

100 SERIES

Operators Manual

SCARI-MAXX, HYDRA-MAXX & PARA-MAXX

GPN 224615 REVISION B 07/16



COPYRIGHT

Neither this manual or part thereof may be reproduced or published
without the prior permission of AF Gason Pty Ltd



AF GASON

OH&S Compliance Certification

Company Name A.F. GASON PTY LTD

A hazard identification, risk assessment and risk control procedure has been carried out on a representative example of the under mentioned product(s) in accordance with the Occupational Health and Safety requirements of all states and territories of Australia and where found necessary the appropriate risk control measures have been incorporated in the product specifications.

The operator's manual contains the necessary health and safety information and safety warnings are applied to the product where necessary.

Product Description Para-Maxx 100, Scari-Maxx, Hydra-Maxx
Models No. or No.'s PM100, SM & HM single wing fold models only.
Signed on behalf of the above named company



Name (printed) Richard Davis
Position Quality Manager
Date 27/05/2011

Details of the Unit Assessed for the Purpose of Compliance

Model No. PM100-12 - 333
Serial No. 224600-13310

Date of Inspection 27/05/2011
Location of Inspection ARARAT, VICTORIA



Contents

Introduction

Welcome	1
To The Dealer	2
About this Manual.....	2
To The Owner	3
Machine Record.....	3
Dealer Pre-Delivery & In-Field Commissioning Check List.....	4

Safety

Why is SAFETY so important?	5
Safety Alert Symbol.....	5
Signal Words.....	5
General Safety.....	6
Safety Rules & Accident Prevention	7
Hydraulic Safety	8
Disclaimer	8

Specifications

Fold Models 9m, 12m, 15m & 18m.....	9
-------------------------------------	---

Assembly Instructions

Unloading From Transport	12
Initial Assembly.....	12
Torque Specifications	17

Hydraulic System

Introduction.....	18
Wing Fold Circuit	19
Depth Control Circuit	20
Hydra - Maxx Circuit.....	21
Para- Maxx Circuit.....	22

Tractor

Requirements	24
Connection	24
Pre - operation Checklist.....	25

Transporting

Road Transportation	26
---------------------------	----

Field Operation

Operating the 100 Series:.....	27
Frame Adjustments:	28
Scari-Maxx Operation.....	30
Hydra-Maxx Operation.....	30
Para-Maxx Operation.....	30

Maintenance and Service

Before you Begin	32
10 Hours (Daily)	32
100 Hours	32
500 Hours or Seasonally	33
Cleaning and Storage	33
Tyre Care	34
Press Wheel Tyre & Rim.....	34
DU Bush Replacement.....	35
Hardened Steel Bush Bush Replacement	35
Wheel Bearing Maintenance.....	35
Hard Facing / Replacement of Spear Point Adaptor	35
Dismantling Scari-Maxx Tine Assy	35
Cylinder Care – (PTE Brand)	49
Cylinder Care – (Nordon Brand)	49
Filter Service & Maintenance - WPF	49
Maintenance Notes.....	49

Order Acknowledgement

.....	50
-------	----

Trouble Shooting

General.....	51
Tracking and Row Variations	53

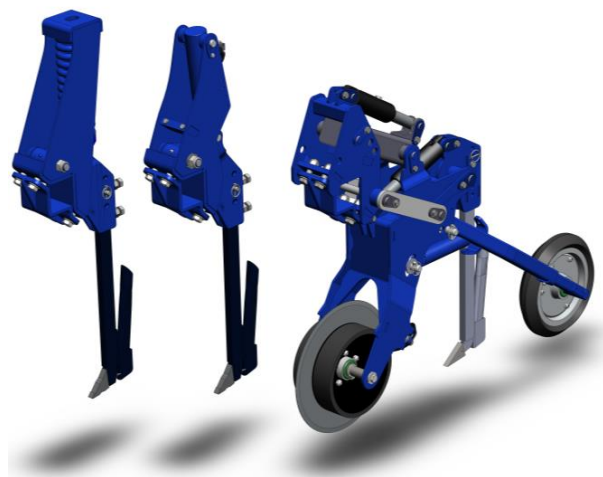


Introduction

Welcome

AF Gason Pty Ltd (Gason) is an Australian owned family business operating from within rural Victoria. The Gason Company has been servicing the needs of rural Australians for just on 70 years. We operate through a local dealer support network that spans the country. Gason would like to thank you for purchasing your Australian made tillage implement, and trust that you will have many years of trouble free service.

The 100 series planter utilizes a 3-row 100x100 frame providing a versatile platform that can be optioned with the patented Para-Maxx 100 Parallelogram row unit assembly, Hydra-Maxx hydraulic tine assembly or Scari-Maxx spring tine assembly.



Scari-Maxx Hydra-Maxx Para-Maxx 100

The row unit and tines accept a 50mm x 25mm vertical shank with upper holes enabling vertical adjustment. This shank is also common to the Gason Scari/Hydra-till range and has been proven over many years of use. Various points and sowing boots are available.

Scari/Hydra-Maxx tines are ideally optioned with the Gason frame mounted press wheel and independent sowing boot. The Hydra-Maxx can also be optioned with the Gason tine mounted parallelogram press wheel.

The Para-Maxx 100 row unit is a multi-purpose parallelogram utilizing a drum coulter for trash

management and depth control, adjustable shank for seed positioning and independent press wheel for optimum seed to soil contact. The Para-Maxx 100 row unit features instant parallelogram and tine pressure management on the run from the tractor seat.



Ideally coupled to a Gason Air Seeder to act as a Minimum/No- till planter, the 100 series can also be used for conventional weed kill/soil preparation. With various tools and options the 100 series implement/ planter can be setup to perform a variety of tasks depending on specific agronomic requirements. These may include:

Conventional cropping: Multiple cultivations before sowing for weed control and seed bed preparation.

Direct drilling: One pass sowing system with wide or full cut points for some soil disturbance.

Minimum-till: Sowing systems aimed at minimizing soil disturbance and retaining crop residues.

No-till: One pass sowing system using narrow points or discs for minimal disturbance

Wide Row Spacing: Wide row spacing can be achieved by pinning up tines or row units.

The frame is equipped with front castor wheels which ensure easy turning and contouring, without any sideways wheel drag. The rear wheels are positioned to obtain maximum clearance for working tools and also cater for tight turning. The frame has been designed to maximize stubble flow and provide uniform finishes while accommodating multiple lay-outs.

Introduction



Caution: This implement has been developed for maximum residue stubble flow. If working around hillsides, pairing of rows may occur.



Caution: Correct seed depth is critical to success. Sowing too deep reduces vigor and plant establishment. Sowing too shallow can cause reduced emergence if moisture is not adequate for germination and can increase the risk of herbicide damage from pre-emergent herbicides. Check seeding depth regularly during sowing.



Caution: Fitment of additional attachments such as anhydrous ammonia tanks and prickly chains, which may place significant loads on the frame, will void warranty on the frame and any related components. Approved attachments include, in frame press wheels, and parallelogram press wheels on the Hydra-Maxx. If unsure as to the warranty implications to any attachment or modification that you wish to make to your 100 Series, consult your local authorized Gason Dealer.

To The Dealer

Assembly and proper installation of this product is the responsibility of the Gason dealer. The dealer and owner/operator must complete & sign the Installation and Warranty Registration Form included with this manual before releasing the Implement to the new owner.

- Purchaser copy to be supplied to owner.
- Dealer copy to be retained by dealer
- Company copy to be returned to Gason.

In addition, the dealer must complete the Dealer Pre-Delivery & In-field Commissioning Check List included within this manual.

Gason **strongly recommend a risk assessment** be carried out prior to the machine being operated to ensure the operators fully understand the dangers involved in the operation of the Gason Tillage Implement.

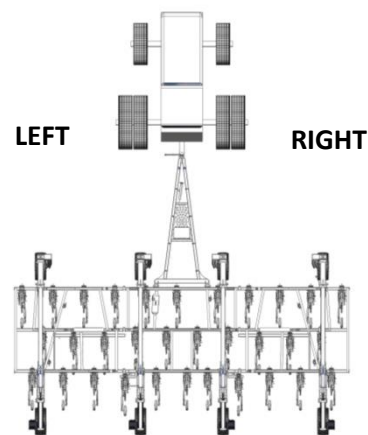
About this Manual

This manual endeavors to provide the owner with a complete understanding of the 100 series implement's safety, assembly, maintenance and operation including the processes required to obtain the highest level of performance possible.



Caution: It is of the utmost importance that the owner/operator read this manual, and any other literature that has been supplied with the machine, to ensure a safe and trouble free operation.

References to the left and right hand sides of the Implement are from the rear of the machine looking forward in direction of travel as shown.



Introduction

To The Owner



Caution: Read & understand this manual before operating your Gason Implement. The information presented will prepare you to operate your machine in a more efficient and safer manner.

This manual should ideally be kept in its protective satchel and stored with the machine. Replacement manuals are available upon request from Gason or online at www.gason.com.au. Replacement “holders” are available through your nearest dealer.

The manual includes an Installation and Warranty Registration Form, of which, requires the dealer & the owner/operator to sign. The Purchaser copy of this form is to remain with the owner/operator.

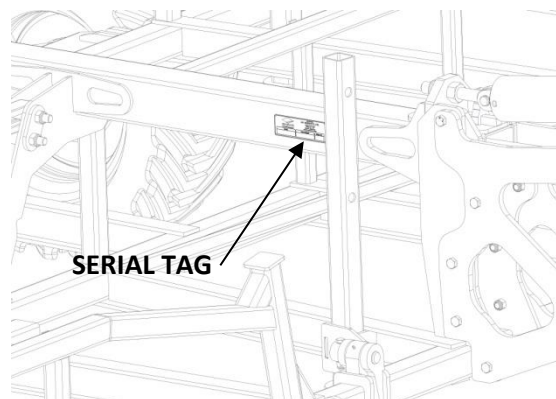


Caution: Ensure you carry out, and keep up to date, a Risk Assessment. All operators must read the manual carefully and become acquainted with all the adjustments and operating procedures before attempting to operate.

The Implement you have purchased has been carefully engineered and manufactured to provide dependable and satisfactory use when operated & maintained in line with this manual. Like all mechanical products, it will require routine cleaning, upkeep and maintenance. Lubricate the implement as specified in this manual. Observe all safety information in this manual and obey all safety decals located on the machine.

Please be aware that in an effort to bring you the best products Gason are always implementing continuous improvements that may change the designs and specifications of the implements. In doing this, Gason, together with its dealers and distributors, are under no obligation to implement such changes, free of charge, on any previously delivered machines.

Machine Record



Serial No Tag Located on/ the centre frame rear left.

Tine/Row Unit Type (*CIRCLE*)

Para-Maxx Hydra-Maxx Scari-Maxx

Frame Type - Cut Width (*CIRCLE*)

9m 12m 15m 18m

Spacing: _____

Number of Tines/Row Units _____

Serial Number: _____

Model: _____

Date Purchased: _____

Owner Name: _____

Owners Address: _____

Options Fitted: _____

Dealer Pre-Delivery & In-Field Commissioning Check List

✓

- [illegible]

NAME: _____

SIGNED:

Safety

Why is SAFETY so important?

The team at Gason rate operator Safety as one of the highest priorities when designing new features and machines. Every effort is taken to consider the end user and the safety risks they may face.

- **Accidents can Disable & Kill**
- **Accidents are Costly**
- **Accidents Can be Avoided**



The **Safety Alter Symbol** means:

**ATTENTION!
BECOME ALERT!
YOUR SAFETY IS INVOLVED!**



DANGER



CAUTION



WARNING

Safety Alert Symbol



The **Safety Alert Symbol** identifies important safety messages applied to the Implement in this manual. When you see this symbol, be alert to the possibility of **injury or death**. Follow the instructions provided on the safety messages.

Throughout this Manual the Safety Alert Symbol will be seen followed by one of the words.

Signal Words

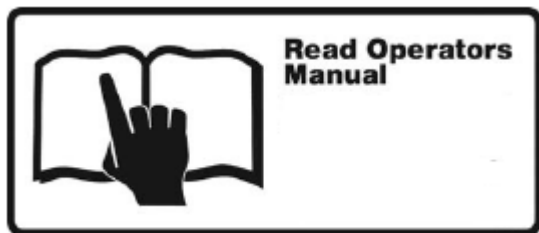
DANGER: indicates an imminently hazardous situation that, if not avoided, **WILL** result in death or serious injury if proper precautions are not taken.

WARNING: Indicates a potentially hazardous situation that, if not avoided, **COULD** result in death or serious injury if proper precautions are not taken

CAUTION: Indicates a potentially hazardous situation that, if not avoided, **MAY** result in minor or moderate injury if proper precautions are not taken, or, serves as a reminder to follow appropriate safety practices.

Safety

General Safety

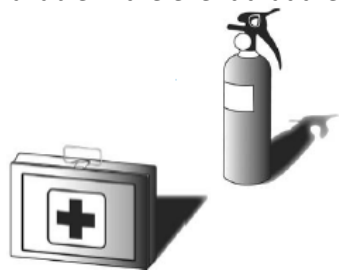


Whilst great care and every effort have been made by Gason to provide a machine to the highest possible safety standards, tillage implements by their nature are potentially dangerous.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

Be Prepared

In the event of an emergency it is best to be prepared. Gason recommend whilst operating the Implement, a fire extinguisher and first aid kit should be readily available in the event that they might be required.

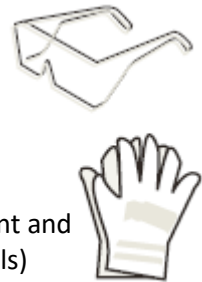


Danger: Do not operate the tractor or Implement until you have fully read and completely understand this operator's manual, your tractors operator's manual, and all safety messages found within these manuals, on the products, or other included material.

Personal Protective Equipment (PPE)

Gason recommends the following personal protective equipment be used when operating the Implement.

- Safety glasses
- Hearing protection
- Gloves (when removing debris from tines)
- Breathing mask (dusty work environment and when handling chemicals)
- Sturdy Footwear.
- Figure hugging clothing.
- Hair Net/Tie (for long haired operators)



Safe operation of the Gason Tillage Implements requires the full attention of the operator. Do not wear radio headphones, or talk on your mobile phone while operating these machines. Never operate while under the influence of alcohol or drugs or allow anyone under the influence to operate the tractor or Tillage Implement.

Safety Decals

All Gason Tillage Implements are provided with a complete set of decals which include important safety information and are required to ensure the machine complies with the relevant work safe regulations. Every effort should be made to ensure the decals are legible at all times. Any decal which can be seen to be worn or can no longer be read should be replaced.

For a detailed list of Decals and their positions on the machines refer to your Parts manual.

Safety

Safety Rules & Accident Prevention



Caution: Customers *MUST* carry out their own Risk Assessment and/or "HazCheck" on every machine on their property.

- If you do not understand any part of this manual and need assistance please call either the dealer or Gason who will direct you to the appropriate training persons.



Warning: Keep hands and body away from pressurized lines. Use paper or a rag to check for leaks, not hands or other body parts. Wear safety glasses to protect eyes. Hydraulic fluid (oil) under pressure can easily penetrate the skin and could cause serious injury or death.



Warning: Ensure all operators and service personnel are aware that if hydraulic fluid (oil) penetrates the skin it will need to be surgically removed as soon as possible. Failure to do so may result in serious injury or death.

- Know your controls and how to stop the machine quickly in an emergency.

- Use a signal person when maneuvering machine and the tractor operator's view is obstructed.



- Ensure all operators are properly instructed on the operation of the machine and position of controls. **Do not allow anyone to operate the machine without proper instruction.**

- Do not allow children or untrained persons to operate equipment.



Danger: Stand clear when folding or unfolding wings.



- Check that all hardware is tight and properly installed. Refer Assembly Torque table.

- Ensure the tillage implement is properly attached, adjusted and in good working order before operating the machine.

- Remove any debris that has accumulated on the implement or tractor.

- Do not operate Gason Implement unless in good working condition. Carry out regular check damaged or fatigued parts and replace or repair as required.

- Watch for hidden hazards on the terrain and remove any hazards or objects that may cause injury or damage.

- Keep all people and animals away from the implement during start-up, operation, when stopping, maintaining or adjusting.

- When operating at night ensure adequate artificial light



Danger: Do Not allow persons to ride on machine during operations or transport.



Caution: For transportation on public roads the operator must ensure that the tractor and Implement complies with current state and federal laws and must strictly adhere to all road traffic regulations in force in his/her particular state.

- Operate tractor at the specified speeds. Always ensure the correct setting on your tractor before start-up.

- Use Extreme care and reduce ground speed on slopes and rough terrain.

Safety

Warning: Do Not stop, start or change direction suddenly on steep slopes. Working up and down is preferred.

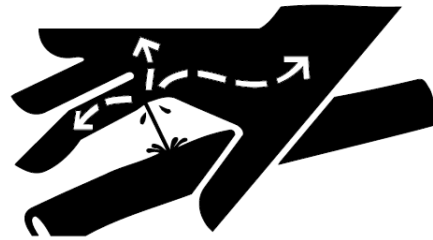
Caution: Stop tractor, immediately upon striking an obstruction. Turn off engine, remove key, inspect and repair any damage before resuming operations.

Caution: Always double check before reversing machine.

Danger: Never place any part of the body underneath Tines or Row Units without first fitting safety stands. Hydraulic systems can “creep” (i.e. slowly lower). Any movement of the control levers can cause the implement to drop or move unexpectedly causing severe injury or death.



Use cardboard or wood to detect leaks - never your hands.



- Never remove hydraulic hoses or ends with machine elevated. Relieve hydraulic pressure before disconnecting hydraulic hoses or ends.
- Maintain sufficient hydraulic fluid levels to ensure air is not introduced into the system.
- Keep all connectors clean for positive connections.
- Ensure all fittings and hoses are in good condition.
- Double check that all is clear before operating hydraulics.

Hydraulic Safety

Warning: Do Not adjust Hydraulic fitting while under pressure. Ensure pressure is released using tractor's hydraulic system before adjusting or disconnecting Implement.

Danger: Do not search for high pressure hydraulic leaks without hand and face protection. A tiny, almost invisible leak can penetrate skin, thereby requiring immediate medical attention.

Disclaimer

- Gason accepts no responsibility or liability for any losses, injuries or damages that may result from failing to observe these safety rules and the safety decals on the Implement.

Specifications

Fold Models 9m, 12m, 15m & 18m

DIMENSIONS- ALL DIMENSIONS IN METRES and (IMPERIAL)	SIZE			
	9m (30ft)	12m (40 ft)	15m (50 ft)	18m (60 ft)
Overall Length (tractor hitch to rear wheels)	9.8m	9.8m	11.2m	12.3m
Frame Depth (Front to rear)	3.0m	3.0m	3.0m	3.0m
Overall transport width ¹	6.0m	6.0m	7.5m	6.5m
Overall transport height ²	4.0m	5.1m	5.7m	5.1m
Overall Weight Approximation ⁷	19.8t – 12.1t	11.00t – 14.5t	12.5t - 16.6t	16.5t – 21.5

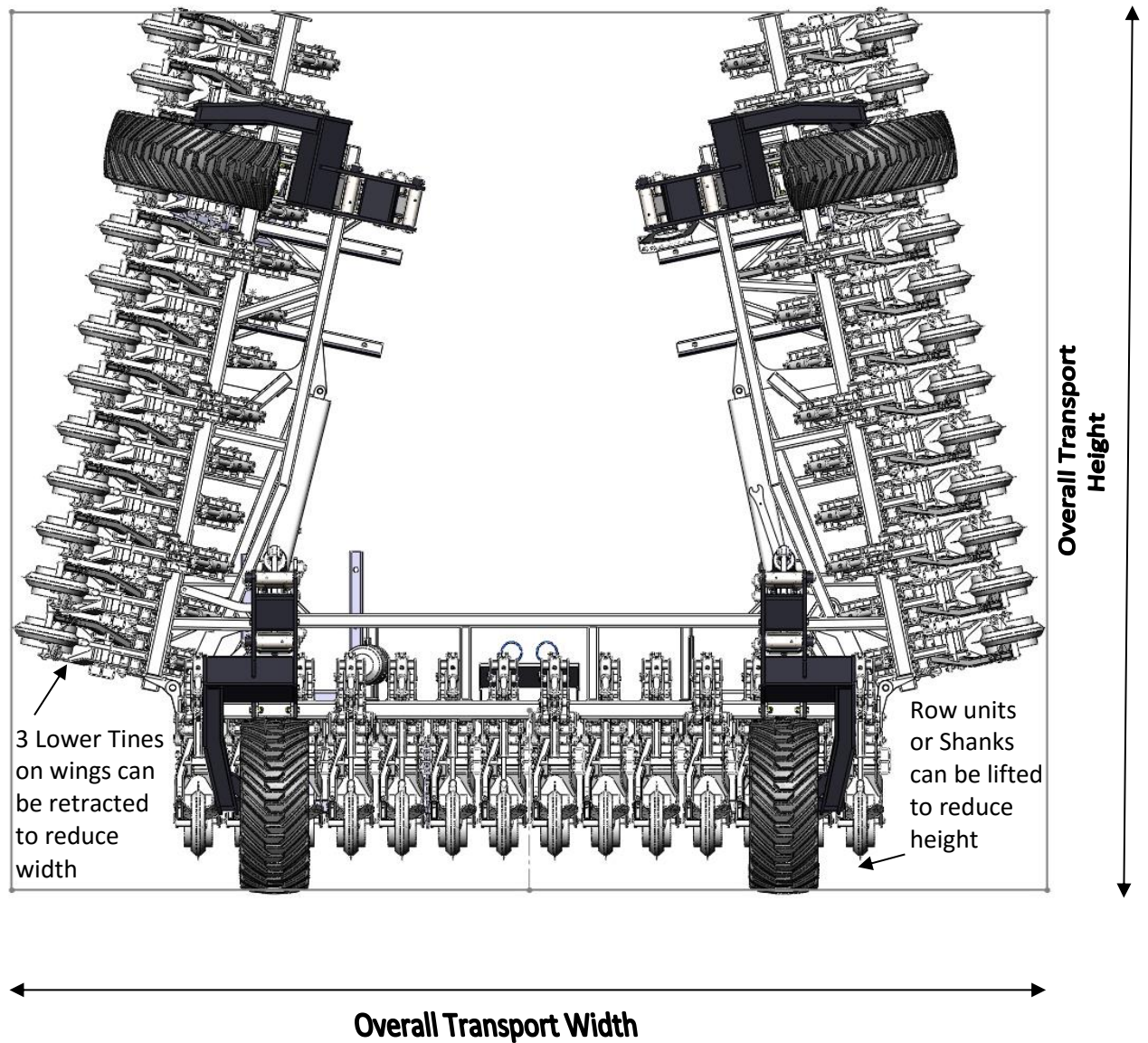
Number of Shanks:	250mm spacing	36	48	N/A	N/A
	300mm spacing	30	40	50	60
	333mm spacing	27	36	N/A	54
	375mm spacing	24	32	39 ⁵	48
	400mm spacing	N/A	30	37 ⁵	N/A
	500mm spacing	18	24	N/A	N/A

Road Clearance:		280mm (11")
Max. Recommended Working Depth:		230mm (9")
No. of Tool bar Rows:		3
Tool bar Spacing (centre to centre)		1.5m (Some rows set back by 200mm)
Centre Frame Width:		<ul style="list-style-type: none"> Narrow – 9m & 12m (hinge to hinge) – 4.2m Wide 15m (hinge to hinge) – 6.0m Wide 18m (hinge to hinge) – 5.6m
Jack:		2 tonne capacity
Frame Section:	Toolbars	100 x 100 x 9.0mm RHS Grade 450 & 100 x 100 x 6.0mm RHS Grade 450
Drawbar Section:		100 x 100 x 9.0mm RHS Grade 450
Scari-Maxx:	Breakout Force ³	• 190kg to 172kg (420lbf to 380lbf)
	Underframe Clearance	760mm to 660mm (30" to 26") in 12.5 mm (½") increments.
	Tine Jump ⁴	350mm (13.8")
Hydra-Maxx:	Breakout Force ³ Hydraulic	• 140kg to 310kg (310lbf to 680lbf)
	Underframe Clearance	760mm to 660mm (30" to 26") in 12.5 mm (½") increments.
	Tine Jump ⁴	350mm (13.8")
Para-Maxx:	Breakout Force ⁶ Hydraulic	• 140kg to 310kg (310lbf to 680lbf)
	Underframe Clearance	Floating Parallelogram 290mm Float. 755mm to 465mm to the bottom of drum coulter.

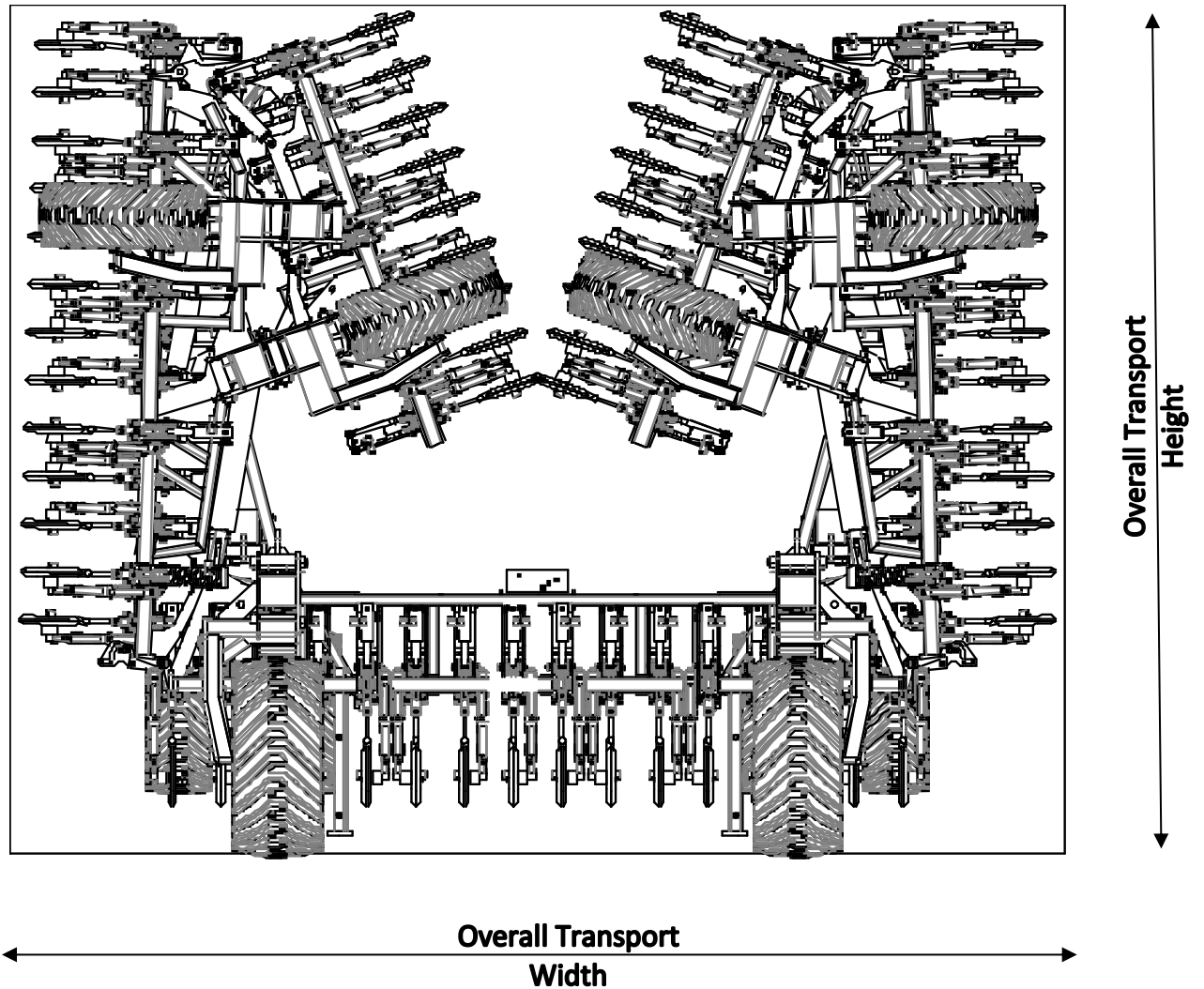
- Overall width based on wings folded and tines fully extended. On Scari/Hydra-Maxx this width can be reduced by up to 1.2m overall by removal of the inner wing shanks. Para-Maxx row units can be pinned up reducing width by 580mm.
- Overall height based on wings folded and tines extended. This height can be reduced by removal of outermost shanks fitted to the wings on some machines. Para-Maxx row units can be lifted allowing machines hydraulics to be dropped lower to reduce height.
- On Scari -Maxx the spear point tip @ 660mm & 760mm under frame clearances, respectively.
- Based on Spear point @ 760mm under frame clearance.
- Not true 15m Pass to Pass.
- Breakout at approximately 100mm depth of cut.
- Refer layouts for weights of specified machine. Weight varies depending on configuration and attachments.

Specifications

SINGLE FOLD MODELS – TRANSPORT ENVELOPE (REAR VIEW):



DOUBLE FOLD MODELS – TRANSPORT ENVELOPE (REAR VIEW):



Assembly Instructions

Unloading From Transport

Machines must be lifted by approved overhead lifting gear and licensed operators.



Warning: Only personnel with correct licenses are to be involved with the lifting of machine. Bystanders must remain clear at all times.



Danger: Ensure that all lifting equipment is in good condition and has the capacity to lift the load. Do not lift unless the weight is known or a reasonable assumption of weight is determined. Note: Gason despatch department measure and record the load & other lift information on a Crane Lift form*. A copy of this form is given to the truck driver for use at the unloading end. Ensure machine is placed on firm level ground with adequate access around machine for assembly. Leave transport stands in place to support machine until assembled.

Use machine lift areas for safe maneuvering as shown below. (Avoid excessive paint damage, if chains must be used, ensure paintwork is protected). Lifting points vary between models but all are identified with decals, see example shown below. If lifting points are around the RHS frame "with rounded corners" use soft slings. If lifting points identified through holes in plates uses shackles.

Lifting points provided on the centre frame of the machine, post 2015, these enable shackles to be attached at 4 points.

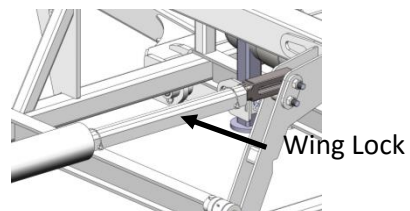


Lifting Point (Typ. both sides)

When lifting the double fold machine use a spreader bar as shown below.



Warning: Ensure wing fold cylinders are fitted with locking channels over the rod to lock in position for lifting. Retract cylinder until just touching channel. 2 places on the single fold models and 4 places on the double fold. These locking channels ensure wings do not float down as the machine is lifted.



*Crane lift form provided with the machine will give a lift weight based on the factory crane reading.

Assembly Instructions

Initial Assembly

Set up instructions detailed as follows are a guide only.

Machines are dispatched ex-factory with components requiring attachment and/or assembly.

The Main items of assembly in most cases will be as follows:

- Fitment of pull.
- Repositioning and fitment of rear depth control wheels and front castor wheel assemblies.
- Fitting wheels and tensioning to correct torque. Wheels may have been removed depending on transport height required.
- Fitment and setting of depth control connector bar.
- Reconnection of hydraulic hoses, securing hoses in clamps and priming hydraulic circuits.
- Fitment of implement depth indicator.
- Fitment of row units / tines / press wheels to the marked position. Where rear row has been removed for narrow transport width.
- Shank Fitment.
- Ground tool Fitment.
- Touchup of paint work if required.

Fitting Pull – the pull may be mounted on top of centre frame. Connect crane to pull before loosening transport stand hardware. Using a crane, position & fit the drawbar to the front of the centre frame using the connecting pins on the assembly. Lower the jack to support the front of the drawbar and fit safety tow chain.

Wheel Fitment - If wheels have been removed for transport, loosely mount wheels on hubs. Be Gentle. Avoid damage to threads. Tighten all nuts firmly then proceed to torque each wheel nut to torque specified for M18 or M20 wheel studs, refer torque settings page 17. Alternate sides across stud pattern when tightening up nuts.

Tine / Row Unit Fitment - Tine location decals (arrows) should be fitted to the toolbar to indicate the tine locations for tines/row units not fitted or not fitted in the correct location. Upon fitment, ensure the correct hardware is used i.e. M20 Grade 8.8 bolts and Class 8 Nyloc nuts. Secure the four fasteners in stages to pull up the tine evenly and squarely onto the toolbar.



Caution: *Assembly torque settings are critical to ensure tine assemblies remain secure to the toolbar at all times. Torque to 247 lbf.ft (335 Nm). Confirm this setting with a good quality torque wrench.*

Shank Fitment - Fully raise implement off its stands, fit the tine shanks to the upper tine assemblies. Ensure positioning pins are in the same hole in both the shank and the pivot bracket to the tine tower. For Scari/Hydra-Maxx also ensure the rear M20 set screws are tightened up hard against the shank and the locking nut is then tightened.



Note: Ensure all shanks are set at consistent settings across machine. This is critical for consistent seed placement.

Assembly Instructions

Hydraulic Circuit - In setting up the hydraulic circuit, it is imperative that the cylinders are correctly located and aligned. Likewise, the plumbing of the hoses must be connected to produce the correct circuit and care taken to maintain cleanliness of the system. Similarly, when securing the hydraulic hoses to the frames, care needs to be taken to ensure that sufficient slack is provided in areas where a pivot joins members or the connection is to a moving component.



Caution: Before operating the hydraulics, read and understand the "Hydraulic System" section of this manual.



Caution: Maintain a close watch on tractor oil level and top-up with new clean oil as required, (not aerated oil). Observe closely as too low an oil level may introduce more air into the system.



Warning: The presence of air in the hydraulic circuits will cause the implement to operate erratically and is potentially very dangerous when folding wings or transporting the implement.

Depth Control - The depth control circuit consists of master/slave phasing cylinders in series.

Generally the depth control system will be factory primed. If not refer "Hydraulics Systems" section of this manual.

Wing Fold - A hydraulic circuit is employed to fold the wings from the working position for transport or storage. The wing fold circuit consists of a number of non-phasing double acting cylinders connected in parallel.

The 18m double fold machine incorporates a hydraulic switching mechanism to retract the wing wheels via the depth control.

Generally the wing fold system will be factory primed. If not refer "Hydraulics Systems" section of this manual.

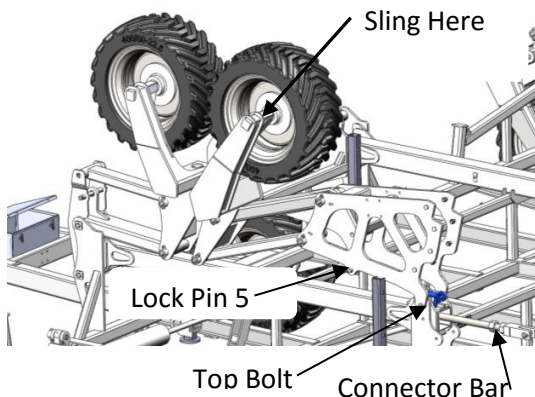
Ground Tool Fitment - There are a selection of aftermarket ground engaging tools available to suit the range of shanks. Selection of the most appropriate ground tool will depend on your agricultural practices, ground conditions and sowing boot design.

Assembly Instructions

Assembly of 9, 12 & 15m packed for transport.

Rear Wheels - Re-position rear wheel assembly before front castor wheels. This will enable fitment of connector bar, position with locking nuts to the rear.

! Danger: Proceed with **Extreme Caution**. Follow instructions below.



Remove any tie down straps. Use crane to lift into position rotating assembly around the top bolt. When in position, secure remaining 8 lower bolts.

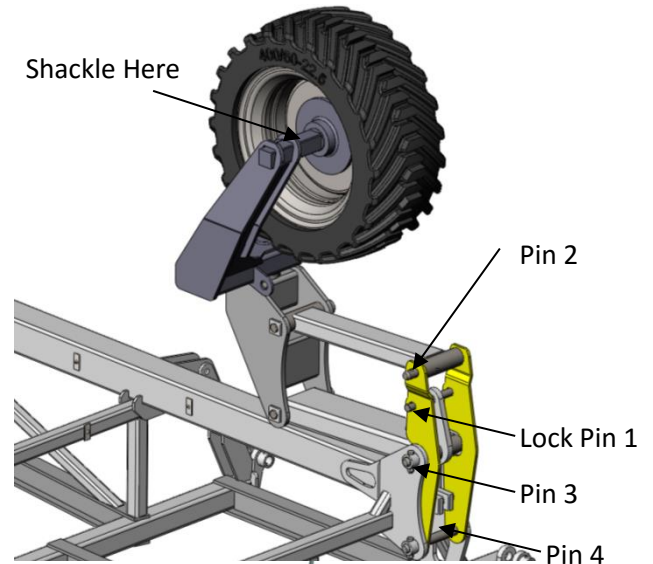


While crane is still connected remove rear assembly Lock Pin 5 and lower to a position enabling fitment of the connector bar and hydraulic cylinder.

Front Castor Wheels - Care needs to be taken as assembly will become unstable and could over-centre when Lock Pin 1 is removed.

! Danger: Proceed with **Extreme Caution**. Connect crane to castor assembly as shown before removing locking Lock Pin 1. Follow instruction below.

Connect crane via sling around stub axle, allow for rotation of assembly when re-positioning. Remove Lock Pin 1 (maybe easier if lifting slightly with crane to remove load) then lift and rotate assembly around Pin 3.



Ensure connector bar clevis is aligned to centre of lug on upper linkage when lowering. Wheel will come to rest on the ground.

Connect crane to the top of the castor wheel pivot frame, while supported carefully remove Pin 2, Pin 4 and plates. Connect lower parallel link with Pin 4. When operational, use the machine's hydraulics to position connector bar for connection to top parallel Link.



Note: Reverse procedure if machine is to be packed up for transport.

Assembly Instructions

Assembly of 18m packed for transport.



The double fold machine will generally be transported with the outside wings folded, this is done to allow machine to be lifted safely and reduce overall transport length.

When the outer wings are folded for transport the front and back wheel assemblies and linkages on the wings will be removed and packed separately. These will require re-assembly; refer common parts section of the parts manual for more detail.

Note: Assemble the centre frame wheels and inner wing wheel to point of operation and fully raise machine before folding outer wings out.

1. Flip Front Centre Frame Wheels - Use the crane to flip front centre frame wheels over. Sling around the stub axle to allow for rotation as the assembly rolls over.



Shackle Here



Secure at shackle points on the top of main pivot frame, remove transport plates "caution assembly becomes unstable", lift and guide to pin lower linkage. Tractor hydraulics maybe required. Remove the depth stops to gain full operation (fitted to aid flip

over). Also ensure unassembled rams have clearance to operate.



Caution linkage can flip over with a cam action on from the ram as guiding into place.

2. Fit Rear linkages and wheel frames to rear of centre frame and "inner wings". Ensure the rear wheel studs face towards the centre.

3. Fit front linkages and castor frame to front of "inner wings". Offset linkages are required on the inner wings, offset to outside of the machine. Connect connecting rod, use tractor hydraulics to adjust if necessary to fit pin. Fit castor boss assembly, sling through main pivot hole. Pin in top first, then pin with lower linkage already fitted.

Fit castor wheel assembly studs facing out from centre.



4. Once operational raise machine to full height and fold outer wing out. Ensure unassembled rams have clearance to operate. Repeat step 2 & 3 for the outer wings.



Assembly Instructions

Torque Specifications

Caution: Torque values listed below should be used as a guide only. If a different torque value or tightening procedure is specified for a specific application, do not use these values.

- Refer to the Parts section for proper grade and length of bolts for replacement parts.
- Do not replace Nyloc nuts with nuts and spring washers. Replace all parts with original specified parts only. (note grade)
- The following torque figures are those recommended for zinc plated, lightly oiled bolts.
- Recommended assembly torques may be obtained by multiplying the torque figures in the table below by:
0.78 – for degreased zinc plated bolts.
1.10 – for black oxide finished bolts.
0.81 – for M20x2.5P Tine and row unit toolbar Hardware (200lbf.ft / 271Nm).

Size		Thread Pitch	Recommended Assembly Torque						
			lbf.ft		Nm		lbf.ft		Nm
S.A.E Grade Number		5		8		Wheel Stud			
Head Markings (Manufacturers marks may vary)									
7/16	UNF	43	59	60	82	-	-		
7/16	UNC	39	53	54	74	-	-		
1/2	UNF	67	91	94	128	-	-		
1/2	UNC	59	81	83	113	-	-		
5/8	UNF	135	184	186	253	-	-		
5/8	UNC	117	159	165	224	-	-		
3/4	UNF	235	319	325	441	-	-		
3/4	UNC	210	285	290	394	-	-		
7/8	UNF	370	502	520	706	-	-		
7/8	UNC	335	455	470	638	-	-		
1	UNF	550	746	775	1052	-	-		
1	UNC	505	685	710	963	-	-		

Metric Grade Number		8.8		10.9		Wheel Stud	
Head Markings (Manufacturers marks may vary)							
M10	1.5	29	40	41	56	-	-
M12	1.75	51	70	73	100	-	-
M16	-	-	-	-	-	170	231
M16	2.0	126	171	180	245	-	-
M18	1.5	-	-	-	-	254	345
M20	1.5	-	-	-	-	376	510
M20	2.5	247	335	351	477	-	-
M22	1.5	-	-	-	-	475	645
M24	-	-	-	-	-	500	679
M24	3.0	425	577	608	825	-	-




Caution: Loose bolts can cause elongation of holes and part failures resulting in dangerous operating conditions and equipment break-down. Check all bolts & nuts periodically during equipment operation and keep them tightened to torque specified.


Hydraulic System


Introduction


The hydraulic system of the 100 series frame consists of two independent circuits i.e. depth control and wing fold. However on 18m models there is some dependency between depth control and wing fold circuits. Please refer to the Parts manual for circuit specifics.


If the machine is configured as a Hydra-Maxx an extra circuit is added including an accumulator for tine breakout. If configured as Para-Maxx, two extra circuits with accumulators are added, one for tine breakout and one for drum coulter pressure.


 **Caution:** Hydraulic oil cleanliness is imperative, especially if trouble free performance is expected.

 **Caution:** Maintain a close watch on tractor oil level and top-up with new clean oil as required, (not aerated oil).

 **Caution:** All work on the hydraulic connections to the accumulator shall only be carried out by suitably trained staff. Improper installation or handling can lead to serious accidents.

 **Warning:** Hydraulic accumulators must only be filled with nitrogen N₂ (oxygen-free), not with oxygen or air.

 **Warning:** Risk of burns as the accumulator can become hot.

 **Danger:** Accumulators are a pressure vessel, never weld, solder or perform mechanical work on an accumulator.

Important: When loosening fittings to bleed, always select the JIC fitting, if there is a choice. Do not bleed from the UNO fittings which screw directly into the cylinders. Damage to the sealing O-rings may result.

Note: Accumulator pre-charge information is recorded on the aluminum identification plate on the gas end of the accumulator.

Tractor Requirements – The implement hydraulic systems are designed to function with modern tractors. All components within the implement's hydraulic circuits are designed to handle a maximum working pressure of 24MPa, (3500 psi). The tractor hydraulic flow rate must be set between 60 and 120 l/min, (16-32 US gpm). All circuits to be connected to the tractor are fitted with ½" BSPT male fittings and are supplied with ½" type A ISO quick release breakaways.

Before operating the tractor hydraulics a careful check should be made of the following:

1. Cylinders are correctly located and aligned. i.e. the cylinders are not under stress due to misalignment or tight pins.
2. Hoses are correctly connected, firmly fixed and clear of any sharp edges or other obstructions that may cause pinching or wear on the outside of the hose.
3. No visible leaks from any hydraulic fittings.
4. All hydraulic tubes, hoses and fittings should be regularly inspected for damage and wear.
5. Check tractor hydraulic reservoir has sufficient oil to operate all circuits.

Important: Do not over tighten hydraulic fittings. Install and tighten nut finger tight until it bottoms the seat, then tighten a further 1/3 turn only. All threaded pipe connections should be treated with a thread sealant compatible with hydraulic systems; e.g. Loctite 569. Only apply sealant to the male threads. Do not use thread sealant on flare type fittings.

Hydraulic System

Wing Fold Circuit

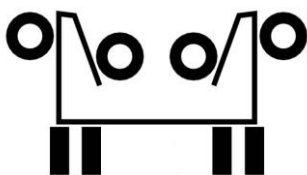
The wing fold circuit comprises of a number of double acting cylinders & valves. The circuit may have a flow divider fitted which should allow all cylinders to operate simultaneously. All models will include an over-centre valve which stops folded wings inadvertently unfolding. The 18m Double fold machine has a special sequencing valve.

The following procedure should be adopted to achieve complete removal of air when priming. Disconnect the bolt and clevis roller from the rod end of the cylinders. Using suitable size blocks, support the wing fold cylinders ensuring that the rods will have freedom to fully extend & retract without fouling.

Warm tractor engine, and then set at idle. Actuate tractor hydraulics to slowly fully extend implement wing fold cylinders and then fully retract. Repeat this process a number of times to ensure all cylinders operate smoothly and simultaneously before reconnecting.

18m, 5 section wing fold.

The wing system consists of sequence, diverts and hydraulic cylinders. The system will fold and retract the wing wheels with the single tractor SCV with no addition input from the operator.



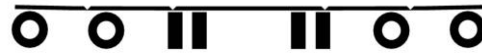
Fully Folded (wing wheels retracted and locked from movement)



Inner Wings Un-folded (wing wheels extend during Un-Fold Cycle)



Outer wings straightened out (small rams extended)



Fully Un-folded. All rams fully extended

Each side will fold and unfold simultaneously. Reverse procedure during folding.

- Machine must be in the fully raised position before folding. Activate wing fold hydraulic circuit until all cylinders retract to the fully folded position.
- When unfolding continue to pressurize the wing fold circuit for 30 seconds after the machine has fully unfolded (this ensures cylinders are fully extended and in sync and also releases pilot pressure from sequence operation).
- When in the fully folded/transport position the wing wheels should always remain static if raising and lowering. If the wing wheels move they can be re-locked by activating wing fold hydraulic circuit in the folding up direction (this will also need to be done after leaving machine folded for a long period of time).
- The frame lift cylinders on the inner wing must be fitted with depth stops **limiting the last 55mm of retraction** (if these are not in place, the machine will fold slowly and wheels may clash).



Warning: for correct fold sequence ensure wing fold cam is free of mud and debris. Cam is located on the left hand side of the centre frame, on the middle hinge pin.

Service Note:

For 18m wing fold circuit analysis, contact your dealer to arrange a copy of circuit & manifold schematics Gason Part Numbers 231149 & 229688.

Hydraulic System

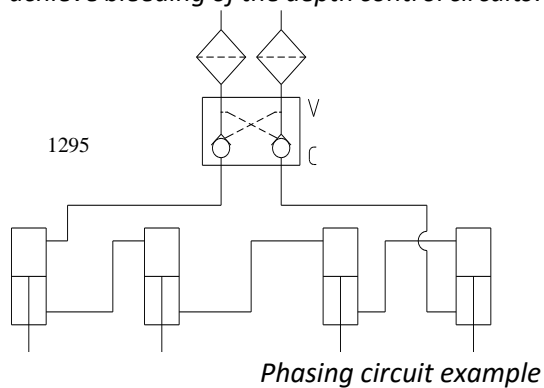
Depth Control Circuit

The depth control circuit found on the implement consists of a master/slave rephasing cylinder system connected in series. The master/slave system means that the rod end of the largest (master) cylinder is connected to the base of the first slave cylinder, and then the rod of the first slave cylinder is connected to the base of the second slave cylinder. The sizes of the cylinders and rods are matched such that a certain extension of the larger cylinder will displace a volume of fluid (from the rod end), which will match the volume required by the next cylinder (at its base end) to extend the same distance.

These rephasing cylinders have a system that allows oil to pass through the piston when it is fully extended or retracted.

The benefits of this feature are twofold. i.e. the cylinders are able to re-synchronize (re-phase), compensating for any leakage (internal or external), and at the same time purge air from the cylinders and hoses back to the tractor.

Note: With these rephasing cylinders, it is NOT necessary to remove hoses or fittings to achieve bleeding of the depth control circuits.



Priming the Depth Control Circuit –

The following procedure should be adopted to achieve complete removal of air from the depth control system. Remove all depth stop plates from cylinder clevises. Warm tractor engine, and then set at idle. Actuate tractor hydraulics to fully retract implement cylinders, (rephasing positions), and hold for 2 minutes. This should be enough time for all the air within the circuit to be dumped into the tractor reservoir.

Then, fully extend implement cylinders and hold for another 2 minutes. All cylinders should operate simultaneously and evenly. If not, repeat steps 2, 3 and 4 again. Refit depth stop plates once confident that the system is fully primed. (For 18m models, refer note in Wing Fold Circuit section, above, for inner wing depth stop setting.)



Caution: To allow the rephasing system to work correctly, all air must be purged from the system. Air within the system may exhibit any of the following symptoms: Uneven frame heights, Spongy feel, sagging of frame, Hoses vibrate and squeal and erratic movement of cylinders.

Note: All depth control circuits have an anti-drop protection valve fitted which allows the hydraulic couplings to be disconnected from the tractor whilst the circuit is under pressure.

The working depth of the implement can be limited with mechanical depth stops fitted to the master cylinder/s. A pressure relief valve is used to limit the retract pressure of the depth control circuit to 10.4MPa (1500psi). This is done to protect the cylinder depth stop plates from excessive load.

Upon working machine, if cylinders become out of synchronization with each other, rephasing can be achieved by simply extending the cylinders & holding.

Hydraulic System

Hydra - Maxx Circuit

The Hydra-Maxx utilizes a dedicated single acting Hydraulic circuit with a pre-charged accumulator as a means of allowing the tine mechanism to break out. Breakout force can be adjusted by increasing or decreasing circuit pressure within specified range.

Note: Maximum recommended system pressure is 104bar (1500psi) during operation. The accumulator is precharged to 40 bar (580psi).

Warranty will be void if circuit pressure is set in excess of the above figure, and/or accumulator pre-charge pressure increased. Exceeding these pressures will significantly reduce the number of tines capable of jumping. In conditions where a large number of tines attempt to jump simultaneously, hydraulic lock-up may occur. In such a scenario, tine jump will be severely limited and consequently, damage to either tine or implement may result. An additional accumulator plumbed into the circuit may remedy such a situation. Refer to your dealer for more information.

Priming the Hydraulic Circuit:

1. Loosen the last hydraulic hose on the outside ends of each wing manifold. i.e. the hose routed to the outermost tine of each manifold. This will assist in purging all air from the system. Loosen the JIC fitting on the hose, hold the fitting on the cylinder firm, if purging from the cylinder fitting the o-rings can be damaged.
2. Once the implement is ready to be primed, lower so that the implement is resting on the shanks/ground tool and creep forward, lowering the implement further as you go.
3. Continue until tines are at full jump height (tine cylinders fully retracted).
4. Attach the tine hydraulic circuit to a remote port on the tractor.

5. With the tractor in neutral and the handbrake disengaged, slowly begin to introduce hydraulic oil to the system. As the tines begin to return to working position they will pull the tractor backwards. Someone must remain in the tractor at all times.
6. Continue until oil begins to emerge from the loosened fittings.
7. Do not tighten until only oil is present. i.e. no air.
8. Nip up fittings and continue to force oil into the circuit.
9. Continue until tines have returned to their working position. i.e. the cylinders are extended.
10. Increase hydraulic pressure until desired working pressure is reached.

If the tines appear to behave erratically during working, further air may need to be bled from the system.

Following is a table of theoretical values of desired breakout at 710mm underframe clearance (UFC) and the corresponding hydraulic pressure.

40 bar (580 psi) precharge	
Breakout [lbf] at 710mm UFC.	Hydraulic Pressure [psi]
310	586
400	756
500	946
600	1135
680	1286

Note: Note: "As a rule of thumb" quick approximation of tine breakout in pounds "Divide Pressure (psi) by 2"

Note: As the under frame clearance increases, so does the pressure necessary for maintaining a given breakout. E.g. Higher breakout is achieved with shorter shank.

Hydraulic System

Para- Maxx Circuit

The Para-Maxx utilizes 2 dedicated single acting Hydraulic circuits with pre-charged accumulators as a means of allowing the tine mechanism to breakout and coulter-parallel-ogram down force to be adjusted. Both circuits can be independently adjusted by increasing or decreasing circuit pressure within specified range.

Note: Max. recommended system pressures are:

Coulter-Parallelogram 104bar (1100psi)

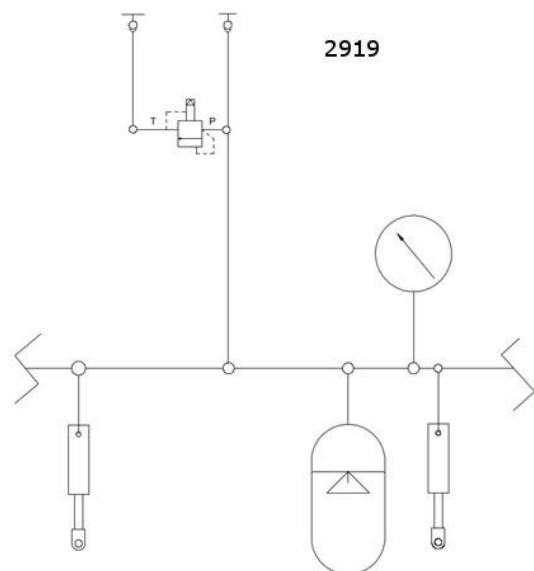
Tine circuit 186bar (2700psi)

Accumulator pre-charge pressures are:

Coulter-Parallelogram 42bar (600psi)

Tine circuit 82bar (1200psi)

Warranty will be void if these pressures are exceeded, and/or accumulator pre-charge increased. Exceeding these pressures will significantly reduce the number of tines capable of jumping. In conditions where a large number of tines attempt to jump, hydraulic lock-up may occur. In such a scenario, tine jump will be severely limited and consequently, damage to either tine or implement may result



Priming the Coulter Circuit:

1. Prime the coulter circuit as follows:

2. To assist in purging all air from the system, loosen the last hydraulic hose on the end of each wing tube. Do this for both the coulter and tine circuit. By having the tine circuit open will ensure no hoses have been plumbed incorrectly.

3. Fully lower the implement onto the ground via the depth control circuit. When fully lowered, the top coulter cylinder on the row unit will be fully retracted. Ensure the coulters are on soft ground.

4. Attach the coulter hydraulic circuit to a remote port on the tractor.

5. Slowly introduce hydraulic oil to the system.

6. As the cylinders fill oil will begin to emerge from the loosened fittings.

7. Do not tighten until only oil is present. i.e. no air. If oil emerges from the tine circuit check both circuits' plumbing.

8. Nip up fittings and continue to force oil into the circuit. Pressurize up to 1100psi.

9. Raise Machine, oil pressure will return to zero as the coulters come to rest.

Note: Row units located at the outer end of each wing should be fitted with a pair of test couplings. One on both the coulter & tine cylinders. The couplings are compatible with the bleed off kit provided with the machine. This allows an alternative method for air removal from the system.

Priming the Tine Circuit:

To assist in purging all air from the system, loosen the last hydraulic hose on the end of each wing manifold related to the circuit.

Once the implement is ready to be primed, lower until the implement is resting on coulters or ground tools. Ensure the coulters are on soft ground.

Hydraulic System

1. Repeat steps 4 to 7 for the tine circuit (not the coulter circuit).
2. Nip up fittings and increase hydraulic pressure until desired working pressure is reached. (Max. 2700psi)

Following is a table of theoretical values of desired breakout at approximately 100mm depth of cut and the corresponding hydraulic pressure.

84bar (1200psi) precharge	
Breakout [lbf] at 100mm deep.	Hydraulic Pressure [psi]
310	1225
400	1580
500	1975
600	2370
680	2690

Note: *If the tines appear to behave erratically during working, further air may need to be bled from the system.*

Note: *“As a rule of thumb” quick approximation of tine breakout in pounds “Divide Pressure (psi) by 4”*

Note: *As the tines depth increases so does the pressure necessary for maintaining a given breakout. E.g. Higher breakout is achieved with shorter shank.*

Requirements

Ensure tractor is compatible with your 100 series implement and seeder combination. Check the following:

1. Does the tractor have sufficient power to pull this combination in the field? Generally you will require between 5-9hp per tine and 8hp per ton of seeder.

Example: 36 tines Para-Maxx with 1890 seeder (9 ton). $(36 \times 5) + (9 \times 8) = 252\text{hp}$ minimum tractor horsepower.

2. Does the tractor have sufficient weight to tow combination safely on public roads? Refer "Transporting" section of this manual.

3. Does the tractor have sufficient hydraulic capability to handle the combination. Scari-Maxx - 2 sets of remotes, Hydra-Maxx - 3 sets of remotes & Para-Maxx - 4 sets of remotes **plus** the seeder's requirements. For more info refer "Hydraulics" section of the manual.

Important: These are only rough guidelines; hills and soil conditions can have a large impact on tractor power requirements.

Note: The implement hitch has been designed to perform at its optimum with a Category 4 drawbar (2" dia. pin). If a Category 3 drawbar is used (1.5" dia. pin), undesirable effects may result due to sloppiness.

Connection

Ensure that the implement is always disconnected/ connected on flat, level ground and these general rules are followed:



Warning: Read your tractor operator's manual and become familiar with all controls before commencing connection.



Warning: Only personnel involved with the connection of machine to tractor are to be present, instruct general public to keep clear at all times. When tractor is not being operated, ensure key is removed from ignition.



1. Reverse the tractor to the drawbar, adjust jack to suit drawbar height and fit drawbar pin. Ensure draw bar pin is installed with an appropriate retaining pin/clip fitted. Lift jack before operating machine's depth control.

2. Attach depth control and wing fold hydraulic hoses to appropriate tractor hydraulic remotes.



Caution: Ensure Hoses are paired into correct remote sets. Hydraulic hoses can be identified by tags fitted near the tip, as shown below.



GPN: 227170



GPN: 227171



Caution: Ensure couplings are clean of dirt and are not damaged. Always carry clean rags with the tractor.

3. Check machine hydraulic actuation responds to desired lever/control movement, i.e. pull lever back to raise machine, push lever forward to lower machine. It may be desirable to mark the tags with a permanent marker for future reference, e.g. "left" for left side of remote pair.

Note: On the wing fold circuit it is good practice to use the tractor's timed detent operation. Set to approximately "30" sec's allowing more for double fold machine.

Tractor



Caution: Wing fold cylinders are fitted with restrictors on the rod end as a safety device in case of hydraulic failure. Folding speed is affected by these restrictors. We recommend reducing the oil flow rate on the wing fold to match flow through restrictor & minimize pressure spikes.

4. Check that the tractor hydraulic fluid reservoir is full. There is a significant volume of fluid required to fill all cylinders and hoses when connecting a new implement. Low reservoir levels may introduce air into the hydraulic circuits!



Danger: The presence of air in the hydraulic circuits will cause the implement to operate erratically and is potentially very dangerous when folding wings or transporting the implement.

5. Install a suitably rated implement safety tow chain (supplied with machine), from drawbar to a secure location on the tractor. A shackle attachment point is located near the front of the drawbar.



6. Raise the parking jack base plate off the ground and rotate into its storage position.

Caution: Do not operate depth control hydraulics until jack is rotated into storage position.

7. Phase depth control cylinders. (Refer Depth Control Circuit – “Hydraulic System” section, above.)

8. Raise safety stands across the front and rear of main frame. These may have been lowered to support machine during storage or for safety reasons when carrying out servicing.

Pre - operation Checklist

- ☐ Read and understand the operator’s manual and all safety decals.
- ☐ Read and understand tractor operator’s manual.
- ☐ Inspect all tyres (where applicable) are in good working condition and correct pressure. Refer to “Tyre Care” in the “General Maintenance”.
- ☐ Inspect all points & hardware are in good working condition.
- ☐ Check that all hardware is in place and is tight. Refer to “Torque Specifications” section for assembly torques.
- ☐ Check that the hydraulics are primed and bled of all air as detailed in the “Hydraulic System” section.
- ☐ Check that all hydraulic hoses are routed to accommodate working angles between implement members joined by pivots, checking for potential pinching, fouling or rubbing of hoses.
- ☐ Check that all accessories do not foul with implement wheels or framework through their working/transporting range.
- ☐ Check all hydraulic connections for leaks.
- ☐ Check safety tow chain is fitted to implement. If additional length is required, use only Grade 80 tow equipment.

Transporting

Road Transportation:

The 100 Series should generally be transported in the fully raised position giving maximum road clearance. However, this does increase the overall height of the machine. Before transporting, ensure the following procedures are considered:

1. Tractor has sufficient weight to handle machine. Generally the tractor needs to be 2/3 the weight of the Implement combination. See Specifications (page 9) for machine's overall weight approximation.



Caution: Prevent collisions between motorists and slow moving equipment on public roads. Frequently check for traffic from the rear, especially in turns, and use the turn signals.



2. Tractor has sufficient braking capacity for emergency stops. Maximum of 15m stopping distance.

3. Fit transport locks to the centre frame depth control cylinders. Transport locks have been provided in the tool box. For 18m models, refer Parts manual to identify fitment locations for the two different style transport locks used.

4. Release hydraulic pressure from hydraulic tines or row units enabling them to freely move if they hit an object. Pins have been provided to pin-up Para-Maxx row units to reduce transport dimensions as required.

5. Understand state and local authority regulations for transport of agricultural machines. Always abide by these regulations. E.g. dimensions, weight, time of day, road and bridge restrictions, piloting, beacons, signs, flags, etc.

6. Centre frame wheels have the maximum tyre pressure, refer to "Tyre Care" in the Maintenance and Servicing section of this manual. Doing so will prevent excessive tyre

side wall heat and distortion and rapid tyre wear occurring.

7. Centrally locate & fix the tractor and airseeder (for front tow seeders) drawbars during road transport to provide greater stability.

8. The safety tow chain must be fitted around a substantial part of the towing implement and hooked back onto itself. Ensure hook safety catch is engaged. The chain must be fitted to allow normal angular movement of the coupling without unnecessary slack. If practicable, the chain must be connected so the drawbar of the implement is prevented from hitting the ground if the coupling accidentally detaches. If towing a combination, ensure safety chain tow capacity is adequate. An additional chain may be required.



Caution: Never travel with wings in any other position except fully up or down.



Danger: BEWARE of power lines and other obstructions when transporting with wings folded.



During transportation ensure:

1. The maximum transport speed of 20km/h is not exceed.

2. Reduce speed when travelling over rough terrain and shift into low gear down steep slopes.

3. After transporting for a few kilometres, stop and check all wheel nuts, connector bars, clevis pins and lynch pins. This should be repeated if transporting extended distances. In particular, wheel nuts can work loose until bedded in. Refer "Torque Specifications" in Assembly Instruction section of this manual.

Important: It is the responsibility of the owner/operator to review the state or local requirements before towing on public roads.

Field Operation

Operating the 100 Series:

The design of your 100 Series provides flexibility in spacings, layouts, individual working depths, ground engaging tools and provision for a multitude of attachments, allowing its use for more than just one application or practice.



Caution: Ensure wing fold cylinders are always fully extended when operating. This will allow wings to freely float through their working range. When unfolding the wings, the cylinders need to continue to full extension after the wheels touch the ground.

Regardless of the practices being employed, there are a number of general rules that should be followed.

1. Whenever starting, the tines should always be out of the ground. When commencing work, move off slowly and lower the implement to the required depth; then increase to the desired working speed (up to a maximum recommended speed of 12 km/h).

2. Do not turn too sharply whilst tines are in the ground as this will place excessive loads on the tines, ground tools and frame. Tines must be raised out of the ground when turning at headlands or in other tight situations.

3. Be aware of the tractor-planter-seeder combination's turning capabilities & limitations, especially at headlands. Work within these limitations to avoid damage.

4. Do not work with the wings folded, whether partially or completely.

5. Become familiar and aware of the limitation of the implement and work within these limits.

6. Assess your specific application and determine the risks involved and appropriate action.

7. Upon selecting the desired frame height, set the depth stop mechanism to control the height as per "Frame Adjustments – Depth Stops".

8. Whilst working, regularly observe the depth indicator and frame, for any signs of variation and keep observing the entire implement for any blockages of mud, stubble or any other obstructions.

9. Regularly inspect sowing boots for blockages. **Tip:** Whilst stationary, operate the seeder to dump a small sample of product. Then check all boots are receiving product.

10. Avoid working on excessively steep slopes or rocky terrain. Such conditions place extreme loads on the implement and will dramatically reduce its working life.

11. The implement should never be worked with the tine shanks constantly jumping or laying back from the vertical. This may result in premature wear of the tine assembly and will not be covered under warranty. If such a situation persists, the load on the tine must be reduced by:

- Decreasing ground speed
- Reducing working depth
- Replacing ground tool with one which produces less draft
- Shortening the tine shank
- Delaying working until more suitable soil conditions prevail

The tine is protected by either a spring or hydraulic breakout mechanism. This system is designed to absorb minor over loads and shocks.

Note: Contractors should discuss ground conditions with the property owner/manager to highlight potential risks on the property before commencing contracted work task.



Caution: This implement is not designed to work in rocky ground! However, the tines do have limited ability to negotiate the occasional object.

Important: Warranty will be void if machine is working rocky ground.

Field Operation

Frame Adjustments:

Frame can be adjusted to level the Implement between the wheels across the width and fore and aft (front of the machine to the back of the machine); Initial adjustments should be made with the ground tools, and frame positioned at working depth. Inspect the ground finish by selecting opposing tines on the front and back toolbars on the extremities of each section.

Tip: scratch to the bottom of slot to check depth.

Important: It is the responsibility of the owner/operator to ensure the machine is adjusted accurately to perform seeding to their specific requirement.

Pre-operation check:

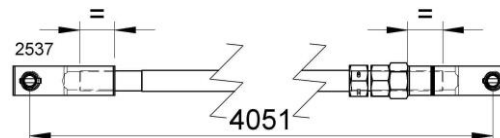
- Tyre pressures are even and within operating range. Refer "Tyre Care" in the Maintenance and Service section of this manual.
- Wing folding cylinders must be fully extended to allow sufficient float.
- Depth control cylinders - must be phased and the operator confident that all air has been eliminated. Refer to the procedure given in the "Hydraulic System" section of this manual. If unsure, measure the length of cylinders from centre of pin to centre of pin, all cylinders should be equal.
- Shanks are set to even height in the Tool holder.
- Points are even and set square to shank

Fore and Aft - Check and adjust this first, starting with the centre frame. Remember each set of wheels are independent.

To finely adjust the frames fore and aft level, the implement has been fitted with adjustable connector bars. These bars join the upper linkages of the front castor wheels to the lower linkage of the rear wheel assembly. Retract the depth control cylinders slightly so that the load

is just off the wheels before attempting adjustment.

"Lengthening" the connector bar "lowers" the front relative to the rear. "Shortening" the connector bar "raises" the front relative to the rear. The factory setting for the connector bar is as follows:



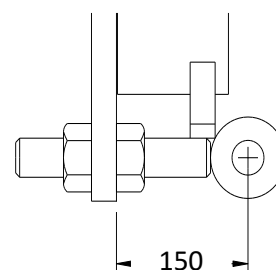
Note: When working the Hydra/Scari-Maxx it may be necessary to set the front points higher than the rear, to compensate for greater draft forces. Check under working conditions that front and rear tines are cutting the same depth.



Warning: Ensure connect bars' lock nut is tightly relocked after adjustment. Use an extension bar on spanner to gain extra purchase.

Across Width - To finely adjust the frame depths, retract depth control cylinders so that the load is just off the wheels. Then loosen the locknuts on the cylinder mount eyebolts. By turning the eyebolt nut closest to the cylinder anti-clockwise, the implement will lower, or clockwise, the implement will rise.

The factory setting for the depth control cylinder eyebolts should be as follows: -

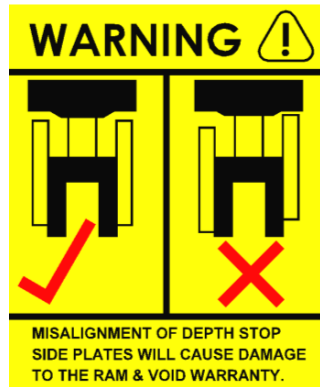


Depth Stops – (Mechanical Stops) Setting the implement's working depth is achieved by the following procedure:

1. Back off or remove the mechanical depth stop plates on each of the master cylinders to allow the cylinders to fully retract.
2. Raise and lower the implement a couple of times, allowing the cylinders to fully extend and rephase.
3. Engage the implement to the required working depth and operate for 50-100 metres.

Field Operation

4. Refit or adjust cylinder depth stop plates until at rest on the cylinder end cap. Ensure that both plates of the depth stop are secured level. If there are two master cylinders, ensure both sets of depth stops are set the same. As a check, count the number of teeth exposed on each depth stop plate.



Double Fold 18m Frame Adjustment.

The double fold machine has 5 frame sections. Each of these frames requires adjustment to level and match each other. Follow the steps below starting at 1 though to 5. This process may need to be repeated to refine the settings. Ensure depth control rams are phased.

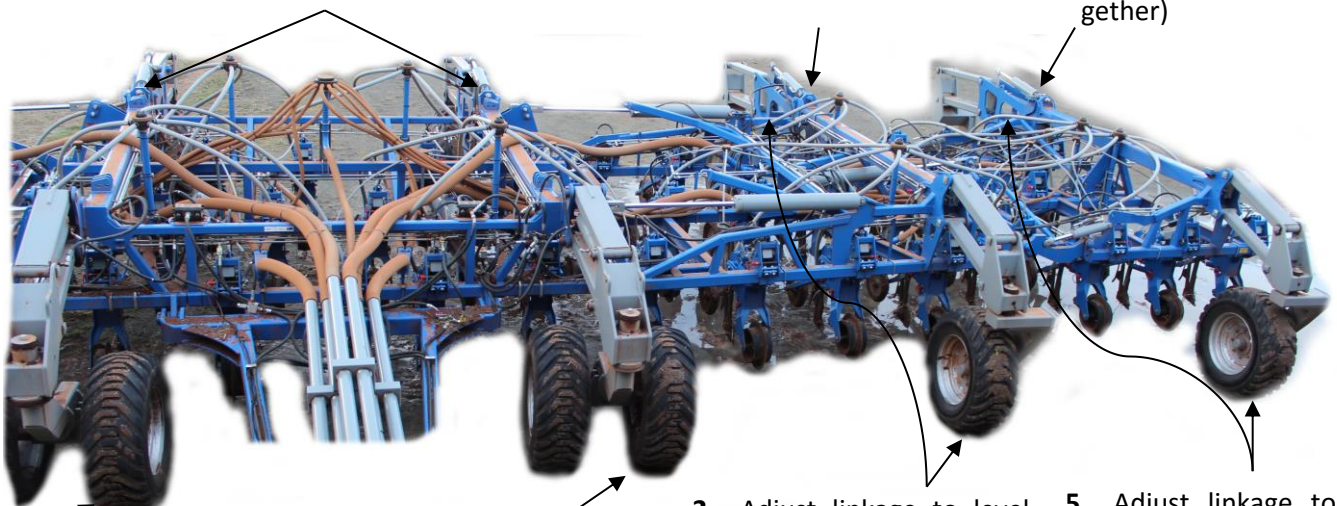
1. Adjust eye bolts at base of lift rams so rear of centre frame matches the front.

3. Adjust eye bolts at base of lift rams so inner wing matches centre frame. (Front and back wheels move together)



Warning: This cylinder has depth stop plates fitted. Do not remove or adjust as these play a role in the wing fold process.

4. Adjust eye bolts at base of lift rams so outer wing matches inner wing & centre frame. (Front and back wheels move together)



Front Centre Frame Wheels, **No Adjustment.** Adjust all Frames to this Level. Check each side is on depth stop evenly.

2. Adjust linkage to level the inner wing fore and aft. (The linkage only adjusts front wheel)

5. Adjust linkage to level the outer wing fore and aft. (The linkage only adjusts front wheel)

Field Operation

Scari-Maxx Operation

The Scari-Maxx utilizes a spring as the break out mechanism. The tine's breakout is nominally 180kg (400lb).



The Scari-Maxx's tine shank height can be adjusted vertically. Its lowest recommended setting can achieve 760mm* (30") underframe clearance. The shank can be adjusted vertical in 12.5mm (1/2") increments up to a minimum under frame clearance of 660mm* (26"). *Note, figures will vary between groundtools.

Digging depth is adjusted using the frame's depth control system.

Important: M20 set screws securing the shank may need retightening upon initial bedding in.

Note: The tine breakout force increases as the underframe clearance (UFC) is reduced. e.g. 380lbf @ 760mm UFC, 420lbf @ 660mm UFC.



Danger: Beware of a potentially dangerous situation whereby a jammed tine shank is lifted off its rest position. Do not stand in front of such tines.

Hydra-Maxx Operation

The Hydra-Maxx utilizes a hydraulic cylinder as the break out mechanism. The tine's breakout can be varied from nominally 140 to 310kg (300 to 680lb) depending on circuit pressure, position of shank & groundtool.

The Hydra-Maxx's tine shank adjustment is identical to the Scari-Maxx. Refer above for detail.



Note: The tine breakout force increases as the under frame clearance (UFC) is reduced.

Digging/seeding depth is adjusted using the frames depth control system.

The tine break out can be adjusted on the go, between the range 600 – 1300 psi. Reduce the tine breakout when the machine is working passes through areas known to have rocks or other submerged objects.

Para-Maxx Operation

The Para-Maxx 100 gives independent control over seed depth on each row unit assembly. This allows the operator to set each row unit independently to a specified depth and at all times have independent control over the position of this depth via the drum coulters and hydraulic breakout on the tine.



Seed depth is adjusted by vertically repositioning the shank via the series of holes in the shank and tine holder. When adjusting seed depth, always conduct a test run. Adjust a few shanks across the machine to confirm desired seeding depth before adjusting the remaining tines.

The shank to press wheel lead is adjusted by removing the mount bolt and sliding the lower assembly in or out via the telescoping tube. Re-fit and tighten the mount bolt after adjustment.

Field Operation

The Para-Maxx 100 frame height does not set the seeding depth. However, it is important to maintain a constant frame height positioning the row unit's arm to approximately 5° below horizontal. This allows adequate up and down movement over the contours of the land, thus facilitating minimum ground compression of both depth wheels and parallelogram units.



Use the master cylinder depth stop to achieve desired frame height. Refer "Frame Adjustments" from this section. Once the frame working position is set, all operating pressures are controlled from the tractor seat except press wheel pressures.

The pressure control on the coulter/gauge wheel can eliminate bulldozing and skipping over various soft, fluffy or hard surface soil conditions.



The optimal operating trait of the Para-Maxx planter unit is for the coulter/gauge wheel to glide evenly over the surface. If the row units begin to bulldoze, ease coulter cylinder circuit pressure until coulter/gauge wheel levels out on the ground surface. If the row unit begins to

skip, then increase pressure until the coulter/gauge wheel returns to optimal position. If the tine begins to trip back, increase tine pressure until tine remains static during working. Avoid using excess tine pressure as this will limit the number of tines able to trip at any one time. If machine goes into hydraulic lock-up, damage may result.

The coulter pressure should be set to an easily accessible remote lever, depending on conditions this will be adjusted regularly. The tine will be adjusted less often and best set to a remote lever and locked out. If adjustment on the run is not required, set pressure and turn off the oil flow with the lock out valve.

If working the machine in areas known to have rocks or other submerged objects, slow down and reduce the tine breakout pressure.



The press wheel pressure is manually set via an extension spring to desired pressure subject to ground surface conditions. Three spring settings are achieved by adjusting the front pin. The highest pin position gives the minimum pressure and the lowest gives the maximum pressure. To enable ease of adjustment remove the rear arm support pin allowing tension to come off the spring. The rear arm support pin has two positions-setting the press wheel's heights to the row unit.



Danger: Beware of tine shank or press wheel arm in a situation where the tine lifts off its resting position. E.g. become jammed with an obstruction (tree branch) in the jumped position.



Warning: Coulter has sharp edges, take extreme care when adjusting or servicing.

Maintenance & Service

Before you Begin

Your 100 Series has been designed with minimum maintenance in mind, however regular maintenance will ensure trouble free operation for the life of the implement. It is recommended that when replacing parts you use genuine components and fasteners of the same grade and quality as the ones used on the original implement.

Gason require all service personnel read the Safety Rules & Accident Prevention section of this manual. Page 7

It is also suggested that the following be completed prior to beginning any service or maintenance.

1. Park Tractor and Implement on flat level ground.
2. Shut off tractor engine and remove ignition key.
3. Relieve pressure in hydraulic lines.
4. Place approved safety stands in secure locations under centre frame and wing section, NOT under axles or wheel supports.
5. Ensure all moving parts are in the resting position and not lodged. E.g. Tines, Parallelograms, press wheel arms. If lodged, these components may risk falling into the resting position.



Danger: Failure to understand the dangers involved in the product being serviced may result in death or serious injury.



10 Hours (Daily)

General:

- Inspect all points and sowing boots for excessive wear, chips, cracks and bends. Replace or repair when necessary.
- Check the state of ground tool hardware to ensure spear points/sweeps remain tight and in place.
- Check sowing boots, for blockages, damage or excessive wear.
- Inspect all coulters, drums & mudscrapers for excessive wear & chips. Ensure all hardware is tightened and desired clearances maintained.
- Check the tightness of any newly replaced nuts and bolts after the first 10 hours of operation, then weekly.
- Check all hardware is tight and secure.

Hydraulics:

- Check all hydraulic fittings and components for any signs of external leaks.
- Check depth control circuit remains phased (cylinder rod lengths all the same).
- Check filter indicator. Replace element if necessary.

Hydra-Maxx and Scari Maxx Tine Assemblies:

- Check tension on the tine toolbar mount and shank hardware. This need only be done for the first couple of days of operation until the tine settles in.

Note: Hardware is Grade 8.8.

Press Wheel Assemblies:

- Check for mud and/or stubble build-up around tyres and clear as necessary to reduce the likelihood of excessive tyre wear.

100 Hours

General:

- Where grease nipples are provided, re-grease using any high quality lithium based extreme pressure multi-purpose grease, e.g. MOBIL GREASE XHP 222.

Maintenance & Service

Note: The exception being the Scari/Hydra-Maxx tine pivots. Gason recommend a superior lithium complex multi-purpose grease containing molybdenum disulphide, e.g. MOLYBOND OPAL HI-LOAD (TPG).

- Check hubs for bearing play and condition of seal.
- Rotate wheels, feeling for any sideways movement or notchiness.
- Check tyres for wear & inflation pressure.
- Check press wheel tyres for splits.
- Grease Front Castor Arm pivots via grease nipples.
- Grease all linkage Bosses.
- Grease wing Pivots.

Hydraulics:

- Inspect all hydraulic hoses for external wear.

Scari/Hydra-Maxx Tine Assemblies:

- Check the tension on tine shank to pivot bracket hardware i.e. M20 set screws and nuts.
- Check ground tool wear and/or damage - replace as required.

Note: When replacing ground tools, it is recommended to replace the relevant hardware with genuine new parts at the same time. Refer to “Tine Assembly” and “Shank Options” in the Spare Parts Manual for details.

500 Hours or Seasonally

The amount of maintenance required will depend on the area of seeding and the conditions.

- Carry out a random check of wear on the bushes used across the implement i.e. tine, castor wheel, and drawbar pivots. Replace bushes if noticeable wear has occurred. Refer to “DU Bush Replacement” in this section of the manual for DU bush replacement.

- Grease all main axle hub bearings. Be careful not to over grease.
 - Randomly check the tension on fasteners across the implement, especially those attaching tines/row units.
- Check drum coulter for endplay and retention with lock nuts.
- Check press wheel hubs for end play. Refer to “Press Wheel Tyre & Rim” in this section of the manual.

Cleaning and Storage

To maximize the life of your 100 Series Implement, we recommend that basic cleaning and protection of some areas be performed at the end of the working season.

- If the implement is covered in mud, spray clean with a high-pressure water jet cleaner.
- Store machine on firm ground, ideally under cover.
- Locate the implement into the storage area and remove loads from main wheels by resting implement on stands supplied. If folded, extend the 4 centre frame stands. If unfolded extend all stands.
- Float all Hydraulics before unplugging from tractor to relieve pressure from each circuit.
- Protect exposed hydraulic cylinder rods by applying light grease on the rods. This should be done if cylinders are left in the extended position for more than three weeks.

Tyre Care

For optimum tyre performance, tyre pressures should be checked and maintained regularly. Under-inflation may cause tyres to slip on rims or over flex and over heat, whereas over-inflation reduces both the flotation effect of tyres and the resistance to punctures. Tyre pressures may need to be varied depending on soil conditions.

Equal tyre pressure across the width of an implement is critical to ensure even load distribution and to maintain stable tracking.

When working the implement, tyres should be initially inflated to 70% of the maximum recommended “cold” tyre pressures.

To ensure that the tyre is capable of carrying its maximum load during any road transportation, centreframe tyres should be inflated to the maximum recommended “cold” tyre pressures.

MAXIMUM RECOMMENDED “COLD” TYRE PRESSURES

TYRE	PRESSURE	
	kPa	psi
385/65-22.5 16PR	345	50
400/60-22.5 18PR	430	62
550/60-22.5 16PR	300	44

Press Wheel Tyre & Rim

In most conditions, and on most properties, minimal maintenance will be necessary. However, more vigilance is required in hostile areas, or when seasons of extended dry seeding are experienced, or on large acreage.

Split Tyre – Small splits in the tyres can be caused by sharp rocks, wire, wood etc. Corrective action, if the split is detected early is as follows: Clean out splits from any lodged dirt. Fill split with an Automotive Adhesive/Sealant or acid-curing silicone. Note, if the split is left, it will gradually open up as dirt is forced in and eventually cause tyre failure. If this occurs replace the tyre.

Worn Tyre – Press wheel tyres are made from a relatively soft rubber compound. They will wear out at the rate of approximately 10% per year depending on the abrasiveness of the soil, the amount of dry seeding or the amount of acres sown. At some stage, the tyres will reach a point that the wear will cause small splits to open up very quickly and the tyre will fail. Monitor wear and replace prior to a state of failure occurring. Consider alternative tyre profiles & constructions, which may improve tyre life. Alternatively, consider running two sets of tyres, one for the wet sticky soils and one for the dry abrasive soils. (This may save you money in the long run.)

Missing Components – Check for grease caps, grease screws, dust caps, dust cap clips, axle housing bolts and lock nuts, seals, tyres and complete wheels.

Loose Wheel – (A) If the wheel has just started to become loose (i.e. sideways movement on the shaft), this is most likely because the pre-tension has come off the bearings. Immediate corrective action is required; remove the dust cap and split pin and re-tension the castle nut so as to remove any sideways movement. i.e. nip-up axle nut then back off to nearest slot to allow fitment of split pin. Ensure wheel can rotate by hand but with some drag. Refit the dust cap and clips. It is also good at any time that the dust cap is removed to remove the spent grease from inside the dust cap and to purge some fresh grease through the grease nipple out through the small bearing.

(B) A loose wheel can also mean wear in the bearings and that the bearings have failed or about to fail. Normally this can be detected by some notchiness as the wheel rotates. Corrective Action; Carry out a complete bearing changeover at the next planned maintenance opportunity. Refer Wheel Bearing Maintenance, below.

Seized Wheel – Normally this will be caused either by a bearing failure or by dust contamination of the grease either through the back seal or through the dustcap. Corrective Action; Remove the wheel and replace with a spare, do a complete bearing and seal changeover at the earliest opportunity on the failed wheel. **Note:** Apply a gasket sealant to the inner & outer seal diameters upon fitment. E.g. Loctite Hi-Tack.

Maintenance & Service

Every 500 hours or end of season:

1. Visual inspection of wheels. See notes above for corrective actions.
2. Mechanical inspection. Rotate wheels feeling for any sideways movement or notchiness. Check all nuts and bolts. See notes above for corrective actions.
3. Regrease. Remove grease purge screw and apply one pump of grease into the hub through the grease nipple. Replace the grease purge screw.
4. Remove the dustcap and remove the spent grease from inside the dustcap cavity. Apply a second pump of grease through the grease nipple to purge grease through the small bearing. Replace the dustcap and dustcap clips.

Do not be tempted to over grease the wheels. For this reason, a grease purge screw is fitted at 180 degrees to the grease nipple. Whenever applying grease through the nipple (and the dustcap is on), ensure the grease purge screw is removed, this will allow any excess, or spent grease, or pressure to be released. Before refitting the purge screw, spin the wheel. This will also help to reduce the pressure. Make sure that the purge screw is refitted. Periodically when greasing, remove the dustcap and remove any spent grease out of the dustcap cavity.

DU Bush Replacement

The self-lubricated bushes used on your Series 100 are designed to run dry, without any form of additional lubrication. These bushes are used within the Para-Maxx 100 row unit and in the main castor pivot. However, we do grease the castor wheel pivot.

The bush is steel, backed with a PTFE (Polytetrafluoroethylene) and lead lined composite bearing material. During normal operation, a thin film from the PTFE lining migrates to the

pin and remains there throughout the working life of the bearing.

If the lubricant layer has worn away, replacement is necessary. The bush is installed in its housing at the factory to the procedure, below. Bushes can be removed by placing a screwdriver on the inside edge of the bush and tapping it outwards (breaking its adhesion).

Important: Care must be taken to ensure no damage is done to the housing internal diameter with the screwdriver.

Installation of the bush must be done as follows:

1. Clean housing internal diameter with non-oil based thinners.
2. Apply light coating of Loctite 609, or similar "MEDIUM STRENGTH" retaining compound to the bush outside diameter only.
3. Press bush squarely into housing with a nylon hammer, taking great care in maintaining the bush's squareness until the end is flush with the housing.
4. Allow adhesive to cure for 12 hours minimum before fitting mating pins. This time can be reduced by using a suitable Loctite activator and/or by increasing the ambient temperature.

Important: Take extreme care not to damage or remove the inner surface of the bush. Ensure no adhesive contacts the bush's inner surface. Ensure bush splits are orientated at 12 o'clock i.e. on top, or on opposing side to where the load will generally be applied.

Hardened Steel Bush Replacement

For pivots using steel pins and bushes, follow the procedure below:

Removal and installation of the bush must be done as follows: -

1. Remove worn bush from its housing by placing a screwdriver on the inside edge of the

Maintenance & Service

bush and tapping it outwards (breaking its adhesion). Care must be taken to ensure no damage is done to the housing internal diameter with the screwdriver.

2. Clean and degrease the housing internal diameter and the bush external diameter with a contact cleaner or Loctite 770.
3. Allow to dry.
4. Apply Loctite Primer N to the external diameter only of the replacement bush and allow drying for 5 minutes.
5. Apply a light coating of Loctite 609 or 620, or similar, retaining compound to the leading chamfered edge of the replacement bush external diameter only.
6. Press fit into housing until flush.

Important: Take extreme care not to damage or remove the inner surface of the bush. Ensure no adhesive contacts the bush's inner surface.

Wheel Bearing Maintenance

Wheel bearings should be checked at the end of each working season and adjustments made when necessary.

To check and adjust wheel bearings: -

1. Raise wheels, and support, to facilitate rotation.
2. Check for endplay by pulling back and forth on wheel.
3. If bearing endplay is present, remove hubcap and cotter pin.
4. Tighten slotted nut whilst rotating wheel until resistance locks hub.
5. Back off the slotted nut one full turn.
6. Retighten until nut locks up and back off to nearest slot in nut, but no more than 30°.

Note: Ensure that the bearing endplay is not apparent. Tapered roller bearings on agricultural tractor and implement wheels are generally set with a free running clearance or end play of somewhere between .03 to .18mm (.001 to .007 inches).

7. Rotate the wheel. There should be only a slight drag.
8. Replace the hubcap.
9. Grease hub via grease nipple. Be careful not to over grease as this may dislodge either the triple-lip seal behind the inner bearing, or the hubcap. The Manutec Integral hub has a purging screw which should be removed when greasing.

Important: When replacing bearings, care should be taken to ensure that the bearings, tools and work areas are clean. Kerosene is recommended for washing bearings, though it is not necessary to wash new bearings. Before storage or assembly of washed bearings, they must be immersed in a light mineral oil after thoroughly dry from the kerosene.

Bearing cups can be pressed or driven into hub. If special drivers are not available, mild steel bars can be used (do not use hardened drifts or brass bars). Care must be taken to ensure that the cup or cone is solidly seated against the shoulders.

Before fitting bearings, check condition of seal and replace if necessary. Apply a suitable sealant to inner & outer diameters of the seal before fitment. E.g. Loctite Hi-Tack gasket sealant. Ensure bearings are fully greased; i.e. grease must completely penetrate within rollers and cage to inner race. Recommended grease is any high quality lithium based extreme pressure multi-purpose grease, e.g. Mobilgrease XHP 222 or Fuchs Poliplex2

Hard Facing / Replacement of Spear Point Adaptor

Hard Facing

The Keech cast steel spear point adaptor (DDA3S) and/or the SCARITILL spring steel shank can be hard faced if required. Hard facing can be achieved as follows:-

Note:

New hard surface welding products are being developed and released on a continual basis. Consult your local welding supplier for an up to date product listing.

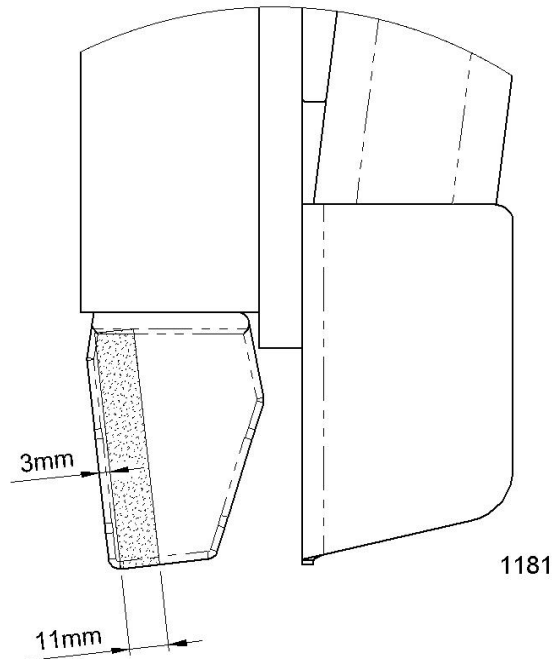
1. Prepare the area to be hard faced by removing any dirt, grease or other contaminants.
2. Pre-heat the zone to a minimum of 100°C. Use temperature crayons to indicate surface temperatures.
3. Apply hard facing material in the vertical orientation as shown. Cool down slowly, away from draughts e.g. lay shank on firebrick, place in lime or use heat blanket to slow down the cooling process.

Replacement of Spear Point Adaptor

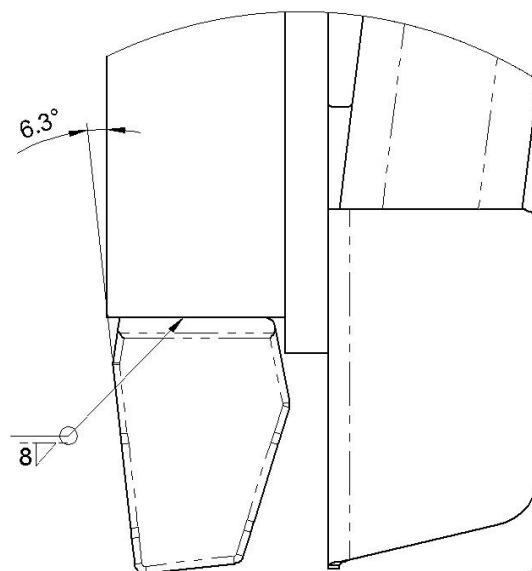
If the adaptor is worn or damaged to the extent that replacement is necessary, the following procedure should be followed.

1. Grind off worn adaptor at its connection point with the shank.
2. Grind surfaces to be welded back to bright steel.
3. Heat both components simultaneously with an oxy-torch or the like. The ground metal surfaces will change colour from straw yellow to brown – to a dark peacock blue. The dark peacock blue colour is about 260 to 270°C. At this colour, remove the heat.

4. Immediately weld the two components together with a suitable welding wire or electrode. Refer your local welding supplier.
5. Cool down slowly, away from draughts e.g. lay the shank on firebrick, place in lime or use heat blanket to slow down the cooling process.



1181



1182

ket to slow down the cooling process.

Dismantling Scari-Maxx Tine Assembly



Caution: *Extreme care must be taken when dismantling the tine. The amount of stored energy in the tine due to the compressed spring is potentially very dangerous.*

To dismantle the tine assembly, the following procedure **must** be adhered to:

1. Fit the washer, thrust bearing and self-aligning cone through the dismantling bolt. Refer to “Scari-Maxx Tine Assembly” in the “Spare Parts Manual” for an illustration.
2. Apply grease to all friction areas, i.e. bolt thread, self-aligning cone and thrust bearing. Molybdenum Disulphide extreme pressure grease such as MOLYBOND OPAL HI-LOAD (TPG) is recommended. This will dramatically improve the wear life of these components.
3. Fit the bolt through hole in top plate of the tine tower and screw it into the spring retainer by hand as far as possible.
4. Continue to screw bolt with a suitably large spanner until the bolt takes the spring load off the tine’s primary pivot, i.e. the spring should only need compressing a few millimetres.
5. Remove the primary pivot pin and lever the lower end of the spring rearwards with a crow bar, or the like.
6. Whilst keeping the pressure on the crow bar, rotate the pivot bracket down and outwards to allow the spring to freely extend. This may require another lever to do so.
7. Begin to unscrew the bolt, i.e. allow the spring to extend in length.
8. Nearing the end of the bolt engagement with the spring retainer, ensure that the

spring has reached its free uncompressed length before removing the bolt completely.

The assembly of the tine is done in a similar, but reverse manner.

Maintenance & Service

Cylinder Care (PTE Band)

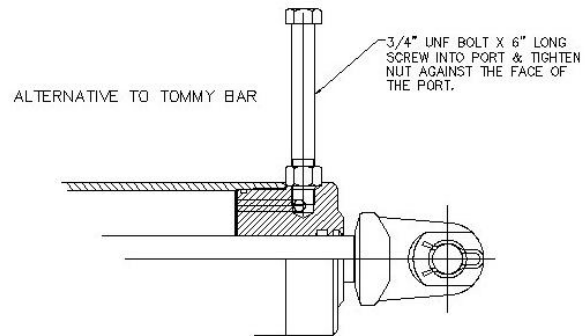
The resealing of cylinders should only be carried out by competent personnel in a well-equipped cylinder repair shop. If there is any doubt we recommend the purchase of new cylinders.

Removal Of The Rod Assembly From The Cylinder

- Plug the ports and clean the outside of the cylinder to help prevent contamination while working on the cylinder.
- Grip the body of the cylinder, if gripping the barrel in a pipe vice take care not to distort the barrel. (Do not grip the barrel in a conventional vice). Alternatively grip the cylinder by the base clevis.
- Screw the tommy bar into the gland port. An alternative to the tommy bar is to use a $\frac{3}{4}$ " UNF x 6" long bolt with a nut fitted to it.



- Ensure that the tommy bar is screwed hard against the spotface of the port before striking it otherwise the port may be damaged. Screw the bolt into the gland



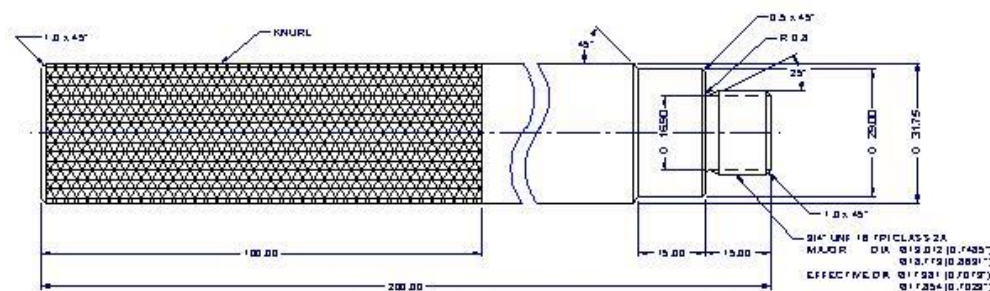
of the port before striking it otherwise the port may be damaged.

- Re-tighten the tommy bar or bolt into the port after each strike.
- Unscrew the gland by striking the tommy bar or bolt with a copper mallet.



Rod assembly, gland and piston from the barrel.

- Protect the rod and barrel assembly from dirt and contamination.



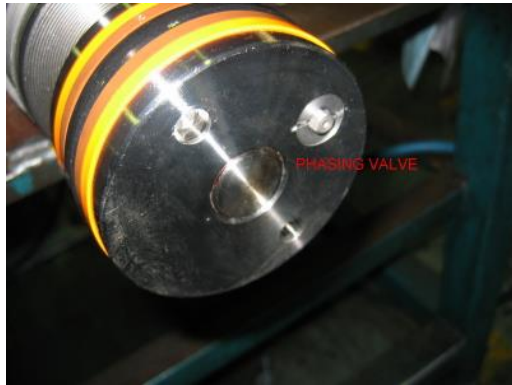
TOMMY BAR FOR TIGHTENING GLAND.

port and tighten the nut against the face

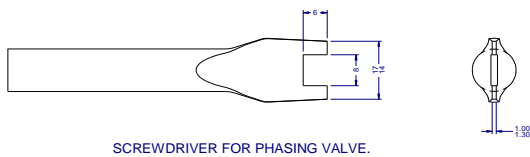
Maintenance & Service

Removal and Refitting Phasing Valve

- Once the rod / piston assembly has been removed from the cylinder the phasing valve can be removed. Work in clean conditions to prevent contamination of the cylinder parts.



- A wide bladed screwdriver with a slot in the end is required to remove the phasing valve.



Unscrew the phasing valve seat from the face of the piston using the special screwdriver.

- Remove the valve seat, valve pin and spring. The valve pin from the other side of the valve can also be removed.

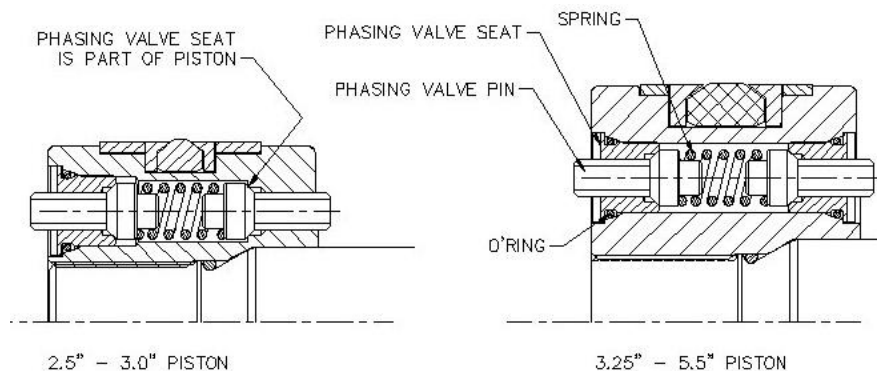


- Unscrew the phasing valve seat from the other side of the piston. Examine the valves for contamination and marks on the seats. The valve must be replaced if there are any marks across the valve seat.
- Ensure all parts are clean.



- Ensure the O-rings are fitted to the valve seats.
- Fit the new valve assembly in reverse order to the above.
- Note! Phasing valves are supplied in sets. The valves and seats should be kept together as they are lapped into each other.
- Peen the edge of the phasing valve seat counterbore to prevent the seats from unscrewing.
- Note the 2.5", 2.75" and 3" cylinders only have one screw in phasing valve seat, the other seat is part of the piston. If this seat is damaged, a new piston is required.





TYPICAL CROSS SECTION THROUGH PISTON

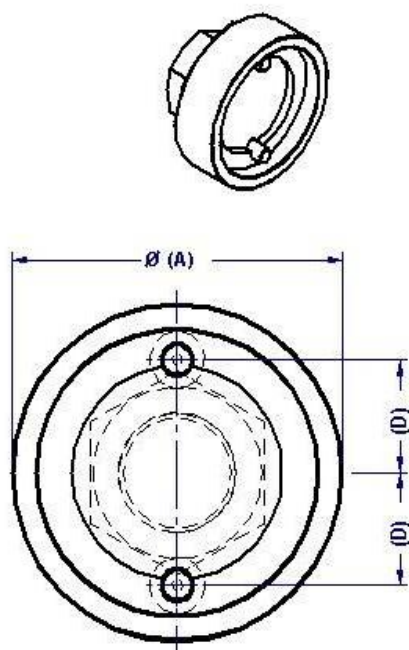
Refurbishing The Phasing Valves

- We recommend fitting new phasing valves, we do not recommend refurbishing them. The following procedure can be used as a stop gap measure.
- The valve pin is hardened and ground and the valve seat is soft. The valve can be re-seated by tapping the valve pin into the seat with a hammer. This will re-coin the seat. The valve must be hit square otherwise the seat will be made oval.
- After coining the valve and seat require lapping with fine lapping paste.

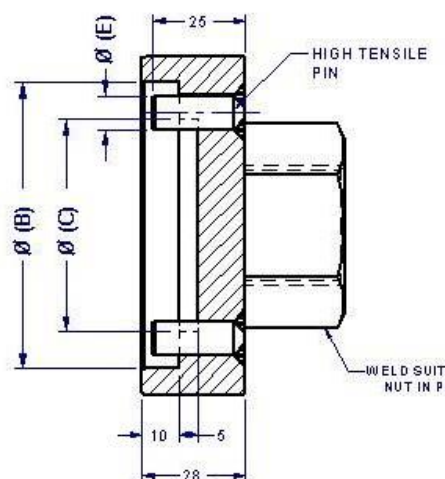
- Thoroughly clean and re-fit the valve as above.

Removal Of The Piston And Gland

- The piston needs to be removed to replace the rod seal and wiper.
- The piston seal and gland O'rings can be changed without removing the piston. Remove the seals and wear bands from the piston. Note the position of the seal for re-assembly.



Bore	Ø(A)	Ø(B)	Ø(C)	(D)	Ø(E)
2.50	78	63.0/63.5	46.0	23.0	9.0
2.75	84	69.0/69.5	48.0	23.0	9.0
3.00	90	75.5/76.0	57.0	30.0	9.0
3.25	95	81.5/82.0	62.0	30.0	9.0
3.50	105	88.5/89.0	61.0	30.0	9.0
3.75	110	94.5/95.0	67.0	35.0	10.0
4.00	115	101.0/101.5	72.0	35.0	10.0
4.25	123	107.0/107.5	78.0	35.0	10.0
4.50	130	113.5/114.0	78.0	40.0	13.0
4.75	135	119.0/119.5	78.0	40.0	13.0
5.00	140	125.5/126.0	88.0	40.0	13.0
5.50	152	137.5/138.0	88.0	40.0	13.0



Maintenance & Service

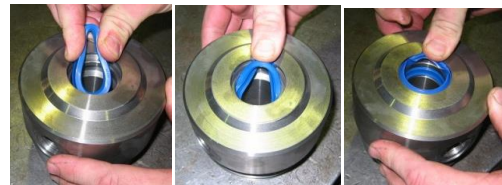
- Remove the valves from the piston as described previously.
- Grip the rod clevis to prevent rotation.
- Heat the piston to break the Loctite.
- Unscrew the piston using the special spanner below:

damaged, a new rod assembly or new cylinder will be required.

- Examine all other part for signs of wear/damage particularly the bore of the gland plus the sealing diameters and grooves of the gland and piston. The gland is not a serviceable item as the ports will not line up when the new gland is screwed into the barrel.

Re-Sealing And Re-Assembly Of The Cylinder.

- Thoroughly clean all components.
- Fit the rod seal and wiper to the bore of the gland. The rod seal must be fitted the right way round.



- Fit the O' rings to the outside of the gland.



- Lubricate the seals and slide the gland onto the rod.



- Remove the O' ring from the rod.
- Clean the Loctite from the rod thread.
- Remove the gland from the rod.
- Remove the rod seal and wiper from the bore of the gland. Make note of the position/orientation of the seals for reassembly.
- Remove the O' rings from the outside of the gland.

Inspection Of The Cylinder.

- Examine the barrel for scores or other damage. Any marks that can be felt using your finger nail will be detrimental to the seals. If the barrel is damaged a new cylinder will be required. The barrel is not a serviceable item.
- Examine the rod for damage. Any marks that can be felt using your finger nail will be detrimental to the seals. If the rod is

- Fit the phasing valve to the piston as described previously. Note if the spanner for tightening the piston does not have a recess to clear the phasing valve pin the valve should be fitted after tightening piston.

Maintenance & Service

- Fit the seal and wear bands to the piston.



- Fit the O'ring to the rod.
- Thoroughly degrease the rod and piston threads and apply Loctite 271 to the rod thread.



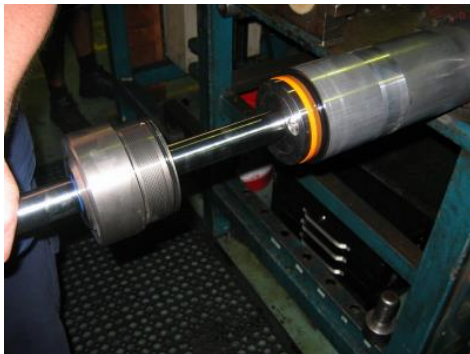
Maintenance & Service

Screw the piston onto the rod and tighten to the torque shown in the table.

Type	SLP					SHP				
Bore	4"	4¼"	4½"	4¾"	5"	4"	4½"	5"	5½"	
ft lb	400		550			950		1420		
Nm	542		746			1288		1925		



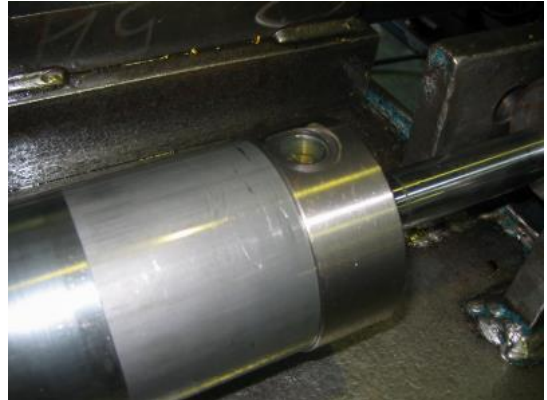
- Remove any excess Loctite.
- Lubricate the piston seal and bore of barrel. Slide the piston and rod into the barrel. Take care not to damage the piston seal on the barrel thread.



- Lubricate the gland O'ring and thread.
- Screw the gland into the barrel. Screw the tommy bar into the gland port. Tighten the gland by striking the tommy bar with a sharp blow from a copper mallet. Ensure that the tommy bar is screwed hard against the spotface before striking, otherwise the port may be damaged.



- Remove the tommy bar and check that the port is not damaged.



Testing The Cylinder.

- Cycle the cylinder and check that oil bypasses the piston at each end of the stroke.
- While still full of oil, plug the base port and pressurize the rod port to 3000psi. This will pressurize both sides of the piston.
- Check for external leaks.
- To check for internal leaks, pin the cylinder mid stroke while still full of oil.
- Leaving the rod port open, pressurize the base port to 1000psi and check for oil flowing out of the rod port. (If the cylinder is full of oil it is easy to detect very small leakage by watching the meniscus of the oil in the port.) A leak rate of up to 5 drops a minute is acceptable.
- Repeat the above but leave the base port open and pressurize the rod port to 1000psi and check for oil flowing out of the base port.
- If there is any bypass the piston seal/phasing valve seats will require rechecking.



Cylinder Care (Nordon Brand)

This manual gives advice and procedures for disassembling and servicing Hydraulic Cylinders manufactured by *Nordon Cylinders*. It covers both NI and NIP Phasing Cylinder ranges. The procedures should be carried out by competent personnel, with the correct tools.

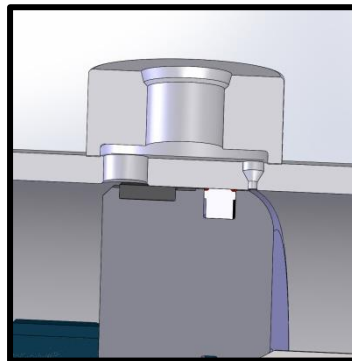
Disassembly



- Clean the cylinder body preventing contamination and drain oil from the cylinder prior to commencing any work.
- Hold the body of the cylinder securely in a pipe vice, taking care not to distort the barrel.
- The rod end clevis can be left in place for all general servicing.
- Using a C-spanner, unscrew the gland. It has a conventional thread, anti-clockwise to loosen.
- Remove the Rod assembly (Rod, Gland and Piston) from the barrel.
- Please note: The piston seal may be damaged when removing from cylinder due to no chamber hole thread side.



Phasing Servicing



The *Nordon Cylinders* Phasing cylinders employ a maintenance free bypass system. Re-phasing occurs when the piston reaches full travel at either end of the barrel. Oil is able

to bypass over the main seal via a small orifice port in the cylinder barrel. This small orifice is located under the external port.

Inspect the Piston seal for any signs of scoring or in-greased material which may indicate that foreign matter may be present in the hydraulic system.

Inspect, and blow compressed air through the re-phasing orifices and port holes to ensure there are no blockages.

Inspection of the Cylinder

- Inspect the general condition of the barrel's internal surface; ensure it is free from scoring and contamination. Any marks that can be felt using your finger nail will be detrimental to the seals. If the barrel is damaged, a new cylinder will be required. The barrel is not a serviceable item and replacement cost leads towards cylinder replacement.



- Examine the rod for damage. Any marks that can be felt using your finger nail will be detrimental to the seals. If the rod is damaged, a new rod, or rod assembly will be required.
- Examine all other parts for signs of wear/damage particularly through the bore of the gland and piston.

Piston and Gland Removal

Removal of the piston should only be required if the gland seals need replacing. If required, follow the steps below.

Maintenance & Service

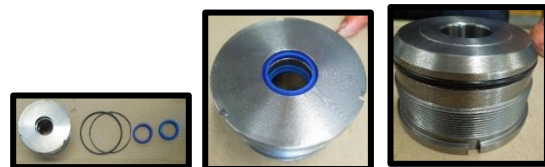
Nordon Cylinders use a selection of nuts for securing the piston, depending on the design and application of the cylinder. Grade 8 Nuts, cone lock nuts and Nyloc nuts are used across the range. NHP Cylinders over 4.0" diameter will have Threaded Pistons

Note

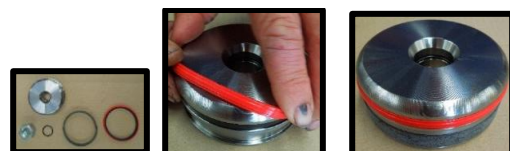
- Grade 8 nuts will have been staked in three places. *It is recommended that the staked regions be drilled out to enable disassembly without further damage to the shaft.*
- Threaded Pistons also have an M8 locking grub screw. *Loctite will have been used on the grub screw and thread. Use heat to break the Loctite. It is recommended that the thread at the bottom of the grub screw hole be drilled out prior to removing the piston, to prevent binding.*
- Be aware that removal of the cone lock nuts may render the shaft irreparable
- Grip the rod clevis to prevent rotation.
- Prepare the nut, and or piston for disassembly as noted above.
- Use the appropriate socket or C-Spanner to remove the nut or threaded piston.
- Clean and inspect the rod thread for damage.
- Remove the gland from the rod.
- Remove the rod seal and wiper from the gland using a scribe and insert into the centre of the seal to remove it so as not to damage the seal groove. Make note of the seal position and orientation for re-installation.
- When removing the piston seal with a suitable tool take care not to damage the piston.
- Clean and Inspect the Piston and gland for damage.

Re-Sealing and Re-Assembly of the Cylinder

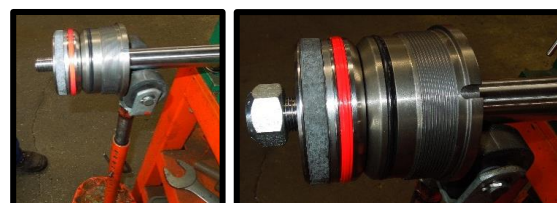
- **Use only parts from a new seal kit, re-using seals is not recommended.**
- Ensure all components are clean and free from damage. – Take care with seals as any nick or scratch can render seals useless.
- Fit the rod seal and wiper to the bore of the gland. Ensure the rod seal is correctly orientated. With the energiser, or Vee facing the rear.



- Fit the O-ring and back up to the OD of the gland. The O-ring is positioned closer to the inside (pressure side) of the cylinder, with the back up towards the outside of the cylinder.
- Lubricate the seals and slide the assembly onto the rod with a smear of hydraulic oil.
- Fit new O-ring inside the piston
- Fit the seals and wear bands to piston



- Thoroughly degrease the rod and piston threads and apply Loctite 680 to the thread.
- Screw the piston onto the rod and tighten to the specified torque.



Maintenance & Service

Piston Nut Tightening Torque									
Bore Dia	3.5"	3.75"	4.0"	4.0"	4.25"	4.5"	4.5"	4.75"	5.0"
Rod Dia	1.25	1.375"	1.375"	2.0"	1.375"	1.5"	2.0"	1.5"	55mm
Thread Size	7/8"	1"	1"	1.3/4"	1"	1.1/8"	1.3/4"	1.1/8"	1.7/8"
Torque (Nm)	275	570	570	1386	570	826	1386	826	1695

- Remove excess Loctite from shaft



Lubricate the piston seal and bore of the barrel with hydraulic oil.

- Slide the rod assembly into the barrel, taking care not to damage the seals on the barrel thread.
- Apply anti seize to the thread of the gland
- Lubricate the gland O-ring.
- Screw the gland into the barrel ensuring the shaft is protected as to not cause damage; a cardboard tube is recommended. Tighten with C-spanner and extension lever to required torque. See table below.

Gland Tightening Torque Based on 80kg weight applied to a bar length in mm	
Bore Dia	Lever Length in mm
3.5"	1106
3.75"	1270
4.0"	1445
4.25"	1630
4.5"	1830
4.75"	2040
5.0"	2258

- Tap cylinder shaft in using plastic mallet.
- Inspect and measure the cylinder to ensure it is correct and free from defects.

Installation

- Fill rod end of cylinders with oil – (manually with container and funnel) preferably this is done in the horizontal position of the machine, but can be done on the machine if rod port is in uppermost position.
- Install cylinders.
- Connect hoses
- Back bleed the system (This is done by bleeding the air out of the hoses working on the retract side) Crack the hose connection at the rod end of the second smallest cylinder.
- Operate control valve in the cylinder retract position until all the air is dispelled from connecting hose, then tighten fitting. (This oil bleeding is fairly slow as the oil has to go through the phasing hole which is usually 3mm dia allowing about 10 Litres per minute through, so allow enough time to displace the air out of the hose. This is why it is important to fill the cylinders with oil prior to bleeding.
- Repeat this step. If more than two cylinders are in the one phasing system working on the third smallest cylinder rod end to bleed from.
- Extend Bleeding (crack the base port of the largest cylinder operate the extend control valve carefully to bleed the air from the supply hose) This hose will bleed a lot faster than on the rod side as you have no restriction as the oil coming direct from the tractor or oil surface.



Maintenance & Service

Filter Service & Maintenance - WPF Series

1. Stop system power and vent captive pressure.
2. Drain filter assembly.
3. Remove bowl and element assembly.
4. Push down to squeeze tangs and lift element.
5. Twist to remove core.
6. Retain reusable core.
7. Discard used element.
8. Insert reusable core into new element until it snaps.
9. Push element assembly into bowl, snap tangs.
10. Inspect O-ring and anti-extrusion ring.
11. Install bowl with new element.
12. Torque bowl, vent and drain plugs.
13. Power up and inspect.



Maintenance & Service

Maintenance Notes

Owner Acknowledgement

Gason Recommend all operators read this manual prior to operating the machine. It is recommended that the owner, when they are not the operator, ensure all operators of the machine fully understand its contents and ask that each operator sign below as an acknowledgement of having done so.

Owners name:
(please print)

Owners signature:

Date:/...../.....

Operator Acknowledgement of manual contents

(When the owner is not the operator)

Operators Name	Operators Signature	Date
		.../.../.....
		.../.../.....
		.../.../.....
		.../.../.....
		.../.../.....
		.../.../.....
		.../.../.....
		.../.../.....
		.../.../.....

Trouble Shooting

Trouble Shooting - General

Symptom	Cause	Solution
Tines not penetrating ground, laying back or jumping excessively.	Tine working forces in excess of tine breakout.	<ul style="list-style-type: none"> Check tine circuit pressure. Increase, if necessary, to maximum as specified in this manual. Reduce working speed. Reduce working depth, if possible. If ground is dry, wait for more moisture. Check for oil leaks or air in hydraulic tine circuit. Bleed or repair if necessary. Check frames level both fore & aft and across width.
	Groundtools worn or not suitable for application.	<ul style="list-style-type: none"> Replace if worn or replace to a more suitable (narrower) groundtool.
	Accumulator pre charge too low.	<ul style="list-style-type: none"> Check accumulator is charged to correct pressure & holding. Contact your dealer for more detail.
Paired Rows	<p>Implement not tracking straight when working.</p> <p>Tines in the incorrect positions.</p>	<ul style="list-style-type: none"> Check that the frames are level both fore and aft, and across the width. Refer to "Adjustments" in the "Field Operation" section. Check that all tyre pressures are consistent and within the limits specified in "Tyre Care" in the "General Maintenance" section. Check the tine layout to verify tines are located correctly. Check that the depth control hydraulic circuit is free of air or foreign matter i.e. rephase the circuit as outlined in "Priming the Depth Control Circuit" in the "Hydraulic System" section. Check that the wheel arms are square/parallel to the frame. The implement wheels should be in-line with the direction of travel and must not be cambered or toed in or out. <p>*REFER END OF TROUBLESHOOTING SECTION FOR GREATER DETAIL ON THIS ISSUE.</p>

Trouble Shooting

Symptom	Cause	Solution
Frame sagging and not raising/lowering evenly.	Hydraulic depth control not functioning properly.	<ul style="list-style-type: none"> Check the tractor control valve and its related hydraulic system. Check that all hoses and valves are plumbed correctly. Refer parts manual for spec plumbing diagrams. Check that the depth control hydraulic circuit is free of air or foreign matter i.e. rephase the circuit as outlined in "Priming the Depth Control Circuit" in the "Hydraulic System" section. Check that the depth control hydraulic circuit is free from Contamination. Check that sufficient oil supply is being delivered from tractor. A minimum tractor hydraulic flow rate of 45 l/min (12 US gpm) is required. Check for internal leaks, i.e. extend cylinders to full transport, disconnect hydraulics from tractor and leave overnight. If any cylinder relaxes significantly, replace seals. For cylinder seal and valve replacement, refer Parts manual for part numbers and "Cylinder Care" section of this manual for fitment.

Symptom	Cause	Solution
---------	-------	----------

Trouble Shooting

Seed placement varies.	Uneven digging depth or lack of penetration.	<ul style="list-style-type: none"> ▪ Check that the frames are level both fore and aft, and across the width. Refer to “Frame Adjustments” in the “Field Operation” section. ▪ Check that all tyre pressures are consistent and within the limits specified in “Tyre Care” in the “Maintenance and Service” section. ▪ Check that all tine assembly shank heights have been set correctly. ▪ Check that the depth control hydraulic circuit is free of air or foreign matter. Rephase the circuit as outlined in “Priming the Depth Control Circuit” in the “Hydraulic System” section. ▪ Check that all hydraulic cylinder mechanical depth stops are set at the correct setting. ▪ If the ground is hard, narrower ground tools may need to be fitted. ▪ Check for worn ground tools and replace as required.
------------------------	--	--

Tracking and Row Variations

Symptom

Most likely cause

Paired Rows (consistent)

(Crabbing)

Paired rows (inconsistent)

(Tines/Row Units in wrong position)

Uneven skip row

(GPS offset) (Crabbing)

Narrow skip row.

(GPS Implement setting wrong)

Crabbing (Implement not tracking straight)

Crabbing is the term used when the implement wants to pull sideways to the desired line of travel. Even when all settings are correct and working conditions are ideal, the 100 series machine may track to plus or minus 40mm of the tractor. However, in certain field conditions or machine setups greater degrees of crabbing may occur. Paired rows are the classic sign of crabbing up to 25mm pairing of each row is common as machine straightens to tractor. This may be greater on hill sides.

Trouble Shooting

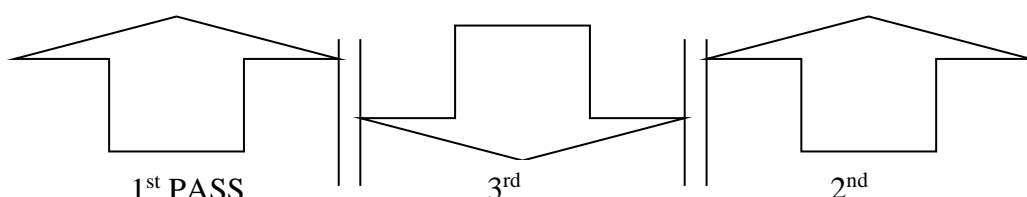
Cause	Possible Solutions
Work on the sides of hills	Work up or downhill if possible.
Inconsistent ground soil conditions	Change direction.
Machine pulling into old slots from previous year's crops.	When turning, ensure machine is straight and in position before engaging into the ground. Work across the slots ideally 90deg will give a more consistent result.
Inconsistent wear between points	Check points for consistent wear, change to new points.
Inconsistent shank setting	Ensure shanks are all set to the same depth across machine.
Frame uneven	Check that the frames are level both fore and aft, and across the width. Refer to "Adjustments" in the "Field Operation" section.
Inconsistent tyre pressures	Check all tyre pressures are consistent and within the limits specified in "Tyre Care" in the "General Maintenance" section.
Depth control out of phase	Check that the depth control cylinders are staying in phase. i.e. rephase the circuit as outlined in "Priming the Depth Control Circuit" in the "Hydraulic System" section. Ensure all cylinder rods reach full extension or retraction at the same time.
Wheels seized or jamming	Check all castor wheels have free movement and alignment.
Tine/Row Unit positioned wrong	Check the tine layout to verify tines are located correctly. Refer machine layout drawing.
Points	Check for point wear consistency & replace if necessary. Alternative point designs may provide improved tracking. E.g. less tendency to skate.
Rear Wheels out of alignment	If all of the above is unsuccessful, check rear wheel alignment with a stringline against edge of tyre, running to the front of machine. Ideally wheels should be set parallel to travel direction or with a slight tow-in. Late models have adjustment capability. Refer Gason Service for more detail.

Trouble Shooting

Setting GPS Implement Width and Offset

When using GPS steering it is important to have Implement Width and Implement to Tractor Offset correctly set to achieve consistent pass to pass row spacings. Offset may seem simple but can become confusing as the effect of multiple passes doubles errors. By having the correct settings in the Auto Steer System consistent pass to pass will be achieved assuming your differential GPS is accurate and the 100 series machine is setup to minimise crabbing (refer pervious section).

In-field checks are best performed by a 3 pass check. Work up 2 sections at least 100m long (e.g. allow sufficient time for the machine to align and settle after the turn) in the same direction with a skip between. Come back between the skip from the opposite direction and stopping when you are between the first 2 runs.



Check the distance between the last tine of each pass on each side. They should equal and at correct spacing.

If two sides are equal, but they are not the right row width. In this case you have not set the "Implement Width" to the correct size. Re check the width of your implement.

If the two sides are not equal but they add up to equal twice the row spacing. In this case you need to adjust the "Implement to Tractor Offset" to achieve consistent spacing.

Implement Width

When using GPS it will be necessary to set implement width to achieve correct pass to pass spacing. Gason 100 Series implements are built to metric measurements refer your machine layout to confirm specified width. A double check with a measuring tape would be desirable.

Measure your implement width between the furthest left hand and the furthest right hand tine and add 1 row width. i.e. For a machine with a row spacing of 300mm, add 300mm to the total width.

Example: 12m machine with 40 rows @ 300mm spacing.

Measured 11700mm (outer left tine to outer right tine) + 300mm (spacing) = 12000 (12m)

Or

40 tines x 300mm = 12000mm (12m)

Trouble Shooting

Implement to Tractor Offset

Implement pulling to one side, Lateral offset from centre of Tractor to centre of Implement Width.

NOTE: Some implements may pull to one side, which can be determined by the 3 pass check using the GPS Steering system. Confirm over varying conditions and depths to obtain correct offset.

Think of the offset as offsetting the tractor to right of the implement which will move the implement to the left. Use only $\frac{1}{2}$ the width variations when adjusting offset to account for the doubling up effect of the passes in opposite direction.



Refer the GPS Control Manual for more information on your specific monitor's settings.

Disclaimer

Trailed wheeled, soil engaging equipment by nature cannot be assured of tracking straight as the machine will always take the least line of resistance. Some factors which can influence the machine from tracking straight include: working on sides of hills, uneven & non homogeneous ground surfaces (due to topography & history of tillage/other practices), unsymmetrical forces from ground engaging attachments, machine design & combinations of trailing equipment. Whilst every effort has been made to ensure our equipment tracks straight, additional assistance may be required in the form of GPS-controlled wheel or hitch steering to gain more stable tracking.