
- 2 Push or pull the knob up or down (vertically), then, left or right (sideways) to adjust the mirror to the desired position.

#### To adjust the right hand side mirror:

- 1 Rotate the Mirror Adjustment Knob clockwise to the right hand mirror position.
- 2 Push or pull the knob up or down (vertically), then, left or right (sideways) to adjust the mirror to the desired position.



Overhead Console photo - information on each item (shown above) is given on the following pages using the item heading).

The left hand mirror.



The Mirror Adjustment Knob.

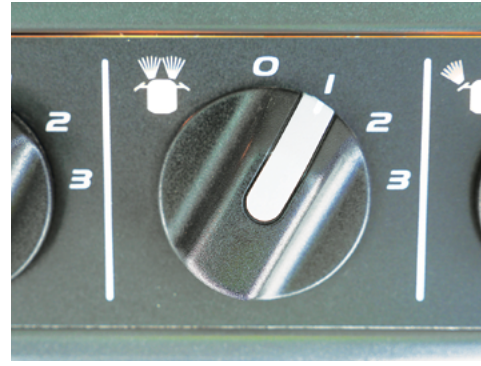


The right hand mirror.

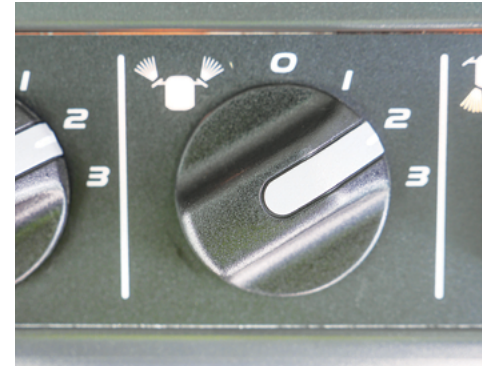




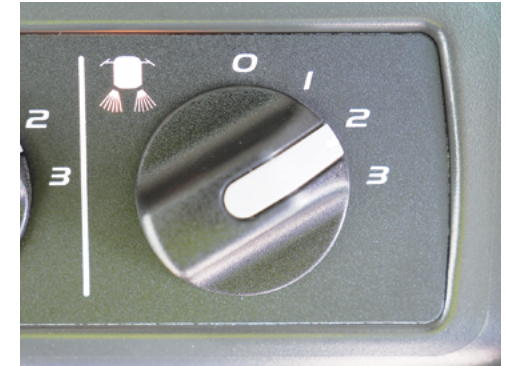
*The Headlights Switch.*



*The Inner Front Work Lights Switch.*



*The Outer Front Work Lights Switch.*



*The Rear Work Lights Switch.*

## Front Light Switches

Four exterior light switches, on the Overhead Panel in front of the operator are used for:

- 1 Headlights
- 2 Inner Front Work Lights
- 3 Outer Front Work Lights
- 4 Rear Work Lights.

To operate the lights, rotate each switch to the position (0, 1, 2 or 3) for the lights required.

The Headlight Switch must be On (Position 1, 2 or 3) for the other three switches to work.

### 1 Headlights Switch

The Headlights Switch controls the Headlights, Interior Cabin Lights, Tail Lights & Outer Boom Marker Lights:

- Position 0 is Off.
- Position 1 is Interior Cabin Lights, Tail and Park Lights & Outer Boom Marker Lights On.
- Position 2 or 3 is Headlights, Interior Cabin Lights, Tail and Park Lights & Outer Boom Marker Lights On.

### 2 Inner Front Work Lights Switch

The Inner Front Work Lights Switch controls the Inner Front Work Lights.

- Position 0 is Off
- Position 1, 2 or 3 is Inner Front Work Lights On.

An Interior Cabin Light (located in RH rear corner ceiling) automatically illuminates when either Park lights or Headlights are switched On.

*The Interior Light (located in RH rear corner ceiling) automatically illuminates when either Park lights or Headlights are switched On.*



### 3 Outer Front Work Lights Switch

The Outer Front Work Lights Switch controls the Outer Front Work Lights:

- Position 0 is Off
- Position 1, 2 or 3 is Outer Front Work Lights On.

### 4 Rear Work Lights Switch

The Rear Work Lights Switch controls the Rear Work Lights & Night Pro LED Boom Lights:

- Position 0 is Off
- Position 1, 2 or 3 is Rear Work Lights & Night Pro LED Boom Lights On.

## NOTE

To switch between High and Low beam Headlights, use the Multi-Function Lever located on the left hand side of the steering column.  
The Headlights Switch must be first turned On.

## NOTE

The Headlights Switch must be turned On for all Front & Rear work lights to function.  
All lights can be turned Off by returning the Headlights Switch to 0 (Off).





The Storage Compartment located in the right hand side corner of the Overhead Console.

### Storage Compartment

A Storage Compartment located in the right hand side corner of the Overhead Console provides convenient storage for documents and other smaller items.

To access the compartment, lift the latch at the bottom of the door and lift the door upwards.

Close the Storage Compartment door before operating.

The Storage Compartment is heated or cooled by the climate control and can be used to cool or warm items if required.



**Hazard Lights Switch**

**Rotating Beacon Lights Switch**

**Auxiliary Chassis Lights Switch**  
- For customer light connection

**Auxiliary Boom Lights Switch**  
- For customer light connection

Overhead light switch panel photo - information on each item (shown above) is given on this page using the item heading).

### Light Switches

The Light Switches (rocker switches) located on the right hand side of the cabin in the Overhead Console (shown above) include:

- 1 Hazard Light Switch
- 2 Rotating Beacons Light Switch
- 3 Auxiliary Chassis Lights Switch
- 4 Auxiliary Boom Lights Switch.

#### 1 Hazard Lights Switch

The Hazard Lights Switch controls the hazard lights function.

To engage the hazard lights, push the rocker switch upwards.

To disengage the hazard lights, push the rocker switch downwards

#### 2 Rotating Beacon Lights Switch

The Rotating Beacon Lights Switch controls the rotating beacon lights on the top of the cabin.

To engage the Rotating Beacon lights, push the rocker switch upwards.

To disengage the Rotating Beacon lights, push the rocker switch downwards.

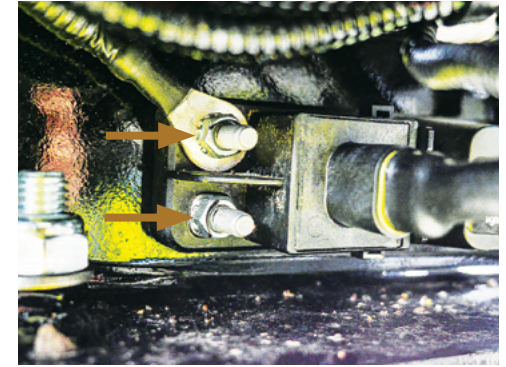
#### 3 Auxiliary Chassis Lights Switch

The Auxiliary Chassis Lights Switch controls customer fitted lights.

The Auxiliary connection point for customer fitted lights is located on the front chassis rail under the front of the engine.

To engage the Auxiliary Chassis lights, push the rocker switch upwards.

To disengage the Auxiliary Chassis lights, push the rocker switch downwards.



The Auxiliary connection point for customer fitted lights is located on the front chassis rail under the front of the engine.

#### 4 Auxiliary Boom Lights Switch

The Auxiliary Boom Lights Switch controls customer fitted lights.

The Auxiliary Power Connectors are externally located within the boom centre section. Boom lights can be fitted as desired.

To engage the Auxiliary Boom lights, push the in-cab rocker switch upwards.

To disengage the Auxiliary Boom lights, push the rocker switch downwards.

Auxiliary power connector located on a cable on the boom centre section (RHS shown [2 connectors - left & right side]).







Two Egress lights on the front corners of the cabin provide exit safety in dark conditions.

## Map Lights

There are 2 map lights in the front right ceiling which can be operated together or individually (shown bottom right).

The front map light is fixed. The Outer rocker switch is used to switch the light On & Off.

The rear directional map light can be adjusted as desired. The Inner rocker switch is used to switch the directional light On & Off.

## Egress Lighting

The Cruiser is fitted with Egress lighting (shown above) to assist in exiting the machine safely when parking in dark conditions.

The G-Hub Controller keeps these outside work lights on for 30 seconds after the engine is stopped & the ignition key removed.

## NOTE

Map Lights only operate when the ignition key is On (in the "Accessories" or "Run" position).



The AM/FM Radio/CD Player located in the Overhead Console above & in front of the operator in the cabin.

## AM/FM Radio/CD Player

The entertainment radio, located in the Overhead Panel in front of the operator comprises an AM/FM radio tuner and single CD player. A Bluetooth compatible phone system is also installed in the unit.

Operating instructions for AM/FM Radio/CD Player are provided in the Entertainment AM/FM Radio/CD Player manual supplied with this manual.

Use the Outer rocker switch to switch the front map light On & Off.



The UHF Two Way Radio located in the Overhead Console above & in front of the operator in the cabin.

## UHF Two Way Radio

The UHF Two Way Radio, located in the Overhead Console of the cabin, has the hand piece located in the right hand rear corner of the cabin.

The operating instructions for the UHF Two Way Radio are provided in the UHF Two Way Radio manual supplied with this manual.

Use the Inner rocker switch to switch the directional map light On & Off.



The Air Conditioner Panel (see next page for details).

## Air Conditioning Controls

The touch buttons of the automatic air conditioning panel (located above the light switches on the Overhead Console), are used to choose & regulate airflow, temperature & humidity within the cabin.

Operating modes of the air conditioner include:

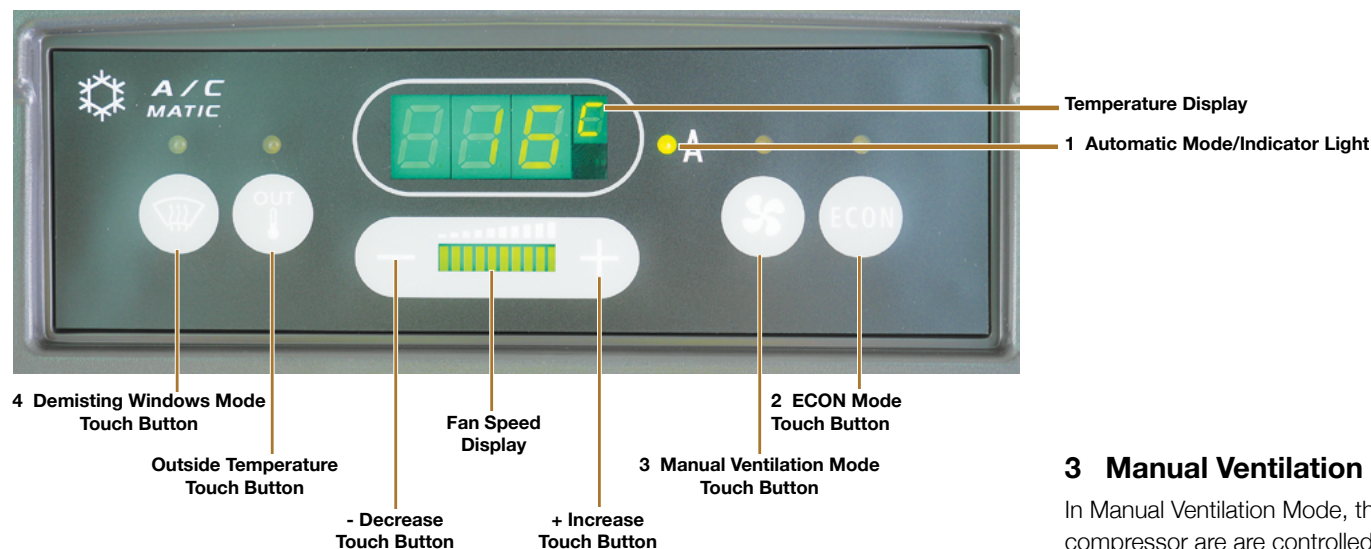
- 1 Automatic Mode - fully automatic operation (ideal for high outside temperatures).
- 2 Manual Ventilation Mode - Automatic Mode with manual fan speed control.
- 3 ECON Mode - Automatic Mode without the cooling function.
- 4 Demisting Windows Mode - Continuous operation at maximum fan speed.

### To Activate the Air Conditioner:

Switch the Ignition On & start the engine.

Once ignition is On, a software version is displayed for 3 seconds, then a self-testing procedure takes a maximum of 20 seconds, to complete, then the control touch buttons on the Air Conditioner Control Panel are enabled for use.

On activation, the air conditioning mode displayed will be the same as last used.



Control touch buttons & Displays of the Air Conditioner Panel (information on each item (shown above) is given on this page).

### 1 Automatic Mode/Indicator Light

In Automatic Mode the air conditioner heater, compressor & ventilation operation is fully automatic to achieve and maintain the pre-set, constant cab temperature. The Automatic Mode is ideal for high outside temperatures.

#### To Activate the Automatic Mode:

Press the following touch buttons to switch off:

- 2 ECON Mode
- 3 Manual Ventilation Mode
- 4 Demisting Windows Mode

Indicator lights of Modes 2, 3 & 4 go Off and the Automatic Mode light (A) illuminates. Automatic Mode is now active.

### NOTE

When outside temperatures go below 10°C, the Automatic Mode shuts down the air conditioner compressor.

### 2 ECON Mode

In ECON mode, the air compressor is shut Off while the heater & ventilation (depending on settings) are controlled automatically. This mode is used when cooling is not required.

#### To Activate the ECON Mode:

- Press the ECON Mode touch button. The ECON Mode Indicator light illuminates and the Automatic Mode Indicator (A) is Off. The ECON Mode is now active.

### 3 Manual Ventilation Mode

In Manual Ventilation Mode, the heater and compressor are controlled automatically (depending on settings) while the fan speed is manually controlled.

This Mode offers opportunity of setting slower or faster fan speeds with slower temperature adaptation in case of large deviations between cab and outside temperatures.

#### To Activate the Manual Ventilation Mode:

- Press the 'Manual Ventilation Mode' touch button and its Indicator light illuminates. The Manual Ventilation Mode is now active.  
Current fan speed is shown on the Fan Speed Display. One bar represents 10% speed increment between 0 & 100%.

#### To Reduce the Fan Speed:

- Press the '- Decrease' touch button once for each 10% speed decrease.

#### To Increase the Fan Speed:

- Press the '+ Increase' touch button once for each 10% speed increase

Changed settings are activated after 5 seconds.

### 4 Demisting Windows Mode

The Demisting Windows Mode is used for demisting cabin windows. The compressor switches to run constantly with maximum fan speed. The heater operates at pre-set value.

#### To Activate the Demisting Windows Mode:

- Press the 'Demisting Windows Mode' touch button and its Indicator light illuminates. The Demisting Windows Mode is now active and the fan operates at maximum speed.

#### To Alter the Fan Speed:

- Refer to previous Fan Speed instructions under "3 Manual Ventilation Mode".



Fully adjustable cabin overhead air flow vents for operator comfort.

## Setting Cab Temperature

The Temperature Display shows the currently set temperature.

### To Decrease the Temperature setting:

- Press the ‘- Decrease’ touch button.

### To Increase the Temperature setting:

- Press ‘+ Increase’ touch button

Temperature will be adjusted in 1°C or 2°F increments per touch button press, depending on Display Unit selected (Refer to “Changing Temperature Display” instructions next).

In Automatic Mode the air conditioner adjusts the cab temperature to its set value. During the Setting Cab Temperature procedure, the fan speed may rise quickly so that the cab temperature reaches the pre-set set point more quickly, for example, on a very hot day. When the cabin temperature approaches its set value, the fan speed will reduce again.

## Changing Temperature Display

The Temperature Display can be changed between degrees Celcius & degrees Farenheit.

### To Change the Temperature Units:

- Press the ‘- Decrease’ touch button & ‘+ Increase’ touch button simultaneously for up to 3 seconds to switch between units.

Repeating the above step will cycle between the two units.

## Displaying Outside Temperature

To display the Outside Temperature:

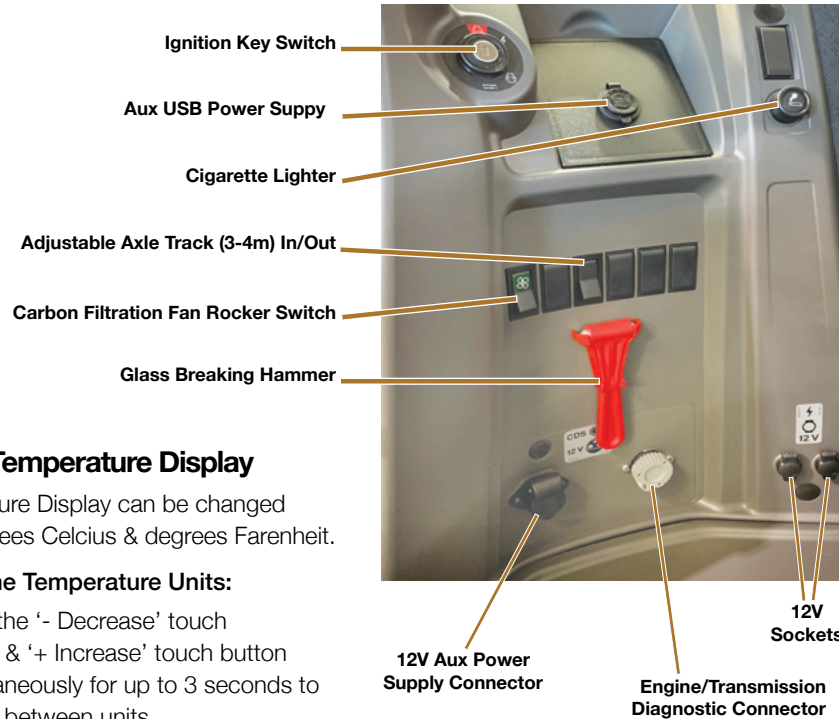
Press the ‘Outside Temperature’ touch button and its Indicator lights illuminates. The display now shows the outside temperature.

## Adjusting Air Flow Vents

Air conditioner air flow is distributed inside the cabin through fully adjustable airflow vents.

Each vent can be adjusted directionally or turned On or Off to suit the individual needs of

For example, to heat the leg area, close all upper vents and direct air flow of the lower vents to the floor area.



Press the Carbon Filtration Fan Rocker Switch to activate the Carbon Filtration System Fan before spraying.

## Carbon Filtration System

A fan forced Carbon Filtration System in conjunction with a fully sealed cabin creates a pressurised operator environment preventing contaminated air from entering the cabin.

The Carbon Filtration System removes dust, pollen, fumes and other potentially harmful pollutants from the air.

The Carbon Filtration fan (independent of the air conditioner fan) must be switched On separately for spraying operations.

### To Activate the Carbon Filtration System Fan:

- Press the Carbon Filtration Fan Rocker Switch, located on the right hand side Rear Corner Console (see above).

## Carbon Filter Maintenance

Carbon filters require periodic maintenance. See Chapter 8 ‘Lubrication & Maintenance’ for more information.

## Cabin Corner Panel

The Cabin Corner Console (shown above) is located in the right hand rear corner of the cabin and incorporates the following:

- Ignition Key Switch
- Aux USB Power Supply
- Cigarette Lighter
- Adjustable Axle Track (3-4m) In/Out
- Carbon Filtration Fan Rocker Switch
- Glass Breaking Hammer (Emergency use only)
- 12V Aux Power Supply Connector
- Engine/Transmission Diagnostic Connector
- 12V Sockets.

## CAUTION

Both cabin doors (entrance door & emergency escape door) must be completely closed and the Carbon Filtration System must be running to protect the operator from contaminated air.





*Armrest Control Console photo - information on each item (shown above) is given on the following pages using the item letter & title).*

## Armrest Control Console

The Armrest Control Console (shown above) incorporates the following controls:

- A) G-Hub Touch Screen
- B) Boom Folding/Unfolding
- C) Joystick Controls
- D) Transmission Shifter
- E) Back-Up/Restore USB
- F) Dual USB Power Outlet
- G) Mode Function Switches
- H) Mobile Phone Holder
- I) Storage Trays

## A) G-Hub Touch Screen

The G-Hub Touch Screen is Goldacres advanced Control System known as the G-Hub. It is a fully integrated electronic control system developed by Goldacres.

The G-Hub system comprises:

- In-Cabin Touch Control Screen
- External Control Screen with separate control pad,
- PLC (programmable logic controller),
- I/O modules,
- Sensors and
- Switches

to control & monitor all critical machine functions.

The fully integrated G-Hub system operates with all leading steering and mapping providers using the ISOBUS protocol.

On-board diagnostics allow an operator to quickly pinpoint any problems that might arise without the need of a laptop, specialised service tools or internet connections to minimise cost & downtimes.

Refer to G-Hub Touch Screen & Chapter 6 'Operation' for more information).

## **⚠ DANGER**

Always check for power lines while folding and unfolding the boom, as getting too close or any contact with power lines can be fatal.



*Boom Rest, Boom Fold & Boom Bi-fold rocker switches used for folding & unfolding the boom.*

## B) Boom Folding/Unfolding

The Boom Folding/Unfolding panel comprises three rocker switches which control the folding and unfolding of the boom (shown above).

## Unfolding the Boom

The Boom Unfolding Procedure is manually controlled by using the Boom Unfolding Switches & a Joystick Button. Refer to Chapter 6 'Operation', 'Unfolding the Boom' for instructions.

## Automatic Boom Folding

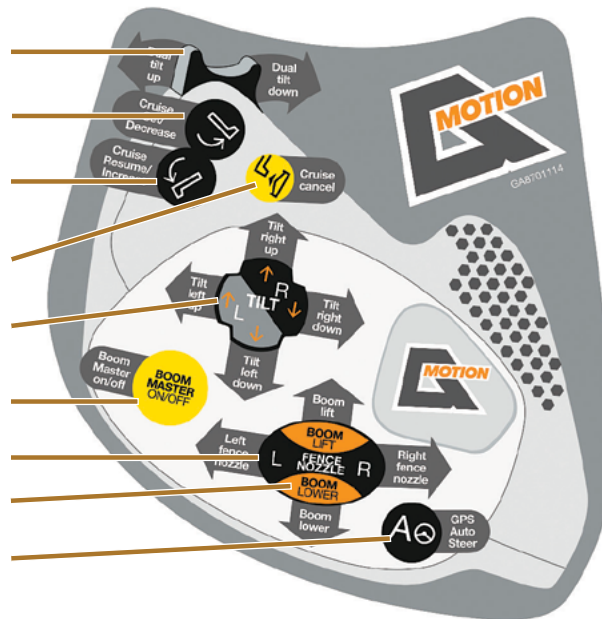
To fold the boom automatically, the calibration values must first be entered into the G-hub Controller for tilt left, tilt right & boom lift. Refer to Chapter 6 'Operation', 'Automatic Boom Folding' for instructions.

## Manual Boom Folding

The boom can be folded manually, but only when the calibration values in the G-hub controller are set to zero for tilt left, tilt right & boom lift. Refer to Chapter 6 'Operation', 'Manual Boom Folding' for instructions.



- 1 Dual Tilt Up/Down
- 2 Cruise Set/Decrease
- 3 Cruise Resume/Increase
- 4 Cruise Cancel
- 5 Boom Tilt - Left Up/Down & Right Up/Down
- 6 Boom Master On/Off
- 7 Fenceline Nozzle L/R On/Off
- 8 Boom Lift/Lower
- 9 GPS - Autosteer On/Off



Joystick Controller Push Buttons - information on each item (shown above) is given on the following pages.

### C) Joystick Controller

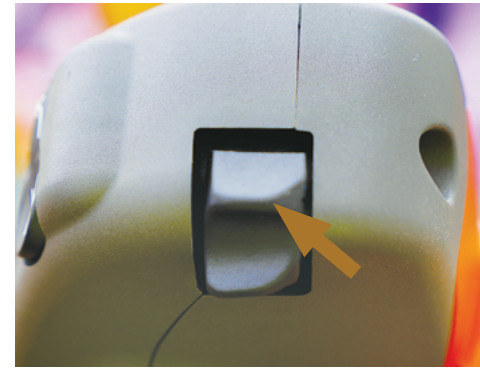
The Joystick Controller incorporates 8 function push buttons shown above and fore/Aft movement of the Joystick is used in 3 modes of Cruise Control.

Refer to Chapter 6 'Operation' for details.

One Rocker Switch and 8 Push Buttons are used on the Joystick:

- 1 Dual Tilt Up/Down (rocker switch)
- 2 Cruise Set/Decrease
- 3 Cruise Resume/Increase
- 4 Cruise Cancel
- 5 Boom Tilt - Left Up/Down & Right Up/Down
- 6 Boom Master On/Off
- 7 Fenceline Nozzle Left/Right - On/Off
- 8 Boom Lift/Lower
- 9 GPS - Autosteer On/Off.

Refer to Chapter 6 'Operation' for instructions.



Dual Tilt rocker switch on the Joystick used to tilt boom wings up for folding.

#### 1 Dual Tilt Up/Down

The Dual Tilt Up/Down rocker switch, located on the front of the Joystick, is used to raise or lower both right & left boom wings simultaneously.

Both boom wings pivot on the centre section and both left & right boom wings are raised or lowered together - the outer end of the wings move the furthest.

Refer to Chapter 6 'Operation' for instructions.



The lower Cruise Set/Decrease push button used to set the current ground speed for Cruise Control.

#### 2 Cruise Set/Decrease

The Cruise Set/Decrease push button is used to set the current ground speed as Cruise Control Speed and to decrease the set ground speed.

See Chapter 6 'Operation' for instructions.

#### 3 Cruise Resume/Increase

The Cruise Resume/Increase push button is used to resume the previously set current ground speed as the Cruise Control and increase the set ground speed.

Refer to Chapter 6 'Operation' for instructions.

The upper Cruise Set/Increase push button used to resume current ground speed for Cruise Control.





The Cruise Cancel push button on the side of the Joystick used to cancel the cruise control function.



The L & R Arrow Boom Tilt push button used to tilt boom ends up & down.



The Boom Master push button used to start & stop the boom spraying.



The Boom Lift & Boom Lower push button used to raise & lower the boom height as required.

#### 4 Cruise Cancel

The yellow Cruise Cancel push button is used to cancel the active Cruise Control. Applying the Foot Brake also cancels the Cruise Control.

The Cruise Master switch is used to cycle the Cruise Control between On [active] and Off [inactive].

Refer to Chapter 6 'Operation' for instructions.

#### 5 Boom Tilt - L Up/Down & R Up/Down

The Boom Tilt - L Up/Down & R Up/Down push button is used to individually lift or lower the angle the boom from left to right or right to left to more closely follow ground contour.

The boom wings pivot on the centre section and the left or right boom wing is raised or lowered - the outer end of the wing moves the furthest.

Refer to Chapter 6 'Operation' for instructions.

#### 6 Boom Master On/Off

The yellow Boom Master On/Off push button is used to cycle the boom spraying On & Off, as required.

Refer to Chapter 6 'Operation' for instructions.

#### 7 Fence Nozzle L/R

The Fenceline Nozzle L/R push button is used to switch the left & right side fenceline nozzles On & Off.

Refer to Chapter 6 'Operation' for instructions.

#### 8 Boom Lift/Lower

The Boom Lift/Lower push button is used to raise or lower the vertical height of the boom. Refer to Chapter 6 'Operation' for instructions.

#### 9 GPS Autosteer On/Off

Auto steer is retrofitted by the dealer/customer according to their requirements.

The black Autosteer push button is used to cycle the GPS autosteer On & Off as required.

Refer to Chapter 6 'Operation' for instructions.

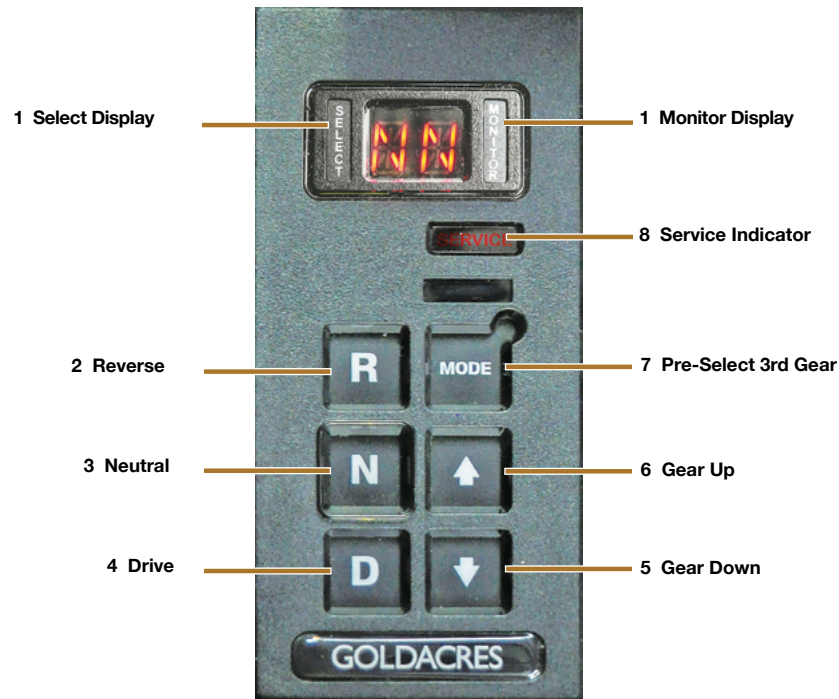
The Fenceline Nozzle push button is used to switch the Left & Right fenceline nozzles On & Off.



The Autosteer push button is used to engage & disengage the Autosteer.







Transmission Shifter photo - refer to Chapter 6 'Operation' for instructions.

## D) Transmission Shifter

The Transmission Shifter panel (shown above) contains 6 push button Gear Selectors, Illuminated Displays and a Service Indicator light as follows:

- 1 Select & Monitor Displays
- 2 Reverse Gear
- 3 Neutral
- 4 Drive

- 5 Gear Down
- 6 Gear Up
- 7 Pre-Select 3rd Gear
- 8 Service Indicator Light.

Refer to Chapter 6 'Operation' for instructions.



The Back-Up/Restore USB is provided to back-up & restore system settings & data.

## E) Back-Up/Restore USB

The Back-Up/Restore USB is provided to back-up & restore system settings & data of the G-Hub Controller only. Refer to the end of this chapter for more information.

## F) Dual USB Power Outlet 5W

A dual USB outlet is provide in the Armrest Control Console to enable charging of a phones, tablets or other USB devices.

The dual USB outlet enables charging of phones or other USB devices.



The Mode Switch panel (The Differential Lock Switch is optional for 4WD models only).

## G) Mode Switch Panel

The Mode Switch panel located on the Armrest Control Console contains 3 or 4 rocker switches (shown above - left to right):

- 1 Spray Mode/ Road Mode
- 2 Cruise Master On/Off
- 3 Differential Lock On/Off (4WD option only)
- 4 Park Brake On/Off.

Refer to Chapter 6 'Operation' for instructions.

## Your Sprayer at a Glance - Cabin



Mobile Phone Holder located in the Armrest Control Console.



Electrical compartment located below the Armrest Control Console.

### H) Mobile Phone Holder

A convenient Mobile Phone Holder is provided in the Armrest Control Console.

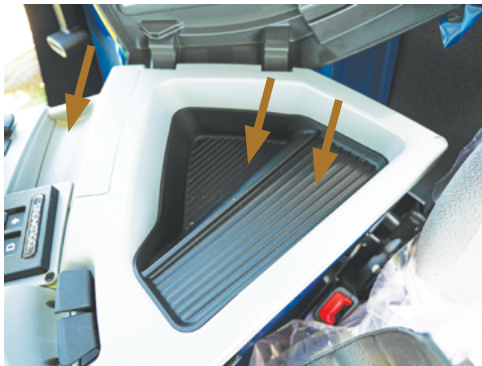
### I) Storage Trays

Storage trays are provided at the rear and underneath the right hand side Armrest.

One storage tray is located to the right side of the Transmission Shifter.

Other trays are located under the rear of the Armrest. Lift up the top of the Armrest to access the storage trays (as shown above).

Storage trays provided at the rear & underneath the right hand side Armrest.



### Electrical Compartment

The Electrical Compartment is located at the right hand side of the operator's seat below the Armrest Control Console.

The compartment contains two main fuse boxes and various fuses, relays to activate the machine circuitry and the connectors for GPS steering systems.

Fuses are designed in the system to protect the system against electrical faults and incorrect connections. If a fault or incorrect connection occurs, a fuse will blow and disconnect the related circuit.

If a fuse has blown, identify the corresponding components in the circuit and investigate the cause before reconnecting with a new fuse.

See Chapter 10 'Integrated Systems', 'Cabin Electrical Compartment' for further information.

### CAUTION

When a fuse is replaced it is important that the fuse is replaced with another fuse of the same rating. Do NOT use a higher rated fuse in an attempt to correct an electrical fault. Failure to follow these instructions may cause damage to the machine which cannot be covered by warranty.



Green light indicator functional change & the Boom Master switch is now a touch button

### G-Hub Interface

Software upgrade has improved functionality and G-Hub Home screen operator interface.

### Home Screen

Functional changes to the G-Hub Home screen include:

- Green light on the top right corner of the G-Hub displays:
  - Green = Connected & OK
  - Red = Display not connected
- External Buzzer sounds, momentarily, when the PLC is turned On with the key & is running OK
- Boom Master Switch - the Boom Master indicator has been changed to a Touch Button switch allowing the Boom to be turned On & Off on the G-Hub Home screen.



Green light indicator & 'RPM Raise' additions shown.

### External Screen

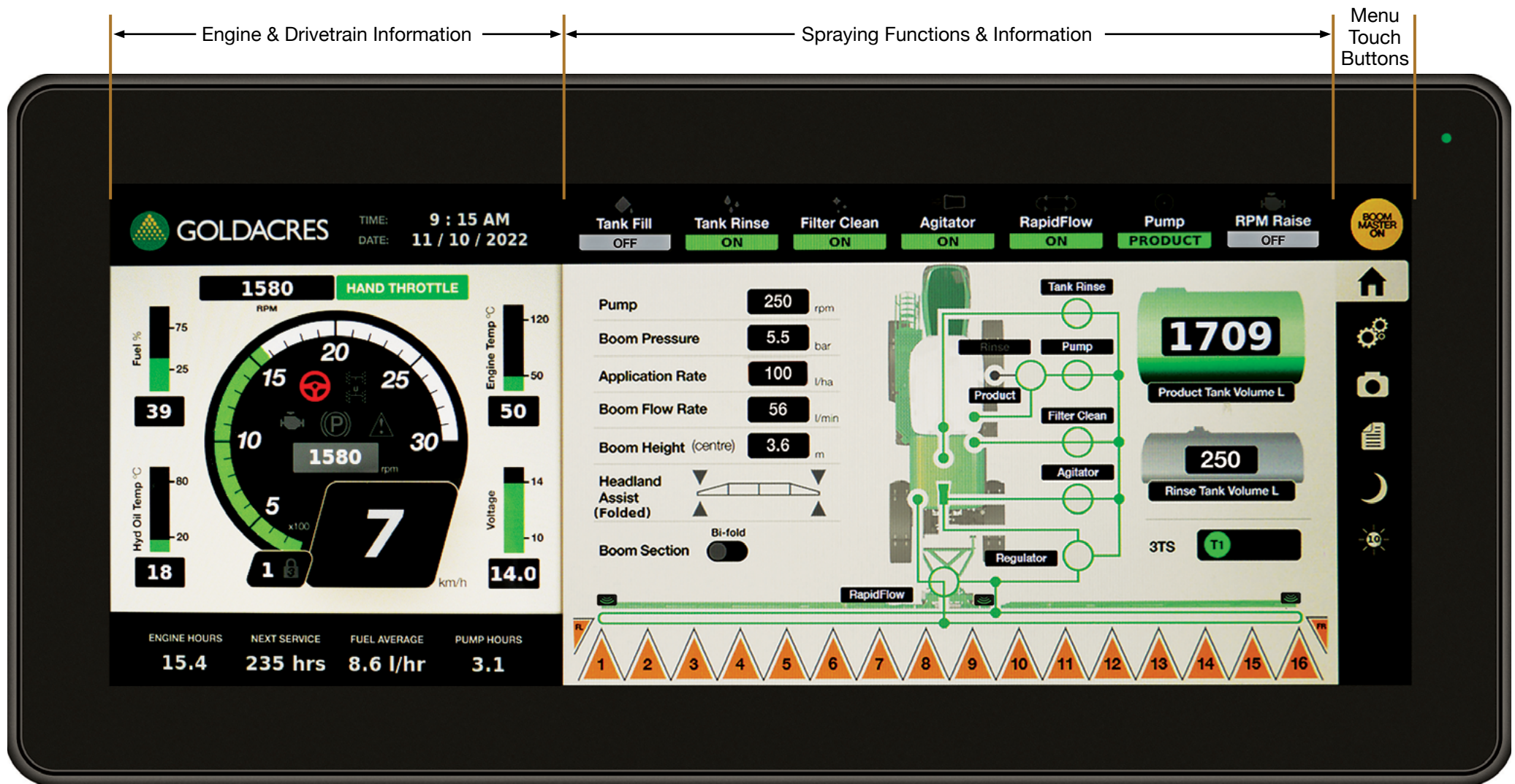
The External display screen includes a Green light on the top right corner of display:

- Green = Connected & OK
- Red = Display not connected

Other External screen changes include:

- 'RPM Raise'
- 'Increase' & 'Decrease' RPM touch buttons to adjust engine RPM while at the filling station
- Added in the Warning/Settings page
- 'Density Factor' adjustment





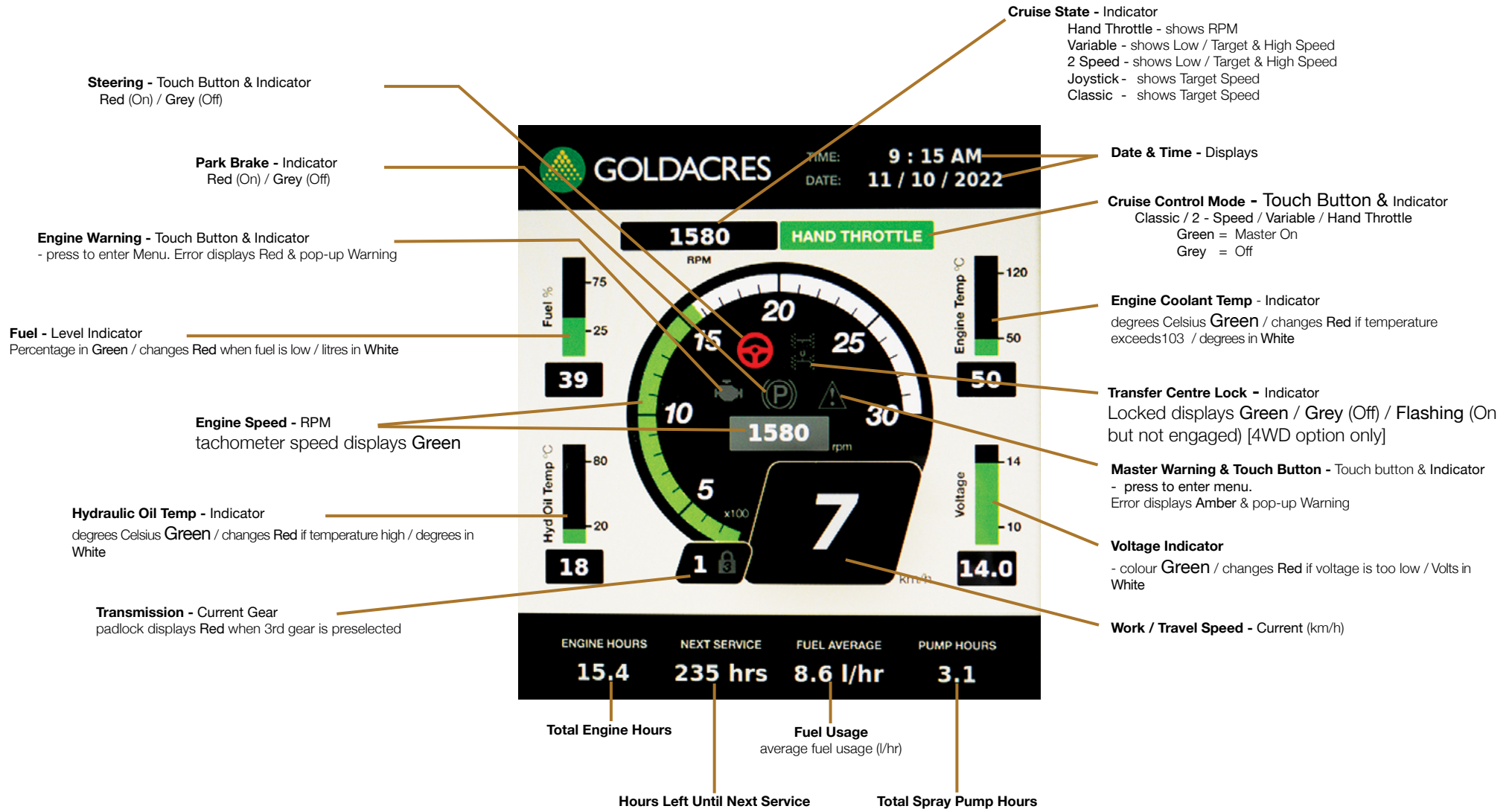
## G-Hub Controller

Goldacres G-Hub Controller with touch button controls (*Home screen shown above*) is a fully integrated electronic control system facilitating easy in-cab controls & monitoring of critical machine & spraying functions (see Chapter 6 'Operation' for instructions), as well as an External G-Hub Control Screen for filling & cleaning functions (Refer to Chapter 6 'Operation', 'Filling the Sprayer').

The G-Hub Controller integrated system is designed to operate seamlessly with leading steering and mapping providers using the ISOBUS protocol.

On-board diagnostics allow the operator to quickly pinpoint problems without the need for laptops, specialised service tools or internet connection (Refer to Chapter 9 'Trouble Shooting' for more information).

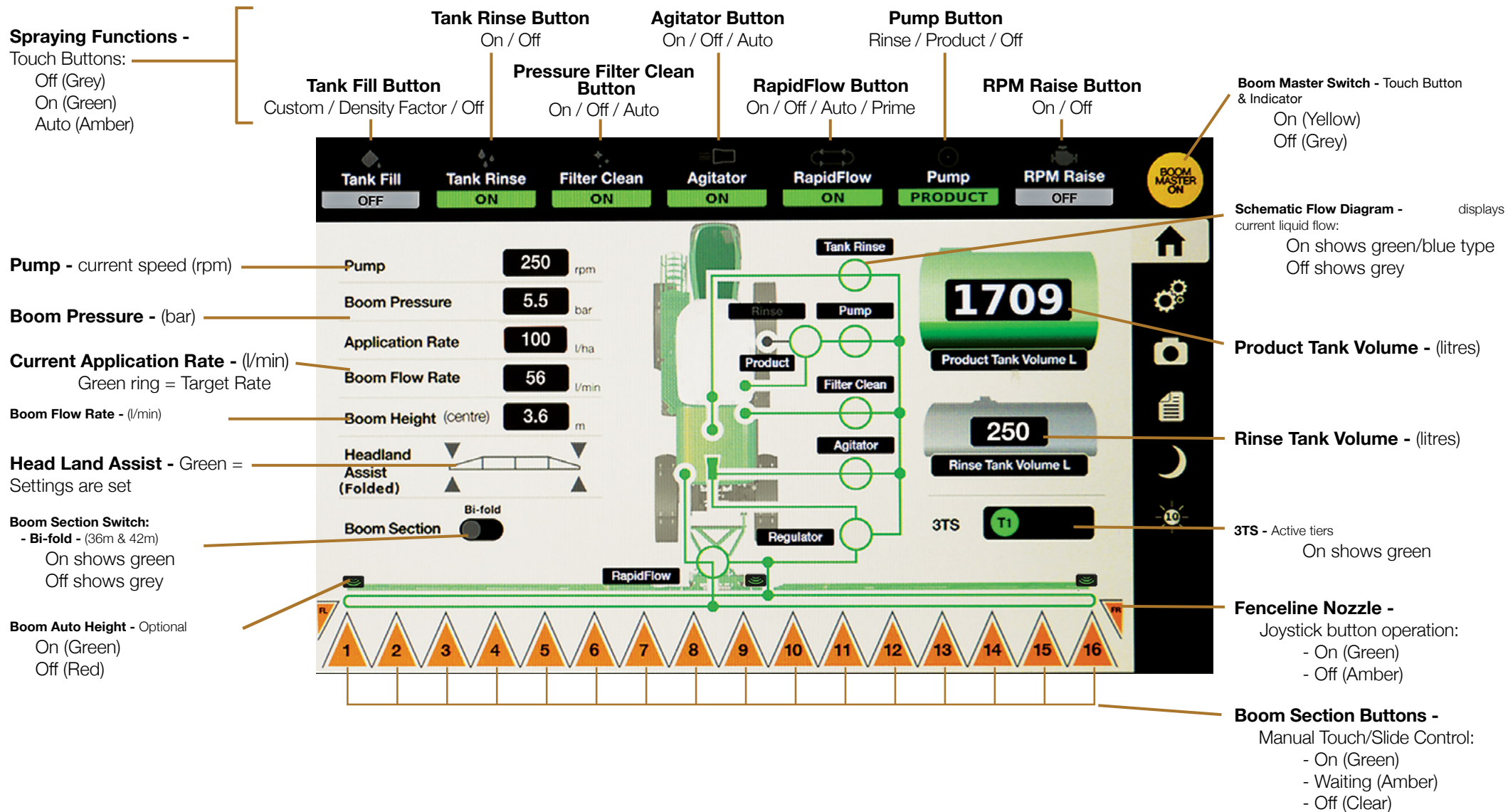
## Your Sprayer at a Glance - Cabin



### Engine-Drivetrain Touch Buttons & Information

The Engine-Drivetrain touch buttons & Information (on the Home screen shown above) displays information of the engine, transmission, servicing, cruise control & system warnings, as well as touch buttons to access Cruise control setting & the Warning menu of the G-Hub Controller.

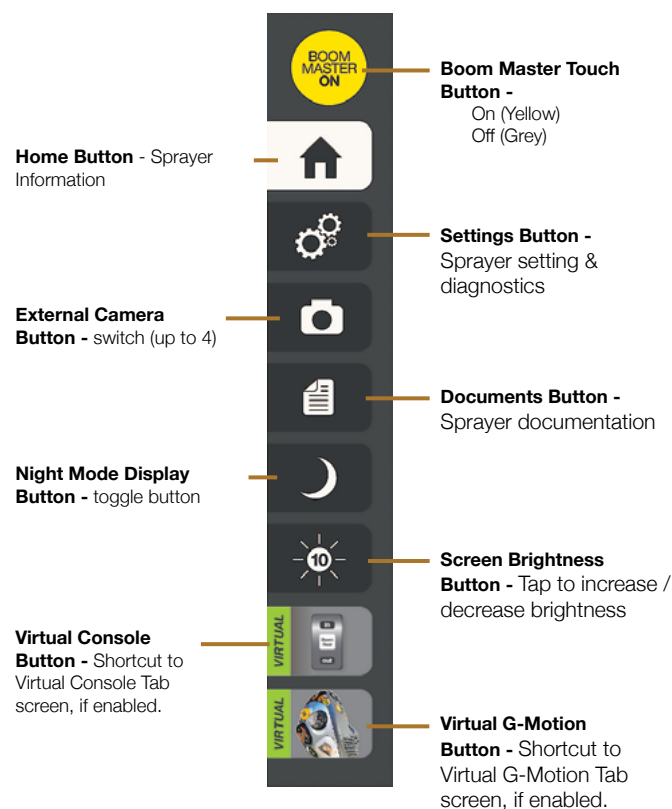




### Spraying System Touch Buttons & Information

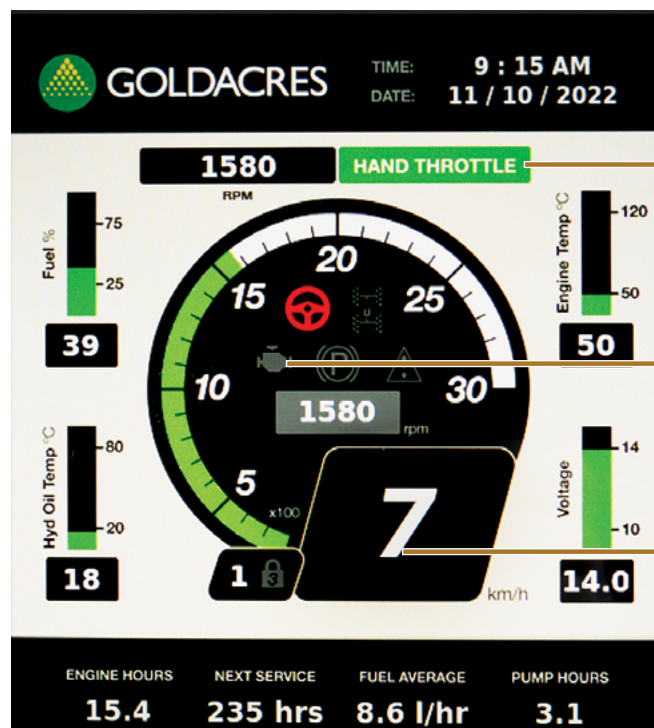
The Spraying System touch buttons & Information (on the Home screen shown above) illustrate the touch buttons for spraying functions and display information of the G-Hub Controller spraying system.

## Your Sprayer at a Glance - **Cabin**



## Menu Touch Buttons

The Menu touch buttons on the Home screen (shown above) provide touch buttons to access the G-Hub Controller settings, cameras, documents, display lighting and other functions according to the configuration and settings of the Cruiser.



**Press the Cruise Mode Touch Button -**  
To display the 'Cruise Control Mode selection panel'

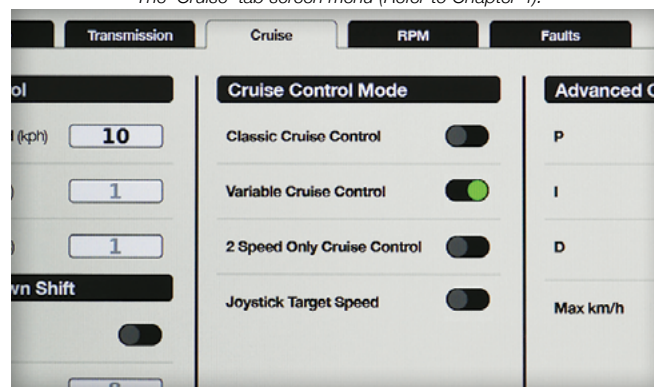
— **Press the Engine/Warning Touch Button Area** -  
To display the Engine 'GA Default Code' screen

**Selected Cruise Mode -**  
Displays the current Cruise Mode selection, gear & current speed in km/hr

## Engine & Drivetrain Touch Buttons

The Engine & Drivetrain touch button Areas (shown above) are short cut buttons providing quick access to both 'Cruise Control' settings and the Engine Warning 'GA Default Codes'

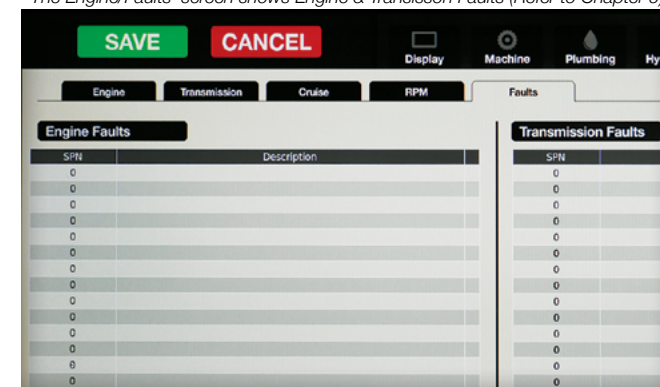
The 'Cruise' tab screen menu (Refer to Chapter 4).



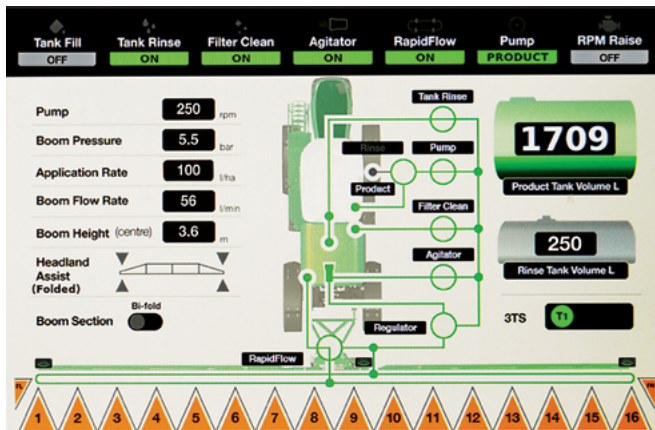
Press the Cruise Mode touch button & the Cruise Control Mode selection panel appears (*see below left*). Refer to Chapter 4, 'Setting Up', 'B Cruise Tab' for instructions.

Press the Engine/Warning touch button Area & the GA Faults screen appears (*see below*). Refer to Chapter 9, 'Trouble Shooting', 'GA Fault Codes' for more information.

The Engine/Faults' screen shows Engine & Transisssion Faults (Refer to Chapter 9).







## Spraying System Touch Buttons

The Spraying System touch buttons (shown above) provide 7 functions along the top the screen:

- Tank Fill
- Tank Rinse
- Filter Clean
- Agitator
- Rapid Flow
- Pump
- RPM Raise.

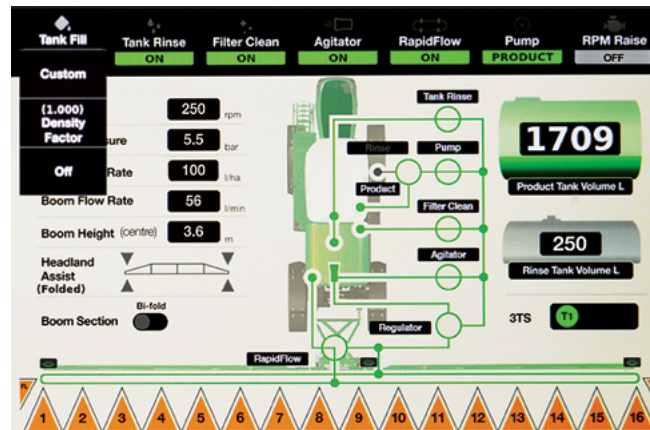
All touch buttons show Grey when Off, Amber in Auto and Green when On

Up to sixteen On/Off Boom touch buttons along the base of the screen (depending on boom size with one touch button for each boom section) show Amber when Off and Green when On (active).

The FL & FR Fenceline symbols are display only.

The Boom Section touch buttons & Fenceline indicators display:

- Green when On
- Amber when Waiting
- Clear when Off.



## Tank Fill Touch Button

Press the Tank Fill touch button and drop a down menu of three touch buttons (shown above) appears:

- **Custom** - allows the operator to set the Product Tank fill volume (litres) before filling.
    - 1 Press the 'Custom' touch button and a keypad appears.
    - 2 Press the touch buttons to enter the amount of Fill liquid required for the Product Tank, then press Enter.

The screen returns to the 'Tank Fill' touch button (Orange). The 'Desired Fill' is now set for use on the External Display.
  - **Density factor (1.000)** - allows the operator to change the density factor according to chemicals being used.
- The Density Factor can also be set using the External G-Hub Controller at the Quick Filling Station (refer to the the External G-Hub Controller & Filling instructions in Chapter 6 "Operation").

### NOTE

The Density Factor under the Tank Fill touch button resets to 1.0 on system reboot.  
Reset the Density Factor to the desire setting after a system reboot.



To Set the Density Factor on the G-Hub Controller in the cabin:

- 1 Press the 'Density Factor' touch button and a keypad appears (shown above).
- 2 Press the keypad touch buttons to enter the Density Factor required, then press Enter.

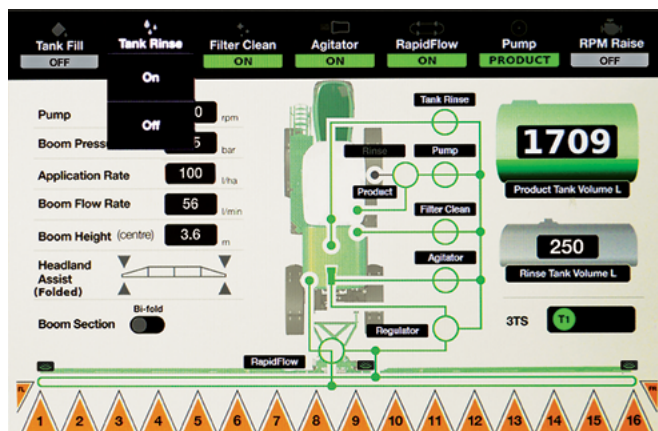
The screen returns to the 'Tank Fill' touch buttons with the new value entered.

- **Off**

Press the 'Off' touch button & the screen returns to the 'Tank Fill' touch button 'Off' (grey).

### NOTE

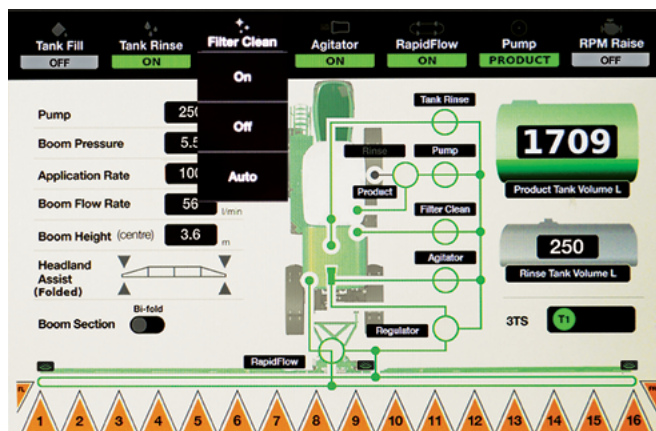
Refer to Chapter 6 "Operation" under External G-Hub Controller & Filling instructions for setting the Density Factor on the External G-Hub Controller while using the Quick Filling Station.



### Tank Rinse Touch Button

Press the Tank Rinse touch button and drop down menu with two touch buttons (shown above) appears:

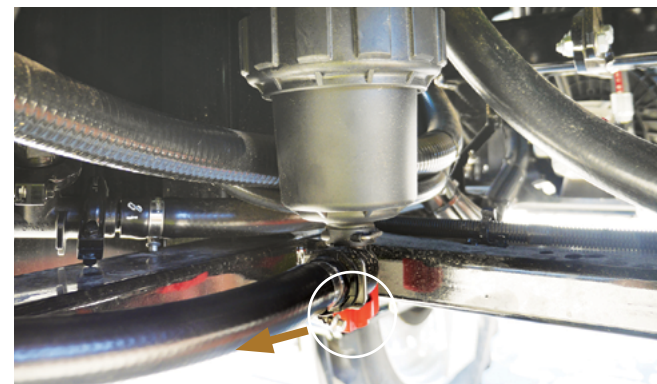
- **On**  
Press the 'On' touch button & the screen returns with the 'Tank Rinse' touch button displaying 'On' (Green)
- **Off**  
Press the 'Off' touch button & the screen returns with the 'Tank Rinse' touch button displaying 'Off' (Grey).



### Pressure Filter Clean Touch Button

Press the Filter Clean touch button and a drop down menu with three touch buttons (shown above) appears:

- **On**  
Press the 'On' touch button & the screen returns with the 'Filter Clean' touch button displaying 'On' (Green)
- **Off**  
Press the 'Off' touch button & the screen returns with the "Filter Clean" touch button displaying 'Off' (Grey).
- **Auto**  
Press the 'Auto' touch button & the screen returns with the "Filter Clean" touch button displaying 'Auto' (Amber).  
When set to 'Auto', pressure filter flushing automatically activates when all boom sections are switched Off or the boom Master Switch is turned Off.



*The red valve at the base of the pressure filter must be open for back-flush cleaning to function.*

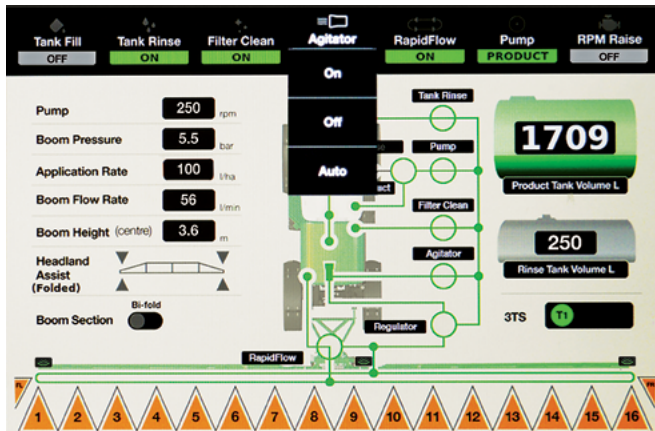
Each time the boom sections are turned Off, a valve opens reversing flow through the filter to take trapped particles back to product tank thereby clearing the element.

The red valve at the base of the pressure filter must be open for this to function.

### NOTE

The Filter Clean touch button allows the pressure filter to be cleaned by backflushing while operating. The red valve at the base of the filter must be open for this to function.

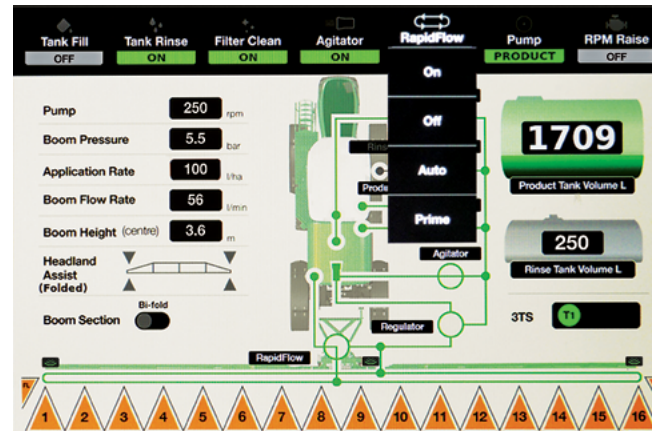
While this is very useful, the pressure filter must be manually cleaned on a regular basis. See Chapter 6 'Operation' for pressure filter cleaning instructions.



## Agitator Touch Button

Press the Agitator touch button (shown above) and drop down menu with three touch buttons appears:

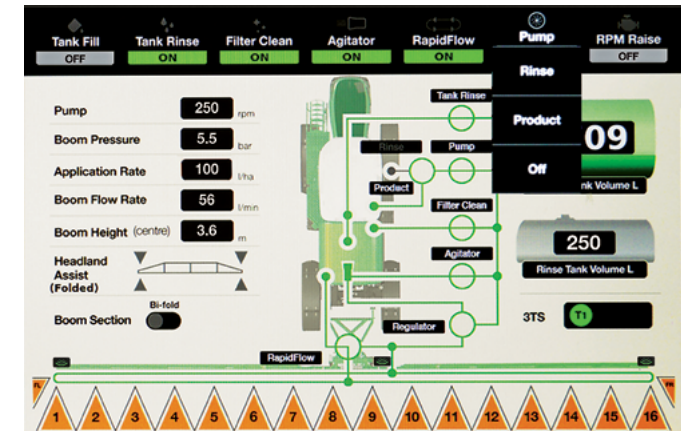
- **On**  
Press the 'On' touch button & the screen returns with the 'Agitator' touch button displaying 'On' (Green).
- **Off**  
Press the 'Off' touch button & the screen returns with the 'Agitator' touch button displaying 'Off' (Grey).
- **Auto**  
Press the 'Auto' touch button & the screen returns with the 'Agitator' touch button displaying 'Auto' (Amber).  
When set to Auto', the agitator automatically switches Off when minimum preset tank level is reached. Refer to Chapter 4 'Setting Up', 'Preset the G-Hub Controller'.



## RapidFlow Touch Button

Press the RapidFlow touch button and a drop down menu with four touch buttons (shown above) appears:

- **On**  
Press the 'On' touch button & the screen returns with the 'RapidFlow' touch button displaying 'On' (Green)
- **Off**  
Press the 'Off' touch button & the screen returns with the 'RapidFlow' touch button displaying 'Off' (Grey)
- **Auto**  
Press the 'Auto' touch button & the screen returns with the 'RapidFlow' touch button displaying 'Auto' (Amber)
- **Prime**  
Press the 'Prime' touch button & the screen returns with the 'RapidFlow' key displaying 'Prime' (Amber)  
Priming the boom lines begins with a count down timer. When boom priming is completed, the 'RapidFlow' key displays 'Auto' (Amber).



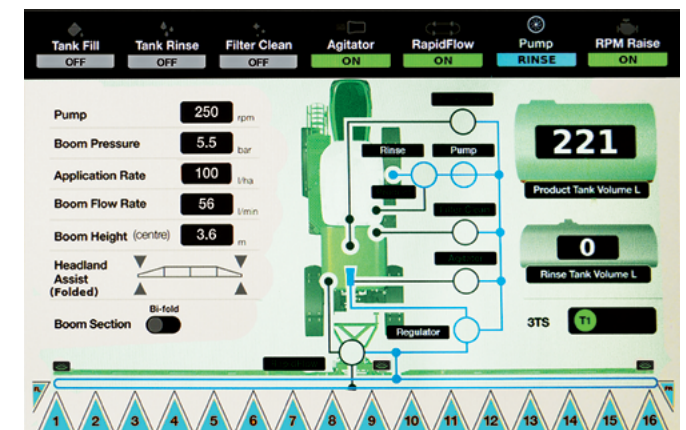
## Pump Touch Button

The Pump touch button provides selection of the Rinse tank or Product tank as the water source.

Press the Pump touch button and a drop down menu with three touch buttons (shown above) appears.

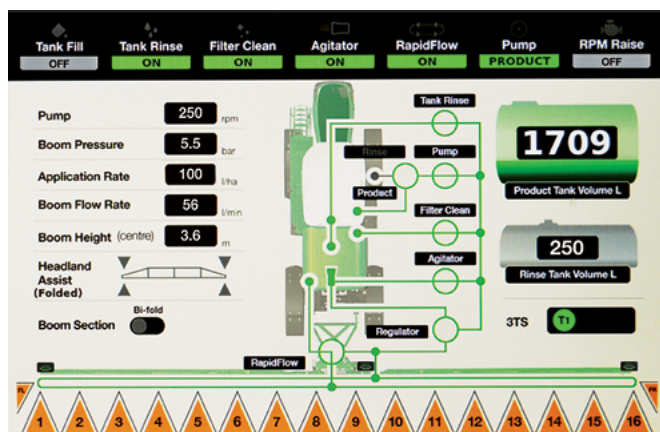
Press the touch button required:

- **Rinse**  
Press the 'Rinse' touch button & the screen returns with the 'Pump' touch button displaying 'Rinse' (Blue) [shown below].





## Your Sprayer at a Glance - Cabin

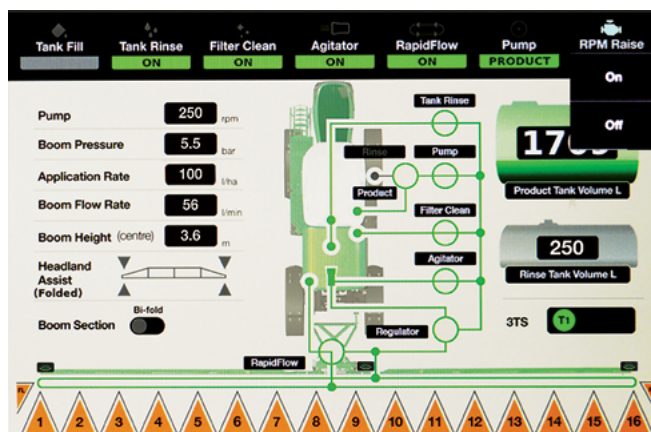


### • Product

Press the 'Product' touch button & the screen returns with the 'Pump' touch button displaying 'Product' (Green) [shown above].

### • Off

Press the 'Off' touch button & the screen returns with the 'Pump' touch button displaying 'Off' (Grey)



### RPM Raise Touch Button

The RPM Raise touch button allows engine speed to be raised while stationary (Park Brake must be On) for filling & mixing functions.

Press the RPM Raise touch button and a drop down menu with two touch buttons (shown above) appears.

Press the touch button required:

#### • On

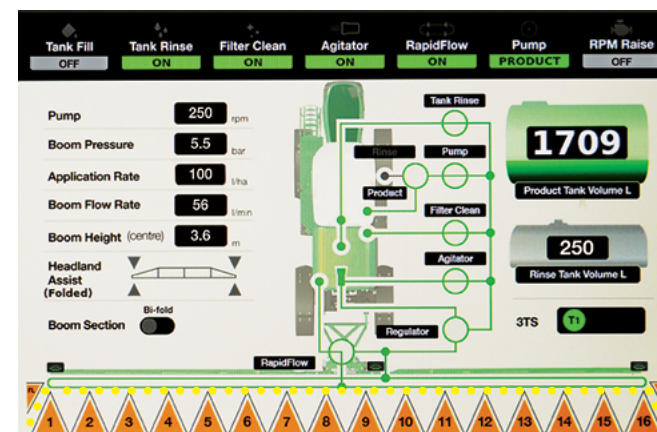
Press the 'On' touch button & the screen returns with the 'RPM Raise' touch button displaying 'On' (Green)

The engine will increase to the preset RPM Raise speed

#### • Off

Press the 'Off' touch button & the screen returns with the 'RPM Raise' touch button displaying 'Off' (Grey).

The engine will reduce to normal idle speed.



### Boom Section Touch Buttons

Boom Section touch buttons along the bottom of the screen (outlined above with yellow dots) can be used to switch selected boom sections On & Off.

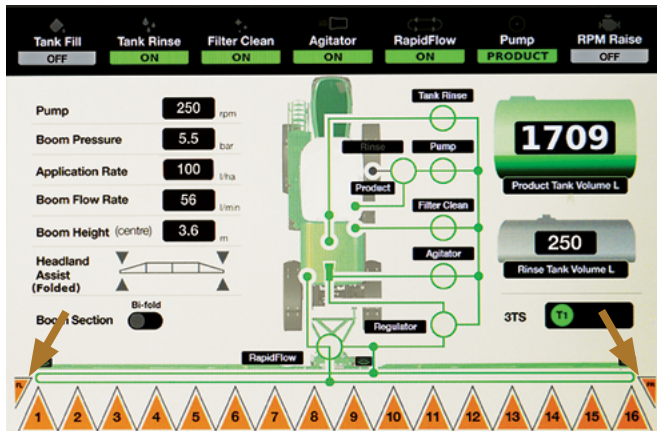
Press a Boom Section touch button to cycle the section On or Off as required:

#### • Boom Sections

Press each touch button as required to activate or deactivate boom sections as required.

Section touch buttons display:

- Amber while waiting for the Spray Controller
- Green when On
- Clear when Off.



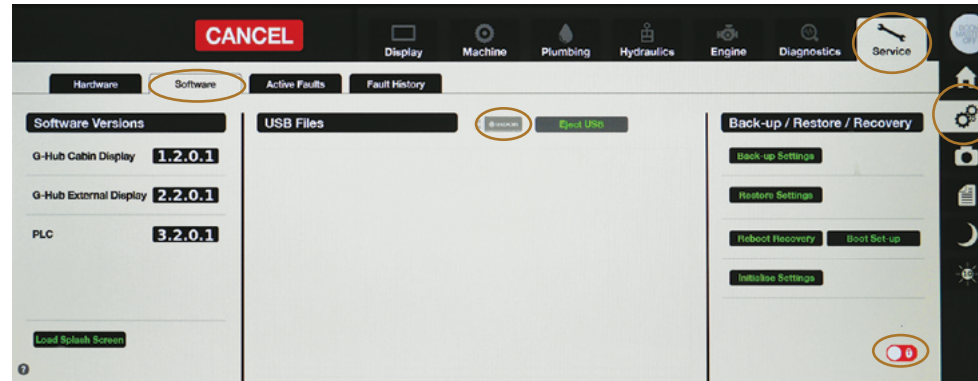
## Fenceline Nozzle Indicators

The Fenceline Nozzle symbols (FL & FR) on the left & right ends of the boom, show whether the fenceline nozzles are On or Off.

- Fenceline Nozzle touch buttons display:
  - Amber with liquid circulating and waiting for the Boom Master to be activated or deactivate
  - Green when On
  - Clear when Off.

Switching the Fenceline Nozzles 'On' or 'Off' is controlled with the 'Fence Nozzle L/R' push button on the Joystick controller.

Press the L/R ends of the Fence Nozzle push button on the Joystick to nozzles spraying. Press again to Stop nozzles spraying.



Press the 'Settings' touch button, then the 'Service' touch button, then the 'Software' touch button to display the 'USB Files' screen menu. Press the red 'Unlock to change' touch button to unlock the screen.

## Back-Up/Restore USB

The Back-Up/Restore USB facility is used to back-up system data onto a USB stick and to restore system data from the USB stick.

### To Back-Up System Settings & Data to a USB Memory Stick:

- 1 Turn the ignition key On.
- 2 Press the 'Settings' touch button on the G-Hub Main screen to open the Display screen, then press the 'Service Tab' touch button to open the Service screen.
- 3 Press the Software tab and the Software screen opens with the Goldacres USB memory stick displaying GREY in the USB Files menu.

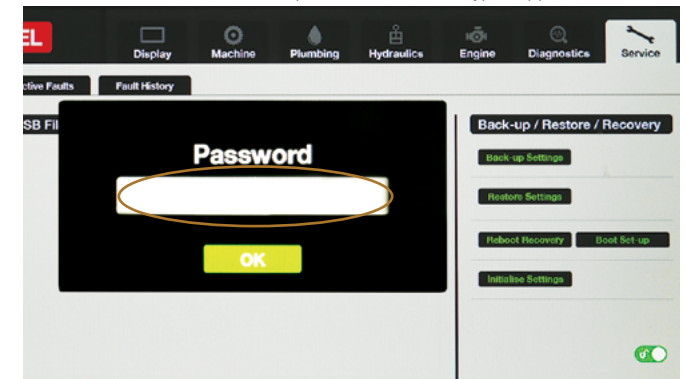
- 4 The Software screen is locked for protection from uninformed or accidental alteration.

The screen must be unlocked before any setting or alterations can be made.

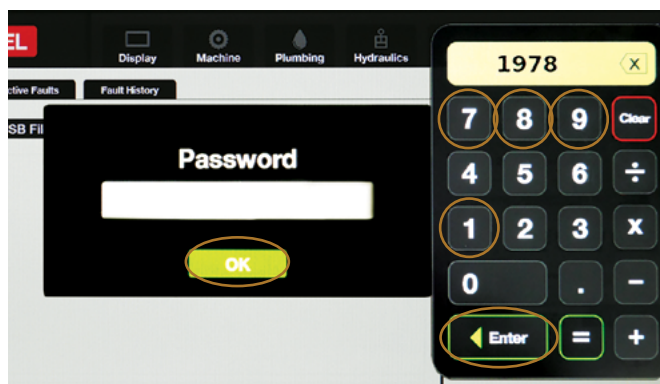
### To Unlock the Software Tab Screen:

- a) Press the red 'Unlock to change' touch button at the bottom RHS of the panel. The 'Unlock to change' touch button changes to green and a password request appears.
- b) Press the password space and a numerical keypad appears.

Press the 'Password' space & a numerical keypad appears.



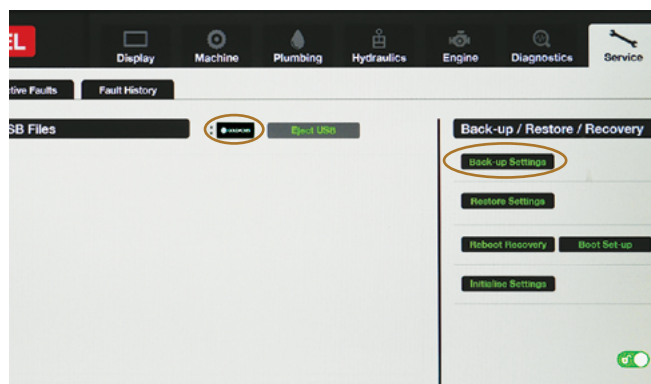
## Your Sprayer at a Glance - Cabin



Press the touch buttons '1978' to enter the password, then press 'Enter'.

- c) Press the numerical touch buttons to enter the password '1978', then press the 'Enter' touch button. The screen returns to the 'Password' with '\*\*\*\*\*' displayed.
  - d) Press the 'OK' touch button and the screen returns to the Software Screen.
- 5 Remove the cap from the Back-Up/Restore USB fitting on the console and Insert a USB Memory Stick into the fitting & wait for the the Goldacres USB memory stick to display BLACK in the USB Files menu.

Remove the cap & insert a USB memory stick into the Back-Up/Restore USB fitting on the console.



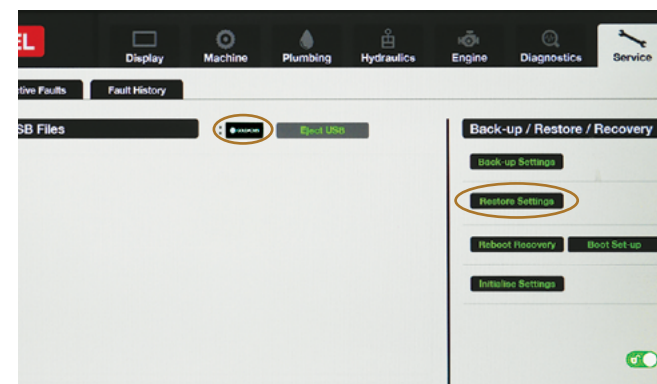
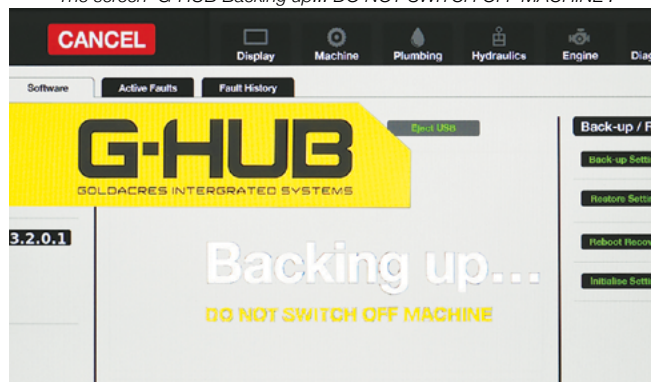
Wait for the the Goldacres USB memory stick to display BLACK in the USB Files menu, then press the 'Back-up Settings' touch button to back-up system settings & data.

- 6 Press the 'Back-up Settings' touch button & the screen changes to 'G-HUB Backing up... DO NOT SWITCH OFF MACHINE'.
- 7 When Back-Up is completed, press the 'Eject USB' touch button, then safely remove the USB Memory Stick.
- 8 Refit the cap to USB fitting on the console.

### NOTE

**DO NOT** press the 'Back-up Settings' touch button or 'Restore Settings' touch button **BEFORE** the the USB Memory Stick is installed & recognised. Otherwise the G-Hub Controller system will stall & require re-booting.

The screen 'G-HUB Backing up... DO NOT SWITCH OFF MACHINE'.



Wait for the the Goldacres USB memory stick to display BLACK in the USB Files menu, then press the 'Restore Settings' touch button to restore system settings & data.

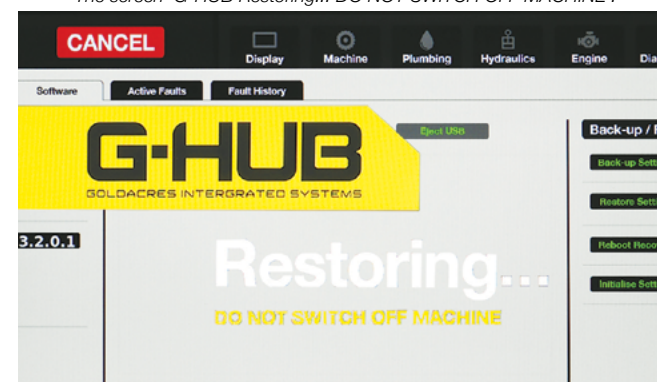
### To Restore System Settings & Data from the USB Stick:

- 1 Follow steps 1 to 5 'To Back-Up System Settings & Data to a USB Memory Stick'.
- 2 Press the 'Restore Settings touch button & the screen changes to 'G-HUB Restoring... DO NOT SWITCH OFF MACHINE'.
- 3 When Restoring is completed, press the 'Eject USB' touch button, then safely remove the USB Memory Stick.
- 4 Refit the cap to USB fitting on the console.

**Reboot Recovery & Boot Set-up** - Used to reboot the display to configure internal hardware settings. For service use only.

**Initialise Settings** - Used to reset GHub settings to default values. If used, the GHub setting must be re-entered before operating.

The screen 'G-HUB Restoring... DO NOT SWITCH OFF MACHINE'.





## 4 - Setting Up – Preparation for Use

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Lift up the the right hand rear latch of the armrest control console.



Lift & raise the front of the armrest control console to its highest position.



The right hand door latch opened with the holding pin & latch holding the door ajar.



Locking latches of the electrical compartment cover lifted up to release the locks.

## Autosteer Installation

The Crop Cruiser is equipped to be fitted with 3rd party GPS Autosteer systems.

Inbuilt Autosteer connectors are located in the Electrical Compartment located below the armrest control console, as well as within the roof space & top of the cabin.

Instructions here provide basic explanation for accessing, locating and connecting relevant connectors for Trimble & John Deere steering systems.

Other systems may be used but details are not provided here.

Refer to installation instructions in this chapter for your chosen steering system.

### NOTE

While it is recommended to gain full access to the electrical compartment via the right hand cabin door, it should be noted that more limited access to the electrical compartment can be made from within the cabin.

## Accessing the Electrical Compartment

It is recommended to open the right hand cabin door and use a step ladder or a raised platform to gain full access to the electrical compartment.

To access the electrical compartment:

- 1 Start the engine and fully open the boom to its working position, then turn the front wheels hard left to create space for a ladder or platform to access the electrical compartment. Stop the engine.

The right hand door latch in locked position.



- 2 While inside the cabin, lift up the right hand rear latch of the armrest control console to release the lock that holds the console in its resting position.
- 3 Lift & raise the front of the armrest control console upwards to its highest position.
- 4 Release the latch of the right hand door.

### CAUTION

When accessing the electrical compartment using a ladder from the outside, do not touch the engine exhaust pipe (along the base of the cabin door) as it may be very hot. Failure to follow this instructions may result in injury.

The right hand cabin door fully opened.



- 5 Unhook the door latch from the holding pin, then fully open the right hand door.
- 6 Place the ladder or platform into position to safely access the electrical compartment.
- 7 Lift up the two latches locking the cover of the electrical compartment.
- 8 Lift & remove the cover from the compartment.

### NOTE

Blue protective wrap covers many in-cab surfaces of a new Crop Cruiser. The blue protective wrap can be carefully removed when desired.

An opened electrical compartment (cover removed).





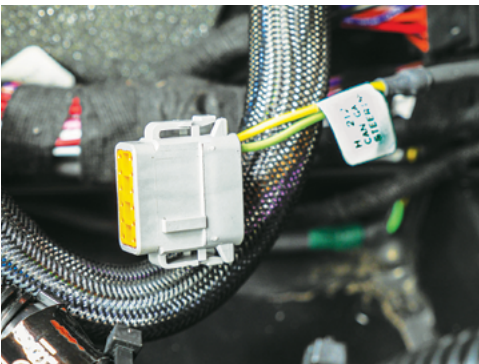
Mounting plate for a Trimble autosteer module at the back of the electrical compartment.

## Autosteer Connectors

Inside the electrical compartment, the following Autosteer connectors are available for fitting and connecting your chosen Autosteer system:

- 1 A mounting plate is located at the back of the electrical compartment for fixing a Trimble autosteer module.
- 2 Steering CAN connector used for both Trimble & John Deere autosteer systems.

Steering CAN connector.



- 3 The Goldacres Standard ISO Cabin Harness fitted to the GPS IN connector is used for both Trimble & John Deere autosteer receivers.
- 4 SMARTRAX connector (Isobus & power) is used for John Deere autosteer systems.

SMARTRAX connector - ISO BUS connection point.



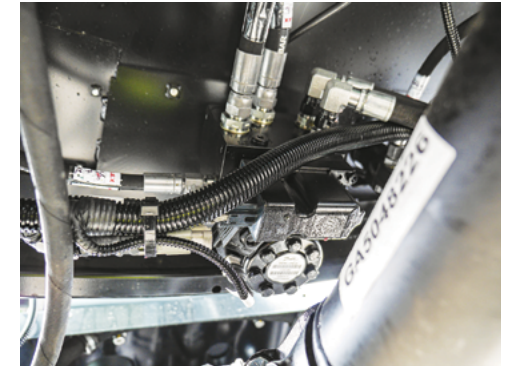
Danfoss autosteer unit.

## Goldacres Autosteer System

Goldacres high performance Danfoss OSPE steering unit with PVED CLS control valve is a fully integrated GPS steering ready solution.

The control valve is compliant with all current legislation and safety standards, and removes the need for a customer to add any extra hydraulic valves to the machine.

While providing a fully integrated solution the steering will function correctly if no GPS system is installed.



Autosteer unit fitted under the cab.

The steering system runs on a dedicated CAN bus network (separate from the ISO BUS) and includes a CAN SASA sensor to measure the current steering wheel angle and speed for steering break out control, as well as, an analogue wheel angle sensor (WAS) to report the angle of the front wheels.

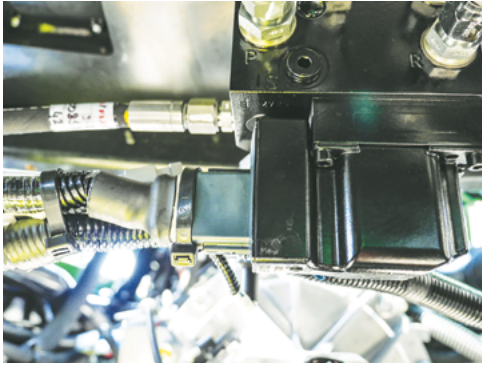
All CAN addresses are setup to utilise the default GPS steering controller source address of '28'.

## NOTE

For safety reasons, when the Crop Cruiser is used in Road Mode, the unit shuts down the autosteering function.



## Preparation for Use – **Setting Up**



Cable connection of the autosteer unit under the cab.



Fitted Danfoss autosteer components.

Machine Steering is controlled via the manual steering wheel via the steering orbital or via CAN commands sent via the steering system to the CLS valve over the CAN bus network.

The safety information, like vehicle speed and MMI information is sent from the G-Hub Controller display located in the cabin.

The valve is also electrically locked out when the field road mode switch is in the 'Road' position to prevent accidental activation.

Maximum engage speed & maximum turn angle setting limits are controlled by the GPS steering system.

The valve can be directly controlled by any steering system that can steer this valve on other model machines. The wheel angle can be read from the Danfoss valve on the steering CAN bus network.

The steering valve is pre-tuned at the factory with the finer adjustments to be made in the field.

Individual Autosteer systems are fitted by the Goldacres dealer.

Refer to the Goldacres Steering System information and Autosteer Electrical Layout drawing provided.



Labelled electrical terminals inside the Electrical Compartment.

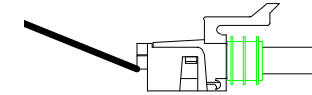
### Switched & Un-switched Power Terminals

Inside the cabin electrical compartment are electrical terminals provided for the easy connection of optional Autosteer controllers and equipment.

Inside the compartment you will see these power studs clearly labelled.

Ensure all connected equipment is suitably fused.

GPS RESUME APTIV P/N 12015791			
CAV	CIR	COLOR	FUNCTION
A	168	BRN	ISO/STEER RESUME



LABEL:  
H: 24  
GPS RESUME

Mating connector PN 12010996.

### GPS Remote Switch Momentary +12V

The G-Hub Controller is set to send a CAN command for the resume switch and a hard wire has also been included if required.

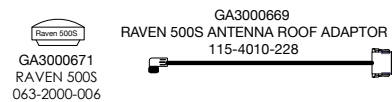
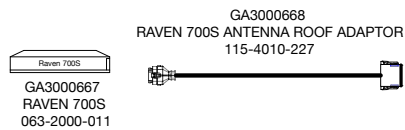
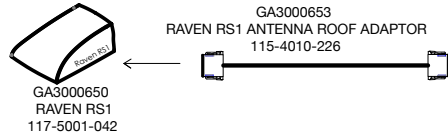
It is used for the connection of the G-Motion GPS momentary switch from the joystick mounted on the Armrest Control Console.

When this single pin connector is connected to the GA3000323 cabin harness, it will provide a momentary 12 volt signal when the steering touch button is pressed.

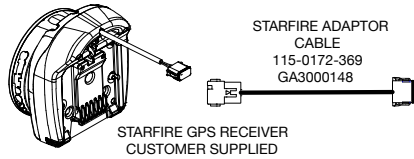
## AUTOSTEER

### GNSS RECEIVERS

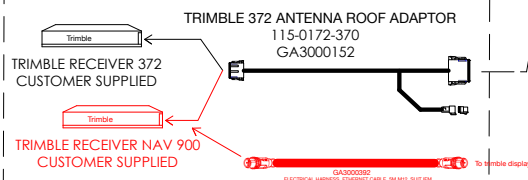
#### RAVEN RS1 AUTO STEERING INCLUDES SC1 AND SLINGSHOT BUILT IN



#### JOHN DEERE AUTOSTEER / SC1



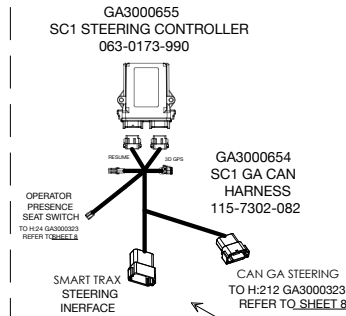
#### TRIMBLE/CASE AUTO STEERING / SC1



#### TRIMBLE AUTO STEERING

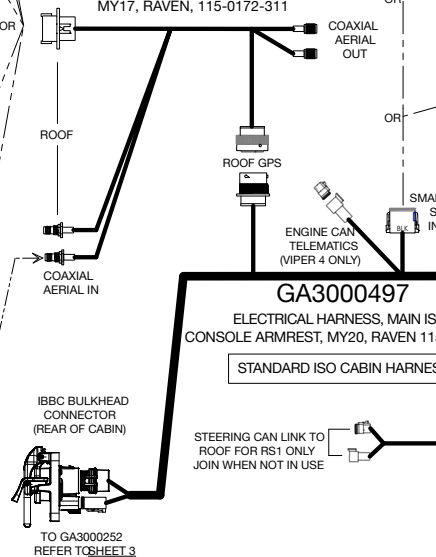


#### RAVEN SC1 AUTOSTEER (WITHOUT RS1)

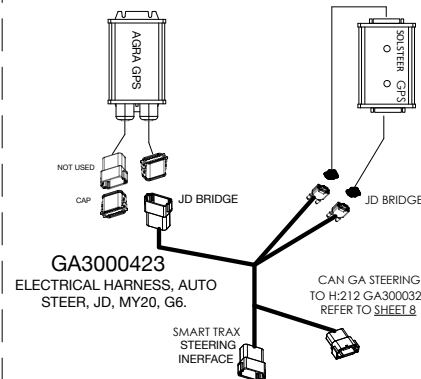


#### STANDARD ISO CABIN HARNESS

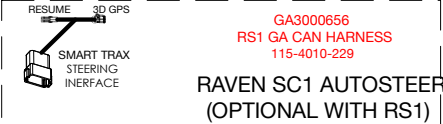
GA3000142  
ELECTRICAL HARNESS, ROOF CABLE EXTENSION,  
MY17, RAVEN, 115-0172-311



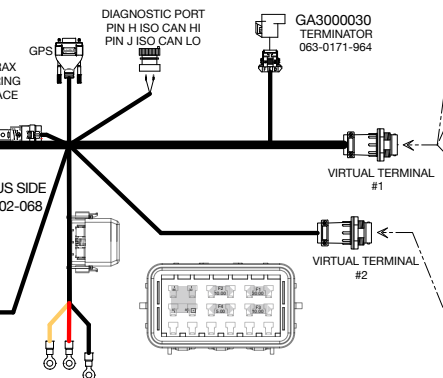
#### CUSTOMER SUPPLIED CAN BRIDGE NODE, CAN BRIDGE SUIT GOLDACRES TO JOHN DEERE STEERING, AGRA-GPS (GOLDACRES-JD) or Solsteer (GO/001)



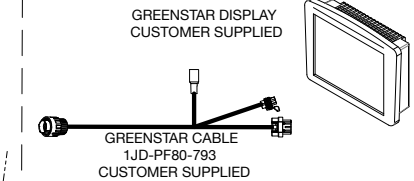
#### JOHN DEERE STEERING READY AUTOSTEER



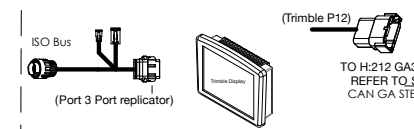
#### RAVEN SC1 AUTOSTEER (OPTIONAL WITH RS1)



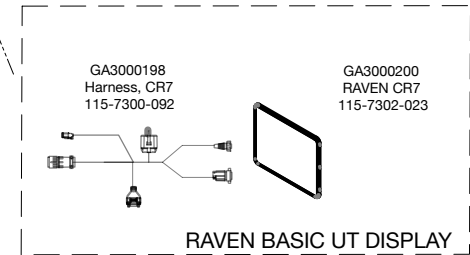
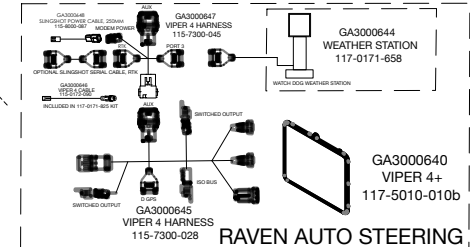
#### JOHN DEERE AUTOSTEER



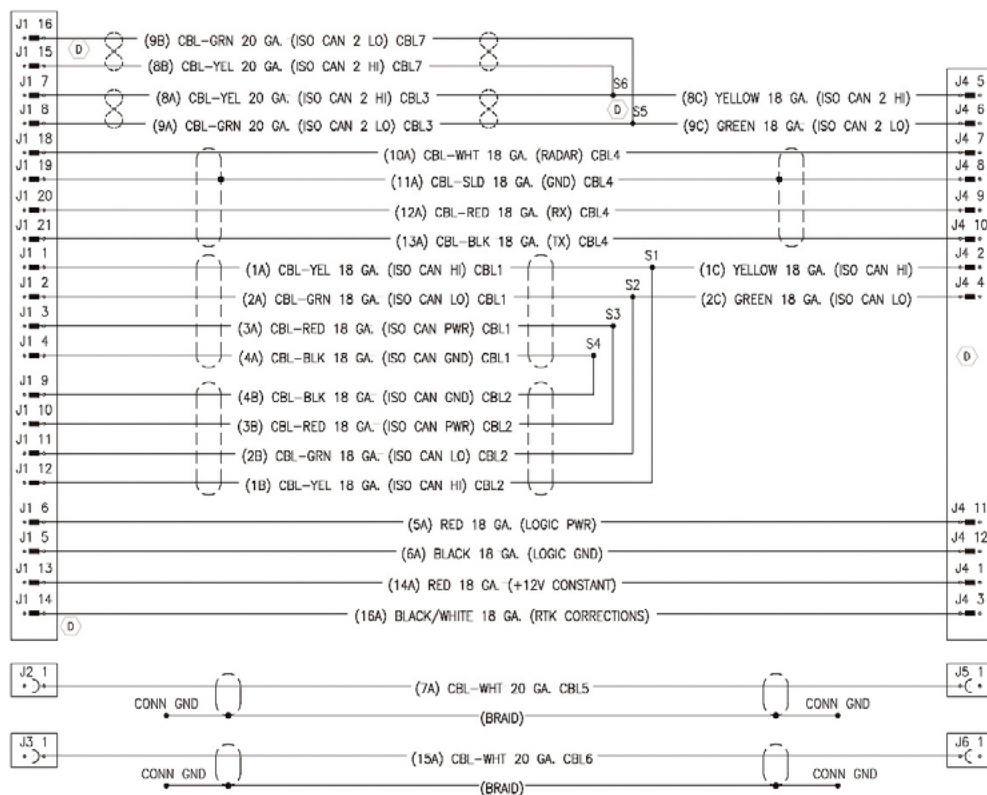
GA3000062  
RAVEN ISO TO TRIMBLE FMX/FM1000, 1050, 2050, GFX  
AGLEADER DISPLAY AND RAVEN SWITCH BOX



#### TRIMBLE AUTO STEERING



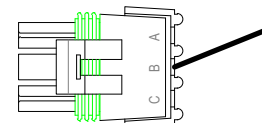
## Preparation for Use – Setting Up



Wiring pin out for GPS receiver connection points.

MASTER GPS SWITCH APTIV P/N 12015793			
CAV	CIR	COLOR	FUNCTION
A	259	ORG	MASTER PWR
B	192	ORG/BLK	ROAD MODE
C	191	ORG/RED	SPRAY MODE

LABEL:  
H: 23  
MASTER GPS



Mating connector PN 12010973.

### GPS Remote ON/OFF Switch

The GPS Remote On/Off Switch is provided for to connect to a customer's auto steer system cable with a 3 pin male weather pack plug.

The switch is labelled Road mode/spray mode and is located near the GPS momentary switch on harness GA3000323.

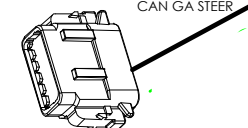
The switch will cut power to the steering orbital when in 'Road' mode making the steering system safe on road.

To make use of this touch button circuit for Autosteer systems it should be connected.

It is wired so the supply for the switch is fed through one connector as the return so it can be used as either a switched earth or a switched positive.

CAN GA STEERING DUETSCH P/N DTM06-12SA			
CAV	CIR	COLOR	FUNCTION
1	304	YEL	CAN HI GA STEERING
12	305	GRN	CAN LO GA STEERING

LABEL:  
H:212  
CAN GA STEER



Mating connector DTM04-12PA.

### Steering CAN bus Network Connection

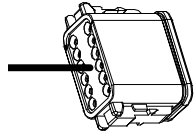
The Steering CAN bus Network Connection is provided for connecting to the steering CAN bus network.

This enables the steering system to send CAN steering commands to the orbital.

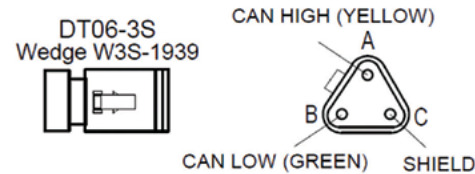
The connection is located on the cabin harness GA3000323.



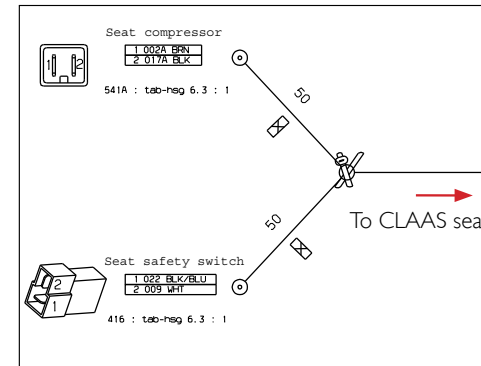
SMART TRAX			
CAV	CIR	COLOR	FUNCTION
1	13	ORG	LOGIC POWER
2	4	RED	BATT POWER
3	15	BLK	LOGIC GROUND
11	105	GRN	ISO CAN LO
12	104	YEL	ISO CAN HI



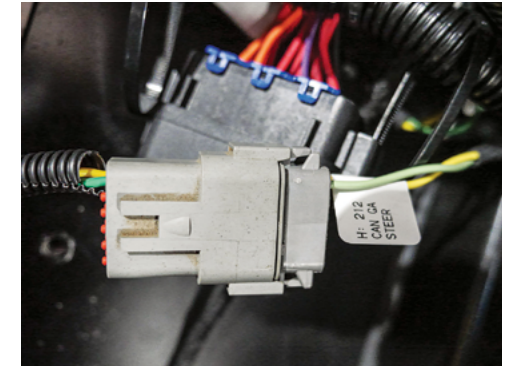
Mating connector DT04-12PB.



Mating connector DT04-3P



Safety switch harness from back of CLAAS seat.



Goldacres connecting cable CAN connector fitted to the Steering CAN connector in the electrical compartment.

## ISO Bus CAN Network Connection

The ISO Bus CAN Network Connection is provided to connect the steering CAN bus network.

It enables the steering system to send CAN steering commands to the orbital.

The connection is located on the Raven ISO bus harness PN 115-7302-068 (GA3000497).

It is labelled J6 or "Smartrax" in the back right side of the electrical compartment.

## J1939 Engine CAN bus Network Connection

The J1939 Engine CAN bus Network Connection is provided to connect the engine and transmission CAN bus network.

It can be used to get engine data such as engine hours for use in remote telematics.

It is located on the J1939 'Backbone' harness near the right hand side of the electrical compartment.

Mating connector DT04-3P.



## Seat Safety Switch

The Seat Safety Switch or operator presence switch causes the Autosteer system to turn off when the operator leaves their seat as a safety feature.

The switch is connected to Autosteer systems to detect the presence of an operator on the seat. For safety, it is recommended this sensor be connected.

The connector is located on the lower rear, right hand side of the electrical compartment.

Safety switch harness connector.



## Installing Trimble Autosteer

The Trimble Autosteer system requires installation of three components:

- Autosteer Module,
- GPS Antenna and
- Display console.

### To Install the Autosteer Module:

- 1 Obtain the optional Goldacres connecting cable for a Trimble autosteer module.
- 2 Connect the Bridge connectors of the Goldacres connecting cable and the Trimble autosteer module.
- 3 Connect the Goldacres connecting cable CAN connector to the Steering CAN connector in the electrical compartment.

## Preparation for Use – **Setting Up**



*Remove the screws from the antenna connectors cover.*



### **To Install the GPS Antenna:**

The GPS Antenna connectors are located within the roof space on the left hand side of the cabin and the antenna platform is located on the top of the cabin roof.

To access & fit antenna connectors:

- 1 Remove two screws from the front & rear of antenna connectors cover above the cabin door.
- 2 Remove the cover to access the antenna connectors.

- 3 Fit & screw the COAXIAL Cable A fitting to the front COAXIAL A connector.
- 4 Feed the other end of the COAXIAL Cable through the eave of roof to the magnet plate on top of the cabin.
- 6 Fit the end connector of the COAXIAL Cable to the Trimble Antenna.
- 7 Place the Trimble Antenna onto the magnetic plate and adjust the COAXIAL Cable to move any excess cable back into the roof space.
- 8 On completion of fitting the antenna, refit the cover & screws above the left hand cabin door.

*The cover removed showing the antenna connectors.*



*The Trimble antenna on the cabin roof magnetic plate.*



### **To Fit the Trimble Autosteer Console:**

- 1 Obtain the optional Goldacres Raven ISO to Trimble connecting cable.
- 2 Fit the Raven ISO to Trimble cable connector to the Terminal ISO connector located on the rail in right hand side of the cabin.
- 3 Fit the Trimble Autosteer Console to the ball mount on the rail at the right hand side of the cabin.
- 4 Fit the other end of the Raven ISO to

*Ball mount fitted on the rail ready for the Autosteer Console.*



*The electrical compartment cover refitted & locked into position.*

Trimble cable connector to the connector on the back of the Autosteer Console

- 6 On completion of the Autosteer installation, refit the cover of the Electrical Compartment and fold down the latches to lock the cover into position.
- 7 Close & lock the right hand cabin door and lower the armrest control console into its working position.





Optional Goldacres connecting cable (Part No. GA3000423) for a Solsteer GPS Module.

## Installing John Deere Autosteer

The John Deere Autosteer system requires installation of three components:

- Solsteer GPS Module or Agra GPS Bridge,
- Starfire GPS Receiver and
- Display console & harness.

### To install the Autosteer Module:

- 1 Obtain the optional Goldacres JD connecting cable (Part No. GA3000423) for a Solsteer GPS Module.
- 2 Connect the Bridge connectors of the Goldacres connecting cable & GPS Module.

Connect the bridge connectors of the connecting cable & the GPS Module in the electrical compartment.



Steering CAN connector in the electrical compartment.

- 3 Connect the Goldacres JD connecting cable CAN connector to the Steering CAN connector in the electrical compartment.
- 4 Connect the Goldacres JD connecting cable SMARTRAX connector to the SMARTRAX connector in the electrical compartment.



SMARTRAX connector in the electrical compartment.



Remove the screws from the antenna connectors cover.

### To Install the GPS Antenna:

The GPS Antenna connectors are located within the roof space on the left hand side of the cabin and the antenna platform is located on the top of the cabin roof.

To access & fit antenna connectors:

- 1 Remove two screws from the front & rear of antenna connectors cover above the cabin door.
- 2 Remove the cover to access the antenna connectors.



The cover removed showing the antenna connectors.



Optional Goldacres connecting cable (Part No. GA3000148) for the Starfire Receiver.

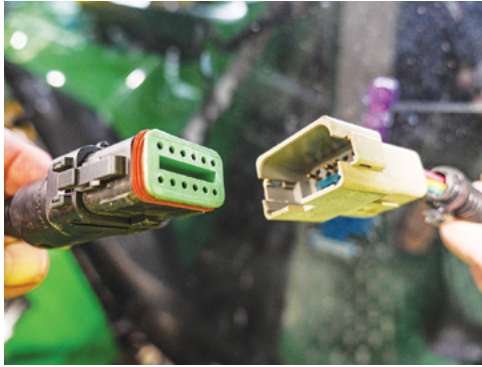
- 4 Obtain the optional Goldacres connecting cable (Part No. GA3000148) for a Starfire Receiver.
- 3 Fit the connecting cable (GA3000148) to the front connector in the cabin roof.
- 4 Feed the other end of the Starfire adaptor cable through the front roof space to the mounting plate on top of the cabin.



The Starfire adaptor cable fitted to the front connector.



## Preparation for Use – **Setting Up**



*Fit the Starfire adaptor cable & Starfire Receiver cable connectors.*



*Fit & connect the Starfire Receiver onto the roof mounting.*



*Fit & connect the John Deere Console.*



*The electrical compartment cover refitted & locked into position.*

- 6 Fit the other end connector of the Starfire adaptor cable to the Starfire Receiver connector.
- 7 Fasten the Starfire Receiver mount onto the roof and fit the receiver cable.

- 8 Fit the Starfire Receiver onto the roof mount and connect the cable connector.
- 9 On completion of fitting the Starfire Receiver, refit the antenna cover & screws above the left hand cabin door.

### **To Fit the John Deere Autosteer Console:**

- 2 Fit the Greenstar cable connector to the virtual terminal ISO connector located on the rail in right hand side of the cabin.
- 3 Fit the John Deere Autosteer Console to the ball mount on the rail at the right hand side of the cabin.
- 4 Fit the other end of the Greenstar cable connector to the connector on the back of the Autosteer Console

- 6 On completion of the Autosteer installation, refit the cover of the Electrical Compartment and fold down the latches to lock the cover into position.
- 7 Close & lock the right hand cabin door and lower the armrest control console into its working position.

*Fasten the Starfire Receiver mount onto the cabin roof.*

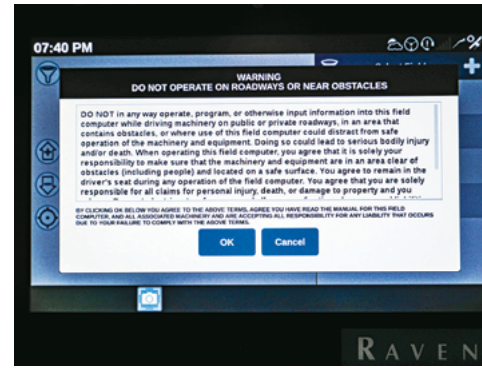


*Ball mount fitted on the rail ready for the Autosteer Console.*

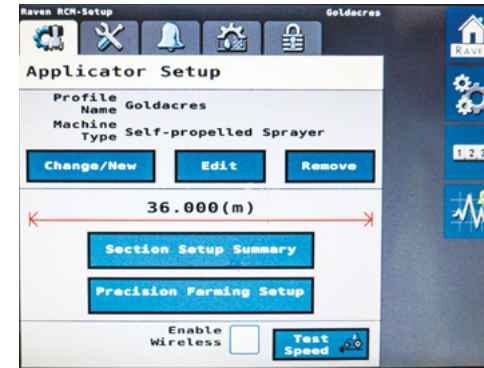




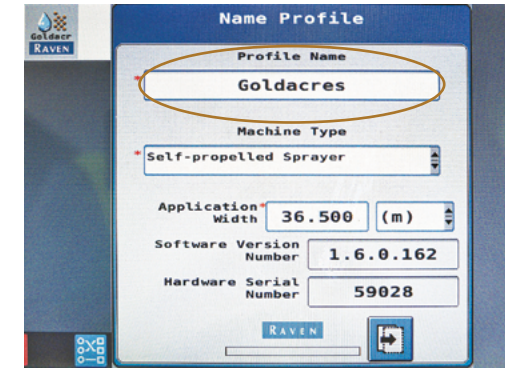
Optional Raven Control screen (CR7) fitted in the cabin.



Opening Warning screen of the optional Raven CR7.



Press the 'Edit' touch button.



Select & press 'Self-Propelled Sprayer'

## Pre-Set the Raven Control Module (RCM)

The Raven Control Module (RCM) (Spray Rate Controller) is pre-set and tested for spraying applications prior to delivery.

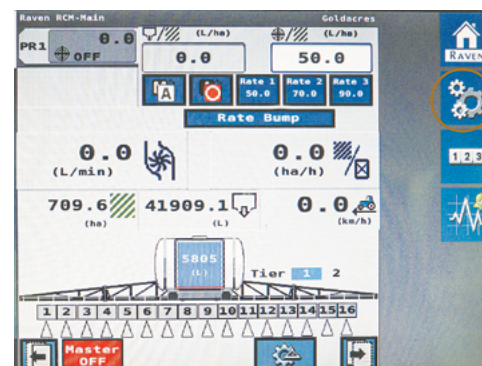
However, it is recommended that all settings and operation be checked and tested for the accuracy prior to spraying applications.

It is the operator's responsibility to correctly operate all controller and sprayer functions at all times.

## To Pre-Set the RCM:

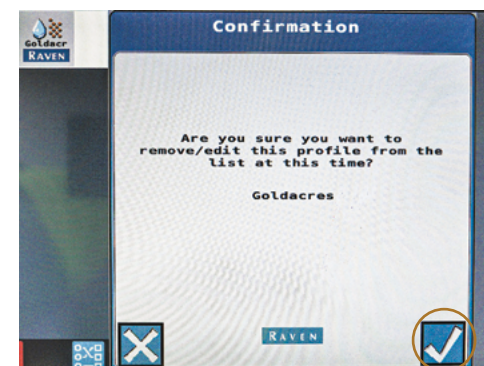
- 1 Start the engine.
- 2 "WARNING DO NOT OPERATE ON ROADWAYS OR NEAR OBSTACLES" appears on the optional Raven CR7 screen.  
Press the OK touch button and the home screen appears.
- 3 Press the 'Set-Up' touch button on the home screen, and the 'Applicator Setup' screen appears.

Press the Set-Up touch button on the home screen.



- 4 Press the 'Edit' touch button or 'Change/New' touch button and a 'Confirmation' screen appears.
- 5 Press the 'Tick' (Next) touch button and the 'Name Profile' screen appears.

Press the 'Tick' (Next) touch button.



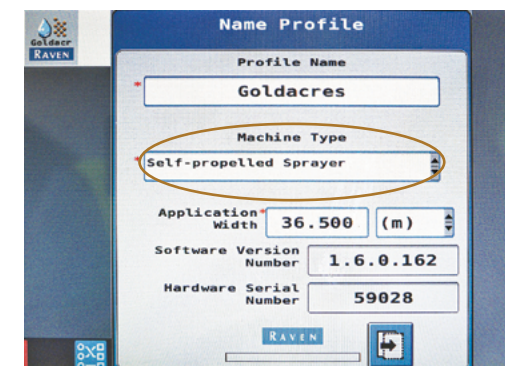
- 6 Press the 'Profile Name' touch button and an alphabetical keypad appears.

Press the touch buttons to create a profile name. eg. 'Goldacres', then press the Next touch button.

The screen returns to the Name Profile screen with "Goldacres" displayed.

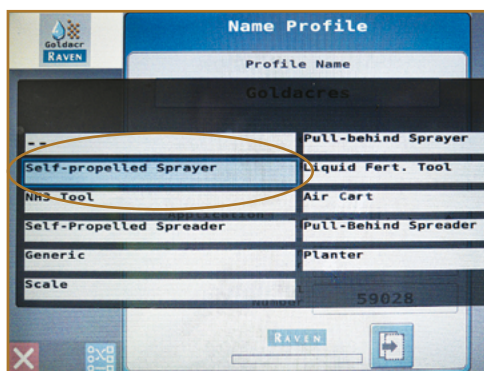
- 7 Press the 'Machine Type' touch button and a machine type menu appears.

Press the 'Machine Type' touch button.

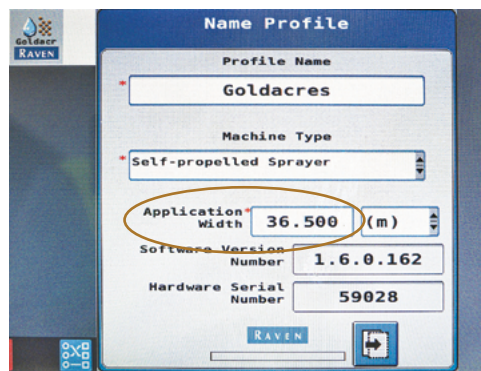




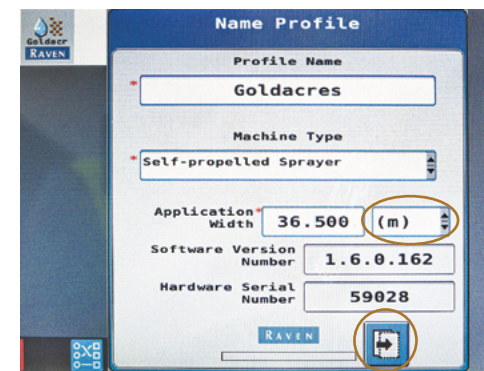
## Preparation for Use – Setting Up



Select & press 'Self-propelled Sprayer'



Press the 'Application Width' touch button.



Press 'Units' touch button.

- 8 Select & press 'Self-propelled Sprayer' and the screen returns to the Name Profile screen with selection 'Self-propelled Sprayer' displayed.

- 9 Press the 'Application Width' touch button and a numerical keypad appears.

It is important that the 'Application Width' of the machine is entered correctly.

Determine how the boom is plumbed.

Booms may be plumbed with either:

- Centreline (rowcrop) plumbing - A single nozzle at the boom centre or
- Broadacre plumbing - Two nozzles either side of the boom centre.

A single nozzle plumbing to the centre of the boom- referred to as centreline or row crop plumbing.



Two nozzles plumbed either side of the centre of the boom - referred to as broadacre plumbing.



Each has a different spray application width, for example, on a 36m boom:

- Centreline plumbing has 73 nozzles x 500mm = 36.5m application width.
- Broadacre plumbing has 72 nozzles x 500mm = 36m application width.

To calculate Application Width, count the number of nozzles on the boom line, then multiply by the nozzle spacing.

Press the touch buttons to enter the boom width. eg. '36.5' metres, then press the 'Next' touch button.

The screen returns to the Name Profile screen with '36.500' displayed.

- 10 Press the 'Units' touch button and a units menu appears.

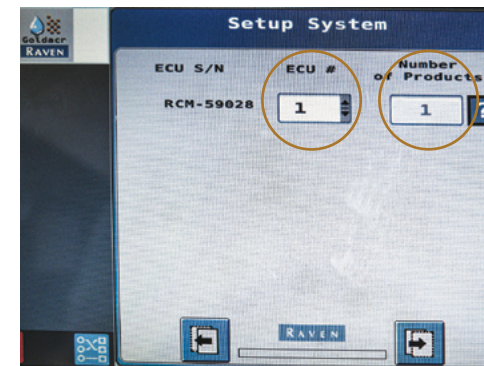
Select & press 'm' (metres) and the screen returns to the Name Profile screen with selection 'm' displayed.

- 11 Press the 'Next' touch button and a 'Setup System' screen appears.

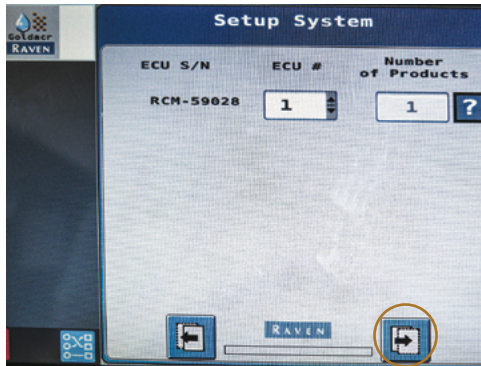
- 12 Press the 'ECU #' touch button and a drop down menu appears.

Select & press the appropriate 'ECU #' and the number 1 appears in the Setup System screen.

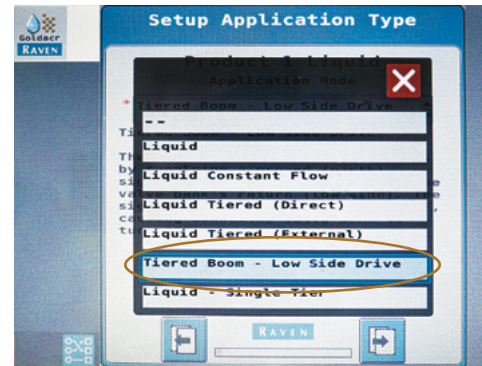
Press the 'ECU #' touch button, then, press 'Number of Products' touch button.



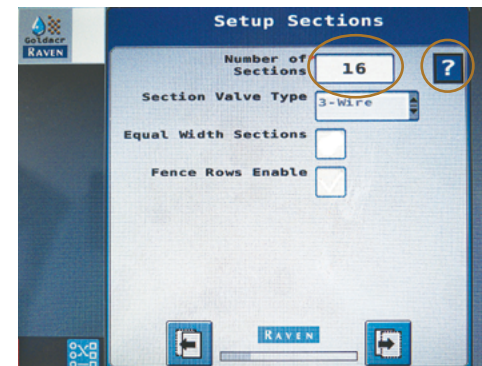




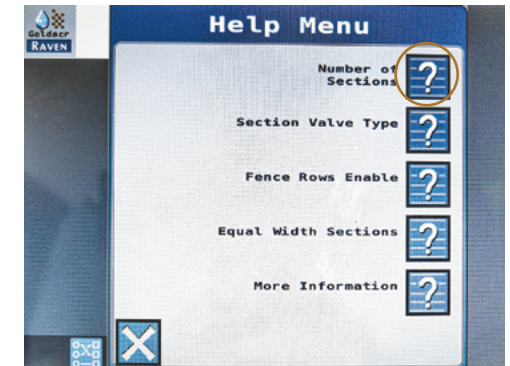
Press the 'Next' touch button.



Select & press 'Tiered Boom - Low Side Drive'.



Press the 'Number of Sections' touch button. Leave the 'Equal Widths Sections' blank. Press the Help Menu '?' touch button.



Select & press the Help Menu '?' touch button required. To exit press the 'X' touch button.

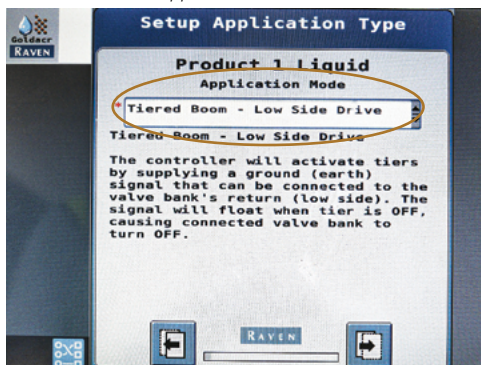
- 13 Press the 'Number of Products' touch button and a drop down menu appears.  
Select & press the appropriate '1' product and '1' appears in the Setup System screen.
- 14 Press the 'Next' touch button and a 'Setup Application Type' screen appears.
- 15 Press the 'Application Mode' touch button and a drop down menu appears.

- 16 Select & press the 'Tiered Boom - Low Side Drive' mode, and 'Tiered Boom - Low Side Drive' appears in the Setup Application Type screen.
- 17 Press the 'Next' touch button and a 'Setup Sections' screen appears.
- 18 Press the 'Number of Sections' touch button and a drop down menu appears.

- 19 Select & press '16', then '16' appears in the Setup Sections screen.
- 20 Leave the 'Equal Width Sections' box unchecked (blank) as Goldacre booms are plumbed with varying section widths.
- 21 Leave the 'Fence Rows Enable' box unchecked (blank) as the Fence Rows are enabled in the Goldacre G-Hub.
- 22 If more information is needed, press the Help Menu '?' touch button and a Help menu appears.

- 23 Select & press the appropriate Help Menu '?' touch button for more information on settings. Another screen appears with more information.  
To exit the Help screen, press the 'X' touch button & the screen returns to the Setup Section.
- 24 Press the 'Next' touch button and a 'Setup Section Width' screen appears.

Press the 'Application Mode' touch button.



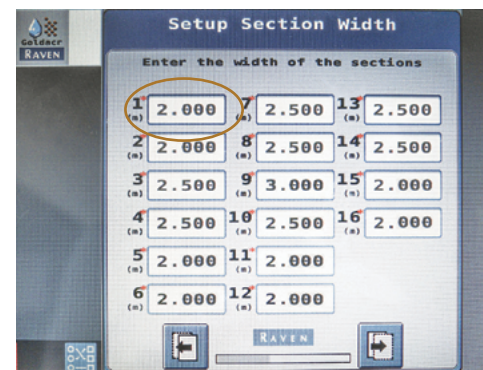
## NOTE

The easiest way to determine the Width of a Section is to count the nozzles.  
Start at section 1 which is on the left end of the boom by counting the number of nozzles in the section.  
For example, section 1 has 4 nozzles. Four nozzles at 500mm spacing gives a section width of 2.0m.  
Repeat the procedure for each section.  
This procedure is applicable to both Broadacre & Rowcrop plumbed booms.

## Preparation for Use – Setting Up

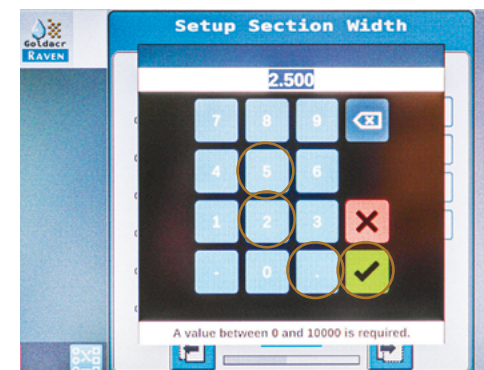
Section Details of a 36m Boom with Centreline Plumbing			
Section Number (L to R)	Nozzle Spacing (m)	No Nozzles in Section	Section Width (m)
1	0.5	4	2.0
2	0.5	4	2.0
3	0.5	5	2.5
4	0.5	5	2.5
5	0.5	4	2.0
6	0.5	4	2.0
7	0.5	5	2.5
8	0.5	5	2.5
9	0.5	6	3.0
10	0.5	5	2.5
11	0.5	4	2.0
12	0.5	4	2.0
13	0.5	5	2.5
14	0.5	5	2.5
15	0.5	4	2.0
16	0.5	4	2.0
Total No of nozzles:		73	
Spray Application Width:		36.5m	

Section Details of a 36m Boom with Broadacre Plumbing			
Section Number (L to R)	Nozzle Spacing (m)	No Nozzles in Section	Section Width (m)
1	0.5	4	2.0
2	0.5	4	2.0
3	0.5	5	2.5
4	0.5	5	2.5
5	0.5	4	2.0
6	0.5	4	2.0
7	0.5	5	2.5
8	0.5	5	2.5
9	0.5	5	2.5
10	0.5	5	2.5
11	0.5	4	2.0
12	0.5	4	2.0
13	0.5	5	2.5
14	0.5	5	2.5
15	0.5	4	2.0
16	0.5	4	2.0
Total No of nozzles:		72	
Spray Application Width:		36.0m	



Individually press each 'Section' touch button from 1st to 16th & set each width in metres.

25 Individually press each 'Section Width' touch button and a numerical keypad appears.



Press touch buttons to enter the section width, then press the 'Tick' touch button.

26 Press the touch buttons to enter a section width. eg. '2.0, 2.5 or 3.0' metres as required, then press the 'Tick' touch button.

The screen returns to the Setup Section Widthscreen with '2.0, 2.5 or 3.0' respectively displayed.

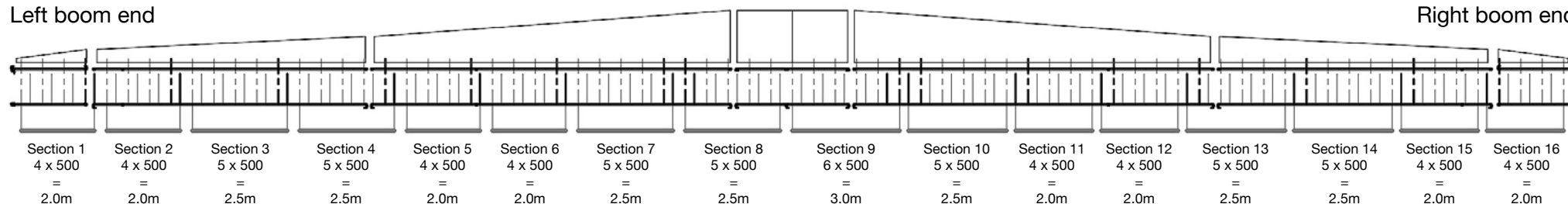
Repeat for each section as required.

An illustration of a 36m Centreline (rowcrop) plumbed boom showing the details of the 16 boom sections.

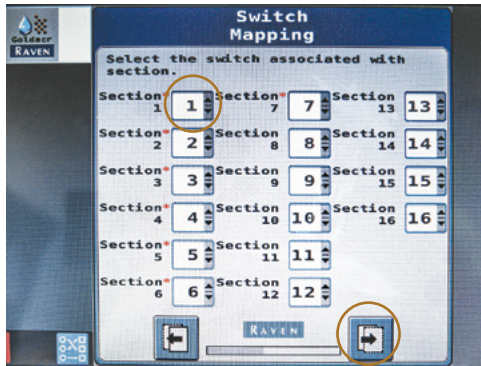
Sections are numbered 1 to 16 starting from the left hand side. Dotted vertical lines illustrate Centreline (rowcrop) plumbing nozzle locations. Solid vertical lines illustrate the broadacre plumbing nozzle location option.

Left boom end

Right boom end







Individually press each 'Section' touch button from 1st to 16th to set the individual switches.

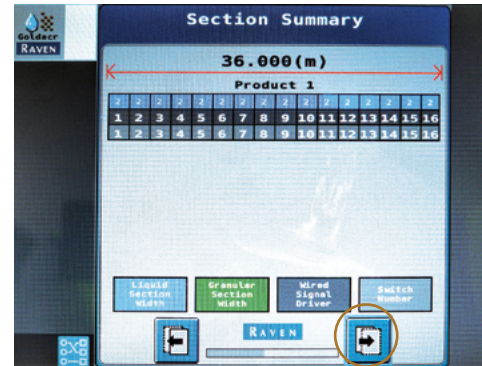
27 Press the Next touch button and a 'Switch Mapping' screen appears.

28 Individually press each 'Section' (1-16) touch button and a numerical list appears.

Select & press the switch number. eg. '1' and the screen returns to the Switch Mapping screen with '1' displayed.

Repeat for each section.

29 On completion press the Next touch button and a 'Section Summary' screen appears.



Review the information on the Section Summary screen. Press the 'Next' touch button.

30 Review the information on the Section Summary screen.

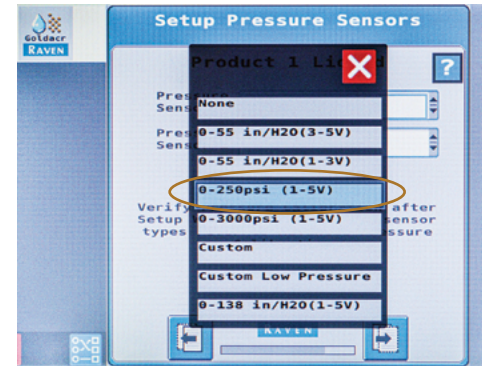
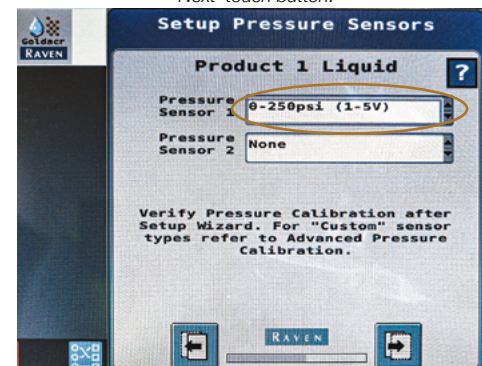
If any change is required, press the 'Back' touch button to the screen(s) required to make the change(s).

31 Press the 'Next' touch button and a 'Setup Pressure Sensors' screen appears.

32 Press the 'Pressure Sensor 1' touch button and a Pressure Sensors menu appears.

33 Select & press the '0-250psi (1-5v)' pressure sensor setting and the screen returns to the Setup Pressure Sensors screen with '0-250psi (1-5v)' displayed.

Press the 'Pressure Sensor 1' touch button. Press the 'Next' touch button.

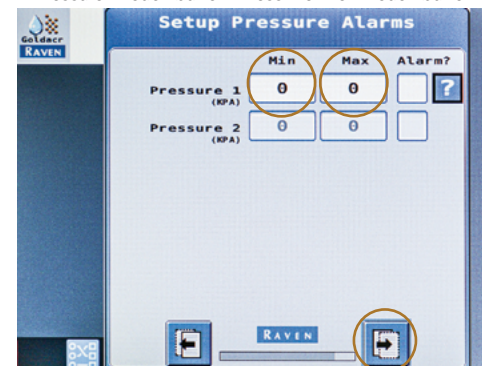


Select & press the '0-250psi (1-5v)' touch button pressure sensor setting.

34 Press the 'Next' touch button and a 'Setup Pressure Alarms' screen appears.

35 Press the 'Min' touch button and a 'Set Pressure Alarms' keypad appears.

Press the 'Min' Pressure 1 touch button. Press the 'Max' Pressure 1 touch button. Press the 'Next' touch button.



Press the touch buttons to set minimum pressure value eg. '100', then press the 'Tick' touch button.

36 Press the touch buttons to set the minimum pressure value eg. '100', then press the 'Tick' touch button.

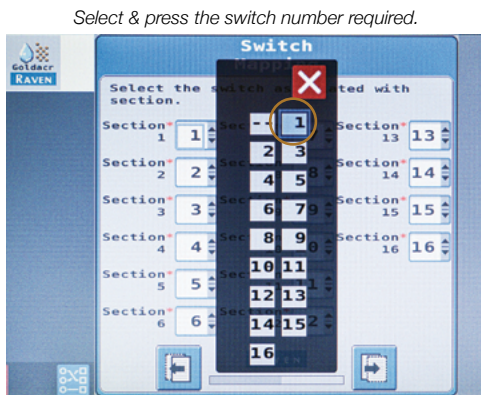
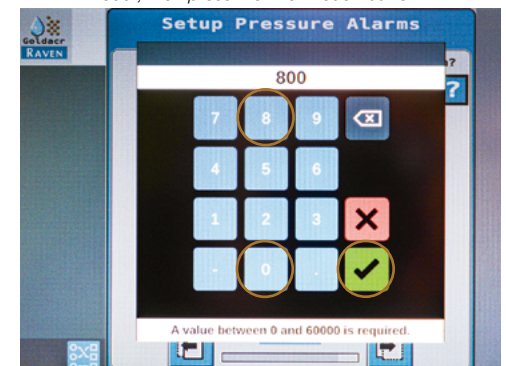
The 'Setup Pressure Alarms' screen returns with the value eg. '100' showing in the 'Min' display.

37 Press the 'Max' touch button and a 'Set Pressure Alarms' keypad appears.

Press the touch buttons to set the minimum pressure value eg. '800', then press the 'Tick' touch button.

The 'Setup Pressure Alarms' screen returns with the value eg. '800' showing in the 'Max' display.

Press the touch buttons to set maximum pressure value eg. '800', then press the 'Tick' touch button.



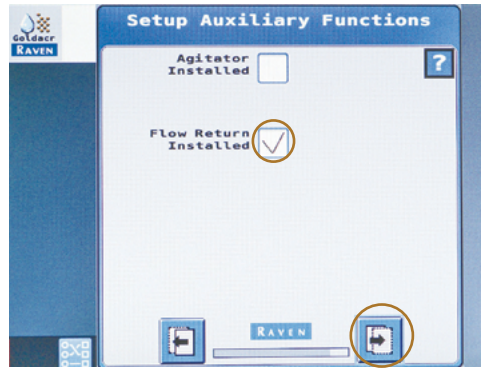
Select & press the switch number required.



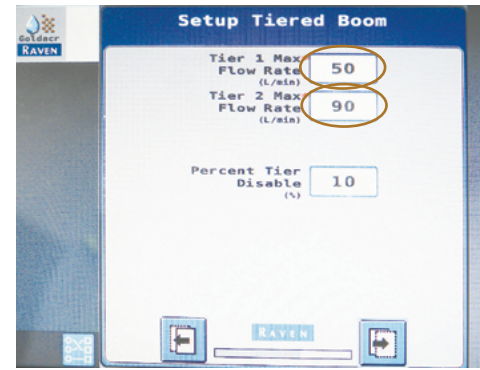
## Preparation for Use – Setting Up



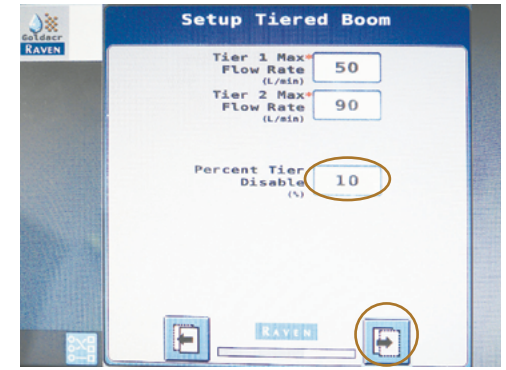
Press the 'Alarm?' touch button to enable the Alarms. Press the Help Menu '?' touch button for Alarm setting notes. Press 'Next'.



Press & 'Tick' the 'Flow Return Installed' box as shown. Press the 'Next' touch button.



Press the 'Tier 1' & 'Tier 2' touch buttons to enter the appropriate Tier Maximum Flow Rates.



Press the 'Percent Tier Disable' touch button and enter 10% as shown, then press the 'Next' touch button.

- 38 Press the 'Alarms' touch button to enable the Alarms.

A 'Tick' appears when Enabled (the checkbox is blank when Disabled).

- 39 Press the Help Menu '?' touch button to read notes on Alarm settings.

- 40 Press the 'Next' touch button and a 'Setup Auxiliary Functions' screen appears.

- 41 In the Setup Auxiliary Function panel:

- Leave the 'Agitator Installed' box blank as agitator is controlled by the G-Hub.
- Press the 'Flow Return Installed' box to select the Flow Return Installed. A "Tick" appears when Selected (the box is blank when unselected).

This stops the 'Warning Pop-Up' when the boom RapidFlow is On (Automatic mode).

If using Manual Mode, an operator may choose to leave this box unchecked to be reminded of switching Off the RapidFlow for spraying.

- 42 Press the 'Next' touch button and a 'Setup Tiered Boom' screen appears.

**This screen requires the operator to calculate the maximum flow rates of nozzles fitted to Tier 1 & Tier 2 boom sections.**

**Refer to Chapter 6 'Calibration' for the information required to determine Maximum Tier Flow Rates & Nozzle Charts.**

- 43 Press the 'Tier 1 Max Flow Rate' touch button and a keypad appears. Press the touch buttons to set the minimum pressure value eg '50' (L/min), then press the 'Tick' touch button.

The 'Setup Tiered Boom' screen returns with eg '50' (L/min) displayed in the 'Tier 1 Max Flow Rate' display.

- 44 Press the 'Tier 2 Max Flow Rate' touch button and a keypad appears. Press the touch buttons to set the minimum pressure value eg, '90' (L/min), then press the 'Tick' touch button.

The 'Setup Tiered Boom' screen returns with eg, '90' (L/min) showing in the 'Tier 2 Max Flow Rate' display (example only).

- 45 Press the 'Percent Tier Disable' touch button and a keypad appears. Press the touch buttons to set the value eg, '10' (%), then press the 'Tick' touch button.

The 'Setup Tiered Boom' screen returns with eg, '10' (%) showing in the 'Percent Tier Disable' display.

Max Flow Rates & Tier Disable values will vary with nozzle type selected.

- 46 Press the 'Next' touch button and a 'Setup Control Valve' screen appears.

### NOTE

#### HELP MENU INFORMATION

##### Minimum Pressure

Enter the minimum desired pressure for the system while applying.

When the pressure sensor is assigned to a liquid product, the alarm is enabled and the minimum pressure threshold has been met, the rate controller will override flow control and attempt to maintain the minimum pressure setting. This condition may result in over-application.

### NOTE

#### HELP MENU INFORMATION

##### Maximum Pressure

Enter the maximum desired pressure for the system while applying.

When the pressure sensor is assigned to a liquid product, the alarm is enabled and the maximum pressure threshold has been met, the rate controller will override flow control and attempt to maintain the maximum pressure setting. This condition may result in under-application.

### NOTE

#### Valve Response Rate

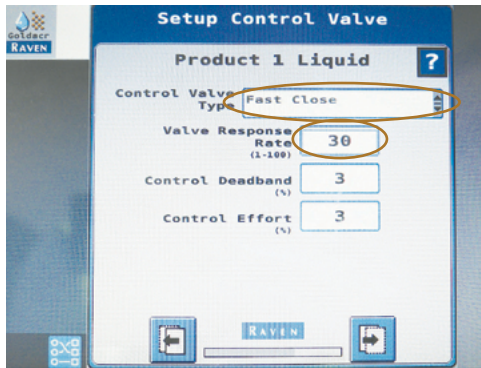
The Response Rate has a range of 1 to 100 and the setting determines how aggressively the target rate is controlled to. Increasing this value will cause the system to respond more quickly. Decreasing it will cause a slower response. If the flow is slow to reach the target value, consider increasing it.

### NOTE

#### Percent Tier Disable

The 'Percent Tier Disable' value is used to minimise unnecessary tier switching when spraying close to the switch point of a tier. Increasing the value, reduces the sensitivity when switching tiers.

The '10% Percent Tier Disable' value means a spraying Tier will not change down until the spray rate is 10% below the target rate.



Press the 'Control Valve Type' & 'Valve Response Rate' touch buttons to set the values as shown.

- 47 Press the 'Control Valve Type' touch button and a menu appears.

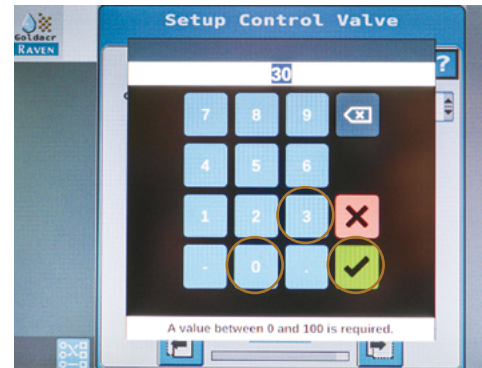
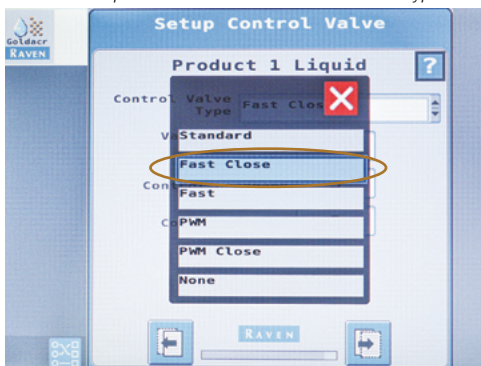
Select & press the 'Fast Close' Control Valve Type and the screen returns to the Setup Control Valve screen with 'Fast Close' displayed.

- 48 Press the 'Valve Response Rate' touch button and a keypad appears.

Press the touch buttons to set the value to '25', then press the 'Tick' touch button.

The 'Control Valve Type' screen returns with '30' showing in the 'Valve Response Rate' display.

Select & press the 'Fast Close' Control Valve Type.



Press the touch buttons to set the Valve Response Rate value to '30', then press the 'Tick' touch button.

- 49 Press the 'Control Deadband' touch button and a keypad appears. Press the touch buttons to set the value to '3' (%), then press the 'Tick' touch button.

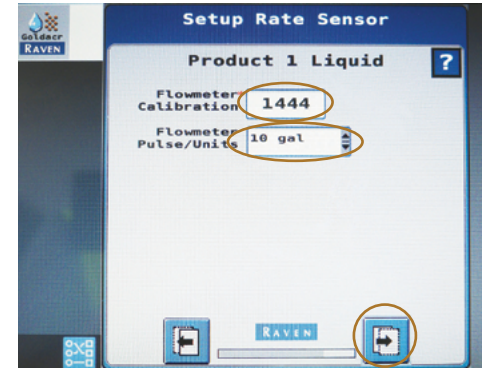
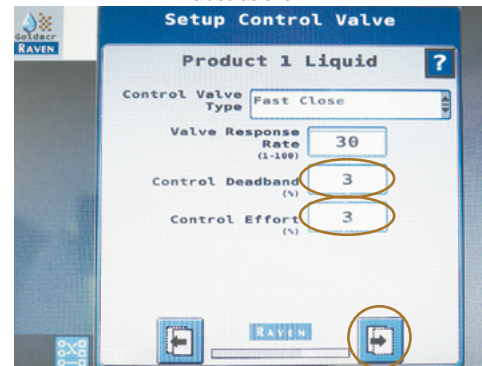
The 'Control Valve Type' screen returns with '3' (%) showing in the 'Valve Response Rate' display.

- 50 Press the 'Control Effort' touch button and a keypad appears.

Press the touch buttons to set the value to '3' (%), then press the 'Tick' touch button.

The 'Control Valve Type' screen returns with '3' (%) showing in the 'Control Effort' display.

Press the Control Deadband & Control Effort and enter the values as shown.



Press the 'Flowmeter Calibration' touch button. Press the 'Flowmeter Pulses/Units' touch button. Press Next.

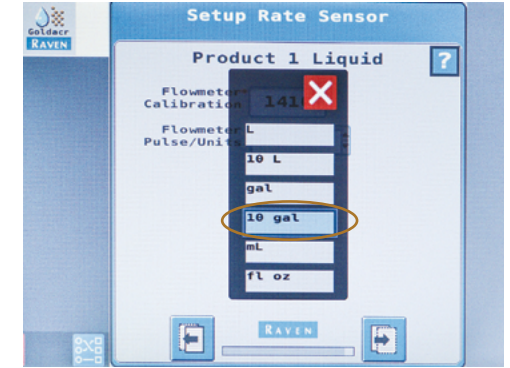
- 51 Press the 'Next' touch button and a 'Setup Rate Sensor' screen appears.

- 52 Press the 'Flowmeter Calibration' touch button and a keypad appears.

Press the touch buttons to enter the flowmeter calibration value (obtained from the flowmeter tag [shown below]) eg, '1444', then press the 'Tick' touch button.

The 'Setup Rate Sensor' screen returns with eg, '1444' showing in the 'Flowmeter Calibration' display.

Check the tag of flowmeter located on the top rear boom centre section.



Select & press the '10 gal' option.

- 53 Press the 'Flowmeter Pulses/Units' touch button and a menu appears. Select & press the '10 gal', then '10 gal' appears in the 'Flowmeter Pulses/Units' display.

- 54 Press the 'Next' touch button and a 'Setup Tank/Bin' screen appears.

## NOTE

### Control Deadband

Enter the percent of target rate the control valve will control to. For example, if 2% is entered the rate controller will attempt to adjust the flow rate until the actual rate is with 2% of the target rate.

### Control Effort

Enter the minimum percentage needed for the control valve to change position.

## NOTE

### Flowmeter Calibration

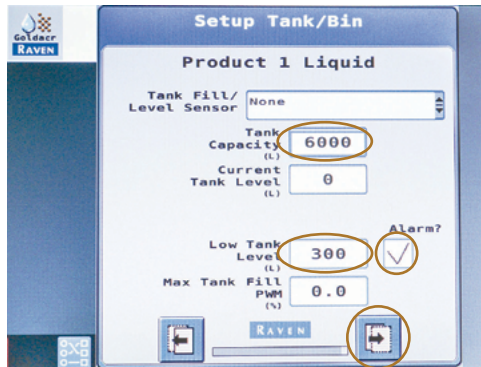
Enter the Flowmeter Calibration. Most flowmeter have an attached tag indicating recommended calibration number. Enter this number as initial flowmeter calibration value.

### Flowmeter Pulse/Units

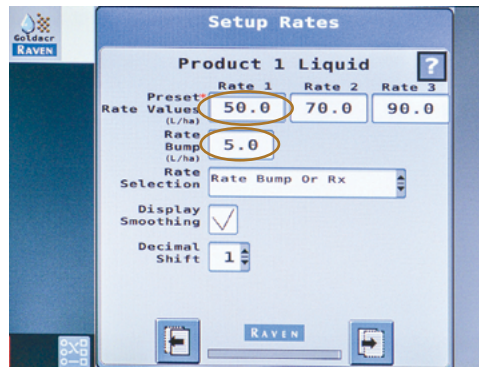
Select the flowmeter units from this drop-down. The Flowmeter Pulses/Units is the number of pulses the flowmeter will generate for a given amount product passed through that flowmeter. For example, a flowmeter calibration of 710 Pulses/10gal (37.85 litres) would indicate that for every 710 pulses from the flowmeter, 10 gal (37.85 litres) of product will pass through the flowmeter.



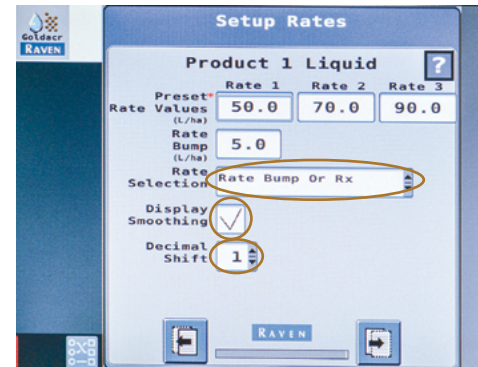
## Preparation for Use – Setting Up



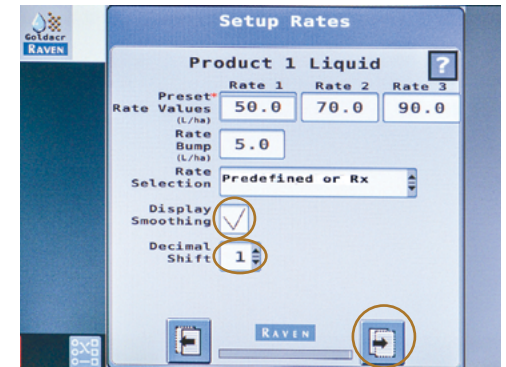
Press the 'Tank Capacity' touch button. Press the 'Low Tank Level' touch button. Enable the Alarm. Press 'Next'.



Press 'Preset Rate Values' touch button and set the rate required, then set the 'Rate Bump' value.



Press 'Rate Selection' touch button & select 'Predefined or Rx' Smoothing'.



Press the 'Enable 'Display Smoothing' checkbox, then. Set the 'Decimal Shift' value. Press the 'Next' touch button.

55 The 'Tank Fill/Level Sensor' should display 'None'.

56 Press the 'Tank Capacity' touch button and a keypad appears. Press the touch buttons to enter the total tank volume in litres eg, '6000', then press the 'Tick' touch button.

The 'Setup Tank/Bin' screen returns with eg, '6000' displayed in 'Tank Capacity'.

Actual tank volume may be more eg, 6200 & may be used if desired.

57 Press the 'Low Tank Level' touch button and a keypad appears. Press the touch buttons to enter the total tank volume in litres '300', then press the 'Tick touch button.

The 'Setup Tank/Bin' screen returns with '300' displayed in the 'Low Tank Level'.

58 Press the 'Low Tank Level Alarm' checkbox to enable the Alarm. A 'Tick' appears when the Alarm is enabled (the checkbox is blank if disabled).

59 Press the 'Next' touch button and a 'Setup Rates' screen appears.

60 Press the 'Preset Rate Values - Rate 1' touch button and a keypad appears. Press the touch buttons to enter the rate required in litres, eg. '50' (L/ha), then press the 'Tick' touch button.

The 'Setup Tank/Bin' screen returns with '50' displayed in 'Tank Capacity'.

61 Repeat for rates required in 'Rate 2' and 'Rate 3'

62 Press the 'Rate Bump' touch button and a keypad appears. Press the touch buttons to enter the rate value, eg '5', then press the 'Tick' touch button.

The 'Setup Rates' screen returns with '5' displayed in 'Rate Bump'.

### NOTE

#### Rate Bump

When spraying in Manual Mode, the operator can adjust the Spray Application Rate (using touch buttons on the Controller) by the amount (l/ha) pre-set in the Spray Bump setting.

64 Press the 'Rate Selection' touch button and a menu appears. Select & press 'Predefined or Rx'.

The 'Setup Rates' screen returns with 'Predefined or Rx' displayed.

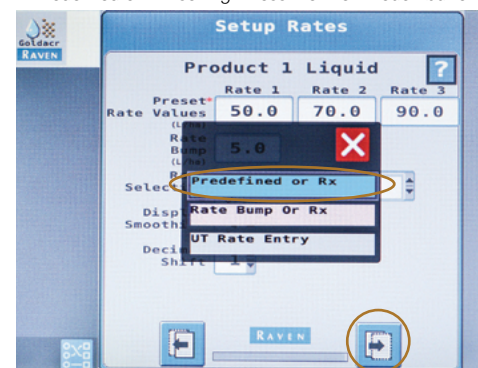
65 Press the 'Display Smoothing' checkbox to enable display smoothing. A 'Tick' appears when the 'Display Smoothing' is enabled (the checkbox is blank if disabled).

64 Press the 'Decimal Shift' touch button and a menu appears. Select & press '1'.

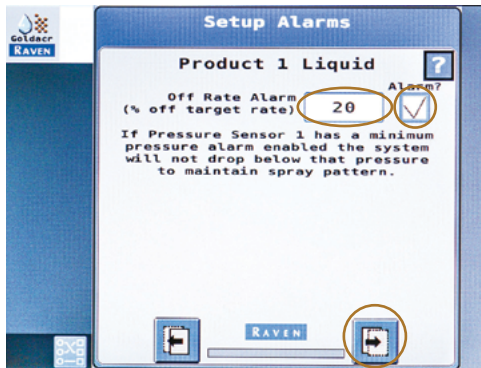
The 'Setup Rates' screen returns with '1' displayed in decimal shift.

65 Press the 'Next' touch button and a 'Setup Alarms' screen appears.

Press the 'Rate Selection' touch button & select the 'Predefined or Rx' setting. Press the 'Next' touch button.







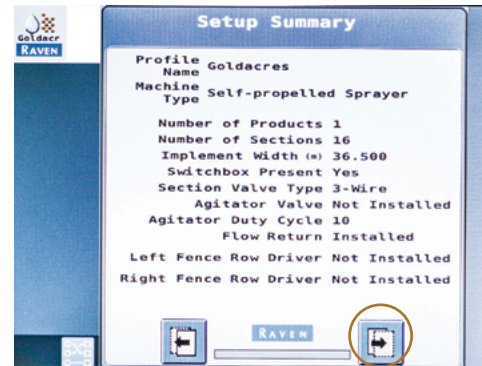
Press the 'Off Rate Alarm' touch button. Enable the 'Alarm?'. Press the 'Next' touch button.

66 Press the 'Off Rate Alarm' touch button and a keypad appears. Press the touch buttons to enter the rate value, eg '20' (%), then press the 'Tick' touch button.

The 'Setup Rates' screen returns with '20' displayed in "Off Rate Alarm".

67 Press the 'Alarm?' checkbox to enable the alarm. A 'Tick' appears when the 'Alarm' is enabled (the checkbox is blank if disabled).

68 Press the 'Next' touch button and a 'Setup Summary' screen appears.



Review the setting summary, then press the 'Next' touch button.

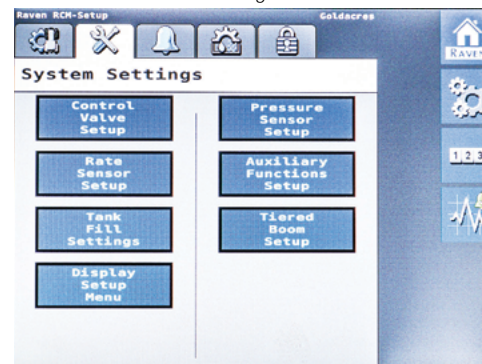
69 Review the Setup Summary page to check all is correct.

This completes the RCM initial setup procedure. After completion of the RCM setup, no further setup in this procedure is necessary unless the boom and its components are physically altered or changed.

70 Press the 'Next' touch button and a 'System Settings' screen appears.

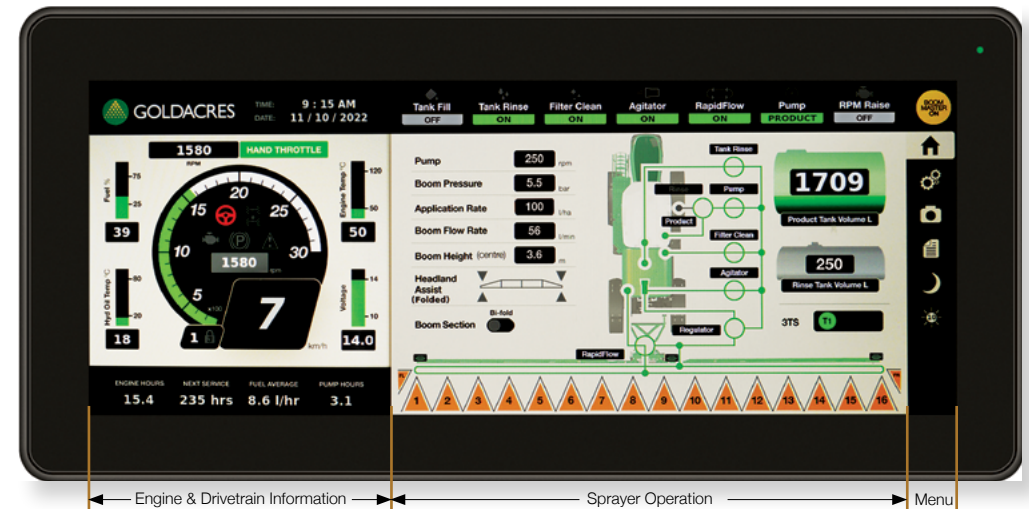
Now that the RCM is preset, any required application rate changes and most system changes are made from this screen.

Use this screen to make further application or system changes.



## NOTE

If the number of boom sections and/or section widths are physically altered at anytime, then the Application Width and Section Width inputs need to be changed accordingly.



Goldacres G-Hub Touch Screen illustrating three sections of touch control & data information.

## Pre-Set the G-Hub Controller

Goldacres G-Hub Controller is pre-set and tested for spraying applications prior to delivery.

However, it is recommended that all settings and operation be checked and tested for accuracy prior to spraying applications.

Goldacres G-Hub Touch Screen in the cabin with Armrest Control Console and Joystick Controller.

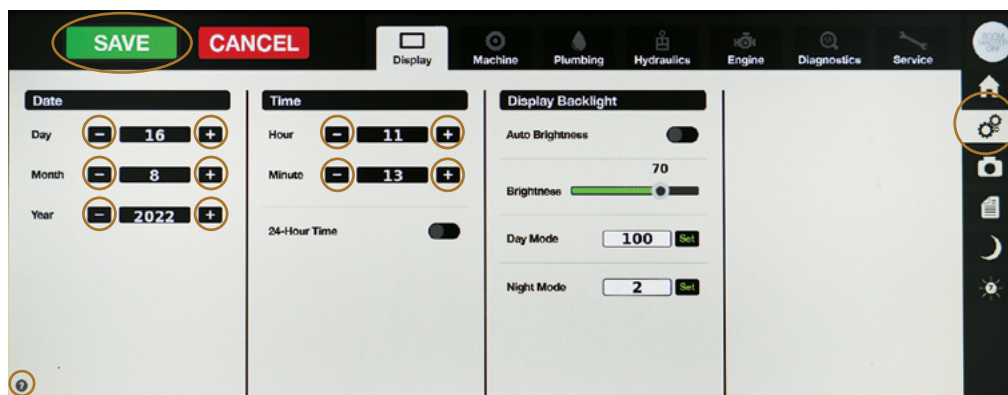


It is the operator's responsibility to correctly operate all controller and sprayer functions at all times.

The Settings touch button in the Menu column on the right hands side of the G-Hub Operating screen gives access to 7 screens for settings, diagnostics and service, namely:

- 1 Display
- 2 Machine
- 3 Plumbing
- 4 Hydraulics
- 5 Engine
- 6 Diagnostics (refer to chapter 8, Lubrication & Maintenance for details)
- 7 Service (refer to chapter 8, Lubrication & Maintenance for details).

Pre-setting the G-Hub uses the first 5 of these screens.



Press the 'Settings' touch button to open the 'Display' tab screen. Press the appropriate touch buttons to set local Date & Time. Press the SAVE touch button to save settings. Press the Help (?) touch button if you require further information.

### To Pre-Set the G-Hub:

- 1 Start the engine.
- 2 Press the Settings touch button on the G-Hub Main screen to open the Display screen.

## 1 Display

The Display screen gives access to set the Date, Time and Display Backlight.

### To Set the Date:

- i) Press the 'Day' Minus (-) or Plus (+) touch buttons to select the correct day.
- ii) Press the 'Month' Minus (-) or Plus (+) touch buttons to select the month.
- iii) Press the 'Year' Minus (-) or Plus (+) touch buttons to select the year.

### NOTE

The 'SAVE' touch button will appear on the left hand side of the screen if a new value is entered or a change made in the G-Hub system.

If the 'SAVE' touch button is not pressed, then any current changes or entered value or values will be lost and previous settings will remain.

The 'SAVE' touch button can be pressed at any stage or screen change to ensure new settings are saved and not accidentally lost.

### To Set the Time:

- i) Press the 'Hour' Minus (-) or Plus (+) touch buttons to select the hour of the day.
- ii) Press the 'Minutes' Minus (-) or Plus (+) touch buttons to select the time in minutes.
- iii) Press the 24 Hour Time touch button if 24 hour is preferred.

The touch button will go Green when selected & Grey when deselected.

### To Adjust the Display Backlight:

- i) Press the 'Auto Brightness' touch button to select Auto Brightness On or Off. Green is On & Grey is Off.
- ii) Drag the Brightness slider to manually adjust backlight brightness.
- iii) Adjust the 'Day Mode' setting for daylight operation.
- iii) Adjust the 'Night Mode' setting for night operation.

### NOTE

The Day Mode/Night Mode is operated on the Home Screen menu using the 'Moon' icon.

Press the 'Help (?)' touch button for further information and a help information screen appears.



Press the 'Settings' touch button to open the 'Display' tab, then press the Machine Tab touch button to open the Machine/Setup tab screen.

## 2 Machine

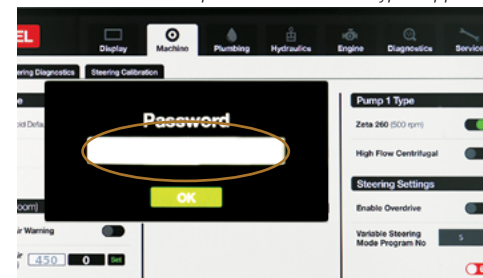
Press the Machine tab touch button & the Machine 'Setup' screen opens displaying:

- i) Sprayer Model
- ii) Axle Options
- iii) Boom Type
- iv) Low Air
- v) Height Readout Non XRT
- vi) Low Fuel (Tank)
- vii) Pump 1 Type
- viii) Steering Settings.

The Machine Setup screen is locked for protection from uninformed or accidental alteration.

The screen must be unlocked before any setting or alterations can be made.

Press the 'Password' space & a numerical keypad appears.



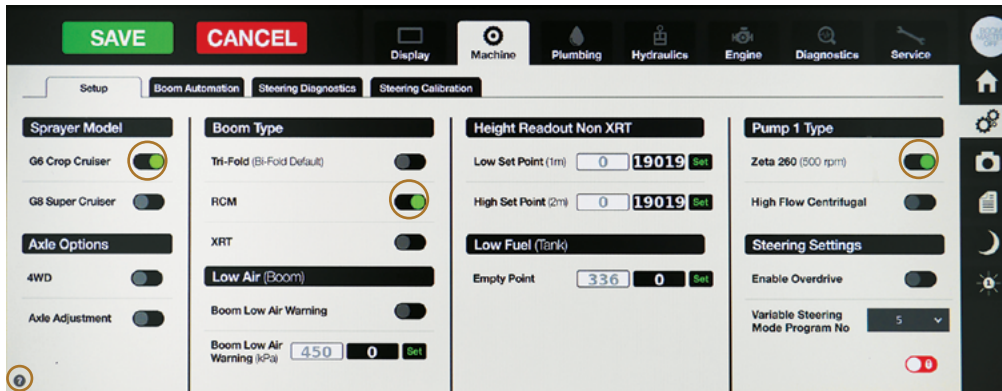
### To Unlock the Machine/Setup Screen:

- 1 Press the 'Unlock to change' touch button at the bottom RHS of the panel and a password request appears.
- 2 Press the password space and a numerical keypad appears.
- 3 Press the numerical touch buttons to enter the password '1978', and press the 'Enter' touch button.  
The screen returns to the 'Password' with '\*\*\*\*\*' displayed.
- 4 Press the 'OK' touch button and the screen returns to the Machine/Setup Screen.

Press the touch buttons '1978' to enter the password, then press 'Enter'.







Press the Machine tab & select the appropriate settings for your machine - items (i) to (viii). Press the 'Help (?)' touch button for further information and a help information screen appears.

## A Setup

### To Select the Appropriate Settings for your Cruiser:

#### i) Sprayer Model

Press the touch button applicable to your machine:

- G6 Crop Cruiser or
- G8 Super Cruiser model.

The touch button goes Green when selected and Grey when deselected.

#### ii) Axle Options

- Select '4WD' only for machines fitted with four wheel drive - this enables full engine torque in all gears (maximum torque curve)
- Select 'Axle Adjustment' only for machines with adjustable width axles - enables touch button on Home screen.

#### iii) Boom Type

Press the touch buttons applicable to your machine:

- Bi-fold (36 or 42m boom)
- Tri-fold boom (48m boom) - allows 3TS middle boom wing section control
- RCM - enables Raven RCM warnings & data transfer
- XRT - enables Raven XRT data display

Touch buttons go Green when selected & Grey when deselected.

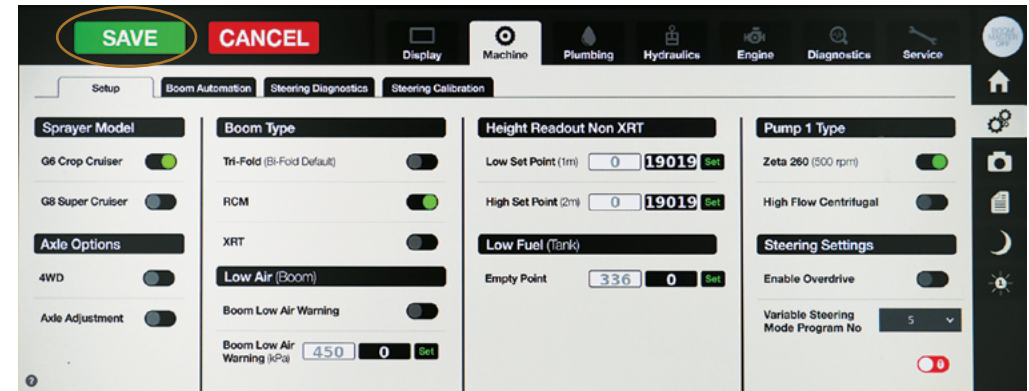
#### iv) Low Air (Boom)

- Low air warning - enables warning if tank or boom air pressure is below the value set in the low air warning kPa
- Low air warning kPa - sets the low air warning alarm point.

#### v) Height Readout Non XRT

Sets the high & low points as measured at 1 metre & 2 metres from ground level to nozzle tip and allows boom centre height to be displayed in metres on the Home screen.

Not to be used if XRT option is fitted.



Press the SAVE touch button to save the Machine settings & exit the screen.

#### vi) Low Fuel (Tank)

This is the empty set point of the fuel tank used to adjust calibration of the fuel tank. Value should be between 335 and 300

#### vii) Pump 1 Type

Pump 1 Type configures display settings.

Press the touch buttons applicable to your machine:

- Zeta 260 or
- High flow centrifugal pump.

The touch button goes Green when selected or Grey when deselected.

#### viii) Steering Settings

- Enable overdrive to select 5th & 6th 'overdrive' gears when in "spray mode".

The steering orbital should be turned Off with the "Road Mode" when steering is not required

- Variable steering mode, select mode 1 to 5. This changes the lock to lock turning ratio of the steering orbital when in "spray mode" only. '1' is least aggressive and '5' is most aggressive. As machine speed increases the ratio returns

When 'Machine Setup' is completed, press the 'SAVE' touch button on the top left hand side of the screen to save the settings into the G-Hub system.

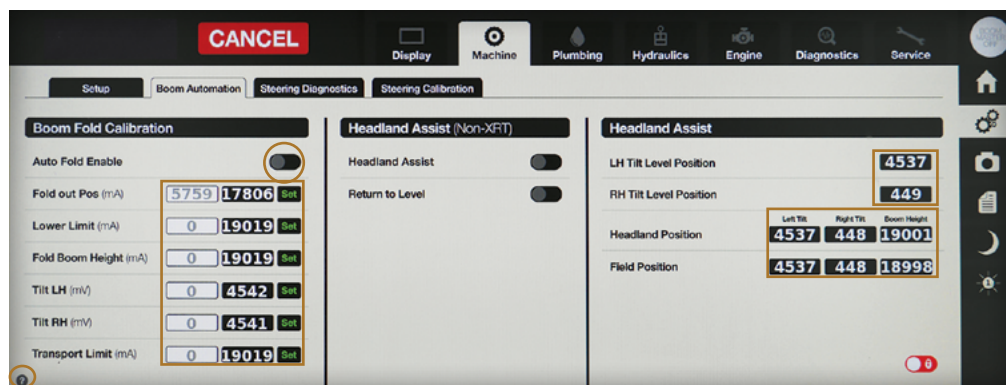
If you don't press 'SAVE' touch button, the settings entered on the Machine screen will be lost.

After Save is pressed, the G-Hub Home screen will return. It will then be necessary to press the 'Settings' touch button to continue with pre-setting.

## NOTE

Press the 'Help (?)' touch button for further information and a help information screen appears.





The 'Boom Automation' screen showing the 'Enable Auto Fold' touch button and the 'Sensor & Set' displays together with the 'Headland Assist' columns & tilt position values & 'Help (?)' touch button.

## B Boom Automation

Press the 'Boom Automation' tab touch button and the Boom Automation screen displays:

- Boom Fold Calibration
- Headland Assist
- Headland Assist Positions.

The 'Machine Setup' screen is locked for protection from uninformed or accidental alteration.

The screen must be unlocked before any setting or alterations can be made.

To unlock the screen, follow the instructions previously provided in this chapter.

A 'Help (?)' touch button in the lower left hand corner of the screen can be pressed for further information.

### i) Boom Fold Calibration

Press the 'Auto Fold Enable' touch button to activate or deactivate the Boom Auto Fold function.

When active, the touch button goes Green and Grey when deactivated.

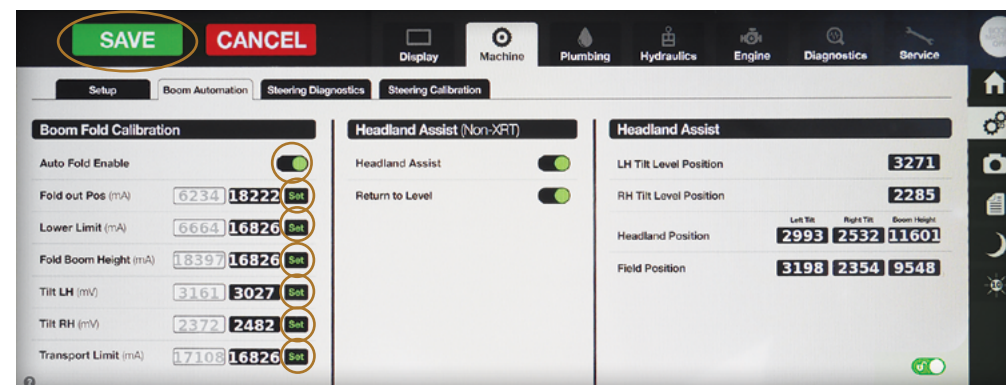
When activated, proceed with the following necessary auto fold settings:

- Fold out Pos (mA)**

The 'Fold out Pos (mA)' sets the fold out position of the boom.

To set the position, operate the boom and when the boom is fully folded out, press 'Set' touch button and the value appears in the left display.

When set, boom suspension, XRT lockouts & other safety locks are engaged.



The 'Boom Automation' screen 'Unlocked' & 'Boom Fold Calibration' 'Enable Auto Fold' activated. After activation, set each of the Boom Auto Fold settings. Press the SAVE touch button to save the 'Boom Automation' settings & exit the screen.

- Lower Limit (mA)**

The 'Lower Limit (mA)' sets the minimum boom operation height.

To set the position, operate the boom and when the boom is at the lowest working position (with 50mm lift cylinder stroke remaining), press the 'Set' touch button and the value appears in the left display.

- Fold Boom Height (mA)**

The 'Fold Boom Height (mA)' sets the maximum boom operating height.

To set the position, operate the boom and when the boom is at maximum boom height, press the 'Set' touch button and the value appears in the left display.

- Tilt LH (mV)**

The 'Tilt LH (mV)' sets the left boom wing tilt angle for auto folding.

To set the Tilt LH, fully open the boom, and tilt the left boom to its correct folding tilt, then press the 'Set' touch button and the value appears in the left display.

- Tilt RH (mV)**

The 'Tilt RH (mV)' sets the right boom wing tilt angle for auto folding.

To set the Tilt RH, fully open the boom, and tilt the right boom to its correct folding tilt, then press the 'Set' touch button and the value appears in the left display.

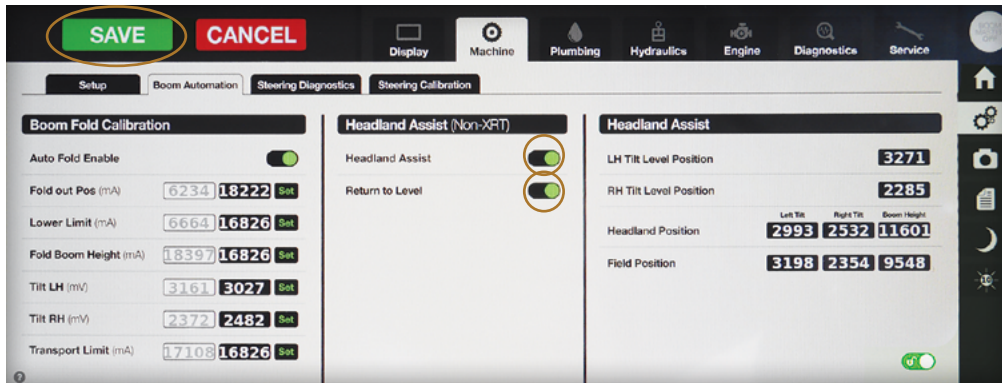
- Transport Limit (mA)**

The 'Transport Limit (mA)' sets the lower transport limit of the boom to avoid the boom hitting the rear mudguards.

When 'Boom Automation' settings are completed, press the 'SAVE' touch button at the top left hand side of the screen to save the settings into the G-Hub system.

If you don't press 'SAVE' touch button, the calibration settings entered on the Machine screen will be lost.

After Save is pressed, the G-Hub Home screen will return. It will then be necessary to press the 'Settings' touch button to continue with pre-setting.



The 'Boom Automation' screen 'Unlocked' with 'Headland Assist' and 'Return to Level' enabled. Press the SAVE touch button to save the 'Boom Automation' settings & exit the screen.

## ii) Headland Assist

The 'Headland Assist' touch button is used enable or disable the Headland Assist (HLA) auto functions.

When enabled, the touch button goes Green and Grey when disabled.

Do not enable the Headland Assist function when the XRT Option is fitted.

The 'Return to Level' touch button is used enable or disable the Return to Level (HLA) auto function.

When enabled, the touch button goes Green and Grey when disabled.

Do not enable the Headland Assist function here when the XRT Option is fitted.

### NOTE

The 'SAVE' touch button will appear on the left hand side of the screen if a new value is entered or a change made in the G-Hub system.

If the 'SAVE' touch button is not pressed, then any current changes or entered value or values will be lost and previous settings will remain.

The 'SAVE' touch button can be pressed at any stage or screen change to ensure new settings are saved and not accidentally lost.

## iii) Headland Assist

Set the sensor values for each HLA auto function by folding the boom out into the desired position, then:

**To set the 'Level Position'**, open the boom & move the boom to desired level position.

When in position, press & hold the 'Cruise Master' switch on the Joystick, then press 'Boom Down'. Release both switches.

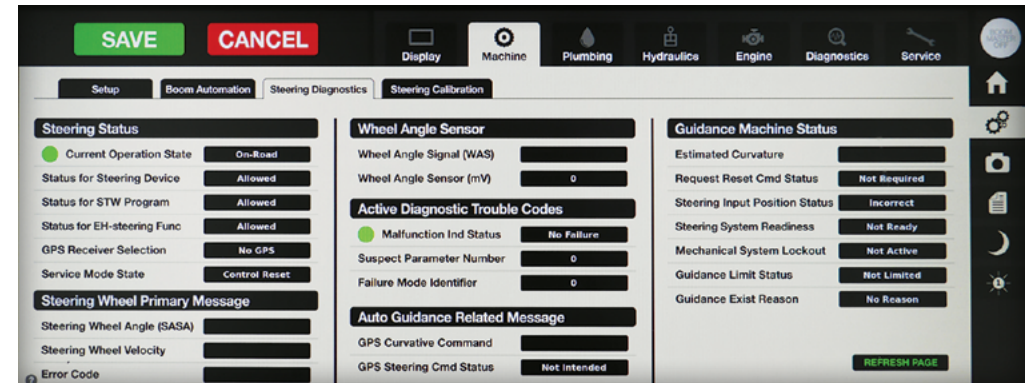
**To set the 'Headland Position'**, operate & raise the boom to desired headland position.

When in position, press & hold the "Cruise Master" switch on the Joystick, then press "Dual Tilt Up". Release both switches.

**To set the 'Field Position'**, operate & lower the the boom into the desired field position.

When in position, press & hold the "Cruise Master" switch on the Joystick, then press "Dual Tilt Down". Release both switches.

When 'Headland Assist' settings are completed, press the 'SAVE' touch button at the top left hand side of the screen to save the settings into the G-Hub system, otherwise the settings entered on the Machine screen will be lost.



The 'Steering Diagnostics' screen. No pre-setting is required with this screen.

## C Steering Diagnostics

Press the 'Steering Diagnostics' tab touch button to display 'Steering Diagnostics' used assist steering troubleshooting & diagnostics.

The Crop Cruiser utilises a Danfoss OSPE steering orbital with PVED CLS control valve as a fully integrated GPS steering ready solution.

The valve is compliant with all current legislation and safety standards, and removes the need for a customer to add any extra hydraulic valves to the sprayer.

The safety information for vehicle speed and MMI information is sent from the G-Hub display located in the cabin.

The valve is electrically locked out when the Spray/Road Mode switch is in the Road Mode to prevent accidental activation.

If the valve is non responsive there is an LED indicator light on the bottom of the orbital to indicate its status.

### NOTE

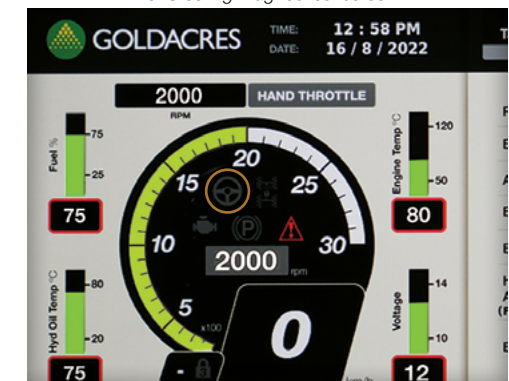
If the Crop Cruiser is started in Spray Mode, the steering orbital will be in safe state, then the Spray/Road Mode switch must be cycled to Road Mode & back to Spray Mode to prevent accidental activation of the GPS steering.

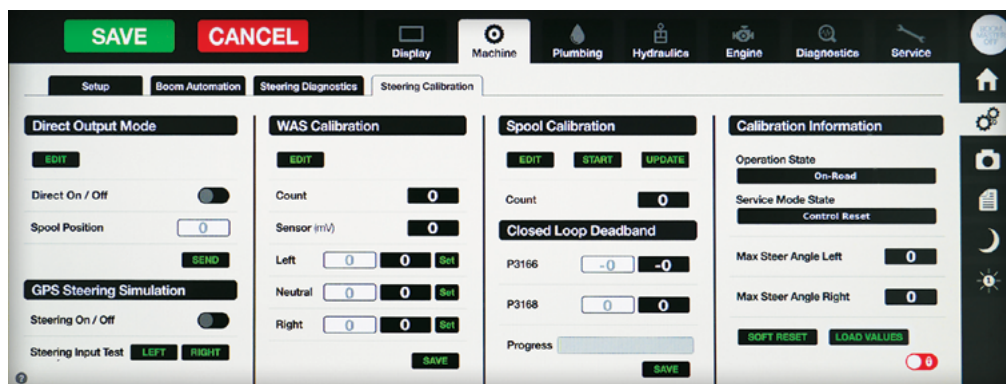
The Steering Wheel symbol (touch button) on the G-Hub Home screen provides quick access to the 'Steering Diagnostics' screen.

The screen includes the following:

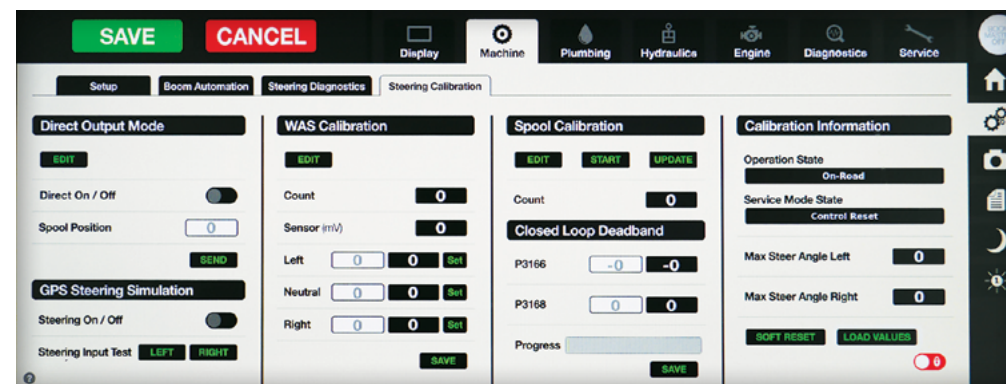
- Steering Status
- Steering Wheel Primary Message
- Wheel Angle Sensor
- Active Diagnostic Trouble Codes
- Auto Guidance Related Message
- Guidance Machine Status
- Refresh Page touch button
- 'Help (?)' touch button.

Press the 'Steering Wheel' symbol touch button to open the 'Steering Diagnostics' screen.





The 'Steering Calibration' screen showing menus & touch button functions.



The 'Steering Calibration' screen showing menus & touch button functions.

## D Steering Calibration

The 'Steering Calibration' screen is used for setting-up & calibration of the steering system.

Press the 'Steering Calibration' tab touch button to display the screen with the following menus:

- i) Direct Output Mode
- ii) GPS Steering Simulation
- iii) WAS Calibration
- iv) Spool Calibration
- vi) Closed Loop Deadband
- vii) Calibration Information &
- viii) 'Help (?)' touch button.

The 'Steering Calibration' screen is locked for protection from uninformed or accidental alteration.

The screen must be unlocked before any setting or alterations can be made.

To unlock the screen, follow the instructions previously provided in this chapter.

A 'Help (?)' touch button in the lower left hand corner of the screen can be pressed for further information.

### i) Direct Output Mode

The Direct Output Mode is used to manually check the spool valve is working correctly and fine tuning closed loop dead band values.

Press the 'Edit' touch button and the valve will then change to Service Mode, then press the 'Direct On/Off' touch button to activate the cut off solenoid. When active, the touch button goes Green and Grey when deactivated.

Enter a spool position to request, eg, 900 or 1100 (the range available is from 0 [full left to 2000 [full right]]. 1000 is the valve's neutral position. Therefore 900 will be 100 to the left and 1100 will be 100 to the right

The spool valve will require a soft reset to return to operation mode.

#### NOTE

After editing, the spool valve requires a soft reset to return to operation mode.

### ii) GPS Steering Simulation

The GPS Seering Simulator is used to simulate a GPS steering system curvature command on address 28.

Press the 'Steering On/Off' touch button to activate the GPS steering simulator. When active, the touch button goes Green and Grey when deactivated.

Then, press & hold the 'Steering Input Test' 'Left' and 'Right' touch buttons as required.

The spool valve must be operating normally & ready to steer for this adjustment to be made.

#### WARNING

Wheels may move or turn unexpectedly when wheel settings are changed.  
Ensure the Crop Cruiser is safely & securely parked and all persons are clear of potential danger before recalibrating, otherwise personal injury or damage may occur.

#### NOTE

The GPS steering simulator adjustment can only be done when the spool valve is operating normally & ready to steer.

### iii) WAS Calibration

WAS Calibration is used to update the Wheel angle sensor calibration data for Max Left, Middle and Max Right

Press the 'Edit' touch button & the valve will then change to 'WAS Service Mode'.

Drive the Crop Cruiser to achieve the following wheel positions and settings:

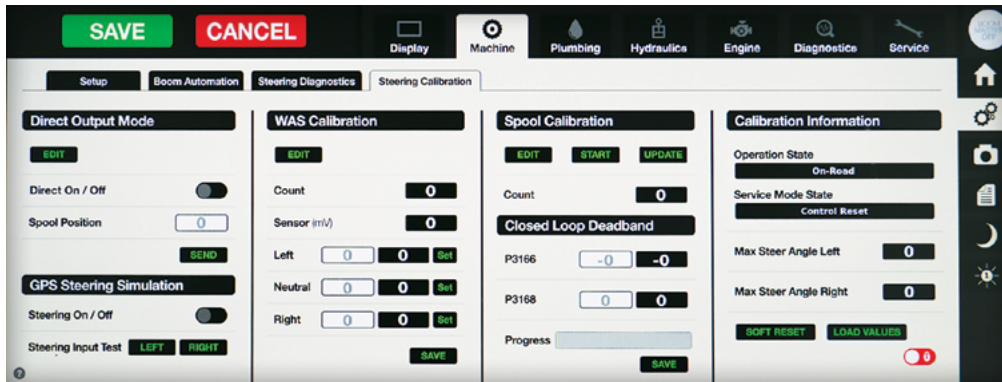
- 'Left' - turn wheels to full 'Left' lock, then press the 'Left' 'Set' touch button
- 'Neutral' turn wheels to driving a dead straight line, then press the 'Neutral' 'Set' touch button
- 'Right' - turn wheels to full 'Right' lock, then press the 'Right' 'Set' touch button.

Press the WAS Calibration 'SAVE' touch button (at the base of the screen) after setting the three values to save the settings.

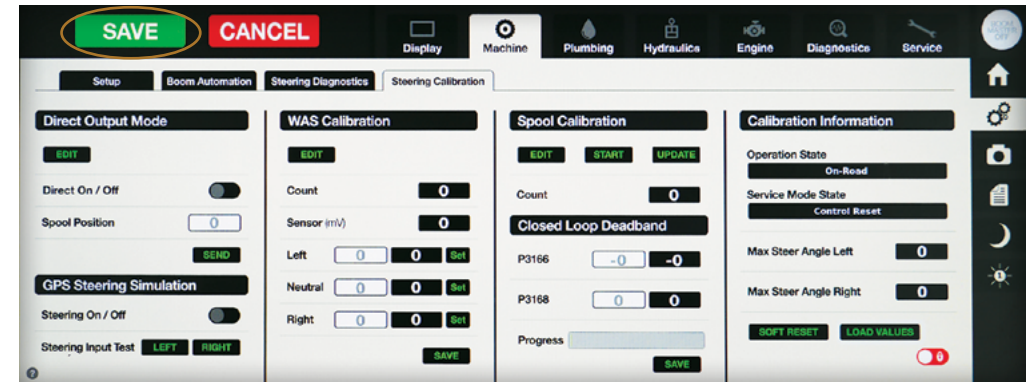
#### NOTE

The WAS Calibration can only be done when the spool valve is operating normally & ready to steer.





The 'Steering Calibration' screen showing menus & touch button functions.



The 'Steering Calibration' screen showing menus & touch button functions.

## iv) Spool Calibration

The 'Spool Calibration' is used to calibrate the steering spool valve.

The Crop Cruiser must be stationary & clear of obstacles for the calibration.

Press the 'Edit' touch button & the valve will then change to 'Spool Service Mode'.

When ready, turn the steering wheel Left & Right to Arm the calibration

When valve status changes from 'Getting Armed' to 'Armed', press the 'START' touch button

When valve status changes to 'Valves Ready to Update', press the 'Update' touch button.

Press the Spool Calibration 'SAVE' touch button (at the base of the screen) after setting the three values to save the settings.

### NOTE

The Spool Calibration can only be done when the spool valve is operating normally & ready to steer.

## vi) Closed Loop Dead Band

The 'Closed Loop Dead Band' is used to manually edit the Left and Right dead band values stored in memory.

The Closed Loop Dead Band value is the minimum force required to move the valve.

This can be determined manually from the 'Direct Output Mode' or from the spool calibration process. The default values is normally around 85 to 105 (- & +).

Adjust both values (- & +) if snake-like or shaky movement is found in the auto-guidance steering mode.

Press the '-0' & '+0' touch buttons and enter new values, eg, '-90' & '90', then press the SAVE touch button (at the base of the screen).

The progress bar will show 100% when completed.

## vii) Calibration Information

Calibration information displays the current state of the valve in Operation State and Service Mode State:

'Max Steer Angle Left' & 'Max Steer Angle Right' (degree valves) are WAS angle factory calculation values - typically 34 degrees.

Press the 'SOFT RESET' touch button to reset the valve if required, ie, with the valve is in safe state.

Press the 'LOAD BUTTON' to reload & refresh the parameters if they have not loaded correctly.

When 'Machine Setup' is completed, press the 'SAVE' touch button on the top left hand side of the screen to save the settings into the G-Hub system.

After Save is pressed, the G-Hub Home screen will return. It will then be necessary to press the 'Settings' touch button to continue with pre-setting.

## 3 Plumbing

Press the Plumbing tab touch button to open the Plumbing settings screen and the Plumbing settings screen opens displaying several tabs (opening on the first tab):

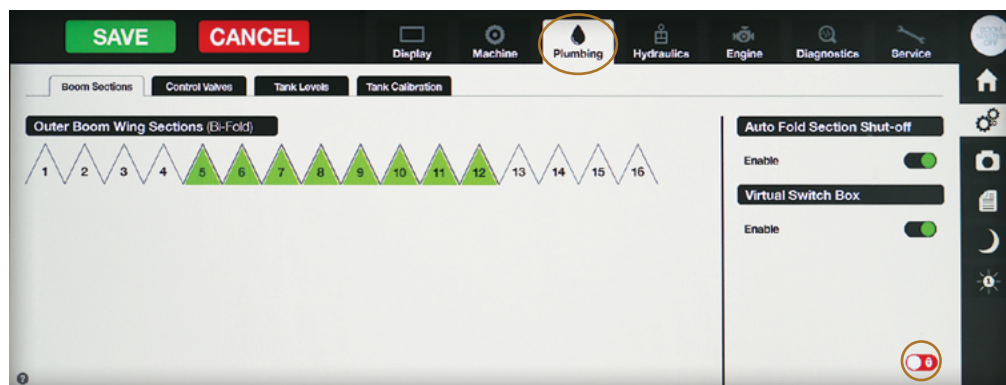
- A Boom Sections
- B Control Valves
- C Tank Levels
- D Tank Calibration.

### NOTE

The 'SAVE' touch button will appear on the left hand side of the screen if a new value is entered or a change made in the G-Hub system.

If the 'SAVE' touch button is not pressed, then any current changes or entered value or values will be lost and previous settings will remain.

The 'SAVE' touch button can be pressed at any stage or screen change to ensure new settings are saved and not accidentally lost.



Press the Plumbing Tab touch button to open the Plumbing settings screen (opening on the first tab) 'Boom Sections' and unlock the screen.

## A Boom Sections

'Boom Sections' provide for setting selected boom sections to be automatically shut off when using Bi-fold and Tri-fold boom functions.

The 'Boom Sections' screen is locked for protection from uninformed or accidental alteration.

The screen must be unlocked before any setting or alterations can be made.

To unlock the screen, follow the instructions previously provided in this chapter.

A 'Help (?)' touch button in the lower left hand corner of the screen can be pressed for further information.

### i) Outer Boom Wing Sections (Bi-fold)

Press the individual touch buttons to select the boom sections to automatically remain On or switch Off when the boom Bi-folds is being used.

Sections which remain On display Green.

Sections to switch Off display Grey.

This function becomes the 2nd stage fold for 48m booms only.

### ii) Middle Boom Wing Sections (Tri-fold)

Press the individual touch buttons to select the boom sections to automatically remain On or switch Off when the boom Tri-fold is being used.

Sections which remain On display Green.

Sections to switch Off display Grey.

This function becomes the 3rd stage fold for 48m booms only.

### iii) Auto Fold Section Shut-off

Press the Shut-Off touch button to automatically shut off the outer boom sections off automatically when the boom is folded

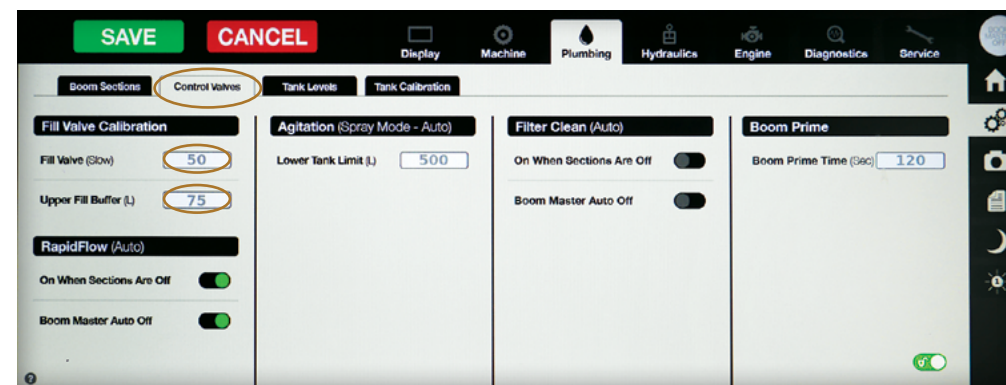
### iv) Virtual Switch Box

The 'Virtual Switch Box' allows boom sections to be controlled by G-Hub home screen virtual switch box.

If turned Off, the operator can use a virtual switch box on their GPS display.

## NOTE

Machine profile in the RCM will require an update to configure the G-Hub 'Virtual Switch Box' changes.



Press the 'Control Valves' Tab touch button to display the screen & set the 'Fill Valve Calibration' values.

## B Control Valves

Press the Control Valves tab touch button to open the Control Valves screen and display:

- Fill Valve Calibration
- Rapid Flow (Auto)
- Agitation (Spray Mode (Auto)
- Filter Clean (Auto)
- Boom Prime.

The 'Boom Sections' screen is locked for protection from uninformed or accidental alteration & must be unlocked before any setting or alterations can be made.

### i) Fill Valve Calibration

The Fill Valve Calibration settings comprise:

#### • 'Fill Valve (Slow)'

The 'Fill Valve (Slow)' sets the back pressure to operate the Rinse Nozzles when filling the Product Tank. Increasing the % value will increase tank filling times.

#### • 'Upper Fill Buffer (L)'

'Upper Fill Buffer L' is the point at which the product fill valve starts to reduce fill flow into the Product tank before it reaches the target fill volume. Set at around 100.

### To Set the Fill Valve (Slow):

- Press the 'Fill Valve (Slow)' display touch button and a numerical keypad appears.
- Press the numbers to set the value eg, 30 (%), then press Enter. The screen returns to the Control Valves tab screen with eg, 30 displayed in the 'Fill Valve (Slow)' display.

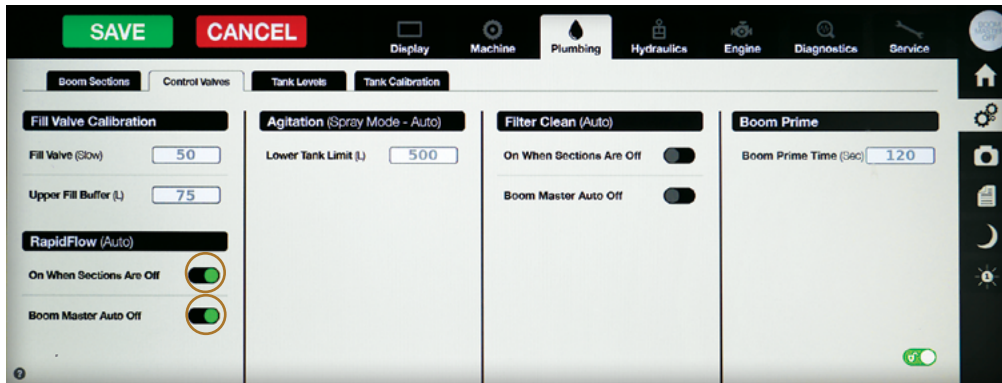
### To Set the 'Upper Fill Buffer (L)':

- Press the 'Upper Fill Buffer (L)' display touch button and a numerical keypad appears.
- Press the numbers to set the value eg, 100 (litres), then press Enter. The screen returns to the Control Valves tab screen with eg, '100' displayed in the 'Upper Fill Buffer (L)' display.

Reducing this value may lead to the Tank being over filled & the Fill control tap closing quickly when the target volume is reached.

## NOTE

The 'Fill Valve (Slow)' value of 30 is a recommended initial calibration which can be altered if required. Range 0-100%. Reduction in 'Upper Fill Buffer L' value may lead to the Tank being over filled and the Fill control valve closing quickly when Target volume is reached.



Press the 'RapidFlow' touch buttons to select/deselect 'On When Sections Off' & 'Boom Master Auto Off' and 'Agitation (Spray Mode - Auto)' functions.

## ii) RapidFlow (Auto)

The Rapid Flow (Auto) settings (for boom recirculation) comprise:

- **'On When Sections Are Off'**

Automatically enables RapidFlow (boom recirculation) when the Boom Master switch is On & all boom sections Off (only if Boom Master Auto is activated). For example, during headland turns, RapidFlow will automatically engage, then turn Off when boom sections are back On

- **'Boom Master Auto Off'**

If activated (Green), the 'Boom Master Auto Off' automatically disables RapidFlow (boom recirculation) when the Boom Master switch is On. Automatically engages RapidFlow when boom sections are Off and disengages RapidFlow when boom sections are On.

### NOTE

When setting the Rapid Flow (Auto) settings set the 'On When Sections Are Off' OR the 'Boom Master Auto Off'. Select one or the other. Both can be selected (Green) if desired.

### To Select the 'On When Sections Are Off' setting:

Press the 'On When Sections Are Off' touch button. The touch button displays Green when selected & Grey when deselected,

OR

### To Select the 'Boom Master Auto Off' setting:

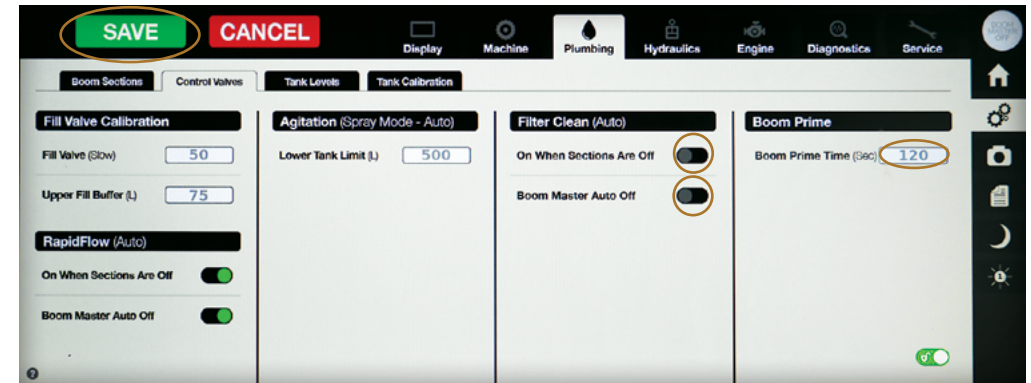
Press the 'Boom Master Auto Off' touch button. The touch button displays Green when selected & Grey when deselected.

## iii) Agitation (Spray Mode - Auto)

The Agitation (Spray Mode - Auto) sets a tank level at which the agitator is triggered to stop operating to reduce foaming at low tank levels.

### To Set the 'Lower Tank Level (L)':

- 1 Press the 'Lower Tank Level (L)' display touch button and a numerical keypad appears.
- 2 Press numbers to set the value at 500, then press 'Enter'. The screen returns to the Agitation Spray Mode (Auto) screen with 500 displayed in the 'Lower Tank Level (L)' display.



Press the 'Filter Clean (Auto)' touch buttons to select/deselect the function and set the 'Boom Prime Time (Sec)' value. Press the SAVE touch button to save the 'Control Valve' settings & exit the screen.

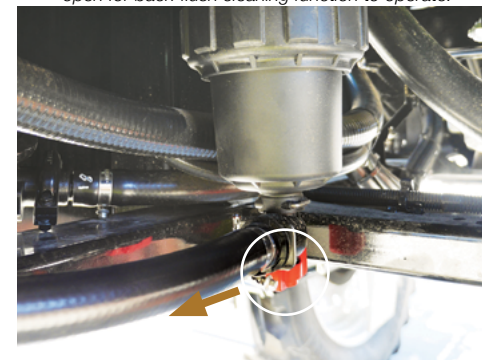
## iv) Filter Clean (Auto)

The Clean Pressure Filter (Auto) provides a back-flush cleaning function to clean the pressure filter element. Select either:

- 'On When Sections Are Off' which automatically engages the filter cleaning function when all booms sections are Off,
- OR
- 'Boom Master Auto Off' which automatically engages the filter cleaning function when the Boom Master switch is switched Off.

'On When Sections Are Off' & 'Boom Master Auto Off' can both be selected (Green) if desired.

*The red valve at the base of the pressure filter must be open for back-flush cleaning function to operate.*



### To Select the 'On When Sections Are Off' setting:

Press the 'On When Sections Are Off' touch button which displays Green when selected & Grey when deselected,

OR

### To Select the 'Boom Master Auto Off' setting:

Press the 'Boom Master Auto Off' touch button which displays Green when selected & Grey when deselected.

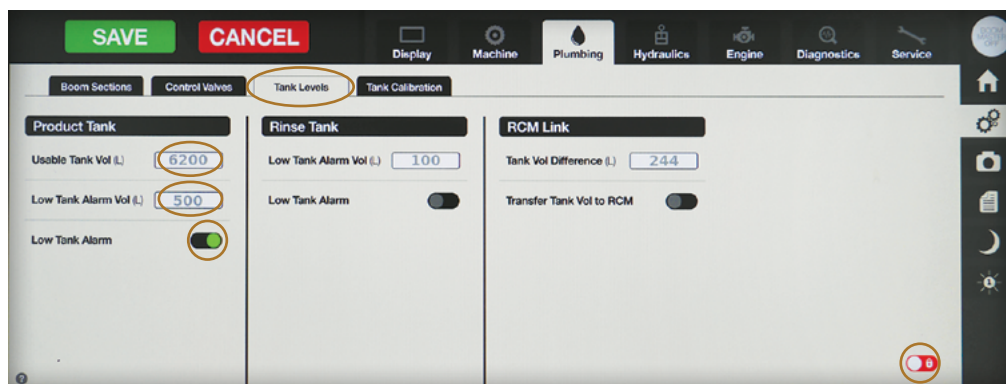
## v) Boom Prime

'Boom Prime' sets a time in seconds in which the "boom prime" function will run RapidFlow for before turning Off. It is used to initially fill or rinse a boom line. 120 seconds will prime a 48m boom

### To Set the 'Boom Prime Time (sec)':

- 1 Press the 'Boom Prime Time (sec)' display touch button and a numerical keypad appears.
- 2 Press the numbers to set the value at 120 (seconds), then press Enter. The screen returns to the Agitation Spray Mode (Auto) screen with '120' displayed in the 'Boom Prime Time (sec)' display.





Press the 'Tank Levels' tab touch button to display the Tank Levels screen. Unlock the screen, then set 'Useable Tank Vol (L)' & 'Low Tank Alarm Vol (L)' and enable the 'Low Tank Alarm'.

### C Tank Levels

Press the Tank Levels tab touch button to open the Tank Levels screen which displays:

- i) Product Tank
- ii) Rinse Tank
- iii) RCM Link.

The 'Tank Levels' screen is locked for protection from uninformed or accidental alteration.

The screen must be unlocked before any setting or alterations can be made.

To unlock the screen, follow the instructions previously provided in this chapter.

A 'Help (?)' touch button in the lower left hand corner of the screen can be pressed for further information.

#### i) Product Tank

'Product Tank' settings comprise:

- **'Useable Tank Volume (L)'**  
'Usable Tank Volume' is the maximum usable volume of the Product Tank. Always set 'Usable Tank Volume' less than the total tank volume, eg, If tank volume is 6400L, set useable volume at 6200L. Used on the external display Auto-fill function.

- **'Low Tank Alarm Vol (L)'**

'Low Tank Alarm Volume (L)' sets the Product Tank volume in litres for the low tank alarm.

- **'Low Tank Alarm'**

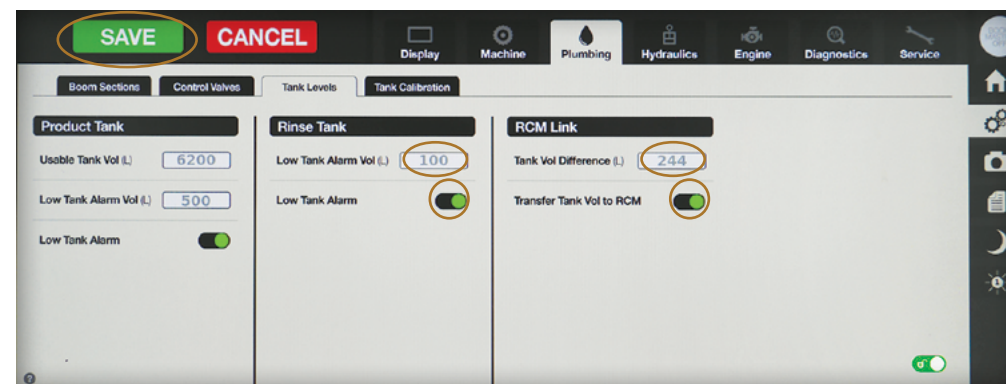
'Low Tank Alarm' activates or deactivates the low level alarm of the Product tank. When activated this alarm warns when the Product tank level goes below the set level.

#### To Set the Usable Tank Volume (L):

- 1 Press the 'Useable Tank Volume (L)' display touch button and a numerical keypad appears.
- 2 Press the numbers to set the value eg, 6000 then press Enter. The screen returns to the Tank Levels tab screen with 6000 displayed in the 'Useable Tank Volume (L)' display.  
Actual tank volume may be more eg, 6200 & may be used if desired.

#### To Set the Low Tank Alarm Vol (L):

- 1 Press the 'Low Tank Volume (L)' display touch button and a numerical keypad appears.



Set the Rinse Tank 'Low Tank Alarm Vol (L)' and enable the 'Low Tank Alarm', then Set the 'Tank Vol Difference (L)' and enable the 'Transfer Tank Vol to RCM'. Press the SAVE touch button to save the 'Tank Levels' settings & exit the screen.

- 2 Press the numbers to set the value at 1000, then press Enter. The screen returns to the Tank Levels tab screen with 1000 displayed in the 'Low Tank Volume (L)' display.

#### To Set the Low Tank Alarm:

Press the 'Low Tank Alarm' touch button to enable or disable the alarm. The touch button displays Green when enabled & Grey when disabled.

#### ii) Rinse Tank

The Rinse Tank settings comprise:

- 'Low Tank Alarm Volume (L)' - sets the volume in litres for the low level alarm in the rinse tank.
- 'Low Tank Alarm' - enables or disables the low level alarm of the rinse tank.

#### To Set the Low Tank Alarm Vol (L):

- 1 Press the 'Low Tank Volume (L)' display touch button & a numerical keypad appears.
- 2 Press the numbers to set the value at 50, then press Enter. The screen returns to the Tank Levels tab screen with '50' displayed in the 'Low Tank Volume (L)' display.

#### To Set the Low Tank Alarm:

Press the 'Low Tank Alarm' touch button to enable or disable the alarm. The touch button displays Green when enabled & Grey when disabled.

#### iii) RCM Link

The RCM Link comprises:

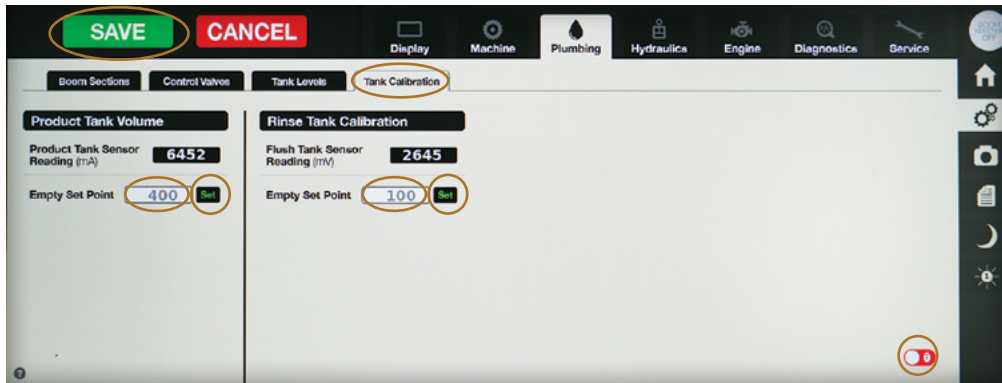
- 'Tank Vol Difference (L)' sets the volume difference alarm point to warn if the G-Hub display & Raven display are displaying differing amounts
- 'Transfer Tank Vol to RCM' enables the G-Hub controller to transfer tank volume to the Raven controller at completion of a Fill cycle.

#### To Set the Tank Vol Difference (L):

- 1 Press the 'Tank Vol Difference (L)' display touch button & a numerical keypad appears.
- 2 Press the numbers to set the value, then press Enter. The screen returns with the value displayed. If set to '0' the alarm will be disabled.

#### To Set Transfer Tank Vol to RCM:

Press the 'Low Tank Alarm' touch button to enable or disable the alarm. The touch button displays Green when enabled & Grey when disabled.



Press the 'Tank Calibration' tab touch button to display the Tank Calibration screen. Unlock the screen, then set the Product Tank Volume 'Empty Set Point' & Rinse Tank Calibration 'Empty Set Point'. Press the SAVE touch button to save settings.

## D Tank Calibration

Press the Tank Calibration touch button to open the Tank Calibration screen & display:

- Product Tank Volume
- Rinse Tank Calibration.

The Tank Calibration screen is locked to protect from uninformed or accidental alteration. The screen must be unlocked before any setting or alterations can be made. See previous instructions

### i) Product Tank Volume

The Product Tank Volume settings comprise:

- The 'Product Tank Sensor Reading (mA)' which is the current value of the product tank pressure transducer sensor. This will vary depending on volume between 4000 & 20000.
- 'Empty Set Point' which is the product tank pressure transducer sensor reading when the tank is empty. If changed from 4000mA, the tank calibration curve will offset.

#### To Set the Empty Set Point:

- Press the 'Low Tank Volume (L)' display touch button & a numerical keypad appears.

- Press keypad numbers to set the value between 4000 & 20000, then press Enter.  
OR  
Press the 'Set' touch button when the Rinse tank is empty to set the value.

### ii) Rinse Tank Calibration

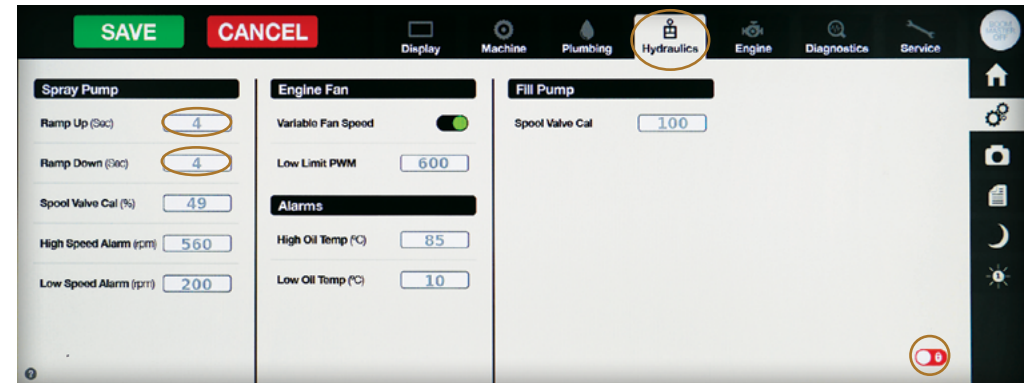
The Rinse Tank Calibration settings comprise:

- 'Flush Tank Sensor Reading (mA)' which is the current value of the rinse tank pressure transducer sensor. This will vary depending on volume between 1000mV & 5000mV.
- 'Empty Set Point' which is the Rinse tank pressure transducer sensor reading when the Rinse tank is empty.

#### To Set the Empty Set Point:

- Press the 'Empty Set Point' display touch button & a numerical keypad appears.
- Press keypad numbers to set the value between 1000 & 5000, then press Enter.  
OR  
Press the 'Set' touch button when the Rinse tank is empty to set the value.

When 'Tank Calibration' is completed, press the 'SAVE' touch button on the top left hand side of the screen to save the settings.



Press the 'Hydraulics' touch button to display the Hydraulics screen. Unlock the screen, then set the 'Spray Pump', 'Engine Fan', 'Alarms' & 'Fill Pump' settings. Press the SAVE touch button to save settings.

## 4 Hydraulics

Press the Hydraulics tab touch button to open the Hydraulics settings screen and the Hydraulics settings screen opens displaying:

- Spray Pump
- Engine Fan
- Alarms
- Fill Pump

The Hydraulics screen is locked to protect from uninformed or accidental alteration.

The screen must be unlocked before any setting or alterations can be made. Refer to previous pages for instructions.

### i) Spray Pump

Spray Pump settings comprise:

- Ramp Up (sec)
- Ramp Down (sec)
- Spool Valve Cal (%)
- High Speed Alarm (rpm)
- Low Speed Alarm (rpm)

### Ramp Up (sec)

'Ramp Up (sec)' is the time in seconds for the pump to reach set speed. Settings range from 1 to 5 seconds.

#### To Set 'Ramp Up (sec) time:

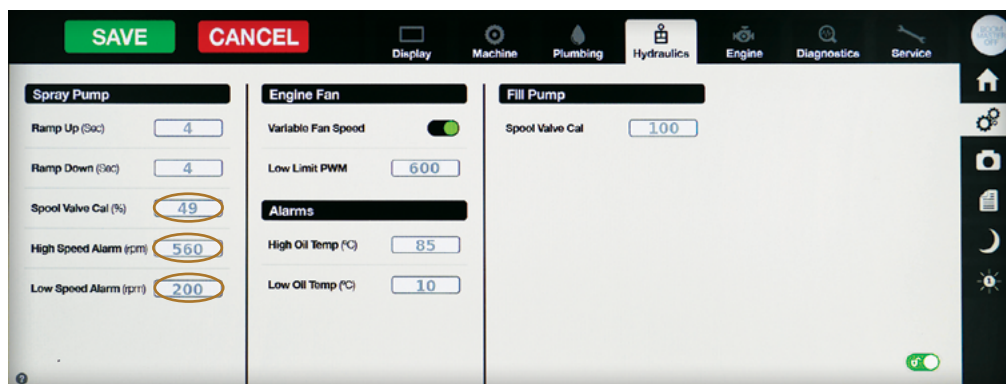
- Press the 'Ramp Up (sec)' display touch button and a numerical keypad appears.
- Press the numbers to set a value between 1 & 5, then press Enter. The screen returns to the Hydraulics tab screen with eg, 3 displayed in the 'Ramp Up (sec)' display.

### Ramp Down (sec)

'Ramp Down (sec)' is the time in seconds for the pump to stop after being switched Off. Settings range from 1 to 5 seconds.

#### To Set 'Ramp Down (sec) time:

- Press the 'Ramp Down (sec)' display touch button & a numerical keypad appears.
- Press the numbers to set the value between 1 & 5, then press Enter.



Enter the 'Spool Valve Cal (%)', 'High Speed Alarm (rpm)' & 'Low Speed Alarm (rpm)' values.

### Spool Valve Cal (%)

'Spool Valve Cal (%)' is used to control pump speed. Increase value to increase pump speed. Recommended is between 10 & 70 and set to 255 for Hawkeye to remove Ramp up time.

#### To Set 'Spool Valve Cal (%)':

- 1 Press the 'Spool Valve Cal (%)' display touch button & a numerical keypad appears.
- 2 Press the keypad numbers to set the required value, then press Enter.

### High Speed Alarm (rpm)

'High Speed Alarm (rpm)' touch button is used to set an alarm for when pump speed exceeds the set rpm.

#### To Set 'High Speed Alarm (rpm)':

- 1 Press the 'High Speed Alarm (rpm)' display touch button & a numerical keypad appears.
- 2 Press the keypad numbers to set the required value, then press Enter.

### NOTE

The Spool Valve Cal (%) requires an engine operating speed of 1800 rpm (not idle) & values depend on pump type:

- Positive displacement (ie, Zeta) - start with 38 & adjust
- Centrifugal (ie, Arag) - start with 40 & adjust as needed
- For Hawkeye fitted machines - set the value to 100.

### Low Speed Alarm (rpm)

'Low Speed Alarm (rpm)' touch button is used to set an alarm for when pump speed falls below the set rpm.

#### To Set 'Low Speed Alarm (rpm)':

- 1 Press the 'Low Speed Alarm (rpm)' display touch button & a numerical keypad appears.
- 2 Press the numbers to set the required value, then press Enter.

### ii) Engine Fan

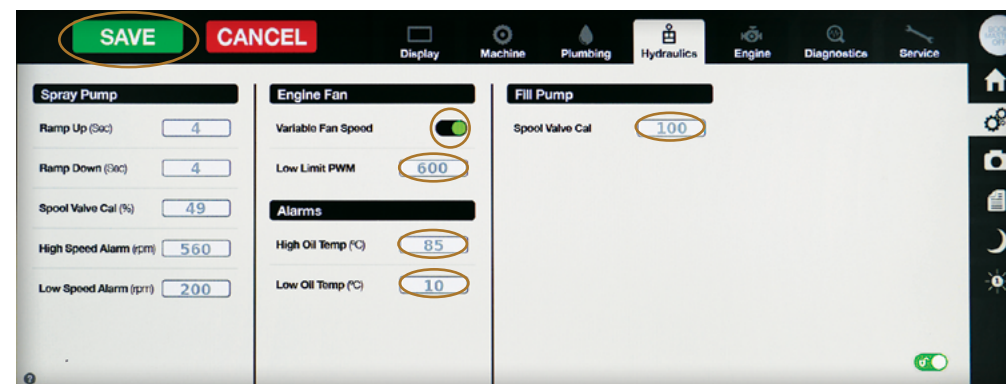
Engine Fan settings comprise:

- **'Variable Speed Fan'**  
'Variable Speed Fan' enables variable engine fan speed to save fuel. If not enabled, the fan runs at full speed while the engine is running.
- **'Low limit PWM'**  
'Low Limit PWM' is the lower speed the valve will operate the fan.

### NOTE

The High Speed Alarm (rpm) setting value depends on the type of pump being used:

- Positive displacement (ie, Zeta) - 540 rpm max speed
- Centrifugal (ie, Arag) - max operating speed is 4500 rpm.



Enable 'Variable Fan Speed' & enter 'Variable Speed Fan' & 'Low Limit PWM' values. Enter Alarm values for 'High Oil Temp (°C)' & 'Low Oil Temp (°C)', then enter the Fill Pump 'Spool Valve Cal' value. Press the SAVE touch button to save settings.

#### To Set 'Variable Fan Speed':

Press the 'Variable Fan Speed' touch button to enable or disable the alarm.

The touch button displays Green when enabled & Grey when disabled.

#### To Set 'Low limit PWM':

- 1 Press the 'Low Limit PWM' touch button to enable or disable the alarm.
- 2 Press the numbers to set the required value, then press Enter.

Setting the 'Low Limit PWM' value too low may result in engine cooling not functioning correctly at engine idle speed due to insufficient air flowing through the AC condenser. 0 setting is maximum fan speed & 1000 is Off. Recommended setting is 605.

### iii) Alarms

Alarm settings comprise:

- **'High Oil Temp (°C)'**  
'High Oil Temp (°C)' will alarm when oil temperate is over 80 degrees C.
- **'Low Oil Temp (°C)'**  
'Low Oil Temp (°C)' will alarm when oil temperate is below 7 degrees C.

#### To Set 'High Oil Temperature (°C)':

- 1 Press the 'High Oil Temperature (°C)' display touch button & a numerical keypad appears.
- 2 Press the numbers to set the required value, then press Enter.

#### To Set 'Low Oil Temperature (°C)':

- 1 Press the 'Low Oil Temperature (°C)' display touch button & a numerical keypad appears.
- 2 Press the numbers to set the required value, then press Enter.

### iv) Fill Pump

The Fill Pump setting comprises:

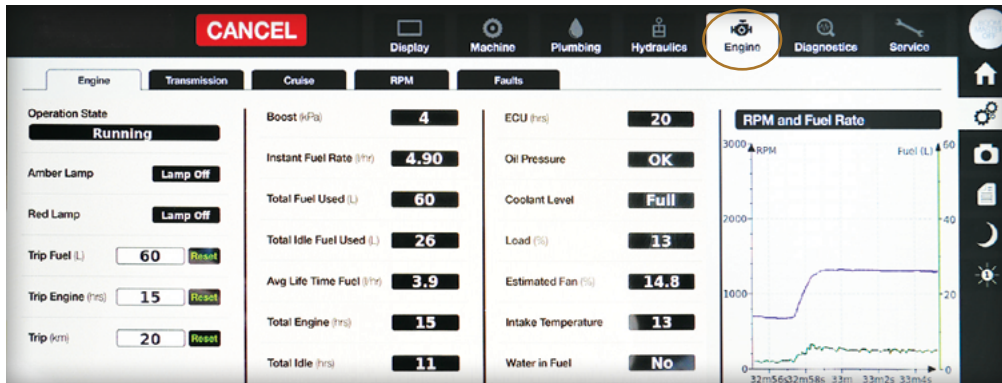
- **'Spool Valve Cal'**  
'Spool Valve Cal' used to control the speed of the Fill pump. Increase value to increase pump speed. Set non PWM valves to 100.

#### To Set 'Spool Valve Cal':

- 1 Press the 'Low Oil Temperature (°C)' display touch button & a numerical keypad appears.
- 2 Press the numbers to set the required value, then press Enter.

When 'Hydraulics' settings are completed, press the 'SAVE' touch button on the top left hand side of the screen to save the settings.





Press the 'Engine' touch button to display the current Engine information.

## 5 Engine

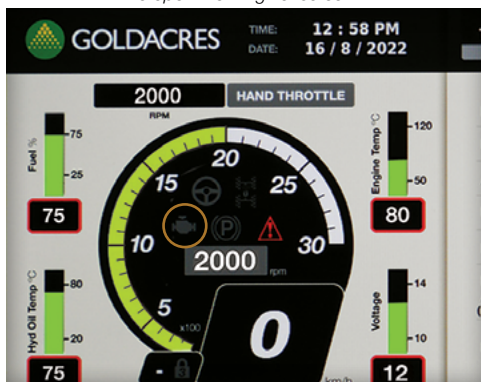
Press the Engine touch button to open the Engine screen displaying a series of tabs:

- A Engine
- B Transmission
- C Cruise
- D RPM
- E Faults.

Pre-setting is required in C & D tab screens.

For quick operating access, press the Engine symbol touch button on the Main screen.

Press the 'Engine' symbol touch button on the Main screen to open the 'Engine' screen.



## A Engine

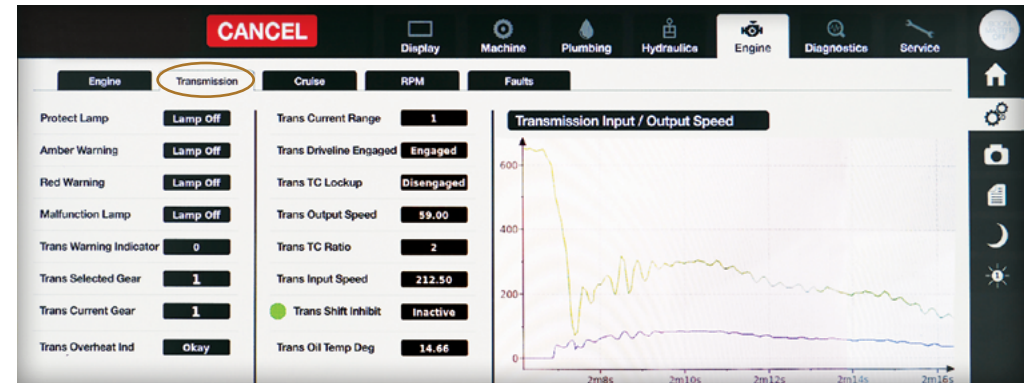
There is no pre-setting required in the Engine tab screen.

Trip items iii), iv) & v) include 'Reset' touch buttons to reset displays back to zero.

To reset 'Trip' values back to zero, press the appropriate 'Reset' touch button.

The Engine tab displays 'Operation State' 'Running' OR 'Stopped' and the operation status of the following items:

- Amber Lamp On/Off
- Red Lamp On/Off
- Trip Fuel (L) Average Fuel Rate (l/hr)
- Trip Engine (hrs)
- Trip (km)



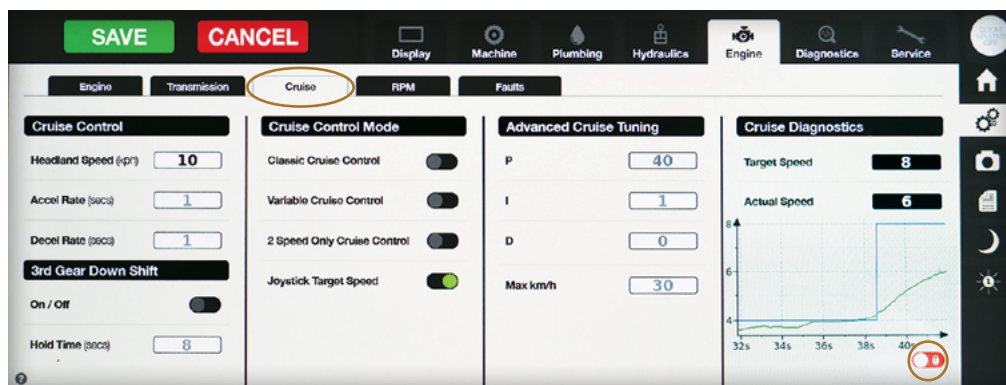
Press the 'Transmission' touch button to display the current Transmission information.

## B Transmission

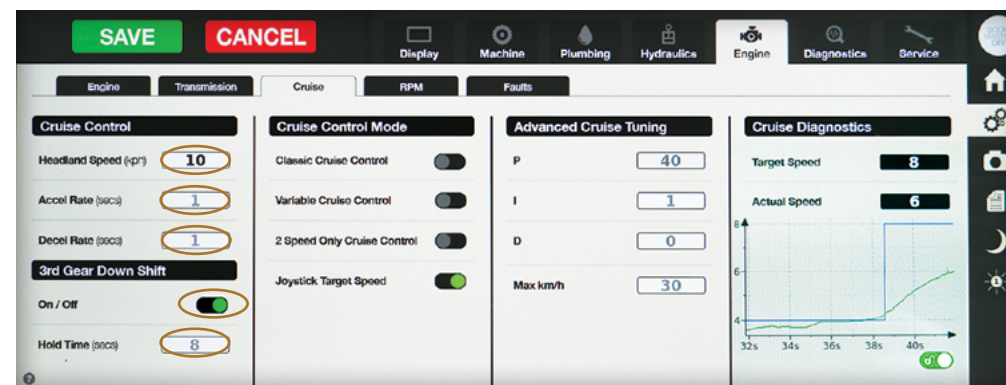
Press the Transmission tab touch button to open the Transmission screen displaying current transmission information:

- Protect Lamp
- Amber Warning
- Red Warning
- Malfunction Lamp
- Trans Warning Indicator
- Trans Selected Gear
- Trans Current Gear
- Trans Overheat Ind
- Trans Current Range
- Trans Driveline Engaged
- Trans TC Lockup
- Trans Output Speed
- Trans TC Ratio
- Trans Input Speed
- Trans Shift Inhibit
- Trans Oil Temp Deg
- Transmission Input/Output Speed display graph.

There is no pre-setting required in the Transmission tab screen.



Press the 'Cruise' touch button to display the current Cruise screen. Unlock the screen to make setting changes.



Set the 'Headland Speed (kph)', 'Accel Rate (sec)' & 'Decel Rate (sec)' values. Enable the '3rd Gear Down Shift' if required, then set the 'Hold Time (sec)'.

## C Cruise

Press the 'Cruise' tab touch button to open the Cruise screen displaying 5 main headings:

- i) Cruise Control
- ii) 3rd Gear Down Shift
- iii) Cruise Control Mode
- iv) Advanced Cruise Tuning
- v) Cruise Diagnostics.

The 'Cruise' screen is locked for protection from uninformed or accidental alteration.

The screen must be unlocked before any setting or alterations can be made.

To unlock the screen, follow the instructions previously provided in this chapter.

Press the 'Help (?)' touch button at the bottom left hand side of the screen for further information if required.

### i) Cruise Control

'Cruise Control' settings comprise:

- **'Headland speed (kph)'**  
'Headland Speed (kph)' is the lower speed to which the Cruiser slows when using Variable or Two Speed Cruise Control mode. Max speed setting is 25 Km/h. The upper speed limit is set via the joystick Cruise Set push button
- **'Accel Rate (secs)'**  
The 'Accel Rate (sec)' setting determines the acceleration rate used by the Cruiser to reach its higher speed target when changing up gears. Enter a value from 1 to 8. The higher the number, the longer it takes to reach the target. Usually set 1 second
- **'Decel Rate (secs)'**  
The 'Decel Rate (sec)' setting determines the acceleration rate used by the Cruiser to reach its higher speed target when changing up gears. Enter a value from 1 to 8. The higher the number, the longer it takes to reach the target. Usually set 1 second

### To Set the Headland Speed (kph):

- 1 Press the 'Headland Speed (kph)' display touch button & a numerical keypad appears.
- 2 Press the numbers to set the required value (eg, 10), then press Enter.

### To Set the Accel Rate (sec):

- 1 Press the 'Accel Rate (sec)' display touch button & a numerical keypad appears.
- 2 Press the number to set the required value (eg, 1), then press Enter.  
  
'Accel Rate (secs)' - The higher the number the longer it takes to reach the target.

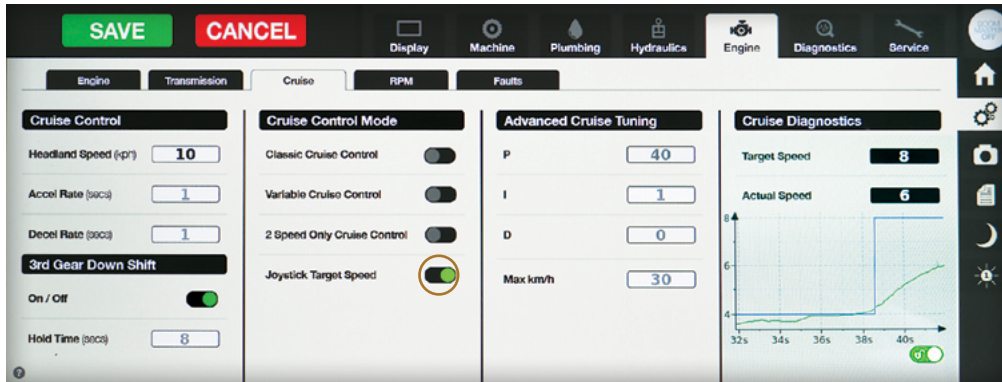
### To Set the Decel Rate (sec):

- 1 Press the 'Decel Rate (sec)' display touch button & a numerical keypad appears.
- 2 Press the numbers to set the required value (eg, 1), then press Enter.  
  
'Decel Rate (secs)' - The higher the number the longer it takes to reach the target.

### ii) 3rd Gear Down Shift

'3rd Gear Down Shift' settings comprise:

- **On/Off**  
Enables the Cruise function to preselect transmission 3rd gear as needed.
  - **'Hold Time (sec)'**  
'Hold Time (sec)' is the number of seconds 3rd gear is held.
    - In Variable or Two Speed Cruise Control mode when requested speed reduction is large enough that engine braking will assist slowing down to target speed - at which Hold is removed
    - In Classic Cruise Control mode, pulling the Joystick fully back activates the function.
    - Manually activate by pushing the 'Mode' push button on the gear selector.
- A lock icon appears over the gear selection displayed on the home screen & the push button gear selector will show 3rd as the maximum gear to be selected. The transmission will only down shift if it is safe to do so.



Enable the 'Cruise Control Mode' required, eg, 'Joystick Target Speed'.

## iii) Cruise Control Mode

'Cruise Control Mode' settings provide 4 different Cruise Control modes with touch buttons to enable or disable them. Only one mode can be enabled at any one time:

- **Classic Cruise Control**  
Used to enable or disable 'Classic Cruise Control' which uses higher set cruise speed only.
- **Variable Cruise Control**  
Used to enable or disable 'Variable Cruise Control' mode in which moving the Joystick changes speed between the Upper & Lower set cruise speeds.  
The Lower speed limit is set on this screen & Upper speed limit on the Joystick using the 'Cruise Set/Decrease' push button.

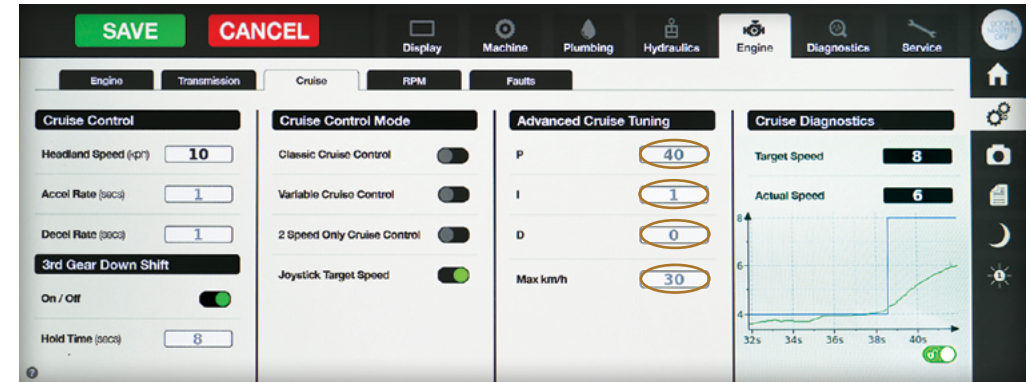
## • 2 Speed Only Cruise Control

Used to enable or disable '2 Speed Only Cruise Control' in which the operator has two speeds (Upper & Lower) moving the Joystick forwards or rearwards.

The Lower speed limit is set on this screen & Upper speed limit on the Joystick using the 'Cruise Set/Decrease' push button.

## • Joystick Target Speed

Used to enable or disable the joystick which is used to target a speed. By sliding the joystick forwards or backwards the operator sets a target speed to which the machine will drive. 'Advanced Cruise Tuning' parameters can be used to alter how the 'Joystick Target Speed' mode responds (See instructions that follow).



'Advanced Cruise Tuning' is only applicable to the 'Joystick Target Speed' mode. The goal of tuning is to ensure minimal process oscillation around the target setpoint after a disturbance has occurred.

## iv) Advanced Cruise Tuning

'Advanced Cruise Tuning' is only applicable to the 'Joystick Target Speed' mode.

'Advanced Cruise Tuning' features a 'PID Controller' using a PID algorithm where:

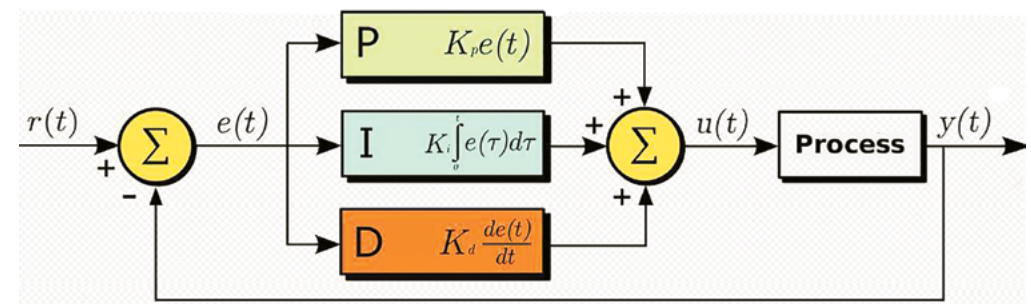
- 'P' is 'Proportional' gain parameter
- 'I' is Integral gain parameter
- 'D' is Derivative' gain parameter
- 'Max km/h' is Max speed targeted.

The combined 'PID' functions of the Controller automatically & efficiently action the desired speed by increasing or decreasing the engine output to match the operating conditions.

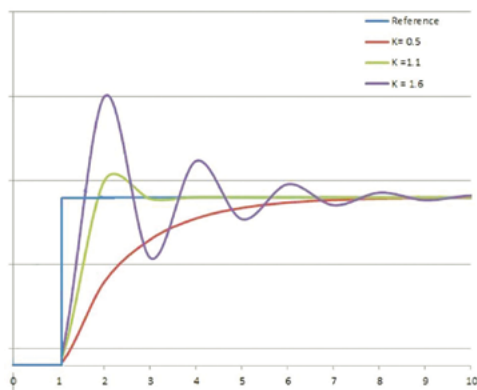
'PID' values can be refined or fine-tuned by an operator to better match operator style, terrain and soil conditions.

There is a science to tuning a PID loop but the most widely used tuning method is trial and error.

The PID Controller algorithm uses 'P' 'I' 'D' inputs to automatically & efficiently control engine speed to achieve target speed.







The 'Cruise Diagnostics' live graph (above) illustrates the tuning goal for minimal process oscillation around the target setpoint - after a disturbance has occurred.

The goal of tuning (using the 'Cruise Diagnostics' live graph) is to ensure minimal process oscillation around the target setpoint after a disturbance has occurred.

Observe the 'Cruise Diagnostics' information and make alterations if needed to improve performance.

#### 'P' = Response gain

Increase P = more aggressive in chasing target speed.

Decrease P = less aggressing in chasing target speed.

#### 'I' = Error removal

Increase 'I' slowly to remove oscillating error from target speed.

#### 'D' = Error over time

Increase 'D' slowly to remove error from target speed over time.

#### To Fine-Tune Advanced Cruise Tuning:

- 1 Individually press each display 'P', 'I' 'D' & 'Max km/h' touch button & a numerical keypad appears.
- 2 Press the numbers to set the required value, then press Enter.

Initially set:

- 'P' = 40
- 'I' = 1
- 'D' = 0

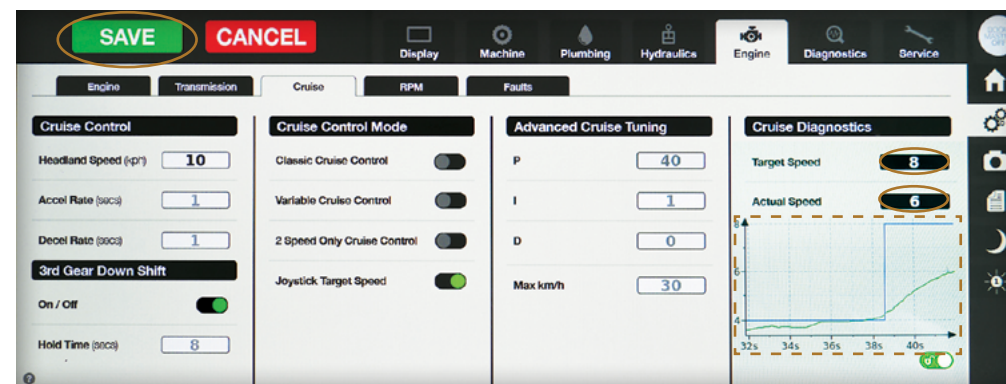
Typically fine tune by only adjusting one variable at a time.

- 3 Therefore, first fine tune 'P'.

Once 'P' is okay (minimal 'P' process oscillation after a disturbance), then move onto 'I'.

- 4 Fine tune 'I' & when okay (minimal 'I' process oscillation after a disturbance), then move onto 'D'.

- 5 Fine tune 'D' for minimal 'D' process oscillation after a disturbance.



'Cruise Diagnostics' (only applicable to the 'Joystick Target Speed' mode) displays 'Target Speed', 'Actual Speed' & a live performance graph. Press the SAVE touch button to save the 'Control Valve' settings & exit the screen.

#### v) Cruise Diagnostics

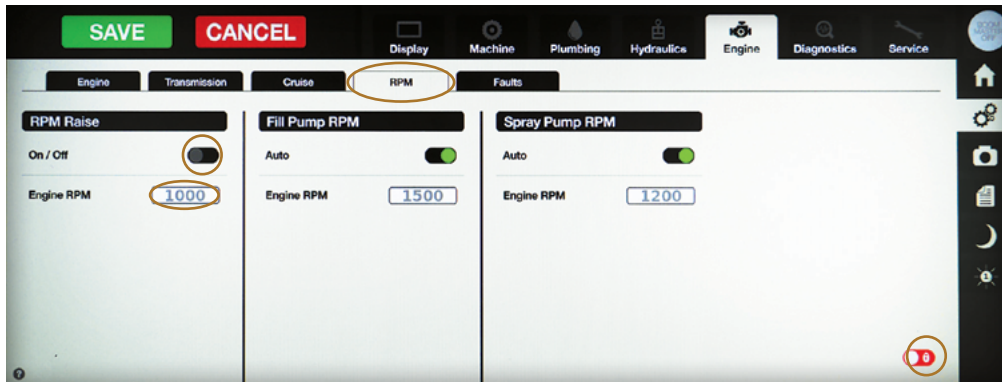
'Cruise Diagnostics' is used to assist fine-tuning cruise performance, using:

- Target speed, as requested by cruise control system
- Actual speed, actual speed of the machine.

The 'Cruise Diagnostics' panel displays:

- Target Speed (Joystick position)
- Actual Speed (current speed)
- Live graph (current performance).

When 'Cruise Control' settings are completed, press the 'SAVE' touch button on the top left hand side of the screen to save the settings.



Press the 'RPM' touch button to display the RPM tab screen. Unlock the screen to make any changes. Enable 'RPM Raise', then set the 'RPM Raise' speed as required.

## D RPM

Press the RPM tab touch button to open the RPM tab screen displaying:

- RPM Raise
- Fill Pump RPM
- Spray Pump RPM.

The 'RPM' screen is locked for protection from uninformed or accidental alteration.

The screen must be unlocked before any setting or alterations can be made.

To unlock the screen, follow the instructions previously provided in this chapter.

Press the 'Help (?)' touch button at the bottom left hand side of the screen for further information if required.

## NOTE

The 'SAVE' touch button will appear on the left hand side of the screen if a new value is entered or a change made in the G-Hub system.

If the 'SAVE' touch button is not pressed, then any current changes or entered value or values will be lost and previous settings will remain.

The 'SAVE' touch button can be pressed at any stage or screen change to ensure new settings are saved and not accidentally lost.

## i) RPM Raise

'RPM Raise' sets an engine speed to be activated on the G-Hub screen when a higher than idle speed is required with Cruiser stationary, eg, when warming up the engine, warming up oil systems and other requirements.

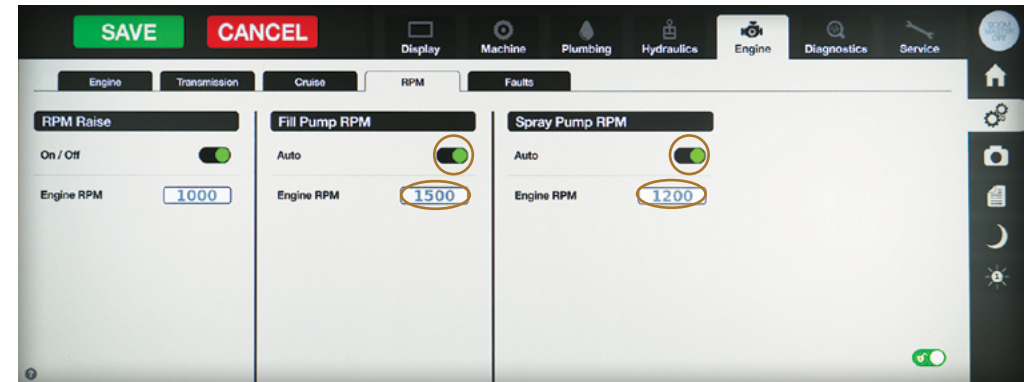
### To Enable the RPM Raise:

Press the RPM Raise 'On/Off' touch button to select On or OFF.

The touch button displays Green when On & Grey when Off.

### To Set the Engine RPM Raise:

- Press the 'Engine RPM' display touch button & a numerical keypad appears.
- Press the numbers to set the required engine RPM (eg, 1500), then press Enter.



Enable 'Fill Pump RPM', then set the 'Engine RPM'. Enable 'Spray Pump RPM', then set the 'Engine RPM'. Press the SAVE touch button to save the 'Control Valve' settings & exit the screen.

## ii) Fill Pump RPM

'Fill Pump RPM' sets an engine speed which is automatically activated from the External Display (at the Filling Station with the Cruiser is stationary), when the 'Fill Pump' is activated for filling.

### To Enable the Fill Pump RPM:

Press the Fill Pump RPM 'Auto' touch button to enable or disable the function.

The touch button displays Green when enabled & Grey when disabled.

### To Set the Fill Pump RPM:

- Press the 'Engine RPM' display touch button & a numerical keypad appears.
- Press the numbers to set the required value, (eg, 1200), then press Enter.

## iii) Spray Pump RPM

'Spray Pump RPM' sets an engine speed to be automatically activated from the External Display (at the Filling Station with the Cruiser is stationary), when the 'Spray Pump' is activated for filling - usual setting 1200 to 1500 RPM

### To Enable the Spray Pump RPM:

Press the Spray Pump RPM 'Auto' touch button to select or deselect it.

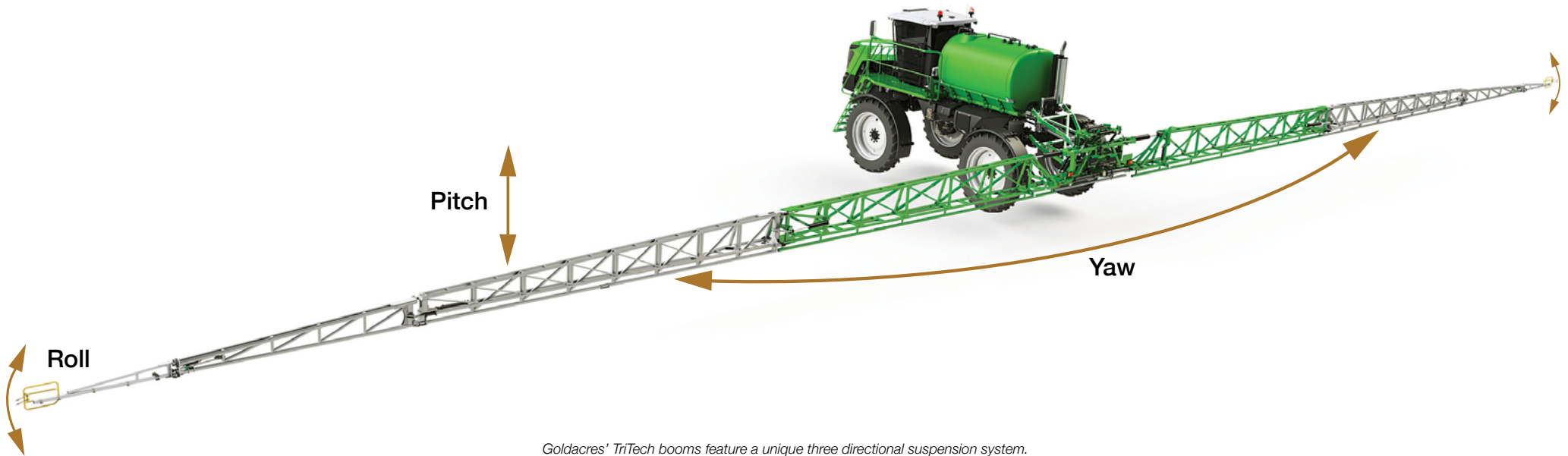
The touch button displays Green when enabled & Grey when disabled.

### To Set the Spray Pump RPM:

- Press the 'Engine RPM' display touch button & a numerical keypad appears.
- Press the numbers to set the required value, (eg, 1500), then press 'Enter'.

The Engine RPM screen is the last screen of the pre-setting procedures of the G-Hub.

It is important to press the 'SAVE' touch button (at top left hand side of the screen) to save the entered pre-set values into the G-Hub system.



*Goldacres' TriTech booms feature a unique three directional suspension system.*

## Check Boom Settings

The G6 Crop Cruiser Series 2 can be fitted with 36, 42 & 48 metre boom widths.

Each boom features hydraulic lift, fold and individual wing tilt controlled from the cabin, as well as pitch, roll and yaw suspension for superior boom ride & efficient, targeted spray application.

Wing tips are fitted with spring loaded breakaway ends to prevent damage when striking objects.

Prior to deliver each boom is pre-set and tested for spraying application.

However, it is recommended that the boom settings checked and tested for the accuracy prior to spraying application.

It is the operator's responsibility to correctly operate all sprayer functions at all times.

## Boom Centre Section

The TriTech boom centre section comprises two components - a Paralift rear and a boom centre section held together by delta links. The delta links allow the boom to provide roll and yaw suspension.

Roll suspension is when the boom pitches up and down at the tips. Yaw suspension is when the boom moves fore and aft at the tips.

If the boom did not feature yaw suspension there would be excessive stresses exerted on the boom and centre section when cornering or corrections of line are made.

The yaw suspension allows the chassis of the machine to move left and right without any movement being transferred to the boom.

The Paralift rear can move with the machine while the boom centre section can remain static or level as it rotates around the delta links connecting it to the Paralift rear.

Goldacres unique TriTech boom suspension system provides three directional suspension:

- **Pitch Suspension**

Vertical boom movement & forces encountered over rough ground conditions are dampened using hydraulic cylinders connected to a nitrogen filled accumulator.

- **Roll Suspension**

Constant boom height over sloping and uneven ground is maintained with the use of shock absorbers

- **Yaw Suspension**

Any erratic whipping movement (fore & aft) of the boom is minimised using hydraulic cylinders connected to nitrogen filled accumulators. Whipping of a boom can create undue stress on the boom frame and uneven spray application.

**Refer to Chapter 7 'Boom Settings' for further information & any necessary boom adjustments.**





Front Cover of the Raven AutoBoom XRT Calibration & Operation Manual.

## Pre-Set the AutoBoom XRT (Option)

If fitted the AutoBoom XRT controller is pre-set and tested for spraying applications prior to delivery.

However, it is recommended that all settings and operation be checked and tested for accuracy prior to spraying applications.

It is the operator's responsibility to correctly operate all controller and sprayer functions at all times.

## Raven XRT, boom levelling, G6 Series 2, suit 36 / 42m boom – REV00

GA1000054



Front Cover of the Goldacres Guide.

For instructions on the configuring & operating the AutoBoom XRT controller, refer to:

- Raven XRT Operation Manual
- Goldacres Guide: 'Raven XRT, boom levelling, G6 Series 2, suit 36/42m boom - REV00 GA1000054.



Lift up the Armrest console and release the G-Hub cable harness from underneath.

## Alternate Screen Mounting

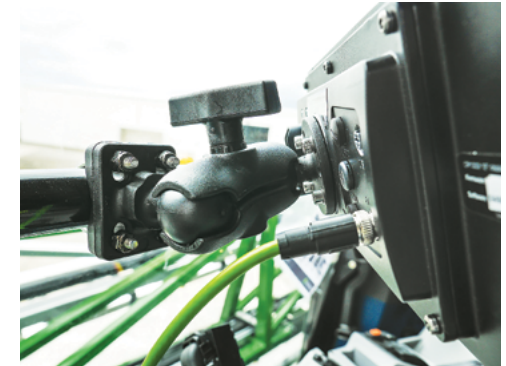
Alternate screen mounting is available for both the G-Hub Controller and GPS screens according to operator preference.

## G-Hub Controller Screen

The G-Hub Controller Screen can be mounted on the cabin rail according to operator preference.

To Mount the G-Hub Screen on the Cabin Rail:

- 1 Ensure the Engine key is in Off position.
- 2 Disconnect the G-Hub cables at the rear of the console & remove the console.
- 3 Lift up the Armrest Console & release the G-Hub cable harness from underneath.
- 4 Lower the Armrest Console & realign the G-Hub cable harness for the cabin rail mounting.



Position the ball mount on the cabin rail & fit the G-Hub Console & cables.

- 5 Position the ball mount on the cabin rail & fit the G-Hub Console & cables.
- 6 Adjust the position of the G-Hub Controller to suit the operator.

### **GPS Screen**

The GPS Screen can be mounted to the Armrest Console according to operator preference.

To Mount the GPS screen on the Armrest Console:

- 1 Ensure the Engine key is in Off position.
- 2 Remove the G-Hub Screen from the Armrest Console & mount it to the cabin rail as per instructions for the G-Hub Controller Screen.
- 3 Fit the GPS Screen to the ball mount on the Armrest Console & fit the GPS cables.
- 4 Adjust the position of the GPS Screen to suit the operator.

## 5 - Calibration – Set & Check Application Rates 95

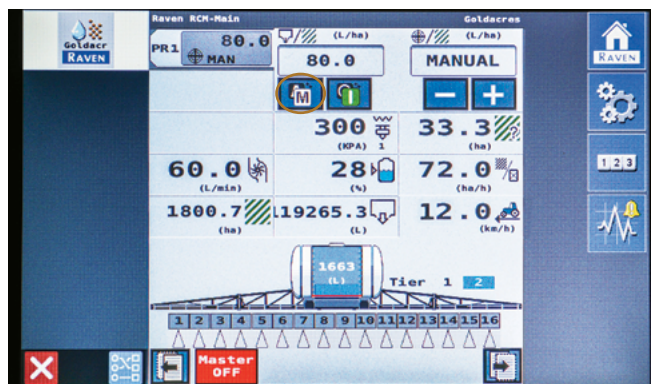
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## 5 Set & Check Application Rates – Calibration



The Raven Control Module (RCM) home screen showing 'Automatic' mode.



The Raven Control Module (RCM) home screen showing 'Manual' mode.



Application rates & droplet size for a situation can be sourced from chemical & nozzle manufacturers and the local agronomist.

### Sprayer Calibration

Sprayer Calibration is the process of determining the amount of spray solution to be applied to a given area and ensuring the target or application rate is being applied according to its product label.

The application rate of a sprayer operating manually remains constant as long as ground speed, spray pressure, number of nozzles and nozzle orifices remain unchanged. If there is any change in these factors, the application rate will change.

The automatic spray controller, however, maintains a constant application rate while allowing for some variation in ground speed and boom width.

To achieve a constant application rate, the spraying system must be correctly maintained and calibrated

### Calibration Procedure

Five steps are required to complete calibration:

- 1 Application Rate Required - Calculating & clearly understanding the volume of liquid (chemical & water) required for the specific application over a given area.
- 2 Nozzle Output Required - Calculating the output required for the application.
- 3 Nozzle Selection - Selecting and fitting the appropriate nozzles.
- 4 Controller Set-Up - Checking controller set-up values and entering values for the nozzles & spray rates required.
- 5 Test Actual Sprayer Output - Test the actual output to ensure the accuracy of the nozzle application rate before spraying.

### 1 Application Rate Required

The application rate is entirely dependant on the chemical manufacturer's application specifications and conditions of the target at the time of application.

Refer to the manufacturer's information and/or consult with the local agronomist for the best application rates and droplet size for your situation.

#### NOTE

Nozzle spray patterns & outputs must be checked regularly to ensure correct & uniform application rates because nozzles wear with use.

#### 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.

#### NOTE

All nozzles have a pressure and flow rate range to achieve the best results. Ensure you have selected the nozzle which best suit the application to avoid any problems.



Calculate the required nozzle output.

## 2 Calculate Required Nozzle Output

Once an application rate is chosen, the required nozzle output can be calculated using the following factors:

- Application rate required (eg, 80 l/ha)
- Speed of travel (eg, 12km/hr)
- Swath width (eg, 36m) and
- Number of nozzles on the boom (eg, 72).

Nozzle output can be calculated using the following formulae:

- **Nozzle Flow Rate (l/min) =** Speed (km/hr) x Swath Width (m) x Application Rate (l/ha) ÷ 600 ÷ Number of nozzles

eg,  $(12 \times 36 \times 80) \div 600 \div 72 = 0.8$  l/min for each nozzle.

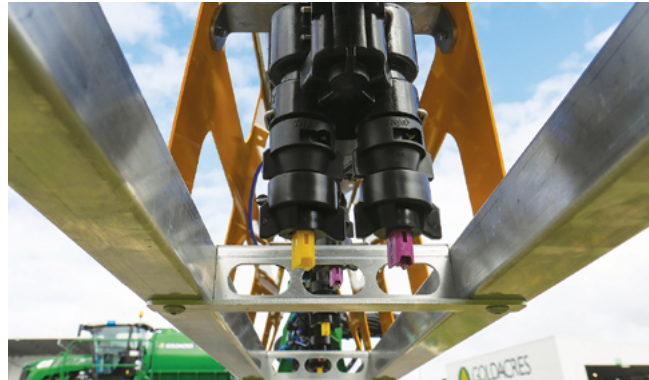
An alternative formula is:

- **Nozzle Flow Rate (l/min) =** Speed (km) x Nozzle Spacing (cm) x Application Rate (l/ha) ÷ 60,000

eg,  $(12 \times 50 \times 80) \div 60,000 = 0.8$  l/min.

### NOTE

Nozzles manufacturers' downloadable Apps may be useful in helping to calculate required nozzle rates, as well as displaying suitable nozzles for various applications.



Selected & fit the appropriate nozzles for the application.

## 3 Nozzle Selection

Use a manufacturer's Nozzle Chart (refer to Nozzle Charts on pages 104 - 107) and/or a manufacturer's App to find & select the most appropriate nozzles for the application according to:

- Application rate (eg, 80 l/ha)
- Speed of travel (eg, 12km/hr)
- Pressure setting (eg, 300kPa [3 bar])
- Boom configuration & nozzle control system fitted to the Cruiser - single line, 3TS option, 3TS Pro option or Hawkeye option.

### NOTE

Nozzles must be selected & fitted for the appropriate application. Nozzle orifices are subject to wear and must be checked regularly. Use the Jug Test to check accuracy of application whenever nozzles are changed or wear.

	bar	DROP SIZE	LERAP RATINGS	CAPACITY ONE NOZZLE IN L/MIN	l/ha							
					5 km/h	6 km/h	7 km/h	8 km/h	10 km/h	12 km/h	16 km/h	50 cm
AIXR110015 (100)	1.0	XC	—	0.34	81.6	68.0	58.3	51.0	40.8	34.0	25.5	
	2.0	C	—	0.48	115	96.0	82.3	72.0	57.6	48.0	36.0	
	3.0	C	—	0.59	142	118	101	88.5	70.8	59.0	44.3	
	4.0	M	—	0.68	163	136	117	102	81.6	68.0	51.0	
	5.0	M	—	0.76	182	152	130	114	91.2	76.0	57.0	
	6.0	M	—	0.83	199	166	142	125	99.6	83.0	62.3	
AIXR11002 (50)	1.0	XC	—	0.46	110	92.0	78.9	69.0	55.2	46.0	34.5	
	2.0	VC	—	0.65	156	130	111	97.5	78.0	65.0	48.8	
	3.0	C	—	0.79	190	158	135	119	94.8	79.0	59.3	
	4.0	M	—	0.91	218	182	156	137	109	91.0	68.3	
	5.0	M	—	1.02	245	204	175	153	122	102	76.5	
	6.0	M	—	1.12	269	224	192	168	134	112	84.0	
AIXR110025 (50)	1.0	XC	**	0.57	137	114	97.7	85.5	68.4	57.0	42.8	
	2.0	VC	**	0.81	194	162	139	122	97.2	81.0	60.8	
	3.0	VC	**	0.99	238	198	170	149	119	99.0	74.3	
	4.0	C	**	1.14	274	228	195	171	137	114	85.5	
	5.0	C	**	1.28	307	256	219	192	154	128	96.0	
	6.0	M	—	1.40	336	280	240	210	168	140	105	

The Teejet AIXR11002 nozzle @ 3 Bar gives 0.79l/min and an output of 0.91l/min @ 4 Bar.

## Single Line Boom

Find one nozzle which is nearest to the application requirements.

Check the speed variation available maintaining the same application rate & droplet size.

It is recommended to select a nozzle on mid-range pressure as this allows the spray controller to adjust pressure up or down with some but limited speed variation.

Using the appropriate nozzle chart, look down the nozzle capacity column (l/min) and select a nozzle to suit the output (eg 0.8 l/min), droplet size and travel speed.

Refer to pages 104 - 107 for commonly used Teejet and Lechler broadcast nozzle charts.

### Example: Nozzle Selection for a Single line Boom

Using the AIXR Teejet Application Chart (see page 104):

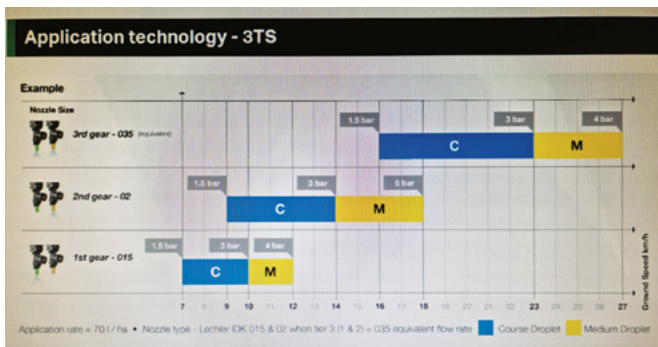
Look down the nozzle capacity column (l/min) and select a nozzle to suit an output of 0.8 l/min (shown above).

The AIXR11002 nozzle @ 3 Bar gives 0.79l/min and an output of 0.91l/min @ 4 Bar.

This nozzle should allow the controller to apply 80 litres per ha with a speed range of approximately 12 to 15kmh and with pressure range of 3 to 5 Bar.

Fit the selected nozzle to the boom.

## 5 Set & Check Application Rates – **Calibration**



*An illustration of the speed range & output (70l/ha) available of two nozzles fitted with the 3TS Option.*

### 3TS Option

Find two nozzles which are nearest to the application requirements..

Check the speed variation available maintaining the same application rate & droplet size.

It is recommended to select two nozzles which allow the spray controller to adjust pressure & switch nozzles On & Off with required speed variations while maintaining consistent droplet size and application rate.

Using the appropriate nozzle chart, look down the nozzle capacity column (l/min) and select a nozzle to suit the output (eg 0.8 l/min), droplet size and travel speed.





Refer to the commonly used Teejet and Lechler broadacre nozzle charts at the end of this chapter. For more information, go to:

[www.teejet.com](http://www.teejet.com)

[www.lechler.com](http://www.lechler.com)

## NOTE

Download the 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](http://www.teejet.com) or Lechler web site: [www.lechler.de](http://www.lechler.de)

 	 bar	DROP SIZE	LERAP RATINGS	CAPACITY ONE NOZZLE IN L / MIN	 l/haz 50 cm						
					5 km/h	6 km/h	7 km/h	8 km/h	10 km/h	12 km/h	16 km/h
<b>AIXR110015</b> (100)	1.0	XC	—	0.34	81.6	68.0	58.3	51.0	40.8	34.0	25.5
	2.0	C	—	0.48	115	96.0	82.3	72.0	57.6	48.0	36.0
	3.0	C	—	0.59	142	118	101	88.5	70.8	59.0	44.3
	4.0	M	—	0.68	163	136	117	102	81.6	68.0	51.0
	5.0	M	—	0.76	182	152	130	114	91.2	76.0	57.0
	6.0	M	—	0.83	199	166	142	125	99.6	83.0	62.3
<b>AIXR11002</b> (50)	1.0	XC	—	0.46	110	92.0	78.9	69.0	55.2	46.0	34.5
	2.0	VC	—	0.65	156	130	111	97.5	78.0	65.0	48.8
	3.0	C	—	0.79	190	158	135	119	94.8	79.0	59.3
	4.0	M	—	0.91	218	182	156	137	109	91.0	68.3
	5.0	M	—	1.02	245	204	175	153	122	102	76.5
	6.0	M	—	1.12	269	224	192	168	134	112	84.0
<b>AIXR110025</b> (50)	1.0	XC	**	0.57	137	114	97.7	85.5	68.8	57.0	42.8
	2.0	VC	**	0.81	194	162	139	122	97.2	81.0	60.8
	3.0	VC	**	0.99	238	198	170	149	119	99.0	74.3
	4.0	C	**	1.14	274	228	195	171	137	114	85.5
	5.0	C	**	1.28	307	256	219	192	154	128	96.0
	6.0	M	—	1.40	336	280	240	210	168	140	105

The 1st AXIR110015 nozzle @ 2 Bar gives 0.48l/min & an output of 0.68l/min @ 4 Bar  
& 2nd AXIR11002 nozzle @ 3 Bar gives 0.79l/min & an output of 1.02l/min @ 5 Bar.

### Example: Nozzle Selection for the 3TS Option

Using the AIXR Teejet Application Chart:

Look down the nozzle capacity column (l/min) and select two nozzles to suit an output of 0.8 l/min (shown above).

The AXIR110015 nozzle @ 2 Bar gives 0.48l/min which is 82.3 l/ha at 7 kmh and an output of 0.68l/min @ 4 Bar which is 81.6 l/ha at 10 kmh.

The AXIR11002 nozzle @ 2 Bar gives 0.65l/min which is 78.0 l/ha at 10 kmh and an output of 1.02l/min @ 5 Bar which is 76.5 l/ha at 16 kmh.

These nozzles should allow the controller to apply 80 litres per ha with a speed range of 7 to 16 km/h and a pressure range of 2 to 5 Bar switching between the 1st & 2nd Tiers.

By adding these two outputs together to use the 3rd Tier @ 3-4 Bar to give 1.38 -1.59 l/min would provide 80 l/ha application rate at increased speeds of 20 to 22kmh.

Fit the selected nozzles to the boom.

## NOTE

When selecting nozzle outputs, higher pressures & wider spray angles generally give finer droplet sizes than lower pressures & narrower spray angles.

## NOTE

Calculation is required to ensure spraying pressures do not exceed operating parameters.



	bar	DROP SIZE	LERAP RATINGS	CAPACITY ONE NOZZLE IN L/MIN	5 km/h	6 km/h	7 km/h	8 km/h	10 km/h	12 km/h	16 km/h	18 km/h	20 km/h
AIXR110015 (100)	1.0	XC	—	0.34	81.6	68.0	58.3	51.0	40.8	34.0	25.5	22.7	20.4
	2.0	C	—	0.48	115	96.0	82.3	72.0	57.6	48.0	36.0	32.0	28.8
	3.0	C	—	0.59	142	118	101	88.5	70.8	59.0	44.3	39.3	35.4
	4.0	M	—	0.68	163	136	117	102	81.6	68.0	51.0	45.3	40.8
	5.0	M	—	0.76	182	152	130	114	91.2	76.0	57.0	50.7	45.6
AIXR11002 (50)	6.0	M	—	0.83	199	166	142	125	99.6	83.0	62.3	55.3	49.8
	1.0	XC	—	0.46	110	92.0	78.9	69.0	55.2	46.0	34.5	30.7	27.6
	2.0	VC	—	0.65	156	130	111	97.5	78.0	65.0	48.8	43.3	39.0
	3.0	C	—	0.79	190	158	135	119	94.8	79.0	59.3	52.7	47.4
	4.0	M	—	0.91	218	182	156	137	109	91.0	68.3	60.7	54.6
AIXR110025 (50)	5.0	M	—	1.02	245	204	175	153	122	102	76.5	68.0	61.2
	6.0	M	—	1.12	269	224	192	168	134	112	84.0	74.7	67.2
	1.0	XC	**	0.57	137	114	97.7	85.5	68.4	57.0	42.8	38.0	34.2
	2.0	VC	**	0.81	194	162	139	122	97.2	81.0	60.8	54.0	48.6
	3.0	VC	**	0.99	238	198	170	149	119	99.0	74.3	66.0	59.4
	4.0	C	**	1.14	274	228	195	171	137	114	85.5	76.0	68.4
	5.0	C	**	1.28	307	256	219	192	154	128	96.0	85.3	76.8
	6.0	M	—	1.40	336	280	240	210	168	140	105	93.3	84.0

The 3TS Pro option requires three nozzles to be selected giving the operator a greater range of application rates and travel speeds.

## Example: Nozzle Selection for the 3TS Pro Option

Using the AIXR Teejet Application Chart:

Look down the nozzle capacity column (l/min) and select two nozzles to suit an output of 0.8 l/min (shown above).

The AIXR110015 nozzle @ 2 Bar gives 0.48l/min which is 82.3 l/ha at 7 kmh and an output of 0.68l/min @ 4 Bar which is 81.6 l/ha at 10 kmh.

The AIXR11002 nozzle @ 2 Bar gives 0.65l/min which is 78.0 l/ha at 10 kmh and an output of 1.02l/min @ 5 Bar which is 76.5 l/ha at 16 kmh.

The AIXR110025 nozzle @ 2 Bar gives 0.81l/min which is 81.0 l/ha at 12 kmh and an output of 1.28l/min @ 5 Bar which is 76.8 l/ha at 20 kmh.

These nozzles should allow the controller to apply 80 litres per ha at speeds ranging from 7 up to 40 kmh

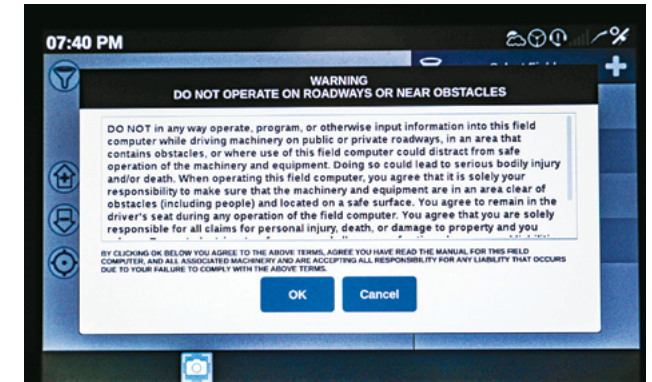
Fit the selected nozzle to the boom.

## NOTE

There are often very serious limitation to possible maximum spray speeds. Maximum spray speeds are limited by safety factors, chemicals used, maximum boom output in l/min, type of target, field conditions, terrain and weather conditions.

## Hawkeye Option (Nozzle Control System)

The Hawkeye Pulse Width Modulated (PWM) technology is an available option. If fitted refer to the manufacturer's manual.



Opening Warning screen of the optional Raven CR7.

## 4 Controller Set-Up

New application rate values must be entered into Automatic Control Module (RCM) according to the boom's nozzle configuration.

The Cruiser may be fitted with one of four nozzle control option technologies:

- a) Single line boom
- b) 3TS option
- c) 3TS Pro option
- d) Hawkeye option (nozzle control system).

### a) Enter Values for the Single Line Boom

After nozzle selection, a single line boom configuration requires the application rates to be entered into the controller according to the nozzle selected.

#### To Enter New Values:

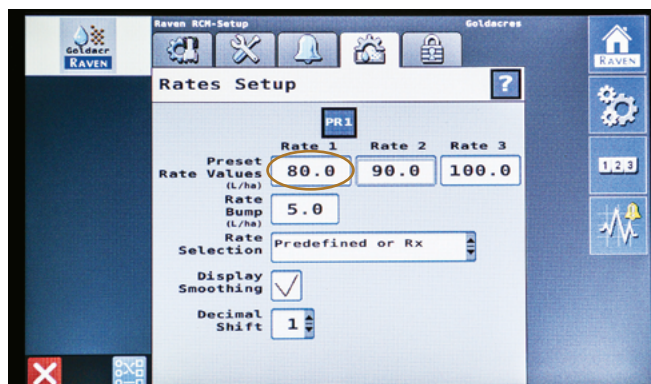
- 1 Start the engine.
- 2 "WARNING DO NOT OPERATE ON ROADWAYS OR NEAR OBSTACLES" appears on the optional Raven CR7 screen or ISO bus screen.

Press the OK button and the home screen appears.

## 5 Set & Check Application Rates – Calibration



Press the 'Set-Up' touch button on the Raven home screen.



Press the 'Preset Rate Value Rate 1' touch button.



The screen returns to the Rates Setup screen with the new rates displayed. Press the home screen touch button to return to the home screen.

- 3 Press the 'Set-Up' touch button on the home screen, and the 'Applicator Setup' screen appears.
- 4 Press the 'Rates Setup' touch button and the 'Rates Set-up' screen appears.

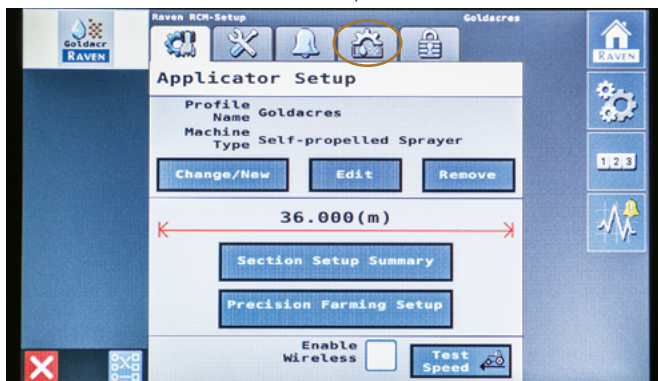
- 5 Press the 'Preset Value Rate 1' touch button and a numerical keypad appears.
- 6 Press the 'X' touch button to clear the existing number and press the touch buttons to enter the Application Rate, eg, 70, then press the 'Tick' touch button.  
The screen returns to the Rates Setup screen with '70' displayed in the Preset Value Rate 1 value.

- 7 Repeat steps 5 & 6 to enter preset rate values for Rate 2 (eg, 80 l/ha) and Rate 3 (eg, 90 l/ha).  
The screen returns to the Rates Setup screen with all rates displayed (eg, 70, 80, & 90) displayed.
- 8 Press the 'Rate Bump' touch button and a numerical keypad appears.  
The screen returns to the Rates Setup screen with eg, '5' shown in the Rate Bump display.
- 8 Press the home touch button to return to the home screen.  
This completes the controller entries for the single line boom calibration.

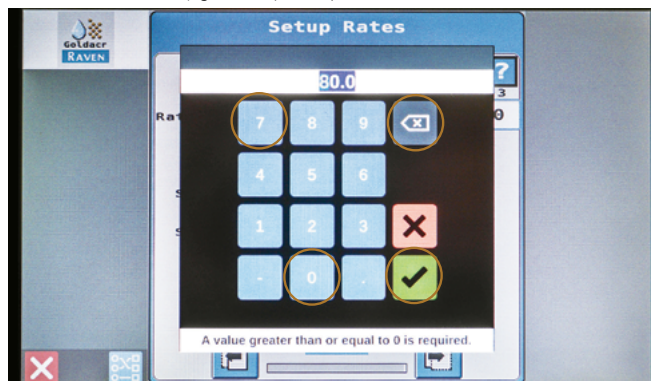
### NOTE

The spraying system has the capability to enter up to 3 pre-set application rates.

Press the 'Rates Setup' touch button.



Press the appropriate touch buttons to enter the spray application rate required for Rate 1 (eg, 70 l/ha), then press the 'Tick' touch button.

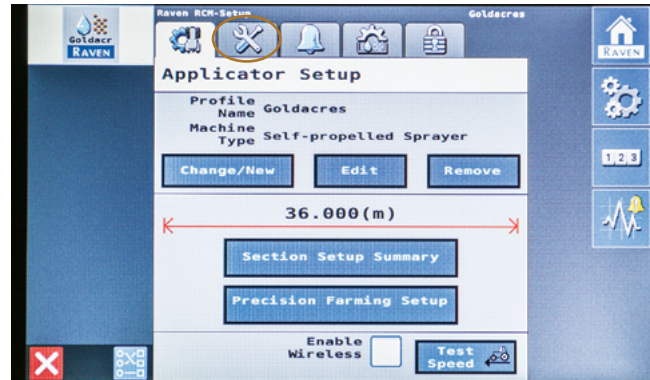


### NOTE

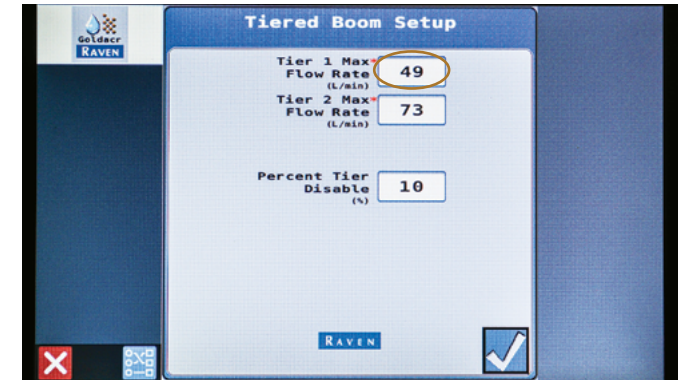
#### Rate Bump

When spraying in Manual Mode, the operator can adjust the Spray Application Rate (using touch buttons on the Controller) by the amount (l/ha) pre-set in the Spray Bump setting.





Press the 'Systems Settings' touch button.



Press the 'Tier 1 Max Flow Rate' touch button.

## b) Enter Values for the 3TS Option

After nozzle selection, the 3TS configuration requires new values to be entered into the controller according to the nozzles selected, namely.

- Spray application rates
- Maximum flow rate (for each tier/nozzle fitted [2 tiers]).

### To Enter New Application Rates:

Follow the steps 1 - 8 previously given under 'Enter Values for the Single Line Boom'.

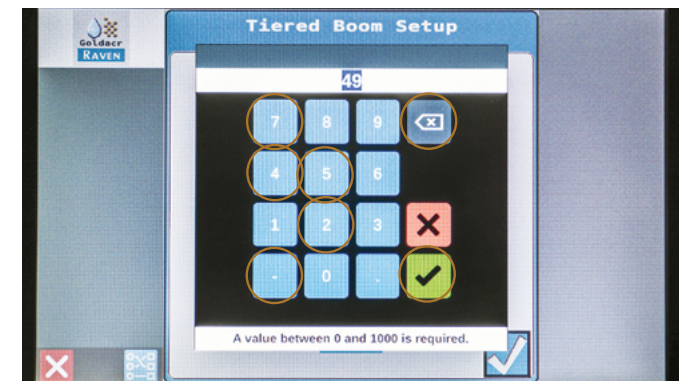
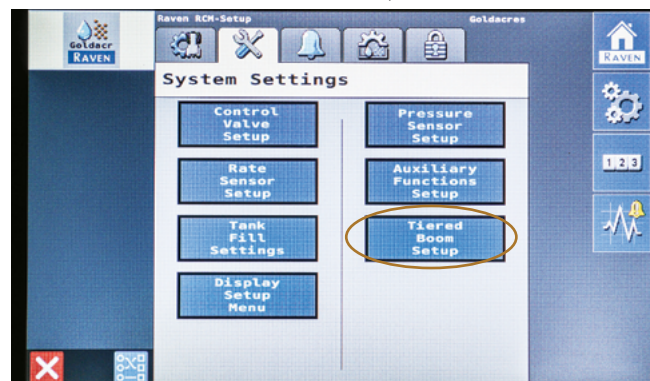
### To Enter Maximum Flow Rates:

- 1 Press the 'Systems Settings' touch button and the 'Systems Settings' screen appears.
- 2 Press the 'Tiered Boom Setup' touch button and the 'Tiered Boom Set-up' screen appears.

- 3 Press the 'Tier 1 Max Flow Rate' touch button and a numerical keypad appears.
- 4 Calculate Max Flow Rate of the 1st Tier nozzles fitted to the boom, eg, AXIR110015 nozzle @ 5 Bar 0.761 l/min. Multiply 0.76 x 72 (number of nozzles) = 54.7 l/min.
- 5 Press the 'X' touch button to clear the existing number and press the touch buttons to enter the Max Flow Rate, eg, 54.7, then press the 'Tick' touch button.

The screen returns to the Tiered Boom Setup screen with '54.7' in the Tier 1 Max Flow Rate value.

Press the 'Tiered Boom Setup' touch button.



Press the appropriate touch buttons to enter the Max Flow Rate for Tier 1 (eg, 54.7 l/min), then press the 'Tick' touch button.

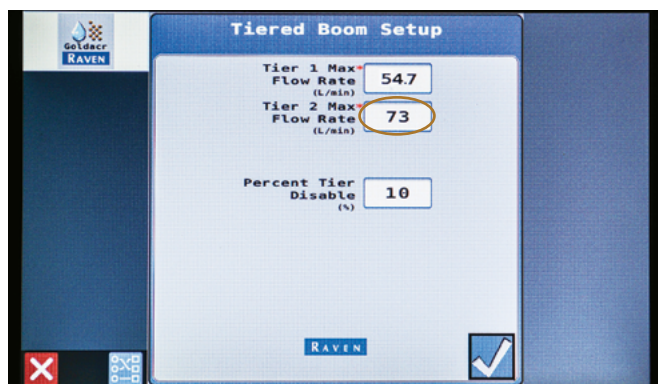
## NOTE

### Tier Max Flow Rates

The Tier Max Flow Rates is the maximum boom flow rate that a tier will reach before switching On the next tier.



## 5 Set & Check Application Rates – Calibration



Press the 'Tier 2 Max Flow Rate' touch button.

- 6 Press the 'Tier 2 Max Flow Rate' touch button and a numerical keypad appears.
- 7 Calculate Max Flow Rate of the 2nd Tier nozzles fitted to the boom, eg, AXIR11002 nozzle @ 5 Bar 1.02 l/min.  
Multiply 1.02 x 72 (number of nozzles) = 73.5 l/min.
- 8 Press the 'X' touch button to clear the existing number and press the touch buttons to enter the Max Flow Rate, eg, 73.5, then press the 'Tick' touch button.  
The screen returns to the Tiered Boom Setup screen with '73.5' in the Tier 2 Max Flow Rate value.
- 9 Press the 'Tick' touch button and the screen returns to the System Setting screen.

This completes the controller entries for the 3TS Option boom calibration.

### NOTE

#### Percent Tier Disable

The 'Percent Tier Disable' value is used to minimise unnecessary tier switching when spraying close to the switch point of a tier. Increasing the value, reduces the sensitivity when switching tiers.

The '10% Percent Tier Disable' value means a spraying Tier will not change down until the spray rate is 10% below the target rate.

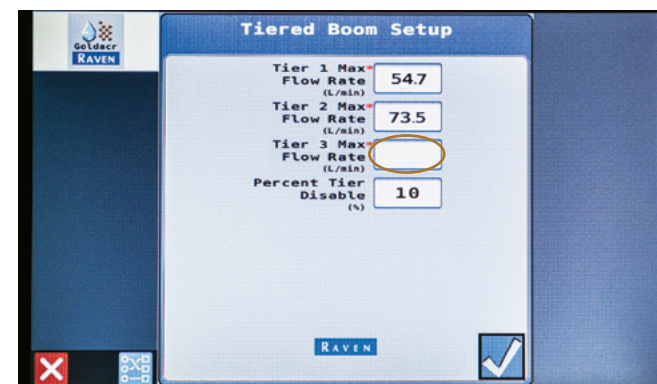
### c) Enter Values for 3TS Pro Option

After nozzle selection, the 3TS Pro configuration requires new values to be entered into the controller according to the nozzles selected, namely:

- Spray application rates
- Maximum flow rate (for each tier/nozzle fitted [3 tiers]).

#### To Enter New Application Rates:

Follow the steps 1 - 8 previously given under 'Enter Values for the Single Line Boom'.

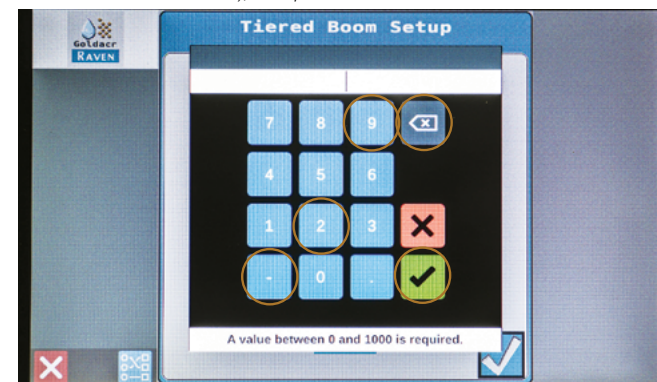


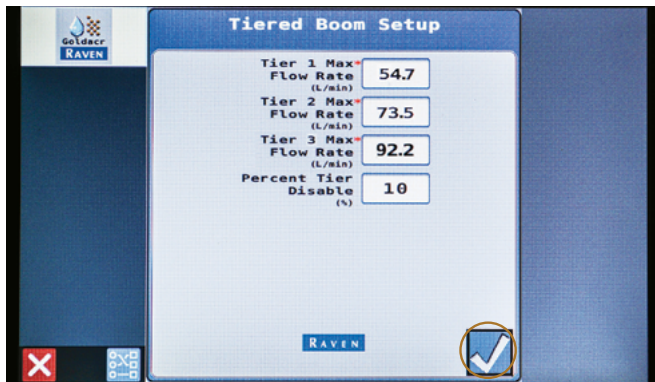
Press the 'Tier 3 Max Flow Rate' touch button.

#### To Enter New Maximum Flow Rates:

- 1 Follow the steps 1 - 8 previously given for the 3TS Option entering the appropriate values, then
- 2 Press the 'Tier 3 Max Flow Rate' touch button and a numerical keypad appears.
- 3 Calculate Max Flow Rate of the 3rd Tier nozzles fitted to the boom, eg, AXIR110025 nozzle @ 5 Bar 1.28 l/min.  
Multiply 1.28 x 72 (number of nozzles) = 92.2 l/min.
- 4 Press the 'X' touch button to clear the existing number and press the touch buttons to enter the Max Flow Rate, eg, '92.2', then press the 'Tick' touch button.

Press the appropriate touch buttons to enter the Max Flow Rate for Tier 3 (eg, 92.2 l/min), then press the 'Tick' touch button.



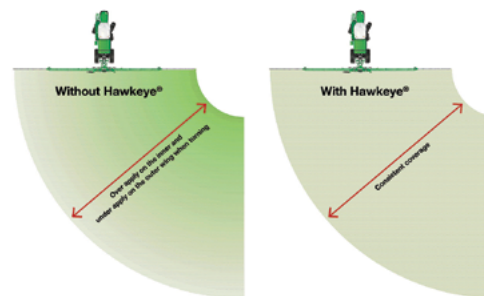


Press the 'Tick' touch button.

The screen returns to the Tiered Boom Setup screen with '92.2' displayed in the Tier 3 Max Flow Rate value.

- 5 Press the 'Tick' touch button and the screen returns to the System Setting screen.

This completes the controller entries for the 3TS Pro Option boom calibration.



Nozzle by nozzle turn compensation with the Hawkeye option.

## d) Hawkeye Option (Nozzle Control System)

The Hawkeye Pulse Width Modulated (PWM) technology is an available option.

Hawkeye 2.0 is offered on 36m and 48m booms with nozzle spacing at 250mm & 500mm providing:

- Nozzle by nozzle turn compensation with each nozzle featuring its own microprocessor & perform diagnostic functions.
- Up to 16 virtual sections & individual nozzle control.

For instructions on configuring & operating the Hawkeye, refer to the Raven Hawkeye Operation Manual supplied.



Unfold the boom in a suitable area & set the height of the boom to allow easy access to nozzles.

## 5 Test Actual Sprayer Output

Testing the Actual Sprayer Output to ensure the accuracy of the application rate before spraying is essential.

This part of calibration uses the 'Jug Test' to check spray nozzles deliver the correct amount of liquid, according to the nozzle manufacturer's rate chart.

### Jug Test

Items required for the 'Jug Test' are:

- Calibrated 2 litre measuring jug which measures in no less than 10 ml increments
- Timing device that counts in seconds
- Device or pen & paper for recording nozzle outputs
- Pressure gauge mounted on a nozzle tip to verify pressure being delivered at the nozzle.

Goldacres part number GA5077983 (suitable gauge mount) is available for attaching a gauge to nozzle body bayonet fittings (gauge not included).

### **CAUTION**

Do not proceed with nozzle testing with mixed chemicals, pesticides or an uncleaned liquid system. Ensure the liquid system is completely decontaminated and use only clean water for testing.  
Contamination or use of any chemicals or pesticides when testing is extremely hazardous to human health.



## 5 Set & Check Application Rates – Calibration

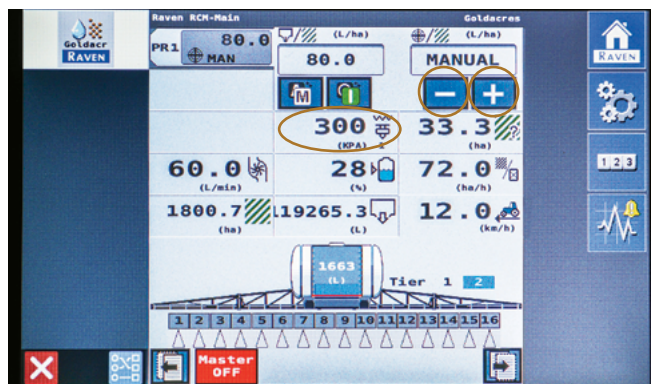


Press the 'A' touch button to change the Raven Rate Controller from Automatic to Manual mode.

### To Do the "Jug Test"

- 1 Start the Cruiser engine and unfold the boom in a suitable area & set the height of the boom to allow easy access to nozzles.
- 2 Press the 'A' touch button (Automatic/Manual) on the Raven Rate Controller shift to Manual mode. The touch button changes to 'M' and MANUAL appears in the '(L/ha) display'.
- 3 Press the touch buttons to start the 'Product Pump' on the G-Hub screen, then press the 'Boom Master On' touch button to start the nozzles spraying.

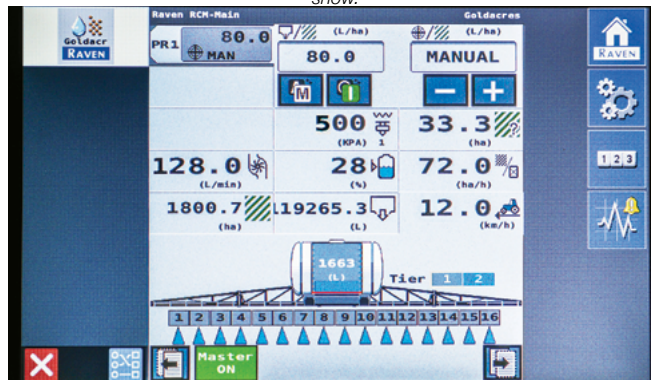
Press the touch buttons on the G-Hub screen to start the nozzle spraying.



Press the '-/+' (Minus/Plus) touch buttons to adjust the spray pressure '(kPa)' and bring the operating pressure up to 300kPa.

- 4 Press the '-/+' (Minus/Plus) touch buttons to adjust the spray pressure '(kPa) display' to the mid range operating pressure of a chosen nozzle output, eg, AXIR110015 nozzle @ 3 Bar (300kPa). Press the touch button(s) until 300 kPa is displayed.
- 5 Check the Raven Controller screen is showing 300 kPa. Adjust if needed, using the '-/+' touch buttons.
- 6 Check the Tier display on the screen (near boom illustration) to ensure all Tiers are spraying for the Jug test:
  - Single line boom - all nozzles operating for the Jug test
  - 3TS option - all nozzles operating for the Jug test
  - 3TS Pro option - all nozzles operating for the Jug test.

Check the Raven Controller screen to ensure all Tiers are spraying. If not, use the '-/+' touch buttons to increase pressure by increments of 100 kPa until all Tiers show.



Before measuring nozzle outputs, check for both air & liquid plumbing leaks, kinked or obstructed hoses and good nozzle spray patterns.

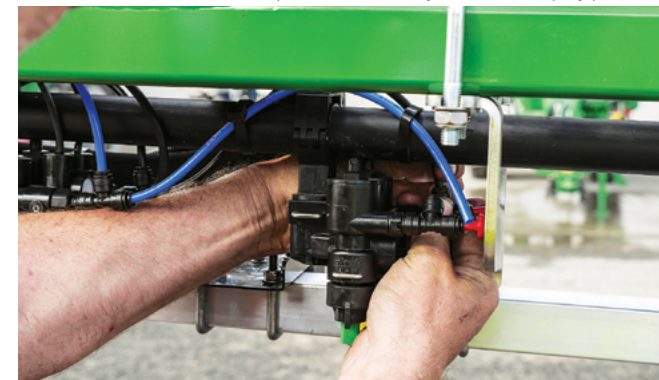
Adjust pressure upwards to 400 or 500 kPa using the '-/+' touch buttons until all tiers are spraying (relative to the boom used).

Pressure increments of 100 kPa must be used to be able to check the nozzle chart pressures & outputs.

- 7 Before measuring the nozzle outputs, check for both air & liquid plumbing leaks, kinked or obstructed hoses and uniform nozzle spray patterns.

If necessary, stop the machine & repair or replace any leaks or hoses which disrupt or reduce the normal air or liquid flows and fix non-uniform nozzle spray patterns.

If necessary, stop the machine & repair or replace any leaks or hoses that might restrict the normal flow of the liquid and correct any non-uniform spray patterns.







Place the measuring jug under one nozzle to collect nozzle output for exactly 1 minute, then remove it.

- 8 Place the measuring jug under one nozzle to collect the nozzle volume output for exactly 1 minute, then remove it.
- 9 Measure and record the nozzle output, nozzle size (Tier) and section location.
- 10 Repeat steps 8 & 9 for each nozzle in each of the 16 boom sections.
- 11 Compare the volume collected from each nozzle to the stated volume in the nozzle manufacturer's rate chart at the operating pressure used.

Any variation must be less than 10% (plus or minus).

Discard and replace all nozzles that deviate more than 10% from the specified output, for example:

- AXIR110015 chart @ 5 Bar (500kPa) = 0.76 l/min plus 10% is 0.84 l/min, less 10% 0.68 l/min
- AXIR11002 chart @ 5 Bar (500kPa) = 1.02 l/min plus 10% is 1.12 l/min, less 10% 0.92 l/min.

TeeJet advise nozzles with a flow greater than +10% of their stated volume are 'worn out' and should be replaced.

## NOTE

Do not use a worn nozzle to set the pressure setting and nozzle rates. If the boom is not fitted with new nozzles, fit one new nozzle and use it to set the flow rate and pressure setting. This sets the standard flow rate, pressure setting and spray pattern with which to test the performance of other nozzles.



Illustration of the RapidFlow and RapidFire nozzle technologies.

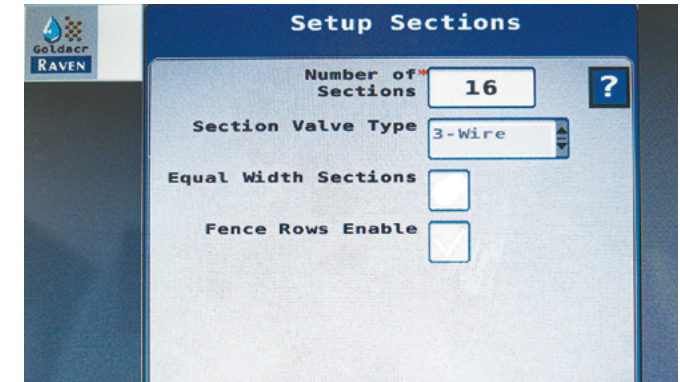
- 12 Test and check any replacement nozzles by collecting and measuring the output of each replacement.
- 13 Record each replacement and its output.
- 14 For each nozzle type tested, add the measured outputs together, then divide the total by the number of test nozzles to obtain the average nozzle output per minute.

eg, Using the 3TS two tier system:

- AXIR110015 Nozzle - Total spray output 15.4 litres ÷ 20 nozzles tested = 0.77 l/min per nozzle.
- AXIR11002 Nozzle - Total spray output 22 litres ÷ 20 nozzles tested = 1.1 l/min per nozzle.

## NOTE

While doing the 'Jug Test' visually check the nozzle spray patterns and spray angles for accuracy and, if necessary, replace any faulty nozzles.



Check boom width & section set-up values in the RCM.

## Other Calibration Items

Other items critical to accurate calibration & application include:

- 1 Boom Width
- 2 Vehicle Speed
- 3 Flow Meter
- 4 Regulator Valve.

### 1 Boom Width

The Boom Width values are entered into the RCM controller during the initial set-up of the machine. Check controller settings have not been changed.

Refer to Chapter 4 'Setting Up', 'Pre-Set the Raven Control Module (RCM)' for instructions.

## NOTE

In the event of any nozzles not delivering the required volume, investigate further, including but not be limited to;

- Cleaning the nozzles using a method recommended by the nozzle supplier
- Cleaning nozzle filters
- Replacing the nozzles.

## 5 Set & Check Application Rates – **Calibration**



*A dealer fitted John Deere Starfire GPS Receiver.*

### 2 Vehicle Speed

The Cruiser ground speed reading displayed on the G-Hub screen is sourced from the transmission speed sensor.

The Raven Rate Controller (RCM) speed reading is sourced via the ISO controller from the installed GPS system.

Any discrepancies or inaccuracies with Cruiser speed displayed on the ISOBus UT must be addressed via the GPS system.

If speed problems occur, contact your GPS supplier.



*The Flow Meter, located on top of the boom centre section, should regularly be inspected & cleaned.*

### 3 Flow Meter

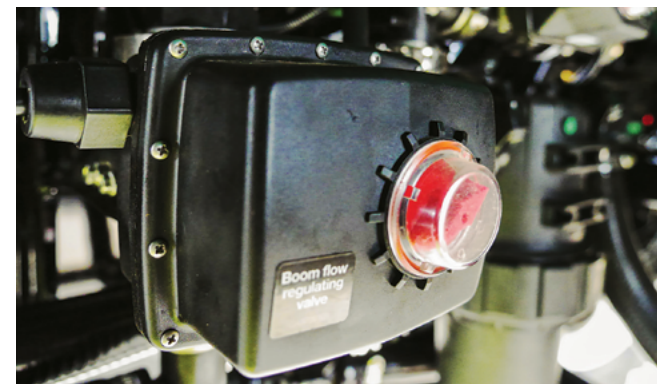
The Flow Meter (used by the controller to monitor flow rates) is critical to the accuracy of application rates.

The Flow Meter should be regularly inspected and cleaned of debris.

The ISO Bus UT has a built-in feature to conduct a flow meter calibration test.

For information on the test procedure, refer to the Raven Rate Control Module Operation Manual (RCM) supplied with the Cruiser.

See Chapter 8 'Lubrication & Maintenance', for 'Flow Meter' service information.



*The Regulator Valve, located under the left hand side chassis, should regularly be checked & calibrated.*

### 4 Regulator Valve

The Regulator Valve or Flow Control Valve (used by the Controller to adjust & control pressure & flow rates) is critical to the accuracy of spraying rates and should be checked & calibrated on a regular basis.

#### NOTE

The flow meter & regulator valve used by the controller are critical components of the spraying system and must be checked & calibrated on a regular basis to ensure accurate application.

#### NOTE

Each flow meter has a unique calibration number printed on a tag attached to the flow meter.

#### NOTE

Nozzle spray patterns & outputs - must be checked regularly to ensure correct & uniform application rates (nozzles wear with use).

## Regulator Valve Performance Adjustments

The Regulator Valve can be adjusted to alter its performance. The **factory set 'Valve Cal'** is [30] [3] [3]. Each value adjusts the performance of the valve:

**[30] is the 'Valve Speed Onto Rate'** (time it takes to reach set rate). The range is 0 – 100.

The valve speed can be adjusted to increase or decrease the time taken to achieve the set rate after switching the Boom Master On.

**[3] is the 'Ramping Onto Rate'** (allowable overshoot of set rate). The range is 1 – 10.

The valve speed can be adjusted to increase or decrease the allowable overshoot.

**[3] is the 'Percentage Off Rate until Valve Reacts'** (Off Rate percentage before valve makes correction).

The range is 1 – 10%. The valve can be adjusted to increase or decrease Off-Rate percentage.

## Record All Data For Future Reference

Record the set-up and calibration data on a work sheet similar to the one shown at the end of this chapter ('Calibration/ Application Work Sheet') for future reference and information.

Photocopy the blank work sheet for operational use as required.



# 5 Set & Check Application Rates – Calibration

AIXR Teejet Application Chart

AIXR Teejet Application Chart					DROPLET SIZE CATEGORIES														
				CAPACITY ONE NOZZLE IN L/MIN		I/ha													
		DROPS SIZE	LERAP RATINGS			50 cm													
						5 km/h	6 km/h	7 km/h	8 km/h	10 km/h	12 km/h	16 km/h	18 km/h	20 km/h					
AIXR110015 (100)	1.0	XC	—	0.34	81.6	68.0	58.3	51.0	40.8	34.0	25.5	22.7	20.4	CAP PART NUMBER					
	2.0	C	—	0.48	115	96.0	82.3	72.0	57.6	48.0	36.0	32.0	28.8						
	3.0	C	—	0.59	142	118	101	88.5	70.8	59.0	44.3	39.3	35.4						
	4.0	M	—	0.68	163	136	117	102	81.6	68.0	51.0	45.3	40.8						
	5.0	M	—	0.76	182	152	130	114	91.2	76.0	57.0	50.7	45.6						
	6.0	M	—	0.83	199	166	142	125	99.6	83.0	62.3	55.3	49.8						
AIXR11002 (50)	1.0	XC	—	0.46	110	92.0	78.9	69.0	55.2	46.0	34.5	30.7	27.6	CAP PART NUMBER					
	2.0	VC	—	0.65	156	130	111	97.5	78.0	65.0	48.8	43.3	39.0						
	3.0	C	—	0.79	190	158	135	119	94.8	79.0	59.3	52.7	47.4						
	4.0	M	—	0.91	218	182	156	137	109	91.0	68.3	60.7	54.6						
	5.0	M	—	1.02	245	204	175	153	122	102	76.5	68.0	61.2						
	6.0	M	—	1.12	269	224	192	168	134	112	84.0	74.7	67.2						
AIXR110025 (50)	1.0	XC	**	0.57	137	114	97.7	85.5	68.4	57.0	42.8	38.0	34.2	CAP PART NUMBER					
	2.0	VC	**	0.81	194	162	139	122	97.2	81.0	60.8	54.0	48.6						
	3.0	VC	**	0.99	238	198	170	149	119	99.0	74.3	66.0	59.4						
	4.0	C	**	1.14	274	228	195	171	137	114	85.5	76.0	68.4						
	5.0	C	**	1.28	307	256	219	192	154	128	96.0	85.3	76.8						
	6.0	M	—	1.40	336	280	240	210	168	140	105	93.3	84.0						
AIXR11003 (50)	1.0	XC	**	0.68	163	136	117	102	81.6	68.0	51.0	45.3	40.8	CAP PART NUMBER					
	2.0	VC	**	0.96	230	192	165	144	115	96.0	72.0	64.0	57.6						
	3.0	VC	**	1.18	283	236	202	177	142	118	88.5	78.7	70.8						
	4.0	C	**	1.36	326	272	233	204	163	136	102	90.7	81.6						
	5.0	C	**	1.52	365	304	261	228	182	152	114	101	91.2						
	6.0	M	—	1.67	401	334	286	251	200	167	125	111	100						
AIXR11004 (50)	1.0	UC	***	0.91	218	182	156	137	109	91.0	68.3	60.7	54.6	CAP PART NUMBER					
	2.0	XC	**	1.29	310	258	221	194	155	129	96.8	86.0	77.4						
	3.0	VC	**	1.58	379	316	271	237	190	158	119	105	94.8						
	4.0	VC	**	1.82	437	364	312	273	218	182	137	121	109						
	5.0	C	**	2.04	490	408	350	306	245	204	153	136	122						
	6.0	C	—	2.23	535	446	382	335	268	223	167	149	134						
AIXR11005 (50)	1.0	UC	***	1.14	274	228	195	171	137	114	85.5	76.0	68.4	CAP PART NUMBER					
	2.0	XC	***	1.61	386	322	276	242	193	161	121	107	96.6						
	3.0	VC	**	1.97	473	394	338	296	236	197	148	131	118						
	4.0	VC	**	2.27	545	454	389	341	272	227	170	151	136						
	5.0	C	**	2.54	610	508	435	381	305	254	191	169	152						
	6.0	C	—	2.79	670	558	478	419	335	279	209	186	167						
AIXR11006 (50)	1.0	UC	***	1.37	329	274	235	206	164	137	103	91.3	82.2	CAP PART NUMBER					
	2.0	XC	***	1.94	466	388	333	291	233	194	146	129	116						
	3.0	VC	**	2.37	569	474	406	356	284	237	178	158	142						
	4.0	VC	**	2.74	658	548	470	411	329	274	206	183	164						
	5.0	C	**	3.06	734	612	525	459	367	306	230	204	184						
	6.0	C	—	3.35	804	670	574	503	402	335	251	223	201						
AIXR11008 (50)	1.0	UC	—	1.82	437	364	312	273	218	182	137	121	109	CAP PART NUMBER					
	2.0	XC	—	2.58	619	516	442	387	310	258	194	172	155						
	3.0	VC	—	3.16	758	632	542	474	379	316	237	211	190						
	4.0	VC	—	3.65	876	730	626	548	438	365	274	243	219						
	5.0	VC	—	4.08	979	816	699	612	490	408	306	272	245						
	6.0	C	—	4.47	1073	894	766	671	536	447	335	298	268						
AIXR11010	1.0	UC	—	2.28	547	456	391	342	274	228	171	152	137	CAP PART NUMBER					
	2.0	UC	—	3.23	775	646	554	485	388	323	242	215	194						
	3.0	XC	—	3.95	948	790	677	593	474	395	296	263	237						
	4.0	VC	—	4.56	1094	912	782	684	547	456	342	304	274						
	5.0	VC	—	5.10	1224	1020	874	765	612	510	383	340	306						
	6.0	VC	—	5.59	1342	1118	958	839	671	559	419	373	335						

## AIXR TEEJET® AIR INDUCTION XR FLAT SPRAY TIPS

## MOST VERSATILE AIR INDUCTION TIP

The AIXR TeeJet Flat Spray Tip offers excellent drift resistance without compromising spray coverage. AIXR spray tips are suitable for a wide variety of systemic herbicides and applications where drift control is critical.

### Features & Benefits

- The unique UHMWPE material provides significantly longer wear life and better acid resistance, making the AIXR ideal for highly acidic applications, such as applying defoliation products
- Air-induction design enhances coverage of larger droplets through air inclusion
- A perfect balance of drift control and coverage – precisely sized, large, air-filled drops stay on target and cover the entire plant



USE WITH:  
**HERBICIDES**  
**SYSTEMIC FUNGICIDES**  
**SYSTEMIC INSECTICIDES**



PRESSURE:  
**1.5-6 BAR**



MATERIALS:  
**VISIFLO ACETAL**



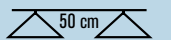


SPRAY ANGLE:  
**110°**

### NOTE

The nozzle charts shown in this manual are for instruction purposes only. Always jug test the accuracy of your nozzles. Also check with the nozzle manufacturer to ensure you are using the correct charts as updates may occur at any time.

TTJ60 Teejet Application Chart

TTJ60 Teejet Application Chart					DROPLET SIZE CATEGORIES										CAP PART NUMBER
	 bar	DROP SIZE	LERAP RATINGS	CAPACITY ONE NOZZLE IN L/MIN	 l/ha										
					5 km/h	6 km/h	7 km/h	8 km/h	10 km/h	12 km/h	16 km/h	18 km/h	20 km/h		
TTJ60- 11002 (100)	1.5	C	—	0.56	134	112	96.0	84.0	67.2	56.0	42.0	37.3	33.6	11441A *-CELR	
	2.0	C	—	0.65	156	130	111	97.5	78.0	65.0	48.8	43.3	39.0		
	3.0	M	—	0.79	190	158	135	119	94.8	79.0	59.3	52.7	47.4		
	4.0	M	—	0.91	218	182	156	137	109	91.0	68.3	60.7	54.6		
	5.0	M	—	1.02	245	204	175	153	122	102	76.5	68.0	61.2		
	6.0	M	—	1.12	269	224	192	168	134	112	84.0	74.7	67.2		
TTJ60-110025 (100)	1.5	VC	**	0.70	168	140	120	105	84.0	70.0	52.5	46.7	42.0		
	2.0	C	**	0.81	194	162	139	122	97.2	81.0	60.8	54.0	48.6		
	3.0	C	--	0.99	238	198	170	149	119	99.0	74.3	66.0	59.4		
	4.0	M	--	1.14	274	228	195	171	137	114	85.5	76.0	68.4		
	5.0	M	--	1.28	307	256	219	192	154	128	96.0	85.3	76.8		
	6.0	M	--	1.40	336	280	240	210	168	140	105	93.3	84.0		
TTJ60-11003 (100)	1.5	VC	**	0.83	199	166	142	125	99.6	83.0	62.3	55.3	49.8		
	2.0	C	**	0.96	230	192	165	144	115	96.0	72.0	64.0	57.6		
	3.0	C	--	1.18	283	236	202	177	142	118	88.5	78.7	70.8		
	4.0	M	--	1.36	326	272	233	204	163	136	102	90.7	81.6		
	5.0	M	--	1.52	365	304	261	228	182	152	114	101	91.2		
	6.0	M	--	1.67	401	334	286	251	200	167	125	111	100		
TTJ60-11004 (50)	1.5	VC	**	1.12	269	224	192	168	134	112	84.0	74.7	67.2		
	2.0	C	**	1.29	310	258	221	194	155	129	96.8	86.0	77.4		
	3.0	C	--	1.58	379	316	271	237	190	158	119	105	94.8		
	4.0	M	--	1.82	437	364	312	273	218	182	137	121	109		
	5.0	M	--	2.04	490	408	350	306	245	204	153	136	122		
	6.0	M	--	2.23	535	446	382	335	268	223	167	149	134		
TTJ60-11005 (50)	1.5	VC	**	1.39	334	278	238	209	167	139	104	92.7	83.4		
	2.0	C	**	1.61	386	322	276	242	193	161	121	107	96.6		
	3.0	C	**	1.97	473	394	338	296	236	197	148	131	118		
	4.0	M	--	2.27	545	454	389	341	272	227	170	151	136		
	5.0	M	--	2.54	610	508	435	381	305	254	191	169	152		
	6.0	M	--	2.79	670	558	478	419	335	279	209	186	167		
TTJ60-11006 (50)	1.5	VC	—	1.68	403	336	288	252	202	168	126	112	101		
	2.0	VC	—	1.94	466	388	333	291	233	194	146	129	116		
	3.0	C	—	2.37	569	474	406	356	284	237	178	158	142		
	4.0	C	—	2.74	658	548	470	411	329	274	206	183	164		
	5.0	M	—	3.06	734	612	525	459	367	306	230	204	184		
	6.0	M	—	3.35	804	670	574	503	402	335	251	223	201		
TTJ60-11008 (50)	1.5	VC	—	2.23	535	446	382	335	268	223	167	149	134		
	2.0	VC	—	2.58	619	516	442	387	310	258	194	172	155		
	3.0	C	—	3.16	758	632	542	474	379	316	237	211	190		
	4.0	C	—	3.65	876	730	626	548	438	365	274	243	219		
	5.0	C	—	4.08	979	816	699	612	490	408	306	272	245		
	6.0	M	—	4.47	1073	894	766	671	536	447	335	298	268		
TTJ60-11010 (50)	1.5	XC	—	2.79	670	558	478	419	335	279	209	186	167		
	2.0	VC	—	3.23	775	646	554	485	388	323	242	215	194		
	3.0	VC	—	3.95	948	790	677	593	474	395	296	263	237		
	4.0	C	—	4.56	1094	912	782	684	547	456	342	304	274		
	5.0	C	—	5.10	1224	1020	874	765	612	510	383	340	306		
	6.0	C	—	5.59	1342	1118	958	839	671	559	419	373	335		

T1441A-CELR

## TTJ60 TURBO TWINJET® FLAT SPRAY TIPS

IDEAL COVERAGE  
& TURBO-CHARGED  
DROPLETS

The TTJ60 produces a symmetrical twin spray pattern which provides superior coverage of small, hard-to-reach vertical targets. Due to the unique Turbo construction of the spray tip, it produces optimally-sized droplets for high coverage, with anti-drift characteristics resulting in a high quality spray application.

## Features &amp; Benefits

- Twin fan provides uniform coverage and penetration to the canopy
- Consistent droplet size spectrum and less driftable droplets for better coverage
- Medium to very coarse drift-resistant Turbo droplets



USE WITH:  
**CONTACT HERBICIDES**  
**CONTACT FUNGICIDES**  
**CONTACT INSECTICIDES**



PRESSURE:  
**1.5-6 BAR**



SPRAY PATTERN:  
**TWIN FAN**







MATERIALS:  
**VISIFLO ACETAL**

## NOTE

The nozzle charts shown in this manual are for instruction purposes only. Always jug test the accuracy of your nozzles. Also check with the nozzle manufacturer to ensure you are using the correct charts as updates may occur at any time.

# 5 Set & Check Application Rates – Calibration

## ID3 Lechler Application Chart

	ISO 25358 		I/min	I/ha 								
				5.0 km/h	6.0 km/h	7.0 km/h	8.0 km/h	10.0 km/h	12.0 km/h	14.0 km/h	16.0 km/h	18.0 km/h
ID-120-01 (80 M)	XC	3.0	0.39	94	78	67	59	47	39	33	29	26
	VC	4.0	0.45	108	90	77	68	54	45	39	34	30
	VC	5.0	0.51	122	102	87	77	61	51	44	38	34
	VC	6.0	0.55	132	110	94	83	66	55	47	41	37
	C	7.0	0.60	144	120	103	90	72	60	51	45	40
	C	8.0	0.64	154	128	110	96	77	64	55	48	43
ID-120-015 (60 M)	VC	3.0	0.59	142	118	101	89	71	59	51	44	39
	VC	4.0	0.68	163	136	117	102	82	68	58	51	45
	VC	5.0	0.76	182	152	130	114	91	76	65	57	51
	C	6.0	0.83	199	166	142	125	100	83	71	62	55
	C	7.0	0.90	216	180	154	135	108	90	77	68	60
	C	8.0	0.96	230	192	165	144	115	96	82	72	64
ID-120-02 (60 M)	XC	2.0	0.65	156	130	111	98	78	65	56	49	43
	VC	3.0	0.80	192	160	137	120	96	80	69	60	53
	VC	4.0	0.92	221	184	158	138	110	92	79	69	61
	VC	5.0	1.03	247	206	177	155	124	103	88	77	69
	C	6.0	1.13	271	226	194	170	136	113	97	85	75
	C	7.0	1.22	293	244	209	183	146	122	105	92	81
M	8.0	1.30	312	260	223	195	156	130	111	98	87	
ID-120-025 (60 M)	XC	2.0	0.81	194	162	139	122	97	81	69	61	54
	XC	3.0	0.99	238	198	170	149	119	99	85	74	66
	VC	4.0	1.15	276	230	197	173	138	115	99	86	77
	VC	5.0	1.28	307	256	219	192	154	128	110	96	85
	VC	6.0	1.40	336	280	240	210	168	140	120	105	93
	VC	7.0	1.52	365	304	261	228	182	152	130	114	101
VC	8.0	1.62	389	324	278	243	194	162	139	122	108	
ID-120-03 (60 M)	XC	2.0	0.97	233	194	166	146	116	97	83	73	65
	XC	3.0	1.19	286	238	204	179	143	119	102	89	79
	VC	4.0	1.37	329	274	235	206	164	137	117	103	91
	VC	5.0	1.53	367	306	262	230	184	153	131	115	102
	VC	6.0	1.68	403	336	288	252	202	168	144	126	112
	VC	7.0	1.81	434	362	310	272	217	181	155	136	121
VC	8.0	1.94	466	388	333	291	233	194	166	146	129	
ID-120-04 (60 M)	XC	2.0	1.29	310	258	221	194	155	129	111	97	86
	XC	3.0	1.58	379	316	271	237	190	158	135	119	105
	VC	4.0	1.82	437	364	312	273	218	182	156	137	121
	VC	5.0	2.04	490	408	350	306	245	204	175	153	136
	VC	6.0	2.23	535	446	382	335	268	223	191	167	149
	VC	7.0	2.41	578	482	413	362	289	241	207	181	161
VC	8.0	2.58	619	516	442	387	310	258	221	194	172	
ID-120-05 (25 M)	XC	2.0	1.61	386	322	276	242	193	161	138	121	107
	XC	3.0	1.97	473	394	338	296	236	197	169	148	131
	VC	4.0	2.28	547	456	391	342	274	228	195	171	152
	VC	5.0	2.55	612	510	437	383	306	255	219	191	170
	VC	6.0	2.79	670	558	478	419	335	279	239	209	186
	VC	7.0	3.01	722	602	516	452	361	301	258	226	201
VC	8.0	3.22	773	644	552	483	386	322	276	242	215	
ID-120-06 (25 M)	XC	2.0	1.93	463	386	331	290	232	193	165	145	129
	XC	3.0	2.36	566	472	405	354	283	236	202	177	157
	VC	4.0	2.73	655	546	468	410	328	273	234	205	182
	VC	5.0	3.05	732	610	523	458	366	305	261	229	203
	VC	6.0	3.34	802	668	573	501	401	334	286	251	223
	VC	7.0	3.61	866	722	619	542	433	361	309	271	241
VC	8.0	3.86	926	772	662	579	463	386	331	290	257	
ID-120-08 (25 M)	XC	2.0	2.58	619	516	442	387	310	258	221	194	172
	XC	3.0	3.16	758	632	542	474	379	316	271	237	211
	VC	4.0	3.65	876	730	626	548	438	365	313	274	243
	VC	5.0	4.08	979	816	699	612	490	408	350	306	272
	VC	6.0	4.47	1073	894	766	671	536	447	383	335	298
	VC	7.0	4.83	1159	966	828	725	580	483	414	362	322
VC	8.0	5.16	1238	1032	885	774	619	516	442	387	344	
ID-120-10 (25 M)	XC	2.0	3.22	773	644	552	483	386	322	276	242	215
	XC	3.0	3.94	946	788	675	591	473	394	338	296	263
	XC	4.0	4.55	1092	910	780	683	546	455	390	341	303
	VC	5.0	5.09	1222	1018	873	764	611	509	436	382	339
	VC	6.0	5.57	1337	1114	955	836	668	557	477	418	371
	VC	7.0	6.02	1445	1204	1032	903	722	602	516	452	401
VC	8.0	6.43	1543	1286	1102	965	772	643	551	482	429	

ISO 25358  
Droplet size classification

New measuring system!  
Further information see page 13.

VF Very fine  
F Fine  
M Medium  
C Coarse  
VC Very coarse  
XC Extremely coarse  
UC Ultra coarse

Classifications are subject to change.

- Spray pressure at the nozzle tip (gauged with a diaphragm valve)
- The stated liter-per-hectare rates apply to water
- Prior to each spraying season, verify the table data by gauging the flow rates
- Make sure that all nozzles have the same settings

Online nozzle calculator



Apple Android

Air-Injector  
flat spray nozzles ID3

ID3



Drift reduction:  
90/75/50 %  
Current list under  
[www.lechler-agri.com/drift-reduction](http://www.lechler-agri.com/drift-reduction)

Extremely low-drift, air-injector flat spray nozzle for professional use.

### Advantages

- Up to 90 % drift reduction depending on nozzle size, pressure and country
- Long injector design ensures high drift stability over a wide pressure range
- Timely application even under adverse weather conditions
- Increased workrate due to flexible use over a wide pressure range
  - Adaptation by changing the driving speed and l/ha rate without nozzle changes
- Very good deposition structure and crop penetration



Crop production Ground care

Dimensions in mm.

Nozzle size  
01 – 10

Spray angle  
120°

Material  
POM, ceramic

Pressure range  
– ID-01 to -015:  
3 – 4 – 8 bar  
– ID-02 to -10:  
2 – 4 – 8 bar  
– UAN: 2 – 4 bar

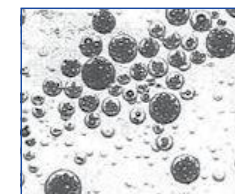
Recommended filters  
80 M 01  
60 M 02 – 04  
25 M 05 – 10

Droplet size  
Ultra coarse – medium

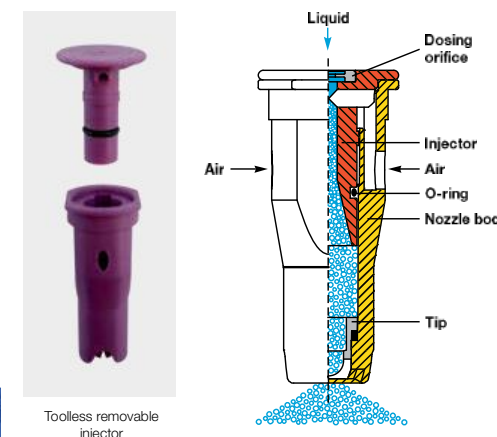
Width across flats  
10 mm

### Application areas

- Plant protection products and growth regulators
- Liquid fertilizer
- Border application can be combined with border nozzle IS 80
- Golf course



Aeration effect






Toolless removable injector

## NOTE

The nozzle charts shown in this manual are for instruction purposes only. Always jug test the accuracy of your nozzles. Also check with the nozzle manufacturer to ensure you are using the correct charts as updates may occur at any time.



## IDK/IDKN Lechler Application

	ISO 25358			l/min	 l/ha								
	IDKN	IDK			5.0 km/h	6.0 km/h	7.0 km/h	8.0 km/h	10.0 km/h	12.0 km/h	14.0 km/h	16.0 km/h	18.0 km/h
IDK 120-01 90-01 (80 M)		VC	1.0	0.23	55	46	39	35	28	23	20	17	15
		VC	1.5	0.28	67	56	48	42	34	28	24	21	19
		VC	2.0	0.32	77	64	55	48	38	32	27	24	21
		VC	2.5	0.36	86	72	62	54	43	36	31	27	24
		VC	3.0	0.39	94	78	67	59	47	39	33	29	26
		C	4.0	0.45	108	90	77	68	54	45	39	34	30
		M	5.0	0.51	122	102	87	77	61	51	44	38	34
	M	6.0	0.55	132	110	94	83	66	55	47	41	37	
IDK 120-015 90-015 (60 M)		VC	1.0	0.34	82	68	58	51	41	34	29	26	23
		VC	1.5	0.42	101	84	72	63	50	42	36	32	28
		VC	2.0	0.48	115	96	82	72	58	48	41	36	32
		VC	2.5	0.54	130	108	93	81	65	54	46	41	36
		C	3.0	0.59	142	118	101	89	71	59	51	44	39
		C	4.0	0.68	163	136	117	102	82	68	58	51	45
		M	5.0	0.76	182	152	130	114	91	76	65	57	51
	M	6.0	0.83	199	166	142	125	100	83	71	62	55	
IDK 120-02 90-02 (60 M)		VC	1.0	0.46	110	92	79	69	55	46	39	35	31
		VC	1.5	0.56	134	112	96	84	67	56	48	42	37
		VC	2.0	0.65	156	130	111	98	78	65	56	49	43
		VC	2.5	0.73	175	146	125	110	88	73	63	55	49
		VC	3.0	0.80	192	160	137	120	96	80	69	60	53
		C	4.0	0.92	221	184	158	138	110	92	79	69	61
		C	5.0	1.03	247	206	177	155	124	103	88	77	69
	M	6.0	1.13	271	226	194	170	136	113	97	85	75	
IDK 120-025 90-025		XC	1.0	0.57	137	114	98	86	68	57	49	43	38
		VC	1.5	0.70	168	140	120	105	84	70	60	53	47
		VC	2.0	0.81	194	162	139	122	97	81	69	61	54
		VC	2.5	0.91	218	182	156	137	109	91	78	68	61
		C	3.0	0.99	238	198	170	149	119	99	85	74	66
		C	4.0	1.15	276	230	197	173	138	115	99	86	77
		M	5.0	1.28	307	256	219	192	154	128	110	96	85
	M	6.0	1.40	336	280	240	210	168	140	120	105	93	
IDK 120-03 90-03 IDKN 120-03 (60 M)	XC	XC	1.0	0.69	166	138	118	104	83	69	59	52	46
	XC	VC	1.5	0.84	202	168	144	126	101	84	72	63	56
	VC	VC	2.0	0.97	233	194	166	146	116	97	83	73	65
	VC	VC	2.5	1.08	259	216	185	162	130	108	93	81	72
	VC	VC	3.0	1.19	286	238	204	179	143	119	102	89	79
	VC	C	4.0	1.37	329	274	235	206	164	137	117	103	91
	C	C	5.0	1.53	367	306	262	230	184	153	131	115	102
	C	M	6.0	1.68	403	336	288	252	202	168	144	126	112
IDK 120-04 90-04 (60 M)	XC	XC	1.0	0.91	218	182	156	137	109	91	78	68	61
	XC	XC	1.5	1.12	269	224	192	168	134	112	96	84	75
	XC	VC	2.0	1.29	310	258	221	194	155	129	111	97	86
	VC	VC	2.5	1.44	346	288	247	216	173	144	123	108	96
	VC	VC	3.0	1.58	379	316	271	237	190	158	135	119	105
	VC	C	4.0	1.82	437	364	312	273	218	182	156	137	121
	C	C	5.0	2.04	490	408	350	306	245	204	175	153	136
	C	C	6.0	2.23	535	446	382	335	268	223	191	167	149
IDK 120-05 (25 M)		XC	1.0	1.14	274	228	195	171	137	114	98	86	76
		XC	1.5	1.39	334	278	238	209	167	139	119	104	93
		VC	2.0	1.61	386	322	276	242	193	161	138	121	107
		VC	2.5	1.80	432	360	309	270	216	180	154	135	120
		VC	3.0	1.97	473	394	338	296	236	197	169	148	131
		VC	4.0	2.28	547	456	391	342	274	228	195	171	152
		C	5.0	2.55	612	510	437	383	306	255	219	191	170
IDK 120-06 (25 M)		C	6.0	2.79	670	558	478	419	335	279	239	209	186
		XC	1.0	1.36	326	272	233	204	163	136	117	102	91
		VC	1.5	1.67	401	334	286	251	200	167	143	125	111
		VC	2.0	1.93	463	386	331	290	232	193	165	145	129
		VC	2.5	2.15	516	430	369	323	258	215	184	161	143
		C	3.0	2.36	566	472	405	354	283	236	202	177	157
		C	4.0	2.73	655	546	468	410	328	273	234	205	182
	C	5.0	3.05	732	610	523	458	366	305	261	229	203	
	C	6.0	3.34	802	668	573	501	401	334	286	251	223	

### ISO 25358 Droplet size classification

New measuring system! Further information see page 13.

VF	Very fine
F	Fine
M	Medium
C	Coarse
VC	Very coarse
XC	Extremely coarse
UC	Ultra coarse

Classifications are subject to change.

- Spray pressure at the nozzle tip (gauged with a diaphragm valve)
- The stated liter-per-hectare rates apply to water
- Prior to each spraying season, verify the table data by gauging the flow rates
- Make sure that all nozzles have the same settings

### Online nozzle calculator



Apple



Android



Best Protection of IDK/IDKN/IDKS/IDKT nozzles through long side walls of MultiCap (see page 108).

Available assembled with IDK-, IDKT- and IDKN nozzle

## Air-injector flat spray compact nozzles IDK/IDKN

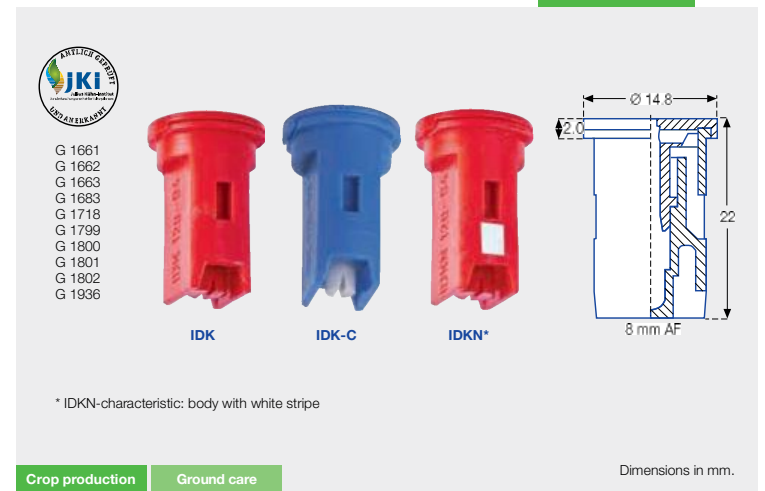


Drift reduction: 90/75/50 %  
Current list under  
www.lechler-agri.com/  
drift-reduction

Very low-drift, compact air-injector flat spray nozzle with wide droplet spectrum (from ultra coarse to medium).

### Advantages

- Up to 90 % drift reduction depending on nozzle size, pressure and country
- Very low drift and loss-reducing in the pressure range up to 3.0 bar (depending on size)
- Inexpensive alternative to conventional standard nozzles
- Very good deposition structure and crop penetration



\* IDKN-characteristic: body with white stripe

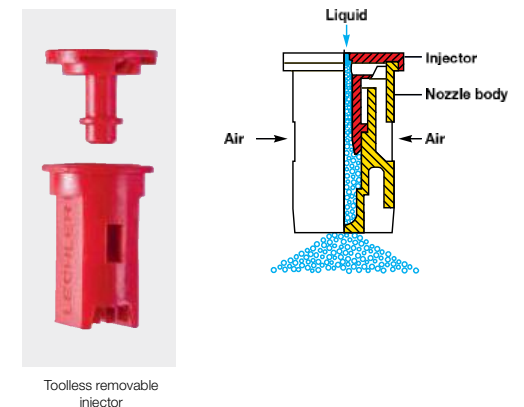
Crop production

Ground care

Dimensions in mm.

### Application areas

- Plant protection products and growth regulators
- Liquid fertilizer
- Spray frame
- Border application can be combined with border nozzle IDKS 80
- Golf course
- Knapsack sprayer
- Greenhouse



Toolless removable injector

## NOTE

The nozzle charts shown in this manual are for instruction purposes only. Always jug test the accuracy of your nozzles. Also check with the nozzle manufacturer to ensure you are using the correct charts as updates may occur at any time.



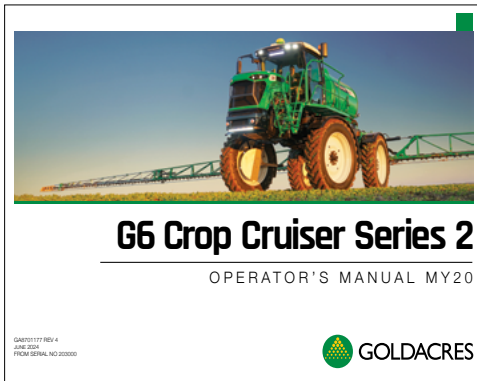
## 6 - Operation – Ready to Spray

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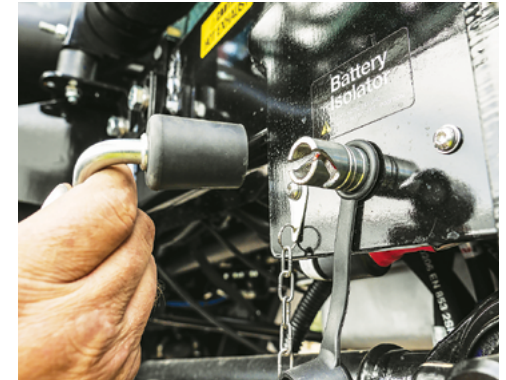
*G6 Crop Cruiser Operator's Manual.*



*Check the suction filter is clean.*



*Check tyre inflation and wheel nuts.*



*Engage the batter isolator switch to provide power to the Cruiser systems.*

## Pre-Operation Check

### Before Starting the Cruiser:

- Read the G6 Crop Cruiser Operator's Manual thoroughly, before attempting to use this machine
- Read & follow instructions on chemical manufacturers labels
- Refer to instructions provided in other operator manuals supplied
- Always wear appropriate protective clothing.
- Before operating the machine, check all fluid levels (oil, water & fuel).
- Check all maintenance procedures have been followed
- Complete scheduled lubrication
- Inspect the machine to ensure there is no damage or wear which could lead to injury, further damage or reduced performance
- Check all plumbing lines & fittings to ensure they are tight, not damaged or leaking
- Check to ensure frost and/or vermin have not damaged the machine
- Check the suction filter is clean
- Check the pressure filter is clean
- Check nozzles are spraying correctly
- Check all hydraulic connections
- Check boom controls functions
- Check all spraying control functions (refer to the instructions in this manual)

- Check tyres are correctly inflated
- Check all lights are working correctly
- Check all bolts & nuts are tight & secure
- Ensure there is a sufficient clean water in the hand wash tank for personal hygiene and chemical safety
- Organise communication with someone to come to your aid, if required.

A more comprehensive checklist of routine checks is provided in chapter 8, 'Lubrication & Maintenance'.

### Starting the Cruiser

Before starting the Cruiser, the battery isolator switch must be engaged to provide power to the machine systems.

To start the engine, the transmission must be in neutral. Insert the ignition key and turn clockwise (the ignition key is located on the rear right console).

After starting the Cruiser, allow hydraulic oil to warm up before operating hydraulic functions.

### Before Starting in Cold Conditions

If the Cruiser in a cold environment, always check components to make sure that they have not been damaged and that there is no ice in the system before starting spraying.

If the water has frozen in the pump and/or in the lines, wait until it has completely thawed before use.

### NOTE

A high quality multi-purpose grease is essential for the machine to operate with maximum effectiveness and life-expectancy.  
It is important to keep the lubricant and lubricant applicator clean. Wipe all dirt from the fittings before use.

### NOTE

Be sure to adequately clean and flush all chemical handling equipment.  
All spray equipment should be cleaned at the start and end of each spray season including all filters and nozzles.

### NOTE

Test the pump with clean water. Switch on the pump at the lowest revolutions possible & gradually increase revolutions until the pump reaches its operating speed.  
Do not exceed 4200 rpm on centrifugal pump or 540 rpm on diaphragm pump.

### NOTE

The operator must wear the operator safety belt at all times when seated in the cabin or when the machine is in motion.



Ensure the Cruiser meets your state vehicle height & width restrictions before driving on roads.

## Machine Transit Safety

A Cruiser height is approximately 4.2m high & aerials on the roof, make it higher.

Check the regulations in your state for maximum vehicle height & width restrictions. Bigger booms may require an escort in some areas.

When driving the machine on roads it may be necessary to remove aerials to meet the required height restrictions.

Aerials on the roof may also need to be removed to meet clearance requirements for over head power lines - on the road & in some paddocks.

## Overhead Power Lines

Check areas to be sprayed for any overhead power lines.

If there are power lines in the area, contact the relevant energy provider for information on safe use of machinery near live power lines.

### **⚠ DANGER**

Check the area to be sprayed for over head power lines. Any contact of the machine & power lines can result in serious injury or death. If power lines are in the spray area, exercise extreme caution when tilting, raising/lowering & folding booms & especially when using automatic fold.

### **⚠ DANGER**

Do NOT walk on the machine platform when near power lines.

## Night Spraying

When conducting spraying operations at night:

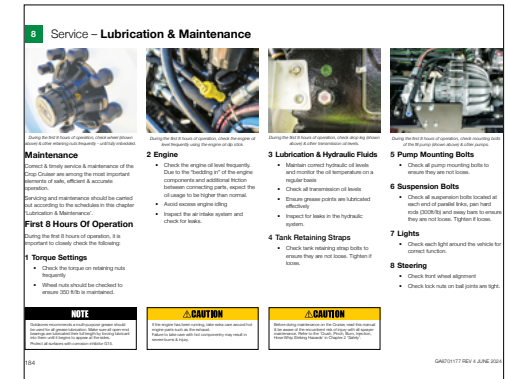
- Lighting around the machine needs to be sufficient for all labels and warnings on the machine to be clearly visible to the operator.
- Lighting of the area to be sprayed needs to be sufficient for obstacles in the path of the machine to be clearly visible to the operator.

### **⚠ WARNING**

If spraying is to be done at night, ensure that adequate lighting is available around the machine and the area to be sprayed.

### **NOTE**

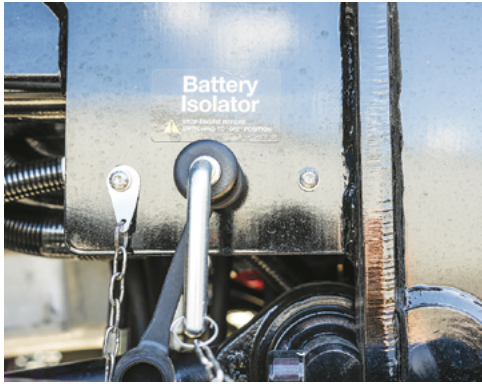
Check nozzle patterns for irregularities. If there are irregularities, clean the nozzles and refit. If the problem persists they could be worn so remove and replace.



Check items closely during the first 8 hours of operation as instructed in Chapter 8 'Lubrication & Maintenance'.

## During First 8 Hours Of Operation

Refer to chapter 8, 'Lubrication & Maintenance' for the items to be checked closely during the first 8 hours of operation of the Cruiser (from new).



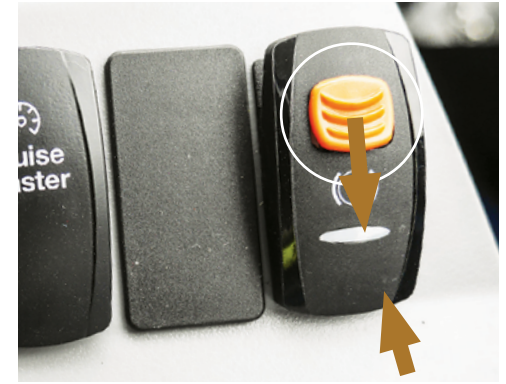
Engage the Battery Isolator switch.



Turn the Ignition key to On/Accessories



Turn the Ignition key to crank & start the engine.



Disengage the Park Brake - slide back the orange lock, then press the switch rearward (Off position).

## Quick Start Guide

It is the responsibility of the operator to familiarise themselves with and understand the information in this manual to ensure competent and safe operation.

Follow the Quick Start instructions to start the engine, drive and shut-down the Cruiser.

## Starting-Up

- 1 Perform a pre-operation check of the Cruiser.
- 2 Engage the Battery Isolator (located on the right hand side chassis by the engine).

Engage the Park Brake - slide back the orange lock & press the switch forward (On position).



## NOTE

Before starting the engine:

- All fluid levels must be checked.
- Ensure the battery isolator switch is engaged - to provide power to the sprayer systems.
- Ensure the transmission in neutral. Otherwise the engine will not start.

- 3 Turn the Ignition key to On/Accessories (lightning symbol)
- 4 Check Park Brake switch is ON.

- 5 Turn & hold the Ignition Key momentarily in crank position until engine starts.

## Driving

- 1 Run engine for least 30 seconds to allow the compressor to build the required system air pressure.
- 2 Check the Foot Brake for response, then hold the Foot Brake down.
- 3 Disengage Park Brake.
- 4 Press the 'D' switch to engage Forward drive or the 'R' switch to engage Reverse.
- 5 Use the steering wheel, foot accelerator & foot brake to drive safely.

Press the 'D' switch to engage 1st gear. 1-6. Press the Arrow switches to change Up or Down (gears 1-6).



## CAUTION

The operator & any passenger must be seated in the cabin and wearing the seat safety belt at all times when the machine is in motion.

## NOTE

For more detailed information on the Transmission Shifter refer to pages 47-49 of Chapter 3.





Disengage the Battery Isolator switch.



Boom Rest, Boom Fold & Boom Bi-fold rocker switches used for folding & unfolding the boom.



The left hand side Boom Rest lock unfolded - 32 & 36m booms only.



The left hand side Boom Rest lock folded - 32 & 36m booms only..

## Shutting-Down

### To Shut-Down the Cruiser:

- 1 Bring the Cruiser to a complete stop.
- 2 Press the 'N' switch (Neutral gear) .
- 3 Engage Park Brake.
- 4 Turn the ignition key to stop position.  
Wait 30 seconds to allow the G-Hub Controller system enough time to save the data before disengaging the Battery Isolator Switch.
- 5 Disengage the Battery Isolator switch.

## Boom Folding/Unfolding

The Boom Folding/Unfolding panel comprises three rocker switches which control the folding and unfolding of the boom (shown above).

As well as usual folding and unfolding of the boom, a Bifold procedure allows the outside boom sections to be folded reducing spray width for purposes such as finishing along fencelines and other applications.

The 'Boom Unfolding' process is manually operated using Boom Unfolding Switches & the Joystick push buttons & rocker switch.

Boom Folding can be done either, manually or automatically (depending on G-Hub settings) for 36m & 42m booms.

The 48m boom is folded & unfolded manually.

## Unfolding the Boom

The Boom Unfolding Procedure is manually controlled by using the Boom Unfolding switches, Joystick push buttons & rocker switch.

### To Unfold the Boom:

- i) Press & hold the OUT end of the Boom Rest rocker switch to unfold the left hand side Boom Rest lock (not applicable to the right hand side Boom Rest).
- ii) Press & hold the Boom Lift push button on the Joystick to raise the boom until it clears the Boom Rests.
- iii) Press & hold down the OUT end of the Boom Fold rocker switch to completely unfold the boom until it is aligned with the boom centre section, then release the switch.
- iv) Press the Boom Lower push button on the Joystick to lower the boom to its desired working height, then release the switch.

## Automatic Boom Folding 36m

To fold the boom automatically, the calibration values must first be entered into the G-hub Controller for tilt left, tilt right & boom lift.

### To Automatically Fold the Boom:

- i) With the boom unfolded, press & hold down the IN end of the Boom Fold rocker switch. The boom will fully rise, tilt & fold-in over the boom rests.
- ii) When fully folded-in, press the Boom Lower push button on the Joystick to lower the boom until it stops at its preset height. The main boom lift suspension accumulator will then automatically lock out.
- iii) Press & hold down the IN end of the Boom Rest rocker switch to completely move into the Boom Rest & lock the boom.
- iv) Press & hold the IN end of the Boom Fold rocker switch, momentarily, to tighten the boom wings in the Boom Rests.

## NOTE

An alarm sounds & a warning illuminates, if the transmission is moved into a gear other than Neutral when the Park Brake is engaged.

## CAUTION

The booms must not be folded, or unfolded, while the sprayer is moving.

While a boom move from fully open to fully closed (and vice versa), greater stresses are placed on many components. If the sprayer moves while folding or unfolding the boom, any bumps or uneven travel may result in severe damage to the boom.

## NOTE

To make the boom fold cylinders extend or compress equally on both sides:

Continue holding the OUT end of the Boom Fold push button for a few extra seconds when the boom is fully unfolded.

Conversely, hold down the IN end of the Boom Fold push button for a few extra seconds when the boom is fully

## NOTE

The 48 metre boom option does not feature an hydraulically adjustable boom rest.



Press & hold down the IN end of the Boom Bi-fold rocker switch to fold the boom outer wings sections in & saddle them onto the inner boom sections.

### Bi-fold Boom Folding

With the boom fully unfolded (open working position), press & hold down the IN end of the Boom Bi-fold rocker switch down to fold the boom outer wings sections in and saddle them onto the inner boom sections.

Do not release the Boom Bi-fold switch until the boom outer wing section are fully folded-in or boom stress may occur.

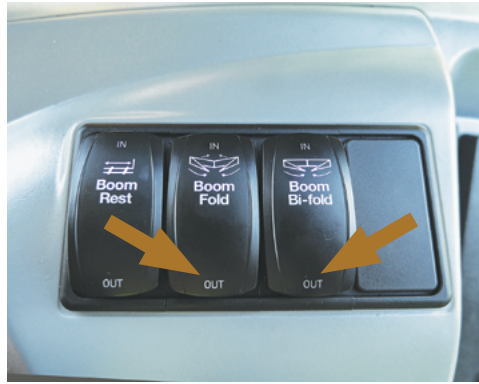
### Bi-fold Boom Unfolding

With the outer boom sections previously folded in (using the Bi-fold Boom Folding above), press & hold down the OUT end of the Boom Bi-fold' rocker switch to fold the boom outer sections back out.

Do not release the Boom Bi-fold switch until the boom outer wing sections are fully folded-out or boom stress may occur.

#### **CAUTION**

Do not release the Boom Bi-fold switch until the boom outer wing sections are fully folded-out or boom stress may occur.



Simultaneously press & hold down the OUT ends of both Boom Fold & Boom Bi-fold rocker switches.

### Bi-fold Inner Boom Unfolding

The inner wings can be folded out while the outer wings remain folded in.

To do this, simultaneously press & hold down both:

- The OUT end of the Boom Fold rocker switch &
- The OUT end of the Boom Bi-fold rocker switch.

Do not release the Boom Fold & Bi-fold switches until the boom inner and outer wing sections are fully folded-out or boom stress may occur.

#### **CAUTION**

Do not release the Boom Fold & Bi-fold switches until the boom inner and outer wing sections are fully folded-out or boom stress may occur.



Press & hold the Boom Lift part of the push button on the Joystick Controller to raise the boom to its full height.

### Manually Folding the Boom

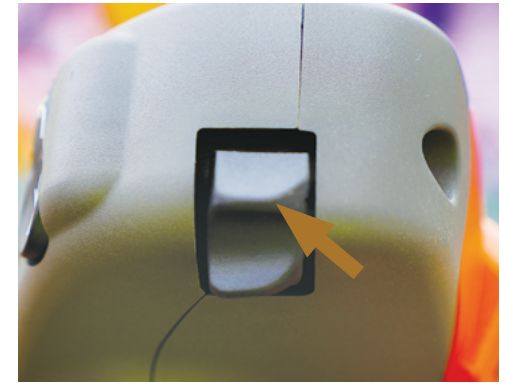
The boom can be folded manually, but only when the calibration values in the G-hub controller are set to zero for tilt left, tilt right & boom lift.

#### To Fold the Boom Manually:

- In the unfolded boom position, press the Boom Lift push button on the Joystick to raise the boom to its full height.
- Press & hold the UP the Dual Tilt push button on the Joystick to tilt boom wings up approximately 5 degrees above horizontal - high enough to clear boom rests but low enough to avoid hitting the rear vision mirrors when folding into position. Release the push button when desired tilt is reached.

#### **CAUTION**

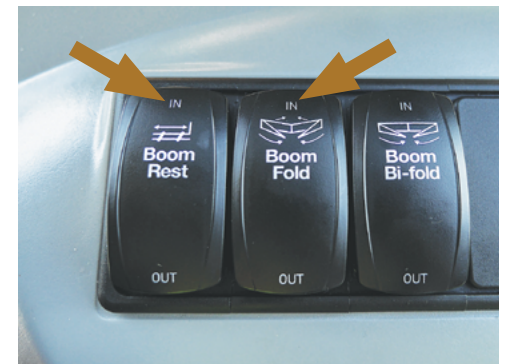
The booms must be folded continuously without stopping and starting during the sequence. Stopping & starting boom folding may result in damage to the boom.



Press & hold up the Dual Tilt rocker switch on the Joystick to tilt boom wings up approximately 5 degrees above horizontal.

- Press & hold down the IN end of the Boom Fold rocker switch to complete the boom folding.
- Press & hold down the Boom Lower push button on the Joystick to lower the booms wings onto the Boom Rests.
- Press & hold down the 'Boom Rest' IN switch to fold-in & lock the left hand side Boom Rest.
- Finally, press the IN end of the Boom Fold rocker switch, momentarily, to fold-in the booms tight in the Boom Rests.

The Boom Rest IN switch & Boom Fold IN switches.





Press & hold Down the lower on the Dual Tilt rocker switch of the Joystick to lower the boom wings ends.



Press & hold Up the lower on the Dual Tilt rocker switch of the Joystick to raise the boom wings ends.

## Joystick Boom Controls

Boom push buttons & a rocker switch on the Joystick provide the following functions:

- Dual Tilting Both Boom Wings (rocker switch)
- Boom Tilt - L Up/Down & R Up/Down
- Boom Master On/Off
- Boom Lift/Lower
- Fence Nozzle L/R.

## Dual Tilting Both Boom Wings

The Dual Tilt rocker switch is used to lower or raise the tilt of the boom wings during operations and when folding & unfolding booms manually.

### To Dual Tilt-Down Both Boom Wings:

- Press & hold Down the Dual Tilt Up/Down rocker switch on the Left Side to lower both left & right boom wings together.
- Release the rocker switch to hold the wings in their desired raised position.

### To Dual Tilt-Up Both Boom Wings:

- Press & hold Up the Dual Tilt Up/Down rocker switch on the Left Side to lower both left & right boom wings together.
- Release the rocker switch to hold the wings in their desired raised position.



Press & hold the L Arrow Up part of the Boom Tilt push button to tilt up the left hand boom end.



Press & hold the L Arrow Down part of the Boom Tilt push button to tilt down the left hand boom end.

## Boom Tilt - L Up/Down & R Up/Down

The Boom Tilt - L Up/Down & R Up/Down ker switch is used to individually lift or lower the angle the boom from left to right or right to left to more closely follow ground contour.

The boom wings pivot on the centre section and the left or right boom wing is raised or lowered - the outer end of the wing moves furthest.

### To Tilt Up the Left Hand Boom:

- Press & hold the L Arrow Up part of the Boom Tilt push button .
- Release the ker switch when the desired tilt is achieved.

### To Tilt Down the Left Hand Boom:

- Press & hold the L Arrow Down on the Boom Tilt ker switch .
- Release the push button to hold the wing in its desired lowered position.





Press & hold the R Arrow Up on the Boom Tilt push button to tilt up the right hand boom end.



Press & hold the R Arrow Down on the Boom Tilt push button to tilt down the right hand boom end.

#### To Tilt Up the Right Hand Boom:

- i) Press & hold the R Arrow Up on the Boom Tilt push button.
- ii) Release the push button when the desired tilt is achieved.

#### To Tilt Down the Right Hand Boom:

- i) Press & hold the R Arrow Down on the Boom Tilt push button.
- ii) Release the push button when the desired tilt is achieved.



Press the Boom Master push button to start boom spraying.  
Press the Boom Master push button to stop boom spraying.

#### Boom Master On/Off

The yellow Boom Master On/Off push button cycles the Boom Master switching boom spraying On/Off.

#### To Switch On/Off the Boom Spraying:

- i) Press to Boom Master On/Off push button to Start the boom spraying.
- ii) Press to Boom Master On/Off push button to Stop the boom spraying.



Press & hold the Boom Lift push button to raise boom height.  
Press & hold the Boom Lower push button to lower boom height.

#### Boom Lift/Lower

The Boom Lift/Lower push button sides are used to raise or lower the vertical height of the boom.

#### To Raise the Boom:

- i) Press & hold the Boom Lift on the push button to raise the boom to its desired level.
- ii) Release the push button to hold the desired boom level.

#### To Lower the Boom:

- i) Press & hold the Boom Lower on the push button to lower the boom to its desired level.
- ii) Release the push button to hold the desired boom level.

#### NOTE

The pump must be running for nozzles to spray.  
See page ? for instructions on engaging & disengaging the pump.



Press the L end of the Fence Nozzle push button to Start the left Fenceline nozzle spraying. Press again to Stop spraying.

## Fenceline Nozzles

The Fence Nozzle L/R push button ends are used to individually switch On or Off the Left & Right Fenceline Nozzles.

### To Switch On/Off the Left Fence Nozzle:

- Press the L end of the Fence Nozzle push button to Start spraying from the left Fenceline nozzle.

When the Fenceline nozzle is spraying, a red LED light on the left hand boom tip is illuminated & the G-Hub main screen fenceline emblem lights Green.

- Press the L end of the Fence Nozzle push button to Stop spraying from the left Fenceline nozzle.

## NOTE

Boom Section 1 must be On and spraying for the left hand Fenceline nozzle to operate.



Press the R end of the Fence Nozzle push button to Start the right Fenceline nozzle spraying. Press again to Stop spraying.

### To Switch On/Off the Right Fence Nozzle:

- Press the R end of the Fence Nozzle push button to Start spraying from the right Fenceline nozzle.

When the Fenceline nozzle is spraying, a red LED light on the right hand boom tip is illuminated & the G-Hub main screen fenceline emblem lights Green.

- Press the R end of the Fence Nozzle push button to Stop spraying from the right Fenceline nozzle.

## NOTE

Boom Section 16 must be On and spraying for the right hand Fenceline nozzle to operate.



Press the Auto push button to engage the Autosteer (if fitted). Press the Auto push button to disengage the Autosteer.

## GPS Autosteer On/Off

Autosteer is retrofitted by the dealer/customer according to their requirements.

The black AUTO push button cycles the GPS Autosteer ON/OFF.

To engage/disengage Autosteer (if fitted):

- Press to Auto push button to activate the Autosteer.
- Press to Auto push button to deactivate the Autosteer.

## NOTE

The Autosteer function must be wired in or use CAN communications for the Autosteer to operate.



Hand Throttle can be sected & used with 'Classic', 'Variable' & '2 Speed Only' Cruise Control modes.

## Cruise Control

Goldacres Joystick and G-Hub control system give the choice of four Cruise Control modes:

- Classic Cruise Control
- Variable Cruise Control
- Two Speed Only Cruise Control
- Joystick Target Speed.

Only one 'Cruise Control' mode can be selected & used at any given time.

The Joystick can be used as a Hand Throttle in 'Classic', 'Variable' & '2 Speed Only' Cruise Control modes.

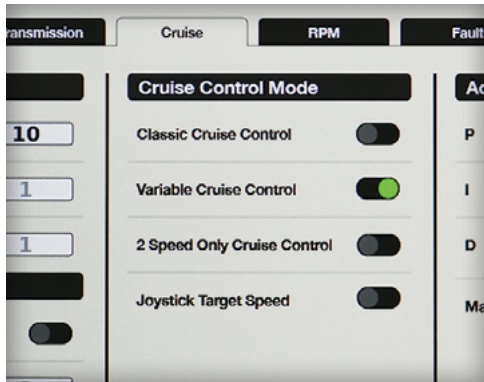
Cruise Control mode can be changed in the settings menu on the G-Hub Controller.

The 'Cruise Master' push switch must first be activated & the Cruise mode is displayed on the screen.

Three Joystick push buttons used with the G-Hub Cruise Control modes are:

- Cruise Set/Decrease
- Cruise Resume/Increase
- Cruise Cancel.

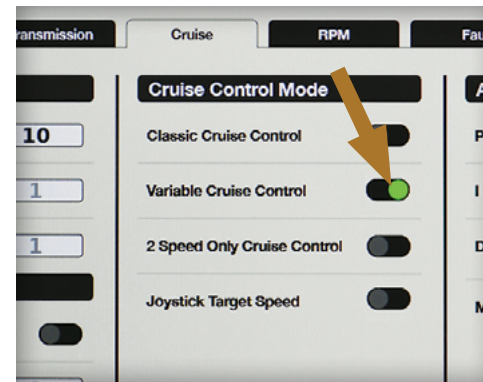




The Hand Throttle can be used with Classic, Variable or 2 Speed Cruise Control modes.



Press the Cruise Control touch button to open the Cruise Control Mode selection screen.



The Cruise Control Mode selection screen with Variable Cruise Control selected (Green = Active).



Home screen displaying Hand Throttle inactive & Engine rpm.

## Hand & Foot Throttles

In addition to the foot throttle engine speed control, a 'Hand Throttle' control using the Joystick is provided for three Cruise Control modes, namely, Classic, Variable & 2 Speed control modes.

The Cruiser can be driven using the Hand Throttle or Foot Throttle or both.

## Hand Throttle

The Hand Throttle mode, featured in the software update, complements the existing foot throttle operation.

The Hand Throttle can be used in Neutral, Forward & Reverse (just like the foot throttle) and in conjunction with the foot throttle. The Hand Throttle is On by default. However, it can only be used when the Cruise Master is turned Off.

If the foot throttle is used while the Hand Throttle control is active, the Hand Throttle will be temporally disabled while the foot throttle controls engine speed.

After the foot throttle is released, the target engine rpm automatically transfers back to Hand Throttle control.

## To Use the Hand Throttle:

- 1 First select the Cruise mode required. Press the Cruise Mode touch button on the G-Hub home screen to open the Cruise Control Mode selection panel and select the Cruise mode required.
- 2 Second, check the Crop Cruiser is in Hand Throttle mode. If not, use the Cruise Master switch to select the Hand Throttle mode.
- 3 Pull the Hand Throttle back towards the operator into the 'Neutral Gate' position to first arm (activate) the Hand Throttle.

If the Hand Throttle is in the 'Neutral Gate' position when starting-up the Crop Cruiser, the Hand Throttle must be moved forward & back into the 'Neutral Gate' to arm (activate) it.

## NOTE

If the Hand Throttle is in the 'Neutral Gate' position when starting-up the Crop Cruiser, then Hand Throttle must be moved forward and back into the 'Neutral Gate' to arm (activate) it.

- 4 Push the Hand Throttle forward to increase engine RPM and the G-Hub screen displays:

- 'HAND THROTTLE' (in a Green field above the tachometer)
- Engine Target RPM (adjacent)

The default maximum engine RPM when the hand throttle is fully forward is 2200 RPM.

The default 2200 RPM can be adjusted using the 'Cruise Increase' and 'Cruise Decrease' buttons on the Joystick, if required.

However, pressing the 'Cruise Cancel' button will result in the maximum RPM on the Hand Throttle being set back to its default maximum setting of 2200 RPM.

- 5 To reduce engine speed, pull the Hand Throttle back towards the 'Neutral Gate' position.

## To Cancel the Hand Throttle

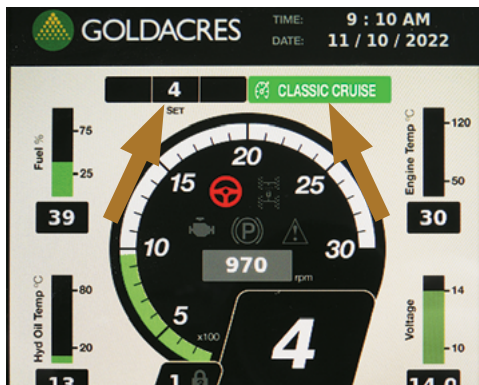
Use any of the following:

- Pull the Hand Throttle back to Neutral Gate
- Press the foot brake
- Press the Cruise Cancel button
- Change the transmission from D to N or N to D
- Turn the Cruise Master On
- Use the foot throttle for a continuous 30 second period.

Press the top of the Cruise Master switch to cycle to Hand Throttle.







'Classic Cruise Control' with set speed shown (left).

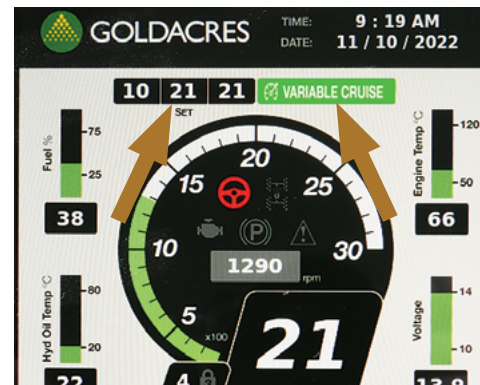
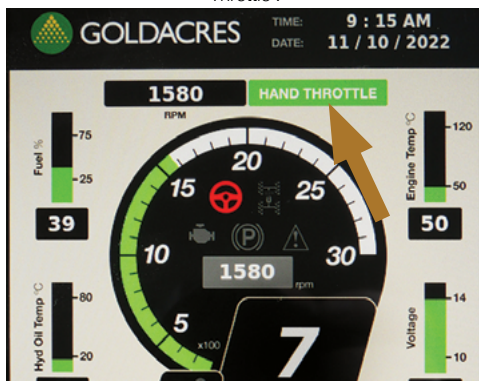
## i) Classic Cruise Control

The Classic Cruise Control Mode allows the operator to simply accelerate to a desired speed, then press the 'Cruise Set' push button on the Joystick to set the speed. The Cruise speed can be cancelled and resumed at any time. Joystick movement is not active.

The 'Hand Throttle' can be selected for using the Joystick to manually control engine speed in 'Classic Cruise' mode.

Press the 'Classic Cruise' touch button to make the selection when required.

Press the 'Classic Cruise' touch button to select 'Hand Throttle'.



'Variable Cruise Control' with Set Speed shown centre left & Low Speed (left of centre) & High Speed (right of centre).

## ii) Variable Cruise Control

Variable Cruise Control Mode allows the operator to set a High speed (for spraying) & a Low speed (for headlands), and then, to move the Joystick (Fore & Aft) for infinite variation of speed between the settings.

Low speed is pre-set.

High speed is set using the 'Cruise Set' push button when the joystick is pushed all the way forward.

The 'Hand Throttle' can be selected for using the Joystick to manually control engine speed in 'Variable Cruise' mode.

Variable Cruise Control Mode allows the operator to move the Joystick (Fore & Aft) for infinite speed variation.



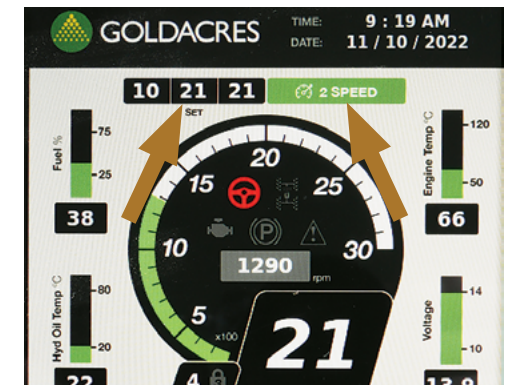
Press the 'Mode' push button to engage the Pre-Select 3rd Gear.

Press the 'Variable Cruise' touch button to make the selection when required.

Variable Cruise Control mode can be used in combination with 3rd Gear Pre-Select function which holds the transmission in 3rd gear.

The Pre-Select 3rd Gear is activated by pressing the 'Mode' push button on the Transmission Controller'.

Press the 'Classic Cruise' touch button to select 'Hand Throttle'.



'2 Speed Cruise Control' with Set Speed shown centre left & Low Speed (left of centre) & High Speed (right of centre).

## iii) Two Speed Cruise Control

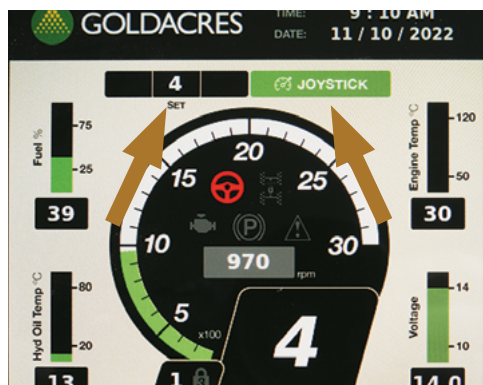
Two Speed Cruise Control operates similarly to Variable Cruise Control except the Cruiser is either operating at the Low Speed or the High speed.

There is no variable speed setting in between high and low speed settings:

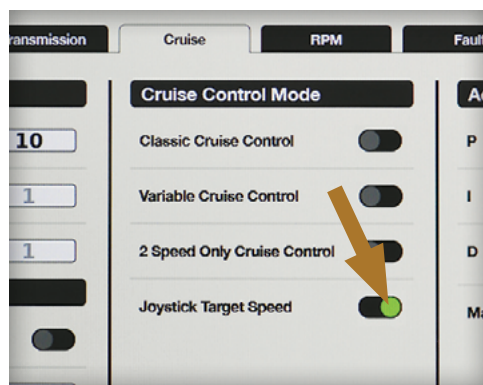
- Push the Joystick Forward (usually over centre) for high speed.
- Pull the Joystick Back (usually over centre) for low speed.

The 'Hand Throttle' can be selected for using the Joystick to manually control engine speed in 'Variable Cruise' mode.

Press the 'Variable Cruise' touch button to make the selection when required.



'Joystick Cruise Control' with speed setting shown centre left.



Joystick Target Speed activated in the Engine/Cruise screen.



Hand Throttle/Joystick.



Press the lower Cruise Set/Decrease push button to set the current ground speed for Cruise Control. Once set, press the push button again to decrease set ground speed.

## vi) Joystick Target Speed

The 'Joystick Target Speed' mode can only be used when 'Joystick Target Speed' is activated in the Engine/Cruise screen.

Press the Cruise Mode touch button on the G-Hub home screen to open the Cruise Control Mode selection panel, then select the Cruise mode required

The 'Joystick Target Speed' is similar in operation to the Hand Throttle but acts like a Variable Cruise control.

The 'Joystick Target Speed' mode drives the engine RPM to achieve the target ground speed displayed on the G-Hub home screen.

The 'Advanced Cruise Tuning' can be used to adjust response rate and maximum target speed (Refer to Chapter 4 for more information).

The target speed can also be adjusted using the 'Cruise Increase' and 'Cruise Decrease' buttons on the Joystick.

This mode can be cancelled in the same way as other Cruise Control modes.

## Driving in Either Hand Throttle or Joystick Target Speed Mode

Follow these instructions to drive the Crop Cruiser using either the 'Hand Throttle' or 'Joystick Target Speed' mode:

- 1 Set the Cruise Control mode & Throttle mode.
- 2 Release the Park brake.
- 3 Depress the Foot Brake pedal.
- 4 Select Forward or Reverse gear.
- 5 If a Forward gear is selected, move the Hand Throttle (Joystick) forward to increase engine speed and drive forward.

If Reverse gear is selected, move the Hand Throttle (Joystick) forward to increase engine speed and drive backwards.

- 6 To accelerate driving forwards or in reverse, push Hand Throttle (Joystick) forward.

The further forward the Hand Throttle (Joystick) is pushed, the faster Engine RPM and Crop Cruiser speed.

As the vehicle speed increases, the transmission will shift up gears as required.

If the operator's hand is removed from the Hand Throttle (Joystick), the throttle will hold its position and the Crop Cruiser will maintain its speed.

- 7 To decelerate, pull the Hand Throttle (Joystick) back toward the neutral gate.  
The Crop Cruiser will decelerate and shift down gears as speed is reduced.
- 8 The Brake pedal can be depressed at any time to reduce speed or decelerate the Crop Cruiser.  
Use of the Brake pedal will reset the throttle back to engine idle speed.  
Pull the Hand Throttle (Joystick) back into the neutral gate to reset it, then push the Hand Throttle (Joystick) forward again to resume to required engine and driving speed.
- 9 To stop the Crop Cruiser, pull the Hand Throttle (Joystick) back into the neutral gate & depress the brake pedal until stopped.
- 10 Select Neutral on the Gear Selector.
- 11 Engage the Park Brake.

## Cruise Set/Decrease

The 'Cruise Set/Decrease' push button is used to set the current ground speed as the Cruise Control Speed and to decrease the set ground speed.

### To Set/Decrease Cruise Control Speed:

- i) The Cruise Indicator on the G-Hub Touch Screen must be active (Blue or Green) to enable use of the Cruise Set/Decrease push button & the Foot Brake must be released.  
Press the Cruise Master switch on the console to change the Cruise Indicator on the G-Hub Touch Screen from Grey to Blue.  
The Cruise Cancel push button can be used to cycle the Cruise Control between On [active] and Off [inactive].
- ii) Press the Cruise Set/Decrease push button to set the current ground speed as the Cruise Control Speed.
- iii) Once the Cruise Control Speed is set/engaged, press the Cruise Set/Decrease push button down to decrease the set ground speed.

To disable Cruise Control, press the Cruise Cancel push button or apply the Foot Brake which also cancels the Cruise Control.





Press the upper Cruise Set/Increase push button to resume current ground speed for Cruise Control & once set, press the push button again to increase the set ground speed.

## Cruise Resume/Increase

The Cruise Resume/Increase push button is used to resume the previously set current ground speed as the Cruise Control and increase the set ground speed.

### To Resume/Increase Cruise Control Speed:

- Press the Cruise Resume/Increase push button to resume the previously set ground speed as the Cruise Control Speed.
- Once the Cruise Control Speed is set/engaged, press the Cruise Resume/Increase push button down to increase the set ground speed.

To disable Cruise Control, press the Cruise Cancel push button or apply the Foot Brake which also cancels the Cruise Control.



Press the Cruise Cancel switch on the on the Joystick to cancel the cruise control function. Press again to reactivate the cruise control.

## Cruise Cancel

The yellow Cruise Cancel push button is used to cancel the active Cruise Control. Applying the Foot Brake also cancels the Cruise Control.

The Cruise Master switch is also used to cycle the Cruise Control between On [active] and Off [inactive].

Applying the Foot Brake also cancels Cruise Control.



Transmission Shifter.

## Transmission Shifter

### To Engage a Gear & Drive:

- Check the display shows N (Neutral). If not select Neutral by pressing the N push button.
- Apply the foot service brake located to the right of the steering column
- Release the Park Brake.
- Press the 'D' push button to drive forward or the 'R' push button to reverse.

### To Stop Driving & Disengage Gears:

- Apply the foot service brake located at near base (right) of the steering column.
- Pressing the 'N' push button to place the unit in Neutral (all gears deactivated).
- Apply the Park Brake.

## NOTE

An alarm sounds & a warning illuminates, if the transmission is moved into a gear other than Neutral when the Park Brake is engaged.



Select & Monitor displays showing Neutral.

## Monitor Display

The Monitor Display allows the operator to glance down & quickly observe which gear is being used.

### Select Display (left side)

In the Select Display, a single LED character shows the gear selected by the operator. It will display D, R, or N or Gear Number of the gear selected.

### Monitor Display (right side)

In the Monitor Display, a single LED character shows which transmission gear is currently engaged. This includes R, N, and Gear Number of the forward gear but not D (Drive).

Select & Monitor displays showing Reverse gear.







Press the 'R' push button to engage reverse gear for reversing the sprayer.



Press the D push button to engage reverse gear for reversing the sprayer.



Press the Gear Up (Arrow up) or Gear Down (Arrow down) push button to manually change gears Up or Down.



Press the 'Mode' push button to engage the Pre-Select

### Reverse Gear

Press the 'R' push button to engage reverse gear to reverse the sprayer.

### Neutral

Press the 'N' push button to place the unit in Neutral (all gears deactivated).

The gear selector must be in Neutral to start the engine & before selection of a gear to start driving.

Press the N push button to deactivate all gears.



### Drive

Press 'D' push button to engage forward gears. When Drive is pressed, the 1st gear through to 6th gear is available and will be selected by the Electronic Control Module (ECM) when changing Up or Down.

Overdrive gears 5th & 6th can only be engaged in Road Mode if the Enable Overdrive is not preset. Refer to Chapter 4, Setting Up.

Enable Overdrive when selected allows the operator to use the 5th & 6th gears while in Spray Mode and maintain the operation of Autosteer.

#### NOTE

The G-Hub system will log any faults that occur. Go to Chapter 9 'Trouble Shooting' for more information.

#### NOTE

If Drive (D) or Reverse (R) are pressed while the Park Brake is still On, a gear cannot be engaged by the transmission and an audible alarm will sound.

### Gear Up

The 'Arrow Gear Up' push button allows the operator to manually upshift the transmission one gear at a time when the transmission is in Drive. Press the 'Arrow Gear Up' push button once for each gear change.

The Select Display shows the gear range selected & the Monitor Display shows the gear currently engaged.

### Gear Down

The 'Arrow Gear Down' push button allows the operator to manually downshift the transmission one gear at a time until the 1st gear is reached.

Press the 'Arrow Gear Down' push button once for each gear change. The Select Display shows the gear range selected & the Monitor Display shows which gear currently engaged.

#### NOTE

The transmission cannot not shift above the gear range selected. When Drive (D) is pressed the full range of automatic shifting is restored.

### Pre-Select 3rd Gear

The Pre-Select 3rd Gear push button allows the operator to quickly select 3rd gear.

It is activated by pressing the 'Mode' push button on the Transmission Controller'. A light illuminates in the top right corner of the Pre-Select 3rd Gear push button when it is activated (selected).

The indicator light of the push button goes dark to indicate when the gear selection is inactive (Off).

### 8 Service Indicator Light

If the Service Indicator Light is illuminated, then there is a fault in the electrical shift system. A qualified technician should inspect the system as soon as possible.

*If the Service Indicator Light illuminates, there is a fault in the electrical shift system and a qualified technician is required.*





The Mode Switches panel (The Differential Lock Switch is a 4WD model option only).

## Mode Switches

The Mode Switches panel located on the Armrest Control Console contains four switches:

- 1 Spray Mode / Road Mode Switch.
- 2 Cruise Master Switch (Off).
- 3 Differential Lock ([Off] 4WD option only).
- 4 Park Brake Switch (On).

### 1 Spray Mode/Road Mode Switch

The Spray Mode/Road Mode Switch provides Spray Mode or Road Mode operation.

#### To Activate Spray Mode:

Press the top of the Spray Mode/Road Mode Switch.

In Spray Mode, the transmission will only go up to 4th gear speeds for spraying.

Unless overdrive is enabled, Spray Mode also activates autosteer (if fitted).

## NOTE

- An Overdrive setting in G-Hub allows operating in:
- 5th gear with auto-steer enabled and
  - 5th gear in spray mode.
- This is used when ground conditions are hard and the sprayer engine RPM can be lowered.



Press the top of the Spray Mode/Road Mode switch to activate Spray Mode

### To Activate Road Mode:

Press the bottom of the Spray Mode/Road Mode Switch.

In Road Mode the 5th & 6th gear are selectable for speeds up to 50 Km/h.

In Road Mode, Autosteer (if fitted) is normally disabled unless an Overdrive setting in the G-Hub is activated. See Chapter 4, 'Setting Up'

### 2 Cruise Master

The Cruise Master switch cycles the Cruise Control On or Off changing the state of cruise on the G-Hub Controller from Grey to Blue.

#### To Activate Cruise Control:

Press the front of the Cruise Master switch and the G-Hub Controller Cruise Indicator illuminates Blue.

#### To Deactivate Cruise Control:

Press the front of the Cruise Master switch and the G-Hub Controller Cruise Indicator illuminates Grey.



Press the top of the Cruise Master switch to activate or deactivate Cruise Control.

### 3 Differential Lock (4WD only)

On 4WD modes only, pressing the Differential Lock switch forward momentarily cycles the transfer case centre differential lock On or Off.

This switch option will only be present on 4WD optioned machines.

On 4WD models only, press the top of the Diff Lock switch to cycle the differential lock On or Off.



To engage the Park Brake (On), slide the orange lock rearward & press the switch Forward.

### 4 Park Brake Switch

This Park Brake Switch must be ON (in the forward position) before starting the engine.

#### To Engage the Park Brake:

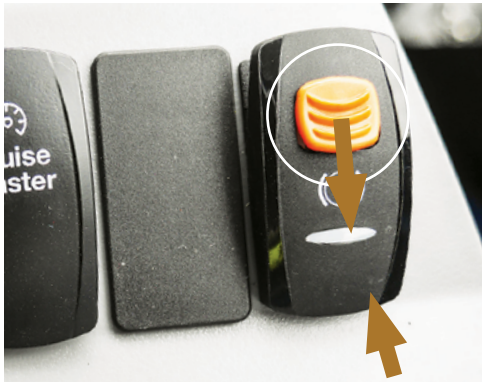
- i) Slide the orange lock rearwards, then
- ii) Press the switch forward to engage the Park Brake (On).

## CAUTION

When travelling on roads with a 4WD sprayer, the differential lock must be OFF. Failure to disengage the differential lock may cause damage to the gear train which is not covered by warranty. On 4WD sprayers, a WARNING will appear on the G-Hub screen @ 30Km/h.



## Ready to Spray – Operation



Disengage the Park Brake - slide back the orange lock, then press the switch rearward (Off position).



Disengage the Battery Isolator switch.

### To Disengage the Park Brake (once the engine has started):

- Apply the foot brake
- Slide back the orange lock, then press the bottom of the switch to disengage the Park Brake (Off).
- A drive gear can now be selected.

When stopping the Cruiser, the Foot Brake must be applied to bring the sprayer to a **complete stop**, then the transmission switch must be placed in N (Neutral) position - before the Park Brake Switch is engaged (ON).

*Apply the Foot Brake when changing the Park Brake mode (On/Off) & when bringing the Cruiser to a complete stop.*



### Shutting-Down

#### To Shut-Down the Cruiser:

- Bring the Cruiser to a complete stop.
- Press the 'N' switch (Neutral gear) .
- Engage Park Brake.
- Turn the ignition key to stop position.
- Wait 30 seconds to allow the G-Hub Controller system enough time to save the data before disengaging the Battery Isolator Switch.
- Disengage the Battery Isolator switch.

Wait 30 seconds to allow the G-Hub Controller system enough time to save the data before disengaging the Battery Isolator Switch.



Press the Left or Right arrow touch buttons to Increase or Decrease the Density Factor by 0.001 increments.

### External G-Hub Screen

The updated External G-Hub display screen includes:

- Indicator Light at the top right corner which displays Green when Connected & OK or Red = Not connected
- 'Density Factor' adjustment.
- 'RPM Raise'
- 'Fill Vol'.
- Warning/Settings.

#### To Adjust 'Density Factor'

Press the Left or Right arrow touch buttons to Increase or Decrease the Density Factor by 0.001 increments.

#### To Adjust 'RPM Raise'

Press the 'Increase' & 'Decrease' RPM touch buttons to adjust engine RPM as required.

#### To Adjust 'Fill Vol'

Press & hold 'Fill Vol' button to record a fill memory volume.

Press once to access volume, press again to fill to full tank.



More colour light functions are in the Push Button Pad on the right of the External G-Hub screen

An External Buzzer sounds when desired Tank Volume is achieved.

### 'Warning/Settings'

Warnings/Settings may drop-down from the top of the display. These self-clear. If not, push the "Clean page push button" to clear them.

Both Cabin G-Hub & External G-Hub displays can now be used at the same time. You can turn the pump On at the External fill station and Off in the Cabin if required.

### Push Button Panel Lights

The Push Button Panel (to the right of the External G-Hub screen) includes more color light functions:

- Green / Blue = On
- Yellow = Waiting
- Solid Red = Error
- Alternating Red & Green or Blue = Running with error (eg, pump under speed).





The external G-Hub Controller located in the storage box of the Quick Filling Station.

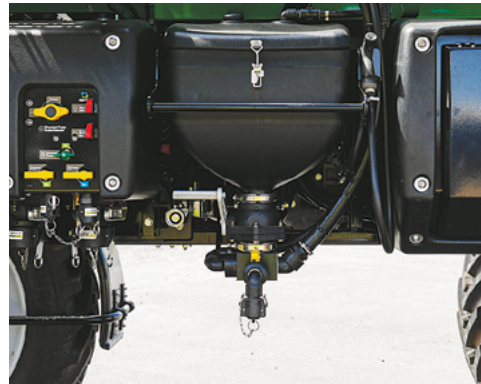
## Filling the Sprayer

The Cruiser is fitted with 3 spraying system tanks:

- Product tank (6000 litre)
- Rinse tank (550 litre)
- Hand Wash tank (30 litre)

When filling it is recommended that the Cruiser to be safely parked in an appropriate area with the engine running.

All filling & cleaning functions of the Cruiser are controlled and monitored on the External G-Hub Controller & Filling Station Pod of the Quick Filling Station on the left hand side of the Cruiser.



The 3" Clean Fill (left) & Dirty Fill (right) inlets with camlock caps fitted.

## Water Source

To fill the Cruiser tanks ready for spraying, requires an external water source.

## Filling the Main Product Tank

The main tank can be filled through 3" connection points on the left hand side of the Filling Station, using either the:

- 'Clean Fill' connection point (3") or
- 'Dirty Fill' connection point (3").



The 3" Clean Fill inlet with camlock cap fitted.

## Clean Fill

The Clean Fill line uses the Cruiser's onboard hydraulically driven Fill Pump.

This connection must be used only with clean fresh water sources as the pump connects to all rinsing circuits.

Rinsing circuits must not be contaminated with dirty, contaminated or unclear liquid.



The 3" Dirty Fill inlet with camlock cap fitted.

## Dirty Fill

The Dirty Fill line requires a separate external fill pump.

Used for premixed water & chemical from a batching system such as the Goldacres Batch Mate.

## NOTE

Always use clean, fresh water, free of suspended organic matter or clay.  
Some chemicals are deactivated when they contact these materials

## CAUTION

It is very important to understand that water weighs 1.0 kg per litre and conversion factors must be used when spraying liquids that are heavier than water.

The **total weight of the liquid** being sprayed **must not exceed the equivalent weight of a full tank of water**. Exceeding this weight can lead to machine damage.

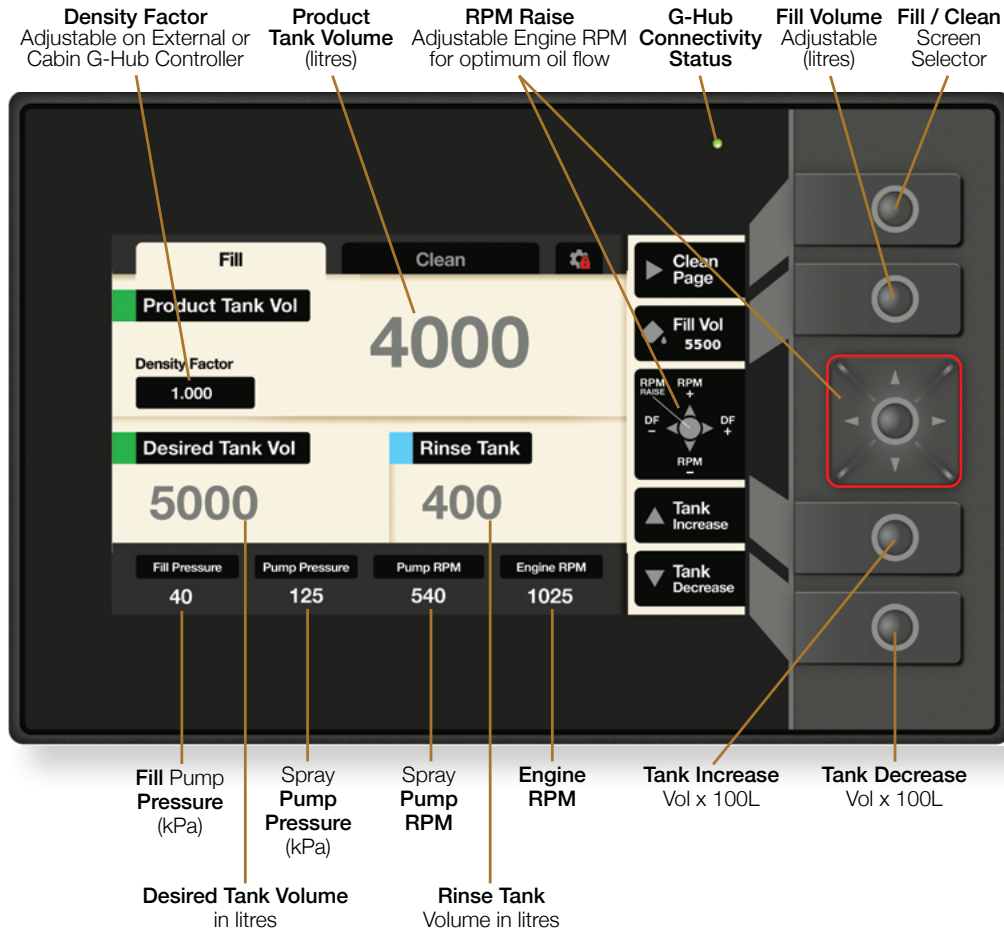
For example, liquid Nitrogen has a density of 1.28 kg per litre. The Cruiser tank size might be 6000 litres BUT the equivalent water weight of liquid Nitrogen is calculated by dividing 6000 by 1.28 kg = 4690 litres.

This means the total volume of liquid Nitrogen allowed in a 6000 litre tank is 4690 litres. It is very important not exceed weight limits.

This rule applies for all tanks sizes.

If unsure about the density/weight of chemicals being applied, contact your local agronomist or chemical supplier for more information.

## Ready to Spray – Operation



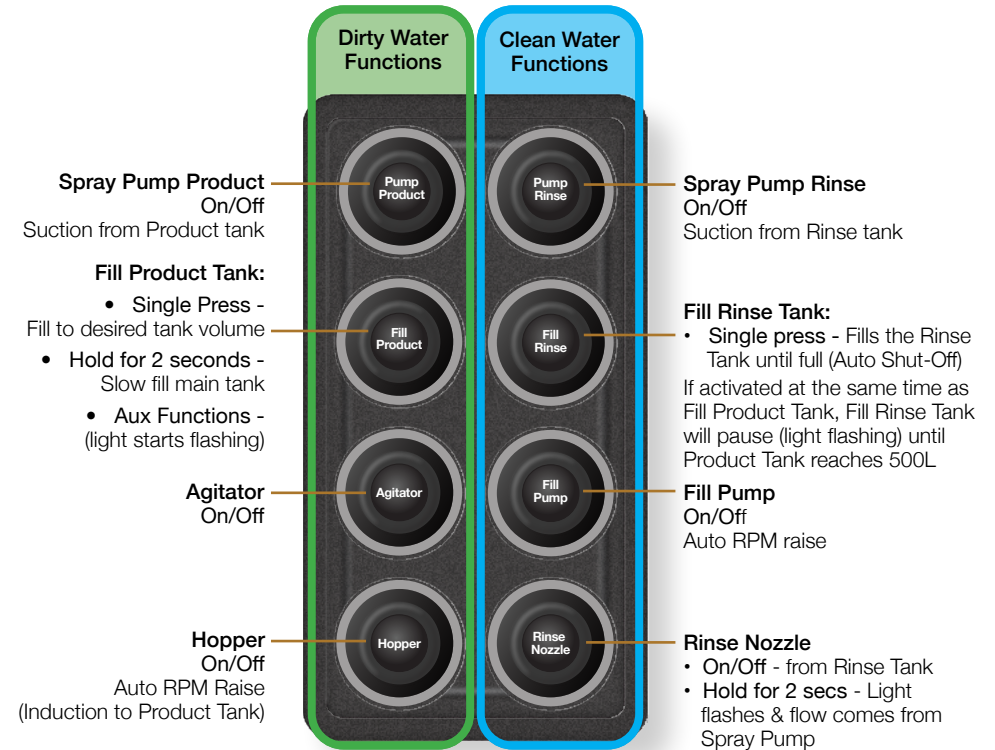
The 'Fill Screen' layout, functions & control touch buttons.

### External G-Hub Controller

The External G-Hub Controller is used to control the spray pump, fill pump, agitator, rinse nozzles and induction hopper functions independently of the cabin mounted G-Hub Controller.

The External G-Hub Controller comprises a 5" full colour screen with push button panel.

The Controller Screen & Push Button Panel are mounted on an adjustable RAM bracket for personalised positioning for the operator within the storage box of Quick Filling Station.



The 'Push Button Panel' layout with push buttons which illuminate Green (Dirty Water) or Blue (Clean Water) when engaged.

### NOTE

The push button switches of the Push button Panel (shown above) are organised to illuminate green or blue when engaged. Blue light indicates Clean water engagement (clean fill, pump, rinse tank, rinsing circuits & fresh water tank) while Green indicates Dirty water (product tank, pump, agitation, dirty fill, chemical mixing/uploading & spraying circuits).

The Controller screen displays either the:

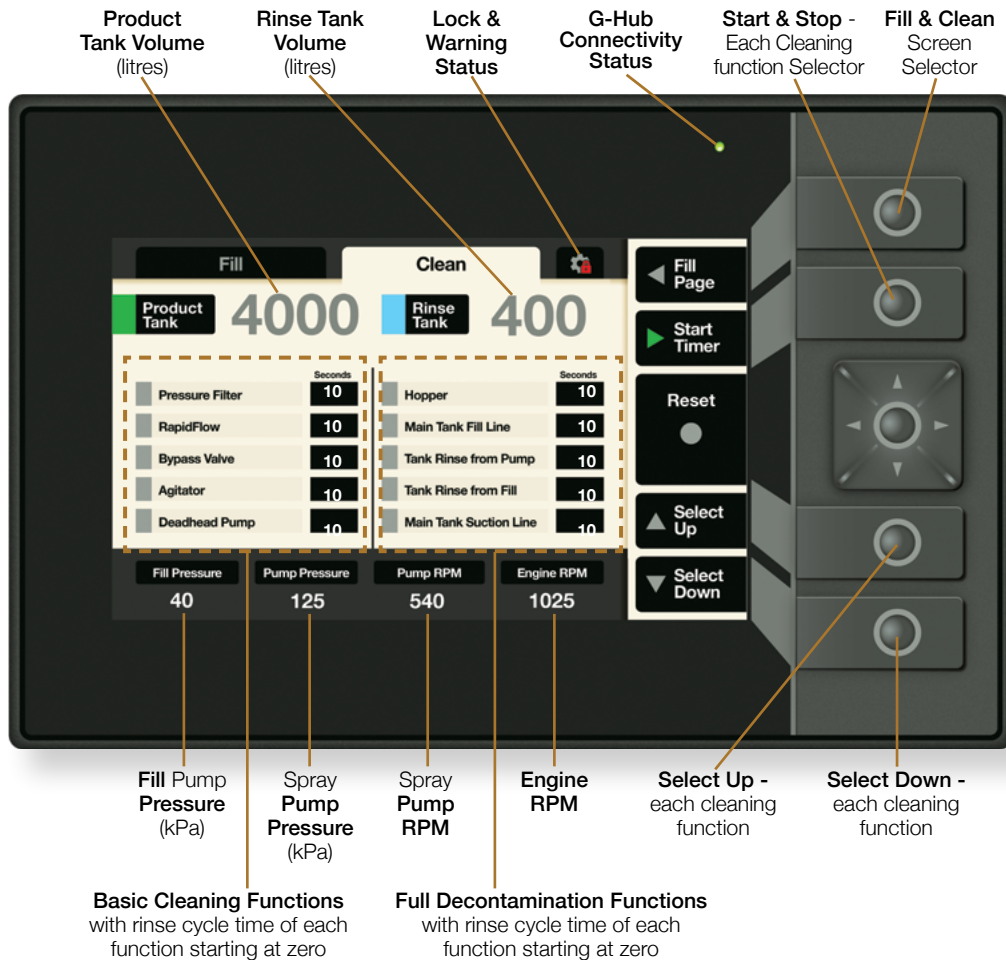
- Fill Screen - for all filling functions (shown above left) or the
- Clean Screen - for all cleaning functions (shown next page)

The Push Button Panel (shown above) is positioned at the right of the Controller screen and is used to switch liquid flows On & Off for all filling and cleaning functions.

The G-Hub External Controller allows the operator to simply enter the desired tank volume, connect Fill hose, start filling and the G-Hub automatically stop filling when fill volume is met.

The functional procedures for operating the Quick Filling Station & External G-Hub Controller are provided on the pages that follow.



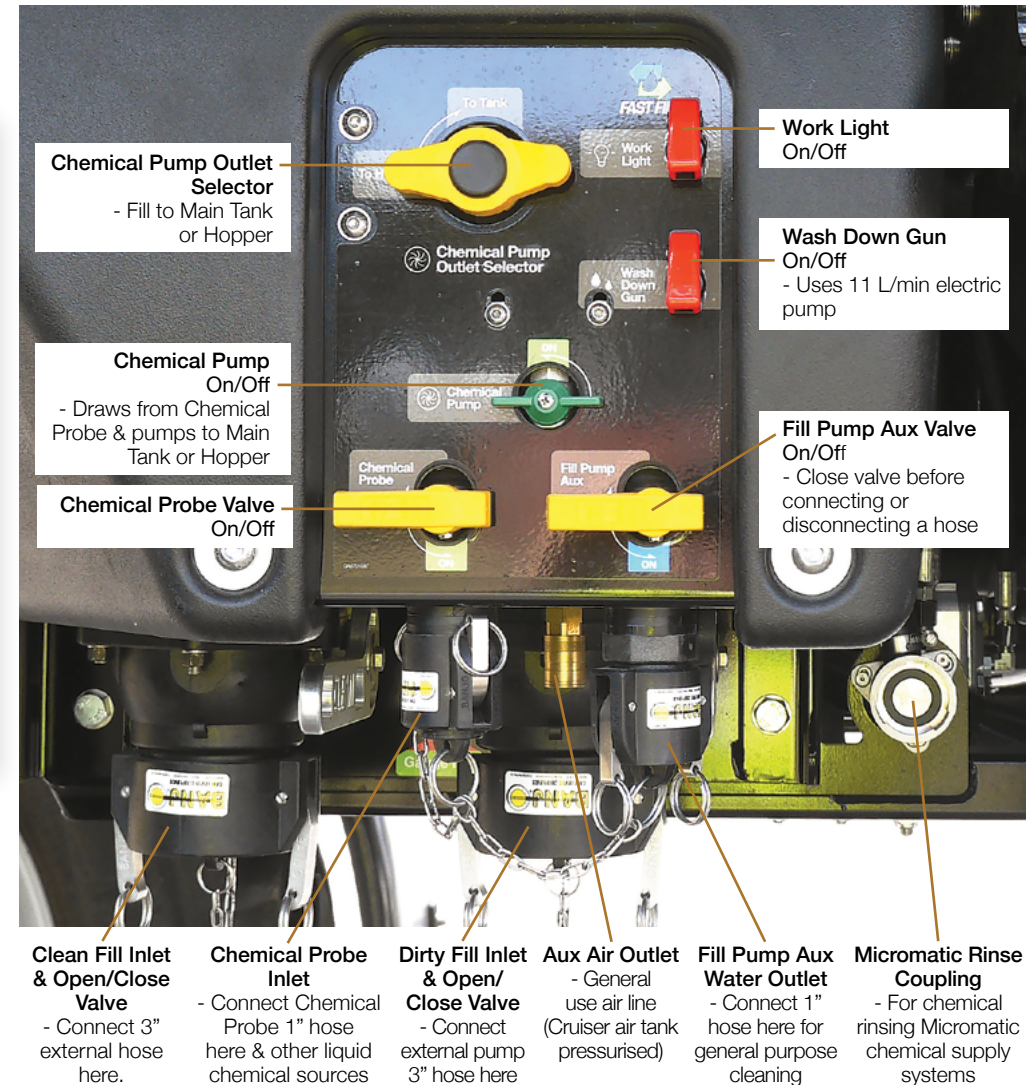


The 'Clean Screen' layout, functions & control touch buttons.

The G-Hub External Controller 'Clean Screen' (shown above) provides full decontamination functions giving both 'Basic' & 'Full' touch button lists that must be done.

## NOTE

Only one of the two controllers (the G-Hub Controller in the cabin or the External G-Hub Controller in the filling station toolbox) can be active at any given time. The screen will be Off on the inactive controller.  
Press any push button on the Controller to switch from inactive to active.



Filling Station showing hose connectors, switches & valves.

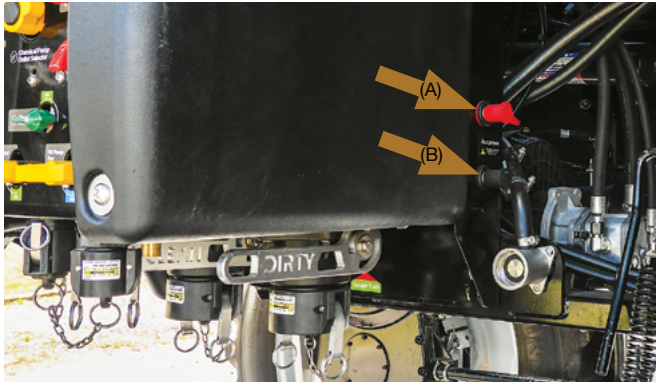
## Quick Filling Station

The Quick Filling Station Pod (shown above) comprises hose connectors, valves and switches used for filling & cleaning functions.

Two 12 Volt power terminals are located on the right hand side of the pod (see next page):

- Auxilliary Power Positive
- Auxilliary Power Negative.





The 12 Volt Power terminals on the RHS of the Pod - Auxiliary Power Positive (A) & Auxiliary Power Negative (B).

These power terminals can be used typically to drive a chemical pump or battery charger.

The terminals must NOT be used for jump starting.

30 Amp is maximum capacity.

### Suction & Delivery Lines

Use good quality suction hose and fittings that will not collapse or leak air under suction.

If pumping water from structures other than storage tanks, the use of an appropriate sized floating filter equipped with a check valve is recommended.

The suction line diameter should match the suction port diameter of 3" to maximise pump performance.

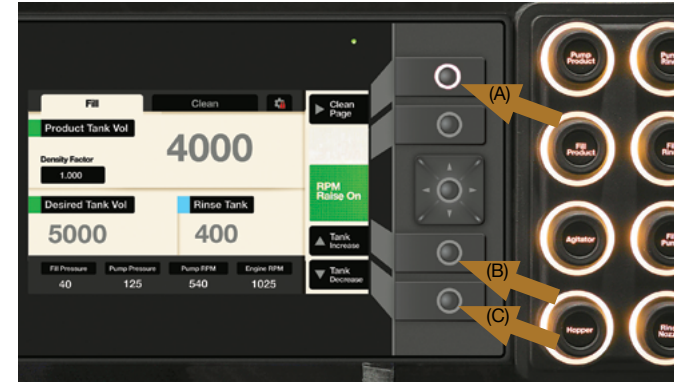
All filling functions require the Cruiser to be safely parked in an appropriate area with the engine running.



Connect a 3" fill hose to the 'Clean Fill' inlet & Open the 'Clean Fill' ball valves.

### To Fill the Product Tank - Clean water source

- 1 Connect a 3" suction hose (not supplied) to the 3" 'Clean Fill' camlock coupling with the other end of the hose connected to a clean water source.
- 2 Open the 'Clean Fill' ball valves by moving the handle down.
- 3 Open the Filling Station storage cabinet to access the G-hub External Controller.



Press the Screen Selector push button (A) to select the Fill screen, then press the 'Tank Increase' (B) or 'Tank Decrease' (C) push buttons to set the required fill volume.

- 4 Press the Screen Selector push button to select the Fill screen.
- 5 Set the desired Fill Volume on the External G-Hub Controller by pressing the 'Tank Increase' or 'Tank Decrease' push buttons as required.

The desired fill volume can be entered on the G-Hub Controller before leaving cabin.

This will always default to the usable tank volume set in the G-Hub Controller.

### NOTE

It is recommended to calculate the correct quantity of liquid required, and when filling, allow sufficient quantity for adding and mixing chemicals.  
If necessary top up the tank to to required quantity after adding chemicals is completed.

### NOTE

All filling, adding chemicals and rinsing functions require the Cruiser's engine to be running and the Park Brake applied.

### NOTE

If filling the Rinse Tank at the same time as the Product Tank, the 'Fill Rinse Tank' push button will flash to indicate pausing until the Product Tank reaches 500 litre level. Rinse Tank filling will then resume as indicated by a solid colour of the push button. Individual tank filling rate is reduced when filling both tanks at the same time.



Press the 'Fill Product' push button, then 'Fill Pump' push button to start filling the Product Tank.

- 6 With the Cruiser engine running at low idle, press the 'Fill Product' push button to On, then
- 7 Press the 'Fill Pump' push button to On to start filling the Product Tank.  
The Cruiser engine RPM will automatically raise if enabled in the G-Hub Controller settings.  
The Fill speed can be reduced if required by holding the 'Fill Product' push button for 2 seconds if more time is required.
- 8 The Fill Pump automatically switches Off when the target product volume is reached.  
The filling process can be stopped at any time by pressing 'Fill Pump' Off.
- 9 When filling is complete, close the 'Clean Fill' ball valves (Cruiser & suction hose) and disconnect the suction hose from the camlock coupling.

## CAUTION

It is important to not close the 'Clean Fill' valve while the pump is running. Running the pump with a closed suction inlet may damage the pump.



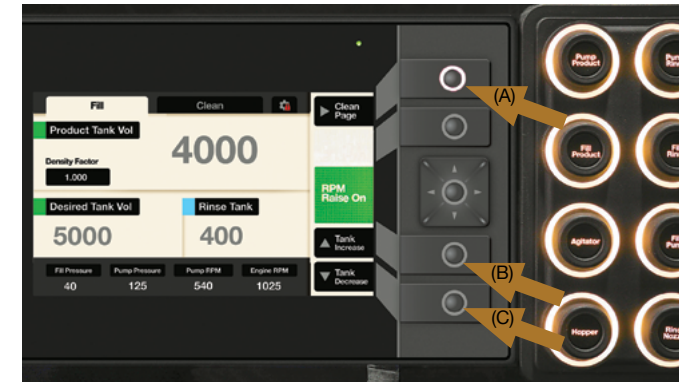
Connect a 3" fill hose to the 'Dirty Fill' inlet & Open the 'Dirty Fill' ball valves.

## To Fill the Product Tank - Dirty water source

- 1 Connect a 3" fill hose (not supplied) from a suitable pumping system to the 'Dirty Fill' camlock coupling of the Filling Station.
- 2 Follow all relevant safety & set-up pumping guidelines for the system being used.
- 3 Open the 'Dirty Fill' ball valves by moving the handle down.

## NOTE

Before disconnecting the suction hose from the Clean Fill Inlet, it should be noted the Drum Rinse & Hopper Rinse nozzles both require the use of suction hose for the supply clean water when rinsing.  
If hopper rinsing will be required, keep the suction hose connected to the clean water source until completion of the rinsing functions.



Press the Screen Selector push button (A) to select the Fill screen, then press the 'Tank Increase' (B) or 'Tank Decrease' (C) push buttons to set the required fill volume.

- 4 Open the Filling Station storage cabinet to access the G-hub External Controller.
- 5 Press the Screen Selector push button to select the Fill screen
- 6 Set the desired Fill Volume on the External G-Hub Controller by pressing the 'Tank Increase' or 'Tank Decrease' push buttons as required.  
The desired fill volume can be entered on the G-Hub Controller before leaving cabin.
- 7 With the Cruiser engine running at low idle, press the 'Fill Product' push button to On, then Press the 'Fill Pump' push button to On to start filling the Product Tank.. Fill progress can be monitored on the External G-Hub Controller screen.
- 8 When the tank is filled to the desired level, a 3" Fill Control Valve will close (stopping flow to the tank). Stop the pumping system.
- 9 Close the 'Dirty Fill' ball valves (Cruiser & supply hose) and disconnect the supply hose from the camlock coupling.

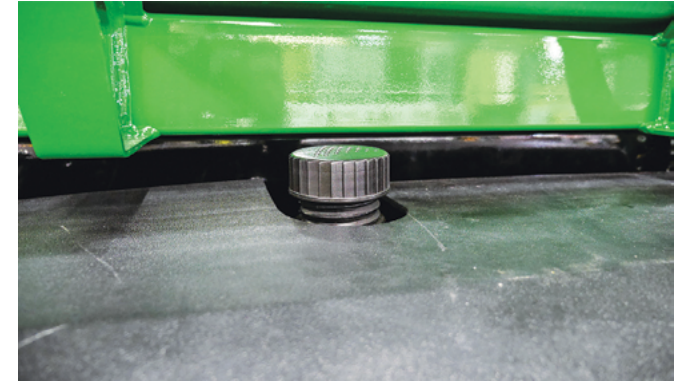




Connect a 3" fill hose to the 'Clean Fill' inlet & Open the 'Clean Fill' ball valves.



Press the Screen Selector push button to select the Fill screen.



The top filling lid of the Hand Wash Tank located above the storage cabinet.

### To Fill the Rinse Tank - Clean water source only

- 1 Connect a 3" suction hose (not supplied) to the 'Clean Fill' camlock coupling with the other end connected to a clean water source
- 2 Open the 'Clean Fill' ball valves by moving the handles down.
- 3 Open the Filling Station storage cabinet to access the G-hub External Controller.

- 4 Press the Screen Selector push button to select the Fill screen.
- 5 With the engine running at low idle, press the 'Fill Rinse' push button On, then 'Fill Pump' On to start filling the tank. The RPM will automatically raise if enabled in the G-Hub Controller settings.
- 6 The Fill Pump automatically switches Off when the Rinse Tank is full. Filling can be stopped at any time by pressing the 'Fill Pump' push button Off.
- 7 When the Rinse tank is filled, close the 'Clean Fill' ball valves and disconnect the suction hose from the camlock coupling.

Press the 'Fill Rinse' push button, then 'Fill Product' push button to start filling the Rinse Tank.



### To Fill the Hand Wash Tank

- 1 Connect a fresh water hose to a fresh water source.
- 2 Open the lid on top of the fresh water tank located above the storage cabinet.  
An alternative method of filling the tank is to connect a hose to the camlock fitting on the Hand Wash Tank outlet.
- 3 Use the hose to fill the tank with fresh water.
- 4 Remove the hose and close the fresh water tank lid, or alternatively, close the valve and remove the hose.

Fresh water tap for personal washing & safety, located at the base of the Quick Filling Station Storage Cabinet.



### NOTE

Always ensure the tank has sufficient water in it for rinsing purposes. The Rinse Tank capacity is approximately 550 litres.

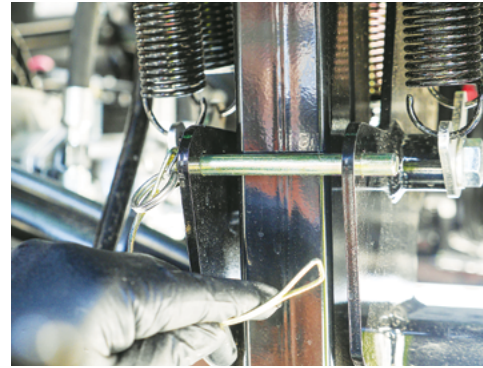
### CAUTION

It is important to not close the 'Clean Fill' valve while the pump is running. Running the pump with a closed suction inlet may damage the pump.





The external G-Hub Controller located in the storage cabinet of the Quick Filling Station.



Remove the hopper safety pin & locking pin.



Pull the hopper down into its working position.



Undo the latch & open the Hopper lid.

## Adding Chemicals to the Product Tank

Chemicals are added to the Product Tank using the:

- Chemical Induction Hopper (granular & liquid)
- Chemical Probe (liquid only).

Before adding chemical to the Product tank, at least 500 litres of clean water must be in the Product Tank - required to ensure the Product Pump operates to create the venturi effect required for transfer fluid from the Chemical Induction Hopper to the Product Tank and to ensure adequate agitation when chemical is added.

All functions for adding chemicals require the Cruiser to be safely parked in an appropriate area with the engine running.

### NOTE

Wear the necessary protective clothing and use the required safety equipment to avoid exposure to chemicals.

## Chemical Induction Hopper

The Chemical Induction Hopper provides mixing, measuring and induction functions for adding required chemicals to the Product Tank.

The Bottom Drain Valve can be used as an entry point for Chemical Induction directly to the Product Tank.

### To Lower the Chemical Induction Hopper

- 1 Remove the safety pin, then the locking pin from the hopper lifting arms.

Support the hopper weight & lift the lever to unlock the holding latch & lower the hopper.



- 2 Support the weight of the hopper, then pull the latch lever beside the hopper to unlock the latch holding the hopper in position.
- 3 Pull down the hopper slowly to its work position.
- 4 Check the hoses connecting to the hopper are not restricted or kinked.

### NOTE

Ensure chemicals added are consistent with the density factor used when filling the Cruiser.  
Water weighs 1.0 kg per litre) and conversion factors must be used when spraying liquids heavier than water.

With hopper in working position, check hoses are not restricted or kinked.



## To Add & Mix Chemical in the Chemical Induction Hopper

- 1 Undo the latch & open the Hopper lid.
- 2 Press the 'Pump Product' push button On to engage suction from Product tank.

The pump should operate at the speed necessary to generate at least 80 psi (with hopper On) delivery pressure (displayed on the External G-Hub Controller screen).

- 3 Press the 'Hopper' push button On to engage the Product Pump & Hopper valve. This push button automatically raises engine RPM.

Press the 'Pump Product' push button On & the 'Hopper' push button On.



## Ready to Spray – Operation



Open the Mixing Jet valve on the RHS of the Hopper.



On completion of mixing, Close the Mixing Jet valve.



Lift-up to Close the foot operated ball valve at the bottom of the hopper.



Press the 'Pump Product' push button On & the 'Hopper' push button On.

- 4 Add the required chemical granules or powder into the flowing liquid.
- 5 Open the Mixing Jet valve on the right hand side of the hopper to start mixing.  
If required turn On the mixing jet to assist induction.

- 6 Open the foot operated 3" ball valve at the base of the Hopper to transfer product into the Main Tank.
- 8 Rinse all chemicals from the Induction Hopper (refer to instructions in this Chapter 'Hopper Rinse Functions')

### To Transfer Chemical to the Product Tank using the Bottom Drain Valve

The Bottom Drain Valve can be used for Chemical Induction.

- 1 Lift up the lever to Close the foot operated ball valve at the bottom of the hopper.
- 2 Close the Bottom Ball Valve & remove the camlock coupling.
- 3 Connect a micromatic hose to the Bottom Ball Valve camlock coupling.

- 4 Press the 'Hopper' push button On to engage the Product Pump & Hopper valve. This push button automatically raises engine RPM.
- 5 Press the 'Pump Product' push button On to engage suction from Product tank.

The pump should operate at the speed necessary to generate at least 80 psi delivery pressure (with hopper On) delivery pressure (displayed on the External G-Hub Controller screen).

Add the chemical granules or powder to the flowing liquid.



Close the Bottom Drain valve & remove the camlock coupling plug.



### NOTE

When transferring contents of the hopper to the Product Tank, avoid letting the hopper run empty or suck air because it may cause foaming in the Product Tank.





Open the Bottom Ball Valve to transfer chemical to the main tank.

- 6 Open the Bottom Ball Valve to transfer chemical to the main tank.
- 7 Close the Bottom Ball Valve on completion of chemical transfer.
- 8 Disconnect the micromatic hose for the chemical source, then rinse with clean water by opening & closing the Bottom Ball Valve as required.
- 9 Disconnect the micromatic hose from the Bottom Ball Valve camlock coupling and refit the camlock coupling plug.

Disconnect the micromatic hose & refit the camlock coupling plug.



Connect a hose for chemical probe filling to the Chemical Probe Inlet.

## Chemical Probe Inlet

The Chemical Probe Inlet can be used to add chemical to the Chemical Induction Hopper or directly to the Product Tank.

## To Add Liquid Chemical to the Chemical Induction Hopper

The Induction Hopper can be used with a:

- a) Chemical Probe, or
- b) Micromatic Coupling.



Rotate the Chemical Pump Output to Hopper position.

## A) To Add Liquid Chemical to the Hopper Using the Chemical Probe

- 1 Connect a Chemical Probe hose to the 1" Chemical Probe Inlet
- 2 Rotate the Chemical Pump Output Selector to 'Hopper' position.



Open the filling station storage cabinet door to access the G-Hub External Controller.

- 3 Open the Filling Station storage cabinet door to access the G-hub External Controller.

## NOTE

The higher the Product 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 set by the pressure relief valve setting.

## NOTE

Ensure chemicals added are consistent with the density factor used when filling the Cruiser.

Water weighs 1.0 kg per litre) and conversion factors must be used when spraying liquids heavier than water.



## Ready to Spray – Operation



Turn the Chemical Pump valve ON.



Rotate the Chemical Probe valve to On position.



After the required amount of chemical has been transferred to the Hopper, close the Probe Valve.



Rotate the Chemical Probe valve to Off position.

- 4 The air operated Chemical Pump requires the Cruiser's engine to be running and the pneumatic system to be pressurised before use.

Activate engine 'RPM Raise' to maximise pump performance.

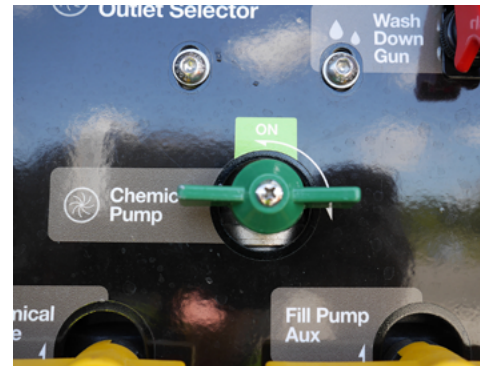
- 5 Rotate the Chemical Probe valve to On position.
- 6 Place the Chemical Probe into the chemical & Open the Probe Valve to transfer the chemical to the Hopper. Chemical will begin transferring to the Hopper.
- 7 After the required amount of chemical has been transferred to the hopper, pull the Probe out of the drum to allow the pump to suck air & purge all chemical mixture out.

Place the Chemical Probe into the chemical & open the Probe Valve to transfer chemical to the Hopper.



- 8 To rinse the Chemical Probe and hose, place the Probe into a container of clean water, then Open the Probe to suck clean water through the Probe and hose. On completion of rinsing, Close the Probe Valve.
- 9 Then, rotate the Chemical Pump valve to Off position.

Rotate the Chemical Pump valve to Off position.



- 10 Rotate the Chemical Probe valve to Off position.
- 11 Disconnect the Chemical Probe hose from the 1" Chemical Probe Inlet & replace the camlock cap.

Disconnect the Micromatic hose from the Chemical Probe Inlet & refit the camlock cap.





Connect a hose for Micromatic filling to the Chemical Probe Inlet.

## B) To Add Liquid Chemical to the Hopper Using the Micromatic Coupling

- 1 Connect a Micromatic hose to the 1" Chemical Probe Inlet.
- 2 Connect the other end of hose to a chemical source using the Micromatic coupling.
- 3 Rotate the Chemical Pump Output Selector to 'Hopper' position.

Rotate the Chemical Pump Output to Hopper position.



Press the 'Pump Product' push button On to engage suction of the Product Pump from the Product Tank.

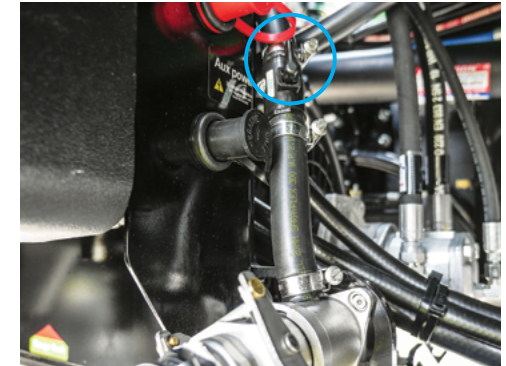
- 4 Press the 'Pump Product' push button On to engage suction of the Product Pump (from Product tank).
  - 5 Turn the 'Chemical Pump' On (rotate the air valve to On).
- Chemical will begin transferring to the Chemical Induction Hopper.

Turn the Chemical Pump valve ON.



Rotate the Chemical Pump valve to Off position.

- 6 After the required amount of chemical has been transferred to the hopper, the Enviro coupler can be partially disconnected to allow air to suck into and clear fluids in the pump and hoses.
- 7 Close the Chemical Pump Valve.



Connect the hose to the Micromatic coupling on the Cruiser, then Open the Rinse Coupling Valve.

## To rinse the Micromatic Hose & Fittings:

- 1 Disconnect the Micromatic hose end from the chemical source, then connect it to the Micromatic Rinse Coupling on the Cruiser & Open the Rinse Coupling Valve (located above the coupling).
- 2 Select either Hopper or Product Tank to rinse the desired circuit.
- 3 Turn the 'Chemical Pump' On (rotate the air valve to On).

Rinse will transfer to the Chemical Induction Hopper or Product Tank.

Turn the Chemical Pump valve ON.



## NOTE

Ensure chemicals added are consistent with the density factor used when filling the Cruiser.  
Water weighs 1.0 kg per litre) and conversion factors must be used when spraying liquids heavier than water.

## NOTE

**Micromatic Hose Rinse**  
The Micromatic Hose Rinse function can only be used while filling the Product & Rinse tanks with clean water and the 'Fill Product' push button is On.



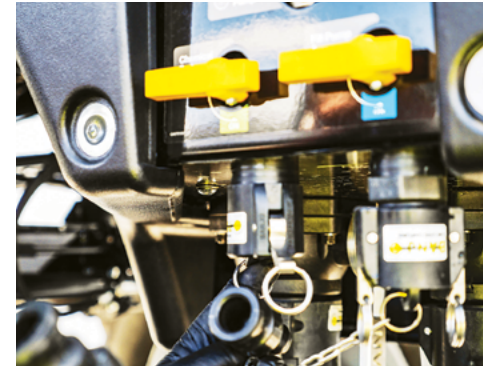
## Ready to Spray – Operation



Press the 'RPM Raise' & 'Pump Rinse' push buttons Off.



Rotate the Chemical Probe valve to Off position.



Disconnect the Micromatic hose from the Chemical Probe Inlet & refit the camlock cap.



Connect a Chemical Probe hose to the Chemical Probe inlet.

- 4 Disconnect the micromatic coupling from the rinse socket and allow air to suck.
- 5 Rotate the 'Chemical Pump' valve to Off position.

- 6 Rotate the Chemical Probe valve to Off position.
- 7 Close the Rinse Coupling Valve.

- 8 Disconnect the other end of the hose from the 1" Chemical Probe Inlet & refit the camlock cap.
- 9 Refer to instructions "To Add & Mix Chemical in the Chemical Induction Hopper" and "To Transfer Chemical from the Hopper to the Product Tank" to complete the hopper procedures.

### To Add Liquid Chemical Directly to the Product Tank Using the Chemical Probe Inlet

The Chemical Probe Inlet can be used with a:

- a) Chemical Probe, or
- b) Micromatic fitting.

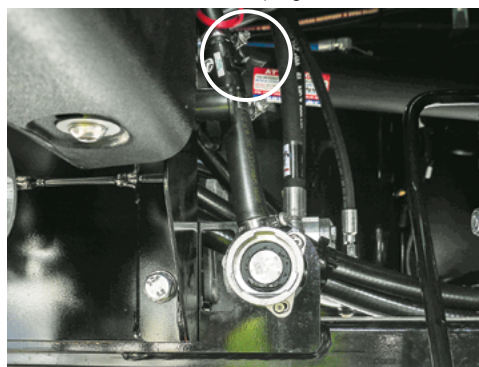
#### a) To Add Liquid Chemical to the Product Tank Using the Chemical Probe

- 1 Connect a Chemical Probe hose to the 1" Chemical Probe Inlet.
- 2 Connect the other end of hose to a chemical source using the Chemical Probe.

Rotate the Chemical Pump valve to Off position.



Close the Rinse Coupling Valve, then disconnect the hose from the Micromatic coupling on the Cruiser.



### NOTE

Ensure the Rinse tank has a sufficient quantity of fresh water before using the rinse functions.

### CAUTION

Do not let the 'Chemical Pump' run with a closed suction inlet as it may damage the pump.





Rotate the Chemical Pump Output to Hopper position.



Rotate the Chemical Probe valve to On position.



Rotate the Chemical Pump valve to Off position.



Disconnect the Chemical Probe hose & refit the camlock cap.

- 3 Rotate the Chemical Pump Output Selector to 'Tank' position.
- 4 Turn the 'Chemical Pump' On (rotate the air valve to On).

The air operated Chemical Pump requires the Cruiser's engine to be running & the pneumatic system pressurised before use.

- 5 Rotate the Chemical Probe valve to On position.
- 6 Place the Chemical Probe into the chemical & Open the Probe Valve to transfer the chemical to the Product Tank. Chemical will begin transferring to the Product Tank.

- 7 After the required amount of chemical has been transferred to the hopper, lift the Probe out of the drum to suck air and purge the system.
- 10 To rinse the Chemical Probe and hose, place the Probe into a container of clean water, then Open the Probe to suck clean water through the Probe and hose.

On completion of rinsing, Close the Probe Valve.

- 11 Then, rotate the Chemical Pump valve to Off position.

- 12 Rotate the Chemical Probe valve to Off position.
- 13 Disconnect the Chemical Probe hose from the 1" Chemical Probe Inlet & replace the camlock cap.

Turn the Chemical Pump valve On.



Place the Chemical Probe into the chemical & open the Probe Valve to transfer chemical to the Hopper.



Rotate the Chemical Probe valve to Off position.



## NOTE

Ensure chemicals added are consistent with the density factor used when filling the Cruiser.  
Water weighs 1.0 kg per litre) and conversion factors must be used when spraying liquids heavier than water.



Connect a hose for Micromatic filling to the Chemical Probe inlet.



Turn the Chemical Pump valve On.



Rotate the Chemical Pump valve to Off position.



Connect a hose for Micromatic filling to the Chemical Probe inlet.

#### b) To Add Liquid Chemical Directly to the Product Tank Using the Micromatic Fitting

- 1 Connect a Micromatic hose to the 1" Chemical Probe Inlet
- 2 Connect the other end of hose to a chemical source using the Micromatic coupling.
- 3 Rotate the Chemical Pump Output Selector to 'Tank' position.

- 4 Turn the 'Chemical Pump' On (rotate the air valve to On).  
The air operated Chemical Pump requires the Cruiser's pneumatic system to be pressurised before use.
- 5 Rotate the Chemical Probe valve to On position.  
Chemical will begin transferring to the Product Tank.

- 6 After the required amount of chemical has been transferred to the Product Tank, rotate the 'Chemical Pump' valve to Off position.

#### To rinse the Micromatic Hose & Fittings:

- 1 Disconnect the Micromatic hose end from the chemical source, then connect it to the Micromatic Rinse Coupling on the Cruiser & Open the Rinse Coupling Valve (located above the coupling).
- 2 Turn the 'Chemical Pump' On (rotate the air valve to On).  
Rinse will transfer to the Product Tank.
- 3 On completion of rinsing, press the 'Pump Rinse' push button Off (blue light goes Off).

Rotate the Chemical Pump Output to Hopper position.



Rotate the Chemical Probe valve to On position.



#### NOTE

Ensure chemicals added are consistent with the density factor used when filling the Cruiser.  
Water weighs 1.0 kg per litre) and conversion factors must be used when spraying liquids heavier than water.

Turn the Chemical Pump valve ON.

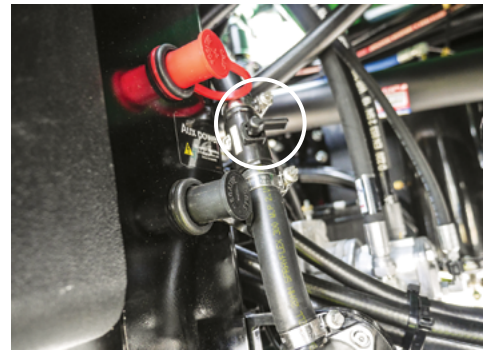






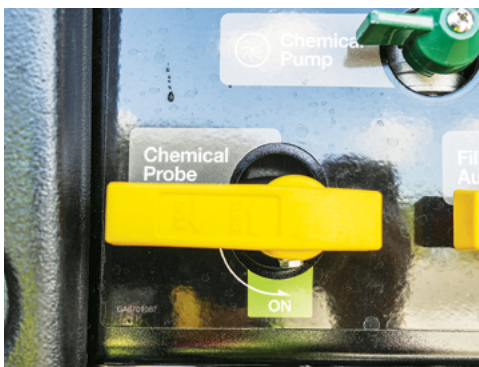
Rotate the Chemical Pump valve to Off position.

- 4 Rotate the 'Chemical Pump' valve to Off position.
- 5 Rotate the Chemical Probe valve to Off position.



Close the Rinse Coupling Valve, then disconnect the hose from the Micromatic coupling on the Cruiser.

- 6 Close the Rinse Coupling Valve, then disconnect the Micromatic hose from the Micromatic Rinse Coupling on the Cruiser.
- 7 Disconnect the other end of the hose from the 1" Chemical Probe Inlet & refit the camlock cap.



Rotate the Chemical Probe valve to Off position.



Disconnect the Micromatic hose from the Chemical Probe Inlet & refit the camlock cap.



The Hopper Rinse Nozzle located under the hopper lid.

## Hopper Rinse Functions

The Chemical Induction Hopper provides several rinsing functions:

- a) Drum Rinse Nozzle
- b) Hopper Rinse Nozzle
- a) Wash Down Gun

After rinsing, the Chemical Induction Hopper can be emptied by:

- Transferring contents to the Product Tank (see previous instruction) or
- Emptying the Hopper via the Bottom Drain valve.

The Wash Down Handgun on the outside of the hopper.



Connect a 3" fill hose to the 'Clean Fill' inlet & Open the 'Clean Fill' ball valves.

## a) To Use the Drum Rinse Nozzle

Connect a 3" suction hose (not supplied) to the 'Clean Fill' camlock coupling with the other end connected to a clean water source.

- 2 Open the 'Clean Fill' ball valves by moving the handles down (Cruiser & Suction hose).
- 3 Check the 'Hopper Rinse' valve on the top of the hopper is Closed.

Check the 'Hopper Rinse' valve on the top of the hopper is Closed.





## Ready to Spray – Operation



Open the hopper lid to access the Drum Rinse Nozzle.



Press the 'Fill Pump' push button Off.



Connect a 3" fill hose to the 'Clean Fill' inlet & Open the 'Clean Fill' ball valves.



Ensure the 'Pump Product' push button is On, then press the 'Fill Pump' & 'Rinse Nozzle' push buttons On.

- 4 Open the Hopper lid to access the Drum Rinse Nozzle.
- 5 Press the 'Fill Pump' push button On.  
If filling the Main Product tank at the same time and more pressure is required at the drum rinse, press & hold the Fill Product push button for 2 seconds.
- 6 Place the opening of the chemical drum over & onto the Drum Rinse Nozzle inside the hopper.
- 7 Press the drum down on the Drum Rinse Nozzle to engage the rinsing function.

Press the 'Fill Pump' push button On.



- 8 When the drum rinsing is complete, lift & remove the drum from the Drum Rinse Nozzle.
- 9 Press the 'Fill Pump' push button Off.
- 10 Empty the Hopper rinse by:
  - Emptying the Hopper to the Product Tank, or
  - Draining the Hopper via the Bottom Drain valve.

### b) To Rinse the Chemical Induction Hopper

- 1 Connect a 3" suction hose (not supplied) to the 'Clean Fill' camlock coupling with the other end connected to a clean water source.
- 2 Open the 'Clean Fill' ball valve by moving the handle down.
- 3 Close & lock down the Hopper lid.

Close & lock down the hopper lid.



- 4 Ensure the 'Pump Product' push button is On.
- 5 Press the 'Fill Pump' & 'Rinse Nozzle' push buttons On.
- 6 Open the Rinse Valve on the top of the hopper.
- 7 Empty the rinse liquid from the hopper by:
  - Transferring contents of the Hopper to the Product Tank, or
  - Emptying the Hopper via the Bottom Drain valve.

Open the Rinse Valve on top of the hopper lid.





Press the 'Fill Pump' push button Off.

- 8 Once the Hopper tank is clean, press the 'Fill Pump' & Rinse Nozzle' push buttons Off.
- 9 Close the Rinse Valve on the top of the hopper.
- 10 When all rinse functions are completed, close the 'Clean Fill' ball valves (both Cruiser inlet valve & Suction hose valve) and disconnect the suction hose from the camlock coupling.



Lift & remove the Wash Down Handgun from its holder on the side of the hopper.

## c) To Use the Wash Down Gun

The Wash Down Gun is provided to assist rinsing & cleaning of the hopper and other items.

Clean water is supplied to the gun by a 12V electric pump which draws water from the rinse tank.

To use the Wash Down Gun:

- 1 Lift & remove the Wash Down Gun from its holder on the side of the hopper.
- 2 Check the hose is not kinked or pinched.



Switch On the Wash Down Gun pump.



Switch On the Wash Down Gun pump.

- 3 Lift & open the red 'Wash Down Gun' hat switch on the Filling Station Pod and Lift the toggle switch On to engage the pump.
- 4 Point the Wash Down Gun towards the hopper area to be rinsed/cleaned, then squeeze the gun trigger to spray & wash.
- 5 Release the gun trigger to stop spraying.

- 6 On completion, press down the red 'Wash Down Gun' hat switch to stop the pump.
- 7 Return the gun to its holder on the side of the hopper.

Close the Rinse Valve on top of the hopper lid.



Point the Wash Down Gun & squeeze the trigger to spray.



## NOTE

Ensure the Rinse tank has a sufficient quantity of fresh water before using the wash down gun.

## CAUTION

Wash the spray gun with clean water, not rinsate. Be mindful of where rinsate is deposited as it may contain chemical residue.





Lift-up to Close the foot operated ball valve at the bottom of the hopper.



On completion of emptying the hopper, Close the Bottom Drain valve.



Lift & push the hopper up into its transport position.



Connect a 3" fill hose to the 'Clean Fill' inlet & Open the 'Clean Fill' ball valves.

### To Empty the Hopper via the Bottom Drain Valve:

- 1 Lift up the lever to Close the foot operated ball valve at the bottom of the hopper.
- 2 Remove the camlock coupling plug & Open the Bottom Drain valve.

This will drain the Hopper tank & hoses.

- 3 On completion Close the Bottom Hopper Drain valve.
- 4 Refit the camlock coupling plug.

Remove the camlock coupling plug & Open the Bottom Drain valve.



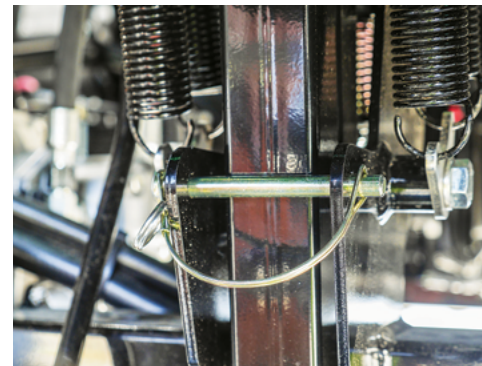
Refit the camlock coupling plug.



### To Raise the Chemical Induction Hopper into Transport Position

- 1 Check the hopper lid is closed and latched.
- 2 Lift and push the hopper up until it latches into its transport position.
- 3 Refit the locking pin to lock-in the hopper lifting arms and refit the safety clip.

Refit the locking pin & safety clip.



### Fill Pump Auxilliary Valve

The Fill Pump Auxilliary Valve, located on the Quick Filling Station, provides a clean water outlet to facilitate auxilliary cleaning functions. The facility utilises the clean fill inlet and fill pump & requires a pressure hose for your cleaning operations.

#### To Use the Fill Pump Aux Valve:

- 1 Connect a 3" suction hose (not supplied) to the 3" 'Clean Fill' camlock coupling with the other end of the hose connected to a clean water source.
- 2 Open the 'Clean Fill' ball valves (both Cruiser inlet valve & Suction hose valve) by moving the handles down.

### NOTE

After adding chemical to the Product Tank, ensure both Pump Product and Agitator push buttons are On to keep the chemical evenly mixed in the tank ready for spraying.





Connect a pressure hose to the 'Fill Pump Aux Valve' 1" camlock fitting.

- 3 Connect a pressure hose to the 'Fill Pump Aux Valve' 1" camlock fitting (hose not supplied).
- 4 Rotate the 'Fill Pump Aux' valve to On position.

## CAUTION

Ensure the 'Fill Pump Aux' valve is closed before connecting or disconnecting the pressure hose.

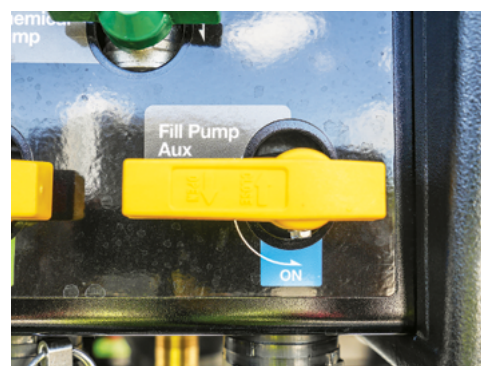
Rotate the 'Fill Pump Aux' valve to On position.



Press the 'Fill Pump' push button to pumping clean water.

- 5 With the Cruiser engine running at low idle, press the 'Fill Pump' push button to On to start pumping clean water.
- 6 Proceed to use the pressure hose for your auxilliary cleaning operations.
- 7 When cleaning is complete, press the 'Fill Pump' to stop pumping clean water.
- 8 Close the 'Fill Pump Aux' valve & disconnect the pressure hose and replace the camlock plug.
- 9 Close the 'Clean Fill' ball valves (Cruiser & suction hose) and disconnect the suction hose from the camlock coupling.

Rotate the 'Fill Pump Aux' valve to Off position.

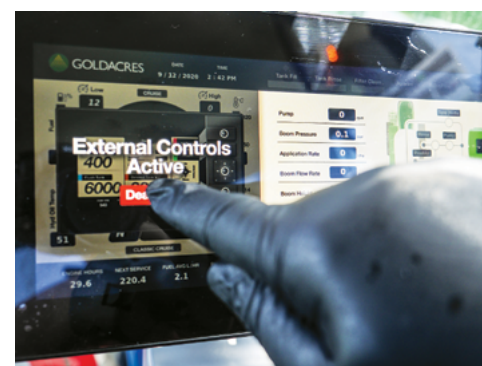


Close & lock shut the storage box of the Quick Filling Station.

On completion of the filling and rinsing functions:

- Ensure all fill and pressure hoses are disconnected/packed away.
- Close & lock the storage box of the Quick Filling Station.
- On returning to the cabin, deactivate the External Controller.

On return to the cabin, deactivate the External Controller.



Press the 'Pump Product' push button On, then press the 'Agitator' push button to keep chemicals mixed.

## Product Tank Agitation

Product agitation can be controlled manually or automatically through the G-Hub system. For example, the agitator can be set for the centre high pressure jet to automatically switch off below certain tank level to reduce chances of foaming with less water. Check the agitator for efficiency because agitator nozzles can block. Refer Chapter 8 'Lubrication & Maintenance' for details.

### To Agitate While Stationary:

- 1 Add a minimum volume of 500 litres of fresh water to the Product Tank
- 2 Add all chemicals. See instructions - 'Filling the Sprayer' & 'Adding Chemicals to the Product Tank'.
- 3 Add remaining water as required.
- 4 Press the 'Pump Product' push button On to activate the spray pump, then press the 'Agitator' push button to On.

## NOTE

If a tank has been filled & spray mixture has settled, agitate for as long as it takes to pump the total quantity of water in the tank to remix the chemicals.  
For example: For a tank with 6000 litres using a 250 L/min pump, agitate for  $6000 \div 250 = 15$  minutes



Home screen of the Spray Rate Controller & Raven Control Module (RCM).

## Spraying Application

After completion of filling, the Cruiser is ready for spraying.

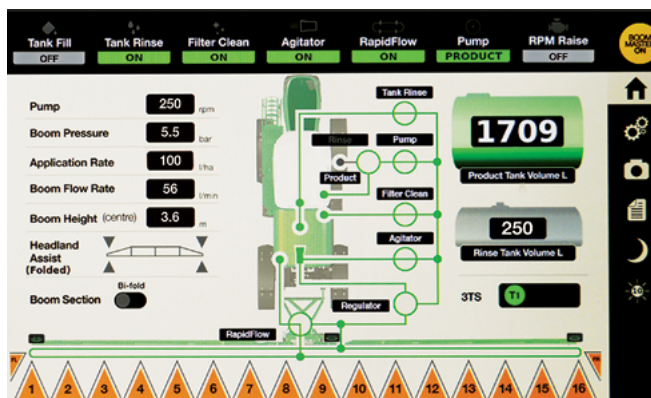
While travelling from filling to the field, both Product Pump & Agitator must be On to ensure chemicals are mixed adequately prior to spraying.

### To Commence Spraying:

- 1 Enter the field and unfold the boom (for instructions, refer to 'Boom Folding/Unfolding'.
- 2 Set the boom to the desired height above the application target (for instructions).
- 3 Switch On the Raven Control Module (RCM), the Spray Rate Controller.
- 4 Check to ensure correct application rates have been entered.

### **⚠ DANGER**

Always check for power lines while folding and unfolding the boom, as getting too close or any contact with power lines can be fatal.

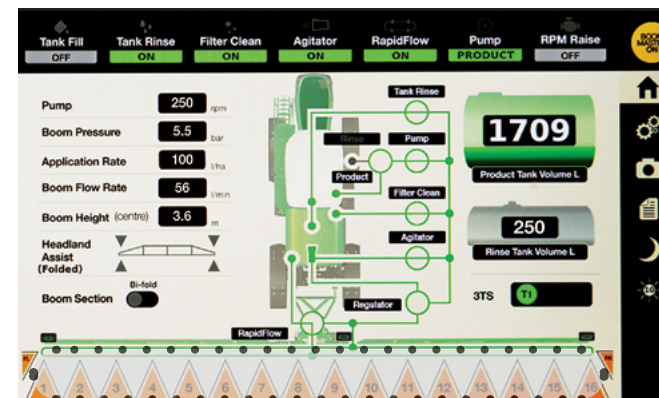


G-Hub Home screen with RapidFlow PRIME completed & the Master Switch On for spraying (Fenceline nozzles Off).

- 4 Set the RapidFlow touch button to PRIME from the drop down selection to prime the boom lines.
- 5 When priming is completed, commence travelling on the spray swath.
- 6 Press the 'Master Switch' touch button of the Joystick On to commence spraying  
The Raven Control Module (RCM) now controls the spraying application rate according to the preset values entered by the operator.  
Home Screen plumbing lines change from Grey to Green colour as spraying functions are engaged.
- 7 If fitted & configured, engage the GPS task controller to automatically cycle boom sections On & Off as required to avoid any overlapping of sprayed areas.
- 8 Screen touch buttons (1 to 16) can be used to manually switch boom sections On & Off.

### **⚠ CAUTION**

Always ensure the sprayer is properly calibrated & tested before beginning to spray (refer to chapter 5, "Calibration - Checking your Application Rates"). Failure to properly calibrate and test chemical mixtures & nozzles may result in undesirable and damaging outcomes.



'Boom Screen touch buttons' can be used to manually switch individual boom sections Off (Amber) or On (Green) .

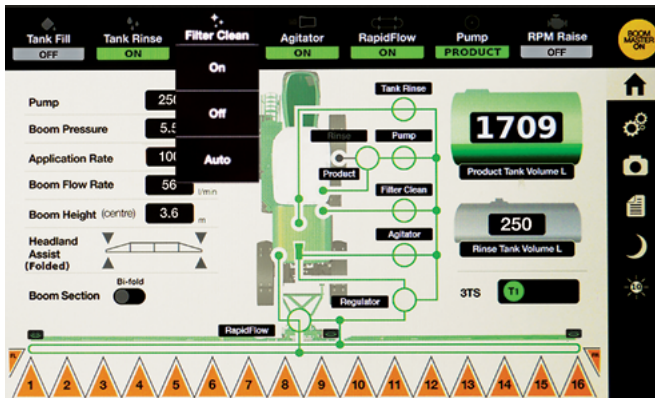
- 9 Fenceline nozzles can be switched On & Off as required by using the 'Fenceline' push button on the Joystick (Boom sections 1 & 16 must be On for fenceline nozzles to operate):
  - Press the 'L' end of the 'Fence Nozzle' push button to switch On the left boom tip Fenceline nozzle.  
When activated, a red LED on the boom tip is illuminated.  
To switch Off the fence line nozzle, press the push button.
  - Press the 'R' end of the 'Fence Nozzle' push button to switch On the right boom tip Fenceline nozzle.  
When activated, a red LED on the boom tip is illuminated.  
To switch Off the fence line nozzle, press the push button.

The Fenceline nozzle screen indicators show Green while On & Amber while Off.

### **NOTE**

The information above is provided as a guide only. It is the full responsibility of the operator to have correctly set-up & calibrated the sprayer and to assess the field conditions in all spraying applications.





Screen switches of the 'Pressure Filter Clean' function.

10 The 'Filter Clean' function of the G-Hub Controller can be:

- Set to 'Auto' setting so that the pressure filter flushing automatically activates when all boom sections are switched Off or the boom Master Switch is turned Off.
- Manually switched to On to flush the pressure filter when not actively spraying.

Refer to Chapter 3 'Cabin', 'Pressure Filter Clean Touch Buttons' for instructions).

11 As the Product Tank gets closer to minimum tank level (300 litres), it may be necessary to switch Off the Agitator to reduce foaming.



Press the 'Boom Master On/Off' push button on the Joystick to stop spraying.

12 When the Product Tank is empty:

- Press the 'Boom Master On/Off' push button Off (using the Joystick to stop spraying)
- Stop the Agitator
- Stop the Pump, and
- Return to water source to refill (refer to 'Filling the Sprayer' & 'Adding Chemicals to the Product Tank'.

13 On completion of spraying at:

- End of the day
- End of a product or
- End of season,

follow the appropriate rinsing instructions to ensure all plumbing is flushed & completely clean.



Connect a 3" fill hose to the 'Clean Fill' inlet & Open the 'Clean Fill' ball valves for filling & rinsing water.

## Rinsing the Sprayer After Spraying

Never leave chemical or contaminated liquid within the Cruiser's spraying system. After spraying the spraying system must be rinsed clean. Three modes of rinsing provided:

- 1 Quick Rinse or Boom Rinse
- 2 Basic Rinse
- 3 Total Rinse & Decontamination.

### NOTE

The operator must wear the operator safety belt at all times when seated in the cabin or when the machine is in motion.

### CAUTION

Do not run a centrifugal pump dry as damage will occur to the pump.

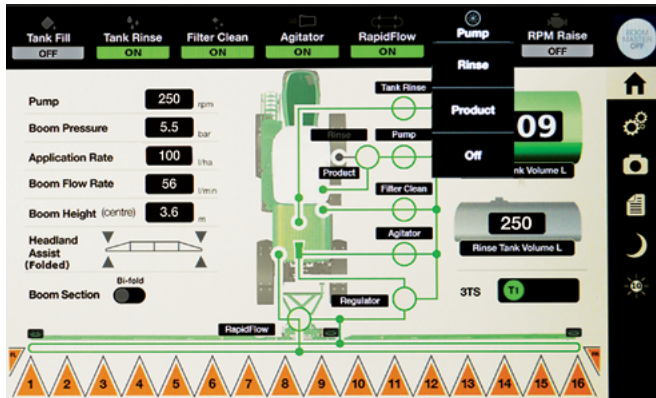
### CAUTION

When rinsing is taking place, the rinsate is potentially very hazardous depending on chemical content.

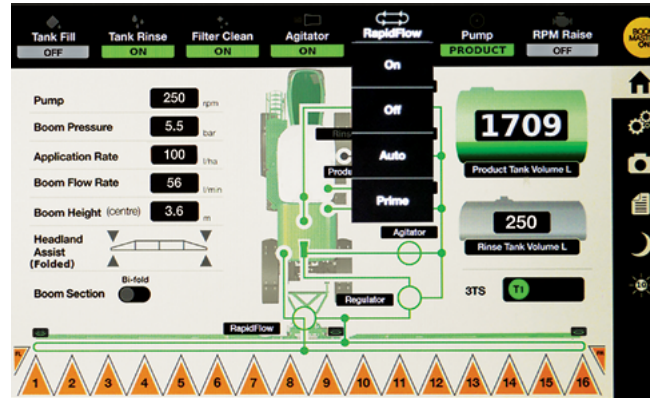
Use recommended personal protective equipment (PPE).

For specific information on rinsing & decontamination of the chemicals being applied, it is recommended to consult the chemical manufacturer's label and/or your chemical supplier.





Press the 'Pump Rinse' touch button to On.



Press the 'RapidFlow' touch button to On.



Open the Product Tank drain valve to drain the tank, then close the valve.

## Quick Rinse or Boom Rinse

Boom Rinse is recommend for use only at end of the day or for short operational breaks where it is intended to continue with the same chemicals.

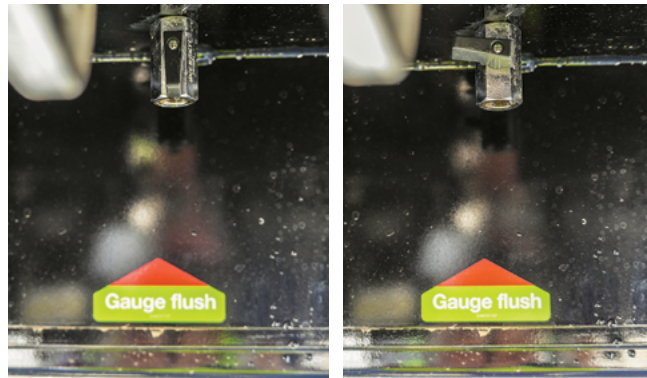
Quick Rinse operates from the G-Hub Controller and draws clean water from the Rinse Tank. This rinse function requires the Rinse Tank to be full prior to start of Quick Rinsing (refer to 'Tank Filling' instructions earlier in this chapter).

### To Quick Rinse the Boom

- 1 Press the 'Pump Rinse' touch button On.

- 2 Press the 'RapidFlow' touch button on the G-Hub Main screen to On.
- 3 Open the spray gauge valve to flush out chemical, then Close the valve.
- 4 On completion of the boom rinse, press the 'RapidFlow' and 'Pump Rinse' touch buttons to Off.

Open (shown left) and Closed (shown right) the Spray Gauge valve to decontaminate & flush the line.



## **CAUTION**

It is important not not close the 'Clean Fill' valve while the pump is running. Running the pump with a closed suction inlet may damage the pump.

## Basic Rinse

A Basic Rinse is necessary at end of the day or operation if intending to later continue with the same chemicals.

Basic Rinsing draws clean water from an external source using the Fill Pump & 3" clean water inlet.

### To Basic Rinse the Spray System:

- 1 Safely park the Cruiser & unfold the boom.
- 2 Open the Product Tank drain valve (located at the bottom of the tank) by turning down the yellow drain ball valve handle to completely drain the tank. Close the valve when empty.
- 3 Lower the Chemical Induction Hopper keeping the hopper lid closed.
- 4 Connect a 3" suction hose (not supplied) to the 3" 'Clean Fill' camlock coupling with the other end of the hose connected to a clean water source (refer to 'Tank Filling' instructions in this chapter).



Connect a 3" fill hose to the 'Clean Fill' inlet & Open the 'Clean Fill' ball valves.

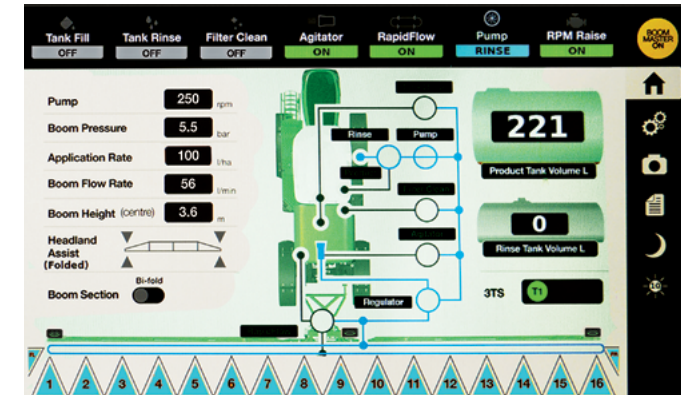
- 5 Open the 'Clean Fill' ball valves (Cruiser & suction hose) by moving the handles down (refer to 'Tank Filling' instructions in this chapter).
- 6 Open the storage cabinet of the Quick Filling Station to access the External G-Hub Controller.
- 7 Press the Screen Selector push button to select the 'Fill' screen.
- 8 Fill the Product Tank with about 200 litres of clean water (refer to 'Tank Filling' instructions in this chapter).
- 9 Fill the Rinse Tank full of clean water (refer to 'Tank Filling' instructions in this chapter).
- 10 Press the Screen Selector push button to select the 'Clean' screen.



For Basic Rinse, individually, use each Rinse function in the left hand column of the 'Clean' screen using the Select & Start/Stop push buttons.

- 11 Press 'Pump Rinse' push button On.
- 12 Process each Rinse function of the left hand list on the External Controller 'Clean' screen:
  - Pressure Filter
  - RapidFlow
  - Bypass Valve
  - Agitator
  - Deadhead Pump (diaphragm pump only).
 Individually using the push buttons to:
  - Select
  - Start - allowing each function suitable time to rinse thoroughly, then
  - Stop the function.

Several functions can be started & running together but then stopped individually with the Start/Stop push button.



G-Hub Home screen showing the Agitator, RapidFlow, RPM Raise, Master Switch and Fenceline nozzles On for rinsing nozzles & boom lines.

- 13 Keep the 'Pump Rinse' touch button On & press the 'RapidFlow' touch button on the G-Hub Main screen to On and proceed to rinse the boom and nozzles.
- 14 Open the spray gauge valve to flush out chemical, then Close the valve.
- 15 On completion of the boom rinse, press the 'RapidFlow' and 'Pump Rinse' touch buttons to Off.
- 16 Open the Product Tank drain valve & completely drain the tank. Close the valve when empty.
- 17 Clean the suction & pressure filters.
- 18 Store & shut-down the Cruiser as required.

## CAUTION

It is important not to close the 'Clean Fill' valve while the pump is running. Running the pump with a closed suction inlet may damage the pump.

## NOTE

If filling the Rinse Tank at the same time as the Product Tank, the 'Fill Rinse Tank' push button will flash to indicate pausing until the Product Tank reaches 500 litre level. Rinse Tank filling will then resume as indicated by a solid colour of the push button. Individual tank filling rate is reduced when filling both tanks at the same time.



Process all rinse functions of the 'Clean' screen, individually using the Select & Start/Stop push buttons.

### Total Rinse & Decontamination

Total Rinse & Decontamination of the Cruiser's spraying system is important whenever changing chemicals or applications and at the end of the spraying application.

Total Rinse & Decontamination draws clean water from an external source using the Fill Pump & 3" clean water inlet, plus an appropriate cleaner/decontaminant is added to clean & neutralise the chemicals previously used.

The procedure requires a minimum of 1000 litres of clean water in the Product Tank and the Rinse Tank must be filled before proceeding.

#### NOTE

After Rinsing, it is recommended to remove and clean the pressure filter and the suction filter.



Press the 'Pump Rinse', 'Pump Product', 'Rinse Nozzle' (press & hold - push button flashes) & Hopper push buttons On.

### To Totally Rinse & Decontaminate the Spray System:

- 1 Safely park the Cruiser & unfold the boom.
- 2 Open the Product Tank drain valve (located at the bottom of the tank) by turning down the yellow drain ball valve handle and completely drain the tank. Close the valve when empty.
- 3 Open the storage cabinet of the Quick Filling Station to access the External G-Hub Controller.
- 4 Lower the Chemical Induction Hopper & open the hopper lid.
- 5 Connect a 3" suction hose (not supplied) to the 3" 'Clean Fill' camlock coupling with the other end of the hose connected to a clean water source (refer to 'Tank Filling' instructions in this chapter).
- 6 Open the 'Clean Fill' ball valves (Cruiser & suction hose) by moving the handles down (refer to 'Tank Filling' instructions in this chapter).
- 7 Fill the Product Tank with about 1000 litres of clean water.
- 8 Fill the Rinse Tank full of clean water.

#### CAUTION

It is important to not close the 'Clean Fill' valve while the pump is running. Running the pump with a closed suction inlet may damage the pump.



Lower the Chemical Induction Hopper & open the Hopper lid.

- 9 Lower the Chemical Induction Hopper & open the hopper lid (refer to 'Chemical Induction Hopper' instructions in this chapter).
- 10 Press 'Hopper' push button On.
- 11 Add the appropriate decontaminating agent to the hopper.
- 12 Press the Screen Selector push button to select the 'Clean' screen.
- 13 Press & hold the 'Rinse nozzle' push button for 2 seconds. The Product Tank rinse nozzles will flow with liquid sourced from product tank. The Rinse Nozzle' flashes when On.

#### NOTE

If filling the Rinse Tank at the same time as the Product Tank, the 'Fill Rinse Tank' push button will flash to indicate pausing until the Product Tank reaches 500 litre level. Rinse Tank filling will then resume as indicated by a solid colour of the push button. Individual tank filling rate is reduced when filling both tanks at the same time.





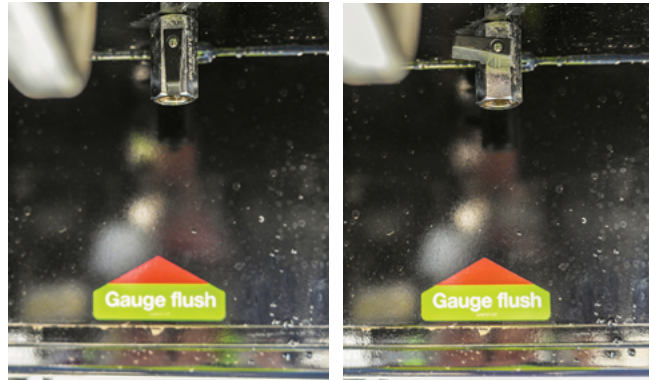
Process all rinse functions of the 'Clean' screen, individually using the Select & Start/Stop push buttons.

- 14 Process each Rinse function of the list on the External Controller 'Clean' screen:
- Pressure Filter
  - RapidFlow - Open Gauge Flush
  - Bypass Valve
  - Agitator
  - Deadhead Pump (diaphragm pump only)
  - Hopper
  - Main Tank Fill Line
  - Tank Rinse from Pump
  - Tank Rinse from Fill
  - Main Tank Suction Line - Only do this if the tank is empty. The pump must be off & suction filter drain open.

Individually use the push buttons to:

- Select
- Start - allowing each function suitable time to rinse thoroughly, then
- Stop the function.

Several functions can be started & running together but then stopped individually with the Start/Stop push button.



Open (shown left) and Closed (shown right) the Spray Gauge valve to decontaminate & flush the line.

- 15 Open & Close the Spray Gauge valve to decontaminate & flush out any chemical.
- 18 After decontaminating the whole system, proceed to the next step of flushing the system with fresh water.

## Flush the Spray System with Clean Water

Repeat the Basic Rinse process to flush the Spray System with clean water (after total cleaning and contamination has been performed) to remove any remaining Rinsate and boom cleaner.

### NOTE

After Total Rinse & Decontamination, it is recommended to remove and clean the pressure filter and the suction filter. Both filters should be cleaned regularly.

### NOTE

Dispose of chemical & pesticide waste safely. If possible, reuse the rinsate when preparing the next batch of tank mixture. Make sure all the dirt and debris in the rinsate are filtered out before adding the rinsate to a spray tank. Small amounts of solids left should be dried, then taken to a hazardous waste disposal site or pesticide collection location.



The Pressure Filter showing the red valve (tap) in Open position at the base of the filter.

### Pressure Filter Removal & Cleaning

It is recommended to remove & clean the Pressure Filter regularly - before each tank fill. Frequency of cleaning will depend on the quality of water and chemicals used.

The Pressure Filter receives liquid from either the Product Tank or the Rinse Tank via the spray pump.

The G-Hub Controller provides a Self Cleaning function controlled by via an electronic valve.

This Self Cleaning function of the controller will only purge some material from the screen. It is NOT a full reverse flush.



Press the Screen Selector push button (A) to select the 'Clean' screen, press the Select Up push button (C) to select Pressure Filter, then press the Start push button (B).

Prior to removal of the filter for cleaning, self clean the filter using the G-Hub External Controller:

- 1 Open the storage cabinet of the Quick Filling Station to access the External G-Hub Controller.
- 2 Press the Screen Selector push button to select the 'Clean' screen.
- 3 Press the Selector push button to select Pressure Filter, then press the Start push button
- 4 Press the 'Pump Product' push button On and allow the pump to run for several seconds to flush the filter out.
- 5 Press 'Pump Product' push button Off.

The Pressure Filter is now ready for manual removal & cleaning.



Loosen the pressure filter bowl nut slowly using the filter spanner supplied.

### To Remove & Clean the Pressure Filter:

- 1 Make sure the 'Pump Product' push button is Off.
- 2 Loosen the filter bowl nut slowly using the filter spanner supplied. Be aware some residual chemical may dribble out.
- 3 After liquid stops coming from the filter, fully unscrew the filter bowl nut and remove the filter bowl.  
Be careful of any chemical and avoid any damage to the O-Rings.
- 4 Clean the filter screen and O-rings, then refit the components making sure the filter bowl & O-rings are correctly placed. Fully tighten the filter bowl nut.

#### NOTE

It is recommended to remove & clean the Pressure Filter after Quick Rinse, Basic Rinse and Total Rinse & Decontamination procedures are completed in which case self cleaning the pressure filter is already done.

Self cleaning the pressure filter at other times requires at least 200 litres of clean water in the Product Tank.

#### CAUTION

The chemicals & rinsate are potentially very hazardous depending on chemical contents. Use recommended personal protective equipment (PPE).

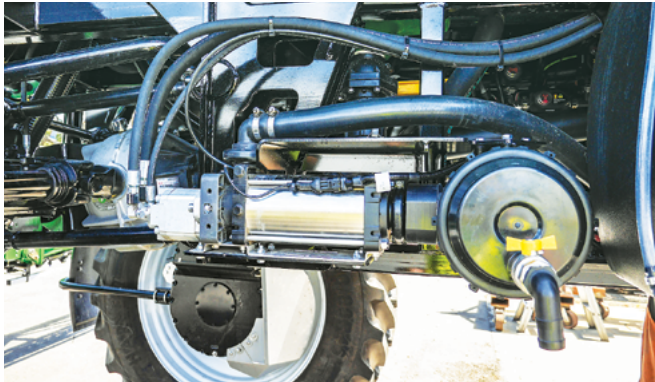
For information specific to your circumstances, the spraying equipment being used and the chemicals being applied, consult your agronomist or chemical supplier.

#### CAUTION

If operating with Centrifugal spray pump, running the centrifugal spray pump dry will damage it.

The pressure filter must be fully assembled with the red drain valve open before operating the pump to avoid damage.





The Suction Filter shown with a centrifugal pump.



Open the drain valve to drain the Suction Filter.



Remove the Suction Filter screen.

## Suction Filter Removal & Cleaning

It is recommended to remove & clean the Suction Filter regularly - before each tank fill. Frequency of cleaning will depend on the quality of water and chemicals used

The Suction Filter receives liquid from either the Product Tank, or the Rinse Tank. All liquid to be sprayed or flushed through the system passes through this filter.

Fluid supply to the suction filter is controlled by an electronically operated valve. The valve operation is controlled by the presets in the G-Hub controller (refer to Chapter 4).

The suction filter valve is plumbed before the filter housing

## To Remove & Clean the Suction Filter:

- 1 Make sure the 'Pump Product push button is Off.
- 2 Open the drain valve on the filter & allow the filter to drain fully.  
Be sure to collect any hazardous chemical and wear appropriate PPE.
- 3 Close the drain and loosen the filter bowl collar slowly using the spanner provided. Be aware some residual chemical may dribble out.
- 4 After liquid stops flowing from the filter, fully unscrew the filter bowl collar and remove the filter bowl.  
Be careful not to damage the O-Rings.

Unscrew the filter bowl collar to remove the filter bowl.



- 5 After removing the filter bowl, carefully remove the filter screen, then clean the filter bowl, body, screen & O-rings.
- 6 After cleaning, refit the components making sure the filter bowl & O-rings are correctly placed.
- 7 Fully tighten the filter bowl collar & close the drain valve.

Fully tighten the filter bowl collar & close the drain valve.



## CAUTION

When rinsing is taking place, the rinsate is potentially very hazardous depending on chemical content.

Use recommended personal protective equipment (PPE).

For specific information on rinsing & decontamination of the chemicals being applied, it is recommended to consult the chemical manufacturer's label and/or your chemical supplier.





*Ensure the Cruiser is properly cleaned and stored at the end of day & end of season.*



*Height adjustable Towbar.*

## End of Day

At the end of each spraying day, follow the instructions for Basic Rinsing or Total Rinse & Decontamination.

### CAUTION

If icing occurs, it is important to ensure any ice has thawed before using the Cruiser.  
Failure to thaw ice prior to use will cause damage to the machine.

### CAUTION

All chemicals have corrosive properties to some degree. Prevent damage to the machine by always consulting the chemical MSDS or the chemical supplier for advice concerning the corrosive properties of the chemical.  
It is the responsibility of the operator to carry out preventative and ongoing maintenance to the machine, particularly while applying chemicals with highly corrosive properties.

### CAUTION

Machine components should be coated with a suitable protectant during storage, then washed down, thoroughly, before use.  
Consult the supplier of protectants, if you require specific advice about the effectiveness of any particular protectant to prevent premature degradation of machine components.

## End of Season

If the Cruiser is to be stored for a long period of time without use, several procedures must be performed.

- 1 Follow the instructions for Total Rinse & Decontamination.
- 2 Thoroughly examine the Cruiser to determine if there is any damage.
- 3 Park the Cruiser where it will not be affected by frosts, and preferably out of direct sunlight.
- 4 Ensure all spray tanks are empty.
- 5 If necessary, remove consoles from cabin and store them in a safe & secure location.

### NOTE

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

## Towbar

The Cruiser is fitted with an height adjustable Towbar.

When using the Towbar, ensure the towbar load & speed limits are adhered to at all times:

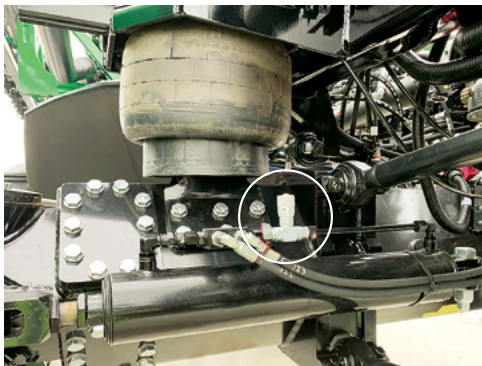
- Maximum vertical load on the towbar is 100kg
- Maximum towing load (unbraked) is 750kg
- Maximum towing load (braked) is 2250kg
- Maximum speed with a trailer attached is 40km/hr.

### To Use the Towbar:

- 1 Ensure the boom is fully folded.
- 2 Remove the safety clip from the holding pin.
- 3 Remove the holding pin & drop the towbar down.
- 4 Refit the holding pin & safety clip.
- 5 Attached the trailer, safety chains & light cable.

### NOTE

Do not run a centrifugal pump dry as damage will occur to the pump.  
Remove the suction filter to drain the line and pump if a centrifugal pump is installed.



Open the Adjustable Axle Track valve on each of the 4 Adjustable Axle Tracks.



Press & Hold the Adjustable Axle Track In/Out Rocker Switch (on the cabin corner panel) as required while travelling forward at 10kph.

## Adjustable Wheel Tracks

These instructions are only applicable to Cruisers fitted with the Adjustable Wheel Track option.

### To Fully Extend or Fully Retract the Adjustable Wheel Tracks:

- 1 Before entering the sprayer, manually OPEN the valves on each adjustable axle hydraulic cylinder (4 in total).
- 2 Start and drive the Cruiser as per the instructions in the 'Quick Start Guide' at the beginning of this chapter.
- 3 Lock the transmission in 1st Gear to achieve the best adjustment operation.

- 4 Maintain a constant speed of 10Km/h, then Press & Hold the 'Axle In' or 'Axle Out' rocker switch (located on the rear RH Switch Panel below the ignition key).
- 5 Press & Hold the rocker switch until all 4 wheels have retracted or extended their full travel In or Out.
- 6 Release rocker switch.
- 7 Manually CLOSE the valves on each adjustable axle hydraulic cylinder (4 in total).

### CAUTION

DO NOT attempt to extend or retract the axles while the machine is stationary.  
Failure to ensure the Cruiser travelling before extending or retracting is attempted will create excessive pressure on the wheel assembly & can cause damage.

### To Extend or Retract the Adjustable Wheel Tracks to a Desired Width:

- 1 Before entering the sprayer, manually OPEN the valves on each adjustable axle hydraulic cylinder (4 in total).
- 2 Start and drive the Cruiser as per the instructions in the 'Quick Start Guide' at the beginning of this chapter.
- 3 Lock the transmission in 1st Gear to achieve the best adjustment operation.
- 4 Maintain a constant speed of 10Km/h, then Press & Hold the 'Axle In' or 'Axle Out' rocker switch (located on the rear RH Switch Panel below the ignition key).
- 5 Press & Hold the rocker switch until the 4 wheels have retracted or extended the desired width In or Out, then release rocker switch and stop the Cruiser.

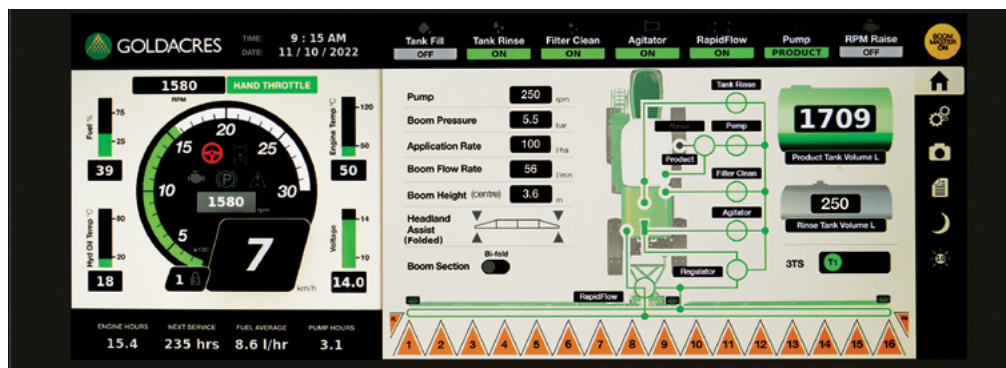
- 6 Measure the distance from the Cruiser centre to the wheel centres to check the required width, eg, 3.5m required width = 1.75m from Cruiser centre to wheel centre.
- 7 Close the cylinder valves of wheels that meet the desired width.
- 8 Repeat steps 2 to 7 until all wheels are set to the required width.
- 7 Check that all adjustable axle hydraulic cylinder valves are fully CLOSED (4 in total).

### NOTE

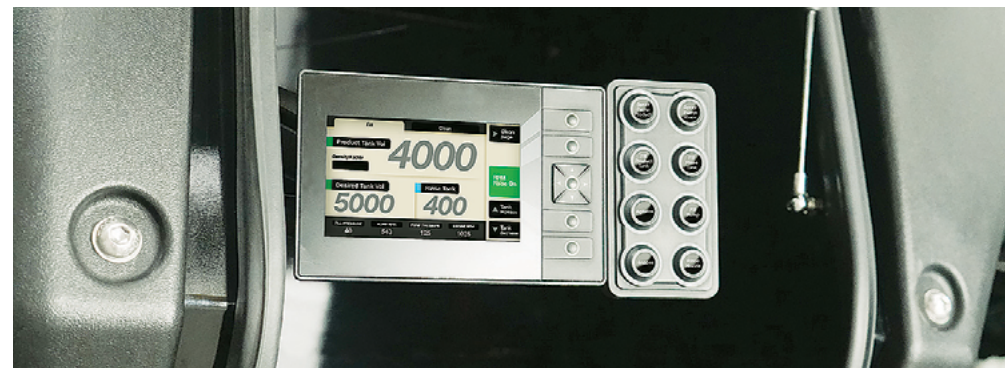
When cleaning telescoping driveshafts and ONE wheel is lifted OFF the ground, the adjustable axle can be adjusted to the desired width providing the OTHER 3 axle adjustment cylinder valves are CLOSED. Adjust & measure the width and repeat the procedure for each wheel.

### CAUTION

For extended road travel, the valves on each cylinder MUST BE CLOSED to prevent unexpected axle movement.  
Failure to ensure valves are fully closed for travelling & operation may result in unexpected machine width changes, instability and unsafe operation.



The External G-Hub controller in the cabin.



The External G-Hub controller at the Quick Filling Station.

## G-Hub Tips & Tricks

The following outlines useful tips for operating the G-Hub controller.

### Internal G-Hub:

#### Fence Line Override

To override Fence Line safety settings for testing purposes, press & hold the Cruise Master (FN) button, then press either Left or Right Fence line on the joystick to lock the out output for testing.

#### Skip Settings Download

If the G-Hub internal 12" display is stuck on the loading settings page, tapping in the top right corner will load the display without loading machine settings. This is useful for checking engine diagnostics, etc.

#### View Application Rate Graph

To view Application Rate Graph, unlock the Settings Page, then go to the G-Hub Home Screen & press "Application Rate" for a detailed unsmoothed graph of 'As Applied Rate Data'. This can be used to adjust settings in the Raven RCM for more accurate application. Note this is unsmoothed raw data.

### Spray Master Override

Press & hold (3 seconds) the 'Boom Master' button on the Joystick to activate the Spray Boom override temporarily for corner spraying.

Press & hold Cruise Master (FN) button, then press the Boom Master button to lock on the Spray Boom Override. Note this function overrides the section controller. While active, it overrides section control and applies the Target Rate which is especially beneficial when entering a field, starting an application from a corner of the field and performing calibration or diagnostic tests. Press the Boom Master button at any time to turn it off, if required.

### Bump Speed/RPM

The "Resume/Inc & Set/Dec" buttons on the Joystick can be used in various control modes to Bump Speed Up & Down:

- RPM Raise
- All 3 Cruise Control modes
- Hand Throttle &
- Joystick Target Speed.

Press Cruise Cancel to reset adjustments.

### Section Control

Turn Off boom sections with a Swipe gesture on the 12" Home Screen display. Swipe your finger over boom sections to be turned On or Off as required.

## External G-Hub

### Restrict Main Fill

Press & hold the "Fill Product" button for 2 seconds to 'half close' the Main Fill valve & restrict the fill line to create back pressure for:

- Filling the rinse tank
- Using the AUX outlet &
- Using Rinse function of the Induction hopper.

### Tank Rinse Modes

Press the 'Rinse nozzle' button for 2 seconds to turn On the Tank Rinse nozzles from the Main Product pump rather than the Fill Pump circuit

### RPM Raise Bump

Press the 'RPM Raise Up & Down' buttons when the automatic RPM Raise is active for either the Product pump or Fill pump to Bump speed Up or Down as required

### Fill Favourite Volume

Select a Desired Fill Volume, then press & hold 'Fill Vol' button to lock it into memory as a favourite Fill volume.

Tapping the 'Fill Vol' button will change the Target Tank Volume between the Favourite value and Max Usable Tank volume.

### Faults/Diagnostics

Press & hold the 'Clean page' button on the 5" Display to access all Fault and Diagnostics display pages.



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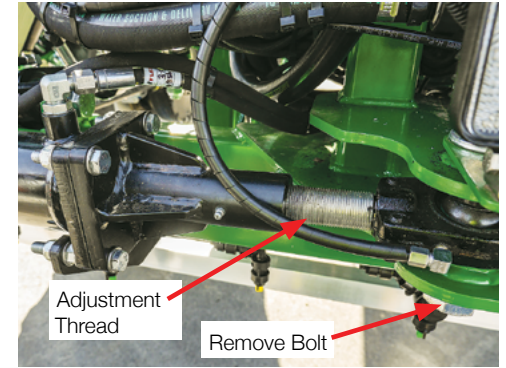
Goldacres Paralift Rear connection to the boom.



On level ground, engage the Park Brake, chock wheels & have the boom in its working position before making adjustments.



'Smiling Forward' on a 36m boom.



Detach the end of the fold cylinder from the boom pivot to adjust the 1st wing section forward.

## Boom Settings & Adjustments

Boom Settings & Adjustments include:

- 1 Smiling Forward Settings (36-42m).
- 1 Smiling Forward Settings (48m).
- 2 Tilt Angle Settings (36-42m).
- 2 Tilt Angle Setting (48m).
- 3 Yaw Alignment (36-42m).
- 3 Yaw Alignment (48m).
- 4 Yaw Hydraulic Pressure (36-42m).
- 4 Yaw Hydraulic Pressure (48m)
- 5 Bi-Fold Breakaway Pressure (36-42m).
- 5 Bi-Fold Breakaway Pressure (48m)
- 6 Three-Way Tip Breakaway.
- 7 Test Folding the Boom.
- 8 Boom Centre Levelling.

### Before Making Boom Adjustments:

- Park the sprayer on a flat level surface with the parking brake engaged & wheels chocked.
- Place the boom in its working (unfolded) position.

### 1 Smiling Forward Setting (36-42m Booms)

The wings of the 36m & 42m booms comprise two sections and a breakaway end. The first and second sections are adjusted forward at the inner pivot points.

### To Adjust the First Section of the RH Wing:

- 1 Follow the 'Before Making Boom Adjustments' instruction on this page.
- 2 The first wing section adjustment should bring outer end of the section 50 mm forward of the centre section.  
A string line can be used as a guide. Alternatively, it may be helpful to observe the boom from underneath as the bottom chords are 50 mm wide all along the section and provide a visual reference for the forward offset.
- 3 The first wing section of the smiling forward adjustment is made by rotating the rose end adjuster thread of the fold cylinder at pivot A (see illustration next page). Loosen and remove the 1" bolt, nuts and washers attaching the fold cylinder to the boom pivot.

### CAUTION

Before adjusting the boom alignment, the hydraulic fold and bi-fold circuit must be free of air. Hydraulic circuits that contain air can make the boom appear that it is too far forward.

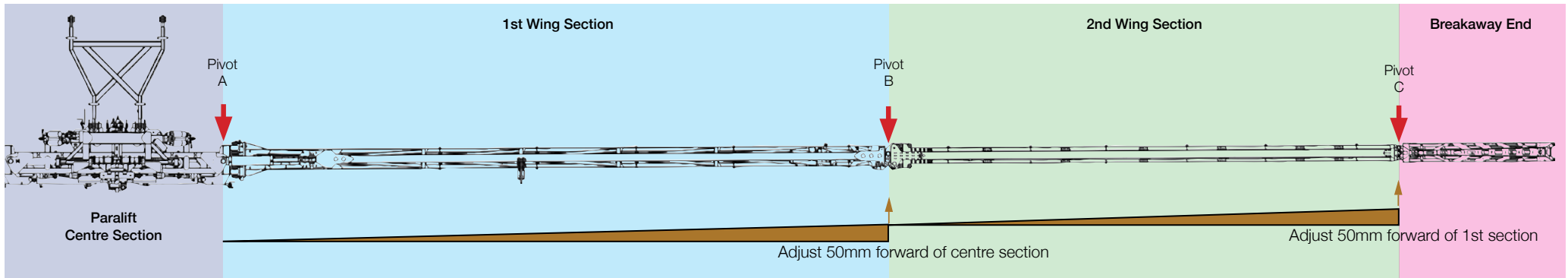
Adjustment of the boom without "bleeding" the hydraulic circuit first will result in a boom that becomes misaligned after a short period of use. .

### NOTE

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

### CAUTION

When making adjustment to the wing fold cylinders, it is strongly recommended to use the help of a 2nd person to hold the boom wing in position especially when removing the 1" bolt attaching fold cylinders - for both safety and ease of making the adjustments.



36 metre Boom: Plan view of right hand side boom wing & the 'Smiling Forward' adjustment points (Pivot A & B).

- 4 Rotate the rose end counter-clockwise to lengthen the cylinder and push wing section forward.  
After adjustment has been made, replace the bolt in the rose end & boom pivot without the nut and check the adjustment.
- 5 Repeat steps 2 and 3 until correct adjustment is achieved.
- 6 Once the correct adjustment is achieved, replace the bolt, washer & nut and retighten.

## To Adjust the Second Section of the RH Wing:

- 1 The second wing section adjustment brings the outer end of the section 50 mm forward of the first section. The adjustment is set using the stopper bolts and Bi-Fold cylinder rod adjustment.  
Loosen the lock nut on the stopper bolts using a spanner.
- 2 Rotate the stopper bolt either in or out with a spanner until the correct boom adjustment is made.

- 3 Loosen the lock nut on the fold cylinder clevis.
- 4 Rotate the fold cylinder shaft with a spanner so the boom is pulled hard onto its stopper. Tighten the fold cylinder but do not lift the breakaway cylinder base rose end off its hexagon bolt head stop.
- 5 Re-tighten the lock nut on the fold cylinder clevis.
- 6 Re-tighten the lock nut on the stopper bolt.

## To Adjust the First Section of the LH Wing:

Repeat the procedure for the right wing.

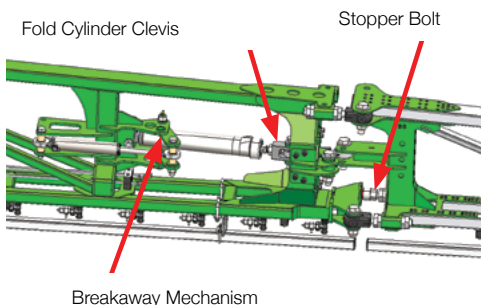
## To Adjust the Second Section of the LH Wing:

Repeat the procedure for the right wing.

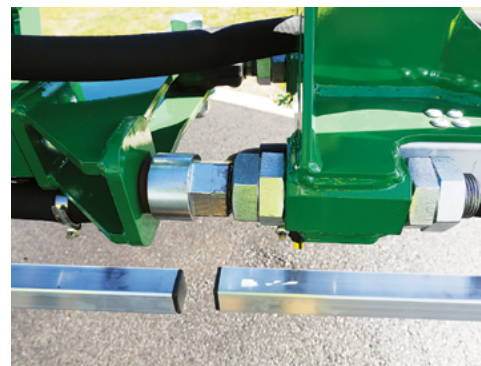
### NOTE

The boom should be adjusted as firm as possible against its stopper without engaging the breakaway mechanism (without lifting the breakaway cylinder base clevis off its hexagon bolt head stop).

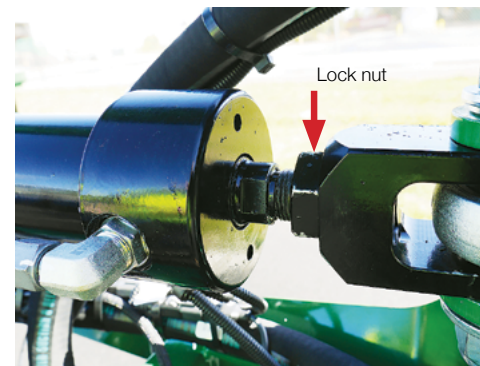
At Pivot B: Adjust the stopper bolt to bring the 2nd wing section forward, then adjust the fold cylinder clevis.



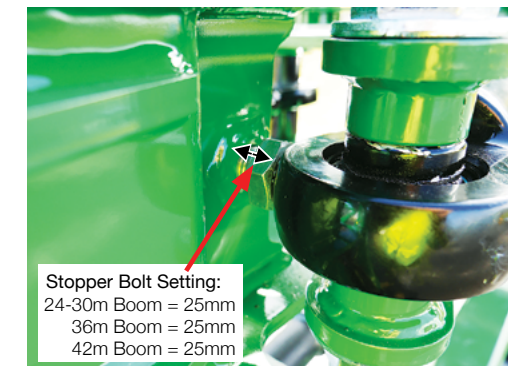
Loosen the locknut & rotate the stopper bolt in or out until the correct forward-adjustment is made.



Loosen clevis locknut and rotate the fold cylinder shaft to bring the boom hard onto its stopper.

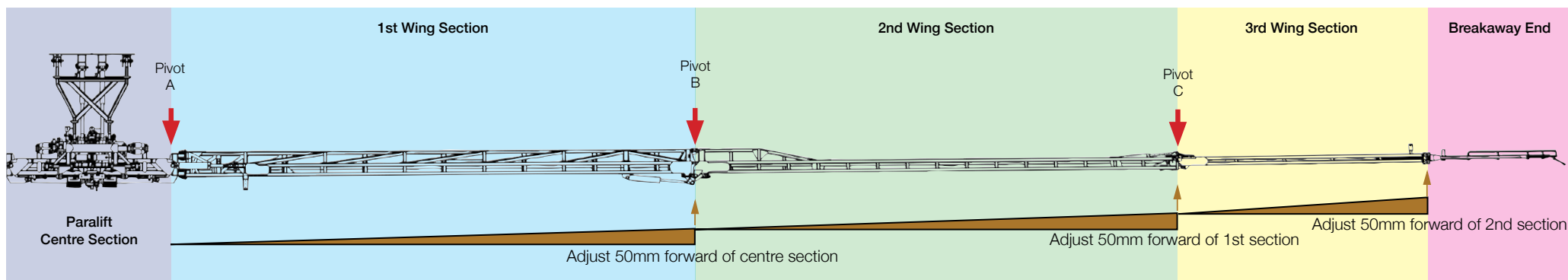


Tighten the fold cylinder but do not lift the breakaway cylinder base clevis off the hexagon bolt head stop.



Stopper Bolt Setting:  
24-30m Boom = 25mm  
36m Boom = 25mm  
42m Boom = 25mm





48 metre Boom: Plan view of right hand side boom wing & the 'Smiling Forward' adjustment points (Pivot A, B & C).

## 1 Smiling Forward Setting (48m)

The wings of the 48m boom comprise three sections and a breakaway end. The first, second & third sections are adjusted forward at the inner pivot point.

### To adjust the first section of the RH wing:

- 1 Follow the 'Before Making Boom Adjustments' instruction.
- 2 The first wing section adjustment should bring outer end of the section 50 mm forward of the centre section.

A string line can be used as a guide. Alternatively, it may be helpful to observe the boom from underneath as the bottom chords are 50 mm wide all along the section and provide a visual reference for the forward offset.

The first wing section of the smiling forward adjustment is made by adding or removing shim plates mounted on the centre section at pivot A.

- 3 Loosen and remove two top bolts, nuts and washers holding the fold ram and dampers together.
- 4 Loosen the two lower bolts, nuts and washers but do not remove them as the shim plates require them to rest on.

- 5 Insert or remove shims by trial and error until the 50 mm forward setting is achieved.  
The two open slots in the shim plates should be facing downward when inserted to sit on the loosened but not fully removed bolts.
- 6 Once the correct adjustment is achieved, replace and tighten all nuts, bolts and washers (18 & 19mm spanner/socket).

The first wing section 'Smiling Forward' adjustment is made by adding or removing shim plates.



Loosen and remove the top 2 bolts, nuts & washers.



Face the open slot of the shims downwards.





*Top stopper.*



*Lower stopper.*



*Damper stopper bolt.*

## To Adjust the Second Section of the RH Wing:

- 1 The second wing section adjustment brings the outer end of the section 50 mm forward of the first section. The adjustment is set using using two stopper bolts and a catch at pivot B.
- 2 Loosen the lock nut on the stopper bolt using a spanner.  
Then, back the stoppers off so that they are not touching the second stage.

- 3 The catch position should be extended or retracted to place the end of the second section 50 mm in front of the end of the first section.  
Loosen the lock nut on the catch on the side to be shortened and tighten the nut on the side to be lengthened.
- 4 Once the catch is in the desired position, wind out the upper and lower stoppers to touch the second stage.  
Check that the catch hooks are just barely touching to ensure smooth operation of the mechanism.
- 5 When the setting is correct, re-tighten the lock nuts on the stoppers.

## To Adjust the Third Section of the RH Wing:

- 1 The third wing section adjustment brings the outer end of the section 50 mm forward of the second section. The adjustment is set using using the stopper bolt on the end of the damper at pivot C.  
Loosen the lock nut on the stopper.
- 2 Wind the stopper out to push the third stage forward or wind it in to let it come backwards.

- 3 Once the position is correctly adjusted, re-tighten the lock nut on the stopper.

## To adjust the sections of the LH wing:

Repeat the procedure for the right wing.

## To adjust the second section of the LH wing:

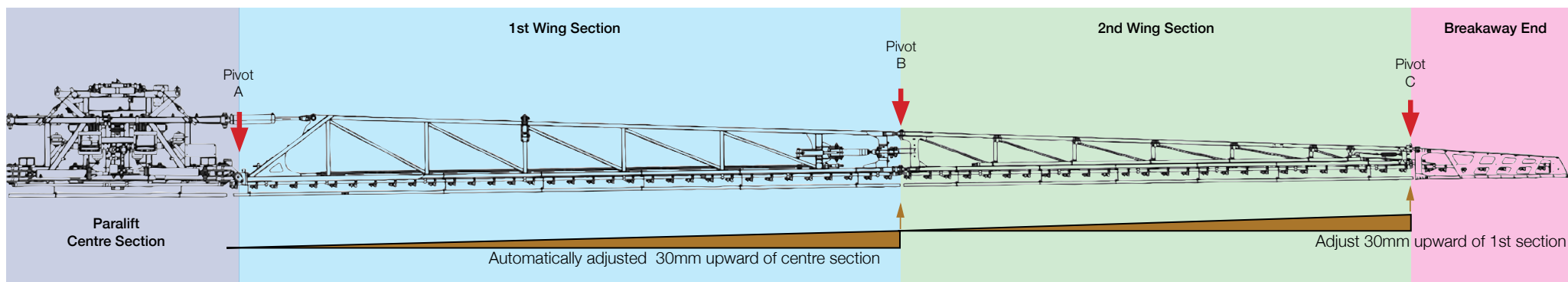
Repeat the procedure for the right wing.

## To adjust the third section of the LH wing:

Repeat the procedure for the right wing.

## NOTE

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



36 metre Boom: Rear view of right hand side boom wing & the Tilt Angle adjustment points (Pivot A & B).

## 2 Tilt Angle Setting (36-42m)

The wings of the 36m & 42m booms comprise two sections and a breakaway end. The first & second wing sections are adjusted upward at the inner pivot point.

The first section tilt angle, at pivot A, is adjusted automatically by the boom control system and does not need to be manually adjusted.

A tilt sensor is present on the tilt cylinder pivot is used by the system to maintain the tilt level.

The second stage tilt angle is adjusted using the clevis joint threads at pivot B.

*The tilt angle of each 1st section is automatically controlled by a tilt sensor.*

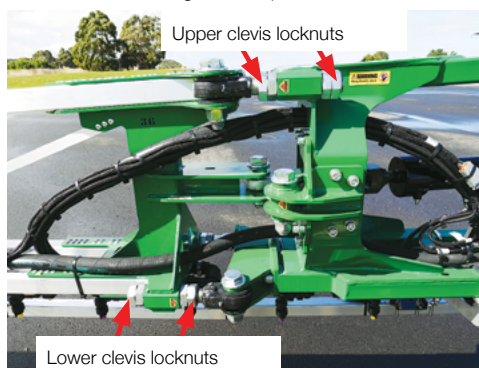


### To Adjust the Second Section of the RH Wing:

- 1 Follow the 'Before Making Boom Adjustments' instruction.
- 2 The second wing section adjustment brings the outer end of the section 30 mm upward of the first section. The adjustment made on the clevis joints of pivot B.

Loosen the locknuts on the upper and lower clevis joint threads.

*Adjust the upper & lower clevis joint threads to tilt the 2nd wing section upwards.*



- 3 Wind the top rose end closer to the first section to raise the second section.  
Wind the top adjuster away from the first section to lower the second section.  
Once the correct alignment is achieved, the second stage height must be checked and adjusted in the Bi-fold position.
- 4 Fold the boom into the Bi-fold position. The second stage should couple into the boom support saddle with minimal clearance to the base plate.

If the second boom section is too low, both the upper rose end & the lower rose end must be lengthened by an equal amount.

If the second boom section is too high, both the upper rose end & the lower rose end must be shortened by an equal amount.

This will correct the height of the second stage boom in the Bi-fold position without effecting the working position.

- 5 Fold the boom into the working position to confirm correct alignment is still achieved.
- 6 On completion, re-tighten the locknuts on the upper and lower clevis joint threads.

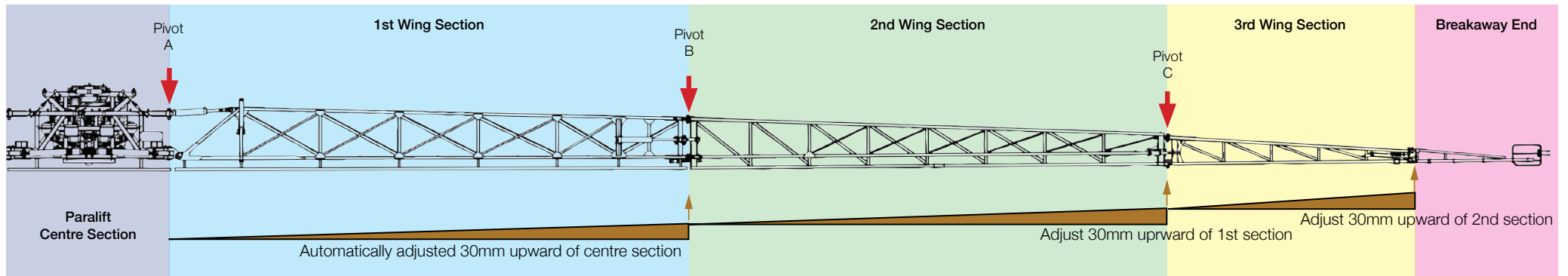
### To Adjust the Second Section of the LH Wing:

Repeat the above procedure for the left wing.

## NOTE

It is important that both wings are adjusted the same. If one wing is adjusted higher or lower than the other, the boom may not sit level.





48 metre Boom: Plan view of right hand side boom wing & the 'Tilt Angle' adjustment points (Pivot A, B & C).

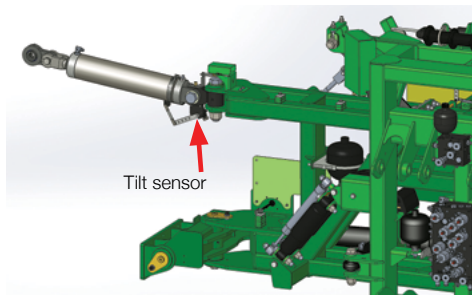
## 2 Tilt Angle Setting (48m)

The wings of the 48m boom comprise three sections and a breakaway end. The first, second & third sections are adjusted upwards at the inner pivot point.

The first section tilt angle, at pivot A, is adjusted automatically by the boom control system and does not need to be manually adjusted.

A tilt sensor present on the tilt cylinder pivot is used by the system to maintain the tilt level. The second stage tilt angle is adjusted using the clevis joint threads at pivot B.

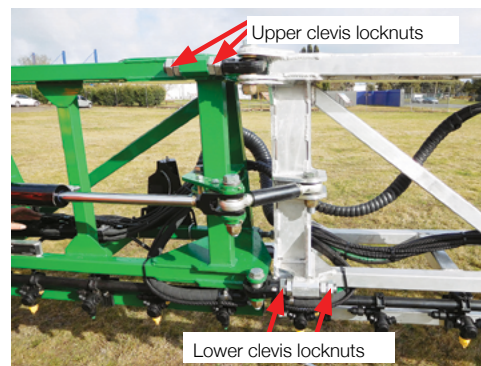
*The tilt angle of the 1st section is automatically controlled by the tilt sensor.*



### To Adjust the Second Section of the RH Wing:

- 1 Follow the 'Before Making Boom Adjustments' instruction.
- 2 The second wing section adjustment brings the outer end of the section 30 mm upward of the first section. The adjustment made on the clevis joints of pivot B. Loosen the locknuts on the upper and lower clevis joint threads.
- 3 Wind the top rose end closer to the first section to raise the second section. Wind the top adjuster away from the first section to lower the second section.

*Adjust the upper & lower clevis joint threads to tilt the 2nd wing section upwards.*



Once the correct alignment is achieved, the second stage height must be checked and adjusted in the Bi-fold position.

- 4 Fold the boom into the Bi-fold position. The second stage should couple into the boom support saddle with minimal clearance to the base plate. If the second boom section is too low, both the upper rose end & the lower rose end must be lengthened by an equal amount. If the second boom section is too high, both the upper rose end & the lower rose end must be shortened by an equal amount. This will correct the height of the second stage boom in the Bi-fold position without effecting the working position.
- 5 Fold the boom into the working position to confirm correct alignment is still achieved.
- 6 On completion, re-tighten the locknuts on the upper and lower clevis joint threads.

### NOTE

It is important that both wings are adjusted the same. If one wing is adjusted higher or lower than the other, the boom may not sit level.

### To Adjust the Second Section of the LH Wing:

Repeat the above procedure for the left wing.

### To Adjust the Third Section of the RH Wing:

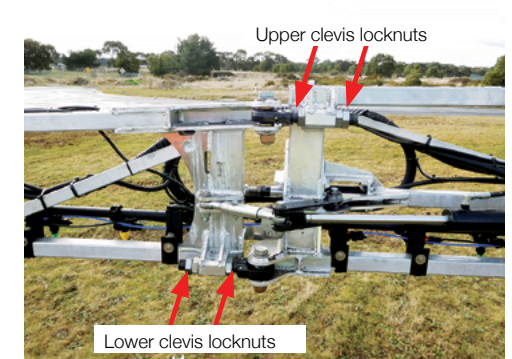
The third wing section adjustment brings the outer end of the section 30 mm upward of the second section. The adjustment made on the clevis joints of pivot C.

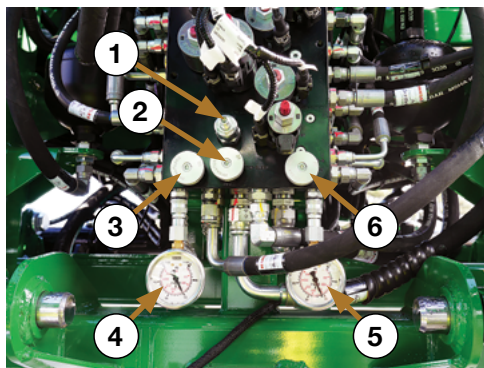
Repeat the steps of the second section.

### To Adjust the Third Section of the LH Wing:

Repeat the above procedure for the left wing.

*Adjust the upper & lower clevis joint threads to tilt the 3rd wing section upwards.*





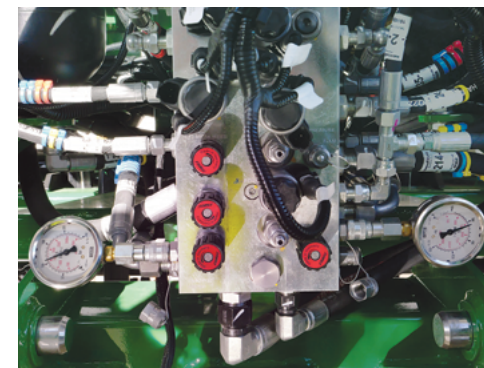
The hydraulic manifold on the centre section (24-42m booms).

- 1 Pressure Reducing Valve
- 2 Yaw Bleed Valve
- 3 Yaw A Valve
- 4 Test Port/Pressure Gauge Yaw A
- 5 Test Port/Pressure Gauge Yaw B
- 6 Yaw B Valve

Identification of items on the hydraulic block (shown left).



Move the boom by hand to adjust the Yaw Alignment.



Ensure the pressure gauges are fitted to the Yaw test ports of the hydraulic cylinder block.

### 3 Yaw Alignment (36-42m)

The boom should be positioned parallel to the rear of the sprayer chassis. To check Yaw Alignment, measure the exposed cylinder rods on both the left & right Yaw hydraulic cylinders.

Each cylinder rod extension should be the same if the boom is running parallel to the end of the chassis.

#### To Adjust the Yaw Alignment:

- 1 Follow the 'Before Making Boom Adjustments' instruction.
  - 2 The boom yaw is controlled by a pair of hydraulic cylinders & accumulators.
- Loosen the locknuts, then wind out (counterclockwise) both 'Yaw A' and 'Yaw B' valves (shown above 3 & 6) until fully open.

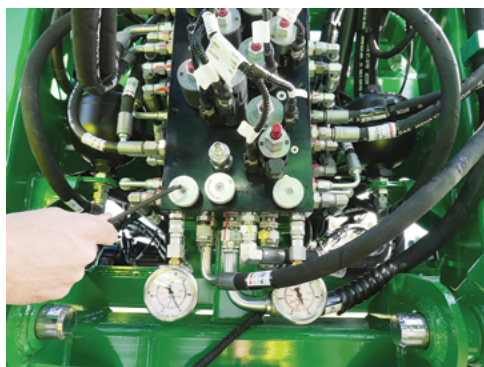
- 3 Move the boom by hand until it is sitting perpendicular to the chassis line of the machine - Each Yaw cylinder rod extension must be the same.
  - 4 Wind in (clockwise) both both 'Yaw A' and 'Yaw B' valves (shown above 3 & 6) to until fully closed, then tighten the locknuts.
- The default Aligned Yaw position is now set.

### 3 Yaw Alignment (48m)

The boom should be positioned parallel to the rear of the sprayer chassis. To check Yaw Alignment, measure the exposed cylinder rods on both the left & right Yaw hydraulic cylinders.

Each cylinder rod extension should be the same if the boom is running parallel to the end of the chassis.

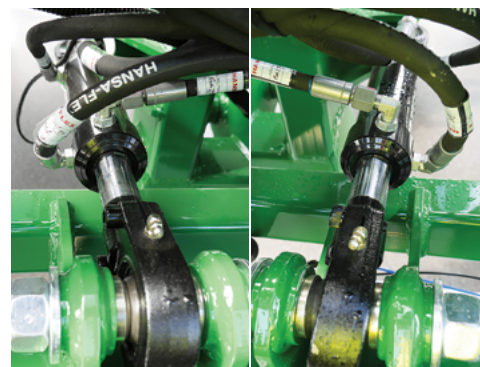
Wind out the Yaw valve A until fully open.



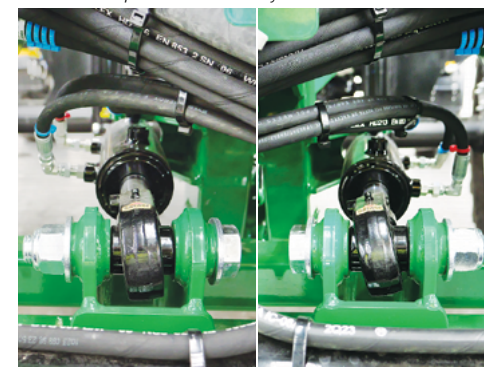
Wind out the Yaw valve B until fully open.



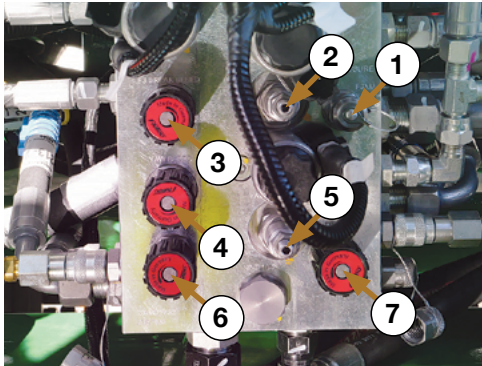
Exposed cylinder rod (on both left & right hand Yaw cylinders) must be the same.



Two Yaw hydraulic cylinders (located on the boom centre section) & an accumulator form the independent pressurised Yaw hydraulic circuit.



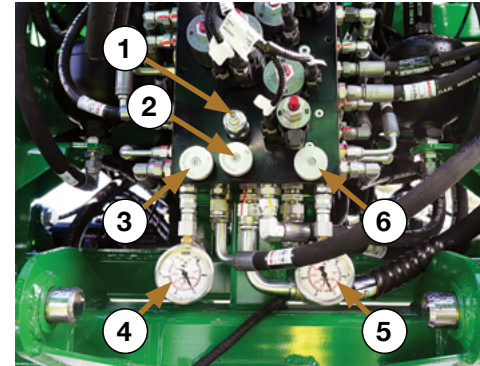




Hydraulic Manifold Valve Identification (48m boom).

- 1 Fold 3 Pressure Test
- 2 Fold 3 Pressure Reducing Valve
- 3 Fold 3 Bleed Valve
- 4 Yaw Bleed Valve
- 5 Yaw Pressure Reducing Valve
- 6 Yaw A Valve
- 7 Yaw B Valve

Manifold Valve Identification (valves shown left).



The hydraulic manifold on the centre section (36-42m booms).

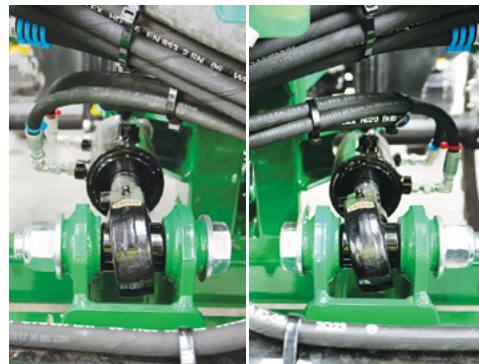
- 1 Pressure Reducing Valve
- 2 Yaw Bleed Valve
- 3 Yaw A Valve
- 4 Test Port/Pressure Gauge Yaw A
- 5 Test Port/Pressure Gauge Yaw B
- 6 Yaw B Valve

### To Adjust the Yaw Alignment:

- 1 Follow the 'Before Making Boom Adjustments' instruction.
- 2 The boom yaw is controlled by a pair of hydraulic cylinders & accumulators.
- 3 Ensure the pressure gauges are fitted to the hydraulic manifold yaw test ports (shown below).
- 4 Open (wind-out counterclockwise) both 'Yaw A' and 'Yaw B' valves (shown above 6 & 7) until fully open.
- 3 Move the boom by hand until it is sitting perpendicular to the chassis line of the machine - Each Yaw cylinder rod extension must be the same.

- 4 Close (wind-in clockwise) both 'Yaw A' and 'Yaw B' valves (shown above 6 & 7) to until fully closed.
- The default Aligned Yaw position is now set.

Exposed cylinder rod (on both left & right hand Yaw cylinders) must be the same.



### 4 Yaw Hydraulic Pressure (36-42m)

The Yaw Hydraulic Pressure controls the Yaw suspension

Two hydraulic cylinders and accumulators are charged with hydraulic pressure and closed off creating a closed circuit for the yaw suspension.

The base end of each yaw cylinder is connected to the rod end of the opposite cylinder with one nitrogen charged (70 bar) accumulator connected separately to each.

When the rod end of one cylinder compresses, it causes the base end of the opposite cylinder to extend and vice versa.

The accumulators help dampen movement & keep the boom centred.

Three valves are normally closed to create a closed circuit so oil movement is restricted to the precharged pressure in the accumulator.

The precharged pressure restricts the ease of boom yaw movement away from the centered position. This pressure needs to be monitored and maintained.

Pressure gauges on the manifold display the closed loop hydraulic yaw pressures.

If set too high the boom centre damping will be too stiff and the boom will be prone to damage under normal operating conditions.

If set too low the boom will move too easily and not return to centre properly - making booms more vulnerable to damage.



**NOTE**

If the pressure is too high then wind out (counter clockwise) the 'Yaw Bleed' valve to reduce it in addition to the pressure reducing valve. Then, close the 'Yaw Bleed' valve and check the maximum pressure achieved again.

Pressure will not decrease on the gauge if only the pressure reducing valve is wound out.



Adjust the Yaw Pressure with the Pressure Reducing Valve (24 to 42m booms).

### To Set the Yaw Hydraulic Pressure:

The Hydraulic Yaw Pressure determines the effective stiffness of the Yaw damping.

Pressure gauges capable of reading up to 3000 PSI are fitted to the Yaw Test Ports (4 & 5 above) of the hydraulic manifold.

- 1 Follow the 'Before Making Boom Adjustments' instruction.
- 2 Check that the test port gauges are fitted to the test ports 'Yaw A' and 'Yaw B'.
- 3 Loosen the locknuts and wind out (counterclockwise) both 'Yaw A' (3) & 'Yaw B' (6) valves to open them fully.

The Yaw bleed (2) must be fully closed (clockwise).

**NOTE**

When the hydraulic yaw system is installed or any components are replaced, the closed loop hydraulic circuit needs to be bled of any air:

- The maximum pressure needs to be reset
- The system re-charged and
- The booms re-aligned.

- 4 The hydraulic system will build pressure when a boom function is activated.  
Preferably engage 'Stage 1 Fold' OUT as the boom is already folded out and will not move in a hazardous way.
- 5 Once pressure has built up fully, use the Pressure Reducing Valve (1 above left) to set it higher or lower as necessary.

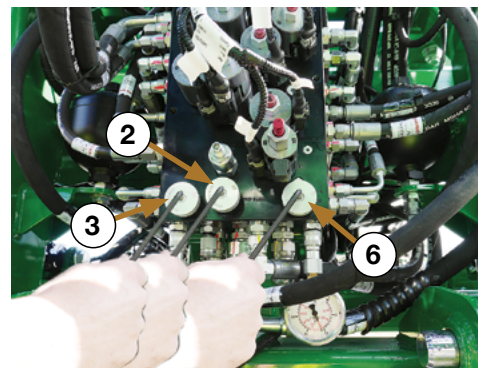
Loosen the lock nut, then:

- Wind in (clockwise) - to increase pressure or
- Wind out (counterclockwise) - to decrease pressure.

Target pressure for:

- 36m boom is 103 Bar (1500 psi)
- 42m boom is 117 Bar (1700 psi)

- 6 Re-tighten the lock nut of the pressure reducing valve once correct pressure is achieved.
- 7 Close (wind-in clockwise) both 'Yaw A' (3) & 'Yaw B' (6) valves until fully closed, then tighten the locknuts.



Fully open the Yaw Bleed' (2), 'Yaw A' (3) & 'Yaw B' (6) valves to purge air from the circuit.

### To Purge Air from the Yaw Hydraulic Circuit:

This procedure is typically only necessary when the hydraulic Yaw circuit has been opened, such as when replacing a component eg, a hose or fitting.

- 1 Follow the 'Before Making Boom Adjustments' instruction.
- 2 Loosen the locknuts and wind out (counterclockwise) the 'Yaw Bleed' (2), 'Yaw A' (3) & 'Yaw B' (6) valves until fully open.
- 3 Start the engine, then move the boom around by hand for a minute or so to help force air out of the hydraulic Yaw circuit.

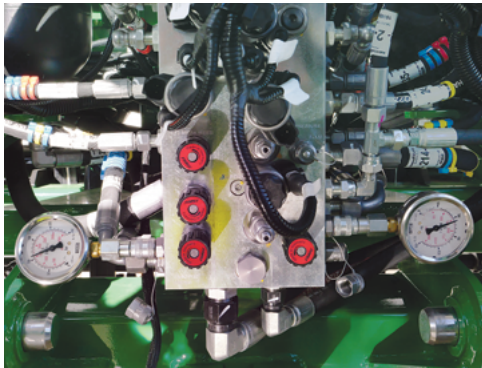


Move the boom fore & aft to purge air from the Yaw hydraulic circuit.

- 4 Wind in (clockwise) the 'Yaw Bleed' (2), 'Yaw A' (3) & 'Yaw B' (6) valves until fully closed, then tighten the locknuts.
- 5 Finally, re-adjust both Yaw Alignment and Yaw pressure - for instructions see previous pages.

**NOTE**

If the pressure is too high then wind out (counterclockwise) the 'Breakaway bleed' valve to reduce it in addition to the pressure reducing valve. Then, close the 'Breakaway bleed' valve and check the maximum pressure achieved again. Pressure will not decrease on the gauge if only the pressure reducing valve is wound out.



Ensure the test port pressure gauges are fitted to the Yaw test ports of the 48m boom hydraulic manifold.

## 4 Yaw Hydraulic Pressure (48m)

The Yaw Hydraulic Pressure controls the Yaw suspension

Two hydraulic cylinders and accumulators are charged with hydraulic pressure and closed off creating a closed circuit for the yaw suspension.

The base end of each yaw cylinder is connected to the rod end of the opposite cylinder with one nitrogen charged (70 bar) accumulator connected separately to each.

When the rod end of one cylinder compresses, it causes the base end of the opposite cylinder to extend and vice versa.

The accumulators help dampen movement & keep the boom centred.

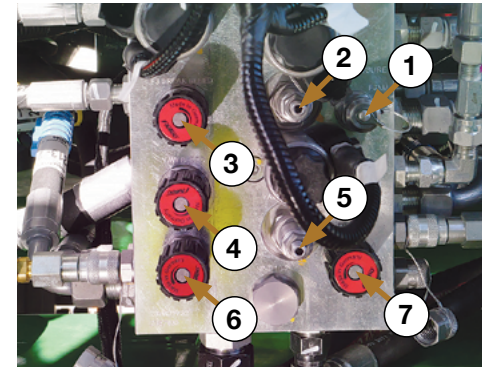
Three valves are normally closed to create a closed circuit so oil movement is restricted to the precharged pressure in the accumulator.

The precharged pressure restricts the ease of boom yaw movement away from the centered position. This pressure needs to be monitored and maintained.

Pressure gauges on the manifold display the closed loop hydraulic yaw pressures.

If set too high the boom centre damping will be too stiff and the boom will be prone to damage under normal operating conditions.

If set too low the boom will move too easily and not return to centre properly - making booms more vulnerable to damage.



Hydraulic Manifold Valve Identification (48m boom).

## To Set the Yaw Hydraulic Pressure:

The Hydraulic Yaw Pressure determines the effective stiffness of the Yaw damping.

Pressure gauges capable of reading up to 3000 PSI are fitted to the Yaw Test Ports (6 & 7 above) on the hydraulic manifold.

- 1 Follow the 'Before Making Boom Adjustments' instruction.
- 2 Ensure the test port gauges are fitted to the test ports for 'Yaw A' and 'Yaw B'.
- 3 Open (wind-out counterclockwise) both 'Yaw A' (6) & 'Yaw B' (7) valves to open them fully.  
The Yaw Bleed valve (4) must be fully closed (clockwise).
- 4 The hydraulic system will build pressure when a boom function is activated.

Preferably engage 'Stage 1 Fold' OUT as the boom is already folded out and will not move in a hazardous way.

- 1 Fold 3 Pressure Test Port
- 2 Fold 3 Pressure Reducing Valve
- 3 Fold 3 Bleed Valve
- 4 Yaw Bleed Valve
- 5 Yaw Pressure Reducing Valve
- 6 Yaw A Valve
- 7 Yaw B Valve

Manifold Valve Identification (valves shown left).

- 5 Once pressure has built up fully, use the Yaw Pressure Reducing Valve (5 above left) to set it higher or lower as necessary.

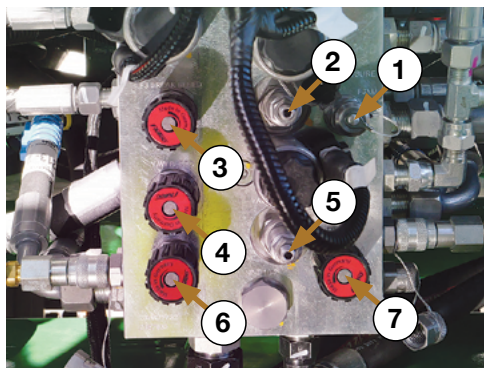
Loosen the lock nut, then:

- Wind in (clockwise) - to increase pressure or
- Wind out (counterclockwise) - to decrease pressure.

Yaw target pressure for the 48m boom is 117 Bar (1700 psi).

- 6 Re-tighten the lock nut of the pressure reducing valve once correct pressure is achieved.
- 7 Close (wind-in clockwise) both 'Yaw A' (6) & 'Yaw B' (7) valves until fully closed.





Hydraulic Manifold Valve Identification (48m boom).

- 1 Fold 3 Pressure Test Port
- 2 Fold 3 Pressure Reducing Valve
- 3 Fold 3 Bleed Valve
- 4 Yaw Bleed Valve
- 5 Yaw Pressure Reducing Valve
- 6 Yaw A Valve
- 7 Yaw B Valve

Manifold Valve Identification (valves shown left).

### To Purge Air from the Yaw Hydraulic Circuit:

This procedure is typically only necessary when the hydraulic Yaw circuit has been opened, such as when replacing a component eg, a hose or fitting.

- 1 Follow the 'Before Making Boom Adjustments' instruction.
- 2 Open (wind-out clockwise) the Yaw Bleed' (4), 'Yaw A' (6) & 'Yaw B' (7) valves until fully open.
- 3 Start the engine, then move the boom around by hand for a minute or so to help force air out of the hydraulic Yaw circuit.

- 4 Close (wind-in clockwise) the 'Yaw Bleed Valve' (4), 'Yaw A' (6) & 'Yaw B' (7) valves until fully closed.
- 5 Finally, re-adjust both Yaw Alignment and Yaw pressure - for instructions see previous pages.

### NOTE

If the pressure is too high then wind out (counterclockwise) the 'Breakaway bleed' valve to reduce it in addition to the pressure reducing valve. Then, close the 'Breakaway bleed' valve and check the maximum pressure achieved again. Pressure will not decrease on the gauge if only the pressure reducing valve is wound out.



Check rubber bumpers for wear. Replace if worn.

### Paralift Rubber Bumpers

Overall Yaw travel is limited by rubber bumpers mounted on the Paralift boom centre section.

If the boom centre section yaws excessively, the centre section will come into contact with the bumpers which will cushion the travel by collapsing the blocks. If the blocks collapse totally, the yaw travel will be stopped.

If the boom is excessively & continually yawed, the bumpers will wear out and require replacement.

Identification of items on the Bi-fold hydraulic manifold (shown right).

- 1 To Breakaway Cylinder B
- 2 Accumulator 0.5L (70 bar)
- 3 To Breakaway Cylinder A
- 4 Gauge Test Port
- 5 Breakaway Pressure Reducing Valve
- 6 Tank (outlet)
- 7 Pressure (inlet)
- 8 Pressure Bleed Valve
- 9 Breakaway Return Speed Valve



Remove the cap & attach a pressure gauge to the Gauge Test Port (4).

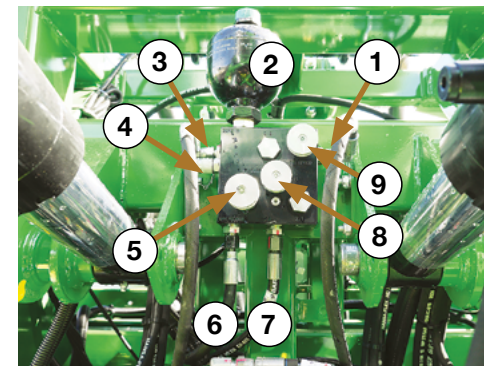
### 5 Bi-Fold Breakaway Pressure Adjustment (36-42m)

Breakaway cylinders are fitted to the stage two Bi-fold mechanism on 36-42 metre booms. Oil in these circuits flows through the hydraulic block mounted on the back of the boom centre section.

The hydraulic breakaway pressure setting determines the effective stiffness of the breakaway damping and return force.

Remove one of the Yaw pressure gauges and attach it to the test port 'BR MP' on the block.

The Hydraulic Bi-fold manifold on the boom centre section (24 to 42m booms).







Loosen the locknut and adjust the pressure with the Pressure Reducing Valve (8) (24 to 42m booms).

## To Set the Bi-Fold Breakaway Pressure:

- 1 Follow the 'Before Making Boom Adjustments' instruction.
- 2 Remove the cap and attached to the pressure gauge to the Gauge Test Port (4).
- 3 The 'Breakaway Bleed Valve' (8) must be fully closed (clockwise).
- 4 The hydraulic system will build pressure when a function is activated.  
Preferably engage 'Stage 1 Fold' OUT as the boom is already folded out and will not move in a hazardous way.
- 5 Once pressure has built up fully, use the Pressure Reducing Valve (5) to set the pressure higher or lower as necessary.

### NOTE

Setting the Bi-Fold Breakaway Pressure is a 2 person job - one person is required to hold the boom fold-out switch to keep the circuit pressurised while the another person adjusts the pressure.



Loosen the locknut and adjust the breakaway return speed with the Breakaway Speed Valve (9).

Loosen the lock nut, then wind the Pressure Reducing Valve (5):

- IN to increase pressure or wind it
- OUT to decrease pressure.

Target pressure for:

- 24 metre boom is 100 Bar
- 30 metre boom is 100 Bar
- 36 metre boom is 100 Bar
- 42 metre boom is 115 Bar.

### CAUTION

DO NOT operate the Cruiser with the Breakaway Speed Valve fully closed. The valve must be positioned at least one (1) turn open.

If the Breakaway Speed Valve is fully closed when operating, excess stresses will hit the boom structure eventually causing structural failure.



Pressure gauge located on the F2MAC Port (48m).

## 5 Bi-Fold Breakaway Pressure Adjustment (48m)

Breakaway cylinders are fitted to the 2nd & 3rd stage Bi-fold mechanisms on the 48m metre boom. Oil in these circuits flows through the hydraulic block mounted on the back of the boom centre section.

The hydraulic breakaway pressure settings determine the effective stiffness of the breakaway damping and return force.

Yaw pressure gauges are removed and attached to pressure ports on the block to set the pressures:

- F2MAC Port	134 Bar (2000psi)
- F3MC Port	134 Bar (2000psi)
- F2MBC Port	134 Bar (2000psi)
- M3 MX	104 Bar (1500psi)

### DANGER

When pressure adjustments are required for the bi-fold breakaway hydraulic circuits, ensure to consult with your Goldacres dealer and use a trained hydraulic service person.

Failure to follow these instructions may result in severe injury.



Pressure gauge located on the F3MC Port (48m).

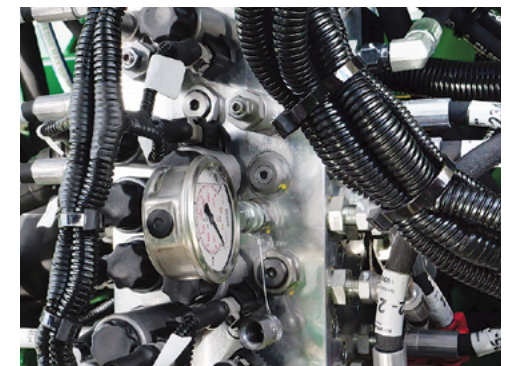
## To Set the Bi-Fold Breakaway Pressure:

The Bi-Fold Breakaway Pressures of the 48m boom are factory set and generally does not require re-adjustment.

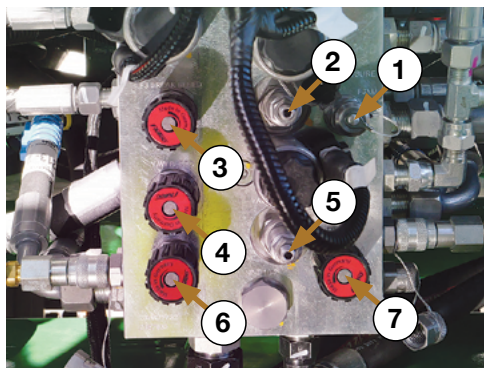
If problems occur with the Bi-Fold pressure settings, it is recommended to consult with your Goldacres dealer to trouble shoot and reset any pressures if required.

Adjustment for such pressure settings must be undertaken by a trained hydraulic service person.

Pressure gauge located on the F2MBC Port (48m).







Hydraulic Manifold Valve Identification (48m boom).

- 1 Fold 3 Pressure Test Port
- 2 Fold 3 Pressure Reducing Valve
- 3 Fold 3 Bleed Valve
- 4 Yaw Bleed Valve
- 5 Yaw Pressure Reducing Valve
- 6 Yaw A Valve
- 7 Yaw B Valve

Manifold Valve Identification (valves shown left).

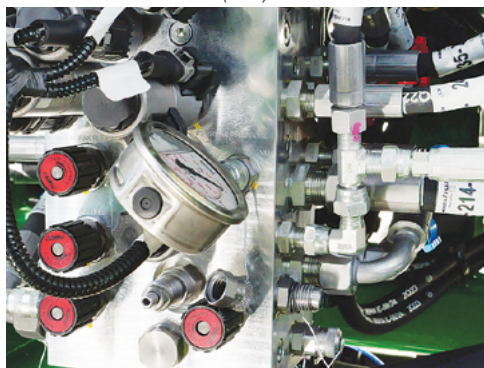
### To Purge Air from the Bi-Fold Breakaway Hydraulic Circuit:

This procedure is typically only necessary when the bi-fold breakaway hydraulic circuit has been opened, such as when replacing a component eg, a hose or fitting.

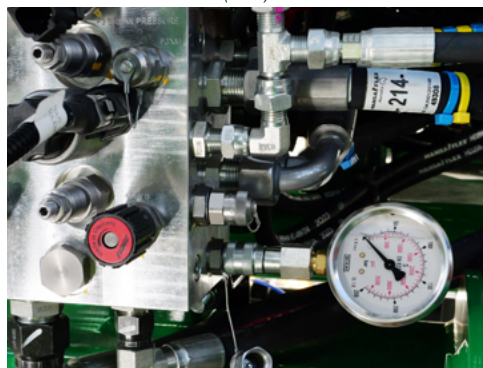
- 1 Follow the 'Before Making Boom Adjustments' instruction.
- 2 Open (wind-out anti-clockwise) the Fold 3 Bleed Valve' (3) valves until fully open.

- 3 Press & hold the Bi-Fold OUT push button in cabin to supply high pressure to the cylinders. Continue for 30 seconds.
- 4 Release the Bi-Fold OUT push button.
- 5 Close (wind-in clockwise) the Fold 3 Bleed Valve' (3) valves until fully open.

Pressure gauge located on the F3 Break Pressure Port (48m).



Pressure gauge located on the Pressure System Port (48m).



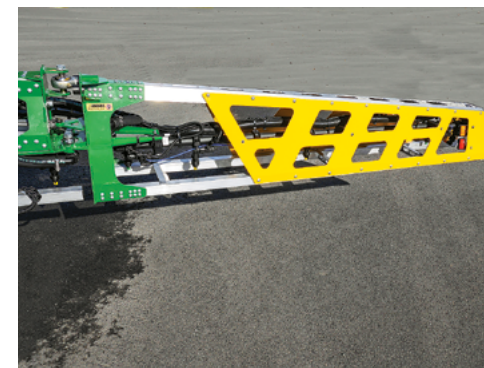
Check rubber bumpers for wear. Replace if worn.

### Paralift Rubber Bumpers

Overall Yaw travel is limited by rubber bumpers mounted on the Paralift boom centre section.

If the boom centre section yaws excessively, the centre section will come into contact with the bumpers which will cushion the travel by collapsing the blocks. If the blocks collapse totally, the yaw travel will be stopped.

If the boom is excessively & continually yawed, the bumpers will wear out and require replacement.



36-42m boom end with Three-Way Breakaway protection.

### 6 Three-Way Tip Breakaway

Each boom wing tip or end incorporates a three-way tip breakaway hinge which allows the wing tip to break-away:

- Forwards,
- Backwards and/or
- Upwards
- minimising possible damage to the boom should an obstacle be hit.

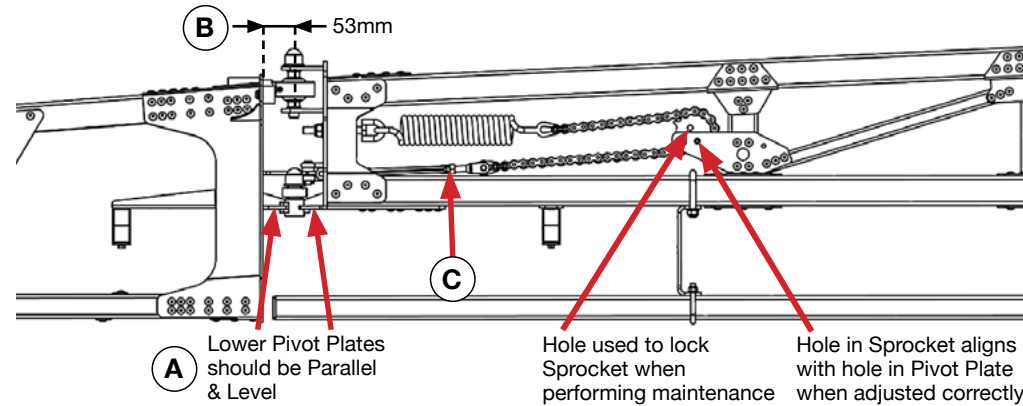
It is important the breakaway hinge is properly adjusted for operating (just tightening the spring does not facilitate the breakaway function).

Upwards Tip Breakaway function.





Close the ball valve on each lift cylinder for safety.



Adjust the turnbuckle to adjust spring tension as required.

## To Set-Up the Three-Way Tip Breakaway:

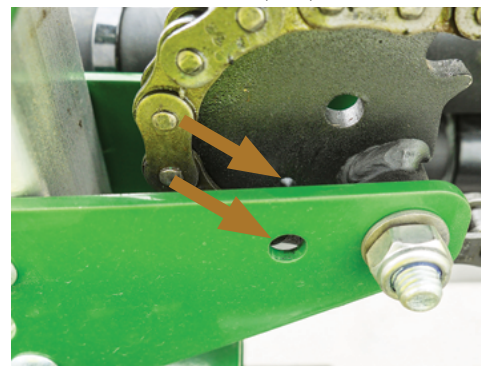
- 1 Follow the 'Before Making Boom Adjustments' instruction.
- 2 Lower the boom to a good working height fully opened (working position).
- 3 Close the ball valves on the two hydraulic lift cylinders for safety purposes.
- 4 The lower pivot plates need to be in line with each other (A).
- 5 If the rose end is removed for any reason, anti-seize should be applied to the thread before it is screwed into the boom tip.

The rose end should be screwed into the breakaway tip so that it measures 53 mm from the boom tip face plate to the centre of the rose end (B) or until correct vertical alignment is achieved.

- 6 The small hole in the sprocket must align with the hole in the side of the pivot plate. This is adjusted by tightening or loosening the turnbuckle (C).
- 7 The spring tension must be adjusted so there is a 1-2 mm gap between the coils. This applies the ideal amount of resistance when breaking away.

The spring tension can be adjusted by tightening or loosening the eye bolt.

The small hole in the sprocket must align with the hole in the side of the pivot plate.



## To Adjust the Turnbuckle:

- 1 Use an assistant to pull the boom wing tip back until the large hole in the sprocket aligns with the hole in the pivot side plate, then place a pin (such as a screwdriver) through the holes.
- 2 Have the assistant return the wing tip only enough to remove spring tension. Do not let the wing tip fully return, otherwise the chain may jump off its sprocket and cause injury.

With the boom tip pulled back, place a pin through the holes to hold the sprocket to adjust the turnbuckle.



- 3 Make adjustments to turnbuckle. Pull tip back and remove the pin. Release the tip and check alignment of small hole in sprocket with pivot plate.
- 4 Repeat previous steps until the small hole in the sprocket and hole in the side plate align.

## ⚠ DANGER

Adjusting the Turnbuckle is a 2 person job: Firstly, one person is required to pull the wing tip back while the other person places the pin. Secondly, one person must hold wing tip to just release the spring tension while the other person adjusts the turnbuckle. Do not let the wing tip fully return fully while making adjustment, otherwise the chain may jump off its sprocket and cause injury.





Rearwards Tip Breakaway function.



Forwards Tip Breakaway function.

## Maintenance

Several things are required to ensure that the breakaway will be functioning properly.

Two things are critical to the breakaway functioning correctly:

- The small hole in the sprocket must align with the hole in the side of the pivot plate, and
- The spring tension.

Check these on a regular basis and adjust as required.

The spring will stretch over time and will lose tension. Worn springs & chain should be replaced if there is insufficient tension on the spring to fully retract.

Lubricate the Three-Way Breakaway mechanism on a regular basis to ensure smooth & long lasting operation:

- **Oil** the sprocket pivot, chain and lower rose joints with a wet lubricant **every 8 hours**.
- **Grease** the upper rose joint **every 8 hours**.



Press & hold down the Boom Rest OUT rocker switch to unlock the LHS boom rest

## 7 Test-Folding the Boom

Test folding the boom is mandatory to check boom fold adjustments allow the boom to fold correctly (checking tilt angle, boom rest alignment & locks).

Test folding the boom involves:

- Firstly, manually operating the boom using the boom switches & joystick push buttons to calibrate the boom in the G-Hub Controller and
- Secondly, Test Folding the boom to check the automatic folding setting (36-42m & 48m booms).



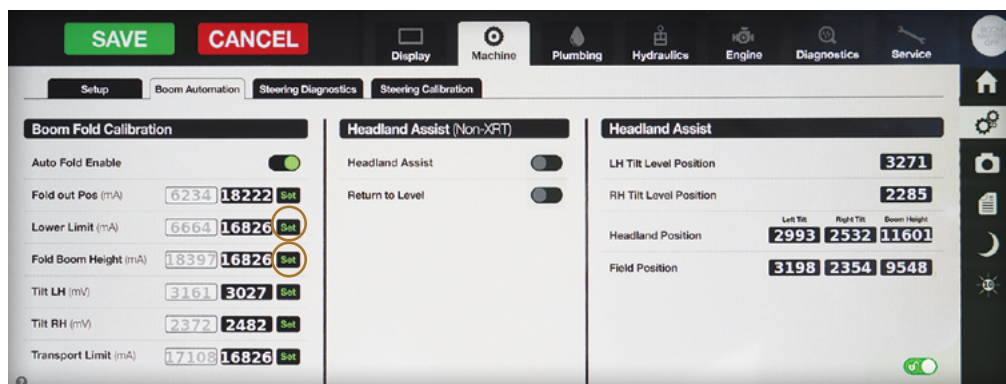
The left hand side Boom catch lifted.

## To Calibrate Boom Folding in G-Hub:

- 1 Follow 'Before Making Boom Adjustments' instruction at the beginning of this chapter.
- 2 With the engine running press & hold the OUT end of the Boom Rest rocker switch to fold the LH boom rest to its outermost position.







Press the 'Lower Limit (mA)' set touch button, then press the 'Fold Boom Height (mA)' set touch button to set the position values.

- 11 Press the Set touch button of the 'Lower Limit (mA)' and a new set value appears in the 'Lower Limit (mA)' display.
- 12 Press & hold the Boom Lift push button on the Joystick to raise the boom until it reaches full height, then release the push button.
- 13 Press the Set touch button of the 'Field Boom Height (mA)' and a new set value appears in the 'Boom height (mA)' display.
- 14 Press & hold the UP side of the Dual Tilt

Press & hold the 'Boom Lower' push button on the Joystick Controller to lower the boom to its lowest position, then press the 'Boom Lift' to raise the boom slightly.



rocker switch on the Joystick to tilt boom wings up approximately 5 degrees above horizontal - high enough to clear boom rests but low enough to avoid hitting the rear vision mirrors when folding into position. Release the rocker switch when the approximate desired tilt is reached.

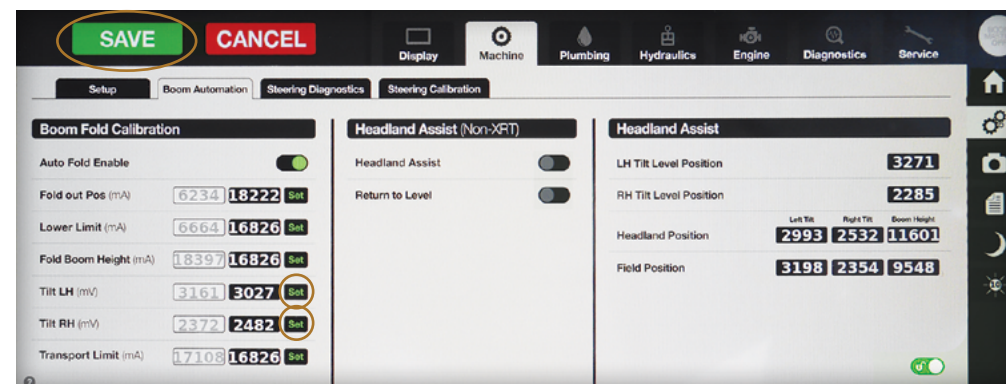
- 15 Press & hold down the IN end of the Boom Fold rocker switch to fold-in the

### NOTE

As well as using the Dual Tilt rocker switch to tilt the boom, the left and right Tilt push buttons can be used to individually adjust the boom tilt.

### NOTE

When set to zero, a Boom Calibration sensor is manually over-riden by the operator.



Press the 'Tilt LH (mV)' set touch button and 'Tilt RH (mV)' set touch button to set the position values.

boom until it is close enough to the boom rests to check the tilt alignment, then release the switch.

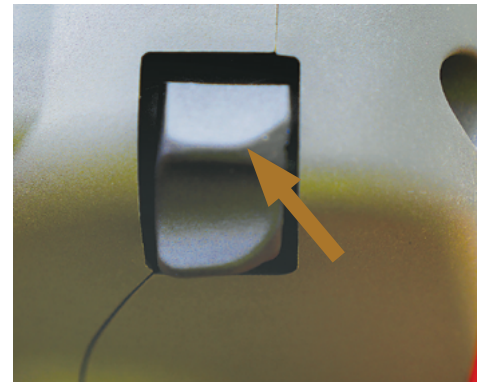
- 16 Check that the boom clears each of the boom rests:  
On the RHS & if adjustment is needed, press & hold the R Arrow Up or Down part of the Boom Tilt push button on the joystick. Release when the desired tilt is achieved.

On the LHS & if adjustment is needed, press & hold the L Arrow Up or Down part of the Boom Tilt push button on the joystick. Release when desired tilt is achieved.

- 17 Once the boom are correctly adjusted for the boom rests, press & hold down the OUT end of the Boom Fold rocker switch to completely unfold the boom (until it aligns with the boom centre section), then release the switch.

- 18 Press the Set touch button of the 'Tilt LH (mV)' and the Set touch button of the 'Tilt RH (mV)' and new set values appear in the 'Tilt RH (mV)' and 'Tilt LH (mV)' displays.

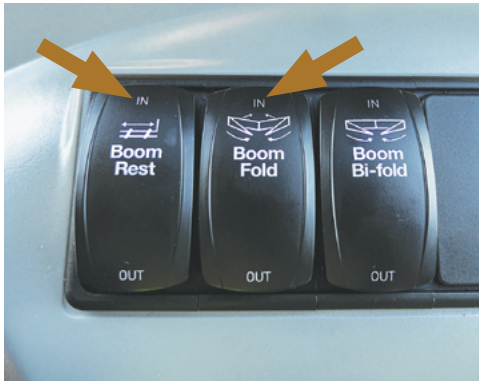
Press & hold the UP side of the Dual Tilt rocker switch on the Joystick to tilt boom wings up approximately 5 degrees above horizontal.



### NOTE

The Tilt Setting must be set while the boom is in its working position.  
Do not attempt to set the tilt when the boom is in the folded position.





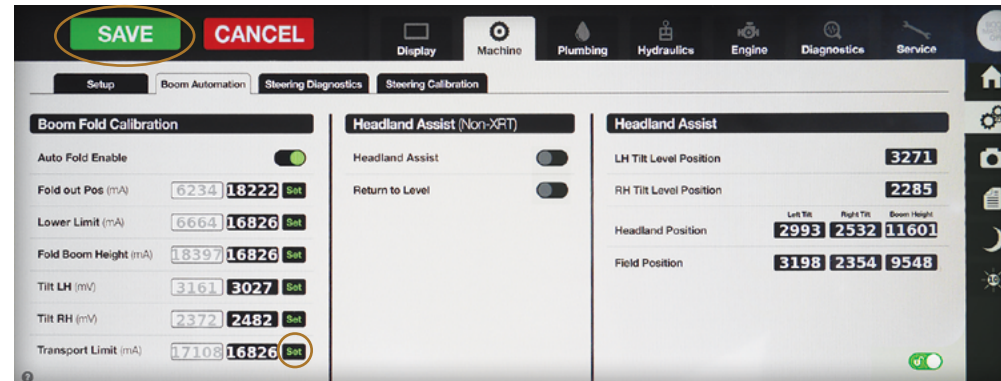
Press & hold the Boom Rest IN switch to lock down the LHS boom lock, then press the Boom Fold IN switch momentarily to tighten the boom into its rests.

19 Press & hold down the IN end of the Boom Fold rocker switch to fold-in the boom until both boom ends fully closed over the boom rests, then release the switch.

20 Press & hold the 'Boom Lower' push button on the Joystick to lower the boom onto the Boom Rests, then release the switch.

Press & hold the 'Boom Lower' push button on the Joystick to further lower the rear of the boom and put sufficient weight on the Boom Rests to stabilise the boom, then release the switch.

Check & adjust the tilt angle on the RHS to raise or lower the boom to clear the boom rest.



Press the 'Transport Limit (mA)' touch button to set the position value. Press the SAVE touch button to save the 'Boom Automation' settings & exit the screen.

21 Press the Set touch button of the 'Transport Limit (mA)' and a new set value appears in the 'Transport Limit (mA)' display.

22 Press the SAVE touch button on the left hand side of the screen to save the boom calibration settings into the G-Hub.

If you don't press SAVE, the boom calibration settings will be lost.

The boom calibration procedure for the G-Hub is now completed.

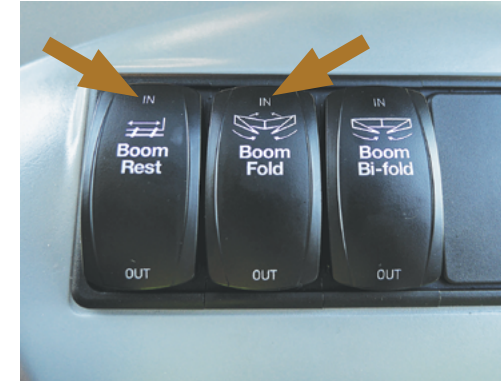
Check & adjust the tilt angle on the LHS to raise or lower the boom to clear the boom rest.



23 Now check the Automatic Folding of the boom to ensure it operates correctly. If it is not operating correctly, seek qualified help to diagnose the problem, then re-calibrate.

24 On completion of folding the boom to transport position, press & hold down the 'Boom Rest' IN switch to lock down the left hand side Boom Rest for road travel.

Individually press & hold the R & L Arrow Up or Down push buttons to adjust the boom tilt for the right & left hand boom ends.

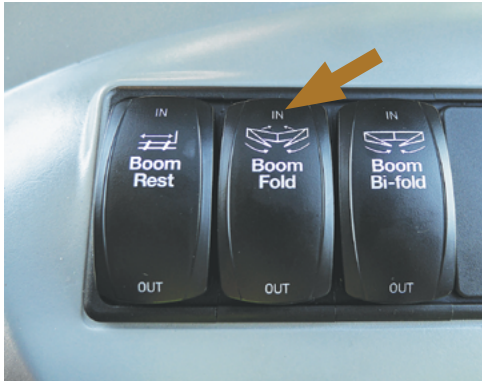


Press & hold the Boom Rest IN switch to lock down the LHS boom lock, then press the Boom Fold IN switch momentarily to tighten the boom into its rests.

25 Then, press the IN end of the Boom Fold rocker switch, momentarily, to fold-in the booms tight into the Boom Rests.

The left hand side Boom catch lowered.

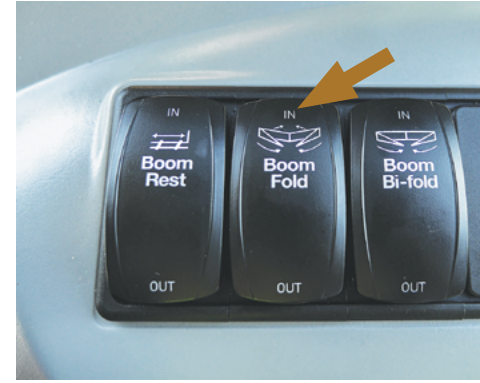




With the boom unfolded, press & hold down the IN end of the 'Boom Fold' rocker switch to fold the boom.



Press & hold the 'Boom Lower' push button to lower the boom onto the boom rests, then lower the boom further to stabilise its weight on the rests.



Press & hold down the IN end of the 'Boom Fold' rocker switch, momentarily, to tighten the boom wings into the Boom Rests.



Adjustment Valve.

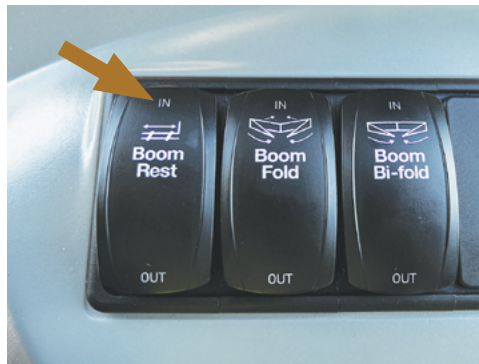
### To Test-Fold the G-Hub (Automatic) Boom Folding

Automatic folding of 36m & 42m booms only applies to folding-up booms for transport (not unfolding). The 48m boom manually folds only.

- 1 Follow the 'Before You Begin' instructions at the beginning of this chapter.
- 2 With the boom unfolded, press & hold down the IN end of the 'Boom Fold' rocker switch. The boom will fully rise, tilt & fold-in over the boom rests.

- 3 When fully folded-in, press the 'Boom Lower' push button on the Joystick to lower the boom until it stops at its preset height. The main boom lift suspension accumulator will then automatically lock out.
- 4 Press & hold down the IN end of the 'Boom Rest' rocker switch to completely fold to the Boom Rest & lock the boom.

Press & hold down the IN end of the 'Boom Rest' rocker switch to completely fold to the Boom Rest & lock the boom.



### CAUTION

When folding the boom, either manually or automatically, ensure the sprayer chassis is laterally level. If the chassis is sloping laterally, sprayer stability and boom folding can be compromised.

- 5 Press & hold the IN end of the Boom Fold rocker switch, momentarily, to tighten the boom wings in the Boom Rests.

If booms do not properly align with the boom rest when automatically folding, recalibrate the G-Hub boom settings.

If the final folding of the outer booms at the boom rests is too fast or too slow, adjust the Cushion Adjustment Valve on the bi-fold cylinder to slow or increase the movement of the boom when approaching the boom rests.

### To Adjust the Bi-Fold Cushion Speed:

- 1 Follow the 'Before You Begin' instructions.
- 2 Loosen the locknut of the Cushion Adjustment Valve.
- 3 Use an Allen key to wind the valve:
  - Inwards (clockwise) to slow the boom bi-fold speed.
  - Outwards (anti-clockwise) to speed-up the boom bi-fold speed.
- 4 Tighten the locknut on the Adjustment Valve.

### NOTE

The Bi-Fold Cushion Speed only functions for the last 50mm of cylinder stroke when the outer boom is folding into the bi-folded or transport position.





Boom Centre Level cable adjusters (shown on 48m boom).



Make adjustment to the Boom Centre Level cable adjusters as required.



Ensure boom Protection Brackets are positioned correctly.

## 8 Boom Centre Levelling

The Boom Centre Levelling system keeps the boom in the same plane as the machine so that the boom folds evenly.

If one side is heavier than the other, the boom will tend to hang lower on the heavy side, therefore, both sides need to be levelled to maintain boom ends at the same height.

If the centre and the booms tilt excessively during folding, the centre level cables may need to be adjusted. With time & use, cables stretch and will require adjustment.

Cable tension can be adjusted by tightening or loosening the nuts on the end of the cable bolts on either side.

### To Adjust Cable Tension:

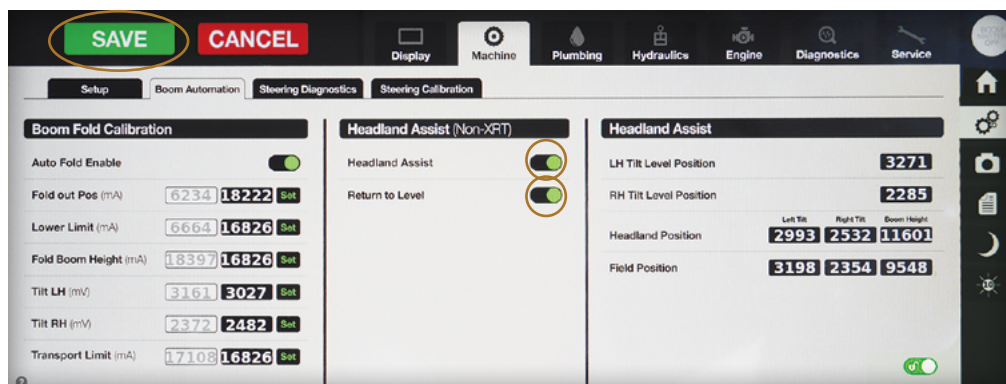
- 1 Follow the 'Before You Begin Making Boom Adjustments' instruction.
- 2 Lower the boom to a suitable working level.
- 3 Loosen the upper nut at each end of the cable (each side).
- 4 Tighten the lower nuts on each end of the cable to set the desired cable tension.
- 5 Tighten the nut firmly against the bracket to hold its position.
- 6 Now check the boom folds correctly.  
Get someone to stand behind the sprayer (out of the booms reach) and watch which side the boom is tilting excessively down when folding.
- 7 If necessary, unfold the boom and re-adjust the cable tension to correct any tilt problems.
- 8 Repeat steps 2 - 5 until the boom is level when folding.

### Boom Protection Brackets

Stainless steel boom protectors are fitted on the boom to protect it when resting on the boom rests for transport.

It is important to ensure that the boom protection brackets are positioned correctly.





The 'Boom Automation' screen 'Unlocked' with 'Headland Assist' and 'Return to Level' enabled. Press the SAVE touch button to save the 'Boom Automation' settings & exit the screen.

## Headland Assist (non XRT)

The 'Headland Assist' touch button is used enable or disable the 'Headland Assist' Auto functions.

When enabled, the touch button goes Green and Grey when disabled.

Do not enable the Headland Assist function when the XRT Option is fitted.

The 'Return to Level' touch button is used enable or disable the 'Return to Level' auto function.

When enabled, the touch button goes Green and Grey when disabled.

Do not enable the Headland Assist function here when the XRT Option is fitted.

### NOTE

The 'SAVE' touch button will appear on the left hand side of the screen if a new value is entered or a change made in the G-Hub system.

If the 'SAVE' touch button is not pressed, then any current changes or entered value or values will be lost and previous settings will remain.

The 'SAVE' touch button can be pressed at any stage or screen change to ensure new settings are saved and not accidentally lost.

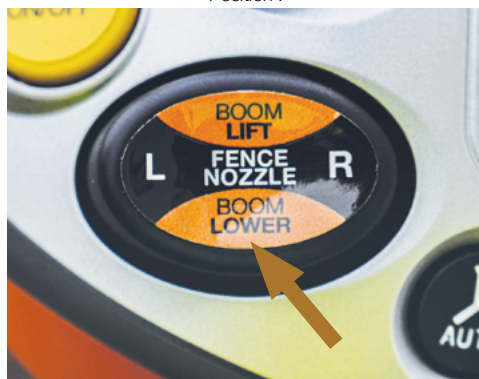
## Level, Headland & Field Positions

Set the sensor values for each Headland Assist Auto function by folding the boom out into the desired position, then:

### To Set the 'Level Position'

- 1 Open the boom & move the boom to desired level position.
- 2 When in position, press & hold the 'Cruise Master' switch on the Joystick, then press 'Boom Down'. Release both switches.

Press & hold the Cruise Master switch and press the 'Boom Lower', then release both switches to set the 'Level Position'.



Press & hold the Cruise Master switch and press the 'Dual Tilt' switch 'Up', then release both switches to set the 'Headland Position'.

### To Set the 'Headland Position'

- 1 Operate & raise the boom to desired headland position.
- 2 When in position, press & hold the 'Cruise Master' switch on the Joystick, then press 'Dual Tilt Up'. Release both switches.

Press & hold Up the lower on the Dual Tilt rocker switch of the Joystick to raise the boom wings ends.



Press & hold the Cruise Master switch and press the 'Dual Tilt' switch 'Down', then release both switches to set the 'Field Position'.

### To Set the 'Field Position'

- 1 operate & lower the the boom into the desired field position.
- 2 When in position, press & hold the 'Cruise Master' switch on the Joystick, then press 'Dual Tilt Down'. Release both switches.

When 'Headland Assist' settings are completed, press the 'SAVE' touch button at the top left hand side of the screen to save the settings into the G-Hub system, otherwise the settings entered on the Machine screen will be lost.

Press & hold Down the lower on the Dual Tilt rocker switch of the Joystick to lower the boom wings ends.



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Regularly do the routine checks on the Cruiser while stationary.

## Pre-Operation Checklist

### Stationary Checks

The following should be routinely done while the Cruiser is stationary:

- Check all tyre pressures for the recommended pressures in the manual
- Check all wheel nut torque (350 ft lb)
- Check mudguard mountings (where fitted)
- Inspect axles for fractures or cracks
- Check axle retaining hardware
- Check sway bar bushes & bolt tension
- Check all pump mounting bolt tensions
- Check tension of tank straps
- Check all oil levels:
  - Engine
  - Transmission
  - Transfer case
  - Differentials
  - Drop legs



Regularly check the engine coolant level.

- Check engine coolant level
- Check/change engine inline fuel filter
- Check engine filters for leaks
- Check oil drain plugs for leaks
- Drain water separator
- Check all electrical ground points are clean and tight
- Check all fasteners are tight
- Check & tighten hose clamps on main hose from pump to manifold
- Clean suction filter
- Clean pressure filters
- Check all filter bowl nuts and O-rings
- Check paralink arm mounting bolt tension (300ft/lb)
- Check toe in of steer axle (0-5mm)
- Check boom alignment.



Check & adjust all seat & steering column adjustments for personal comfort.

### Running Checks

The following should be routinely done while the Cruiser is running:

- Check all light functions
- Check all air conditioner controls
- Check radio functions
- Check UHF radio functions
- Check all seat adjustments
- Check all steering column adjustments
- Set-up the engine monitor
- Check all warning sound alarms function correctly



Check all joystick boom switch functions.

- Check boom switches operate
- Check all hoses for leaks and/or excessive movement
- Check air bag axle ride height
- Check air bag system for air leaks
- Inspect airbag reservoir & drain any liquid



Check airbags are functioning correctly.



During the first 8 hours of operation, check wheel (shown above) & other retaining nuts frequently - until fully imbedded.

## Maintenance

Correct & timely service & maintenance of the Crop Cruiser are among the most important elements of safe, efficient & accurate operation.

Servicing and maintenance should be carried out according to the schedules in this chapter 'Lubrication & Maintenance'.

## First 8 Hours Of Operation

During the first 8 hours of operation, it is important to closely check the following:

### 1 Torque Settings

- Check the torque on retaining nuts frequently
- Wheel nuts should be checked to ensure 350 ft/lb is maintained.

### NOTE

Goldacres recommends a multi-purpose grease should be used for all grease lubrication. Make sure all open-end bearings are lubricated their full length by forcing lubricant into them until it begins to appear at the sides.  
Protect all surfaces with corrosion inhibitor G15.



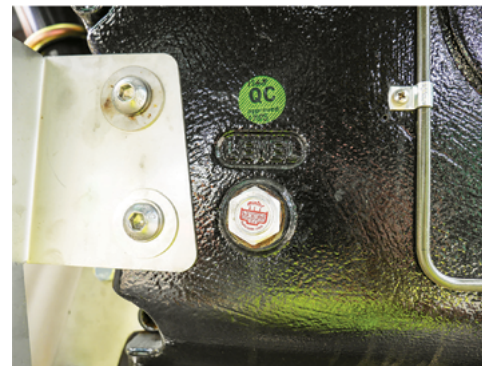
During the first 8 hours of operation, check the engine oil level frequently using the engine oil dip stick.

### 2 Engine

- Check the engine oil level frequently. Due to the "bedding in" of the engine components and additional friction between connecting parts, expect the oil usage to be higher than normal.
- Avoid excess engine idling
- Inspect the air intake system and check for leaks.

### CAUTION

If the engine has been running, take extra care around hot engine parts such as the exhaust.  
Failure to take care with hot componentry may result in severe burns & injury.



During the first 8 hours of operation, check drop leg (shown above) & other transmission oil levels.

### 3 Lubrication & Hydraulic Fluids

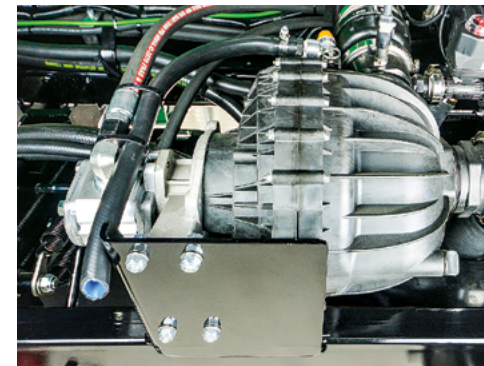
- Maintain correct hydraulic oil levels and monitor the oil temperature on a regular basis
- Check all transmission oil levels
- Ensure grease points are lubricated effectively
- Inspect for leaks in the hydraulic system.

### 4 Tank Retaining Straps

- Check tank retaining strap bolts to ensure they are not loose. Tighten if loose.

### CAUTION

Before doing maintenance on the Cruiser, read this manual & be aware of the encumbent risk of injury with all sprayer maintenance. Refer to the 'Crush, Pinch, Burn, Injection, Hose Whip Striking Hazards' in Chapter 2 'Safety'.



During the first 8 hours of operation, check mounting bolts of the fill pump (shown above) & other pumps.

### 5 Pump Mounting Bolts

- Check all pump mounting bolts to ensure they are not loose.

### 6 Suspension Bolts

- Check all suspension bolts located at each end of parallel links, pan hard rods (300ft/lb) and sway bars to ensure they are not loose. Tighten if loose.

### 7 Lights

- Check each light around the vehicle for correct function.

### 8 Steering

- Check front wheel alignment
- Check lock nuts on ball joints are tight.

## First Service - 50 hours

<b><u>Engine</u> - Service Item</b>	<b>Type of Service</b>	<b>Part No. Goldacres</b>	<b>Part No. Generic</b>
Engine oil	Drain & Replace	GA5012457 (20L) GA5017913 (200L)	-
Engine oil filter	Replace	GA5051755	LF3970
Fuel filter - Engine	Replace	GA5051765	FF5612, FF5421
Fuel filter - Primary	Replace	GA5051760	FS1242
Fuel filter - In-line	Replace	GA5069895	WZ153 (3/8" tails)

<b><u>Hydraulic Oil Tank</u> - Service Item</b>	<b>Type of Service</b>	<b>Part No. Goldacres</b>	<b>Part No. Generic</b>
Hydraulic oil return filter	Replace	GA5069056	-
Hydraulic pressure filters	Replace	GA5008721 x 3	-

<b><u>Air Conditioning</u> - Service Item</b>	<b>Type of Service</b>	<b>Part No. Goldacres</b>	<b>Part No. Generic</b>
Compressor drive belt	Check & re-tension	GA5071435	13A1080

### NOTE

Lubricant details are provided under 'Service Parts' which follow the 'Maintenance Schedules'.

### NOTE

For more detailed engine maintenance information refer to 'Cummins Operation and Maintenance Manual QSB4.5 and QSB6.7 Engine' supplied with the machine.

## First Service - 50 hours cont.

<b><u>Transmission &amp; Transfer Case</u> - Service Item</b>	<b>Type of Service</b>	<b>Part No. Goldacres</b>	<b>Part No. Generic</b>
Transmission oil	Inspect	GA5006959 (20L) GA5006960 (208L)	-
Transmission external spin-on filter	Inspect	GA5048281	29539579 or HF35296
Transfer case oil	Drain & Replace	GA5072325 (20L)	-

<b><u>Front Axle</u> - Service Item</b>	<b>Type of Service</b>	<b>Part No. Goldacres</b>	<b>Part No. Generic</b>
Differential oil - Non-LSD	Drain & Replace	GA5047310 (200L)	-
Front wheel bearings	Check Pre-load & Inspect	See Parts Manual	-
Toe in (1-5 mm)	Measure	-	-

<b><u>Rear Axle</u> - Service Item</b>	<b>Type of Service</b>	<b>Part No. Goldacres</b>	<b>Part No. Generic</b>
Differential oil - LSD	Drain & Replace	GA5009421 (20L) GA5009422 (200L)	-
Drop leg oil	Drain & Replace	GA5047310 (200L)	-
Telescoping drive shafts (3-4m axles)	Clean & Re-grease	Klüberpaste 46 MR 401	-



## Maintenance Schedules

<b>Engine - Service Item</b>	<b>DAILY (10Hrs)</b>	<b>WEEKLY (50Hrs)</b>	<b>250hrs/ 3 mths</b>	<b>500hrs/ 6 mths</b>	<b>750hrs/ 9 mths</b>	<b>1000hrs/ 1 year</b>
Engine oil level	Inspect	Inspect	Replace	Replace	Replace	Replace
Engine oil filter	Inspect	Inspect	Replace	Replace	Replace	Replace
Fuel filter - engine	Inspect	Inspect	Replace	Replace	Replace	Replace
Fuel - (separator filter)	Drain	Drain	Replace	Replace	Replace	Replace
Fuel Filter - (in-line)	Inspect	Inspect	Replace	Replace	Replace	Replace
Fuel level	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Antifreeze/Coolant - Replace @ 2000 hours	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Fan	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Drive belts	Inspect	Inspect	Inspect	Inspect	Inspect	Replace
Cooling system	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Mounting bolts & isolators	-	Inspect	Inspect	Inspect	Inspect	Inspect
Hoses, lines and clamps	-	Inspect	Inspect	Inspect	Inspect	Inspect
Exhaust system	-	Inspect	Inspect	Inspect	Inspect	Inspect
Air cleaner (Primary filter)	-	Inspect	Inspect	Inspect	Inspect	Replace
Air cleaner (Safety filter)	-	Inspect	-	Inspect	Inspect	Replace
Air intake piping	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Crankcase breather tube	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Belt tensioners	-	Inspect	Inspect	Inspect	Inspect	Inspect
Turbocharger	-	Inspect	Inspect	Inspect	Inspect	Inspect
Air compressor	-	Inspect	Inspect	Inspect	Inspect	Inspect
Harmonic balancer	-	Inspect	Inspect	Inspect	Inspect	Inspect

## Maintenance Schedules cont.

<b>Transmission - Service Item</b>	<b>DAILY (10Hrs)</b>	<b>WEEKLY (50Hrs)</b>	<b>250hrs/ 3 mths</b>	<b>500hrs/ 6 mths</b>	<b>750hrs/ 9 mths</b>	<b>1000hrs/ 1 year</b>
Selector Linkage	-	Inspect	Inspect	Inspect	Inspect	Inspect
Bolts	-	Inspect	Inspect Tension	Inspect Tension	Inspect Tension	Inspect Tension
Electrical Harnesses	-	Inspect	Inspect	Inspect	Inspect	Inspect
Cooling System	-	Inspect	Inspect	Inspect	Inspect	Inspect

**Transmission****- Filter Change Internal**

<b>Main Filter (Spin-on)</b>	<b>2000 Hours 24 Months</b>	<b>4000 Hours 48 Months</b>
------------------------------	---------------------------------	---------------------------------

*Internal Filter to be replaced on rebuild only.*

**Transmission****- Oil Change Internal**

<b>Allison Approved Oils:</b>	<b>3000 Hours 36 Months</b>	<b>6000 Hours 72 Months</b>	<b>9000 Hours</b>
- Castrol TranSynd TES 295 - Valvoline Syn Gard TES 668			
<b>Non-Approved TES 295 Oil*</b>	<b>500 Hours 6 Months</b>	<b>2000 Hours 24 Months</b>	<b>4000 Hours 48 Months</b>

*\* Less than 100% concentration Allison approved TES 295 fluid is considered a mixture and should utilise Allison approved non-TES295 fluid change intervals.*

<b>Transfer Gearbox - Service Item</b>	<b>DAILY (10Hrs)</b>	<b>WEEKLY (50Hrs)</b>	<b>250hrs/ 3 mths</b>	<b>500hrs/ 6 mths</b>	<b>750hrs/ 9 mths</b>	<b>1000hrs/ 1 year</b>
Oil Level	-	Inspect	Inspect	Replace	Inspect	Replace
Input output seals	-	Inspect	Inspect	Inspect	Inspect	Inspect
Breather	-	Inspect	Inspect	Inspect	Inspect	Inspect

## Maintenance Schedules cont.

<b>Drive Shafts - Service Item</b>	<b>DAILY (10Hrs)</b>	<b>WEEKLY (50Hrs)</b>	<b>250hrs/ 3 mths</b>	<b>500hrs/ 6 mths</b>	<b>750hrs/ 9 mths</b>	<b>1000hrs/ 1 year</b>
Transmission & at Axle Input, Centre Bearing	-	Inspect	Inspect	Inspect	Inspect	Inspect
Universal Joints	-	Grease Inspect	Grease Inspect	Grease Inspect	Grease Inspect	Grease Inspect
Slip Splines	-	Grease Inspect	Grease Inspect	Grease Inspect	Grease Inspect	Grease Inspect
Centre Bearing	-	Grease Inspect	Grease Inspect	Grease Inspect	Grease Inspect	Grease Inspect

<b>Suspension System - Service Item</b>	<b>DAILY (10Hrs)</b>	<b>WEEKLY (50Hrs)</b>	<b>250hrs/ 3 mths</b>	<b>500hrs/ 6 mths</b>	<b>750hrs/ 9 mths</b>	<b>1000hrs/ 1 year</b>
Polyurethane bushes	-	Inspect	Inspect	Inspect	Inspect	Inspect
Bolts & nuts *	-	Inspect	Tension	Tension	Tension	Tension
Shock absorbers	-	Inspect	Inspect	Inspect	Inspect	Inspect
Ride height valve	-	Inspect	Inspect	Inspect	Inspect	Inspect
Sway bar & ball ends	-	Inspect	Inspect	Inspect	Inspect	Inspect
Torque Rod - Welds	-	Inspect	Inspect	Inspect	Inspect	Inspect

## Maintenance Schedules cont.

<b>Axles &amp; Drop Leg - Service Item</b>	<b>DAILY (10Hrs)</b>	<b>WEEKLY (50Hrs)</b>	<b>250hrs/ 3 mths</b>	<b>500hrs/ 6 mths</b>	<b>750hrs/ 9 mths</b>	<b>1000hrs/ 1 year</b>
Differential Oil	-	Inspect	Inspect	Replace	Inspect	Replace
Drop leg Oil	-	Inspect	Inspect	Replace	Inspect	Replace
Clean Dropleg Breathers	-	-	Inspect	Inspect	Inspect	Inspect
Steering Pins/ Bearing	-	Grease Inspect	Grease Inspect	Grease Inspect	Grease Inspect	Inspect Replace
4WD King pin seals		Inspect	Inspect	Inspect	Inspect	Inspect
4WD King pins		Check	Check	Check	Check	Check
Tie Rod Ends & Ball Joints*	-	Lubricate Inspect	Tension Lubricate Inspect	Lubricate Inspect	Tension Lubricate Inspect	Lubricate Inspect
Universal Joints	-	Grease Inspect	Grease Inspect	Grease Inspect	Grease Inspect	Grease Inspect
Axles		Inspect	Inspect	Inspect	Inspect	Inspect
Toe In (1-5mm)	-	-	Measure	Measure	Measure	Measure
Telescoping Drive Shafts 3-4m Axle Only		Clean & Grease	Clean & Grease	Clean & Grease	Clean & Grease	Clean & Grease

### NOTE

Suspension System: \* Parallel link bolts are to be torqued to 300 ft/lb.

### NOTE

Axles & Dropleg: \* Machines fitted with John Deere Autosteer systems need the tie rod ends checked and re-tensioned every 20 hours to prevent excessive toe angle change over time.

## Maintenance Schedules cont.

<b>Wheels &amp; Tyres</b> - Service Item	DAILY (10Hrs)	WEEKLY (50Hrs)	250hrs/ 3 mths	500hrs/ 6 mths	750hrs/ 9 mths	1000hrs/ 1 year
Rims	-	-	Inspect	Inspect	Inspect	Inspect
Wheel nuts - 350 ft/lb	Tension	Tension	Tension	Tension	Tension	Tension
Tyre pressure	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Tyres	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect

<b>Braking System</b> - Service Item	DAILY (10Hrs)	WEEKLY (50Hrs)	250hrs/ 3 mths	500hrs/ 6 mths	750hrs/ 9 mths	1000hrs/ 1 year
Brake pads - Replace as required	-	Inspect	Inspect	Inspect	Inspect	Inspect
Hydraulic brake lines/hoses	-	Inspect	Inspect	Inspect	Inspect	Inspect
Brake discs - Min Thickness 20mm	-	Inspect	Inspect	Inspect	Inspect	Inspect
Seals	-	Inspect	Inspect	Inspect	Inspect	Inspect
Brake operation	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Park brake pads - Replace as required	-	Inspect	Inspect	Inspect	Inspect	Inspect
Park brake operation	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Park brake switch	-	Inspect	Inspect	Inspect	Inspect	Inspect
Caliper mountings	-	Inspect	Inspect	Inspect	Inspect	Inspect
Caliper & Rotor	Inspect	Clean	Clean	Clean	Clean	Clean

## Maintenance Schedules cont.

<b>Pneumatic System</b> - Service Item	DAILY (10Hrs)	WEEKLY (50Hrs)	250hrs/ 3 mths	500hrs/ 6 mths	750hrs/ 9 mths	1000hrs/ 1 year
Air tanks	Drain	Drain	Drain	Drain	Drain	Drain
Air lines & fittings	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Air dryer filter	Inspect	Inspect	Inspect	Inspect	Inspect	Replace

<b>Hydraulic System</b> - Service Item	DAILY (10Hrs)	WEEKLY (50Hrs)	250hrs/ 3 mths	500hrs/ 6 mths	750hrs/ 9 mths	1000hrs/ 1 year
Hydraulic oil	-	Inspect	Sample	Sample	Sample	Replace
Hydraulic oil return filter	-	Inspect	Inspect	Replace	Inspect	Replace
Hydraulic pressure filters	-	Inspect	Inspect	Replace	Inspect	Replace
Hydraulic lines & hoses	-	Inspect	Inspect	Inspect	Inspect	Inspect
Hydraulic cylinders	-	Inspect	Inspect	Inspect	Inspect	Inspect
Hydraulic pumps	-	Inspect	Inspect	Inspect	Inspect	Inspect
Hydraulic pump mountings	-	Inspect	Inspect	Inspect	Inspect	Inspect
Hydraulic valves	-	Inspect	Inspect	Inspect	Inspect	Inspect

**NOTE**

Braking System: Minimum thickness of the Brake rotor is 20mm. Replacement is required.



## Maintenance Schedules cont.

<b>Chassis - Service Item</b>	<b>DAILY (10Hrs)</b>	<b>WEEKLY (50Hrs)</b>	<b>250hrs/ 3 mths</b>	<b>500hrs/ 6 mths</b>	<b>750hrs/ 9 mths</b>	<b>1000hrs/ 1 year</b>
Ladder switch	-	Inspect	Inspect	Inspect	Inspect	Inspect
Ladder folding mechanism	-	Grease	Grease	Grease	Grease	Grease
Ladder mounting bolts	-	Tighten	Tighten	Tighten	Tighten	Tighten
Pump mounting bolts	-	Tighten	Tighten	Tighten	Tighten	Tighten
Cab mount bolts & bushes	-	Inspect	Inspect	Inspect	Inspect	Inspect
Cabin seals	-	-	Inspect	Inspect	Inspect	Inspect
Cabin interior	Clean	Clean	Clean	Clean	Clean	Clean
Tank retaining strap bolts	Tighten	Tighten	Tighten	Tighten	Tighten	Tighten
Para lift link bushes	Grease	Grease	Grease	Grease	Grease	Grease
Tank frame mount bolts	-	Tighten	Tighten	Tighten	Tighten	Tighten
Chassis frame	-	-	Inspect	Inspect	Inspect	Inspect
Induction hopper mounting	-	Grease	Grease	Grease	Grease	Grease
Boom support mounting bolts	-	Tighten	Tighten	Tighten	Tighten	Tighten
Machine exterior	-	Clean	Clean	Clean	Clean	Clean
Windscreen wiper fluid	-	Inspect	Inspect	Inspect	Inspect	Inspect

## Maintenance Schedules cont.

<b>Electrical System - Service Item</b>	<b>DAILY (10Hrs)</b>	<b>WEEKLY (50Hrs)</b>	<b>250hrs/ 3 mths</b>	<b>500hrs/ 6 mths</b>	<b>750hrs/ 9 mths</b>	<b>1000hrs/ 1 year</b>
Battery Electrolyte level	-	Inspect	Inspect	Inspect	Inspect	Inspect
Lights	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Leads and wires	-	-	Inspect	Inspect	Inspect	Inspect
Earth Leads	-	-	Inspect	Inspect	Inspect	Inspect
Wires near moving parts	-	-	Inspect	Inspect	Inspect	Inspect
Battery Terminal	-	-	Clean & Protect	Clean & Protect	Clean & Protect	Clean & Protect

## Maintenance Schedules cont.

<b><u>Air-Conditioning System</u></b> - Item	DAILY (10Hrs)	WEEKLY (50Hrs)	250hrs/ 3 mths	500hrs/ 6 mths	750hrs/ 9 mths	1000hrs/ 1 year
Condensor	Clean	Inspect	Inspect	Inspect	Inspect	Inspect
Air conditioner lines	-	-	Inspect	Inspect	Inspect	Inspect
Refrigerant & dryer	-	-	Inspect	Inspect	Inspect	Replace
HVAC box	-	-	Inspect	Inspect	Inspect	Inspect
Carbon filter (or as required)	-	Inspect	Inspect	Replace	Inspect	Replace
Carbon filter inlet	-	Inspect	Inspect	Inspect	Inspect	Inspect
Compressor drive belt	-	Inspect	Inspect	Adjust	Adjust	Adjust

<b><u>Spraying Equipment</u></b> - Service Item	DAILY (10Hrs)	WEEKLY (50Hrs)	250hrs/ 3 mths	500hrs/ 6 mths	750hrs/ 9 mths	1000hrs/ 1 year
Booms	Inspect	Adjust Inspect	Adjust Inspect	Adjust Inspect	Adjust Inspect	Adjust Inspect
Nuts & bolts	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Hinge bushes	Grease	Grease	Grease	Grease	Grease	Grease
Tilt bushes	Grease	Grease	Grease	Grease	Grease	Grease
Sprayer calibration	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Filters (suction, pressure, flush & air compressor filter)	Inspect	Inspect	Inspect or replace	Inspect or replace	Inspect or replace	Inspect or replace

## Maintenance Schedules cont.

<b><u>Spraying Equipment</u></b> - Service Item	DAILY (10Hrs)	WEEKLY (50Hrs)	250hrs/ 3 mths	500hrs/ 6 mths	750hrs/ 9 mths	1000hrs/ 1 year
Arag Pump Motor Spline	-	-	Lubricate	Lubricate	Lubricate	Lubricate
Nozzles	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Pump (pre-spray test)	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Pump Oil condition & level	Inspect	Inspect	Replace	Replace	Replace	Replace
Pump Diaphragms	-	-	-	Replace	-	Replace
Pump seals	-	-	-	Replace	-	Replace
Pump valve O-rings	-	-	-	Replace	-	Replace
Pump valve springs & cages	-	-	-	Replace	-	Replace
Hoses and fittings	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Boom secure in boom rests	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Sprayer Pump & lines	Flush	Flush	Flush	Flush	Flush	Flush
Tanks	Inspect	Inspect	Inspect	Inspect	Inspect	Inspect
Flow meter	Inspect Drain	Inspect Drain	Inspect Drain	Inspect Drain	Inspect Drain	Inspect Drain
Ball valves	Open & inspect	Open & inspect	Open & inspect	Open & inspect	Open & inspect	Open & inspect
Fill Pump Safety valve	-	Purge	Remove & clean	Remove & clean	Remove & clean	Remove & clean

## Service Parts

<b>Lubricants - Service Item</b>	<b>Service Specification</b>	<b>Capacity (L)</b>	<b>Part No.</b>
Engine	SAE 15W-40 heavy duty engine oil that meets Cummins standard CES20078 API1 & CI-4	15L	GA5012457 (20L) GA5017913 (200L)
Hydraulic oil	46W Dedicated hydraulic oil eg: Valvoline Ultramax HVI 46	90L	GA5017199 (200L)
Transmission	Castrol Allison Transynd - TES295 or Valvolene TES668	20L approx. (dry)	GA5006959 (20L) GA5006960 (208L)
Transfer Gearbox	SYN FE 75W-90	6.6L	GA5072325 (20L)
Front Differential	80W90 EP Gear Oil - Non LSD	14L (welded diff casing)	GA5047310 (200L)
Rear Differential	Titan Supergear LS 85W140 High Performance Fuchs - LSD Fuchs - LSD Additive	9.5L (cast diff casing)	GA5009421 (20L) GA5009422 (200L) GA5055935 (150ml)
Driven Drop legs	80W90 EP Gear Oil	36L (fill to level hole)	GA5047310 (200L)
Telescoping Drive Shafts	Klüberpaste 46 MR 401	-	-
General Grease pts	Multi-Purpose Grease	-	-
Steering Pivot pts	Molybdenum Based Grease	-	-
Coolant	TEC PG XL Cummins	39L approx.	GA5008311 (205L)
Spray Pump	SAE 15W40	2.68L for Zeta 260	GA5012457 (20L)
Arag MSP400 Motor Spline	Bigfoot EP02	Grease	GA5025810 (500gm)
Air-conditioning unit	Oil, Sanden SP20	150-160ml	-
	Gas R134a	2kg	-
Auto greaser	NGLI 0 - Groeneveld	4kg	-
	NGLI 2 - Alemlube	4kg	-

## Service Parts cont.

<b>Filters - Service Item</b>	<b>Part No. Goldacres</b>	<b>Part No. Generic</b>
Hydraulic Pressure Filters	GA5008721 x 3	-
Hydraulic Return Filter	GA5069056	-
A/C Carbon Filter	GA5066740	P277
Air Cleaner Primary Element	GA5069031	P608666
Air Cleaner Safety Element	GA5069032	P601560
Engine Oil Filters	GA5051755	LF3970
Transmission Oil Filters	GA5048281 (spin on)	Series 2000 = 29539579 or HF35296
	GA5048285 (internal)	Series 2000 = 29537966 internal kit
Fuel Filter (primary)	GA5051760	FS1242
Fuel Filter (engine)	GA5051765	FF5612 , FF5421
Fuel Filter in-line	GA5069895	WZ153 (3/8" tails)
Hydraulic Breather cap	GA5075450	-
Air Dryer Cartidge	GA7000022	-

### Further Lubricant recommendations:

- For differing weather conditions consult the Cummins operator's manual to choose the suitable oil grade.
- Ensure lubricants are stored in a place where the lubricants are protected from contamination (such as dirt and moisture). Always use clean containers when handling lubricants.
- Do not mix lubricants. Proper lubrication may be affected by differences in chemical composition.
- Seek advice from the petroleum dealer on the correct use of lubricants & additives.
- At time of manufacture, G15 Anti-Corrosion Spray is applied to all fasteners (bolts, washers & nuts) and zinc plated components.
- G15 Anti-Corrosion Spray should also be applied to the machine both pre & post season.
- As a guide, application of G15 Anti-Corrosion Spray is recommended to the following (but not limited to) areas: Pump mounting bolts, boom rests, left hand pod, mudguard mounting bolts, induction hopper bolts & latches, hydraulic manifold, boom hinge bolts, airbag hose fittings and hydraulic hose crimp fittings, etc.



## Service Parts cont.

<b><u>Belts</u> - Service Item</b>	<b>Part No. Goldacres</b>	<b>Part No. Generic</b>
V Belt, Air Conditioner Compressor	GA5071435	13A1080
Belt, Serpentine, Water Pump Alternator	GA5075275	-
Hydraulic pump belt	GA2700098	-

<b><u>Headlights</u> - Service Item</b>	<b>Part No. Goldacres</b>	<b>Part No. Generic</b>
Headlight globe - Low beam - LED	GA3000492	HB3-LED
Headlight globe - High beam - LED	GA3000492	HB3-LED

## Service Kits - G6 Series 2 MY20

<b>GA1100062</b>	<b>Service Kit for G6 Series 2 MY20 @ 50hr (Items below)</b>	<b>QTY</b>
GA5069056	Filter element, Hydraulic return to suit tank mounted filter GA5069055, Hydac	1
GA5008721	Filter screen, Hydraulic pressure, 10 micron, suit GA5010013 & GA3500705	3
GA5051755	Filter, Oil, Suit Cummins QSB engine	1
GA5048281	Filter, Allison Transmission, Spin On, 2000 Series (Replaces GA5048280)	1
GA5051760	Filter cartridge, Suit primary fuel filter on self propelled with QSB	1
GA5069895	Fuel filter, Inline, 3/8 male hose barbs, Suit Crop Cruiser MY11	1
GA5051765	Fuel Filter, Spin on, suit QSB Engine	1
GA5024630	Carton, Cardboard box, Branded, Scores, 311mm x 208mm x 188mm	1
GA8700724	Decal, Next Service Indicator, Self Propelled	1

<b>GA1100063</b>	<b>Service Kit for G6 Series 2 MY20 @ 250hr &amp; 750hr Intervals (Items below)</b>	<b>QTY</b>
GA5051755	Filter, Oil, Suit Cummins QSB engine	1
GA5051760	Filter cartridge, Suit primary fuel filter on self propelled with QSB	1
GA5069895	Fuel filter, Inline, 3/8 male hose barbs, Suit Crop Cruiser MY11	1
GA5051765	Fuel Filter, Spin on, suit QSB Engine	1
GA5009731	Gun Box 250x 175 x70	1
GA8700724	Decal, Next Service Indicator, Self Propelled	1

## Service Kits - G6 Series 2 MY20 cont.

GA1100064	Service Kit for G6 Series 2 MY20 @ 500Hr Intervals (Items below)	QTY
GA5069056	Filter element, Hydraulic return to suit tank mounted filter GA5069055, Hydac	1
GA5008721	Filter screen, Hydraulic pressure, 10 micron, suit GA5010013 & GA3500705	3
GA5075450	Breather Cap, Oil Reservoir Filler, HYDAC	1
GA5051755	Filter, Oil, Suit Cummins QSB engine	1
GA5048281	Filter, Allison Transmission, Spin On, 2000 Series (Replaces GA5048280)	1
GA5051760	Filter cartridge, Suit primary fuel filter on self propelled with QSB	1
GA5051765	Fuel Filter, Spin on, suit QSB Engine	1
GA5069895	Fuel filter, Inline, 3/8 male hose barbs, Suit Crop Cruiser MY11	1
GA5024630	Carton, Cardboard box, Branded, Scores, 311mm x 208mm x 188mm	1
GA8700724	Decal, Next Service Indicator, Self Propelled	1

GA1100065	Service Kit, Series 2 G6, MY20, 1000Hr Intervals (Items below)	QTY
GA5069056	Filter element, Hydraulic return to suit tank mounted filter GA5069055, Hydac	1
GA5008721	Filter screen, Hydraulic pressure, 10 micron, suit GA5010013 & GA3500705	3
GA5075450	Breather Cap, Oil Reservoir Filler, HYDAC	1
GA5069031	Air cleaner primary element, suit GA5069030, Donaldson	1
GA5069032	Air cleaner safety element, suit GA5069030, Donaldson	1
GA5051755	Filter, Oil, Suit Cummins QSB engine	1
GA5048281	Filter, Allison Transmission, Spin On, 2000 Series (Replaces GA5048280)	1
GA5051760	Filter cartridge, Suit primary fuel filter on self propelled with QSB	1
GA5051765	Fuel Filter, Spin on, suit QSB Engine	1
GA5069895	Fuel filter, Inline, 3/8 male hose barbs, Suit Crop Cruiser MY11	1
GA5066740	Carbon filter, Replacement insert suit donaldson	1
GA7000022	Cartridge, Air Dryer, Wabco, 432.420.220.2	1
GA7000021	Filter/Silencer, Air Dryer, Wabco 432.407.012.0	1
GA5013535	Carton, Cardboard box, 440 x 320 x 450	1
GA8700724	Decal, Next Service Indicator, Self Propelled	1

## Service Instructions

### G-Hub Controller Service Tab

The G-Hub Controller provides quick reference to service intervals and service history.

#### To Access the Service Screen:

Press 'Settings' touch button, then the 'Service' tab touch button to open the Hardware tab screen which displays 4 tab screens:

- i) Hardware
- ii) Software (see chapter 3 for instructions).
- iii) Active Faults (see chapter 9 for instructions).
- iv) Fault History (see chapter 9 for instructions).

The 'Hardware' screen is locked for protection from uninformed or accidental alteration.

The screen must be unlocked before any setting or alterations can be made.

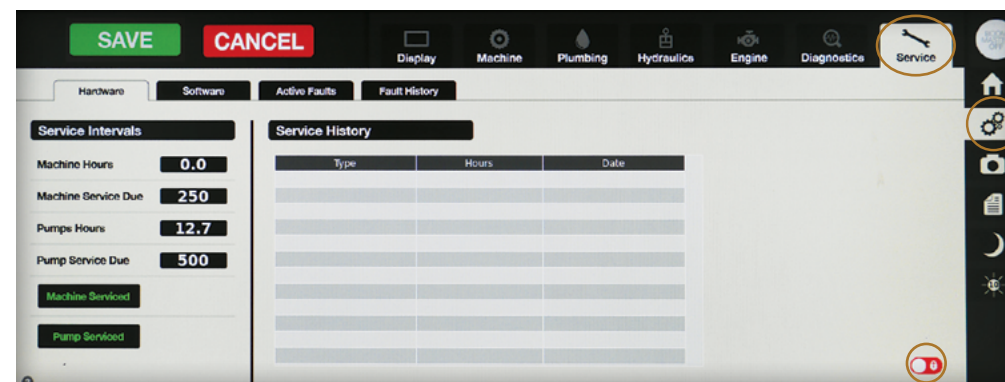
To unlock the screen, follow the instructions previously provided in chapter 4 & 6.

A 'Help (?)' touch button in the lower left hand corner of the screen can be pressed for further information.

### Hardware

The 'Hardware' screen shows two menus:

- 1 Service Intervals
- 2 Service History.



Press the Setting tab, then the 'Service' tab to open the Hardware tab screen.

### 1 Service Intervals

Required 'Service Intervals' are set for the Machine & Pump. Each service should be recorded after servicing is completed.

#### To Record Service Intervals:

##### Machine Service Due

Complete the Machine Service as required, then press the 'Machine Serviced' touch button to record the service.

The Machine hour reading is automatically recorded and the next service requirement ('Machine Service Due') is updated.

##### Pump Service Due

Complete the Pump Service as required, then press the 'Pump Serviced' touch button to record the service.

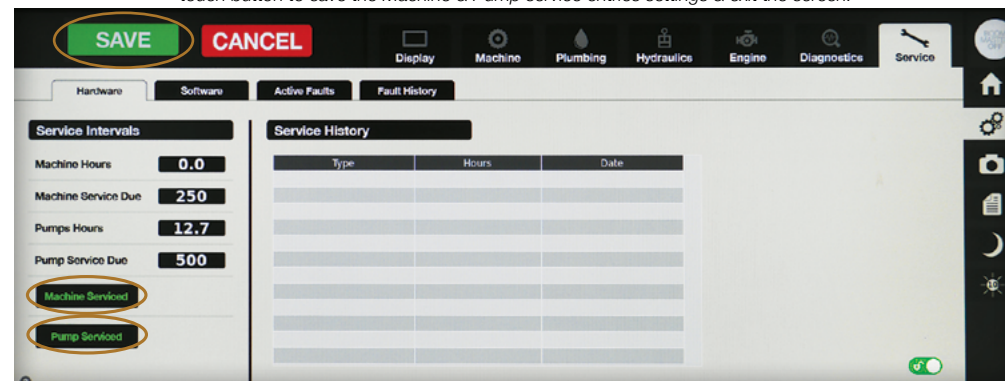
The Pump hour reading is automatically recorded and the next service requirement ('Pump Service Due') is updated.

### 2 Service History

As Machine & Pump services are recorded on the G-Hub, these are displayed on the Service History.

Press the SAVE touch button save Machine & Pump service entries and exit the screen.

Press the 'Machine Service Due' & 'Pump Service Due' touch buttons, respectively, to enter each service. Press the SAVE touch button to save the Machine & Pump service entries settings & exit the screen.







To open the bonnet unclip two latches, located on either side of the bonnet near the cabin.

## Opening the Engine Bonnet

To open the bonnet, unclip two latches located on either side of the bonnet near the cabin, then lift & move the bonnet forwards. Don't let the bonnet fall forwards under its own weight.

Once opened, the bonnet remains open by its over-centre weight.



Left hand side bonnet latch unclipped.

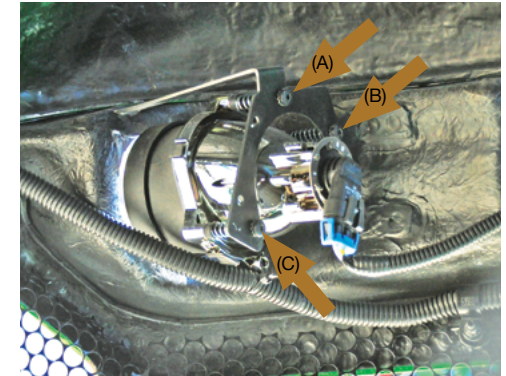
Be sure to close the bonnet & refasten the latches on both sides before driving the Cruiser.  
Strap tension can be adjusted, if necessary.  
Ensure strap tension is tight when the bonnet is closed.



Crop Cruiser Front Headlights.

## Headlights

To replace a globe, unclip the engine bonnet latches on both sides of the bonnet, then lift & move the bonnet forwards. Don't let the bonnet rotate forwards under its own weight.  
Ensure the engine is cold, then lean across to unclip the loom from the globe, then unclip the globe from the headlight housing and remove it.



Align the headlight by adjusting three screws (A, B & C) located around the headlight body.

Replace the globe with a new globe, then, reconnect the loom.

Headlight alignment is made by adjusting three screws located around the headlight body.

Make a small adjustment to the screws, then check to see if movement is in the correct direction.

Repeat screw adjustments until the headlight is properly aligned.

Ensure the bonnet is closed and latches re-fastened before driving.

The headlight uses an HB3 globe type globe (see details left).

Refer to Globe specification provided in the 'Service Parts' of the 'Maintenance Schedules' of this chapter.

### CAUTION

When the bonnet is closed, ensure the latches are properly attached and tight before driving the Cruiser.

### CAUTION

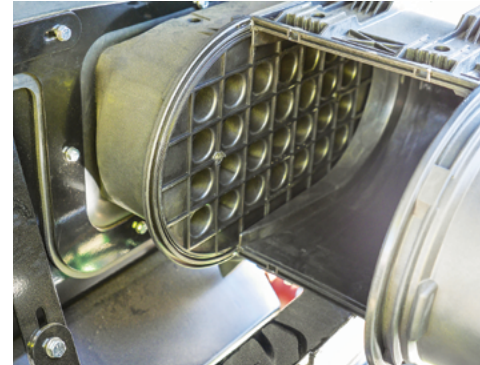
If the engine has been running, take extra care around hot engine parts such as the exhaust.  
Allow the engine to cool down before doing maintenance and repairs.



Engine air cleaner.



Release the cover clips on top of the air cleaner.



Air cleaner with the primary air filter removed.



The engine radiator & radiator cap.

## Engine Air Cleaner

The engine air cleaner is located under the engine bonnet, at the top front right hand side of the engine.

A vacuum gauge (located the right hand side of the hydraulic oil tank frame) is used to detect blockage of the air filter. The vacuum gauge is visible from the cabin.

In middle range, the gauge indicates normal function but in the 'RED' zone, shows filter blockage and the primary air filter must be removed and replaced.

NEVER attempt to clean the secondary filter, (located behind the primary air filter). The filter must be replaced when it is contaminated or damaged.

Inspection of filters is recommended when the Cruiser is new and inspection of the primary air filter at each service interval and when the vacuum gauge indicates filter change.

## To Change the Air Filter:

- 1 Open the the engine bonnet (refer to instructions on the previous page).
- 2 Release the cover clips on top & bottom of the air cleaner.
- 3 Remove the cover, then remove the primary and/or safety air filters.

Remove the air cleaner cover, then remove the primary air filter.



- 4 Fit new primary and/or safety air filters.
- 5 Carefully refit the air cleaner cover.
- 6 Reconnect & fasten the cover clips on top of the air cleaner. This completes the primary air filter change.
- 7 Close the the engine bonnet

Refer to Air Filter specification provided in the 'Maintenance Schedules' of this chapter.

Fit a new primary air filter.



## Engine Coolant

The engine radiator is fitted with a header tank which allows for expansion of coolant as the engine warms up.

The radiator cap allows excess fluid to drain out of the over flow as coolant expands.

Radiator coolant level must be checked DAILY.

Ensure the engine is cool before checking. Do not open the radiator cap if the engine is hot.

The coolant level must be visible when the cap is removed. Coolant should be no more than 50mm below the opening when the engine is cool.

The header tank is fitted with a level sensor so that if coolant drops below the sensor, the engine controller initiates an alarm via the G-hub controller & shuts the engine down.

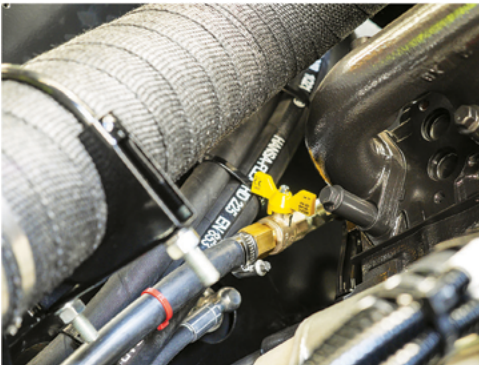
The coolant condition must be checked at regular service intervals. Refer to 'Engine Maintenance Schedules' in this chapter.

Coolant test kits are available from Cummins.

## CAUTION

Never remove the radiator cap when the engine is hot. Failure to follow this instruction may result in severe injuries.





Open the heater ball valve (on the LHS rear of the engine) when replacing coolant to bleed any air.

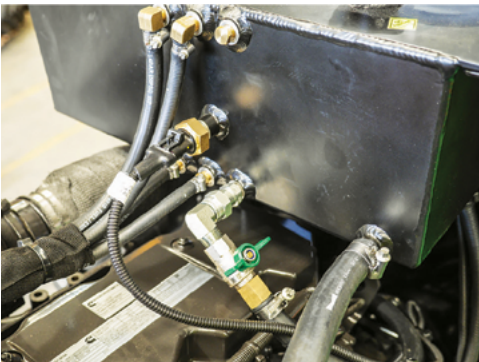
## Coolant Replacement

Coolant must be replaced every 2000 hours. Follow the instructions on top of the radiator. Quantity & coolant type as shown in the 'Maintenance Schedules' of this chapter.

Ball valves (located on heater hoses on LHS rear of the engine & header tank) may be isolated during hotter weather to allow air conditioning to operate more efficiently.

When replacing the coolant, these ball valves must be opened so that all the air is bled from the coolant lines.

Open the heater ball valve (on the top rear of the engine) when replacing coolant to bleed any air.



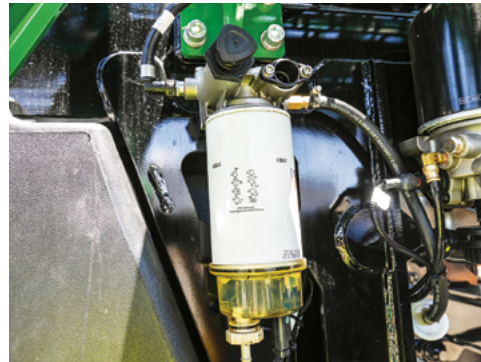
The Inline fuel filter located on the left hand side of the engine.

## Fuel Filters

Three fuel filters are located on the left hand side of the Cruiser engine area:

- In-line fuel filter, located on the left hand side of the engine.
- Primary fuel filter with water separator & manual hand pump, mounted on the left hand chassis.
- Secondary fuel filter, locate on the left hand side above the engine oil dip stick (fine pressure filter).

The Primary fuel filter located on the left hand side of the chassis.



The Secondary fuel filter located on the left hand side above the engine oil dip stick.

The Primary filter is the second point from the fuel tank, it separates any water from the fuel and also filters contaminants.

The water trap at the base of the filter cylinder should be drained daily.

It has a sensor at its base which triggers an alarm when excessive amounts of water are detected in the fuel.

Unscrew & pump the plunger to prime the fuel. Retighten the plunger after the fuel is primed.

The Primary filter should be replaced within the first 50 hours of use, then every 250 hours of engine operation.

The Secondary (engine) filter is mounted on the left hand side above the engine oil dip stick.

Refer to Fuel Filter specification provided in the 'Maintenance Schedules' of this chapter.



Engine oil dip stick (shown left [yellow]) & engine oil filler cap (shown behind the dipstick).

## Engine Oil & Filter

Follow the recommended service schedules for engine oil and filter.

Check engine oil level DAILY.

### To Check the Engine Oil:

- 1 Stop the engine.
- 2 Remove the engine oil dipstick from the engine tube and wipe it clean of oil.
- 3 Replace the engine dipstick, then remove it to measure the engine oil level.

The oil level must be between the 'ADD' and 'FULL' marks on the dipstick.

If the oil level is below the 'ADD' mark, top-up the oil level with the appropriate oil.

Refer to Lubricant specification provided in the 'Maintenance Schedules' of this chapter.

## NOTE

Required Fuel Filter maintenance is provided under 'Engine Maintenance Schedules & Filter' specifications in this chapter.

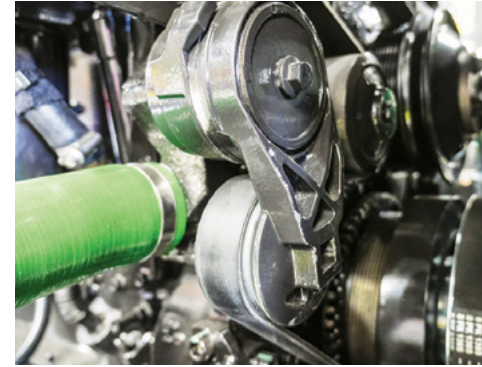




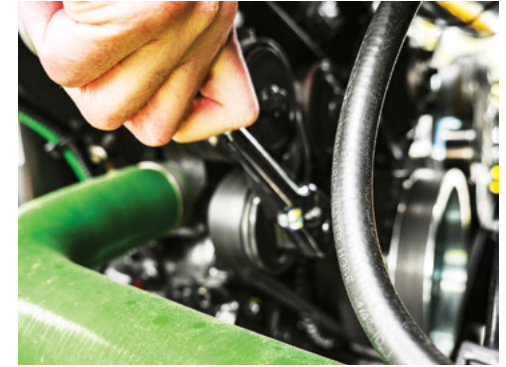
Engine oil filler cap in the rocker cover on top of the engine.



Engine oil filter located on the right hand side of the engine.



Engine drivebelt & belt tensioner.



Use a breaker bar with a 1/2" socket to release the engine belt tensioner.

### Engine Oil & Filter Change

The engine oil & oil filter must be changed within the first 50 hours of engine use. Refer to the 'Maintenance Schedules' in this chapter

#### To Change the Engine Oil & Oil Filter:

- 1 Place a container (at least 30 litre capacity) under the remote drain plug, located on the left hand side of the front cross rail in front of the fuel tank.
- 2 Remove the drain plug.  
The engine oil filler cap can be loosened to allow the oil to drain more freely.
- 3 Remove the spin-on external engine oil filter by rotating it in the counter-clockwise direction. A standard strap-type wrench may be used.
- 4 Replace the filter with new filter. Lubricate the filter gasket with film of engine oil.
- 5 Install the filter by hand, until the gasket tightens onto the engine (hand tight only).
- 6 After the engine oil is fully drained, refit the oil drain plug.
- 7 Fill the new engine oil via the filler cap in the rocker cover on the top of the engine or via the filler cap located by the dipstick on the left hand side of the engine.
- 8 Check the oil level using the dipstick on the left hand side of the engine.
- 9 On completion, ensure the oil filler caps drain plug and oil filter are fitted correctly and wipe any oil spills from the machine.

### Engine Drive Belt

The Engine Drive Belt (located on the front of the engine) uses a spring tensioner which requires no manual adjustment, but requires inspection at regular service intervals.

If the tensioner loses tension, belt slip will occur and the tensioner must be replaced.

Check the belt regularly, as it may become slippery, frayed or cracked over time. The belt should be replaced at minimum every 1000 hours.

### To Replace the Engine Drive Belt:

- 1 Remove the drive belt using a breaker bar with a 1/2" socket to release the tensioner before slipping the belt off.  
Slowly & smoothly release bar to avoid snap back injury.
- 2 Replace the drive belt using the breaker bar with a 1/2" socket to release the tensioner.  
Slip new belt on & ensure the belt ribs are aligned correctly with the pulleys.  
Slowly & smoothly release bar to avoid snap back injury.

### NOTE

Refer to 'Engine Maintenance Schedules' in this chapter for Engine Oil & Oil Filter specifications.



Use a breaker bar with a 1/2" socket to release the hydraulic pump belt tensioner.

## Hydraulic Pump Belt

The Hydraulic Pump Belt (located on the front left hand side of the engine) uses a spring tensioner which requires inspection at regular service intervals.

If the tensioner loses tension, belt slip will occur and the tensioner must be replaced.

Check the belt regularly, as it may become slippery, frayed or cracked over time. In addition, belt ribs will turn red when worn and in need of replacement.

## To Replace the Hydraulic Pump Belt:

- 1 Remove the drive belt using a breaker bar with a 1/2" square drive to release the tensioner before slipping the belt off.  
Slowly & smoothly release bar to avoid snap back injury.
- 2 Replace the drive belt using the breaker bar with a 1/2" square drive to release the tensioner.  
Slip new belt on & ensure the belt ribs are aligned correctly with the pulleys.  
Slowly & smoothly release bar to avoid snap back injury.



Cabin Air Cleaner on the rear right hand side of the cabin.

## Cabin Air Cleaner

The Cabin Air Cleaner is externally located at the rear right hand side of the cabin.

The filter cleans impurities from air entering the cabin. Air is drawn in through the carbon filter by a fan which pressurises the cabin preventing impure air entering the cab from gaps or possible seal leaks.

Filter elements include a:

- Pre-cleaner &
- Carbon filter.

The Pre-cleaner is a foam element which must be cleaned regularly.

The Carbon filter must be checked regularly and changed when necessary.

Carbon balls within the Carbon filter capture air impurities from the air passing through the filter.

A colour indicator on the end of the filter shows when the filter needs replacement (or recharging by a certified agent).



Unscrew the carbon filter retaining nut & remove the filter element from the filter housing.

## To Service the Cabin Air Filter:

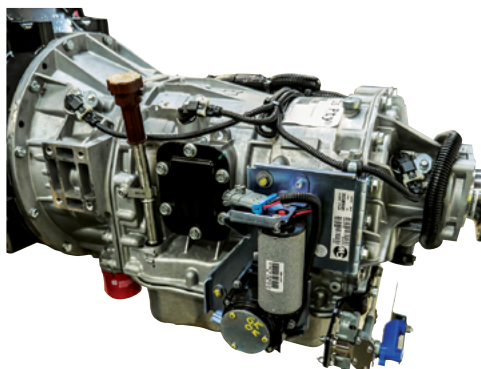
### Carbon Filter

- 1 Unscrew the top housing retaining band.
- 2 Remove the top of the housing.
- 3 Unscrew the carbon filter retaining wing nut
- 5 Remove the filter element from the housing.
- 6 Check the carbon ball colour guide:
  - Purple - Active
  - Brownish Orange - Active
  - Brownish Red - Filter must be replaced (or recharged by a certified agent).

When the indicator shows Brownish Red, replace/renew the carbon filter.

## NOTE

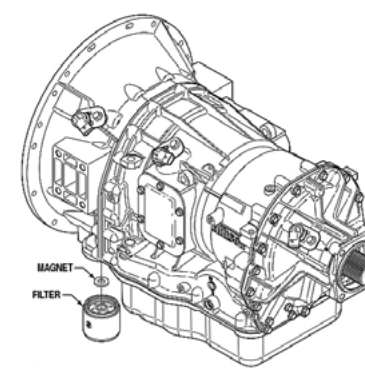
Carbon Filter specification is provided in the 'Service Parts' & 'Filters' section in this chapter.



Allison 6 Speed Automatic Transmission.



Transmission oil dipstick.



The oil filter & magnet is located on the bottom left hand side of the transmission.

- 7 Fit the filter element into the housing.
- 8 Refit the filter retaining wing nut & tighten.
- 9 Refit the top of the housing & retaining band and tighten the band.

Refer to Filter specification provided in the 'Maintenance Schedules' of this chapter.

### Foam Element

Clean the grey foam element of the Cabin Air Cleaner regularly.

## Transmission

The Allison 6 Speed Automatic Transmission oil level must be checked regularly.

Follow the transmission oil & oil filter service schedules specified in the 'Maintenance Schedules' of this chapter.

Check the transmission oil level using the dipstick located on the left hand side in front of the cabin. Oil level must be checked with the engine running.

If oil is cold (less than 70 degrees Celsius) the oil level must be in the lower range on the dipstick.

If oil temperature is warm (above 70 degrees Celsius) the oil level must be in the upper range on the dipstick.

### CAUTION

Avoid any skin contact with used transmission oil. Beware that draining transmission oil may be hot. Failure to follow these cautions may result in personal injuries.

## To Replace the Transmission Oil:

- 1 Park the Cruiser on a flat level surface.
- 2 Place a suitable container under the transmission to collect draining oil.
- 3 Remove the drain plug from the bottom of transmission oil pan. Warm oil will drain more easily.
- 4 Remove & replace the transmission oil filter according to the following instructions.
- 5 Allow the oil to drain out fully, then re-fit the drain plug & sealing washer. Tighten drain plug to 30-40 Nm (22-30 lb ft)
- 6 Refill the transmission with fresh oil via the dip stick tube (located on the left hand side in front of the cabin) until the oil level on the dipstick is correct.
- 7 Start the engine. The oil level will drop as it fills the oil lines running from the transmission.
- 7 Top up the oil level until it again reads correctly on the dip stick.
- 8 Replace the dipstick & stop the engine.

## To Replace the Transmission Filter:

- 1 Remove the spin-on external filter by rotating it in the counter-clockwise direction. A standard strap-type wrench may be used.
- 2 Remove the magnet from the filter attachment tube or the top of the filter element.
- 3 Clean any metal debris from the magnet. Any metal pieces found larger than dust needs to be further investigated.
- 4 Re-install the magnet onto the filter attachment tube.
- 5 Lubricate the gasket on the filter with a thin film of transmission fluid.

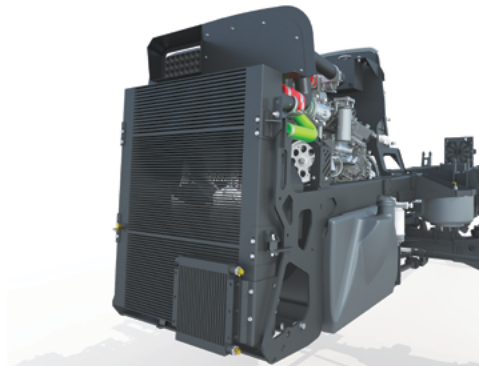
### NOTE

Transmission Maintenance Schedules and transmission fluid specification can be found the 'Maintenance Schedules' of this chapter.





Transmission oil filter.



Integrated transmission oil cooler.

- 6 Install the filter by hand, until the gasket touches the housing.  
Turning the filter more than one full turn after gasket contact will damage it. Turn the filter ONE FULL TURN ONLY after gasket contact.
- 8 Refill transmission with oil.  
Refer to the oil & filter specification provided in the 'Maintenance Schedules' of this chapter.

## Transmission Oil Cooler

The transmission oil cooler is integrated within the engine radiator.



Inspect & grease fixed drivelines regularly.

## Fixed Drivelines

Fixed Drivelines transmit drive between the transmission and the differentials.

Each driveline has greasable universal joints at each end & centre bearings on the shafts.

The rear shaft also has a telescopic spline which requires greasing.

All fixed drivelines should be inspected for wear & greased at regular service intervals.

Refer to the 'Grease Points' & 'Maintenance Schedules' in this chapter.



Clean the breather of differentials regularly.

## Differentials

Differentials run in an oil bath sump.

The oil level can be checked by removing the level plug on the side of the differential housing.

The oil should be replaced at the first service to remove manufacturing contamination. The oil must be replaced every 500 hours.

Refer to the specification provided in the 'Maintenance Schedules' of this chapter.

A breather, located on the top of the differential, allows oil to expand and contract without creating a vacuum or pressurising the differential housing.

Differential breathers must be cleaned at regular service intervals.

Inspect & grease fixed drivelines regularly.



### NOTE

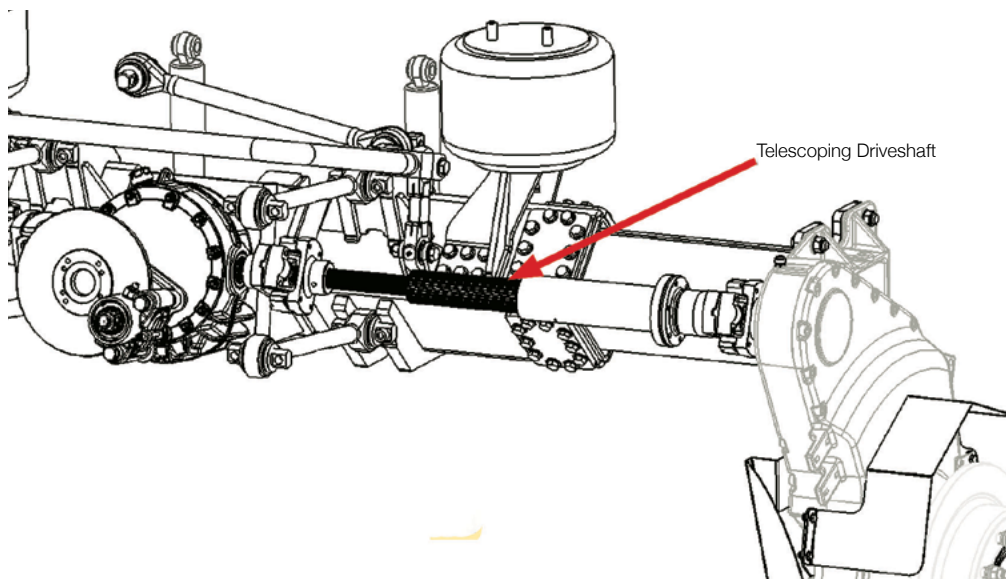
Refer to the Allison Transmission Operation & Codes Manual (supplied) for any information on the operation and/or troubleshooting of the Allison transmission.

### NOTE

Driveline & Differential Maintenance Schedules are provided in the 'Maintenance Schedules' of this chapter.

### NOTE

Rear differentials are fitted with an LSD. Some chattering noise may be present during first use, but will subside over time. This is normal.



Extend the Adjustable Axles and clean the telescoping driveshafts.

### Adjustable Axles 3-4m

The rear axle of the 3-4m adjustable axle is fitted with splined telescoping driveshafts between the differential centre and dropleg inputs.

These shafts do not have a shield or guard so they must be cleaned and greased regularly.

When performing maintenance on the adjustable axles, 3 of the needle valves can be closed allowing controlled extending and retracting of the axle being serviced.

Before extending or retracting an axle, ensure that the wheel is raised sufficiently off the ground using a rated axle stand or jack.

#### CAUTION

DO NOT attempt to extend or retract axle while the extending or retracting axle wheel is On the ground. Failure to ensure the wheel is Off the ground before extending or retracting is attempted will create excessive pressure on the wheel assembly & can cause damage.

### To Clean & Re-apply Grease

- 1 Fully extend the axles using the procedure explained in Chapter 6, 'Operation'.
- 2 Turn engine off and chock all wheels
- 3 Using a strong degreaser or wax & grease remover, generously coat the splines. Use a brush to loosen the grease and dirt.
- 4 Use compressed air to clean splines. Ensure safety glasses or a face shield are worn.
- 5 Once clean, apply a generous coat of grease to all surfaces of the splines.  
Recommended grease: Klüberpaste 46 MR 401.
- 6 Reset the desired axle width using the procedure explained in Chapter 6, 'Operation'.

### Drop Legs

Dropleg oil levels should be checked regularly.

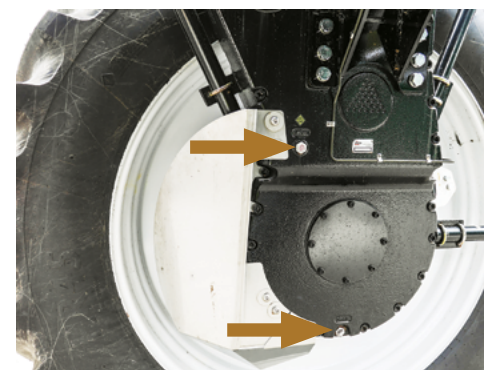
Replace dropleg oil at the first 50 hour service to remove manufacturing contamination. Thereafter, replace oil every 500 hours.

Refer to the specification provided in the 'Maintenance Schedules' of this chapter.

### Dropleg Oil

Drop legs incorporate an oil bath sump in which chains run & carry oil for the chains, sprockets & bearings.

Each idler shaft bearing housing utilises a sump to ensure bearings are always lubricated.



Dropleg oil level/fill plug (top arrow) & drain plug (bottom)

### To Check Dropleg Oil Levels:

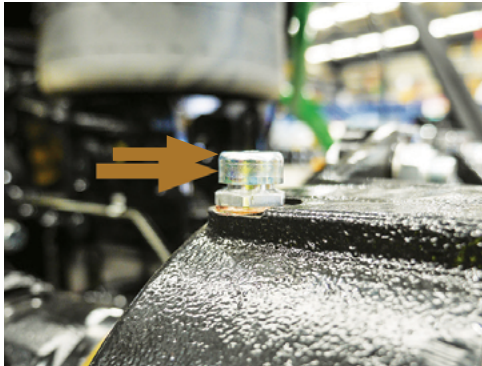
- 1 Remove the dropleg oil level/fill plug.
- 2 Check the oil level. Oil level must be just below the level/fill plug.
- 3 If required, add more oil.
- 4 Refit & tighten the level/fill plug.
- 5 Repeat the procedure for each dropleg.

### To Change Dropleg Oil:

- 1 Place a container below the drain plug at the base of the dropleg to collect the draining oil.
- 2 Remove the drain plug to empty old oil.
- 3 After the oil is completely drained, refit and properly tighten the drain plug.
- 4 Refill the dropleg with recommended oil. Refer to the specification provided in the 'Maintenance Schedules' of this chapter.
- 5 Repeat the procedure for each dropleg.

#### NOTE

When cleaning telescoping driveshafts and ONE wheel is lifted OFF the ground, the adjustable axle can be adjusted to the desired width providing the OTHER 3 axle adjustment cylinder valves are CLOSED. Adjust & measure the width. Repeat the procedure for each wheel.

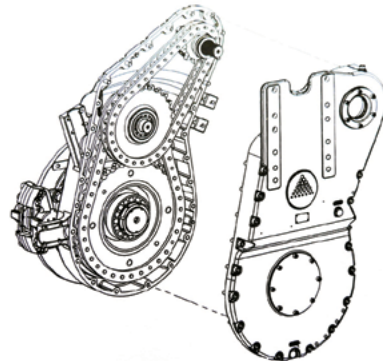


*Clean the breather of droplegs regularly.*

## Dropleg Breathers

Breathers on top of the drop legs allow oil to expand & contract without pressurising or creating a vacuum in the drop leg housings. Each dropleg breather must be cleaned at regular service intervals.

Refer to the specification provided in the 'Maintenance Schedules' of this chapter.



*Illustrated dropleg drive chains.*

## Dropleg Drive Chains

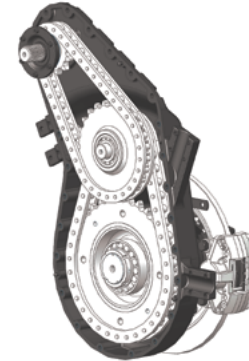
Drive chains of highest quality & designed for long trouble free life are used in the droplegs. Ensure proper dropleg care & maintenance is followed to maximise chain & sprocket life.

Top drive chain uses Tsubaki 120 Super HT chain & bottom drive chain uses Tsubaki 140 Super HT chain. Refer to the specification provided in the 'Maintenance Schedules' of this chapter.

Even the best chains will eventually stretch over time & loosen. Maximum allowable chain stretch is 1.5%. When this occurs the chains must be replaced.

Chain service life is gauged by total stretch. There is no tensioning mechanism. As chains stretch beyond 1.5%, the chains will no longer align correctly with the drive teeth. Therefore proper replacement is mandatory to prevent excessive wear of the drive sprocket teeth.

Stretch gauges to check chains are available from Goldacres.



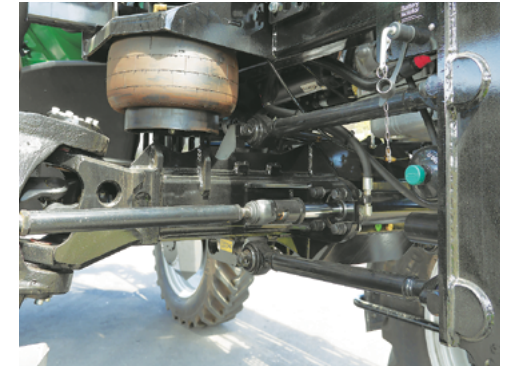
*Replace dropleg drive chains when necessary.*

## Condition of Drop Chains

Drop chains do not have a specific service life. Chain condition is determined by observing metal particles in the oil & on the sump plug.

Larges numbers of metal particles larger than 1mm indicate the dropleg must be opened for inspection. Possible chain & bearing failure may be imminent and the dropleg should be overhauled.

As preventative mainenance measure, chains should be replaced whenever a dropleg is opened.



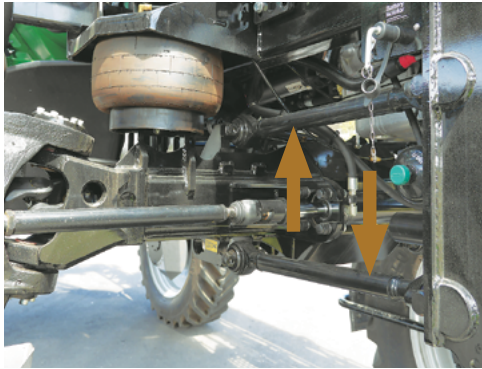
*Five point suspension system components.*

## Suspension

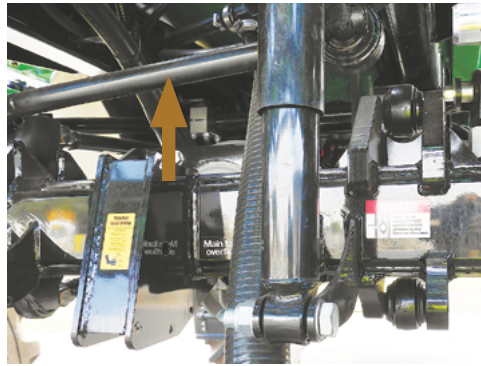
The Cruiser's five point axle suspension system comprises:

- Four trailing arm torque rods,
- One Panhard rod
- Two air bags on each axle - allowing axles to oscillate
- Rear axle anti-roll sway bar.





*Panhard rod.*



*Trailing arm torque rods.*

### Panhard Rods

Panhard rods hold the axle centred in the chassis and to prevent any sideways movement holding axles central to the chassis.

Panhard rods are attached to the top of the axle & bottom of the chassis with two polyurethane bushes and 3/4" high tensile bolts.

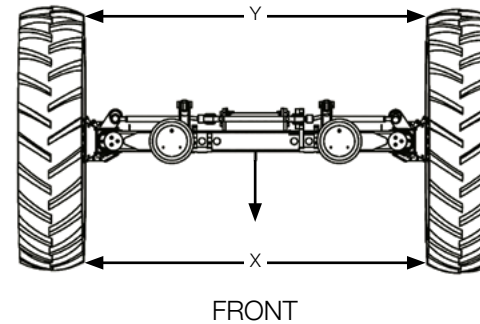
Bolts and bushes should be checked each time that the vehicle is serviced.

### Trailing Arm Torque Rods

Trailing arm torque rod links hold axles in place on the chassis. The rods allow the axle to distort or twist fore & aft when wheels come an obstruction such as pot holes, logs, rocks or embankments, etc.

Any oscillation is absorbed by polyurethane bushes in each end of the links. Each end of the parallel link is attached to the chassis and differential with polyurethane bushes & 3/4" high tensile bolts.

Bolts & bushes should be checked each time that the vehicle is serviced. Refer to the specification provided in the 'Maintenance Schedules' of this chapter.



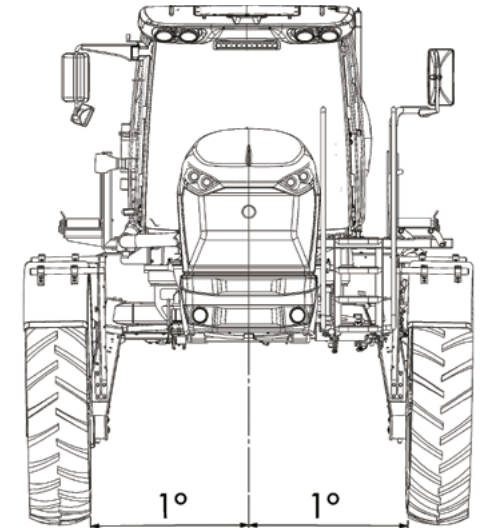
*Steering Toe-In distance 'X' should be 1-5 mm less than distance 'Y'.*

### Steering Toe-In

Steering Toe-In should be set to 1-5 mm.

#### To check Steering Toe-In:

- 1 Park the Cruiser on a flat level surface, apply the parking brake & remove the ignition key
- 2 Measure up 900mm from the ground on the right hand side front steer tyre & mark the front part of the tyre.
- 3 Measure up 900mm from the ground on the right hand side front steer tyre & mark the rear part of the tyre.
- 4 Repeat steps 2 & 3 on the left front steer tyre.
- 5 Measure between the front marks (previously made) on the left & right front steer tyres and record the distance.

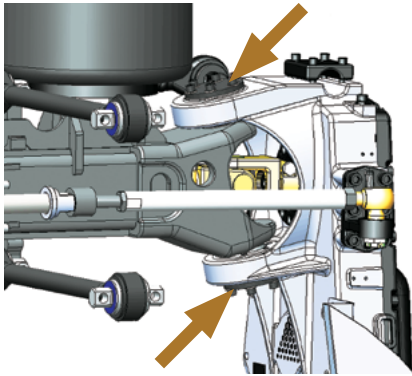


*Front wheel camber is set to +1.0°.*

- 6 Measure between the rear marks (previously made) on the left & right front steer tyres and record the distance.
- 7 The front measurement must be 1-5 mm less than the rear measurement.
- 8 To make an adjustment, loosen the tie rod lock nuts, then rotate the rod to extend or shorten the rod, until the toe-in measurement is correct.
- 9 When correct, re-tighten the lock nuts.

### Wheel Camber

Wheel Camber is factory set and cannot be adjusted. At the time of manufacture the wheel camber is set to +1.0°.



Remove the top & bottom King Pin retaining plates.

## 4WD King Pin Torque & Inspection

### To Check King Pin Torque:

- 1 Support the front axle with a rated lifting jack to take weight off the front wheels.
- 2 Remove the screws and the top & bottom King Pin retaining plates.
- 3 Check the Kingpin Torque using a  $\frac{3}{4}$ " torque wrench.  
A 1350 Nm (1000 ft/lb) Torque multiplier may be required.
- 4 Replace both top & bottom King Pin retaining plates, screws & fully tighten.
- 5 Repeat steps 2 - 4 on the other side.

Size & Load Index	Recommended pressure at	
	30km/h kPa / PSI	50km/h kPa / PSI
<b>480/80R46</b> 166A8/159D	240 / 35	290 / 42
<b>480/80R50</b> 177A8/166D	220 / 32	240 / 35
<b>520/85R46</b> 173A8/169D	220 / 32	240 / 35

Cruiser tyre options & recommended tyre pressures.

## Tyre Maintenance

The Cruiser has three tyre options (see above).

It is very important that tyres are properly maintained.

Tyre pressure is the most important factor for maintaining correct load rating of the tyre. Correct tyre pressure should be maintained at all times.

Tyre pressure should be checked regularly - every 8 to 12 hours of operation.

Inflation above or below recommended pressures may cause damage to the tyres.

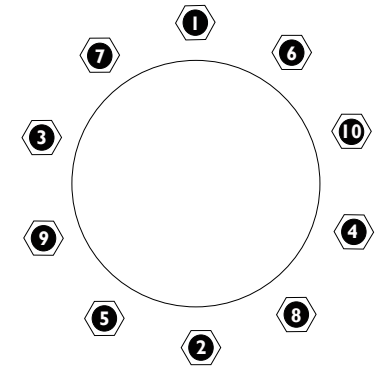
High road speeds & heavy loads may cause tyres to wear prematurely.



Regularly check tyre pressure and wheel nut tension.

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 the Cruiser.

Protect the tyres as much as possible to minimise wear and deterioration. Chemical sprays & insecticides are harmful to the rubber in the tyres and should be washed off immediately after use.



Follow the wheel nut tightening sequence (above) to ensure even wheel nut torque distribution (350 ft/lb).

## Wheel Nut Tension

Wheel nuts must be tensioned daily when the machine is new and whenever wheel nuts are removed and refitted.

Once wheel nuts hold their tension, inspection can be lengthened to approximately 50 hours.

Wheel nut tension specification on the Cruiser front & rear wheels is 350 ft/lb.

Follow the wheel nut tightening sequence (shown above) to ensure even wheel nut torque distribution.

### **⚠ DANGER**

Do not chock or support the machine using materials that may crumble.  
Use only load rated supports.

### **⚠ DANGER**

Take extreme care when inflating tyres and use an accurate inflation gauge when doing so.  
If tyres are inflated at a rapid rate then the tyre rim combination may explode. This can result in serious or fatal injuries.



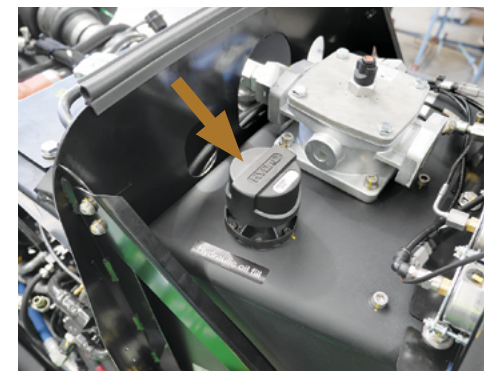
Recommended wheel nut torque tension is 350 ft/lb.



Chock opposite wheels of the Cruiser before lifting.



Oil pressure gauge of the closed centre pump.



Oil tank fill point.

## Wheel Changing

Changing of wheels should only be done by an experienced person working with the correct equipment.

To change a wheel:

- Ensure the Cruiser is on hard, flat level ground and wheels are chocked at the opposite end of lifting.
- Remove the isolator key and ignition key.
- Ensure the boom is fully closed before raising the machine off the ground.

- Empty the spray tank if possible before lifting the machine.
- Place a rated jack securely under the jacking point, then gently raise the machine until the weight is taken off the wheel being changed.

## Hydraulic Oil System

The Hydraulic Oil System uses pressure filters for maintaining oil cleanliness in every circuit.

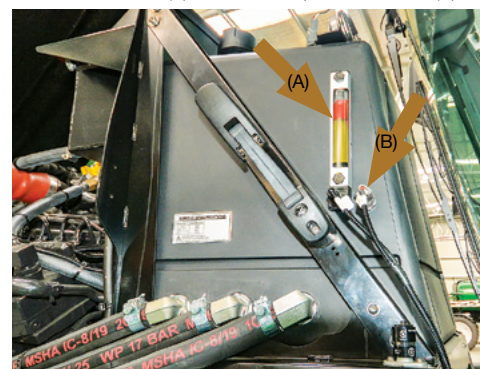
Electronic filter blockage indicators monitor filter health and valves include manual overrides where possible.

## Hydraulic Oil Tank

The Hydraulic Oil Tank is located under the bonnet at the back of the engine and:

- All hydraulic systems operate from this common hydraulic reservoir.
- The reservoir has a sight tube mounted on the side. The oil level must always be visible in top third of the tube.
- Optimal oil operating temperature range is 50-70 degrees Celsius.
- Digital temperature and low oil level sensors connect into the G-Hub system for real time hydraulic oil temperature and low oil level alarm.
- The visual oil level display window includes a red float for quick oil level checks.
- The gauge layout on top of tank shows closed centre variable displacement hydraulic pump pressure through the cabin windscreen.
- The dedicated case drain return ports are at front of tank.

Oil tank oil level (A) & G-Hub Temperature sensor (B).



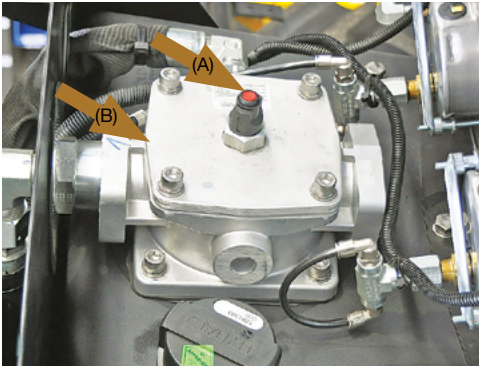
### **⚠ DANGER**

When the tank is fully loaded each wheel supports a weight up to approximately 5 tonnes.  
Always ensure that the jack is designed to operate under this pressure.

### **⚠ DANGER**

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





Filter Indicator (A) & Return Filter (B).

## Return Filter

The Return Filter is fitted to the top of the hydraulic reservoir tank in front of the cabin.

Filters returned oil to the reservoir.

This filter should be replaced after the first 50 hours of use and there after every 500 hours.

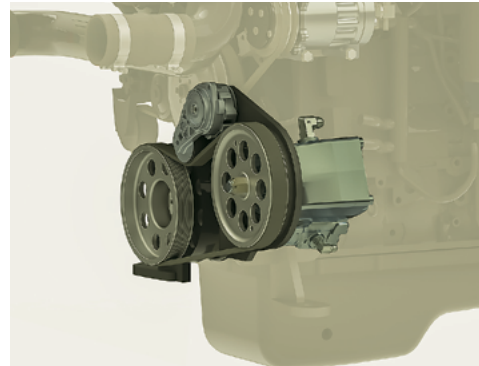
A red indicator is located on the top of the filter. If the indicator pops out, the filter must be replaced because it is blocked and causing back pressure in the system.

The filter indicator should be checked once the oil has reached operating temperature as cold oil can cause a false reading on the indicator.

Refer to the specification provided in the 'Maintenance Schedules' of this chapter.

## NOTE

Refer to the 'Maintenance Schedules' this chapter for information on hydraulic maintenance, lubricants and parts.



Closed Centre Variable Displacement Pump driven by a multi-rib belt (with belt tensioner).

## Closed Centre Variable Displacement Pump

The Closed Centre Variable Displacement Pump With Load Sensing (located at the front of the engine) powers the:

- Boom functions (boom lift, boom tilt, boom fold & boom rest)
- High flow fill pump and
- Steering system.

The pump is driven by a multi-rib belt from the engine crankshaft.

The belt drive uses a spring tensioner which eliminates the need for adjustments.

The tensioner can be released by using a 1/2" drive tool such as a breaker bar.

The pump is 45cc which delivers relatively high flow at low engine RPM. Oil flow is on demand.

The multi-rib belt incorporates a red wear indicator.



Twin hydraulic gear pumps - 22cc (A) & 32cc (B).

## Twin Hydraulic Gear Pump - 32cc & 22cc

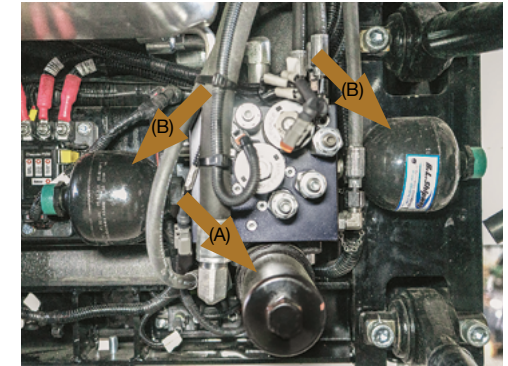
The Twin Hydraulic Gear Pumps are located on the left hand side of the engine.

Both are positive displacement pumps powered by the engine PTO drive.

The 22cc pump drives the service brakes, park brake and engine fan.

The 32cc pump drives the spray pump.

Oil pressure filters clean oil in both circuits.



Forward-Mounted Hydraulic Manifold with Pressure Filter (A) & Service Brake Accumulators (B).

## Forward-Mounted Hydraulic Manifold

The Forward-Mounted Hydraulic Manifold (located under chassis on the RHS behind the engine [see illustration below] is a dedicated hydraulic manifold controlling the park brake, service brakes and engine cooling fan.

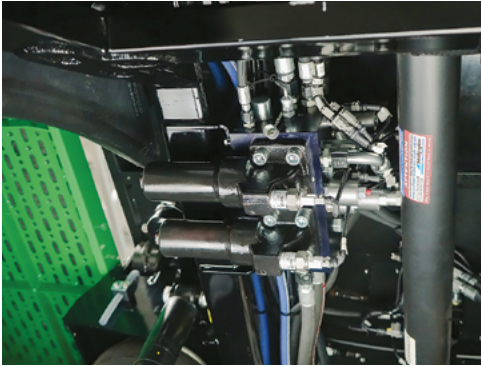
Hydraulic accumulators allow full brake control in the event of engine failure.

Use of a pressure filter & proper maintenance provides for a clean hydraulic circuit.

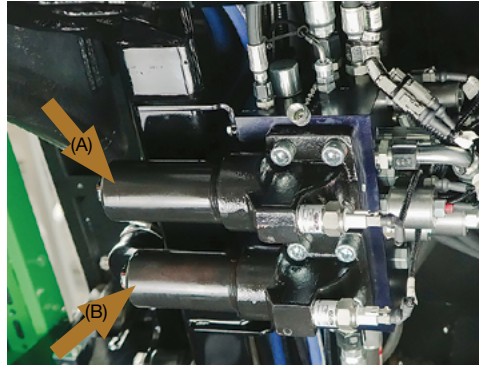
Variable hydraulic control of engine cooling & radiator fan minimizes noise, fuel usage and power loss.

## NOTE

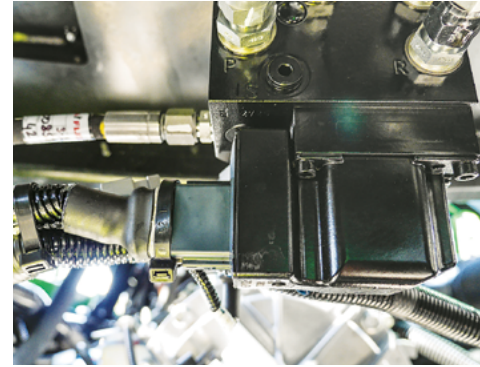
Refer to the specification provided in the 'Maintenance Schedules' of this chapter.



*Mid-Mounted Hydraulic Manifold with Pressure Filters.*



*Twin Pressure Filters (A) & (B).*



*The Danfoss OSPE Steering Orbital under the cabin.*



*The Hydraulic Oil Cooler behind the spray tank*

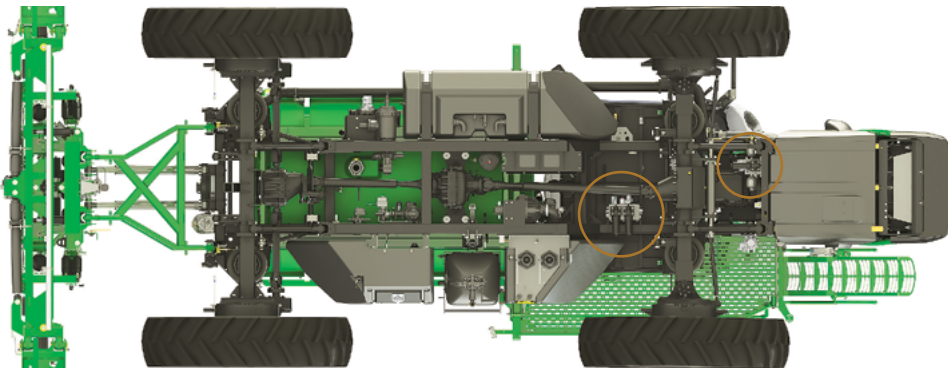
## Mid-Mounted Hydraulic Manifold

The Mid-Mounted Hydraulic Manifold (located on the LHS behind the front axle) controls the:

- Spray pump speed (electric control with soft start/stop)
- Adjustable boom rest activation
- Fill pump & load sensing for the variable displacement hydraulic pump
- Steering priority.

Dual pressure filters keep the flowing oil clean. A pressure relief valve is built into the manifold with an opening pressure of 2750 PSI.

*The under-chassis locations of the Forward-Mounted (right) & Mid-Mounted (left) Hydraulic Manifolds.*



## Hydraulic Pressure Filters

The hydraulic pressure filters filter oil before it is pumped through the manifolds.

One filter is for the 45cc pump and the other is for the 32cc pump.

The filtration elements are rated at 10 micron.

The filters are fitted with electronic condition sensors which report to the G-Hub integrated system. A warning shows on the controller display when replacement is necessary.

The pressure filters have a general usage life expectancy of 500 hours.

## Danfoss OSPE Steering Orbital

The Danfoss OSPE Steering Orbital, located under the cabin, is a high performance steering unit with a fully integrated GPS ready steering ready system which removes need to add any extra hydraulic valves to the machine.

The steering valve is powered on via the 'Spray mode/Road mode' switch on the side console in the cabin.

The valve is disabled when in 'Road mode'.

Auto steer ready AgLeader, Trimble, Raven & Topcon applications can be steered directly from the Nav controller via CAN BUS network.

For John Deere applications, a separate 'CAN Bridge' is required & supplied from Agra GPS or Solsteer (dealer to supply).

Wheel angle and steering manual override sensors are factory fitted.

## Hydraulic Oil Cooler

The Hydraulic Oil Cooler, located on the chassis behind the spray tank, incorporates a large hydraulic oil cooler core, variable fan speed fan & an auto fan reverse system to blow out dirt build-up and debris.

A thermal bypass allows oil to rise to optimum operating temperature as quickly as possible. The oil cooler engages when the oil temperature reaches 55°C.

A warning is given in the cabin when the hydraulic oil may be overheating. The warning activates if oil temperature reaches 95°C.

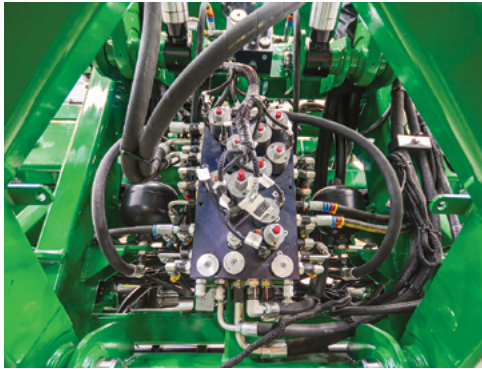
If the warning sounds, cease operating the Cruiser immediately and assess whether the cooler is operating correctly or ambient temperature is too high for operating.

## CAUTION

Do not use this machine in ambient temperatures exceeding 40°C.

Significant damage may occur where machine is operated continuously in very hot conditions.





Rear Manifold at the front of the boom centre section.

## Rear Manifold

The Rear Manifold with compact cartridge style valves, located on the front of the boom centre section, controls all boom functions including lift, fold, tilt, bi-fold, centre level and hydraulic yaw.

The hydraulic block is divided into left and right sections with hydraulic hoses directed to each side of the boom.

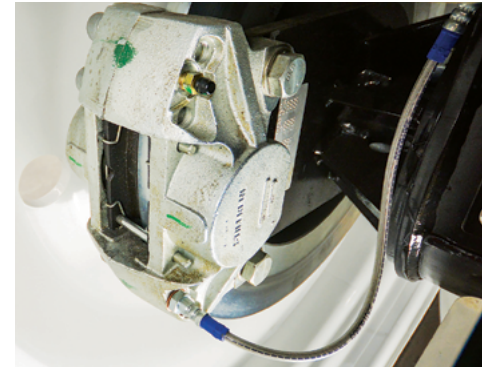
Manual overrides are fitted to the solenoids.



Cabin foot brake.

## Braking System

The Braking System is hydraulically operated with disc brakes on all 4 wheels. Hydraulic accumulators are used to ensure an operator can still safely stop the Cruiser in the event of engine failure.



600mm diameter rotors (discs) are fitted to the hub on the inside of each wheel.

## Rotors

600mm diameter rotors are fitted to the hub on the inside of each wheel. Rotor thickness is 22mm new. Minimum rotor thickness is 20 mm.

Rotor with a thickness of less than 20mm must be replaced.

Rotors used on the Cruiser are a customized construction and replacements must be purchased from your local Goldacres dealer.



Brake caliper & pads.

## Brake Calipers & Pads

The calipers used on the machine have two brake pads on each caliper which clamp onto the rotor when the brakes are applied.

These pads must be inspected regularly for wear. When the pads wear down to the indicator groove they must be replaced. Build up of mud and debris will cause the brake pads to wear prematurely for this reason the brake calipers must be kept clean at all times.

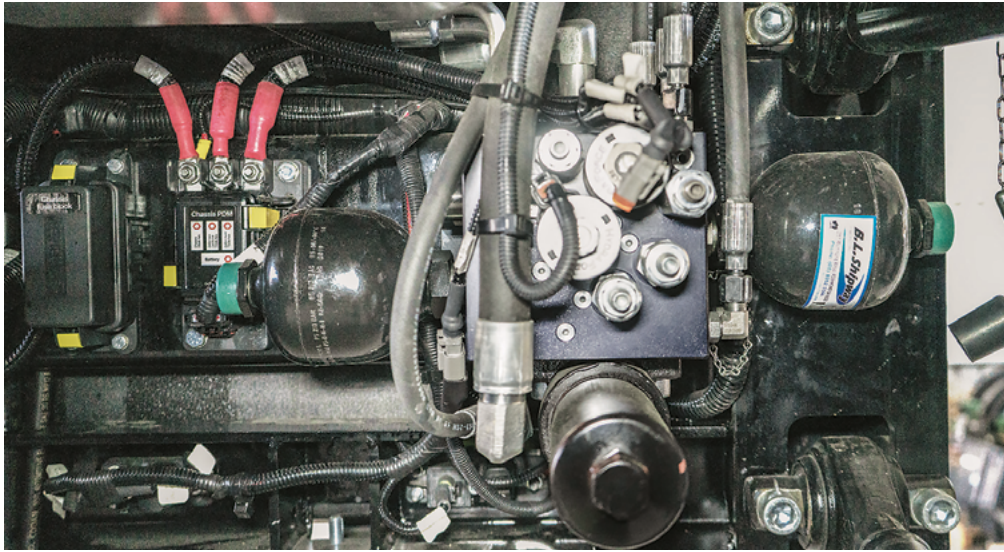
### NOTE

Refer to the specification provided in the 'Maintenance Schedules' of this chapter.

### NOTE

Refer to the specification provided in the 'Maintenance Schedules' of this chapter.





Service & park brake hydraulic manifold & accumulators located under the transmission.

## Hydraulic Manifold

Service brakes and park brake are controlled via an the accumulators & hydraulic manifold mounted under the transmission.

Two brake accumulators store pressurised hydraulic oil so that the service brakes remain operable in the event of an engine failure.

The front & rear brakes are separate brake circuits. One accumulator is use for the front brakes and one for the rear brakes. In the event of a brake circuit failing, the other can still operate.

The energy stored in the accumulators is enough to provide the operator 5-10 pedal presses until the pressure runs out after the engine stops.

Once pressure is fully depleted, the park brake will automatically apply.

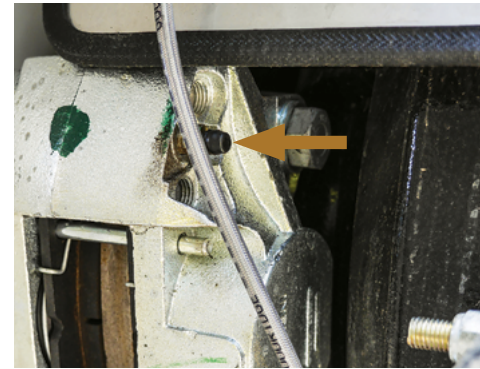
## Service Brake Bleeding Procedure

### To Replace the Service Brakes

- 1 Park the Cruiser on a flat level surface and chock the wheels (engine running).
- 2 Place approximately 30mm of hydraulic oil into a container for use for bleeding the brakes and place the container below the one of the brakes. Each brake caliper must be bled separately.
- 3 Connect a clear plastic tube to the bleed screw on the service brake caliper.

### CAUTION

During the brake bleeding process, the person bleeding the brakes must wear suitable eye protection and gloves. Failure to follow this caution may result in personal injury.



Connect a clear plastic tube to the bleed screw on the service brake caliper.

- 4 Place the opposite end of the tube into the oil container and submerge the end of the plastic tube in it.

This is important to stop air being drawn back through the system.

- 5 Loosen the bleed screw & ask the cabin assistant to slowly depress the brake pedal & hold the pedal down.

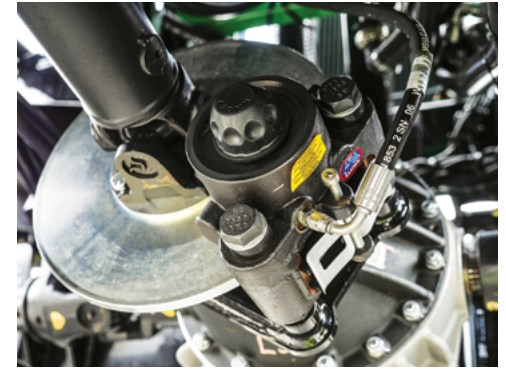
Oil will flow continuously. Repeat the procedure of slowly depressing the brake pedal to fully bleed the system - until no more air bubbles appear in the container.

- 6 Re-tighten the bleed screw only when no air bubbles are visible in the oil leaving the bleed screw.

- 7 Repeat this procedure on each service brake caliper.

### DANGER

Do not chock or support the machine using materials that may crumble.



The Park Brake (a disc brake) is mounted on the rear differential.

## Park Brake

The Park Brake is a disc brake mounted on the rear differential for powerful holding capacity. It operates with a spring On and hydraulic release so that the park brake is automatically On when the engine is not running.

Normal Park Brake operation is via the electric switch mounted on side console.

An alarm sounds & a warning illuminates, if the transmission is moved into a gear other than Neutral when the Park Brake is engaged.

The Park Brake manual release tool (GA4602900) supplied with the Cruiser.







Chock all wheels of the Cruiser

## Manually Releasing the Park Brake

If necessary, the Park Brake can be manually released, using the Locknut tool (GA4602900 - supplied with the machine) and an 8mm Allen key.

### To Manually Release the Park Brake:

- 1 Chock all the wheels of the Cruiser before attempting to release the Park Brake.
- 2 Remove the dust cap from the Park Brake caliper by unscrewing counter-clockwise (see picture next page).
- 3 Fit the Locknut tool (GA4602900) & 8mm Allen key, then loosen the adjuster lock nut (counter-clockwise). Loosen only, do not remove (see picture next page).
- 4 Turn the setting screw (inner grub screw) counter-clockwise with an Allen key until both brake pads loosen from the brake disc (rotor).

After manually releasing the park brake to move the Cruiser, the Park Brake must be reset to operate correctly. See 'To Set the Park Brake' instructions next page.



The Park Brake on the rear driveshaft.

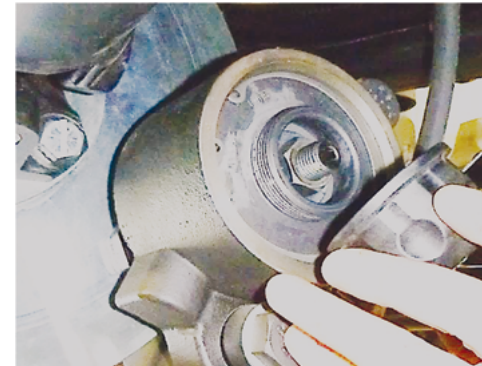
## Park Brake Bleeding Procedure

### To Bleed the Park Brake:

- 1 Park the Cruiser on a flat level surface and chock the wheels.
- 2 Place approximately 30 mm of hydraulic oil into a container to be use for bleeding the brake and place it below the Park brake.
- 3 Connect a clear plastic tube to the bleed screw on the Park brake caliper.
- 4 Place the opposite end of the tube into the oil container and submerge the end of the plastic tube in it.

This is important to stop air being drawn back through the system.

- 5 Loosen the bleed screw on the Park brake caliper & press the Park brake in the cabin. Oil will flow continuously.
- 6 Re-tighten the bleed screw only when no air bubbles are visible in the oil leaving the bleed screw.



Remove the dust cap from the Park Brake caliper (unscrew counter-clockwise).

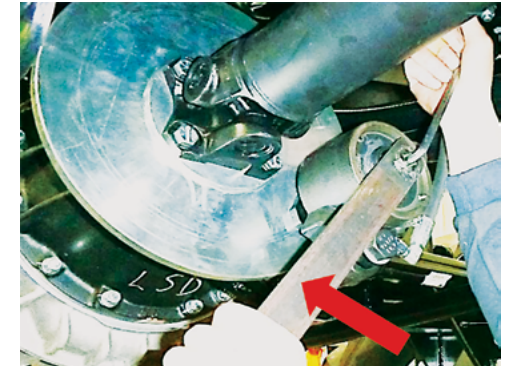
## Park Brake Clearance

Requirements for setting the Park Brake Clearance are a cabin Assistant, an 8mm Allen key, the GA4602900 Park Brake Locknut Tool (supplied) & Feeler Gauge - 0.4mm shim.

### To Set the Park Brake:

- 1 Park the Cruiser on a flat level surface and chock the wheels.
- 2 Ask the cabin assistant to start the engine (Park Brake is On) and disengage the Park Brake using the foot brake & shifting to Park Brake Switch to Off. Keep the foot brake pressure On to avoid machine movement while setting the park brake.

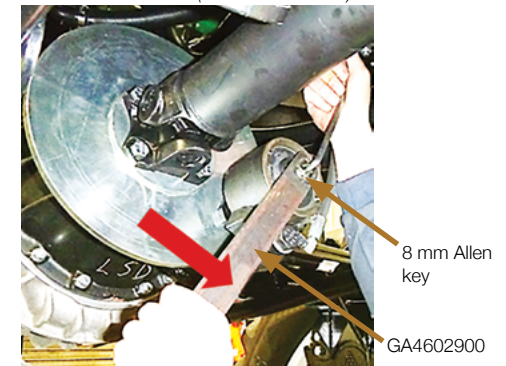
To disengage the Park Brake, slide back the orange lock, then press the switch rearward (Off position).



Fit the Locknut tool & Allen key, then hold the Allen key while turning the Locknut tool clockwise to lock the setting.

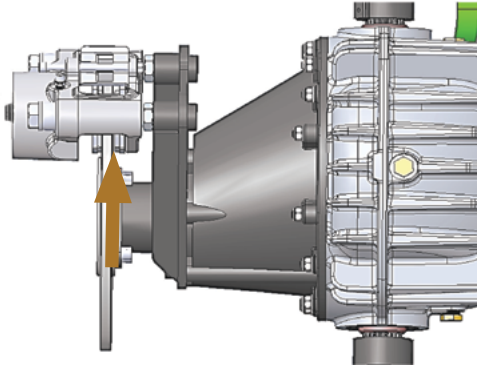
- 2 Remove the dust cap from the Park Brake caliper by unscrewing counter-clockwise.
- 3 Fit the Locknut tool (GA4602900) & 8mm Allen key, then loosen the adjuster lock nut (counter-clockwise). Loosen only, do not remove.
- 4 Turn the setting screw (inner grub screw) clockwise with an Allen key until both brake pads make contact with the brake disc (rotor).
- 5 Fit the Locknut tool (GA4602900) and Allen key, then hold the Allen key while turning the Locknut tool clockwise to lock the setting screw.

Fit Locknut tool & Allen key, then loosen the adjuster lock nut (counter-clockwise).



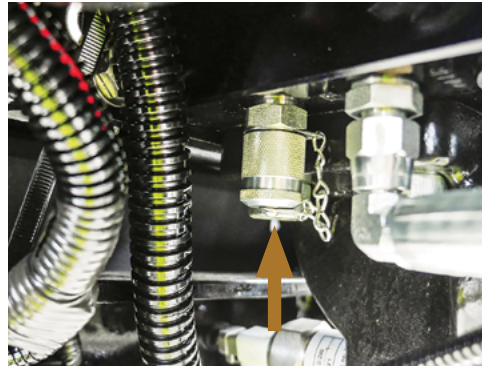
8 mm Allen key

GA4602900



Use a Feeler Gauge to check the gap is 0.4mm.

- 6 Using a Feeler Gauge (0.4mm shim), slide the shim between rear brake pad & disc on the opposite side to the piston (rear side).
- 7 Ask the cabin assistant to re-apply the Park Brake and check the Park Brake disc is locked (unable to turn).
- 8 Ask the cabin assistant to release Park Brake again, then re-check the gap with the Feeler gauge.  
If ok, ask the cabin assistant apply the Park Brake and switch Off the engine.
- 9 Refit dust cover.



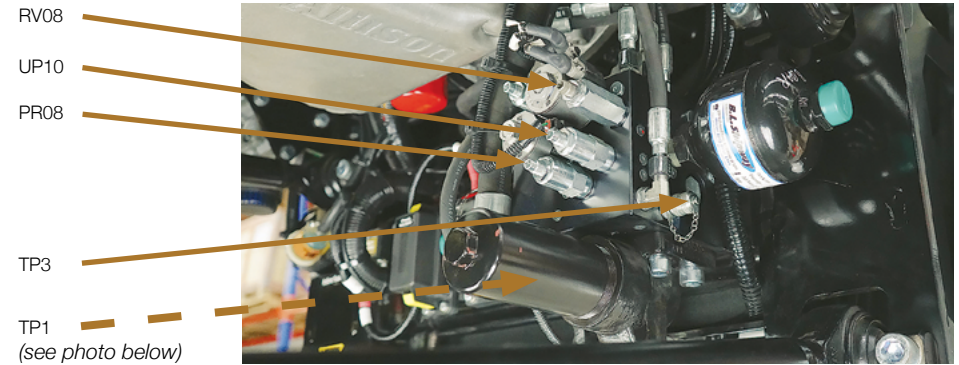
Test Port 1 (TP1) of the hydraulic braking pressure manifold shown on the next page (with the dust cap fitted).

## Braking Manifold Pressures

Setting Braking Manifold Pressures is only required in the rare event of a valve on the brake and brake hydraulic manifold or the entire block is replaced.

Service Brake Hydraulic Manifold Pressure and Park Brake Manifold Pressure is initially set at the time of manufacture & doesn't require adjustment during routine maintenance.

Tools required to set Braking Manifold Pressures include a pressure gauge, 3/4" spanner and a 1/4" Allen key.



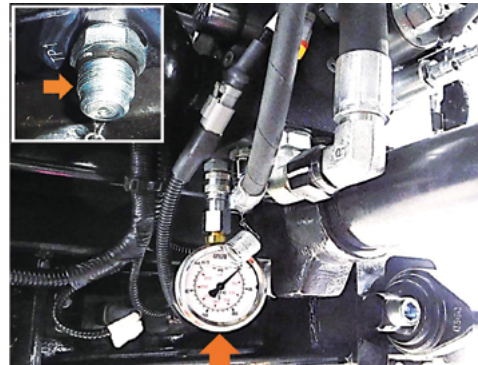
Relief valve & test port locations of the brake and fan hydraulic manifold located under the transmission.

## To Set the Manifold System Pressure:

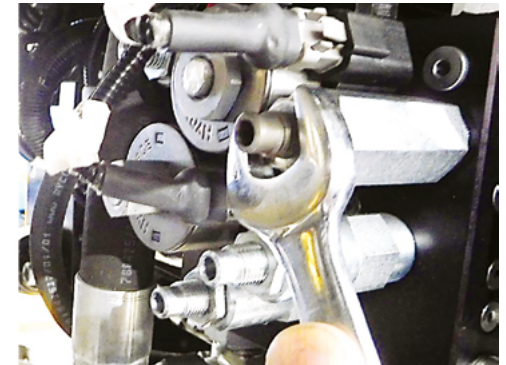
- 1 Park the Cruiser on a flat level surface and chock the wheels.
- 2 Remove the dust cap & attach a pressure gauge to Test Port 1 (TP1 [see above]) on the brake & fan manifold.

- 3 Release lock nut on pressure relief valve (RV08 [see below]) using a 3/4" spanner.

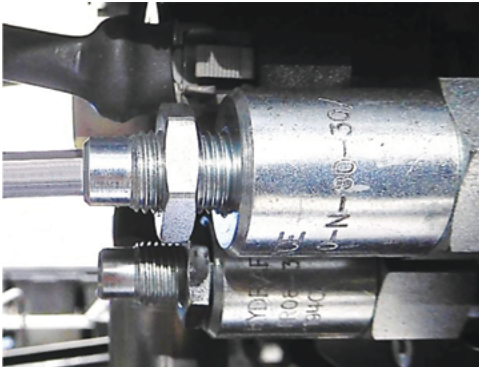
Remove the dust cap from Test Port 1 (TP1) and attach a pressure gauge.



Release lock nut on pressure relief valve (RV08) using a 3/4" spanner.



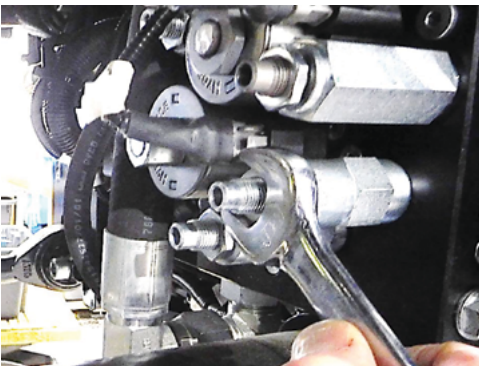




Wind Out fully the adjuster screw fully using a 1/4" Allen key.

- 4 Wind Out fully the adjuster screw fully using a 1/4" Allen key.
- 5 Release the lock nut on pressure relief valve (UP10 [see below]) using a 3/4" spanner.
- 6 Wind In the adjuster screw fully using 1/4" Allen key.
- 7 Ask a cabin assistant to start the engine.

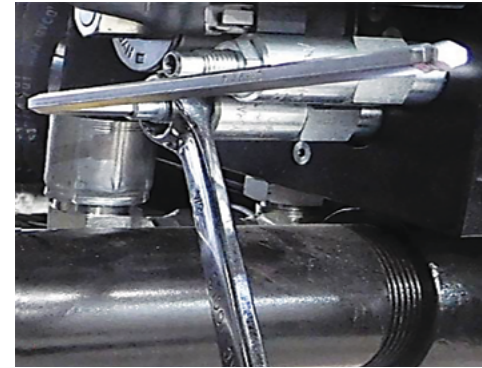
Release lock nut on pressure relief valve (RV08) using a 3/4" spanner.



Wind In the adjuster screw on pressure relief valve (RV08) until the gauge reads 200 Bar, then tighten the lock nut.

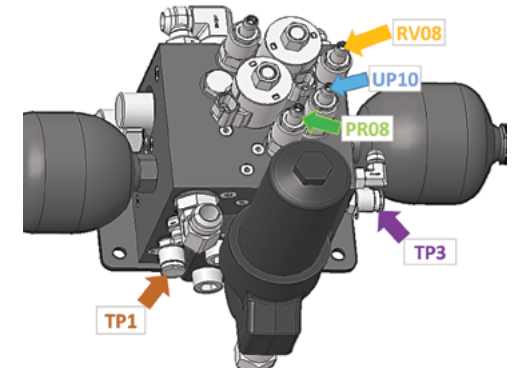
- 8 Fit the spanner & Allen key to the pressure relief valve (RV08) and Wind In the adjuster screw on pressure relief valve until the gauge reads 200 Bar.
- 9 Tighten the lock nut using the spanner.
- 10 Ask the cabin assistant to pump the brake pedal a few times. The gauge pressure will drop.  
Wait until it builds back up to 200 Bar.
- 11 Wind Out the adjuster screw of the pressure relief valve (UP10) until the gauge reads 190 Bar.

After the adjusting the screw until the gauge reads 200 Bar, pump the brake and the pressure will drop.



Tighten the lock nut on the pressure relief valve (UP10) using the spanner & Allen key.

- 12 Tighten the lock nut on the pressure relief valve (UP10) using the spanner & Allen key.
- 13 Again, ask the assistant in the cabin to pump the brakes a few times.  
The minimum pressure reading that occurs on the gauge. The pressure should not drop below 150 Bar. Releasing the brake should see pressure return to 190 Bar.  
If the minimum pressure is too low, repeat steps 11-13.
- 14 Once required pressure is obtained, stop the Cruiser engine.
- 15 Remove pressure gauge from test port and replace dust cap.

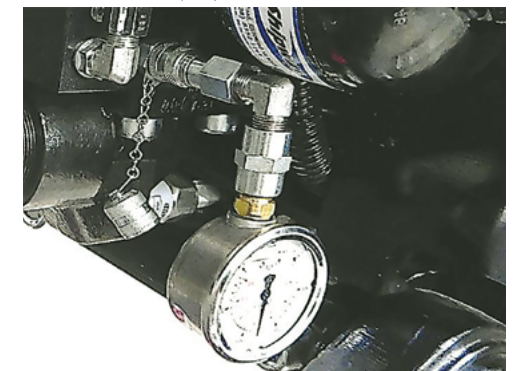


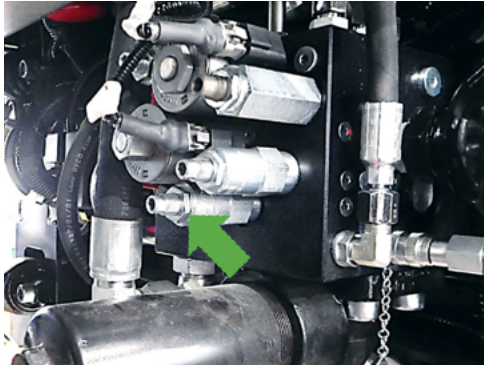
Remove the dust cap from test port 3 (TP3).

## To Set the Manifold Park Brake Pressure:

- 1 Park the Cruiser on a flat level surface and chock the wheels.
- 2 Attach a pressure gauge (with an elbow fitting) to test port 3 (TP3) on the manifold.
- 3 Ask a cabin assistant to start the engine and disengage the Park brake.

Attach a pressure gauge (with an elbow fitting) to test port 3 (TP3) on the manifold.

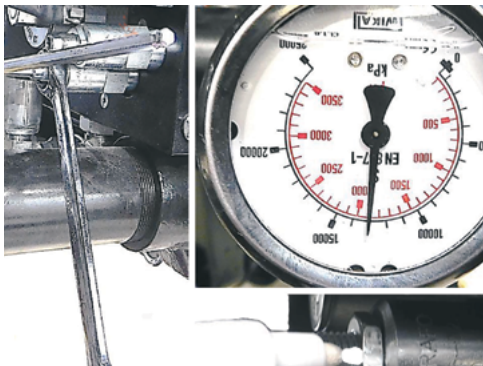




Fit a 3/4" spanner & 1/4" Allen key to the pressure reducing valve (PR08) & release the lock nut (counter-clockwise).

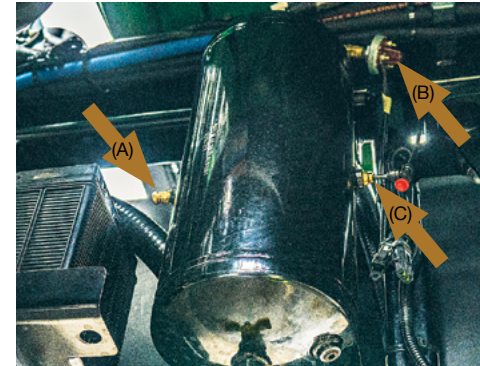
- 4 Fit a 3/4" spanner & 1/4" Allen key to the pressure reducing valve (PR08) and release the lock nut (counter-clockwise).
- 5 To increase the pressure, turn the Allen key clockwise until 1900 PSI (130 Bar) is showing on the gauge.
- 6 Tighten the lock nut (PR08) using the spanner.
- 7 Mark the lock nut with white paint to indicate that the pressure has been set.

Once 1900 PSI (130 Bar) shows on the gauge, tighten the lock nut (PR08) & mark the nut with white paint.



Remove the pressure gauge from test port & replace the dust cap

- 8 Once required pressure is obtained, stop the Cruiser engine.
- 9 Remove the pressure gauge from test port and replace the dust cap.



The Air Tank showing the Pressure Relief Valve (A), Low Pressure Sensor (B) & Air Outlet (C).

## Pneumatic System

The Pneumatic System is used to operate the:

- Air bags
- Chemical pump
- RapidFire system
- Cabin access ladder
- Engage & disengage centre differential lock on 4WD models.

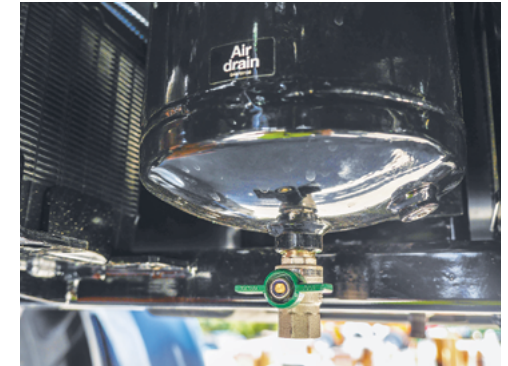
## Pressure Relief Valve

A Pressure Relief Valve incorporated on the Air Tank tank prevents air pressure within the system acceptable limits.

The valve is set to open if 150 PSI is reached.

## Low Pressure Sensor

A Low Pressure Sensor is fitted to the tank so that if the air pressure within the tank goes down to 55 PSI or lower, an alarm will sound in the cabin to warn the operator.



Manual drain tap at the base of the Air Tank.

## Air Tank

The Air Tank, located on the right hand side near the batteries, is a reservoir of compressed air from the compressor used to supply pneumatic functions on the Cruiser.

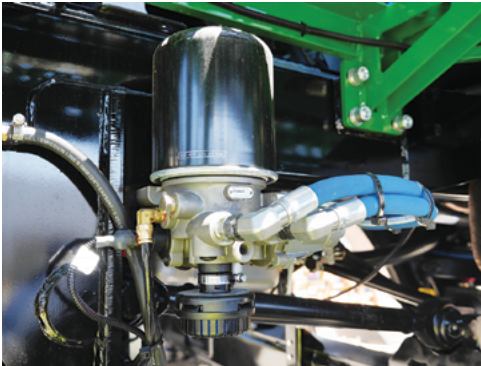
An air dryer & filter is placed between the compressor & air tank to extract moisture from incoming compressed air. The filter needs to be changed periodically.

A manual drain tap, placed in the bottom of the air tank, can be used to decompress the pneumatic system or check for presence of any moisture and debris.

## CAUTION

Beware when releasing air from the air tank, there can be dangerous particles being released at high-speed.  
Be aware due to the rapid expansion of air, the tank release valve may become very cold.





Wabco air dryer & filters. Replace the desiccant air dryer filter (top filter) every 2 - 3 years.

## Air Dryer Filter Maintenance

Routine maintenance recommended to keep the Wabco air dryer & filters operating efficiently, is as follows:

- 1 Each week, ensure the dryer purges when the compressor unloads at completion of operation.
- 2 Each week, at completion of operation, check for moisture in the air system by slowly opening the drain valve of the air tank.
- 3 Replace the desiccant air dryer cartridge every two to three years, or more often depending on usage, vocation & condition of compressor.



Replace the coalescing air dryer cartridge every one or two years.

- 4 Replace the desiccant air dryer cartridge whenever the compressor is rebuilt.
- 5 Replace the coalescing cartridge. Every one to two years.

## Air Compressor

The Air Compressor is attached to the timing gear case on the rear of the engine.

A governor is attached to the side of the compressor to regulate the amount of air being generated by the compressor. A sense line connects the governor to tank.

The governor enables the compressor to continue pumping until the required tank pressure is achieved, then stops the compressor.

The governing pressure is set to 120 PSI.



The pneumatic cylinder raises & lowers the Folding Ladder for cabin access.

## Folding Ladder

A pneumatic ram is used to raise & lower the cabin access Folding Ladder.

The folding speed of the ladder is factory set. If adjustment needs to be made, a flow control needle valve on the inlet of the cylinder is used to control its speed of the lift & fall.

## To Adjust Ladder Folding Speed:

- 1 Screw the flow control needle valve Inwards to decrease the lifting/falling speed.
- 2 Screw the flow control needle valve Out to increase lifting/falling speed.

Air inlet of the ladder folding cylinder.







Auxiliary Air Outlet located in the left hand side fill area .



Air driven chemical transfer pump.

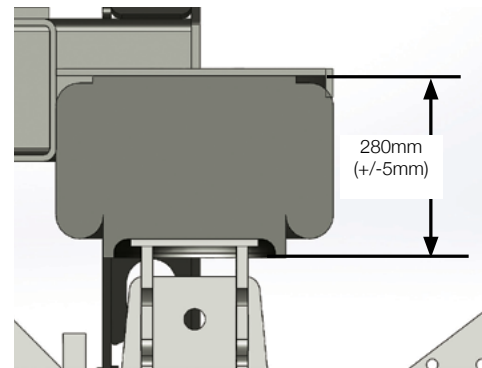
### Auxiliary Air Outlet

A quick release air coupling, located on the left hand side fill area, provides an Auxiliary Air Outlet for for cleaning filters, nozzles & other uses.

### Chemical Transfer Pump

The Chemical Transfer Pump is a Graco pneumatic twin diaphragm high capacity pump ideal for direct chemical transfer.

A valve on the left hand fill line pod is used to turn it On and Off.



Height setting of inflated air bags.

### Air Bag Ride Height Settings

The Cruiser suspension system incorporates Airbags to maintain a comfortable and stable ride in the machine.

Front & rear air bag height should be set at 280mm (+ or -5mm) .

If the correct ride height setting is not maintained, the angle of the drive shaft will change which can cause vibration and possible damage to the drive train.

Air bag height measurement is from the inside of the top mount to the bottom of the plastic skirt of the air bag.

Ride height valves are used to adjust the air pressure within the air bags to maintain the correct ride height.

Two ride height valves are located on each side of the rear axle and one located in the centre of the front axle.

### NOTE

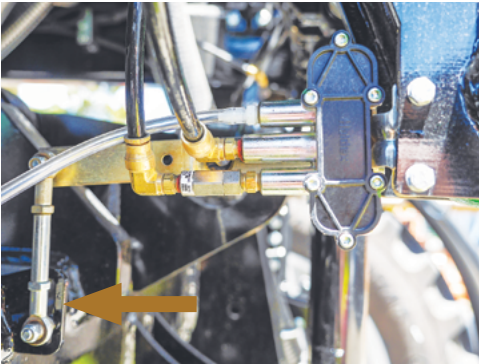
When the Cruiser has been unused for a period of time, the air bags may deflate. This is normal. The airbags will re-inflate after the engine is started.



Loosen the bolt holding the adjustor plate & move the plate up or down to adjust the ride height, then retighten the bolt.

### To Adjust the Front Ride Height

- 1 Park the Cruiser on a flat level surface.
- 2 Loosen the bolt of the adjustor plate which attaches the vertical rod to the chassis.
- 3 Move the adjuster plate up or down to achieve the correct ride height. The plate has notches to use as a guide.
- 4 Re-tighten the bolt.



Loosen the bolt holding the adjuster plate & move the plate up or down to adjust the ride height, then retighten the bolt.

## To Adjust the Rear Ride Height

- 1 Park the Cruiser on a flat level surface.
- 2 Loosen the bolt of the adjuster plate which attaches the vertical rod to the chassis.
- 3 Move the adjuster plate up or down to achieve the correct ride height. The plate has notches to use as a guide.
- 4 Re-tighten the bolt.
- 5 Repeat the procedure for the other side of the rear axle.



Air bag dump valve closed.

## To Deflate Air Bags for Trailer Transport:

- 1 Load and park the Cruiser on transport platform.
- 2 Open the drain valve on the air tank and let the air empty out.
- 3 Open the air dump valves:
  - One on LHS of the front airbag
  - One on each rear airbag.
- 4 The air bags will lower on to the bump stops.
- 5 Once the Cruiser is on the bump stops, close the air tank dump valves.



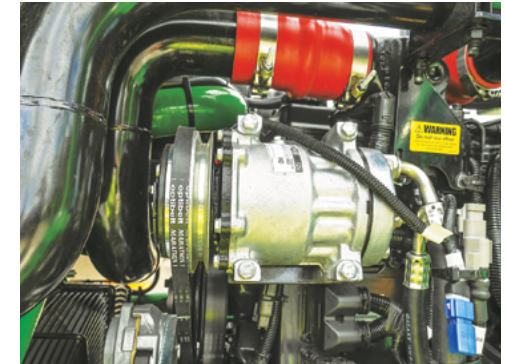
Air bag ride height measurement & shock absorber (right).

## Shock Absorbers

Four shock absorbers are fitted to the Cruiser, one fitted to each side of the front and rear axles. The shockers absorbers dampen movement of the air bags & prevent recoil.

Shockers absorbers should be regularly checked for damaged rubbers or oil leaks.

Refer to the specification provided in the 'Maintenance Schedules' of this chapter.



Air Conditioner Compressor.

## Air Conditioner Compressor Belt

The Air Conditioner Compressor Belt requires manual adjustment. Check the belt regularly.

A deflection of no more than 12mm is present in the belt when it is tensioned correctly.

The belt should be replaced at minimum every 1000 hours.

Refer to the specification provided in the 'Maintenance Schedules' of this chapter.

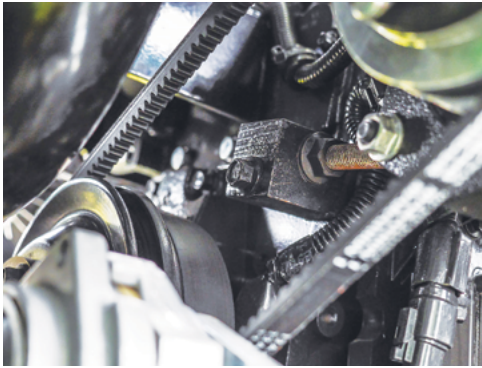
## To Tension the Compressor Belt:

- 1 Loosen the compressor mounting & adjuster bolts
- 2 Use the lock nuts on the adjuster to pivot the compressor and pull the belt tight.
- 3 When the belt is correctly tensioned, tighten the mounting and adjuster bolts.

## CAUTION

When deflating the air bags, keep clear of all chassis parts as the machine can move suddenly downwards. Failure to heed this caution may result in personal injury.





Use the lock nuts on the adjuster to pivot the compressor and tension the belt.



'Grease' Decals are used to assist in locating each grease point.



Driveshaft 'Manual Grease Points'.



'Remote Grease Bank' with a 'Grease Decal' used to simplify greasing access.

### To Replace the Compressor Belt:

- 1 Loosen the compressor mounting & adjuster bolts
- 2 Remove the old belt.
- 3 Fit a new belt.
- 4 Use the lock nuts on the adjuster to pivot the compressor and tension the belt.
- 5 When the belt is correctly tensioned, tighten the mounting and adjuster bolts.

### Grease Points

The location & greasing schedules of the Crop Cruiser grease nipples are shown in the illustrations that follow:

- 1 Driveshaft Grease Points - 2WD
- 2 Driveshaft Grease Points - 4WD
- 3 Boom Rest Grease Points
- 4 Paralift & Headstock Grease Points
- 5 Centre & Rear Grease Points 1
- 6 Centre & Rear Grease Points 2
- 7 Boom Grease Points - 36m & 42m
- 8 Boom Grease Points - 48m.

Boom wing fold 'Manual Grease Points'.

'Grease' Decals are used to assist in locating each grease point.

'Remote Grease Banks' with a Grease Decal are also used to simplify greasing access.

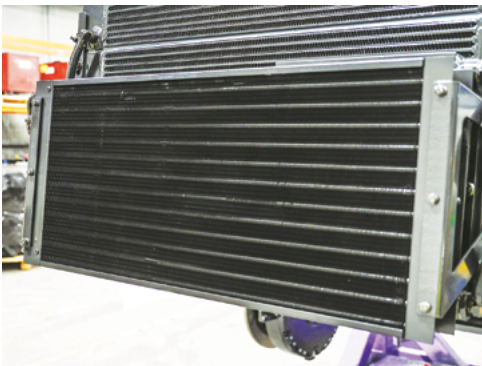
Additionally, a Cruiser may be optionally fitted with either of two different auto-greasing systems.

### Auto-Greasing System Options

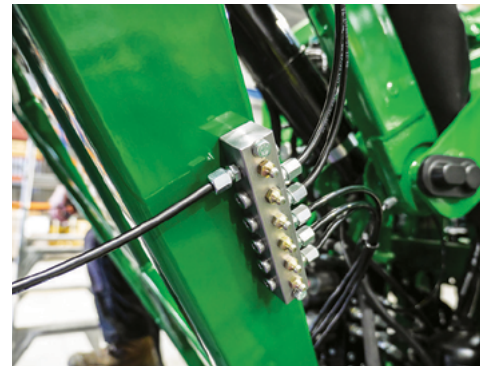
Two optionally fitted auto-greasing systems include either:

- Groenveld Auto-Greasing System
- Alemlube Auto-Greasing System.

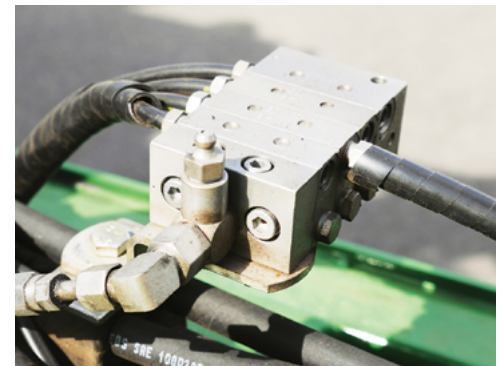
Air Conditioner condenser.



'Remote Grease Bank' on the Paralift arms used to simplify greasing access..



Auto-Greasing section on a 48m boom (optional).







*A Groeneveld Auto-Greasing System centre (option).*

## Groeneveld Auto-Greasing System

The Groeneveld Auto-Greasing System, well suited to cool to moderate climates, includes:

- 48 grease points
- 4 Litre grease capacity
- NLGI0 type grease.

If fitted, refer to the manufacturer's website for detailed product instructions & maintenance:

- <https://www.groeneveld-lubrication-solutions.com>



*An Alemlube Auto-Greasing System centre (option).*

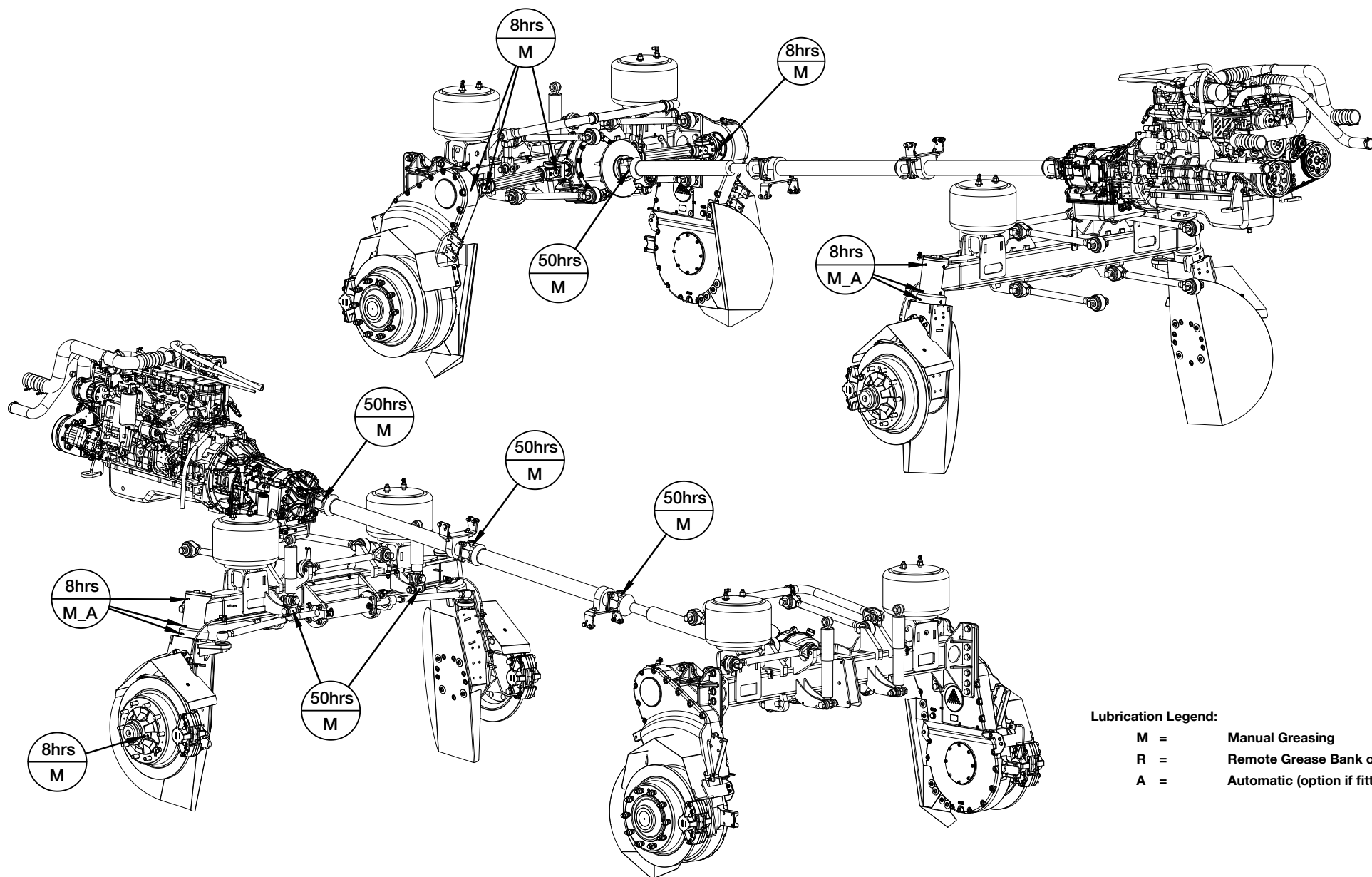
## Alemlube Auto-Greasing System

The Alemlube Auto-Greasing System, well suited to cool to warmer climates, includes:

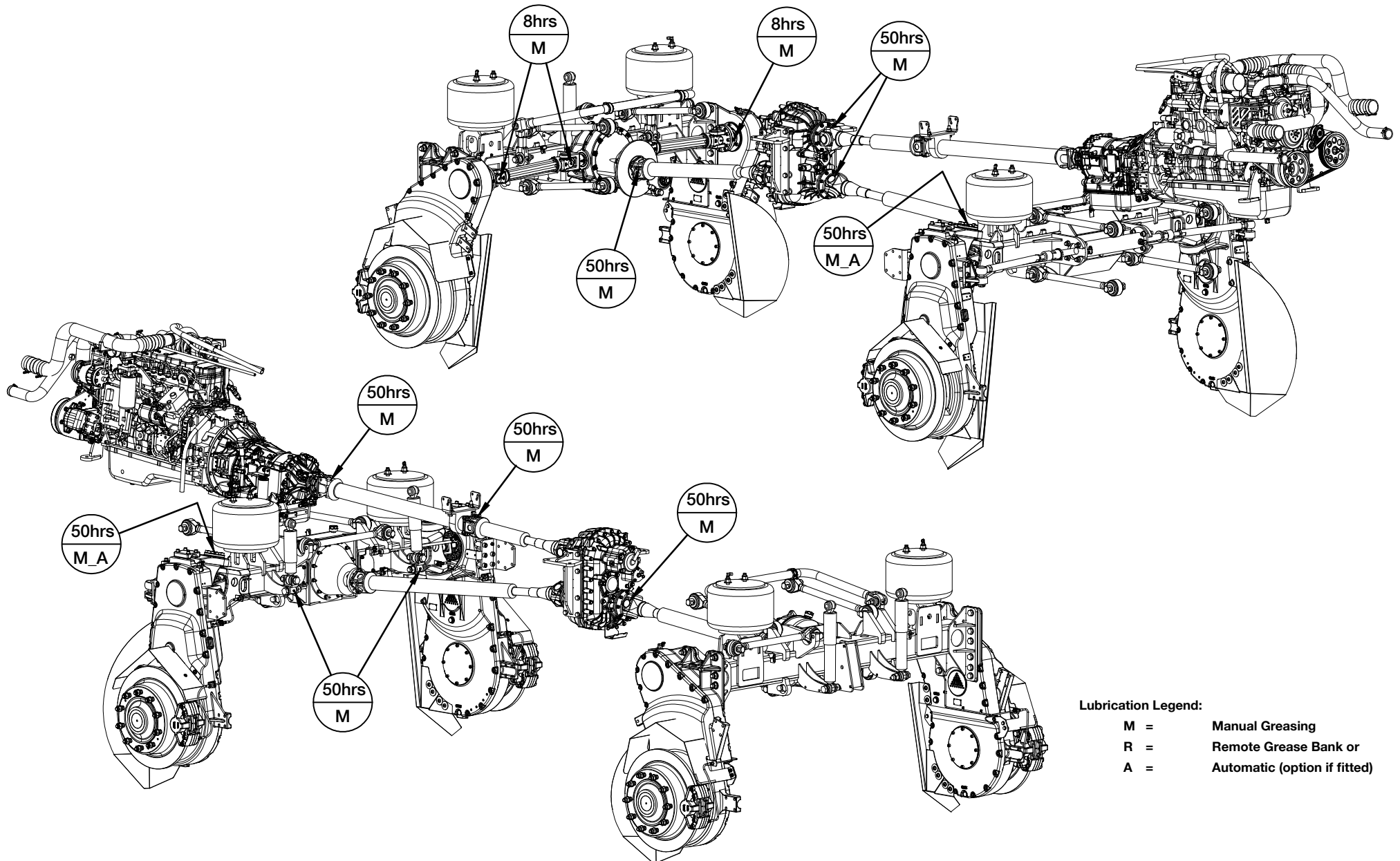
- 48 grease points
- 4 kg grease capacity
- NLGI2 type grease

If fitted, refer to the manufacturer's website for detailed product instructions & maintenance:

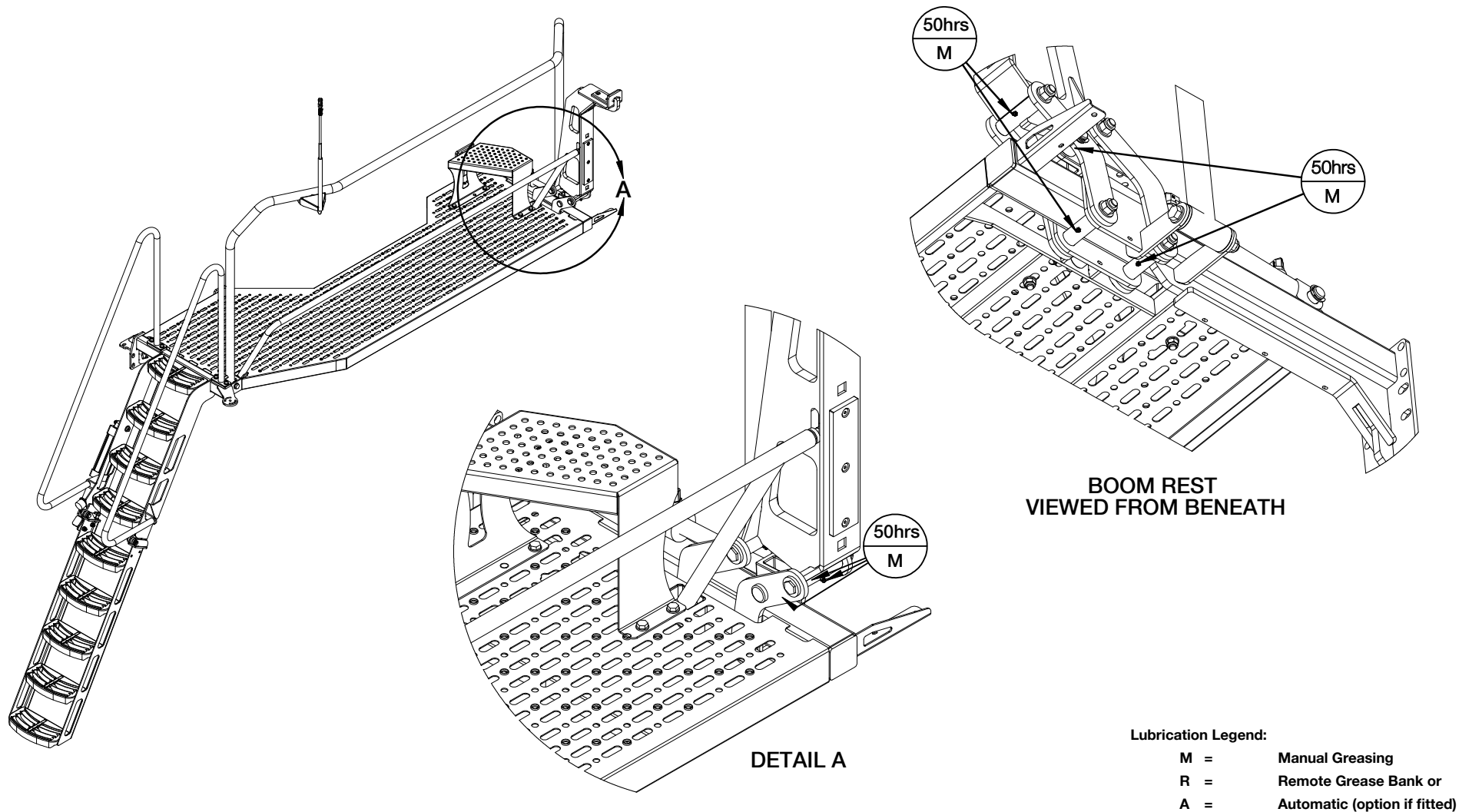
- <https://alemlube.com.au/web/>

**1 Driveshaft Grease Points - 2WD**

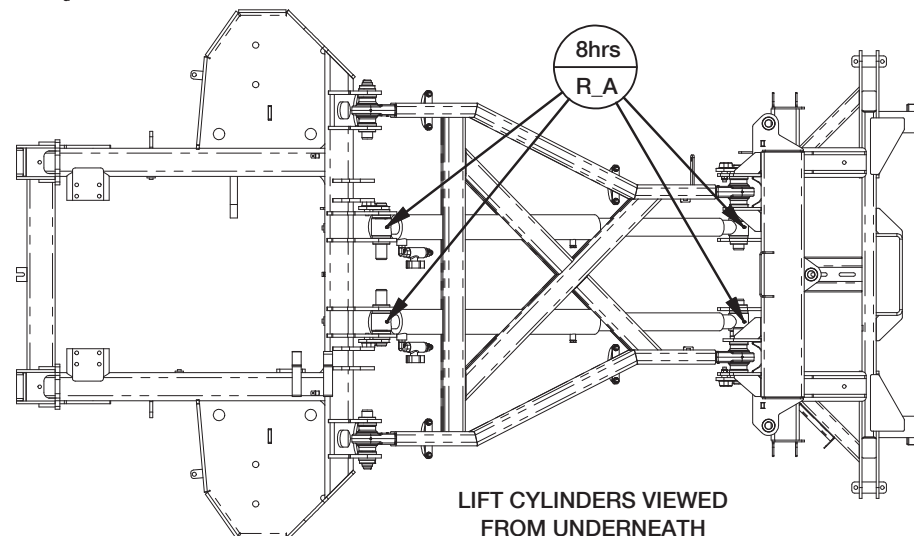
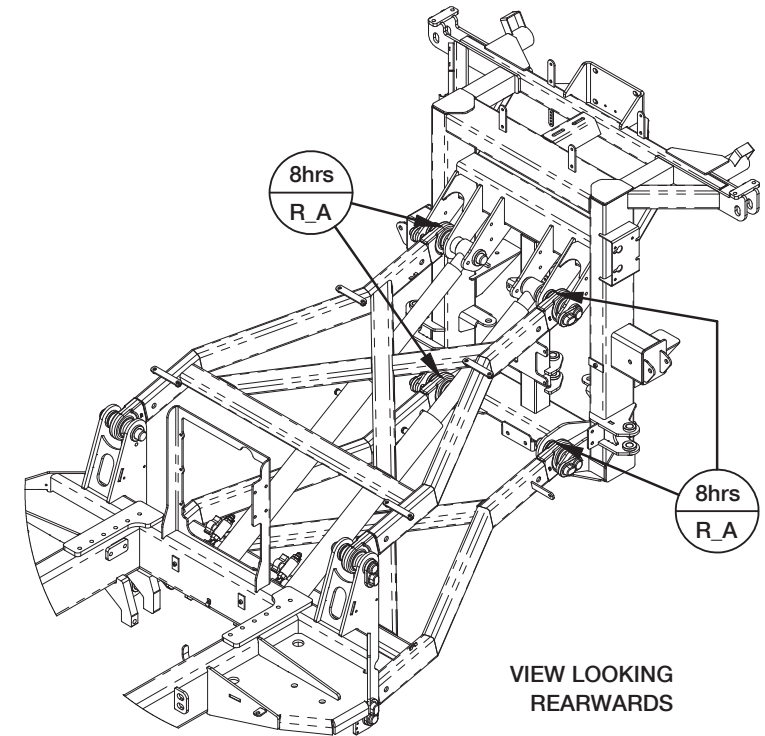
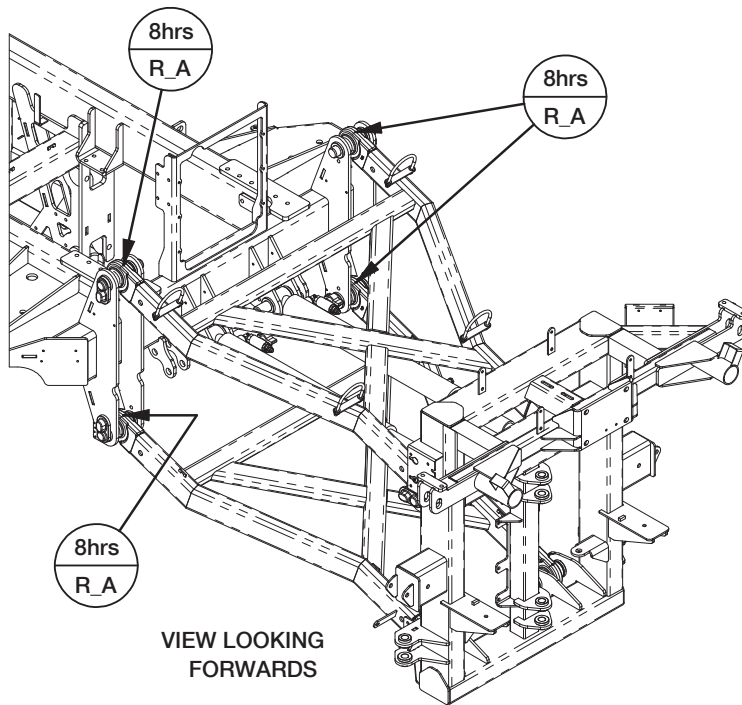
## 2 Driveshaft Grease Points - 4WD





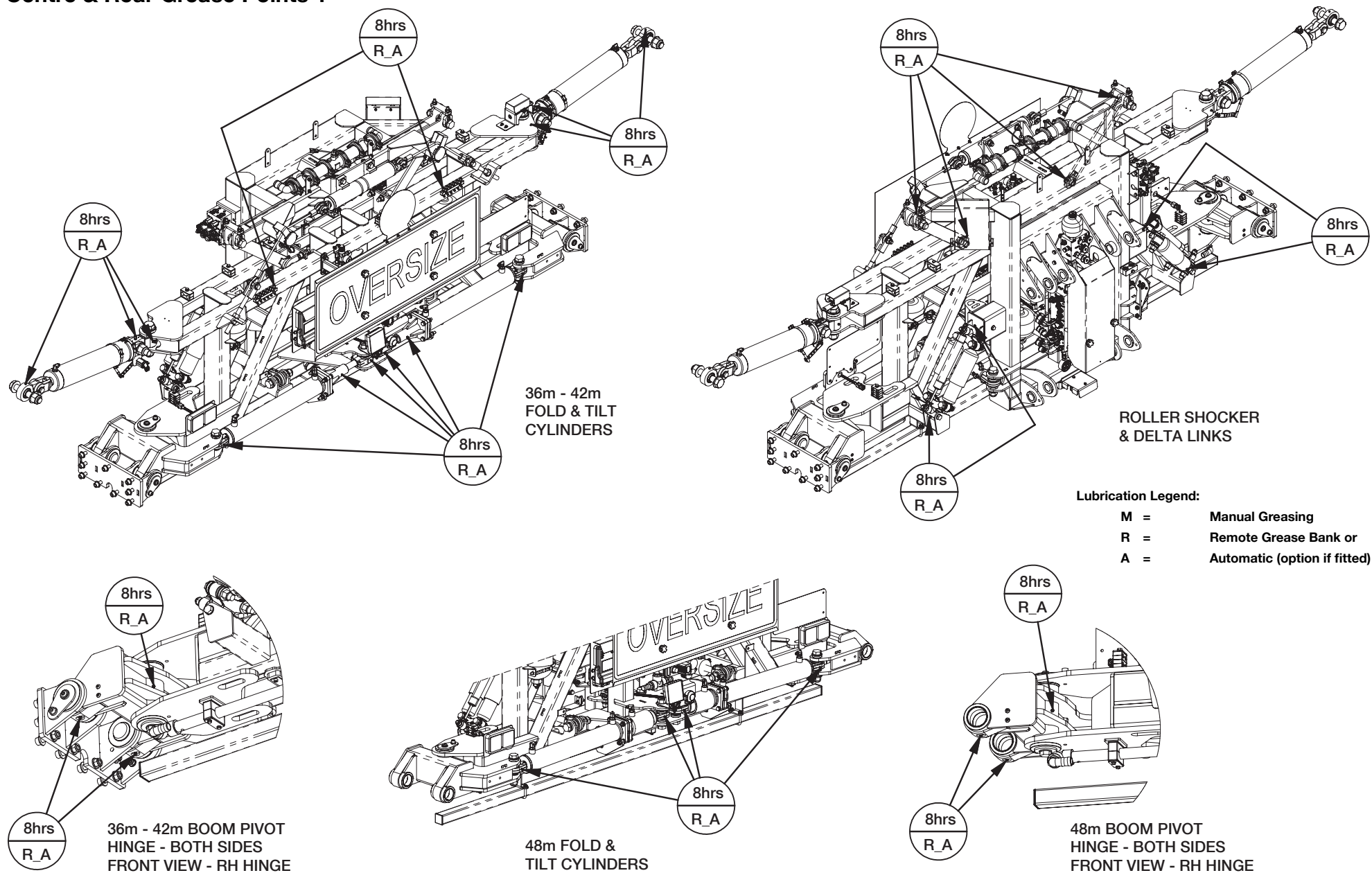
**3 Boom Rest Grease Points - 36m & 42m**

## 4 Paralift & Headstock Grease Points



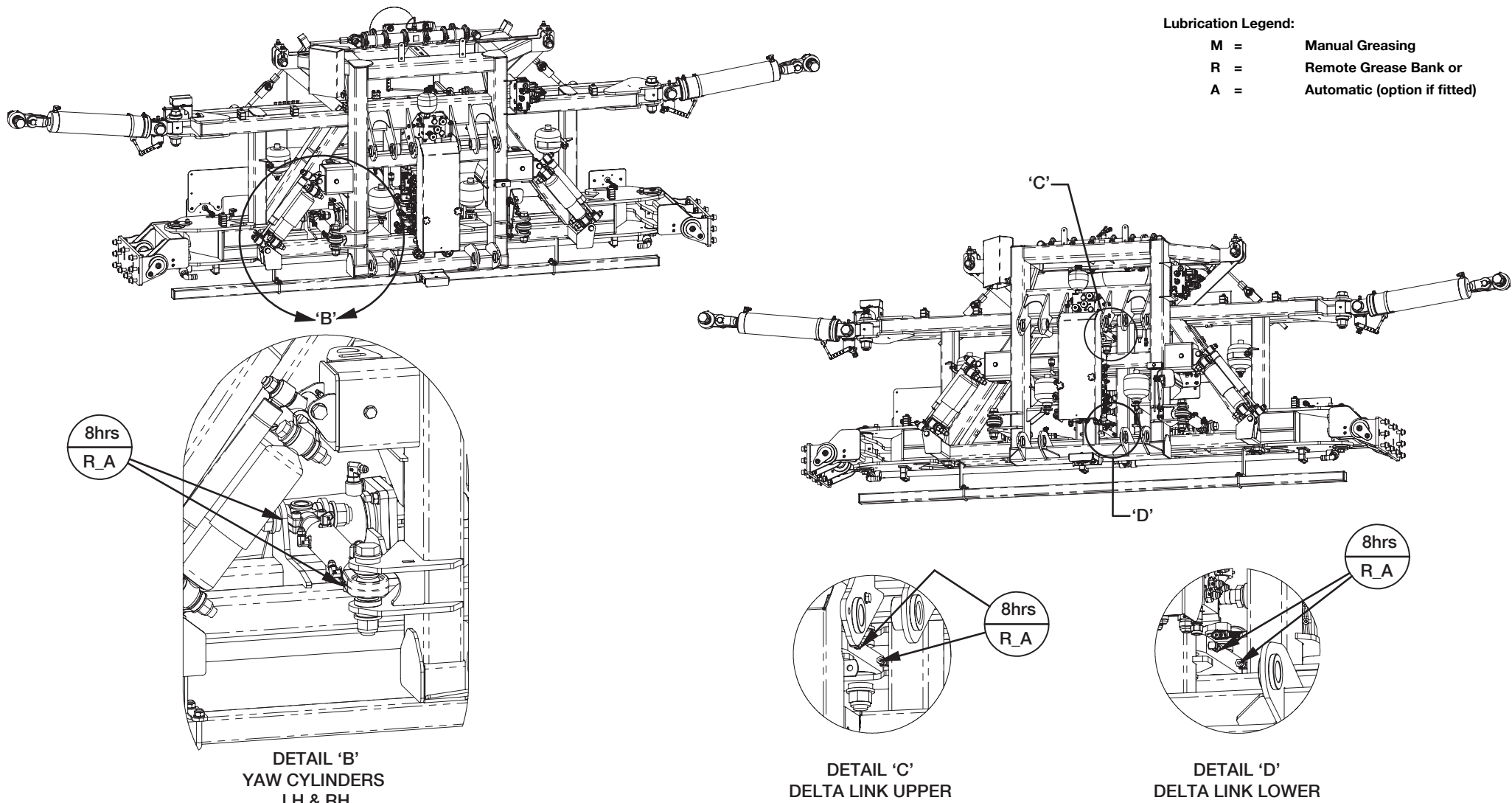
### Lubrication Legend:

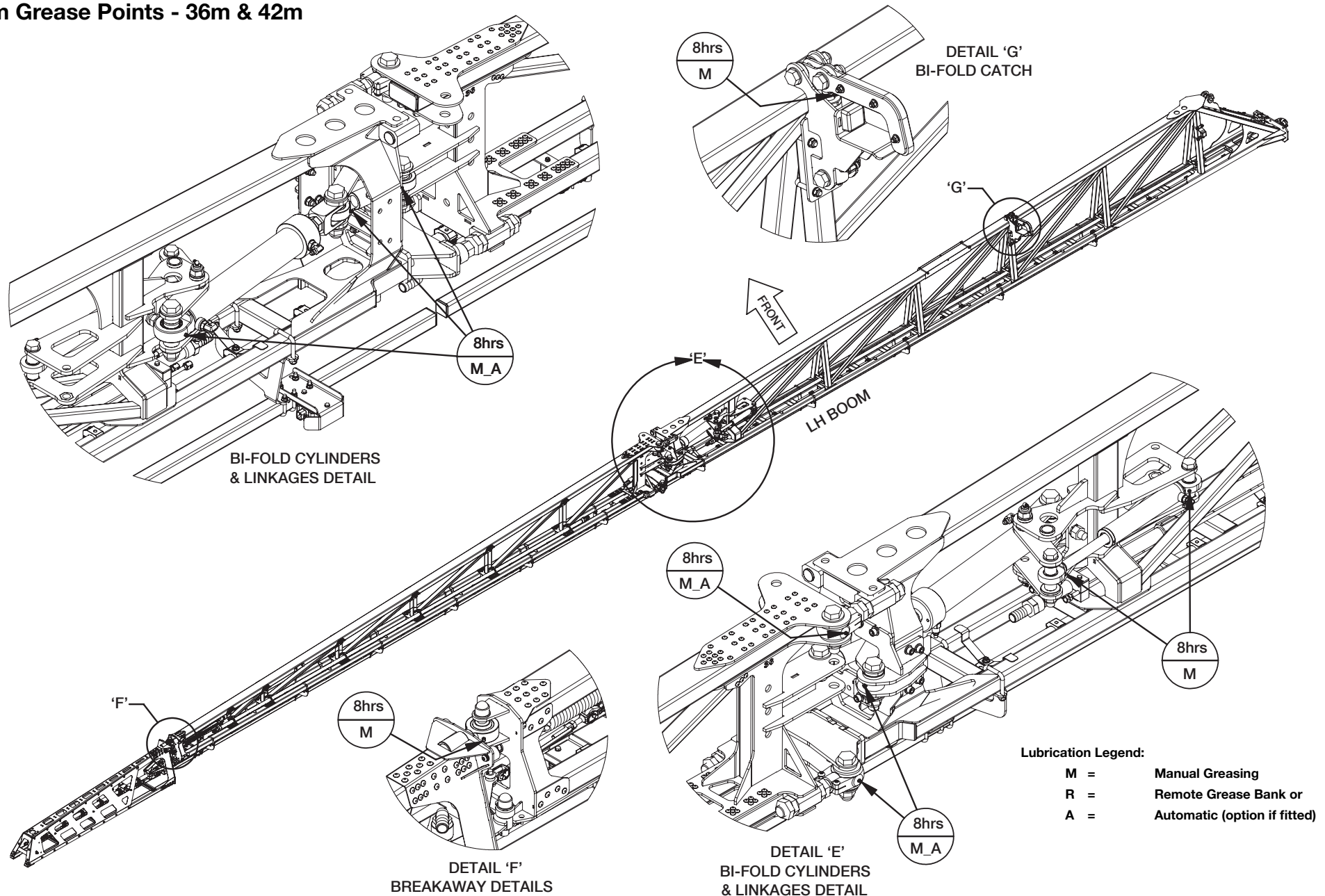
- M = Manual Greasing
- R = Remote Grease Bank or
- A = Automatic (option if fitted)

**5 Centre & Rear Grease Points 1**

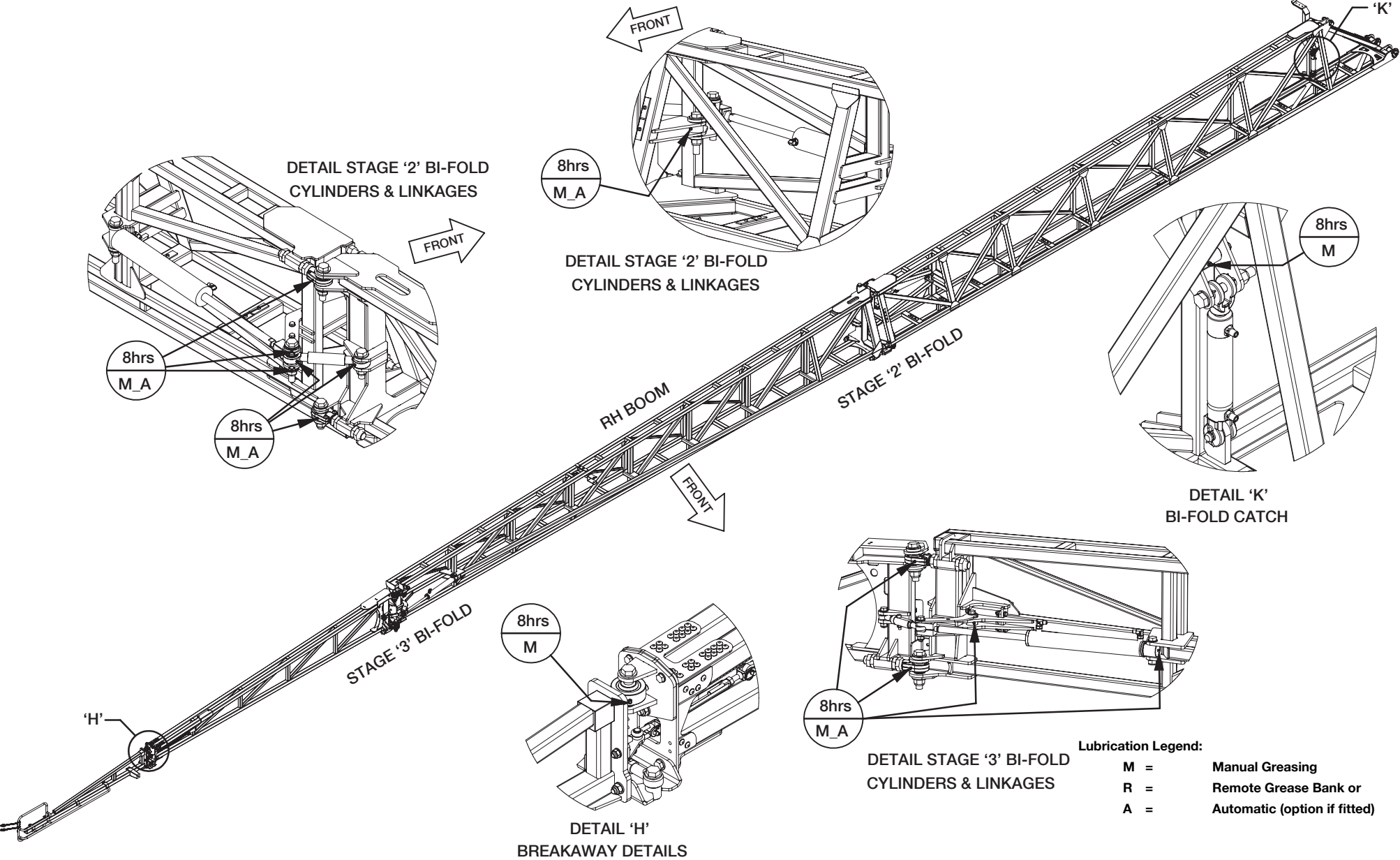


6 Centre & Rear Grease Points 2



**7 Boom Grease Points - 36m & 42m**

8 Boom Grease Points - 48m





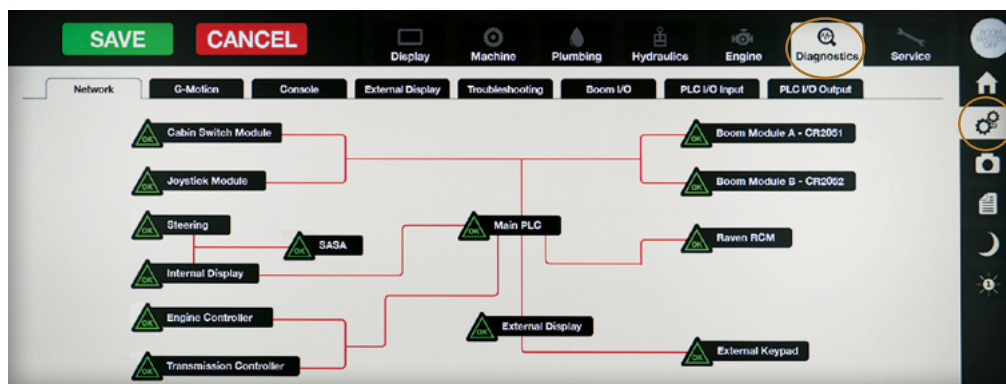


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## 9 Fast Tracking Problems – Trouble Shooting



Press the Setting tab, then the 'Diagnostics' tab to open the 'Diagnostics screen which opens with the 'Network' tab screen.

### Trouble Shooting Preface

The following troubleshooting information is provided as a reference if your machine is not functioning correctly.

To ensure 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.

### Integrated G-hub System

Goldacres Integrated G-hub System offers full system diagnostics, including warnings and operation states.

Pop up on-screen dialogs will display any system information and warnings.

Some problems may simply be resolved by cycling the G-Hub system Off and On again.

It is recommended to try this first before resorting to more advanced troubleshooting.

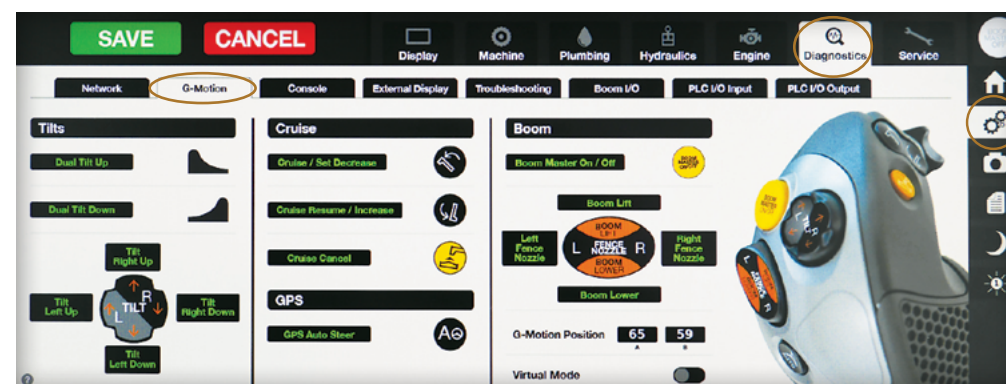
All valves will be reset to their initial position on the G-Hub System start up.

The G-Hub 'Diagnostics' screens provide detailed information on all system components.

To access the 'Diagnostic' screens, press 'Settings' touch button, then the 'Diagnostics' touch button to open the Diagnostics screen displaying the Network screen - with a total of 8 tab screens (areas) for trouble shooting:

- 1 Network
- 2 G-Motion
- 3 Console
- 4 External Display
- 5 Troubleshooting
- 6 Boom I/O
- 7 PLC I/O In
- 8 PLC I/O Out.

Start with the 'Network' screen to make sure all CAN components are online and operational, then move onto targeted areas of any faults.



Press the Setting tab, then the 'Diagnostics' tab to open the 'Diagnostics screen which opens with the 'Network' tab screen.

### 1 Network

The CAN-link between the PLC and the main display are critical for the system to function correctly.

The 'Network' screen gives a quick overview of the whole G-Hub connectivity system:

- If an item displays Green it is connected & working.
- If an item displays Red, it is not connected or not working.

Go to the next relevant G-Hub diagnostic page to further check the item.

Always start with the 'Network' screen to ensure all CAN components are online and operational, then move onto the targeted area of any faults.

### 2 G-Motion

Press the G-Motion tab touch button to display the G-Motion screen

The G-Motion display screen provides two testing functions:

- To check the function of each push button and rocker switch on the Joystick.
- To operate each function in Virtual Mode.

In Virtual mode, the Joystick is disabled & the screen touch buttons can be used to operate the various joystick push button & rocker switch functions.

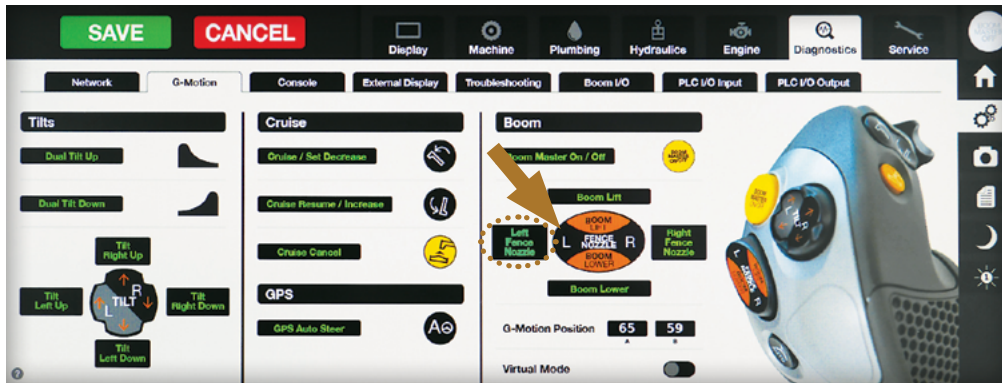
This is useful for example, if the Joystick fails - the boom can be folded & Cruiser moved temporarily without the Joystick being functional.

### NOTE

If a CAN component has been replaced, it is important to:

- Upload the correct software, and
- Set the correct CAN address for it to function correctly.





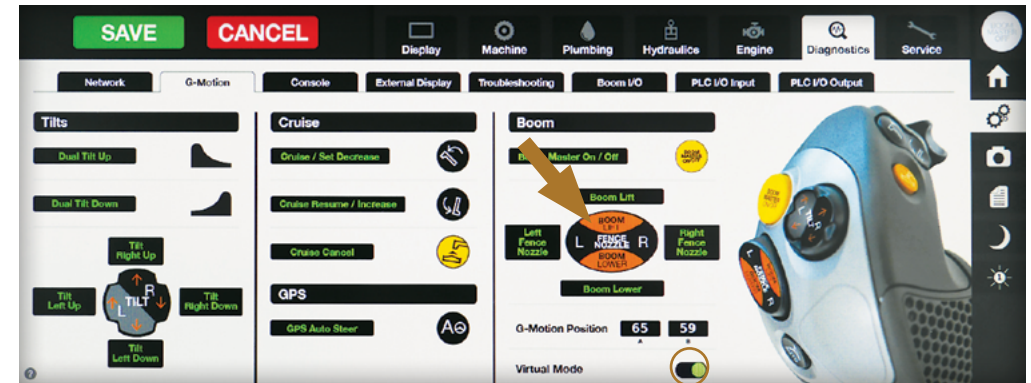
Press the 'G-Motion' touch button tab to display the 'G-Motion' screen to check the functions of the Joystick push buttons/switches. Press a Joystick push button (eg, 'Fence Nozzles L'), then its corresponding switch on the G-Motion screen will light up Green, if functioning correctly.

## To Check the Function of Each Switch:

- 1 While in the 'G-Motion' diagnostic screen, press the relevant push button/switch on the Joystick:
  - If a push button/switch is working, its corresponding touch button on the G-Motion screen will light up 'Green' each time the push button or switch is pressed.
  - If a Joystick push button/switch is not working, its corresponding touch button on the G-motion screen will not light up.
- 2 If the corresponding touch button on the G-Motion screen button fails to light up, then go to the Joystick Control Module which is located under the control console in the cabin (shown right [A]).
- 3 Remove the top cover of the console & check the connectors .  
The Cabin Switch Module is also located under the control console (shown right [B]).

- 4 After checking the Joystick Module connectors, re-check the function of the relevant push buttons/switches using the Joystick & the G-Motion Diagnostic screen.
- 5 If the function continues to not light up it will be necessary check the relevant function in Virtual Mode.

The Joystick Module (A) & Console Switch Module (B) located under the cabin control console below the Joystick.



The screen is used to operate the Joystick functions in Virtual Mode. Enable 'Virtual Mode', then press a Joystick push button (eg, 'Boom Lift'). If working the boom will rise when the push button is held & stop when the button is released.

## To Check a Function in Virtual Mode:

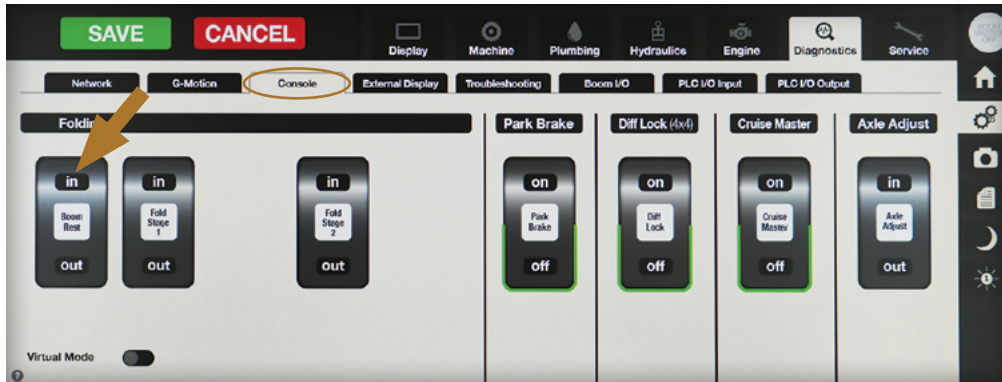
- 1 Press the Virtual Mode touch button to engage/disengage the Virtual Mode.  
The touch button displays Green when engaged & Grey when disengaged.
- 2 Press the relevant screen button to test its function (eg, 'Boom Lift').  
If working, the boom will raise while the push button is being pressed and stop when the push button is released.

- 3 When testing is completed, press the Virtual Mode touch button to disengage Virtual Mode.  
The touch button displays Grey when disengaged & Green when engaged.

## NOTE

The G-Motion Position display gives a digital reading within a range of 60 -112 when the Joystick is moved forwards and backwards.

## 9 Fast Tracking Problems – Trouble Shooting



Press the 'Console' tab to open the 'Console screen. Press a Console push button/switch (eg, Boom Rest In), then its corresponding touch button on the Console screen will light up Green, if functioning correctly.

### 3 Console

Press the Console tab touch button to display the Console screen which provides two testing functions:

- To check the function of each switch along the top of the cabin switch panel
- To operate switches in Virtual Mode

When Virtual Mode is enabled, cabin switches are disabled

If any switches fail, Virtual Mode push buttons can be used to operate the cabin switch functions.

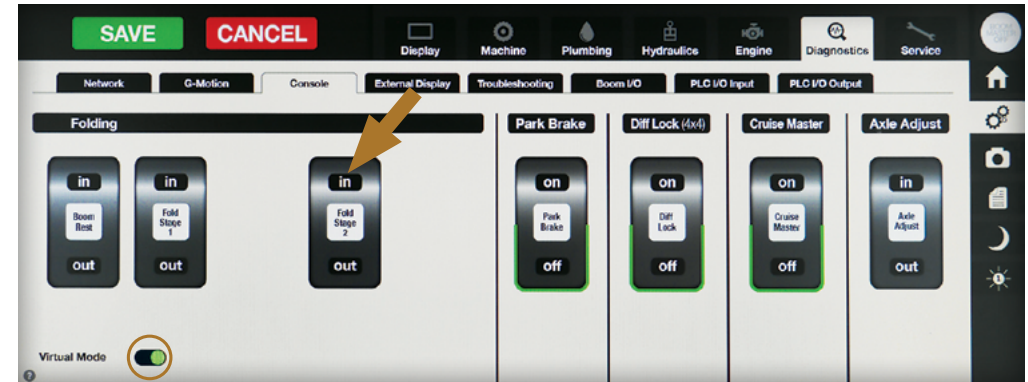
#### To Check the Function of Each Switch:

- While in the diagnostic 'Console' screen, press a switch on the Cabin console switch panel:
  - If a cabin console switch is working, its corresponding touch button on the Console screen will light up 'Green' each time the push button or rocker switch is pressed.
  - If a cabin console switch is not working, its corresponding touch button on the Console Diagnostic screen will not light up.
- If a touch button on the Console diagnostic screen fails to light up, then locate the Console Control Module (shown right) and check that connectors are fitted correctly.

### NOTE

Variations in the Console screens shown above can occur because there are different Cruiser models:

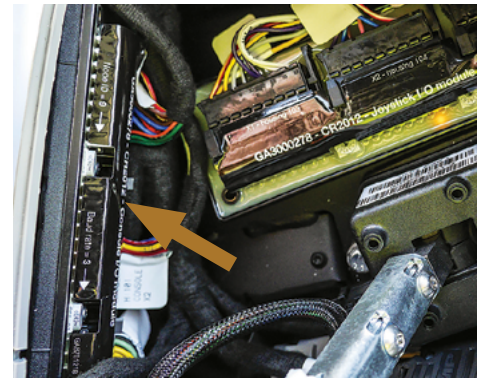
- 'Fold Stage 3' switch only appears with 48m booms.
- 'Fold Diff Lock' switch only appears with 4WD Cruisers.



Enable Virtual Mode, then press & hold a Console push button (eg, Fold Stage 2 In), then the outer boom will fold-in while the touch button is held. Release the touch button to stop the function.

- Remove the top cover of the console (shown below) and check the connectors.
- After checking the console Module Connectors, re-check the function of the switches using the control console switches & the diagnostic Console screen.
- If the function continues to not light up, it will be necessary check the relevant function in Virtual Mode.

The Console Control Module located under the Joystick console in the cabin.



#### To Check a Function in Virtual Mode:

- Press the Virtual Mode touch button to enable/disable the Virtual Mode. The touch button displays Green when enabled & Grey when disabled.
- Press a screen touch button to test its function (eg, In Fold Stage 2). If working, the boom will fold while the switch is being pressed and stop when the switch is released.
- When testing is completed, press the Virtual Mode touch button to disable Virtual Mode. The touch button displays Grey when disabled & Green when enabled.

### NOTE

The Park Brake cannot be enabled/disabled in Virtual Mode.





Press the 'External Display' tab to open the 'External Display' screen. Press an External Display push button, eg, 'Fill Product', then its corresponding switch on the Console screen will light up Green, if functioning correctly.



With 'Virtual Mode' enabled, press an External Display touch button, eg, 'Fill Rinse', then the 'Fill Rinse' function will start. Press the touch button again to stop the function.

## 4 External Display

Press the 'External Display' tab touch button to display the External Display which provides diagnostic & virtual control functions:

- To check the function of each touch button and push button of the external control functions
- To operate Fill only touch buttons in Virtual Mode.

In Virtual mode, the RPM Raise, Pump Product, Fill Product, Agitator, Hopper, Pump Rinse, Fill Rinse, Fill Pump and Rinse Nozzle push button switches are used operate the fill functions.

### To Check Function of Each Push Button:

- While in the 'External Display' screen, press the relevant touch button on the External Controller:
  - If a push button switch is working, its corresponding switch on the 'External Display' diagnostic screen will light up 'Green' or 'Blue' each time the push button switch is pressed.
  - If a push button is not working, its corresponding touch button on the diagnostic External Display screen will not light up.
- If a corresponding touch button on the External Display diagnostic screen fails to light up, then go to the External Display Module (located in the left hand side of the Quick Fill Toolbox [shown right]) and check that connectors are fitted correctly.

- Open the door of the toolbox and check the connectors.
- After checking the External Display Module connectors, re-check the function of the relevant External Display push buttons and the External Display diagnostic screen touch buttons.
- If a function continues to not light up it may be necessary check the relevant function in Virtual Mode.

The External Controller is part of the Chassis Controller or Main PLC located inside the left hand side Quick Fill Area Toolbox.



### To Check Functions in Virtual Mode:

- Press the Virtual Mode touch button to enable/disable 'Virtual Mode'.  
The touch button displays Green when enabled & Grey when disabled.
- Press a Fill function touch button (on the right hand side of the screen) eg, 'Fill Rinse' to test its function.  
If working, the item will operate while the touch button is On and stop when the touch button is Off.
- When testing is completed, press the Virtual Mode touch button to disable Virtual Mode.  
The touch button displays Grey when disabled & Green when enabled.

### NOTE

Checking Switch functions on the External Display requires 2 persons, one in the cabin observing the External Display Diagnostic screen and one outside operating the External Display.

### NOTE

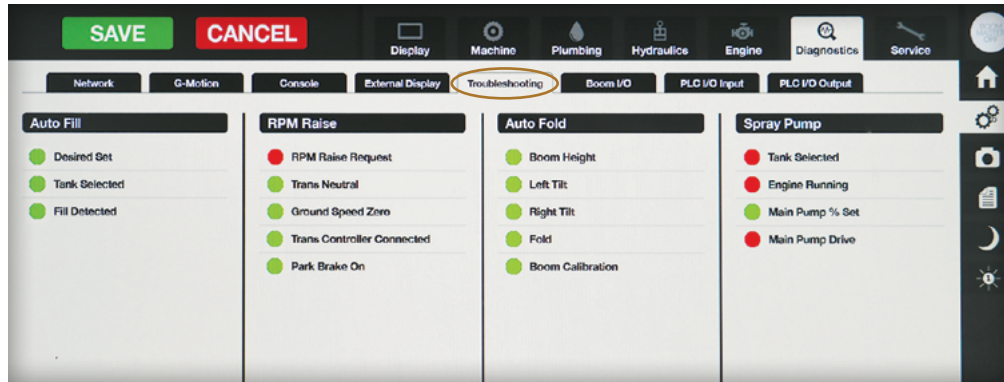
Only 'Fill' screen functions can be operated or checked in Virtual Mode.  
'Clean' screen functions cannot be checked or operated in Virtual Mode.

### NOTE

All functions should be turned off when leaving this screen.



## 9 Fast Tracking Problems – Trouble Shooting



Press the 'Console' tab to open the 'Console' screen which is used to check Console switch functions & operate Console switch functions in Virtual Mode if needed.

### 5 Troubleshooting

Press the 'Troubleshooting' Display tab touch button to display the screen.

The 'Troubleshooting' screen provides function checklists for:

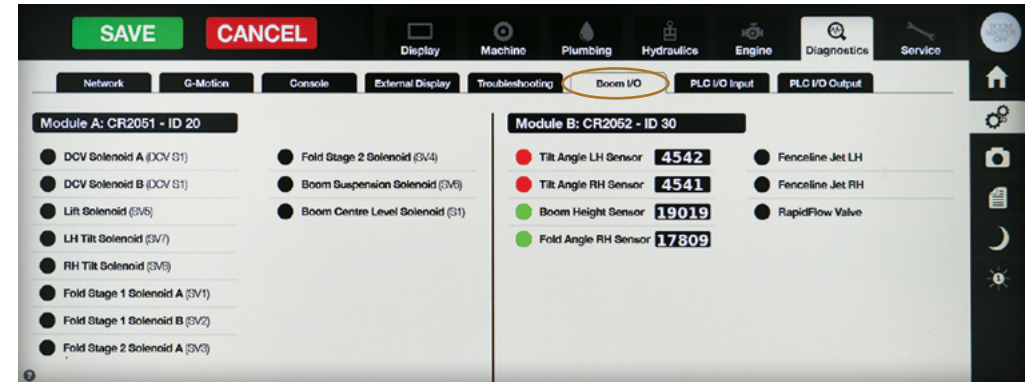
- Auto Fill
- RPM Raise
- Auto Fold
- Spray Pump.

If an indicator displays Green it is connected & working.

If an indicator displays Grey, it is Off

If an indicator displays Red, it is not working

If Red, go to the relevant control module or setting and check the connections.



Press a Console push button (eg, Boom Rest In), then its corresponding switch on the Console screen will light up Green, if functioning correctly.

### 6 Boom I/O

Press the 'Boom I/O' Display tab touch button to display the screen.

The 'Boom I/O' screen provides checklists and readouts for the boom functions operating through Boom Module A & Boom Module B located on the right hand side of the boom centre section.

Used to test and troubleshoot system inputs and outputs.

Fields display the raw sensor data for inputs and the PWM value for outputs of the system.

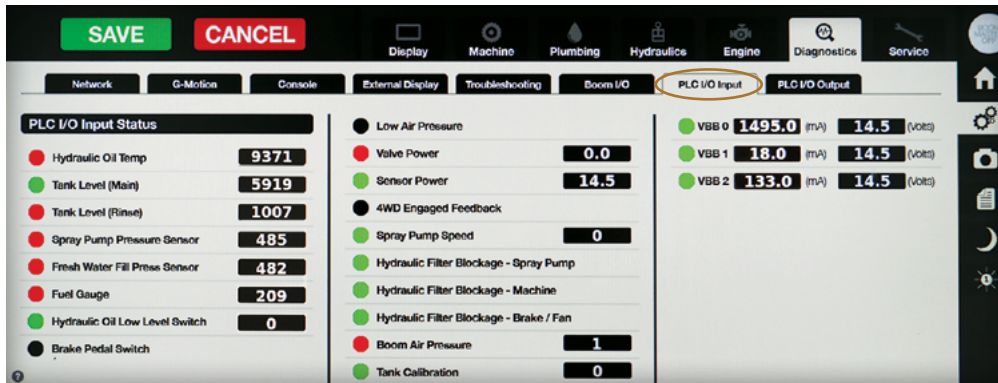
Circular indicator lights for inputs & outputs:

- Black = Off
- Green = Input is working ok & in range
- Red = Sensor is out of range or disconnected - see fault log for more details.

Go to the Boom Module A & Boom Module B and check connections.

Boom Module A & Boom Module B located on RHS boom centre section (cover removed).





Press the 'PLC I/O In' tab to open the screen 'PLC I/O'

## 7 PLC I/O In

Press the 'PLC I/O In' Display tab touch button to display the screen.

The 'PLC I/O In' screen provides checklists & readouts for all Inputs to the Chassis Controller or Main Control Module (located in the left hand side Fill Area toolbox).

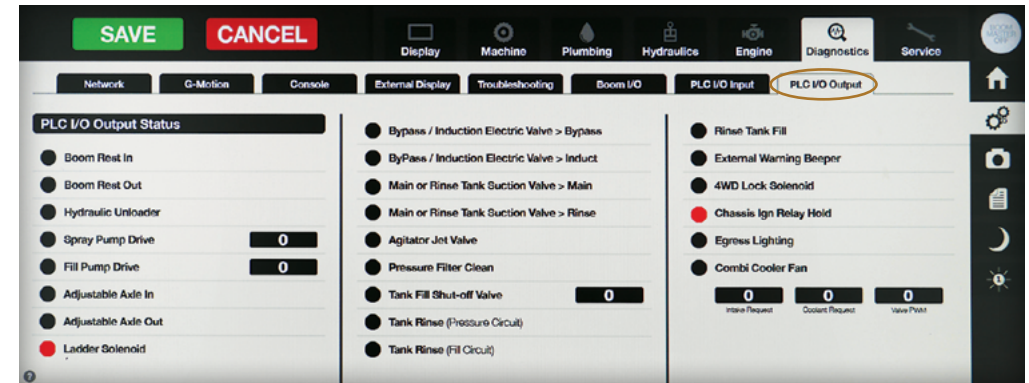
Used to test and troubleshoot system inputs and outputs.

Fields display the raw sensor data for inputs and the PWM value for outputs of the system.

Circular indicator lights for inputs:

- Black = Off
- Green = Input is working ok & in range
- Red = Sensor is out of range or disconnected - see fault log for more details.

Also go to the Chassis Controller or Main Control Module and check the Input connections.



Press a 'PLC I/O Out' push button to display the screen and check functions.

## 8 PLC I/O Out

Press the 'PLC I/O Out' Display tab touch button to display the screen.

The 'PLC I/O Out' screen provides checklists & readouts for all Outputs to the Chassis Controller or Main Control Module (located in the left hand side Fill Area toolbox).

Used to test and troubleshoot system inputs and outputs.

Fields display the raw sensor data for inputs and the PWM value for outputs of the system.

Circular indicator lights for outputs:

- Black = Output is Off
- Green = Output is On and working ok
- Red = Error fault – see fault log for more details

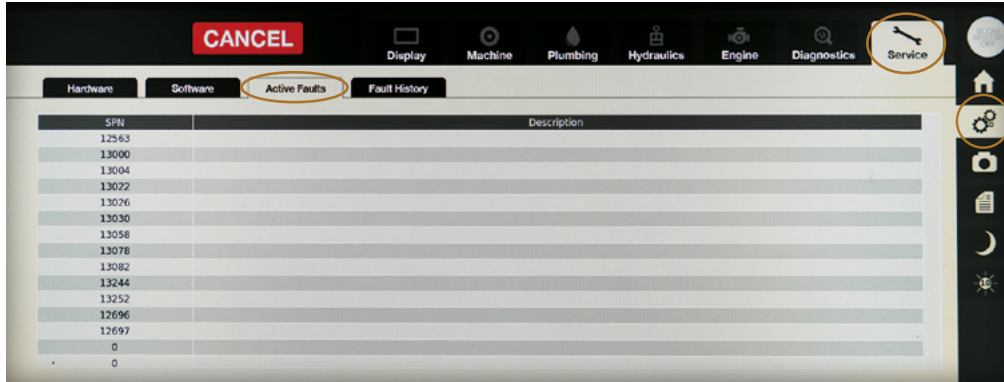
Also, go to the Chassis Controller or Main Control Module and check the Input connections.

## NOTE

The number indicators shown on the PLC I/O Out screen above, namely:

- Spray Pump Drive '350' and
  - Tank Fill Shut Off Valve '650'
- are the PWM outputs. Numbers range from 0 to 1000 where 0 is Off & 1000 is fully On.

## 9 Fast Tracking Problems – **Trouble Shooting**



Press the 'Active Faults' tab to open the 'Active Faults' screen which can be used to check faults.

### Active Faults

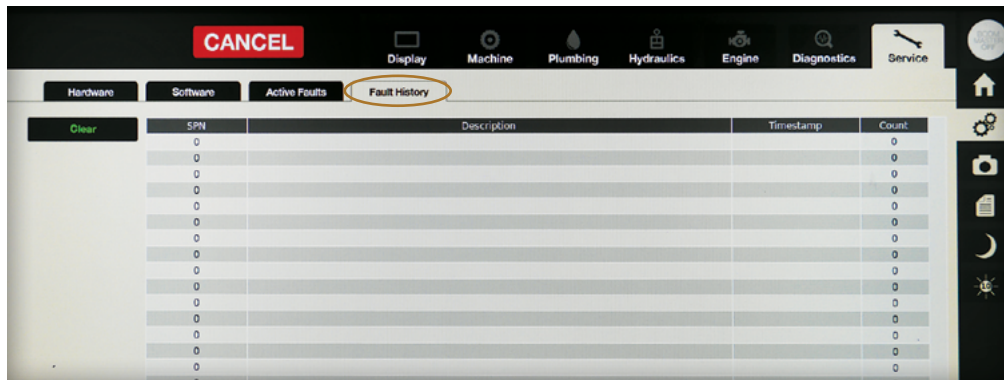
Another G-Hub screen, useful in trouble shooting, is 'Active Faults' accessed in the Service tab screen.

Press 'Settings' touch button, then the 'Service' touch button, then press the 'Active Faults' tab touch button to open a screen displaying all active faults.

Only active faults are displayed.

Once corrected the fault code automatically clears.

Press a Console push button (eg, Boom Rest In), then its corresponding switch on the Console screen will light up Green, if functioning correctly.



### Fault History

'Fault History' is also available in the Service tab screen to assist with trouble shooting.

Press the 'Fault History' tab touch button to open the screen 'Fault History' displaying recorded faults since last cleared.

Press the 'Clear' touch button to clear recorded faults.



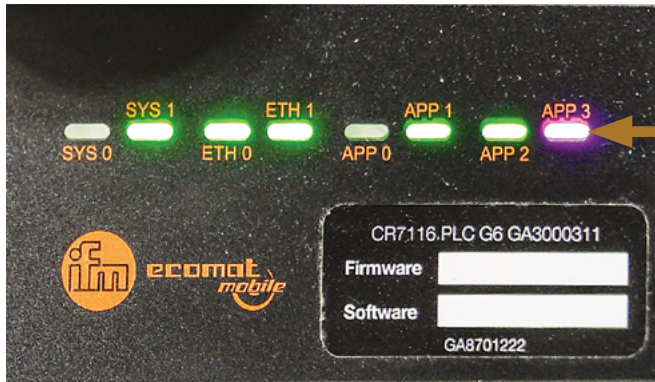
The ISOBus Module (also known as the Chassis Controller or Main Control Module) located in the storage box of Quick Filling Station.

### G-Hub Main PLC Controller

The G-Hub Main PLC Controller, also known as the Chassis Controller or Main Control Module, is located in the storage box of the Filling Station on the right hand side of the Cruiser.

Illustrations & a table (next page) provide trouble shooting touch buttons & information for the light functions on the ISOBus Module.





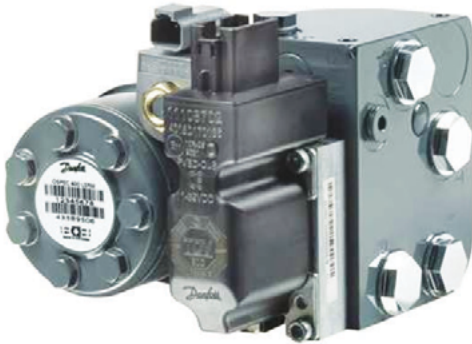
LED lights & keys on the ISOBus Module

LED KEY	LED COLOUR	DESCRIPTION
SYS0	Red	PLC Error, PLC not running
	Green (Flashing)	PLC OK, running
	Off	No PLC power
SYS1	Green	Not used (second PLC)
ETH0	Off	No Ethernet connection
ETH1	Off	No Ethernet connection
APP0	Off	Error
	Blue	G-Hub online
APP1	Red	No HMI settings transfer
	Green	HMI Settings transferred ok
APP2	Blue	No HMI settings changed
	Green	HMI Settings changed ok
	Red	HMI Settings changed failed
APP3	Green	CAN OK, online
	Red	CAN RAW fault
	Blue	CAN open fault
	Yellow	CAN ISOBUS fault
	Magenta	CAN J1939 fault

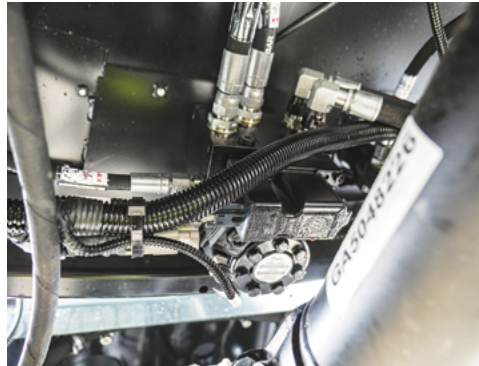
## NOTE

When nothing appears on the G-Hub screen, first, check the lights of the PCL Controller (located in the filling station storage box) for more information. Check the LED colours and if problem is showing according to the LED lights Description, contact you local Dealer for service.

## 9 Fast Tracking Problems – Trouble Shooting



Danfoss autosteer unit.



Autosteer unit fitted under the cab.

### Goldacres Autosteer Orbital Error Codes

Goldacres high performance Danfoss OSPE steering unit with PVED CLS control valve is a fully integrated GPS steering ready solution.

The control valve is compliant with all current legislation and safety standards, and functions correctly without GPS system installation.

The steering system runs on a dedicated CAN bus network (separate from the ISO BUS) and includes a CAN SASA sensor to measure the current steering wheel angle and speed for steering break out control, as well as, an analogue wheel angle sensor (WAS) to report the angle of the front wheels.

All CAN addresses are setup to utilise the default GPS steering controller source address of '28'.

To assist trouble shooting problems, the following tables provide the error codes which may appear if problems arise.

Category	SPN	Signal Name	Signal Name	FMI	Severity	Possible Root Cause(s)
Monitoring	520219	Executed steering device/program crosscheck (application state)	cross-check failure	25 - Signal crosscheck failed	Severe	1 P3237, P3238, P3239, P3241, P3250 or P3251 are set to different values in PVED-CLS Main and Safety controller
Monitoring	520224	MMI flag crosscheck	cross-check failure	25 - Signal crosscheck failed	Severe	1 MMI signals do not match between primary and redundant signal 2 Transmit rate of primary and redundant signal deviate too much from each other 3 P3374 setting does not fit to the MMI device
Monitoring	520249	IMD status crosscheck	cross-check failure	25 - Signal crosscheck failed	Severe	4

Category	SPN	Signal Name	Failure Mode	FMI	Severity	Possible Root Cause(s)
I/O Signals	520192	Analogue sensor connected to AD1	Short circuit to GND	4 - Voltage below normal or shortcircuit to low source	Severe	1 Wire connected to AD1 lost connection (open circuit). 2 Wire connected to AD1 short circuit to GND.
			Short circuit to VCC	3 - Voltage above normal or shortcircuit to high source	Severe	1 Wire connected to AD1 short circuit to a source higher than 4.9V.
			Too high deviation	25 - Signal crosscheck failed	Severe	1 Wheel angle sensors are not calibrated properly. 2 Sensor characteristics have changed. 3 If two physical separated sensors are used, one of them has lost the mechanical connection or has increased hysteresis. 4 WAS crosscheck threshold parameter (P3375) does not match the wheel angle sensor mounting.
			Signal exceeded calibration limit	13 - Out of calibration	Severe	1 Wheel angle sensors are not calibrated properly. 2 Vehicle geometry has changed and it's now possible to steer the wheels further than the calibrated max points. 3 Mechanical link integrity lost.
I/O Signals	520193	Analogue sensor connected to AD2	Short circuit to GND	4 - Voltage below normal or shortcircuit to low source	Severe	1 Wire connected to AD2 lost connection (open circuit). 2 Wire connected to AD2 short circuit to GND.
			Short circuit to VCC	3 - Voltage above normal or short circuit to high source	Severe	1 Wire connected to AD2 short circuit to a source higher than 4.9V.
I/O Signals	520195	Temperature Sensor	too low	1 - Data valid, but below normal operational range - Most severe level	Severe	1 Ambient Temperature is below -40 °C.
			too high	0 - Data valid, but above normal operational range - Most severe level	Severe	1 Ambient Temperature + self-heating of PVED-CLS (~15 °C) is above 120°C.
			too high average	16 - Data valid, but above normal operating range – Moderately severe level	Info	1 Average ambient temperature + self-heating of PVED-CLS (~15 °C) is above 85 °C. This error code can only get active above 500hours of operation and has severity level INFO.
I/O Signals	627	Vbat	too high	3 - Voltage above normal or shortcircuit to high source	Severe	1 Supply voltage is above 35.5V.
			too low	4 - Voltage below normal or shortcircuit to low source	Info	1 Supply voltage is below 9V. This error code has severity level INFO
			Power on self-test failed due to too low battery supply	1 - Data valid, but below normal operational range - Most severe level	Severe	1 Supply voltage has been below 9V during Power-On-Self-Test for too long time



## 9 Fast Tracking Problems – Trouble Shooting

Category	SPN	Signal Name	Failure Mode	FMI	Severity	Possible Root Cause(s)
I/O Signals	520197	Sensor_+5V	too high	3 - Voltage above normal or shortcircuit to high source	Severe	1 Sensor supply wire above 5.25V
			too low	4 - Voltage below normal or shortcircuit to low source	Severe	1 Sensor supply wire below 4.75V 2 Sensor supply wire shortcut to GND 3 Too high load on sensor supply wire
I/O Signals	520198	Cut-Off supply	shortcut to GND	4 - Voltage below normal or shortcircuit to low source	Severe	1 DOUT short-circuited to GND
			Shortcut to Vbat	3 - Voltage above normal or shortcircuit to high source	Severe	1 DOUT short-circuited to Vbat
			Dutycycle differs from expected value	8 - Abnormal frequency or pulse width or period	Severe	1 Internal Failure
			Open circuit	5 - Current below normal or open circuit	Severe	1 No load connected to DOUT 2 Parameterized current levels (P3074 & P3076) do not match the connected load 3 DOUT short-circuited to Vbat
			Too high load	6 - Current above normal or grounded circuit	Severe	1 Load connected to DOUT is too high >2.5A 2 DOUT short-circuited to GND
CAN messages	520199	SASAIID sensor	never received (boot-up timeout)	22 - Message missing	Severe	1 SASAIID Not powered 2 SASAIID CAN Bus not connected 3 Incorrect parameter setting of SASAIID source address or PGN
			message lost (timeout)	19 - Abnormal update rate Severe	Severe	1 SASA lost CAN bus or power connection
			invalid CRC or message sequence	19 - Received network data in error	Severe	1 CAN bus disturbance
			invalid velocity value	2 - Data erratic, intermittent or incorrect	Severe	1 SASA data out of range
			invalid position value	2 - Data erratic, intermittent or incorrect	Severe	1 SASA data out of range
			Error code signal displays active error	2 - Data erratic, intermittent or incorrect	Severe	1 SASAIID is sending error code - See communication protocol

Category	SPN	Signal Name	Failure Mode	FMI	Severity	Possible Root Cause(s)
CAN messages	520200	Vehicle Speed sensor	never received (boot-up timeout)	22 - Message missing	Severe	1 Vehicle speed sensor not powered 2 Vehicle speed sensor CAN Bus not connected 3 Incorrect parameter setting of VSP source address or PGN
			message lost (timeout)	9 - Abnormal update rate	Severe	1 Vehicle speed sensor lost CAN bus or power connection 2 Wrong message timing
			invalid CRC or message sequence	19 - Received network data in error	Severe	1 CAN bus disturbance 2 Incorrect Vehicle speed sensor message implementation
			invalid speed value	2 - Data erratic, intermittent or incorrect	Severe	1 Vehicle speed sensor data out of range
CAN messages	520201	MMI	never received (boot-up timeout)	22 - Message missing	Severe	1 MMI Not powered 2 MMI CAN Bus not connected 3 Incorrect parameter setting of MMI source address or PGN
			message lost (timeout)	9 - Abnormal update rate	Severe	1 MMI lost CAN bus or power connection 2 Wrong message timing
			invalid CRC or message sequence	19 - Received network data in error	Severe	1 CAN bus disturbance 2 Incorrect MMI message implementation
			invalid program	2 - Data erratic, intermittent or incorrect	Severe	1 MMI data out of range
			invalid off-road flag value	2 - Data erratic, intermittent or incorrect	Severe	1 MMI data out of range
			invalid enable/disable command	2 - Data erratic, intermittent or incorrect	Severe	1 MMI data out of range
CAN messages	520202	Auxiliary steering device	never received (boot-up timeout)	22 - Message missing	Severe	1 AUX Not powered 2 AUX CAN Bus not connected 3 Incorrect parameter setting of AUX source address or PGN
			message lost (timeout)	9 - Abnormal update rate	Severe	1 AUX lost CAN bus or power connection 2 Wrong message timing
			invalid CRC or message sequence	19 - Received network data in error	Severe	1 CAN bus disturbance 2 Incorrect AUX message implementation
			Invalid flag value	2 - Data erratic, intermittent or incorrect	Severe	1 AUX data out of range
			invalid set-point	2 - Data erratic, intermittent or incorrect	Severe	1 AUX data out of range

## 9 Fast Tracking Problems – Trouble Shooting

Category	SPN	Signal Name	Failure Mode	FMI	Severity	Possible Root Cause(s)
CAN messages	520228	WAS CAN sensor	2 never received (boot-up timeout)	22 - Message missing	Severe	1 WAS Not powered 2 WAS CAN Bus not connected 3 Incorrect parameter setting of WAS source address or PGN
			message lost (timeout)	9 - Abnormal update rate	Severe	1 WAS lost CAN bus or power connection 2 Wrong message timing
			invalid CRC or message sequence	19 - Received network data in error	Severe	1 CAN bus disturbance 2 Incorrect WAS message implementation
			invalid position value	2 - Data erratic, intermittent or incorrect	Severe	1 WAS data out of range
			Signal exceeded calibration limit	13 - Out of calibration	Severe	1 Wheel angle sensors are not calibrated properly. 2 Vehicle geometry has changed and it is now possible to steer the wheels further than the calibrated max points. 3 Mechanical link integrity lost
Safety Functions	520203	Vehicle speed triggered EH steering shut-off (Safety function 3)	Vehicle speed too high	31 - Condition exists	Severe	1 Vehicle speed is higher than the specified threshold specified by P3253
Safety Functions	520204	EH-main spool monitoring	EH spool position greater than set-point	7 - Mechanical system not responding or out of adjustment	Severe	1 EH-Spool out of control
			EH spool moved without steering input	23 - Unintended Steering	Severe	1 SASA disconnected from OSPCX in EHPS system
			Not in neutral at startup	28 - Not in neutral at Power-up	Severe	1 EH-Spool not in neutral at startup
Safety Functions	520205	Fault Detection Algorithm Monitoring	Unintended steering	23 - Unintended Steering	Severe	1 Improper sensor parameter setup 2 Chock valves have been open 3 Wheel angle sensor detached 4 SASA IID sensor detached from steering column 5 Improper calibration of wheel angles 6 Change in spool calibration values
Safety Functions	520206	Safe ON-Road Monitoring	Switch stuck closed	30 - Stuck Closed	Severe	1 Road switch relay failure (relay is not able to disconnect load)
			Switch state undefined	2 - Data erratic, intermittent or incorrect	Severe	1 AD3 Road switch signal in undefined range
			Switch state missing	22 - Message missing	Severe	1 AD3 Road switch signal not able to stabilize within valid range during initialization



# Trouble Shooting – Fast Tracking Problems

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Category	SPN	Signal Name	Failure Mode	FMI	Severity	Possible Root Cause(s)
Safety Functions			Switch state crosscheck failed	25 - Signal crosscheck failed	Severe	If P3072 = 255: 1 Internal failure If P3072 = 0 & P3242 = 255: 1 Mismatch in Road switch states between DOUT resistance and AD3 voltage signal
Safety Functions	520207	Road switch resistance monitoring	Switch state undefined	2 - Data erratic, intermittent or incorrect	Severe	1 DOUT Resistance in invalid range
			Switch state missing	22 - Message missing	Severe	1 DOUT Resistance not able to stabilize within valid range during initialization
			Switch state crosscheck failed	25 - Signal crosscheck failed	Severe	1 Mismatch in Road switch states between DOUT resistance and AD3 voltage signal
Safety Functions	520208	Demanded safe state	externally triggered safe state	31 - Condition exists	Severe	1 Controller forced to safe state by peer controller via SPI. This happens for example when one of the controllers detects a failure, which the other controller is not capable of detecting
Diagnostic functions	520210	Cut-off solenoid	unable to supply pilot flow to PVED	30 - Stuck Closed	Severe	1 No/insufficient Pump pressure
			unable to cut pilot flow to PVED	29 - Stuck Open	Severe	1 Internal hydraulic failure in OSPE/EHi
			Synchronization failed	19 - Received network data in error	Severe	Internal failure
Diagnostic functions	299023	Coils Supply Switch	Self-test failed	12 - Bad intelligent device or	Severe	Internal failure
			Safety switch state not in sync with operation	2 - Data erratic, intermittent or incorrect	Severe	Internal failure
			Synchronization failed	19 - Received network data in error	Severe	Internal failure
Diagnostic functions	520211	Overvoltage supervisor	Self-test failed	12 - Bad intelligent device	Severe	Internal failure
			Synchronization failed	19 - Received network data in error	Severe	Internal failure
Internal Hardware	520582	+5V	+5V signal out of range	2 - Data erratic, intermittent or incorrect	Severe	Internal failure

## 9 Fast Tracking Problems – Trouble Shooting

Category	SPN	Signal Name	Failure Mode	FMI	Severity	Possible Root Cause(s)
Internal Hardware	298967	CAN bus	CAN bus off and recovered	19 - Received network data in error	Severe	1 CAN bus disturbance 2 No/insufficient termination on the CAN bus network 3 Shortcut or wire breakage on CAN bus wire
			Address arbitration lost	11 - Unknown root-cause	Severe	1 Address conflict on the CAN bus
			Internal CAN Rx buffer overflow	12 - Bad intelligent device or component	Severe	2 Excessive number of messages intended for PVED CLS
			Internal CAN Tx buffer overflow for CAN priority 3 (safety related messages)	0 - Data valid, but above normal operational range - Most severe level	Severe	3 Excessive number of Priority 3 messages
			Internal CAN Tx buffer overflow for CAN priority 6 (status messages)	15 - Data valid, but above normal operating range - Least severe level	INFO	4 Excessive number of Priority 6 messages
Internal Hardware	299029	EEPROM	Verified write fails on EEPROM cell	12 - Bad intelligent device or component	Severe	Internal failure
Internal Hardware	520212	LVDT sinus signal	LVDT sinus frequency out of range	8 - Abnormal frequency or pulse width or period	Severe	Internal failure
Internal Hardware	520585	Vref generation	Vref signal out of range	2 - Data erratic, intermittent or incorrect	Severe	Internal failure
Internal Hardware	520586	GND level	GND level above upper limit	3 - Voltage above normal or shortcircuit to high source	Severe	Internal failure
Internal Hardware	520588	LVDT demod A	LVDT demo A signal out of range	2 - Data erratic, intermittent or incorrect	Severe	Internal failure
Internal Hardware	520589	LVDT demod B	LVDT demo B signal out of range	2 - Data erratic, intermittent or incorrect	Severe	Internal failure
Software	520229	Soft error	31 - Condition exists	31 - Condition exists	Severe	Internal failure
Software	520213	SPI Communication	SPI message queue full	11 Unknown root-cause	Severe	Internal failure
			2 - Data erratic, intermittent or incorrect	SPI message queue full	Severe	Internal failure
Software	1557	RAM test	RAM-code test fails	I12 - Bad intelligent device or component	Severe	Internal failure

Category	SPN	Signal Name	Failure Mode	FMI	Severity	Possible Root Cause(s)
Software	520579	EEPROM VPS data	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520232	EEPROM Hydraulic config	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520233	EEPROM SEHS FDA	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520234	EEPROM Valve calibration data	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520235	EEPROM CAN WAS Calibration data	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Illegal parameter combinations – see section 17.4.4 3 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520236	EEPROM Analogue Sensor Calibration data	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Illegal parameter combinations – see section 17.4.5 3 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC



## 9 Fast Tracking Problems – Trouble Shooting

Category	SPN	Signal Name	Failure Mode	FMI	Severity	Possible Root Cause(s)
Software	520237	EEPROM Peripherals config	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Illegal parameter combinations – see section 17.4.6 3 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520238	EEPROM SEHS Protocol data	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520239	EEPROM Internal monitoring	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520241	EEPROM Vehicle geometry	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520242	EEPROM GPS config	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Illegal parameter combinations – see section 12 3 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520243	EEPROM STW config	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Illegal parameter combinations – see section 10 3 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC

Category	SPN	Signal Name	Failure Mode	FMI	Severity	Possible Root Cause(s)
Software	520244	EEPROM AUX config	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Illegal parameter combinations – see section 11 3 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520245	EEPROM Auto-Calibration config sector	Parameter value out of range/Incorrect configuration of EEPROM data	2 - Data erratic, intermittent or incorrect	Severe	1 Parameter setting out of range 2 Incorrect sector CRC
			Approval CRC failure	14 - Special instructions	Severe	1 Incorrect Approval CRC
Software	520246	Invalid sensor configuration	Invalid sensor configuration	31 – Condition exists Severe	Severe	If parameter settings are not done as per section 6.1.1
Software	299005	Software Initialization	Fault in software configuration or initialization process	11 - Unknown root-cause	Severe	Internal failure
Software	299004	Division by zero	Division by zero	11 - Unknown root-cause	Severe	Internal failure
Software	628	Flash test	Flash test failure	12 - Bad intelligent device or component	Severe	Internal failure
Software	299002	Variable truncation	Variable truncation	11 - Unknown root-cause	Severe	Internal failure
Software	299001	I2C communication	I2C communication failure	12 - Bad intelligent device or Component	Severe	Internal failure
Software	520592	Too many errors	Too many errors to handle	0 - Data valid, but above normal operational range - Most severe level	Severe	1 If more than 5 errors happen at the same time, this error code will be shown by PVED-CLS
Software	298968	Interpolation	Interpolation overflow or underflow or incorrect data	11 - Unknown root-cause	Severe	Internal failure
Software	520577	SVC Parameters	Invalid PWM calibration values	2 - Data erratic, intermittent or incorrect	Severe	Internal failure
Software	298966	Program sequence monitoring	Program sequence monitoring failure	11 - Unknown root-cause	Severe	Internal failure

## 9 Fast Tracking Problems – Trouble Shooting

Category	SPN	Signal Name	Failure Maode	FMI	Severity	Possible Root Cause(s)
Software	298965	PSM task	PSM task record buffer full or slow PSM data processing	11 - Unknown root-cause	Severe	Internal failure
Software	520583	LVDT calculation	Denominator used in LVDT calculation out of range	2 - Data erratic, intermittent or incorrect	Severe	Internal failure
Software	1563	Software Mismatch	Software does not match peer controller	31 - Condition exists	Severe	PVED-CLS main controller contains a different software version than the PVEDCLS safety controller
Software	1562	Incompatible Bootloader	Bootloader is not compatible to application	31 - Condition exists	Severe	PVED-CLS main and/or safety controller contains a bootloader version not compatible to the application software
Software	520240	PVED-CLS Spare part	This DTC informs that this unit is running a spare part software (Info level DTC)	31 - Condition exists	Info	This DTC is shown by spare parts
Monitoring	520214	Flow command crosscheck	crosscheck failure	25 - Signal crosscheck failed	Severe	1 Flow command calculation by PVED-CLS Main controller and PVEDCLS Safety controller. This can happen if fx. Gain parameters are not equal in Main and Safety controller.
			Loops to look back in Flow CMD buffer exceeded buffer length	2 - Data erratic, intermittent or incorrect	Severe	Internal failure
Monitoring	520225	EH-Mainspool Position crosscheck	crosscheck failure	25 - Signal crosscheck failed	Severe	Internal failure
Monitoring	520215	Wheel angle crosscheck	cross-check failure	25 - Signal crosscheck failed	Severe	If P3244 is set to 0: Internal failure If P3244 is set to 255: 1 CAN Wheel angle sensors are not calibrated properly. 2 Sensor characteristics have changed. 3 If two physical separated sensors are used, one of them has lost the mechanical connection or has increased hysteresis 4 WAS crosscheck threshold parameter (P3352) does not match the wheel angle sensor mounting. 5 CAN Wheel angle sensor transmit rate of primary and redundant signal deviate too much from each other
Monitoring	520216	Vehicle Speed sensor speed crosscheck	cross-check failure	25 – Signal crosscheck failed	Severe	1 Vehicle speed signal deviation too high between primary and redundant 2. Transmit rate of primary and redundant signal deviate too much from each other 3. P3363 & P3364 settings does not fit to the vehicle speed sensor



## Trouble Shooting – Fast Tracking Problems

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Category	SPN	Signal Name	Signal Name	FMI	Severity	c Possible Root Cause(s)
Monitoring	520217	STW sensor Position crosscheck (SASA)	cross-check failure	25 - Signal crosscheck failed	Severe	SASA Failure
Monitoring	520227	STW sensor Speed crosscheck (SASA)	cross-check failure	25 - Signal crosscheck failed	Severe	SASA Failure
Monitoring	520218	Auxiliary steering device Steering angle crosscheck	crosscheck failure	25 - Signal crosscheck failed	Severe	1 AUX mini wheel steering angle deviation too high between primary and redundant signal 2 Transmit rate of primary and redundant signal deviate too much from each other 3 P3371 & P3372 settings does not fit to the AUX mini wheel device
Monitoring	520230	Auxiliary steering device Steering angle velocity crosscheck	crosscheck failure	25 - Signal crosscheck failed	Severe	1 AUX mini wheel steering angle velocity deviation too high between primary and redundant signal 2 Transmit rate of primary and redundant signal deviate too much from each other 3 P3365 & P3366 settings does not fit to the AUX mini wheel device 1 AUX mini wheel steering angle velocity deviation too high between primary and redundant signal 2 Transmit rate of primary and redundant signal deviate too much from each other 3 P3365 & P3366 settings does not fit to the AUX mini wheel device
Monitoring	520231	Auxiliary steering device Steering angle velocity crosscheck	crosscheck failure	25 - Signal crosscheck failed		1 AUX Joystick flow request deviation too high between primary and redundant signal 2 Transmit rate of primary and redundant signal deviate too much from each other 3 P3368 & P3369 settings does not fit to the AUX joystick
Monitoring	520247	Auxiliary steering device Joystick trim value crosscheck	cross-check failure	25 - Signal crosscheck failed	Severe	1 AUX Joystick trim signal deviation too high between primary and redundant signal 2 Transmit rate of primary and redundant signal deviate too much from each other 3 P3388 & P3389 settings does not fit to the AUX joystick
Monitoring	520248	Auxiliary steering device Joystick enable signal crosscheck	cross-check failure	25 - Signal crosscheck failed	Severe	1 Transmit rate of primary and redundant signal deviate too much from each other 2 P3387 setting does not fit to the AUX joystick

## 9 Fast Tracking Problems – Trouble Shooting

### Spray Pump

PROBLEM	COMMON CAUSES	COMMON SOLUTION
<b>Pressure &amp; Flow rate are too low</b>	Centrifugal pump speed	Check pump speed is 4000 - 4200 RPM
	Diaphragm pump speed	Check pump speed is 400 - 540 RPM.
	Diaphragm pump diaphragms	Check oil for colour change. If the oil appears milky, a diaphragm will be damaged and needs to be replaced
	Diaphragm pump valves	Check pump valves for wear or blockage
	Suction line air leak	Check suction line for air leak.
	Suction blockages	Check the tank sump, suction line & suction filter for blockage
	Nozzle wear	Measure the flow per minute coming out of one nozzle, then check the nozzle chart for the corresponding flow.
	Regulator valve function	Check the regulator valve is rotating the full 90 degrees when the boom valves are switched Off
	Excessive bypass on pressure manifold	Verify the Console calibration settings
<b>Pressure &amp; Flow rate are too high</b>	Supply to pump is restricted	Check the pressure relief valve setting on the pump.
	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

### Spray Pump

PROBLEM	COMMON CAUSES	COMMON SOLUTION
<b>Pressure gauge reads higher than the nozzle flow indicates</b>	Blocked filters of nozzles	Check and clean all pressure and nozzle filters
	Flow loss due to resistance in lines, valves & filters.	Re-calibrate console to allow for pressure loss
<b>Pressure fluctuation</b>	Air leak on suction side of pump	Check suction pump for air leaks.
	Incorrect pump speed	Adjust pump speed: <ul style="list-style-type: none"> <li>Centrifugal pump: 4000 - 4200 RPM</li> <li>Diaphragm pump: 400 - 540 RPM.</li> </ul>
	Faulty pump valves	Replace pump valves
<b>Pump pressure pulsating</b>	Incorrect pump speed	Adjust pump speed: <ul style="list-style-type: none"> <li>Centrifugal pump: 4000 - 4200 RPM</li> <li>Diaphragm pump: 400 - 540 RPM.</li> </ul>
	Air leak on suction side of pump	Check pump suction for air leaks
<b>Pump oil is becoming milky</b>	Cracked diaphragm	Replace all diaphragms
<b>Pump is noisy</b>	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
<b>Pump housing or mounting cracked.</b>	Extremely cold weather can cause liquid in the pump to freeze	Check for ice in the pump and let defrost if required

## Flow Meter & Controller

PROBLEM	COMMON CAUSES	COMMON SOLUTION
<b>Application rate is inaccurate, unstable or zero</b>	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
<b>Speed sensor display is inaccurate, unstable or zero</b>	Incorrect speed calibration	Re-calibrate console speed
<b>Volume display is inaccurate, unstable, zero or not changing</b>	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
<b>Flow meter appears not to be working</b>	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
<b>Application rate or pressure will not alter</b>	Faulty control valve	Test valve manually and replace if required
<b>Control valve has failed</b>	Faulty cable	Replace control valve
	Faulty valve	Temporary solutions: Remove the motor from the 3 way ball valve and manually adjust the flow by turning the shaft with a spanner

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 machine.
- Drive the machine at a constant speed in order to apply the required application volume as determined by the nozzle selection chart.
- The machine should then be operated to empty the tank. Once the machine 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.

## Spray Nozzles

PROBLEM	COMMON CAUSES	COMMON SOLUTION
<b>Streaky pattern coming from nozzle</b>	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.
<b>No spray coming from nozzle</b>	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.



## 9 Fast Tracking Problems – Trouble Shooting

### Boom

PROBLEM	COMMON CAUSES	COMMON SOLUTION
Inner and outer wing are not in line with each other when the boom is unfolded	Stopper bolt holding out the boom	Adjust the boom stopper bolt
Booms will not fully fold to the boom rests	Insufficient lubrication	Lubricate all boom pivots
	Fold cylinder mounts have moved	Adjust fold cylinder mounts
Boom unfold unevenly	Air trapped in the hydraulic lines	Unfold booms completely and hold switch for a few seconds. Then, fold booms completely and hold switch for a few seconds. Do this multiple times as necessary to purge any air out of the hydraulic lines.
Outer boom does not line up with the inner wing when unfolded	Incorrect boom adjustment	Fold the boom out and note the position the outer boom is in. Fold the boom in to transport position and note position outer boom is in. Follow the table below to adjust boom so it sits level in the out (work) position and to have the bottom chords sitting parallel in the folded (transport) position
Booms are showing signs of bending components and welds cracking	Folding or unfolding of booms is too fast	Reduce the hydraulic flow to the folding cylinders
	Folding or unfolding of booms while the machine is still moving	Do not fold or unfold the boom while the machine is still moving
	Tilt operation	Tilt operation should be kept to a minimum. If the tilt operation is too fast, reduce the oil flow

### NOTE

By nature, booms fitted with flow dividers don't fold 100% evenly.  
Hold the boom fold switch for a few seconds after the first boom has folded completely to give the other boom the chance to match the fully folded position.

### Plumbing

PROBLEM	COMMON CAUSES	COMMON SOLUTION
No water at boom.	No Tier valve value entered or is at 0	Enter value greater than 0

### Induction Hopper

PROBLEM	COMMON CAUSES	COMMON SOLUTION
Induction hopper is not performing as well as it should	Insufficient flow to venturi in the hopper bottom	Check the pressure supplied to the hopper bottom is around 550 kPa (80 PSI).
	Air leaks on induction system	Check all hoses, clamps, and cam lever fittings are sealed

### Brakes

PROBLEM	COMMON CAUSES	COMMON SOLUTION
Brakes are spongy	Air in brake lines	Bleed brakes as outlined in maintenance chapter
Machine is stopping inconsistently	Grease or oil on the brake discs	Clean the discs with a clean cloth and methylated spirits.
	Warped brake discs	Inspect the discs to ensure they are straight. If warped, they must be replaced.
The brakes are screeching or squealing.	Insufficient friction material on brake pads and/or rotors worn.	Inspect brake pads and rotors. Replace immediately if worn beyond wear indicators. Rotor min. thickness 20 mm.
	Brake pad rubbing on piston	Fit Anti-squeal liners on pads

## Hydraulic & Pneumatic

PROBLEM	COMMON CAUSES	COMMON SOLUTION
<b>No hydraulic pressure</b>	Low hydraulic oil level	Check the oil level in the hydraulic reservoir and top up if necessary
	Fill pump is engaged	Switch the hydraulic fill pump off
<b>The air bags are not inflating</b>	Low system pressure	The bags will not inflate until the pressure in the system is above 75 PSI, check system pressure.
	Compressor not working properly	Check that the compressor is working correctly
<b>Vehicle sits unevenly</b>	Incorrectly adjusted ride height valves.	Adjust the ride height valves as per the instructions in the Lubrication and Maintenance chapter.
<b>Air conditioning not cooling effectively</b>	Condenser blocked	Check the condenser for a build up of dirt and plant matter, clean if required
	Compressor belt loose	Inspect the belt to see if it is tensioned correctly. If belt is showing signs of wear, replace
	A/C system needs re-gassing	If this is the case, only allow a qualified air conditioning technician to work on the system. R134a refrigerant must not be allowed to escape to the atmosphere
	Evaporator blocked	Build up of dirt and plant matter, clean if required. Be careful not to damage any of the components

## 9 Fast Tracking Problems – **Trouble Shooting**



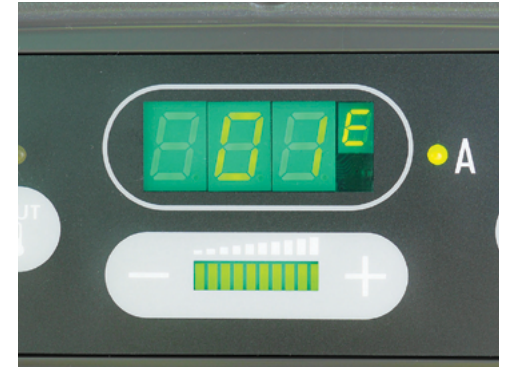
If the **SERVICE** indicator is illuminated, then a fault in the shift by wire system has occurred.



When the transmission shifter displays 'D-\-' (loss of J1939), press 'D' and/or consult a qualified technician.



The 'Select' display flashes if restricted transmission shifting occurs. If so, consult a qualified technician.



Air conditioner display showing '01' HVAC Fault Code.

### Transmission Shifter

#### Transmission Fault Warning

If the **SERVICE** indicator is illuminated, then a fault in the shift by wire system has occurred.

A qualified technician should inspect the system as soon as possible.

#### Loss of J1939

Loss of the J1939 to or from the shifter will result in an error indicated on the display as 'D-\-'.

The **SELECT** display works as normal except that in drive, only the error 'D-\-' is displayed.

Up shift and down shift commands are sent on the J1939 link and can not function in this mode.

The vehicle transmission will not be able to hold any of the forward gears unless the loss of J1939 occurred while a lower range than currently selected. If this is the case, the selected range will be the max range.

Press 'D' (Drive) during this situation to enable shifting to all 6 gears.

If loss of J1939 occurs, consult a qualified technician.

#### Range Inhibit Indicator

Certain conditions may cause the Allison transmission control module (TCM) to restrict shifting.

The range inhibit indicator alerts the operator that such a condition exists when the 'SELECT' display (the left digit) begins flashing & the 'MONITOR' Display (the right digit) remains constant.

Please consult a qualified technician in this situation.

### Air Conditioner Fault Codes

The overhead display of Air Conditioner in the cabin may show one of the following **HVAC Fault Codes** if a problem occurs:

- 01** HVAC High Pressure fault
- 02** HVAC Low Pressure fault
- 03** HVAC Control Panel Blower Potentiometer fault
- 04** HVAC Control Panel Temperature Potentiometer fault
- 07** HVAC Cab Temperature Sensor fault
- 08** HVAC Evaporator Sensor fault
- 09** HVAC Outlet Temperature Sensor fault
- 19** HVAC Communication fault.

#### **WARNING**

Operating the machine with the wrench icon flashing is not recommended. It may indicate a loss of safety back up systems. The operator should use extra caution when shifting to ensure that the transmission is performing properly.





Front left tie-down attachment & towing point.



Front right tie-down attachment & towing point.

## Towing & Transporting a Disabled Cruiser

- A disabled Cruiser is best transported on a drop deck trailer.
- Use chains to secure the machine via the tie-down attachment point located under the front and rear axles.

- The Cruiser must not be towed unless the engine is running (as the steering and brakes require engine power to operate).
- Before towing, the front tail shaft should be disconnected, due to the risk of damaging the transmission.
- While towing do not travel at a speed greater than 10 Km/h.
- A Cruiser must be actively steered & braked if being towed.



Rear left tie-down attachment point.



Rear right tie-down attachment point.



Use the touch buttons & content pages to quickly access the information required.

## Document Centre

Copies of Operators & Parts manuals in PDF format can be accessed and viewed via the 12" G-Hub screen screen in the cabin.

Use the touch buttons and contents page to quickly access the information you require.

Please note manuals on the G-Hub are accurate at time of loading and are subject to change.

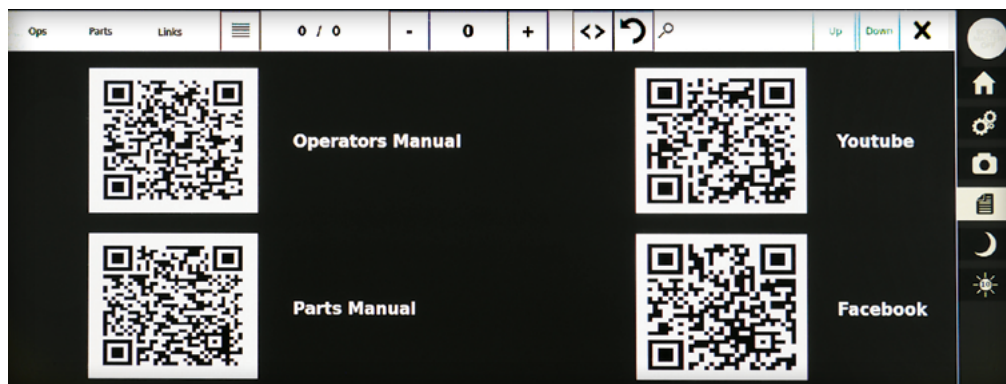
For the most recent and accurate versions of all manuals refer to the Goldacres website -

[www.goldacres.com.au](http://www.goldacres.com.au)



Use the touch buttons & content pages to quickly access the information required.

## 9 Fast Tracking Problems – **Trouble Shooting**



*The 'QR Codes' screen provides quick access to the most up to date information from Goldacres website.*

### **QR Codes**

'QR Codes' give quick online access to the most up-to-date versions of the Operator's and Parts manuals on the Goldacres website.

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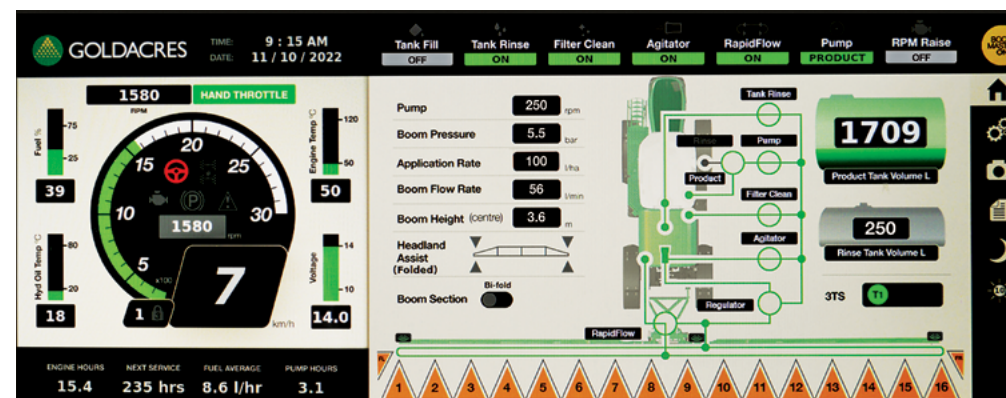


G-Hub - Goldacres Integrated Control System console.

## G-Hub - Goldacres Integrated Control System

### G-Hub Glossary of Terms:

<b>CANBUS</b>	- Controller Area Network which allows devices to communicate
<b>Crash</b>	- PLC code run failure; Requires restart
<b>Ethernet</b>	- Network technology like CANBUS but 100 times the bandwidth
<b>G-hub</b>	- Goldacres integrated machine control system
<b>HC</b>	- High current
<b>ifm</b>	- Company brand name of PLC hardware used
<b>I/O</b>	- Input/output
<b>PDM</b>	- Power distribution module
<b>PLC</b>	- Programmable logic controller
<b>RCM</b>	- Raven control module used for product rate control
<b>XRT</b>	- Raven boom height control system (replaces Norac).



In cabin - G-Hub Controller Display/Touch Home Screen.

### Internal Controller Display:

- Full colour, 12" 8:3 ratio Touch screen, running embedded Linux OS, IP 67 which displays important machine data to the operator from all connected systems
- Full system diagnostics, including warnings and operation states "Right to repair ready"
- Displays all relevant machine data for the operator
- Goldacres have custom designed the user interface with inbuilt help
- The system has been designed to keep going even if individual components fail.
- Responsible for sending the steering safety information to the Danfoss steering valve (*Auto steer will not operate if this display is disconnected*)
- Full virtual controls in case of component failures with input switches and joystick.
- Full virtual control of external display in case of external display failure.
- Interface to change settings and configure the system.

### External Controller Display:

- Full colour, 5" Non Touch screen, running embedded Linux OS, IP 67
- Activating the external display temporally locks the main display screen
- External CAN Key pad with function indicator LED's, 8 push button can pad with coloured indicator lights
- Automatic tank fill function
- System Rinse functionality
- Control of electric plumbing valves, valves including colour indicator lights for easy diagnostics.

External G-Hub Controller Display.





Main Control Module located in the storage box of the

## Main PLC:

- Main 'brain' of the control system, contains all the chassis I/O for sensors and control
- The diagnostic lights on the PLC tell inform the user if software is loaded and if there are any problems (see PLC LED table in Chapter 11 'Troubleshooting')
- The software has been written to allow continued operation even when sensors fail, if a sensor is faulty it can be disconnected. But please note that some system functionality may be lost until the sensor can be replaced.
- Links via CAN to the Raven RCM to get sprayer information and transfer tank volume
- Links via CAN to Raven XRT for control and sense when in operation
- Links to engine and transmission CAN to exchange information and control cruise control
- Correct operation of the PLC is critical to machine operation.

## Cabin I/O Modules:

- There are two basic I/O modules inside the cabin side console that convert the input from the console switches and joystick into CAN bus messages
- The CAN bus messages are then sent to and interpreted by the PLC to operate machine functions
- The I/O modules are not programmed, rather they are configured with mechanical selectors that set the CAN address and the CAN data speed. If not set correctly they will not be detected on the network.
- Each module has built in power and input status lights for each input allowing quick and easy diagnostics.

### NOTE

The Park Brake is not controlled by the Main PLC for safety reasons.



Boom I/O module.

## Boom I/O Modules:

- In order to reduce the amount of wires running to the rear of the machine, two smaller I/O modules do the work for the PLC at the rear
- The two modules look the same but they are different
- Each module has a unique CAN bus address as displayed on their screens
- The CAN bus address and data rate can be manually set and adjusted as required with the buttons
- The modules house diagnostic LEDs to assist troubleshooting
- The indicator lights will display when the output is on and flash if there is an output disconnected. The small screen displays the node address and the status of the CAN bus connection.
- The modules do not contain software and do not require updating.

## Valves & Solenoids:

- Most of the plumbing valves have a built in light, red or green, that primarily indicates the valve position but also the fact that they have power connected
- Note that the main suction valve has three positions and is normally in the centered OFF position. There will be no light on in this position but it may still have power connected as normal.
- The main plumbing valves have a breakout harness for easy assembly and diagnostics if required with the use of a break in tee harness
- The main hydraulics also have a breakout harness for easy assembly and diagnostics
- The rear I/O modules will also flash a red LED when a solenoid is disconnected (they run a small amount of current into the output to detect presence of connections).

## CANBUS

The machine control systems use six independent CANBUS networks & these are critical to complete operation of the G-Hub:

- 1 Goldacres CAN network (PLC to displays)
- 2 Goldacres CAN control (PLC to I/O modules)
- 3 J1939 CAN (Engine and Transmission)
- 4 ISOBUS CAN (RCM, Raven XRT and GPS, etc)
- 5 GA steering CAN (Steering Orbital, SASA sensor, GPS, Display)
- 6 Goldacres CAN open (Keypad to external display screen).

Raven & Hawkeye run their own sub-CANBUS networks. These networks are separate and must not be joined.

They must be fully installed before they will operate, ie, fully installed including installation of terminators (see CANBUS layout schematics on the following pages).

## G-Hub Settings Backup

The internal controller display gives the operator the ability to back up the G-Hub settings, this can save information such as the machine setup and the tank calibration values to an external USB drive for future use if required.

## Software Updates

The three components that can be updated include:

- Main PLC
- Internal display
- External display.

The customer can enjoy improvements and added functionality from future software updates as it is designed and released.

Software updates are performed using:

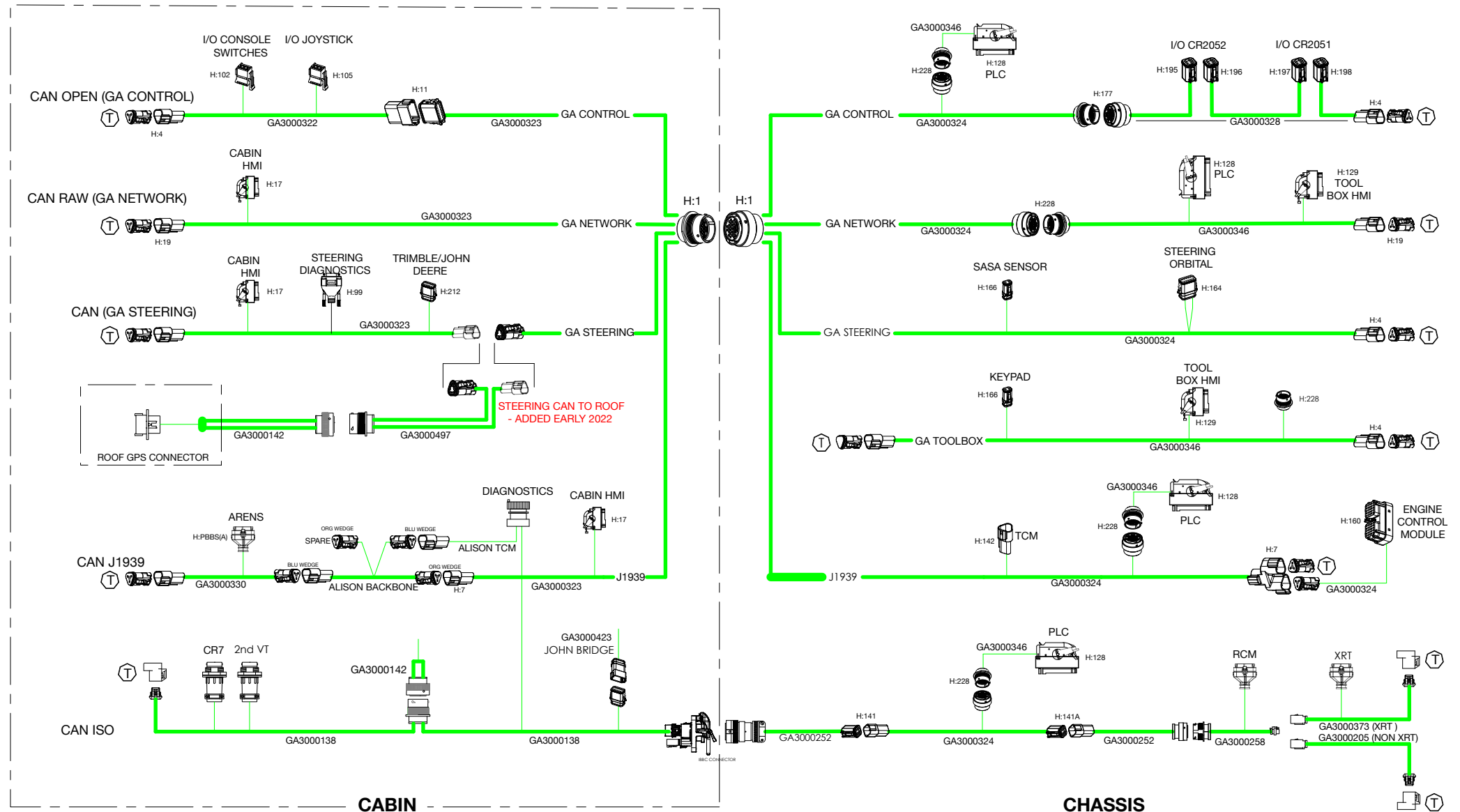
- USB port to the internal controller display in the cabin (G-hub Controller updates [see instructions at the end of chapter 3 'Cabin']) and
- IFM maintenance tool (PLC updates).

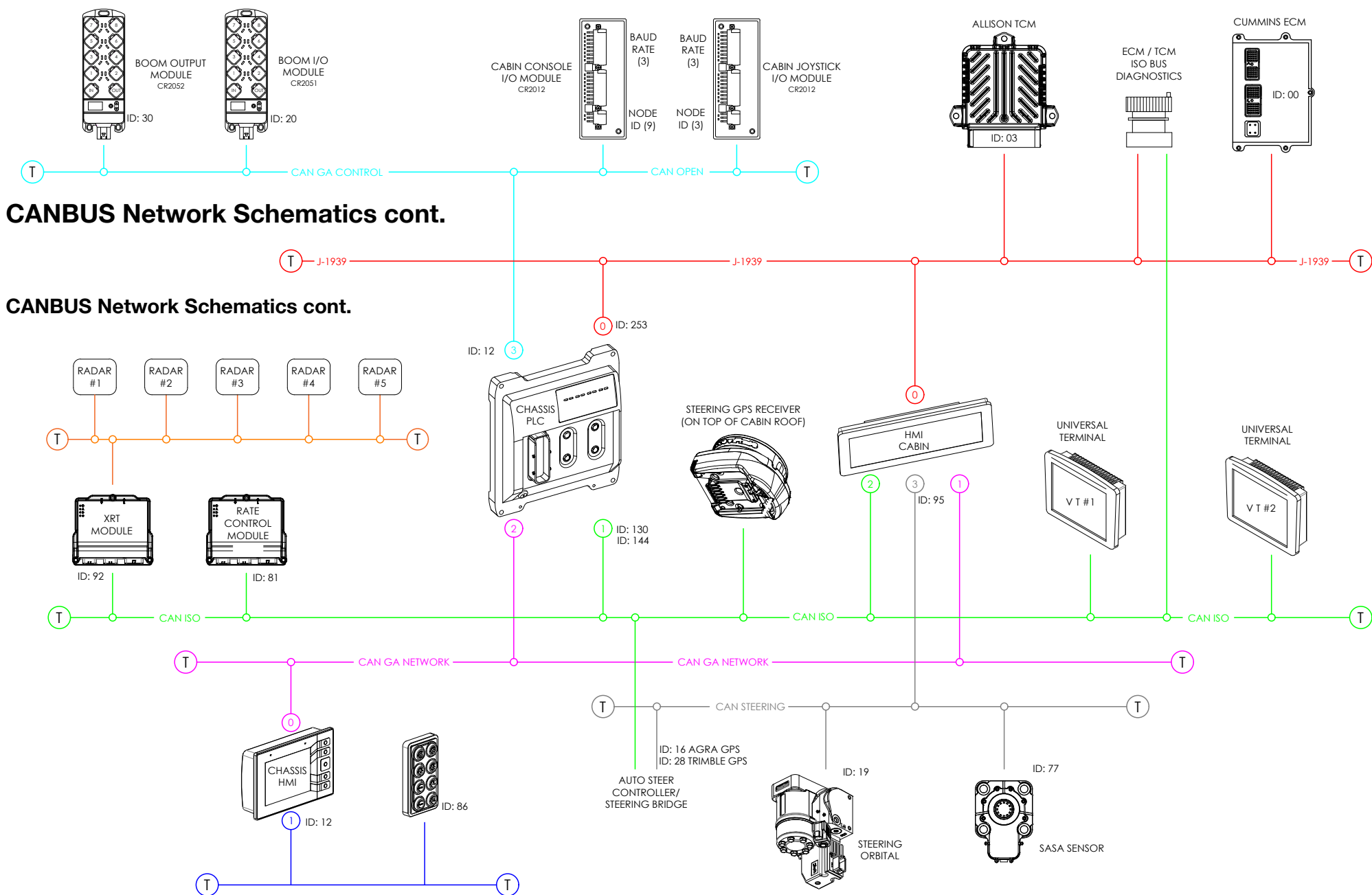
Further information on how to perform updates will be provided with each software update release.

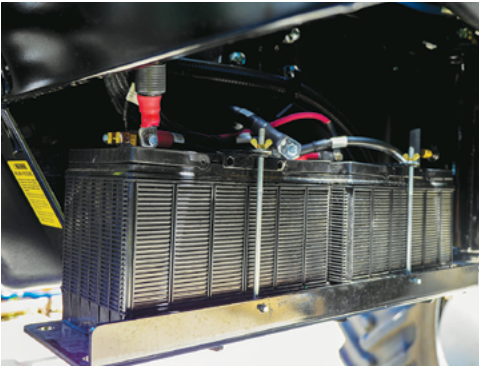
It is highly recommended that all settings are backed up before performing a software update in case of issues.



## CANBUS Network Schematics







Two 12 volt supply batteries located under the chassis.

## Electrical System

### Batteries

The electrical system operates on 12 volts. To provide a 12 volt supply with sufficient current, two 12 volt batteries are used in parallel.

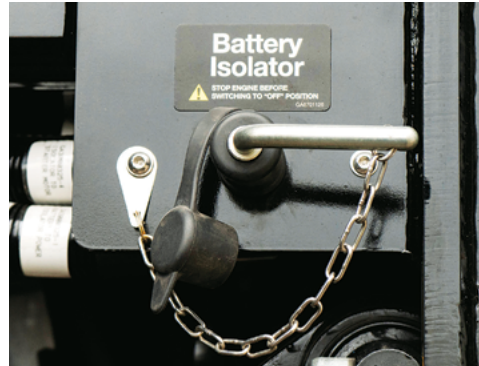
- Before carrying out any repairs to the electrical system turn the Battery Isolator switch to the 'Off' position.

The battery isolator is located just behind the fuel tank on the right hand side.

- When welding, connect the ground terminal directly to the part being welded and ensure that the batteries are disconnected.

Disconnect any electronic controls such as the engine controller, transmission controller, G-hub controllers, PLC, RCM, etc.

- When welding on the machine ensure, if fitted, that all weed seeker controllers are totally removed from the machine.



The Battery Isolator located on the right hand side of the engine.

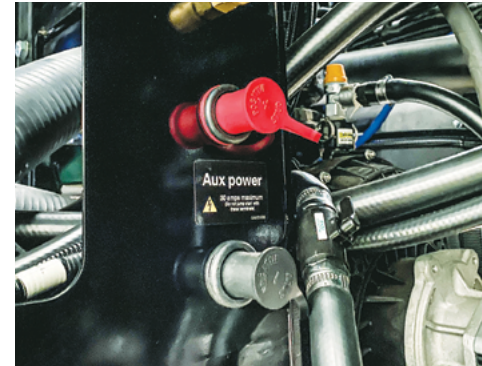
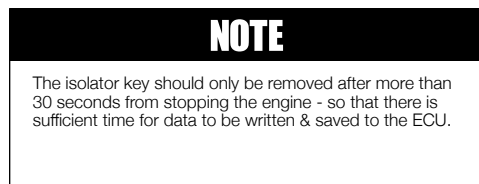
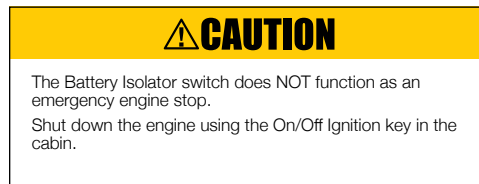
### Battery Isolator

The battery isolator is located just behind the fuel tank on the right hand side.

The battery isolator switches power flow from the batteries to the machine.

The isolator switch is a 250 Amp unit which cuts all power to the machine except for the radio back up power.

The isolator switch must be isolated when the machine is not in use to prevent battery leakage or power faults.



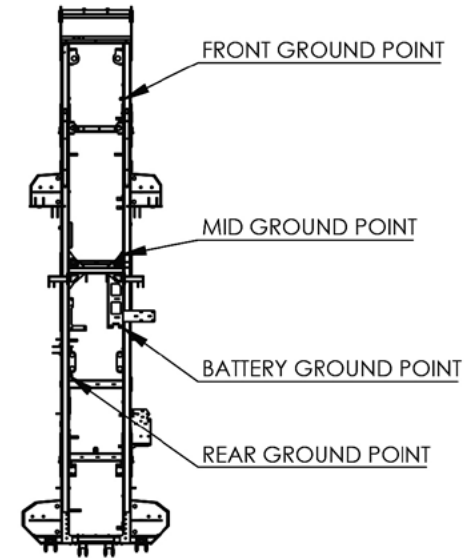
Auxiliary power connection points located on the left hand side of the machine.

### Chassis Auxiliary Power Points

#### General

Auxiliary power connection points (12V, 30A maximum) are fitted to the side of the left hand pod.

They can be used as a battery charging point or to power electrical attachments, but NOT to be used for jump starting.



Four ground/connection points located on the chassis

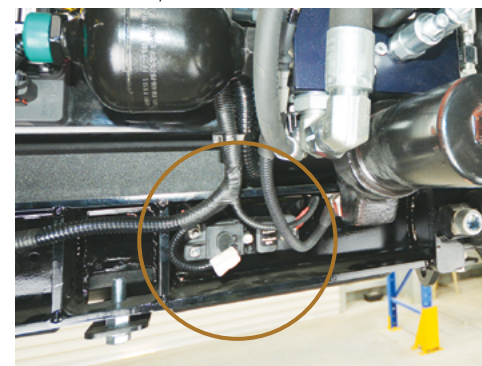
### Lighting

A switched and fused power stud (12V, 500W maximum) is provided for customer fitted lighting accessories under the front axle area just under the hydraulic manifold.

### Chassis Ground Points

There are four ground points located on the chassis to assist with connection of optional equipment.

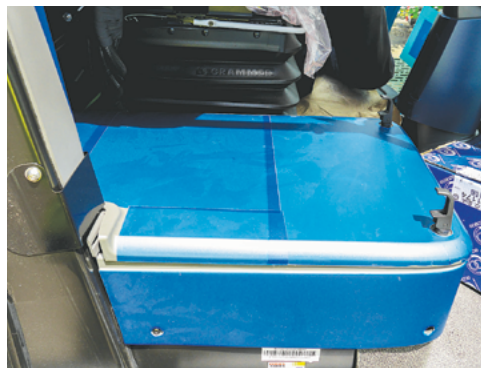
Switched/fused power stud located under the front axle.







Chassis mounted ACC Relay, Fuse box & Chassis PDM.



The Electrical Compartment located under the armrest controls in the cabin.

## Chassis Mounted Components

Some electrical components are mounted under the chassis in the front axle area.

These include the;

- ACC relay,
- Chassis fuse block &
- Chassis PDM.

## Cabin Electrical Compartment

The electrical compartment is located under the armrest controls in the cabin. To access the electrical compartment, refer to instructions on page 52 of this manual.

The electrical compartment contains two main fuse boxes and various fuses and relays to activate the machine circuitry.

The fuses have been placed in the system to protect the system against electrical faults and incorrect connections.

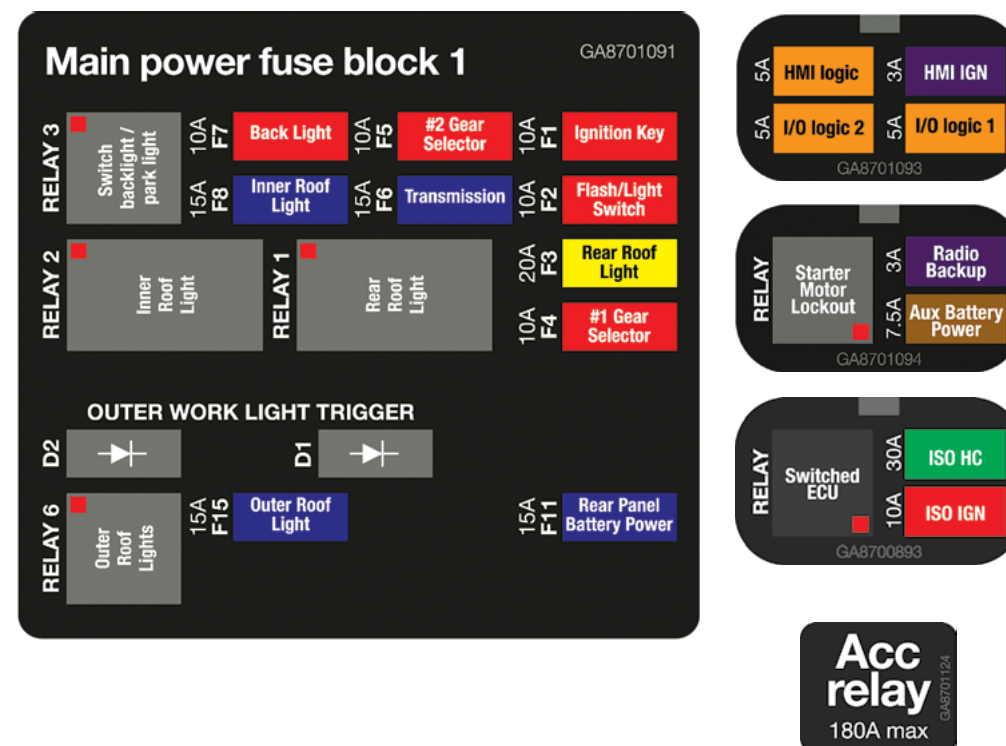
In the case of incorrect connections or faults, a fuse will blow and disconnect the related circuit.

If a fuse has blown, identify the corresponding components in the circuit and investigate the cause before reconnecting with a new fuse.

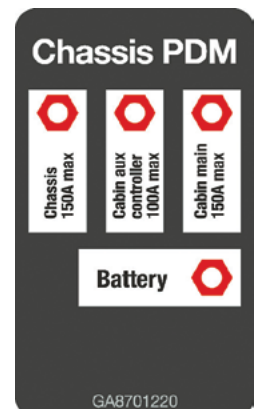
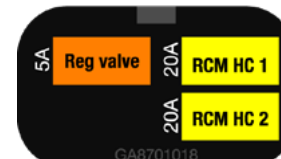
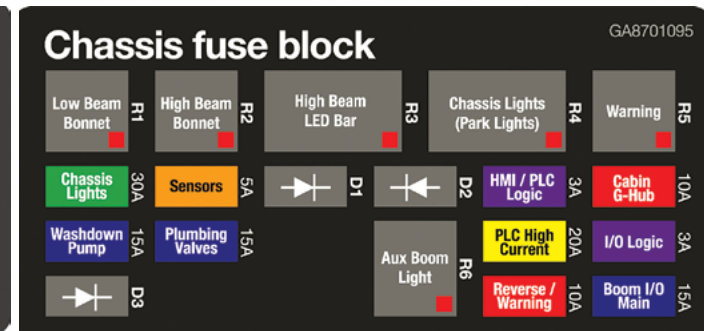
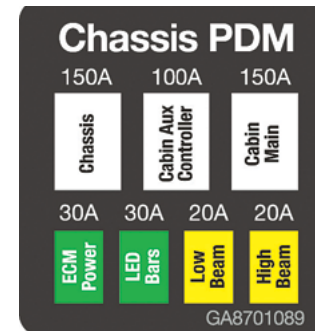
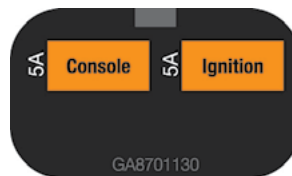
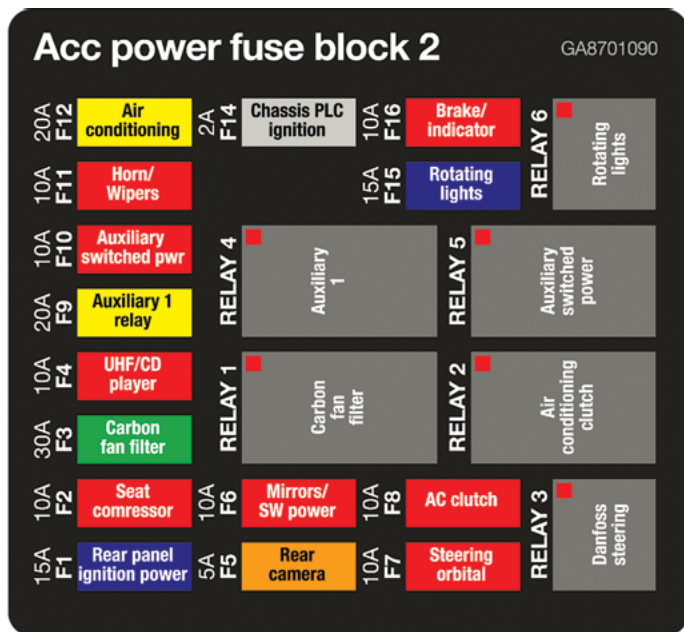
When a fuse is replaced it is important that the fuse is replaced with another fuse of the same rating.

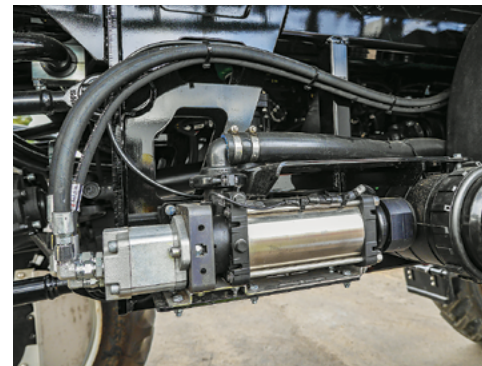
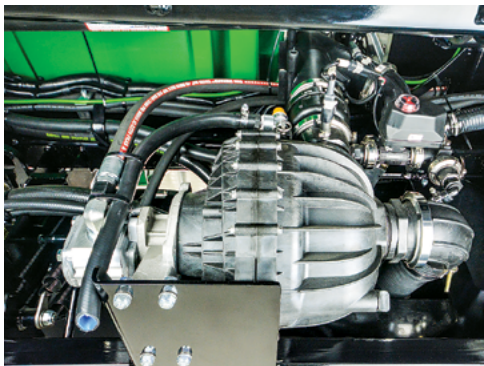
**Do NOT** use a higher rated fuse in an attempt to correct an electrical fault.

## Fuses & Relays in the Cabin



## Fuses & Relays on the Chassis





## Liquid Application System

The Liquid Application System comprises the liquid & chemical:

- Filling & Cleaning system
- Spraying system

## Filling & Cleaning System

Filling & Cleaning functions of the Cruiser are primarily controlled and monitored on the External G-Hub Controller & Filling Station Pod of the Quick Filling Station on the left hand side of the Cruiser. Refer to chapter 6 'Operation - Ready to Spray' for operating details.

Primary components include:

- Fill pump
- Chemical transfer pump.

## Fill Pump

A 3" high-capacity fill pump combined with high flow fluid plumbing and hydraulics is capable of filling the sprayer at rates of up to 1150 l/min. The pump & distribution valves are controlled by the G-Hub system to regulate fill rate & tank level soft shut-off.

## Chemical Transfer Pump

A pneumatic twin diaphragm high-capacity chemical transfer pump (up to 40 l/min) ideal for high viscosity chemicals allows neat chemical to be delivered directly to the main product tank or diverted to the induction hopper to be measured before being transferred



## Spraying System

Optimum droplet sizing, pressure, nozzle flow rate and spray uniformity across the boom width are all critical to accurate chemical application.

Goldacres Rapid flow, boom recirculation, 3 tiered nozzle system (3TS, 3TS-Pro) options and Hawkeye Pulse Width Modulated (PWM) system option offer many application benefits.

All Spraying application functions of the Cruiser are controlled and monitored on the G-Hub Controller in the cabin. Refer to chapter 6 'Operation - Ready to Spray' for operating details.

Primary components include:

- Spray pump, filters & valves
- Rate Control Module (RCM)
- Spray pump & liquid controls
- RapidFlow & RapidFire
- Boom sections & height control
- Driveline & speed control

## Spray Pump

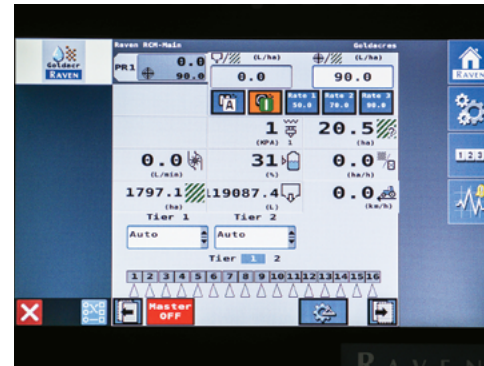
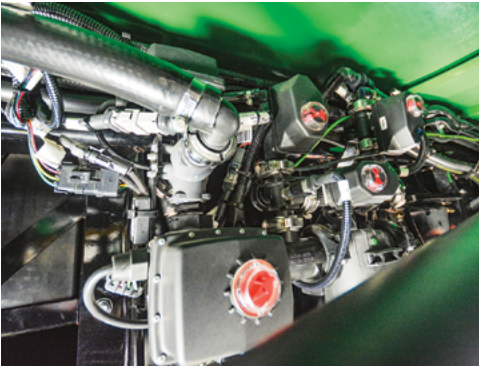
The Cruiser is optioned with a diaphragm or centrifugal spray pump:

- A Udor Zeta 260 l/min diaphragm pump with nearly 85% of the pump capacity available to the spray line. This increased capacity allows spray application rates of up to 140 l/ha @ 25km/h to be achieved (220 l/min total flow rate across a 36m boom) OR
- A five-stage centrifugal pump can deliver up to 400 l/min at 8 bar of pressure. The multi-stage pump technology proved far more linear relationship between flow and pressure which is crucial in keeping large volumes of chemical in solution whilst spraying at relatively high pressures.

The centrifugal pump is standard with all 48m booms and when the Hawkeye PWM option is fitted.

Both pumps are protected by a large suction filter as well as rpm and run-dry sensors for peace of mind spraying.





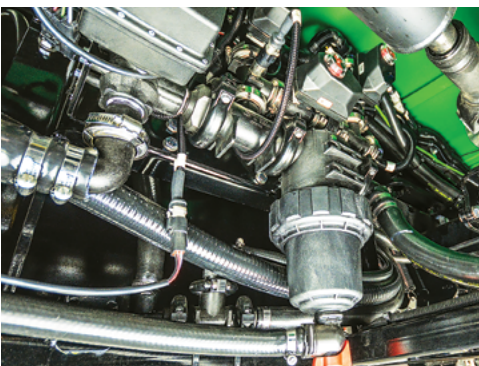
RCM screen.

## Centralised Filters & Valves

All filling, rinsing and spraying fluid circuits are controlled using motorised electric ball valves which are centralised to minimise pressure drop which is essential for maximising pump performance.

Electric motorised ball valves feature LED status lights and valve position indicators to aid trouble shooting.

A large single pressure filter featuring a self-flushing flushing function helps keep contaminants from blocking nozzles.



## Rate Control Module (RCM)

The Raven Control Module (RCM) fitted as standard. It uses innovative control algorithms for precise application including 16 section boom control to eliminate expensive skips and overlaps.

The RCM is compatible with many ISOBUS universal terminals on the market, including the CR7 from Raven - ISOBUS compliant CAN channel, plus 3 available CAN subnets. Compatible with ISOBUS Universal Terminal and Task Controllers Integrated Bluetooth providing long range line-of-sight wireless connectivity for control, monitoring & testing.

It has multi-language support including English, French, Russian, Spanish and Portuguese. IP 67 environmental rating for the harshest of environmental conditions.

Refer to the Raven RCM operation manual supplied for detailed setup and calibration information.

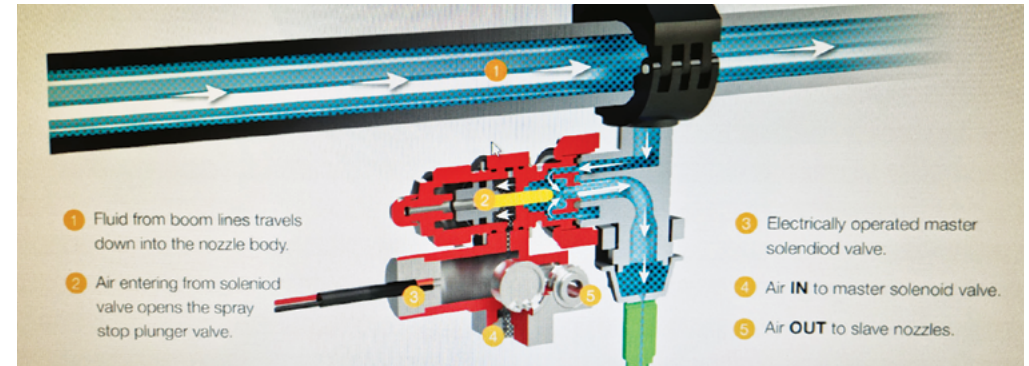


Illustration of the RapidFlow and RapidFire nozzle technologies.

## RapidFlow

RapidFlow boom recirculation, fitted as standard, allows the sprayer boom lines to be fully primed without spraying a single drop, significantly reducing wastage at the start of spraying, changing chemicals and cleaning. RapidFlow is used to thoroughly flush out the boom lines without the need to physically spray on the ground.

Boom recirculation can also be controlled through the G-Hub system and can be set to be either manual or automatic in its operation.

## RapidFire - Air Solenoid Nozzles

The Cruiser is fitted standard with 16 section boom section and RapidFire nozzle control.

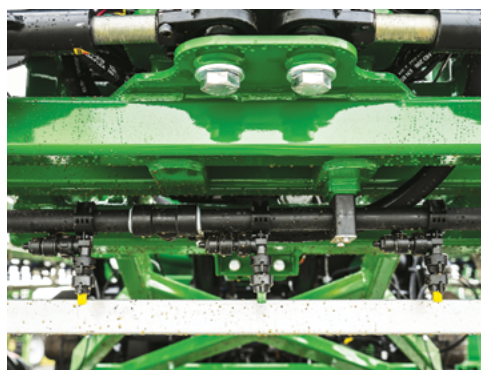
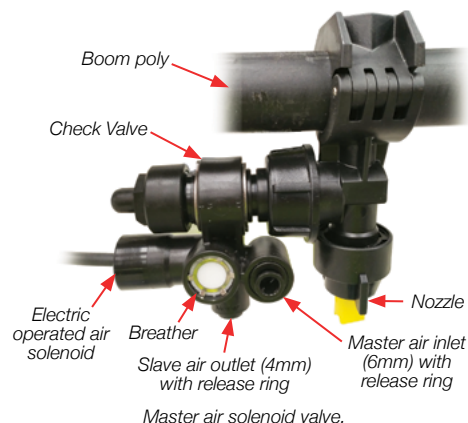
The nozzle system contains a master and slave arrangement for each section. One master air solenoid per section is electrically operated, which sends air to activate a number of slave cylinders which are pneumatic only.

Master cylinders have dual or single nozzle bodies, depending on the spacing option at time of purchase, but operate in the same way.

In the event of nozzles not operating as expected, there are checks to help diagnose and solve the problem.

First check the electrical connections to the master air solenoids. There should be power at the connector when the nozzles are activated from the cabin and the connectors should be securely plugged in to the nozzle.

Secondly, check the air lines for secure fitment and presence of air pressure in the 6 mm supply lines to the masters when the machine is running.



Centreline plumbed boom with optional 3TS single nozzles at 250mm spacing.

### RapidFire - Nozzle & Air Check

Test the air check nozzles for instantaneous response at the nozzle tip. With the lines at spraying pressure switch the nozzles On & Off. Each nozzle must respond quickly without dribbling, as the pressure builds up or subsides.

The air checks Close under a spring tension of 140 PSI. This traps the liquid in the spray line at the same pressure that it was being applied.

When the booms are turned On, air pressure (acting against the 140 PSI springs) instantly opens flow to the nozzle applying the boom line liquid pressure at the rated pressure and droplet size with full fan angle.

The air check valve is located on the side of the nozzle, it has 2 O-rings in it. Over time, the O-ring may swell or be damaged. This may result in the nozzle dripping or being slow to shut when it has been turned off.

If the nozzle leaks the outer O-ring requires replacement. If the air shut off has poor or delayed response, the inner O-ring requires replacement.

### 3 Tier System - 3TS & 3TS Pro (Options)

The 3 Tier System (3TS) provides a wider range of flexibility with application rates and spraying speed. The 3TS effectively gives a much wider operating band whilst still maintaining optimum droplet size.

The 3TS might be described as a three step gearbox or in the case of the 3TS Pro, a seven step gearbox.

### 3TS Option

Each nozzle type on 2 tiers has an operating pressure band for a given droplet size. As the first nozzle set or tier reaches the top of its pressure band, the next larger size nozzle tier is activated.

When the second tier reaches the top of its pressure band, the first tier will be reactivated to spray at the same time. This effectively gives three operating bands.



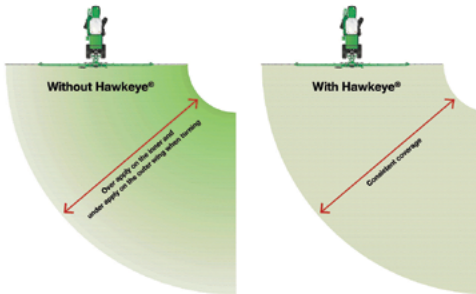
Boom with 3TS Pro with alternating single & double nozzles at 250mm spacing.

### 3TS Pro Option

The 3TS Pro option is an extension of this idea using three different nozzle sizes and gives seven effective bands of operation for even greater application control.

It requires an unlock code for the Raven RCM which is provided when the feature is optioned.

The Raven RCM controls the 3TS system. For specific calibration and operating instructions, see Raven RCM operation manual supplied.



Nozzle by nozzle turn compensation with the Hawkeye option.

## Hawkeye (Option)

The optional Raven Hawkeye is a Pulse Width Modulated (PWM) spray system. Known as Hawkeye 2.0, this PWM is offered on 36m and 48m booms with nozzle spacing at 250mm (& 500mm on request). This system provides:

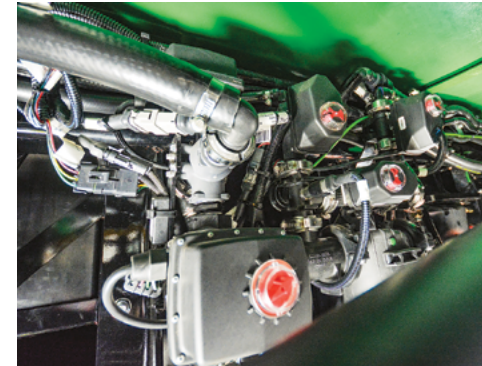
- Nozzle by nozzle turn compensation. Each nozzle features its own microprocessor which can perform diagnostic functions.
- Up to 16 virtual sections or individual nozzle control.

The system runs at 10Hz with blended pulse application & is controlled through the ISO BUS terminal.

## Speed Sensors

The Raven Automatic Rate Controller utilises a speed reading from the transmitted GPS speed over ISOBUS network.

The GPS system must be configured to transmit the ground speed over the ISOBUS network.



Flow Control Valve.

## Flow Control Valve

The flow control valve (mounted on the chassis) regulates the amount of liquid going to the boom sections as directed by the console. It controls the flow to the boom by regulating the amount of liquid which bypasses and flows 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 the system pressure.

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



AutoBoom XRT radar sensor.

## XRT Auto Boom Height Control (Optional)

Boom height control is automated using the Raven AutoBoom XRT radar sensor system. This system is standard on 48 metre equipped machines and optional for 36-42 metre boom machines.

Centre section stability is physically managed using variable rate roll dampeners.

Variable rate dampeners are used to stiffen the centre section roll action which allows the boom wing tilts to be operated much faster without effecting the boom stability.

The XRT operating status is displayed on the G-Hub internal screen whilst the setup is configured through the ISO BUS terminal.



The XRT height sensors are radar based. They enable a larger height measurement range over ultrasonic types and can detect both ground and crop canopy and are less affected by spray drift, dust and mud.

The sensors are also very compact, allowing simple fitment along the boom.

The Raven XRT system uses extra sensors to monitor:

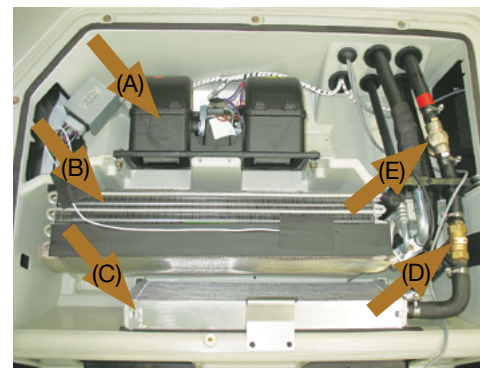
- The machine chassis rate of roll
- The boom centre position relative to the chassis &
- Boom wing tilt angle.

These extra sensors allow the computer to predict how the boom will react well before the radar sensors even see the change in boom height. The end result is a more stable boom in uneven terrain.

More detailed and specific information can be found in the product documentation from the Goldacres and Raven websites.

[www.goldacres.com.au](http://www.goldacres.com.au)

[www.ravenprecision.com](http://www.ravenprecision.com)



*In cab roof: Blower Fan (A), AC Evaporator (B), Heater Core (C), Heater Control Valve (D) & Heater Water Filter (E).*

## Air Conditioning System

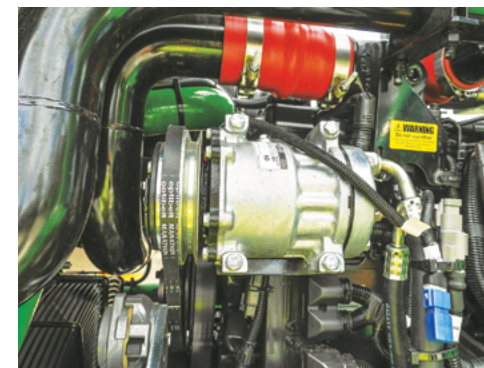
The Air Conditioning System provides all heating, ventilation & cooling of the cabin.

A separate pressurising fan draws clean air into the cabin through the carbon filter - pressurising the cabin with clean air and forcing air out through any holes or leaking seals in the cabin ensuring no impurities can be drawn into the operator's clean environment.

A blower fan pulls air through the air conditioning evaporator & heating evaporator and pushes air to the demist & roof vents.

When the air conditioning compressor is engaged, the air conditioner evaporator will cool the air.

If the heater thermostat is turned to heat, the air will warm again as it passes through. If the heater is off, the cool air passes through to the vents.



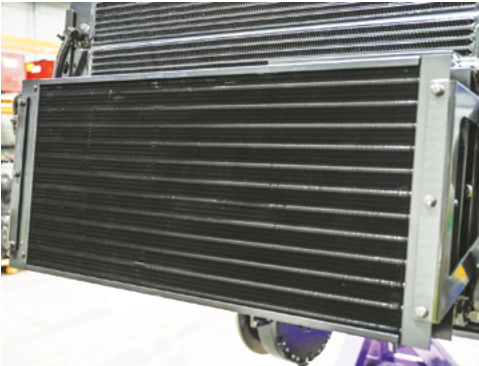
*The air conditioner Compressor.*

## Compressor

The air conditioning compressor is located on the front side of the engine. This compressor is driven by an engine V-belt.

The function of the compressor is **controlled by the air conditioning controller unit in the cabin.**

A thermostat will cycle the air compressor if the evaporator gets too cold.

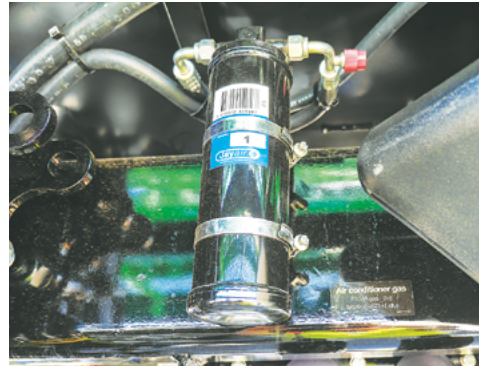


*The air conditioner Condenser.*

## Condenser

The air conditioning Condenser is located in front of the engine radiator. The condenser is cooled by air being drawn through from the engine fan.

The condenser requires regular cleaning of dust and any debris.



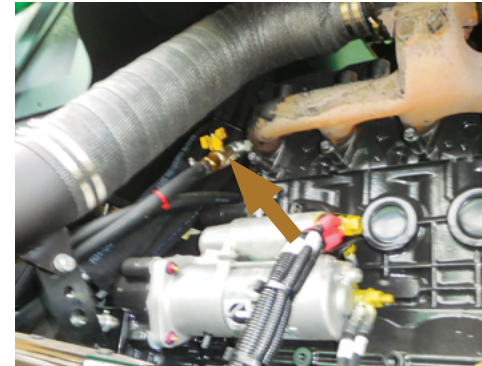
*The air conditioner Receiver Dryer.*

## Receiver Dryer

The air conditioning Receiver Dryer unit is fitted to the right hand side chassis rail under the cabin.

This unit captures any moisture circulating within the air conditioner system. Moisture within the air conditioning system will freeze & cause blockages.

The Receiver Dryer must be replaced every time the air conditioning system is opened or serviced.



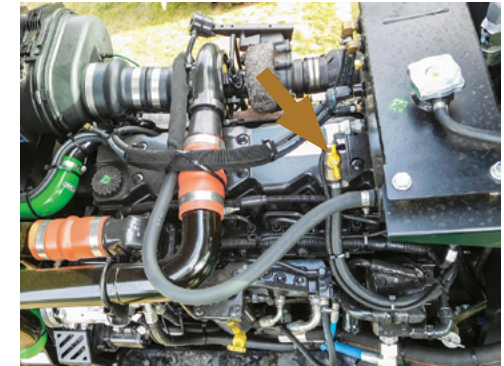
*The 1st heating core Isolating Tap located on the right hand side of the engine at the rear of the exhaust manifold.*

## Heating System

Coolant from the engine flows through the heater core causing it to radiate heat into the cabin when the engine is up to temperature.

The volume of the water travelling through the system, and therefore the amount of heat transferred, may be adjusted by setting the temperature on the A/C head unit.

To enable the heating core to be isolated from the engine two taps have been installed.



*The 2nd heating core Isolating Tap located on the left hand side on top of the engine near the header tank.*

The first tap is located on the right hand side of the engine at the rear of the exhaust manifold.

The second isolating tap is located on the left hand side on top of the engine near the header tank.

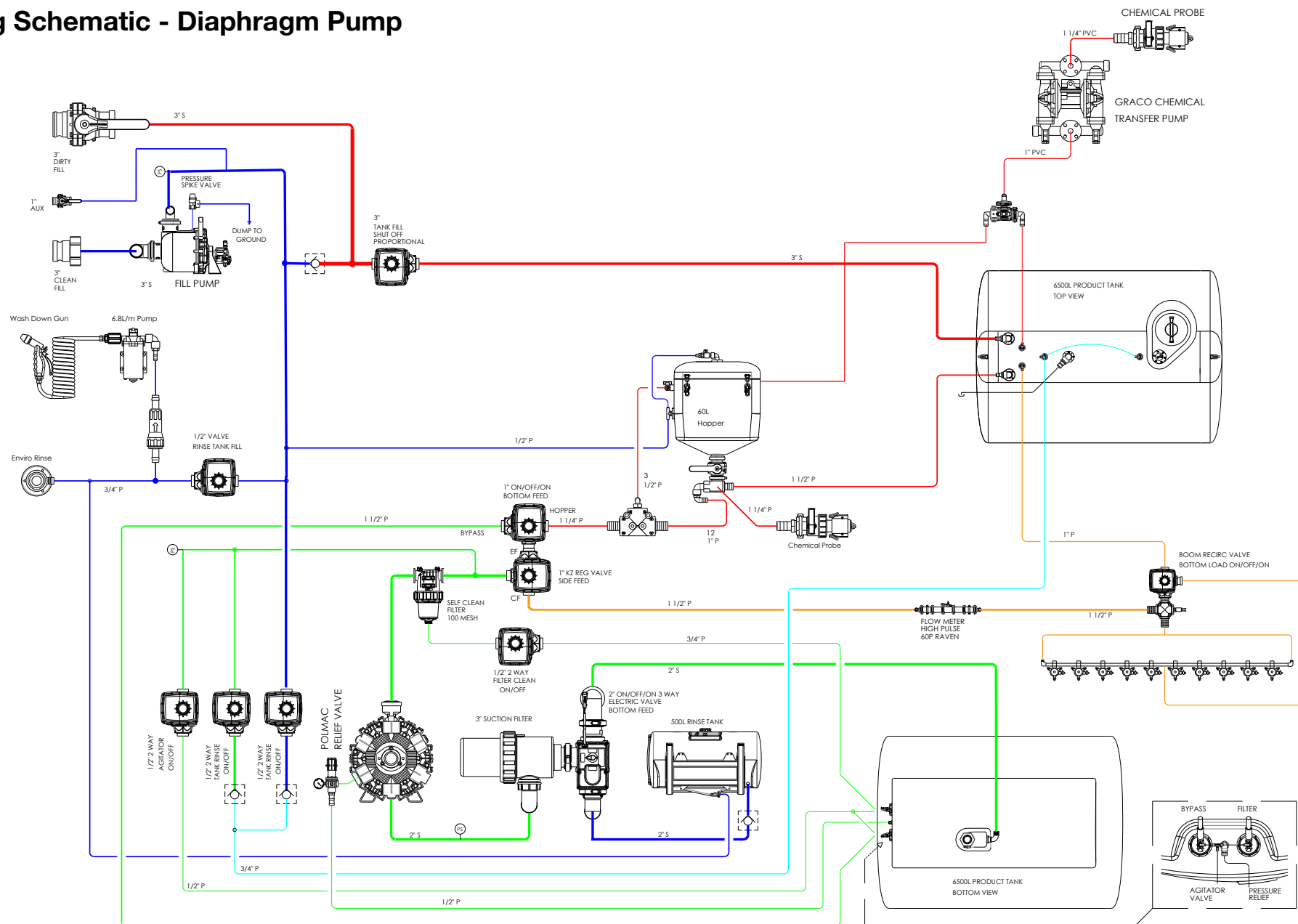
### NOTE

Take care not to damage the condenser coils or fins when cleaning the condenser.

### NOTE

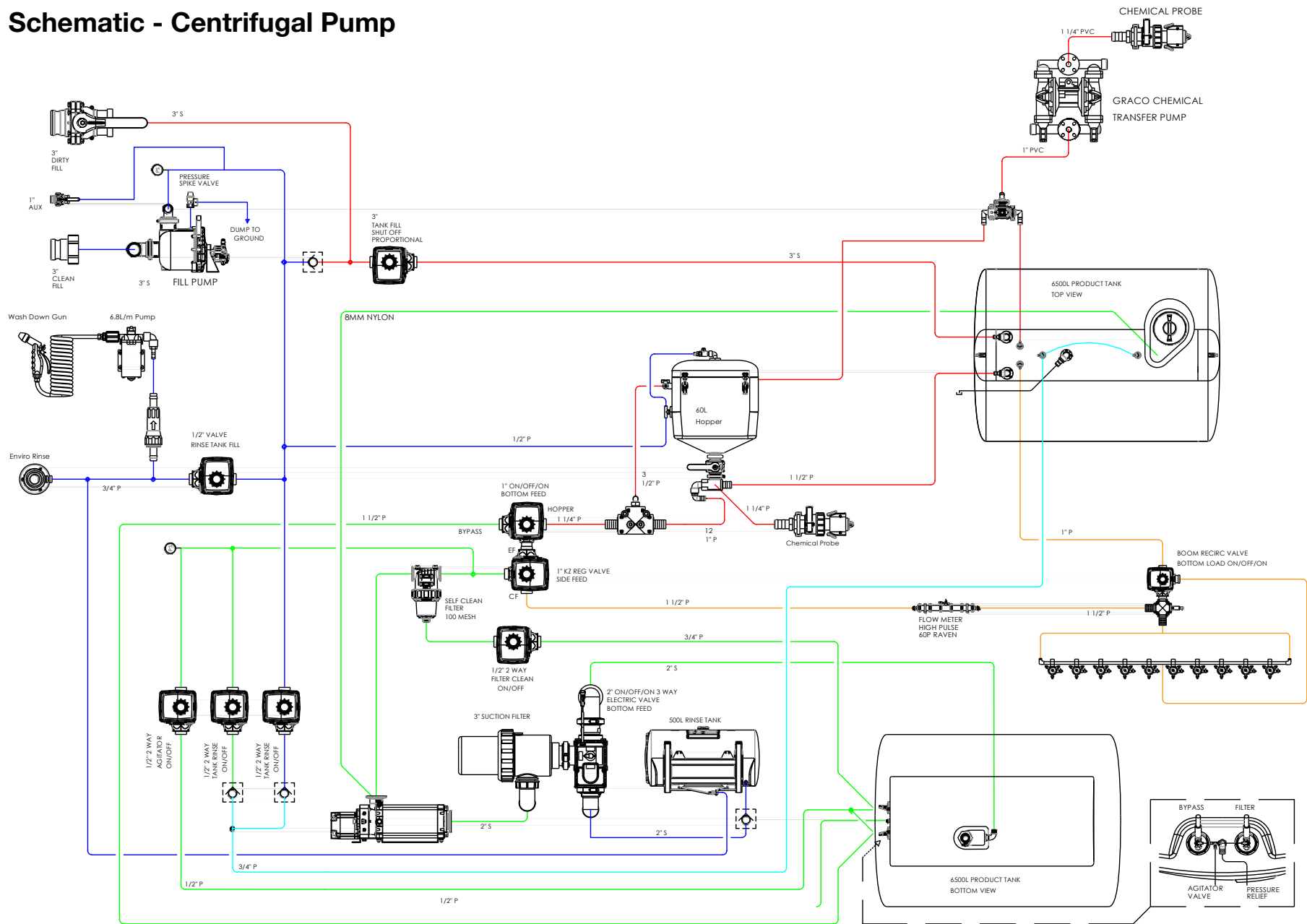
If the heating is not working when the engine is warm, ensure that the isolating taps are allowing coolant to flow through to the heater core.

## Plumbing Schematic - Diaphragm Pump



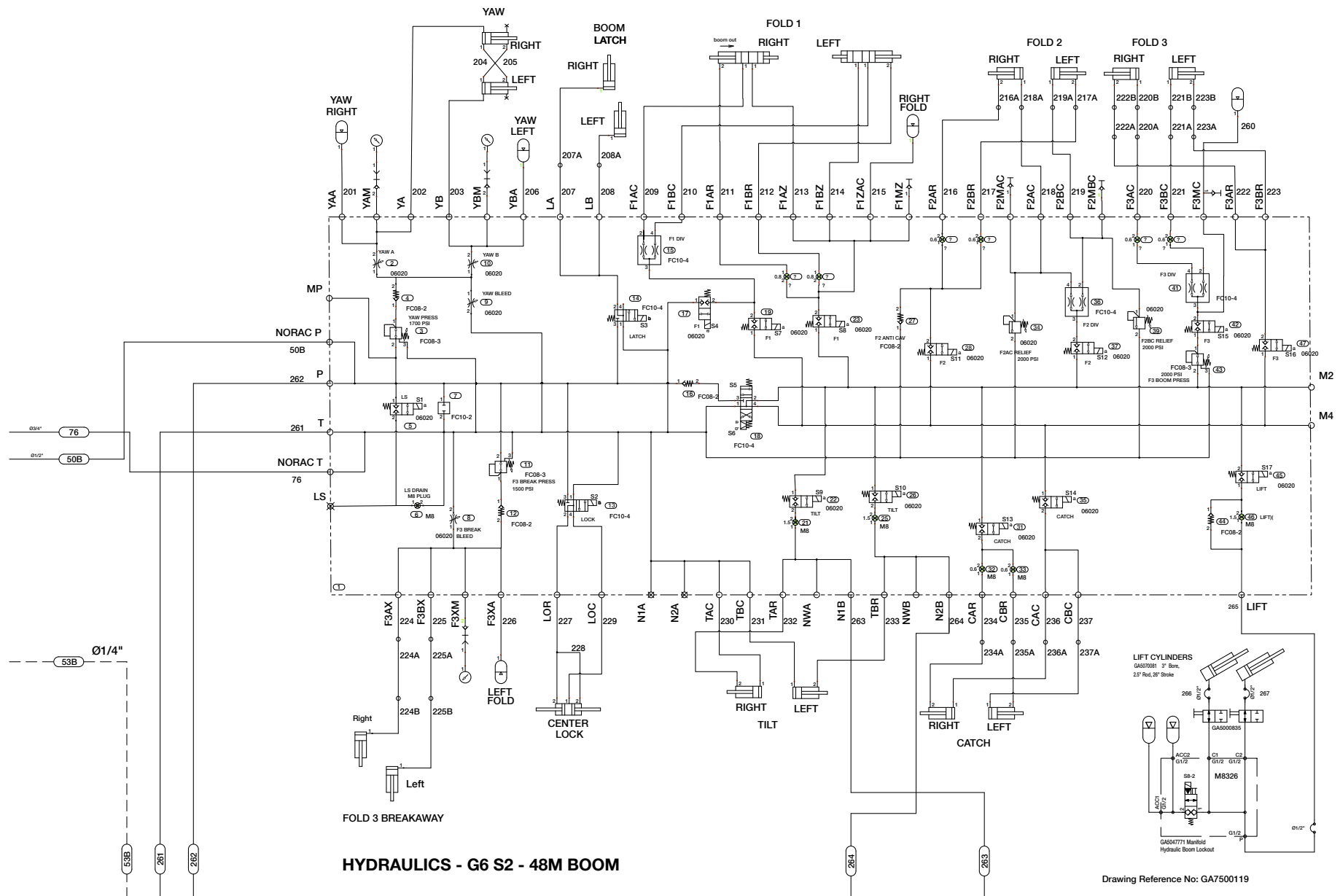


Plumbing Schematic - Centrifugal Pump



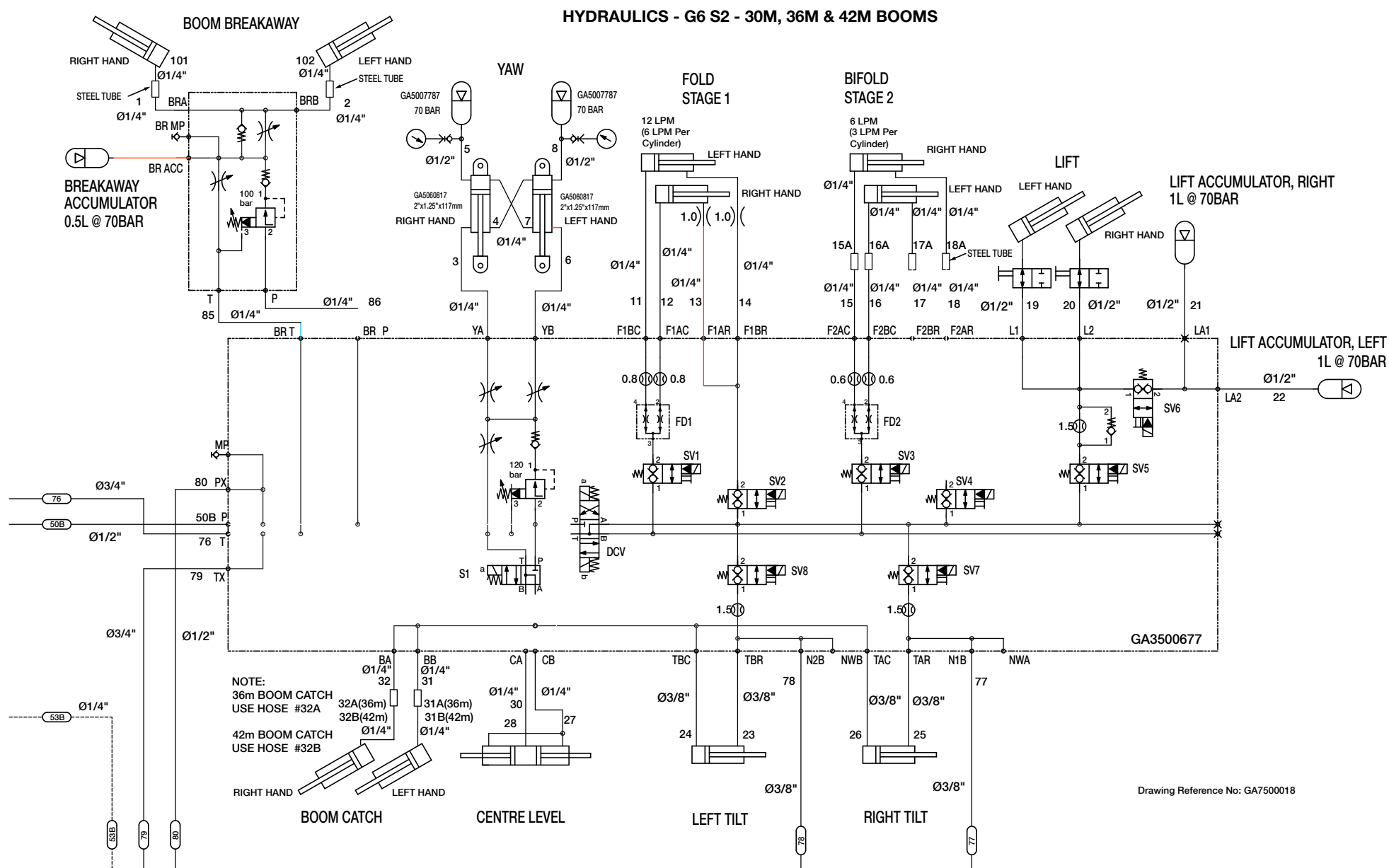


## Hydraulic Schematic - 48m Boom

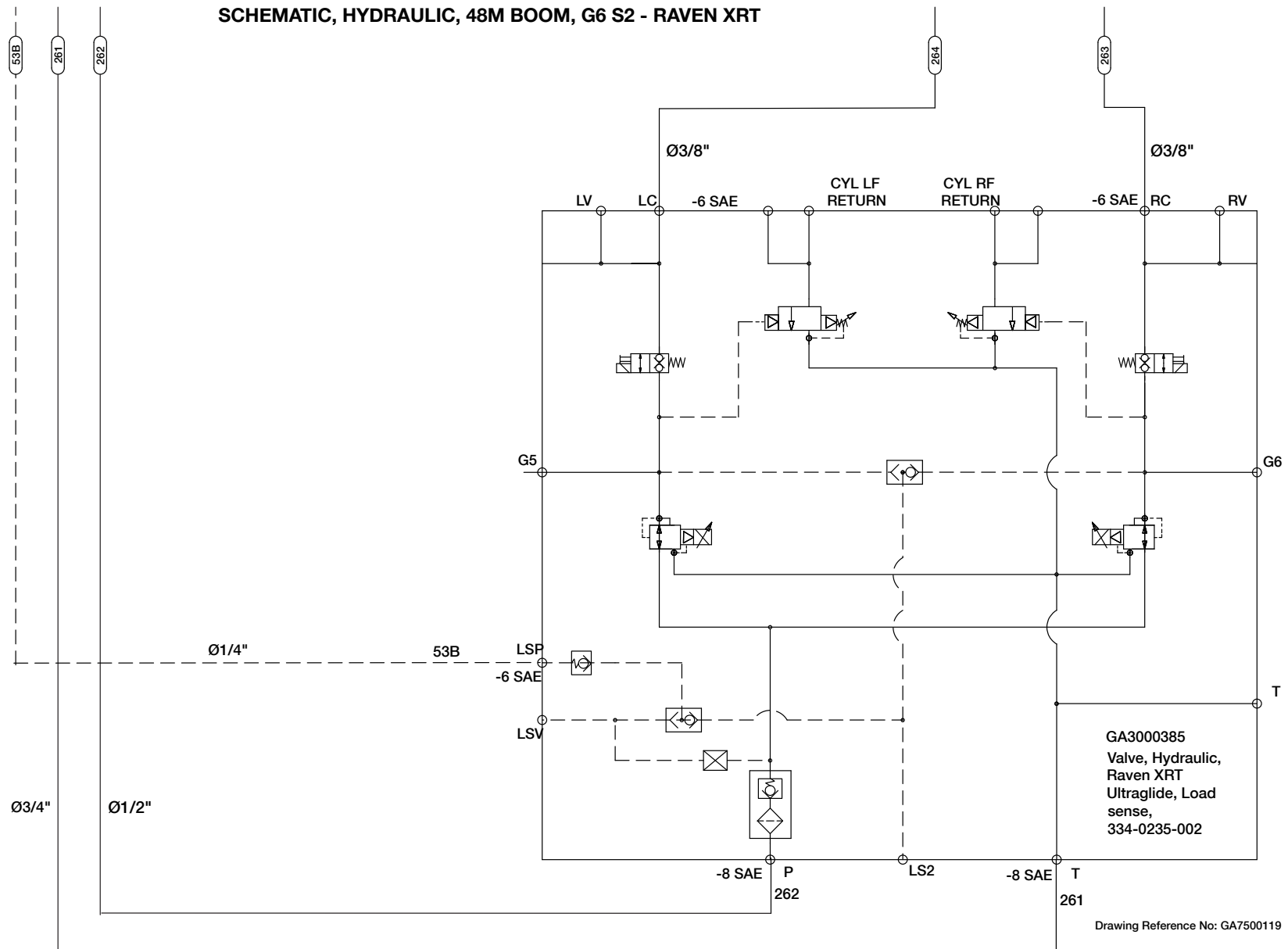




## Hydraulic Schematic - 30m, 36m & 42m Booms

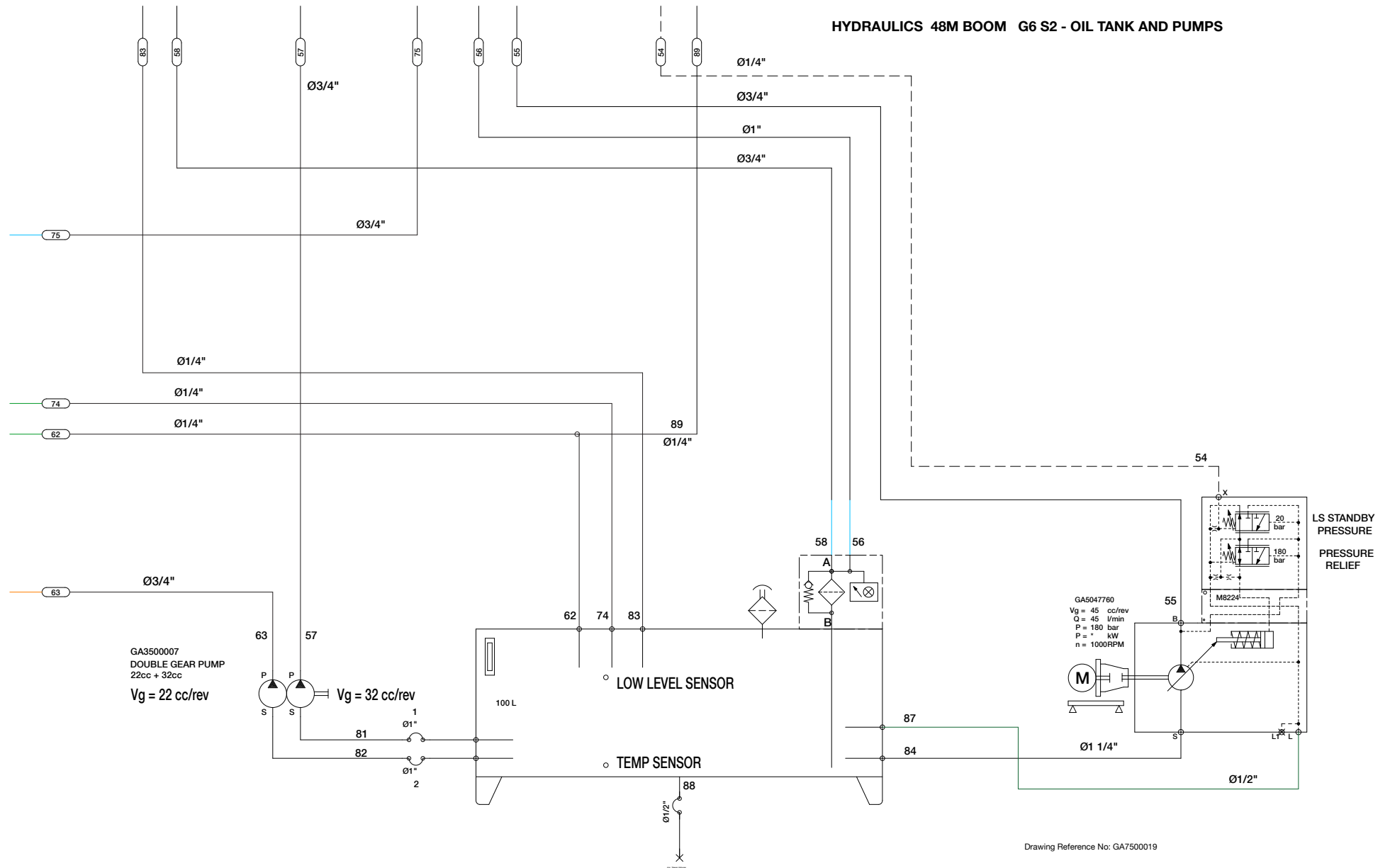


## Hydraulic Schematic - Raven XRT



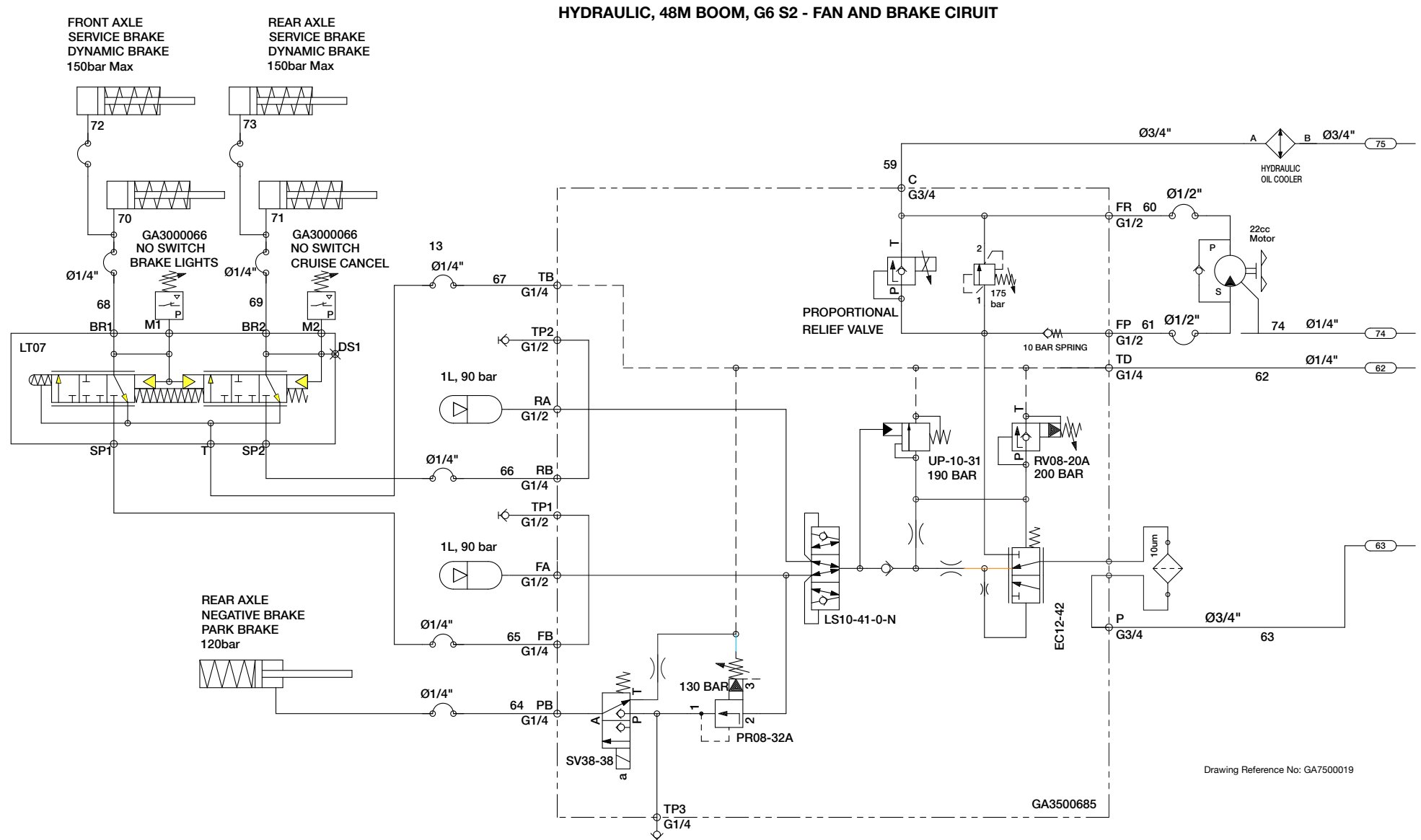
# 10 Appendix – Integrated Systems

## Hydraulic Schematic - Oil Tanks & Pumps

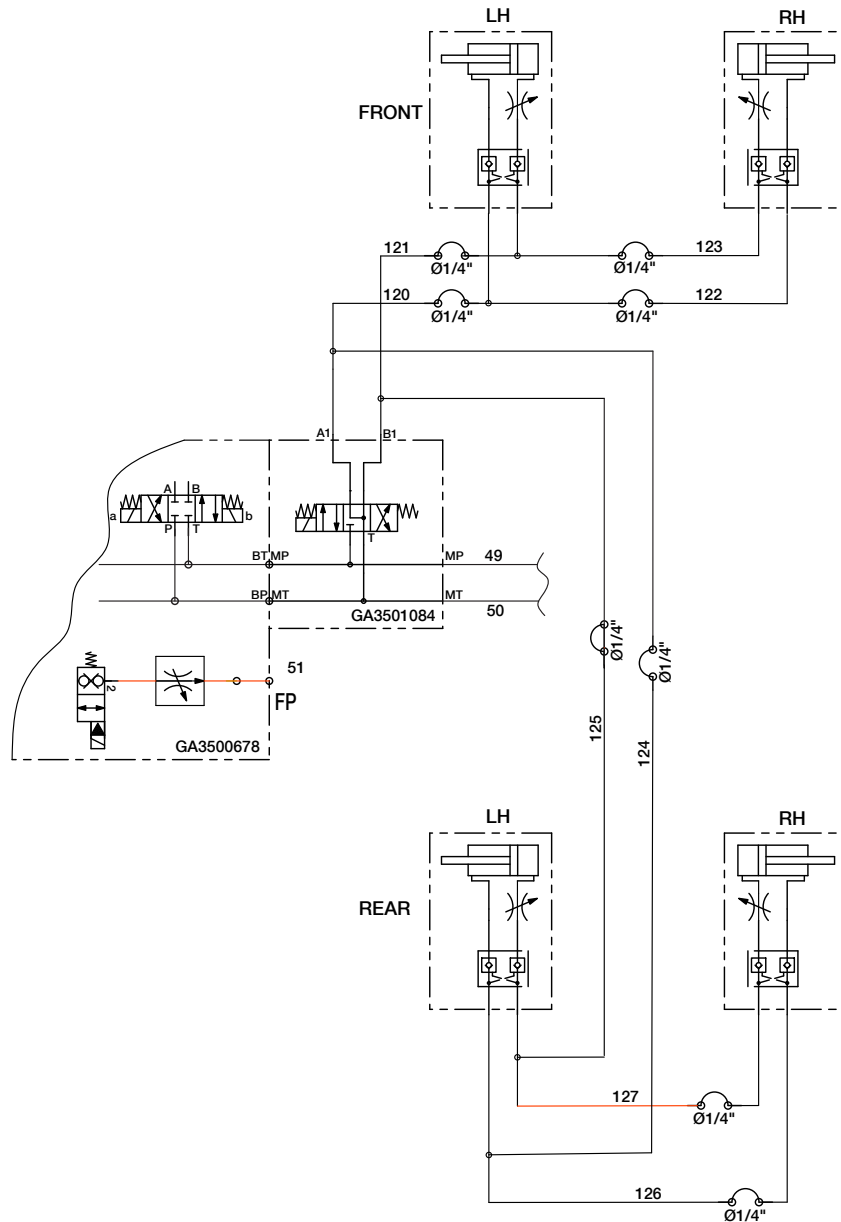




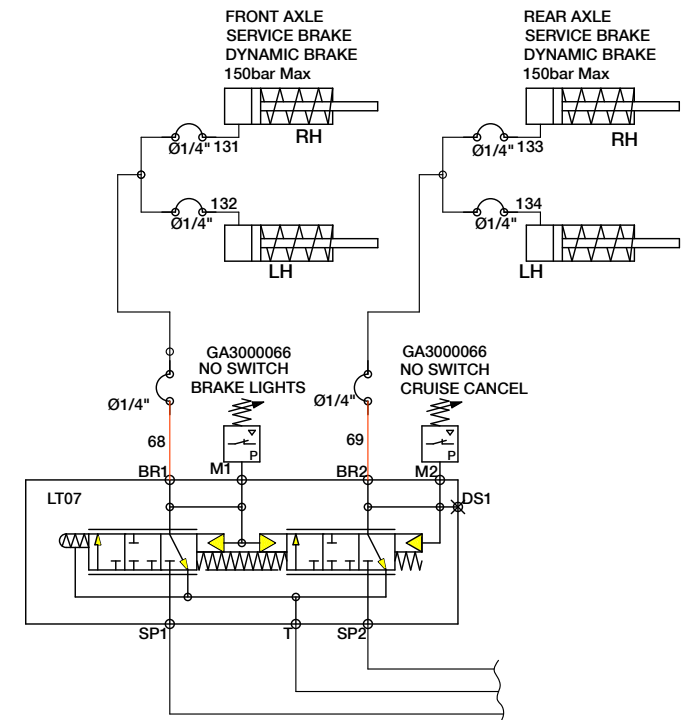
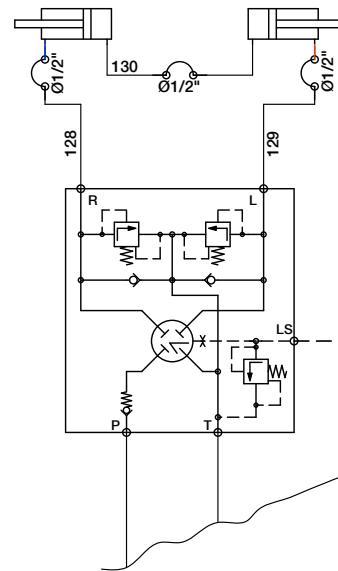
## Hydraulic Schematic - Fan & Brake Circuit



## Hydraulic Schematic - 3 to 4m Adjustable Axles



HYDRAULIC 48M BOOM G6 3-4m ADJUSTABLE AXLES



Drawing Reference No: GA7500019





