

MANDAKO



**CHISEL FLEX
10 SERIES**

OPERATORS MANUAL

LIMITED WARRANTY:

Mandako Agri Marketing (2010) Ltd. ("MANDAKO") warrants for a period of one (1) year from the date of delivery to the purchaser that any new machinery purchased from MANDAKO (the "Product") will be free of manufacturing and materials defects (the "Covered Defects"). Before using the Product, the purchaser shall determine the suitability of the Product for its intended use. This Limited Warranty is non-transferable and valid to the purchaser of the Product only.

Except for the Covered Defects, this Limited Warranty shall not apply to any other defects or problems in the Product, including without limitation: (i) alterations, changes, replacements or repairs to the Product made by anyone other than MANDAKO or MANDAKO authorized Dealers; (ii) accessories, attachments, tools or parts sold or operated with the Product, if they have not been manufactured by MANDAKO; (iii) application or installation of accessories, attachments, tools or parts not completed in accordance with MANDAKO's operator's manual, specifications or printed instructions; (iv) defects or problems caused by misuse, abuse, neglect, improper testing, improper storage, improper handling or abnormal conditions; and (v) defects caused by wear and tear from ordinary use of the Product.

During the one (1) year warranty period, provided that written notice of the Covered Defects is given to MANDAKO within seven (7) days from the date that the defect was, or ought to have been, discovered, the liability of MANDAKO under this Limited Warranty shall be limited to the repair or replacement of any defective Product. For clarity, the purchaser shall be responsible for all expenses incurred as a result of any repairs, labour, parts, transportation or any other work, unless MANDAKO has otherwise authorized reimbursement of such expenses. In order to obtain repair or replacement, the written notice provided by the purchaser must contain full details of the Covered Defects and submitted online at www.mandako.com/warranty-claim or be sent to:

Mandako
Box 379, 12159B, Hwy 306
Plum Coulee, Manitoba, R0G 1R0

MANDAKO reserves the right to inspect the defective Product prior to repair or replacement. If MANDAKO determines that a defect in the Product is not a Covered Defect, it shall not have any obligation to repair or replace the Product.

No one is authorized to make oral warranties or representations on behalf of MANDAKO regarding the Product. The Product is subject to design changes and MANDAKO shall not be required to retro-fit or exchange items on previously sold Product, except at its own option.

THIS LIMITED WARRANTY IS DEEMED ACCEPTED BY YOU UPON YOUR PURCHASE OF THE PRODUCT. TO THE EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY IS EXCLUSIVE, AND IN LIEU OF ANY AND ALL OTHER WARRANTIES, CONDITIONS OR REPRESENTATIONS RESPECTING THE PRODUCT, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT, SUITABILITY, OR ANY OTHER WARRANTIES, REPRESENTATIONS OR CONDITIONS THAT MAY ARISE FROM USAGE OF TRADE OR COURSE OF DEALING.

MANDAKO'S OBLIGATION SHALL NOT EXTEND BEYOND THE OBLIGATIONS EXPRESSLY UNDERTAKEN ABOVE AND IN NO EVENT SHALL MANDAKO OR ITS SUPPLIERS, AGENTS, OFFICERS, DIRECTORS, CONTRACTORS AND EMPLOYEES BE LIABLE TO THE PURCHASER OR ANY THIRD PARTY FOR ANY INDIRECT, PUNITIVE, EXEMPLARY, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES OR LOSSES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS, LOSS OF PROFITS OR SALES, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, LOSS OF GOODWILL, WORK STOPPAGE, COMPUTER FAILURE OR MALFUNCTION OR ANY OTHER PECUNIARY LOSS OR COMMERCIAL DAMAGE OR LOSS) ARISING FROM ANY CLAIM WHATSOEVER, INCLUDING ANY TORT, EQUITY, NEGLIGENCE, GROSS NEGLIGENCE, WILFUL MISCONDUCT OR STRICT LIABILITY CLAIM, EVEN IF MANDAKO HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR LOSSES OR THEY ARE FORESEEABLE. THE PURCHASER WAIVES ANY CLAIM AGAINST MANDAKO FOR PUNITIVE OR EXEMPLARY DAMAGES.

**WARRANTY VOID IF NOT REGISTERED
PLEASE REGISTER AT www.mandako.com/registration**

TABLE OF CONTENTS

Section 1: INTRODUCTION	1
1.1 Serial Number Location	1
Section 2: SAFETY	3
2.1 Safety Orientation	4
2.2 General Safety	4
2.3 Equipment Safety Guidelines	5
2.4 Safety Decals	6
2.5.2 Safety Decal Installation	6
2.5 Safety Training	6
2.6 Preparation	7
2.7 Operating Safety	8
2.8 Maintenance Safety	8
2.9 Tire Safety	9
2.10 Storage Safety	9
2.11 Hydraulic Safety	9
2.12 Transport Safety	10
2.13 Safety Decals	11
2.14 Safety Decal Location	12
Section 3: OPERATION	15
3.1 Machine Components	16
3.2 Machine Break-In	19
3.3 Pre-Operation Checklist	19
3.4 Equipment Matching	20
3.5 Controls	21
3.6 Attaching to Tractor	22
3.7 Field Operation	25
3.8 Transport to Field Conversion	33
3.9 Transporting	36
3.10 Storage	38
3:10:1 Place in Storage	38
3:10:2 Remove from Storage	40
Section 4: SERVICE AND MAINTENANCE	41
4.1 Fluids and Lubricants	41
4:1:1 Grease	41
4:1:2 Storing Lubricants	41
4:1:3 Greasing	41
4.2 Servicing Intervals	42
4:2:1 Every 40 Hours	42
4:2:2 Annually	43
4.3 Service Record	44
Section 5: TROUBLE SHOOTING	45
Section 6: SIGN-OFF FORM	47
Section 7: REFERENCE	49
7.1 Mechanical Specifications	49
7.2 Bolt Torque	50
7.3 Hydraulic Fitting Torque	51
Section 8: INDEX	53

Section 1: INTRODUCTION

Congratulations on your choice of a Mandako Chisel Flex Tillage Tool to compliment your farming operation. This equipment has been designed and manufactured to meet the needs of a discerning agricultural industry.

Safe, efficient and trouble free operation of your Mandako Chisel Flex requires that you and anyone else who will be using or maintaining the Chisel Flex, read and understand the Safety, Operation, Maintenance and Trouble Shooting information contained within this Operator's Manual.

This manual covers the Mandako Chisel Flex Tillage Tool. Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your Mandako dealer if you need assistance, information or additional copies of the manual.

NOTE:

The directions left, right, front and rear, as mentioned throughout this manual, are as seen from the tractor driver's seat and facing in the direction of travel.

1.1 SERIAL NUMBER LOCATION



Fig. 1 Serial Number Location

Always give your dealer the serial number of your Chisel Flex when ordering parts or requesting service or other information.

The serial number plate is located where indicated above. Please mark the number in the space provided for easy reference.

Model Number _____

Serial Number _____

Page intentionally left blank

Section 2: SAFETY

Why is SAFETY important to you?

3 Big Reasons:

- ▲ Accidents Disable and Kill
- ▲ Accidents Cost
- ▲ Accidents Can Be Avoided

This Safety Alert symbol means:
ATTENTION!
BECOME ALERT!
YOUR SAFETY IS INVOLVED!



The Safety Alert symbol identifies important safety messages on the Chisel Flex Tillage Tool and in this manual.

When you see this symbol, be alert to the possibility of personal injury or death.

Follow the instructions in the safety message.

SIGNAL WORDS:

Note the use of the signal words **DANGER**, **WARNING**, **CAUTION** and **ATTENTION** along with the accompanying safety messages. The appropriate signal word for each message has been selected using the following guidelines:

DANGER - Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components which, for functional purposes, cannot be guarded.

WARNING - Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. It identifies hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION - Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

ATTENTION - Indicates practices or situations which may result in the malfunction of, or damage to, the equipment.

2.1 SAFETY ORIENTATION

You are responsible for the SAFE operation and maintenance of your Mandako Chisel Flex Tillage Tool. Ensure that you and anyone else who will use, maintain or work around the Chisel Flex be familiar with the Safety, Operating and Maintenance procedures in this manual.

This manual will take you step-by-step through your working day and alerts you to all good safety practices that should be used while using the Chisel Flex.

Remember, You are the key to safety. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety program. Be certain that everyone using this equipment follows all safety precautions, as well as the detailed operating and maintenance procedures.

Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices:

- Chisel Flex owners must give operating instructions to operators or employees before allowing them to operate the machine, and review annually thereafter.
- The most important safety device on this equipment is a SAFE operator. It is the operator's responsibility to read and understand ALL Safety and Operating instructions in the manual and to follow these. Most accidents can be avoided.
- A person who has not read and understood all using and safety instructions is not qualified to use the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.
- Think SAFETY! Work SAFELY!

2.2 GENERAL SAFETY

- Read and understand the Operator's Manual and all safety signs before using, maintaining, adjusting or cleaning the Chisel Flex.



- Have a first-aid kit available for use should the need arise and know how to use it.



- Have a fire extinguisher available for use should the need arise and know how to use it.

- Do not allow riders.

- Wear appropriate protective gear. This list includes but is not limited to:

- Hard hat
- Protective shoes with slip resistant soles
- Protective glasses, goggles or face shield
- Heavy gloves
- Hearing Protection



- Install and secure all guards before starting.

- Wear suitable ear protection for prolonged exposure to excessive noise.





- Lower machine to ground, place all controls in neutral, set park brake, stop engine, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.

- Clear the area of people, especially small children, before operating the unit.

- Review safety related items annually with all personnel who will operating or maintaining the Chisel Flex.

2.3 EQUIPMENT SAFETY GUIDELINES

- Safety of the operator and bystanders is one of the main concerns in the design and development of equipment. However, every year many accidents occur, which could have been avoided, by a few seconds of thought and a more careful approach to handling equipment.
- You, the operator, can avoid many accidents by following the precautions in this section. Insist those working with you, or for you, follow them also.
- In order to provide a better view, certain photographs or illustrations in this manual may show an assembly with a safety shield removed. Equipment should never be used in this condition. Keep all shields in place. If shield removal becomes necessary for repairs, replace the shield prior to use. 
- Replace any safety or instruction sign that is missing or not readable. The location of these safety signs are indicated in this manual.
- Never use alcoholic beverages or drugs which can hinder alertness or coordination while using this equipment. Consult your doctor about using this machine while taking prescription medications.
- Under no circumstances should young children be allowed to work with this equipment.
- The operator should be a responsible, properly trained and physically able person. They should be familiar with machinery and trained in this equipment's operations.

If the elderly are assisting with work, their physical limitations need to be recognized and accommodated.
- Use a tractor equipped with a Roll Over Protective Structure (ROPS) and a seat belt. 
- Never exceed the limits of the Chisel Flex. If its ability to do a job, or to do so safely, is in question - DON'T TRY IT.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and life of the equipment, and result in serious injury or death.

2.4 SAFETY DECALS

- Keep safety decals clean and legible at all times.
- Replace decals that are missing or have become illegible.
- Replaced parts that displayed a safety decal should also display the current sign.
- Safety decals displayed in Section 2.13 each have a part number in the lower right hand corner. Use this part number when ordering replacement parts.
- Safety decals are available from your authorized Distributor or Dealer Parts Department or the factory.

2:4:1 How to Install Safety Decals:

1. Be sure that the installation area is clean and dry.
2. Be sure temperature is above 50°F (10°C).
3. Determine exact position before you remove the paper backing. See Section 2.13
4. Remove the smallest portion of the split backing.
5. Align the decal over the specified area and carefully press the small portion with the exposed adhesive in place.
6. Slowly peel back the remaining paper and carefully smooth the rest of the decal in place.
7. Small air pockets can be pierced with a pin and smoothed out using the piece of the paper backing.

2.5 SAFETY TRAINING

- Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by a single careless act of an operator or bystander.



- Accident prevention and identifying hazards are dependent upon the proper training of personnel. Their awareness, concern and common sense are crucial when involved with the operation, transport, maintenance and storage of the equipment.
- Working with unfamiliar equipment can lead to careless injuries. Read this manual to become acquainted with the machine.
- Whether the machine owner is the operator, loans or rents it out, it is their responsibility to make certain that the borrower reads and understands the operator's manuals.
- Know your controls, how to stop the tow unit, the engine and machine quickly in an emergency.
- Train all new personnel and review instructions frequently with existing workers. Be certain only a properly trained and physically able will use the machinery.

A person who has not read and understood all using and safety instructions is not qualified to use the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.

If the elderly are assisting with the work, their physical limitations need to be recognized and accommodated.

2.6 PREPARATION

- Never use the Chisel Flex until you have read, this Manual and power unit Operator's Manual. Take note of each Safety Message found on the safety decals on the Chisel Flex and power unit.



- Personal protective equipment including a hard hat, safety glasses, safety shoes, gloves are recommended during assembly or installation, operation, adjustment, maintaining or repairing, cleaning or moving the unit.



Do not allow long hair, loose fitting clothing or jewelry to be around equipment.

- PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS!**

- Power equipment with or without equipment attached can often be noisy enough to cause permanent, partial hearing loss. We recommend that you wear hearing protection on a full-time basis if the noise in the Operator's position exceeds 80db.



Noise over 85db on a long-term basis can cause severe hearing loss. Noise over 90db adjacent to the Operator over a long-term basis may cause permanent, total hearing loss.

NOTE:




Hearing loss from loud noise (from tractors, chain saws, radios, and other such sources close to the ear) is cumulative over a lifetime without hope of natural recovery.

- When towing with a tractor, use only with a tractor equipped with an approved Roll-Over-Protective-Structure (ROPS). Always wear a seat belt. Serious injury or even death could result from falling off the tractor. If a roll-over occurs, the operator could be pinned under the ROPS or inside the tractor.









- Clear working area of stones, branches or hidden obstacles that might be hooked or snagged, causing damage or injury.
- Be sure the Machine is properly attached, adjusted and in good operating condition.
- Ensure that all safety shielding and safety decals are properly installed and in good condition.

2.7 OPERATING SAFETY

- Read and understand the Operator's Manual and all safety signs before using. Review safety instructions annually. 
- Lower machine to ground, place all controls in neutral, stop engine, set park brake, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
- Install and secure all guards and shields before starting or operating.
- Keep hands, feet, hair and clothing away from all moving and/or rotating parts. 
- Do not allow riders on the Chisel Flex or tractor during operation or transporting.
- Clear the area of all bystanders, especially children, before starting.
- Stay away from side wings when folding or extending frame. Keep others away.
- Clean reflectors, SMV (Slow Moving Vehicle) emblem and lights before transporting. Be sure you are in compliance with all federal and local regulations regarding transport of equipment on public roads and highways. 
- Do not exceed a safe travel speed.
- Use hazard flasher on tractor when transporting.
- Before applying pressure to the hydraulic system, make sure all components are tight and that the steel lines, hoses and couplings are in good condition.
- Fold wings and install transport lock brackets with its retainer over wheel lift cylinder before transporting.
- Stay away from overhead power lines when folding or extending wings. Electrocutation can occur without direct contact.
- Attach securely to towing unit using a hardened pin with a retainer and a safety chain.
- Do not drink and drive.

2.8 MAINTENANCE SAFETY

- Good maintenance is your responsibility. Poor maintenance is an invitation to trouble.
- Follow good shop practices. 
 - Keep service area clean and dry.
 - Be sure electrical outlets and tools are properly grounded.
 - Use adequate light for the job at hand.
- Lower machine to ground, place all controls in neutral, stop engine, set the park brake, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
- Place stand or blocks under the frame before working beneath the machine or when changing tires.
- Always use personal protective devices such as safety glasses, gloves and hearing protection, when performing any service or maintenance work. 
- Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts must be used to restore your equipment to original specifications.
- A fire extinguisher and first aid kit should be kept readily accessible while performing maintenance on this equipment. 
- Relieve pressure on hydraulic system before servicing or disconnecting from tractor. 
- Before applying pressure to a hydraulic system, make sure all components are tight and that steel lines, hoses and couplings are in good condition. 
- When completing a maintenance or service function, make sure all safety shields and devices are installed before placing unit in service. 

2.9 TIRE SAFETY

- Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury or death.
- Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.
- Have a qualified tire dealer or repair service perform required tire maintenance.
- When replacing worn tires, make sure they meet the original tire specifications. Never under size.



2.10 STORAGE SAFETY



- Store the unit in an area away from human activity.
- Do not allow children to play on or around the stored machine.
- Store the unit in a dry, level area. Support the frame with planks if required.
- Lower wings and frame to the ground for storage.

2.11 HYDRAULIC SAFETY

- Always place all tractor hydraulic controls in neutral before dismounting.
- Make sure that all components in the hydraulic system are kept in good condition and are clean.
- Replace any worn, cut, abraded, flattened or crimped hoses and steel lines.
- Relieve pressure from hydraulic circuit before servicing, connecting or disconnecting from tractor.
- Do not attempt any makeshift repairs to the hydraulic lines, fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high-pressure. Such repairs will fail suddenly and create a hazardous and unsafe condition.
- Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a back stop instead of hands to isolate and identify a leak.
- If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.
- Before applying pressure to the system, make sure all components are tight and that lines, hoses and couplings are in good condition.



2.12 TRANSPORT SAFETY

- Read and understand ALL the information in the Operator's Manual regarding procedures and SAFETY when operating the Chisel Flex in the field and/or on the road. 
- Always use hazard warning flashers on tractor when transporting unless prohibited by law.
- Do not drink and drive.
- Maintain wheel bolts to specified torque.
- Check with local authorities regarding Chisel Flex transport on public roads. Obey all applicable laws and regulations.
- Always travel at a safe speed. Use caution when making corners or meeting traffic.
- Clean reflectors, SMV (Slow Moving Vehicle) emblem and lights before transporting. Be sure you are in compliance with all federal and local regulations regarding transport of equipment on public roads and highways. 
- Install additional lights on the rear of the machine to safeguard against rear end collisions. Daybreak and dusk are particularly dangerous and pilot vehicles are recommended.
- Install wheel cylinder lock brackets and close valves in hydraulic lines before transporting or working under frame.
- Be sure that the machine is securely hitched to the towing vehicle and a retainer is used through the drawbar pin. Always attach a safety chain between the frame and the towing machine.
- Stay away from overhead power lines when raising wings. Electrocutation can occur without direct contact.
- Raise wings and install transport lock brackets over wheel cylinders before transporting.
- Keep to the right and yield the right-of-way to allow faster traffic to pass. Drive on the shoulder of the road, if permitted by law.
- Do not exceed 32 km/h (20 mph) on highway transport. Reduce speed on rough roads and surfaces.

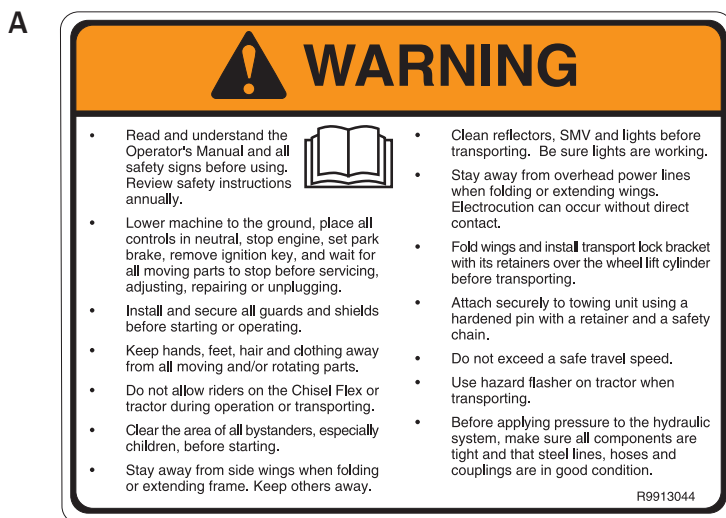
2.13 SAFETY DECALS

The various safety decals, and their locations on the equipment are shown in the illustrations to follow.

Good safety practices require familiarizing yourself with the decals. Read the warning messages, and note the area, or particular function related to that area, that the decal highlights.

If safety decals have been damaged, removed, become illegible, or replacement parts do not have the decal; new ones must be applied. Safety decals are available from your authorized dealer.

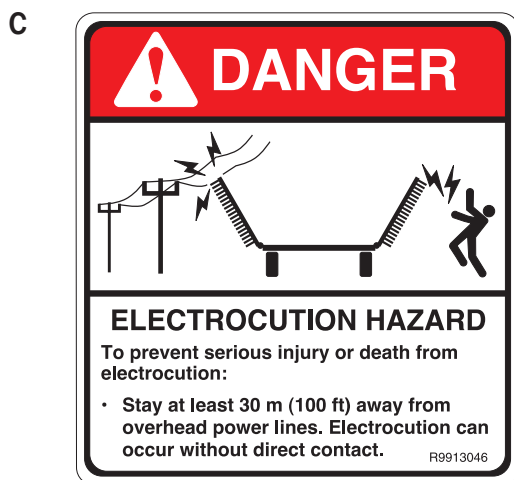
Mandako reserves the right to update safety decals without notice. Safety decals may not be to scale or exactly as shown.



Part No. R9913044



Part No. R9913045



Part No. R9913046



Part No. R9913113

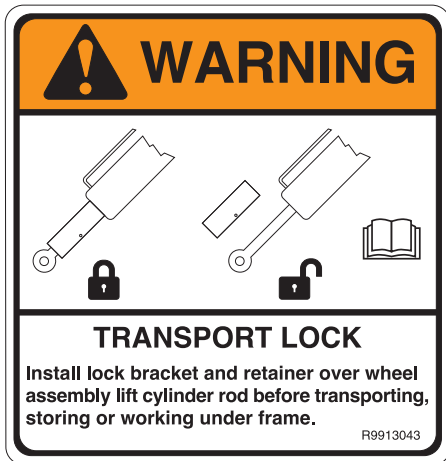
Remember - Safety Decals are for your protection!

If they have been damaged, removed, become illegible, or replacement parts do not have the decal; new ones must be applied. Safety decals are available from your authorized dealer.

2.14 SAFETY DECAL LOCATIONS



E



Part No. R9913043

Remember - Safety Decals are for your protection!

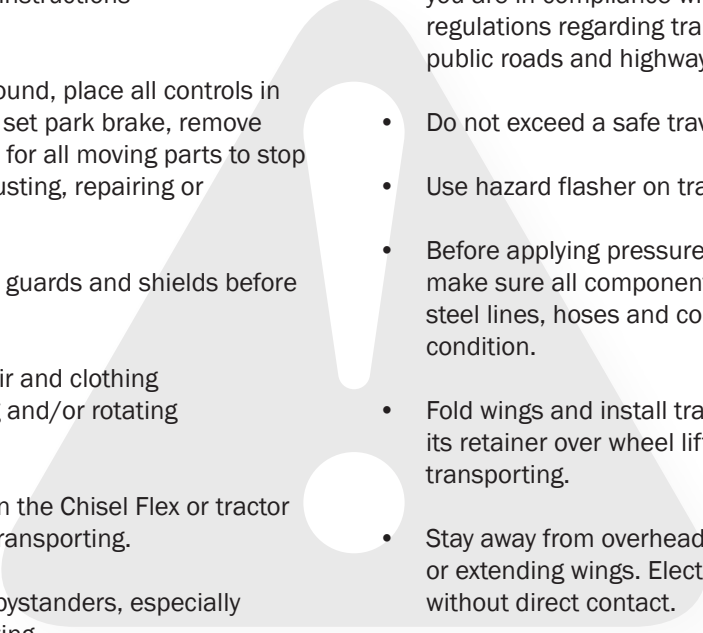
If they have been damaged, removed, become illegible, or replacement parts do not have the decal; new ones must be applied. Safety decals are available from your authorized dealer.





Page intentionally left blank

Section 3: OPERATION

-
- 
- Read and understand the Operator's Manual and all safety signs before using. Review safety instructions annually.
 - Lower machine to ground, place all controls in neutral, stop engine, set park brake, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
 - Install and secure all guards and shields before starting or operating.
 - Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
 - Do not allow riders on the Chisel Flex or tractor during operation or transporting.
 - Clear the area of all bystanders, especially children, before starting.
 - Stay away from side wings when folding or extending frame. Keep others away.
 - Clean reflectors, SMV (Slow Moving Vehicle) emblem and lights before transporting. Be sure you are in compliance with all federal and local regulations regarding transport of equipment on public roads and highways.
 - Do not exceed a safe travel speed.
 - Use hazard flasher on tractor when transporting.
 - Before applying pressure to the hydraulic system, make sure all components are tight and that the steel lines, hoses and couplings are in good condition.
 - Fold wings and install transport lock brackets with its retainer over wheel lift cylinder before transporting.
 - Stay away from overhead power lines when folding or extending wings. Electrocution can occur without direct contact.
 - Attach securely to towing unit using a hardened pin with a retainer and a safety chain.
 - Do not drink and drive.
-

It is the responsibility of the owner and operator to read this manual. They must train all others before starting to work with the machine. Follow all safety instructions exactly. Safety is everyone's business. By following recommended procedures, a safe working environment is provided for the operator, bystanders and the area around the work site.

Many features incorporated into this machine are the result of suggestions made by customers like you.

This manual will describe how to set the Chisel Flex to provide maximum field efficiency. By following the operating instructions in conjunction with a good maintenance program, your Chisel Flex will provide many years of trouble-free service.

3.1 MACHINE COMPONENTS

The Mandako Chisel Flex Vertical Tillage Tool consists of a main frame with wings on each side that can fold up for transport or storage. The center frame and each wing is designed with spring-loaded shanks with shovels to engage the soil. It is the responsibility of the operator to monitor the job being done and adjust the depth of the shovels to provide the desired performance.

Each wing folds up for transport. Install cylinder stops around center frame section wheel lift cylinders before transporting. Use the center wheel lift cylinders to set and control the depth of the shovels penetrating the soil.

Optional harrows are available to mount on the back of each frame.

A 'single point depth' control is mounted on the front of the frame and plumbed into the wheel lift circuit so the shovels return to the same pre-set depth when lowered for working.

The main components of the unit are as follows:

- a. Center Frame
- b. Left Wing
- c. Right Wing
- d. Wheels
- e. Hydraulic Line Storage Holder
- f. Shovels
- g. Shanks
- h. Castor Wheels
- j. Tine Harrows
- k. Single Point Depth Control
- l. Hitch

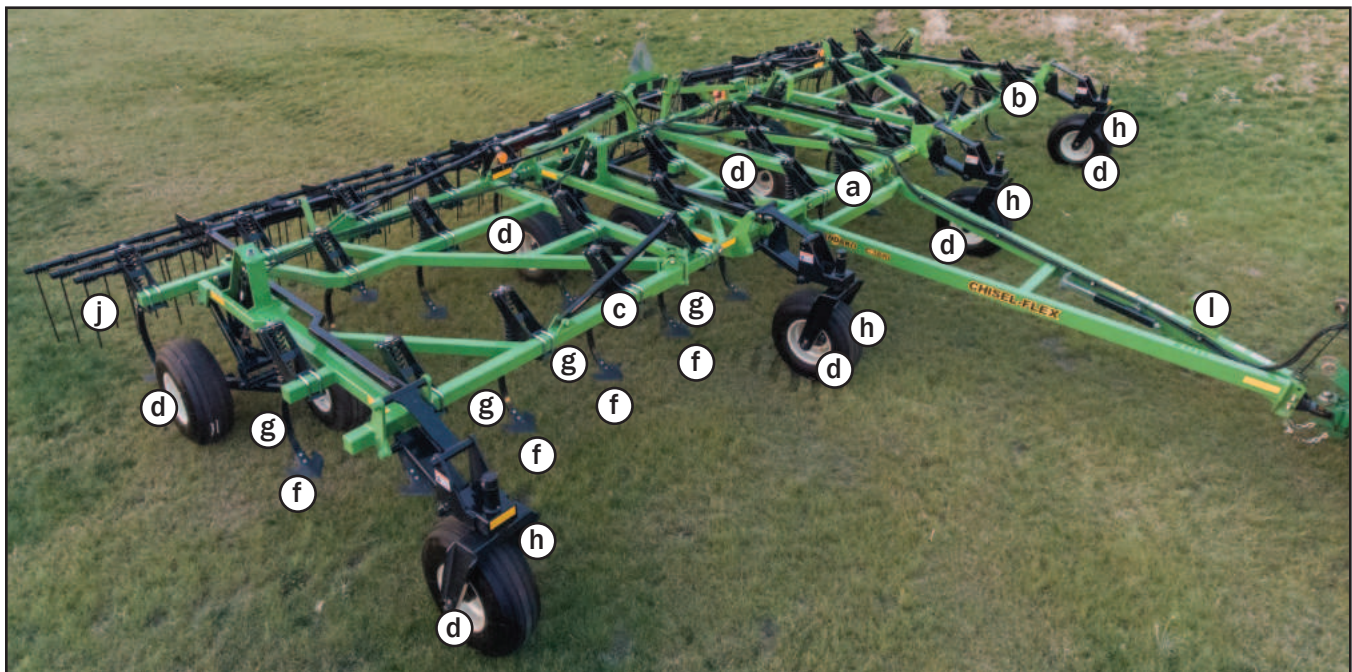
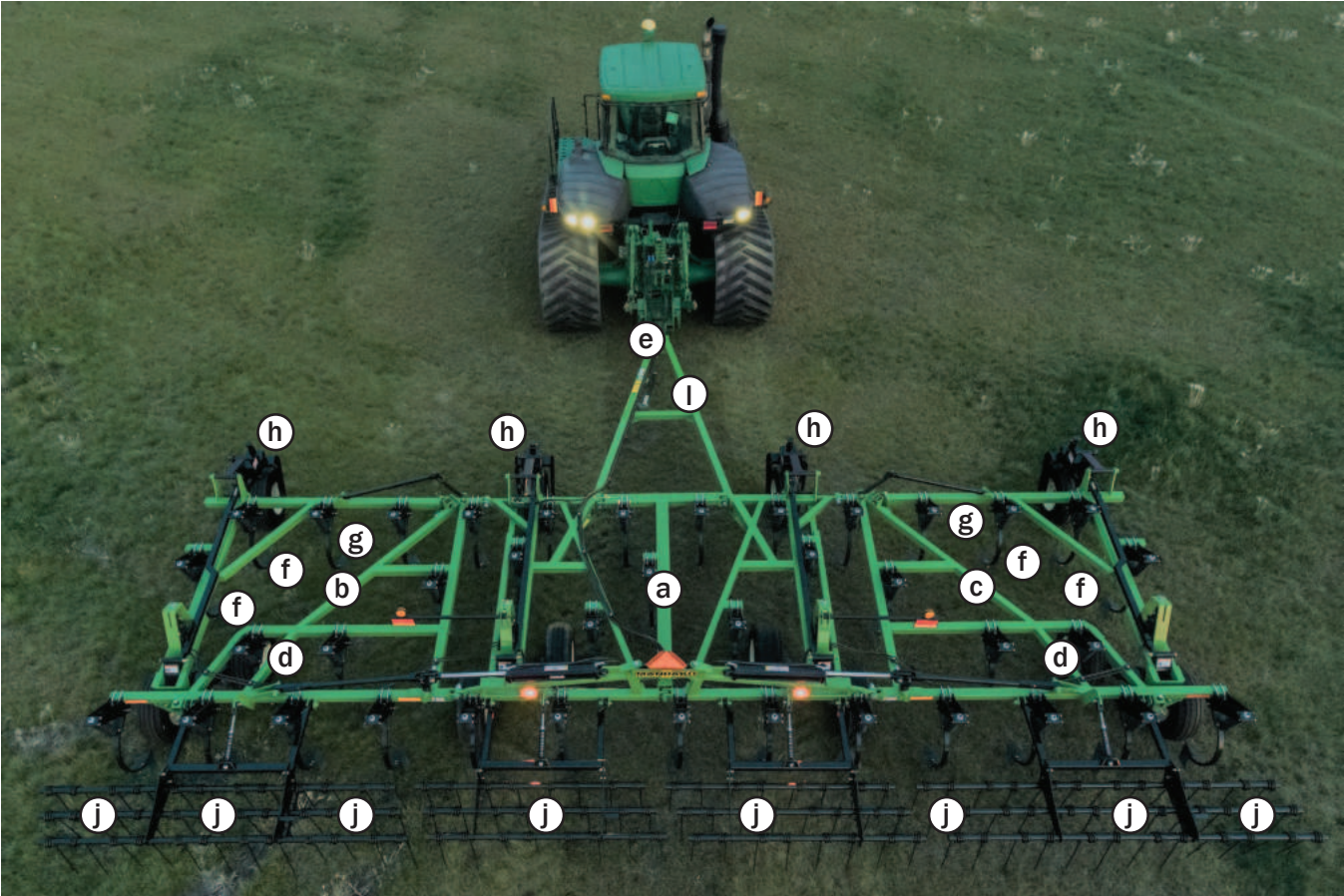
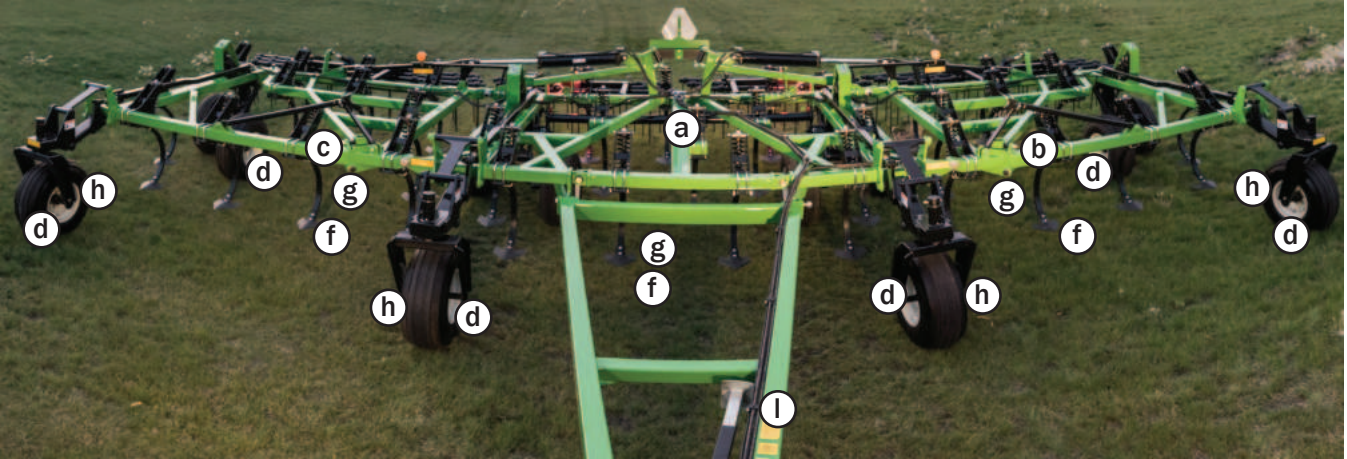
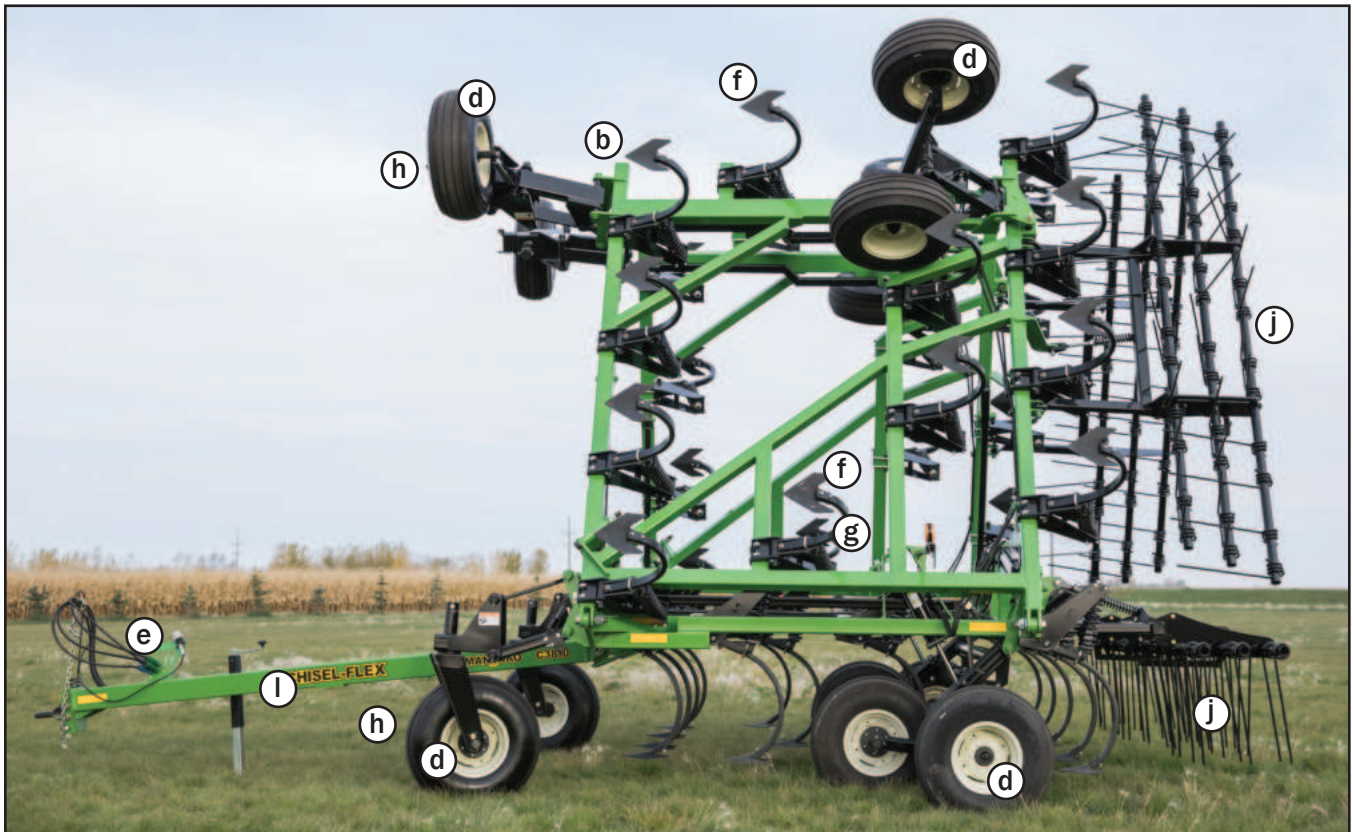


Fig. 2 Machine Components





3.2 MACHINE BREAK-IN

There are no operational restrictions on the Chisel Flex when used for the first time.

Although, it is recommended that the following mechanical items be checked:

After operating for 1/2 hour:

1. Re-torque all wheel bolts.
2. Re-torque all fasteners and hardware.
3. Check that no hydraulic lines are being pinched or crimped. Re-route as required.
4. Inspect all hydraulic lines, hoses, fittings and couplers for leaks. Tighten any leaking fitting.
5. Check for, and remove all entangled material.
6. Lubricate all grease fittings except bearings.

After 5 hours and 10 hours of operation:

7. Re-torque all wheel bolts, fasteners and hardware.
8. Inspect all hydraulic lines, hoses, fittings and couplers for leaks. Tighten any leaking fittings.
9. Go to the normal servicing and maintenance schedule as defined in the Service and Maintenance Section.

3.3 PRE-OPERATION CHECKLIST

Efficient and safe operation of the Mandako Chisel Flex requires that each operator reads and understands the using procedures and all related safety precautions outlined in this section. A pre-operation checklist is provided for the operator. It is important for both the personal safety and maintaining the good mechanical condition of the Mandako Chisel Flex that this checklist is followed.

Before operating Mandako Chisel Flex and each time thereafter, the following areas should be checked off:

1. Lubricate the machine per the schedule outline in the Maintenance Section.
2. Use only a tractor of adequate power and weight to operate the Mandako Chisel Flex. See section 3.4 for recommendations.
3. Be sure the machine is properly attached to the tractor. Be sure that a mechanical retainer is installed through the drawbar pin and that the safety chain is used.
4. Inspect all hydraulic lines, hoses, fittings and couplers for leaks. Tighten any leaking fitting.
5. Check the tires and ensure that they are inflated to their specified pressure.
6. Check the wheel bolts. Ensure they are tightened to their specified torque.
7. Remove all entangled material.

3.4 EQUIPMENT MATCHING

To ensure the safe and reliable operation of the Chisel Flex, it is necessary to use a tractor with appropriate specifications.

As a guideline, be certain that these requirements are met:

1. **Horsepower:**

The Chisel Flex needs both power and mass to pull and stabilize the unit in all operating conditions.

The lower levels of power are appropriate for hard, level terrain. Higher levels for soft or hilly land. Extra mass is also required to maintain stability when slowing down or travelling downhill.

2. **Hydraulic System:**

The tractor's hydraulic system must be capable of a minimum of 10 gpm (38 lpm) at 1800 psi (12,420 kPa) but not to exceed 2800 psi (19,320 lpm).

The Chisel Flex requires 2 hydraulic circuits wheel frame lift and wing lift.

Size	Horsepower
38'	380
40'	400
55'	550
65'	650

Table 1 - Minimum Horsepower Recommendation



Fig. 3 Two Circuits

3.5 CONTROLS

Before starting to work, all operators should familiarize themselves with the location and function of all controls.

1. Single Point Depth Control:

All Chisel Flex Vertical Tillage Tools are equipped with a shut off valve in the wheel lift circuit that allows the operator to set the wheel assemblies at the appropriate position to obtain the desired depth of operation of the shovels. Once the depth control system has been set, the system will always return to the same shovel depth when lowered again.

It is the responsibility of the operator to set the position of the wheel assemblies (shovel depth into the ground) to provide the desired performance.

When the frame is lowered (wheel assemblies raised), the 'return to depth' system should be set so the shovels always return to the desired operating depth throughout the field.

The system consists of:

- a. Arm to wheel assembly frame.
- b. Shut off valve.
- c. Valve engage rod.
- d. Position adjust anchor.
- e. Position adjust lock pin.
- f. Position anchor holes.

To adjust:

- a. Raise frame or lower wheels.
- b. Remove lock pin through the wheel position and frame components.
- c. Slide the valve engage rod assembly up or down as required to reset shovel depth.
- d. Monitor the machine performance and readjust as required.

IMPORTANT:

There are several position holes available to anchor arm to. Each one is designed to change the shovel depth by approximately 1/2 inch (12.5 mm). Move assembly in small increments and monitor performance. A small move can result in a large change in performance.

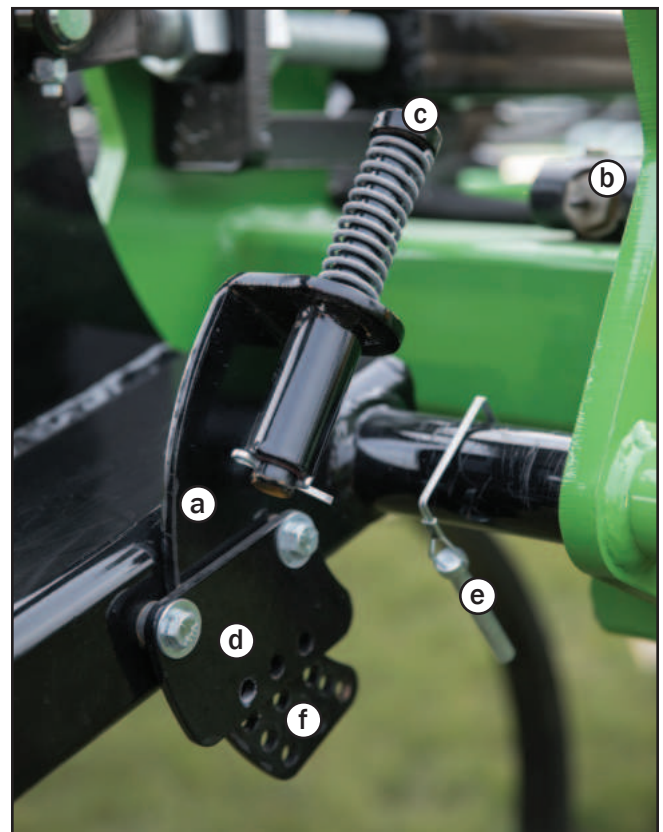


Fig. 5 Depth Control Components



Fig. 4 Depth Control Mechanism: Working/Raised

3.6 ATTACHING TO TRACTOR

Follow this procedure when attaching the Chisel Flex to a tractor:

1. Clear the area of bystanders, especially small children.
2. Make sure there is enough room and clearance to safely back up to the machine.
3. While backing up, use the jack to align the hitch and drawbar.
4. Stop tractor, set park brake, remove ignition key and wait for all moving parts to stop before dismounting.



Fig. 6 Backing Up



Fig. 7 Aligning

5. Use a drawbar pin with provisions for a mechanical retainer. Install the retainer.



Fig. 8 Pin/Retainer

6. Safety Chain:
Attach the safety chain around the drawbar cage to prevent unexpected separation.



Fig. 9 Safety Chain

7. Connect Hydraulic System:
Warning: High Pressure Fluid
Wear eye and hand protection when searching for leaks. Relieve pressure before adjusting. Keep components in good repair.
- a. Use a clean cloth or paper towel to clean the dirt and build-up from around the couplers and male tips.



Fig. 10 Stored

- b. Insert the male tips into the couplers. Be sure they are locked in place.
- c. Route the hoses through the metal hose retainer on the hitch to prevent the hoses from dragging on the ground. Make sure there is enough slack to prevent hoses from being pinched when turning.



Fig. 11 Circuit 1

- d. Check the function of each circuit. Be sure they function according to expectations. Reverse hoses if they do not.



Fig. 12 Connected

8. Connect the wiring harness by inserting terminal into plug on tractor. Route harness through hose retainer on hitch to prevent dragging on ground.



Fig. 13 Wiring Harness

9. Stow the jack:

- Pull out pin.
- Rotate 90°.
- Reinsert pin.



Fig. 14 Jack



Fig. 15 Stowed

3.7 FIELD OPERATION

Although the Chisel Flex is easy to use. Each operator should review this manual to familiarize themselves with the Safety and Operating procedures.

When using this machine, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Attach the machine to the tractor. See Section 3.6.
3. Review and follow Pre-Operation Checklist. See Section 3.4.
4. Transport to the working area.
5. Convert to field configuration. See Section 3.8.

6. Starting:
 - a. With the tractor engine at approximately $\frac{1}{3}$ throttle position, release clutch and move forward.
 - b. Lower machine into ground.
 - c. Increase throttle position until desired engine RPM or ground speed is reached.
7. Stopping:
 - a. Reduce engine RPM.
 - b. Raise machine out of ground by lowering wheel frame.
 - c. Depress clutch to stop forward motion of the Chisel Flex.



Fig. 16 Transporting to Field



Fig. 17 Field Configuration



Fig. 18 Starting/Stopping

8. Wing Position:

The wings are designed to float or move up and down as the machine moves across a field. Always extend the cylinders fully when lowering the wings. Each wing is designed with a slotted anchor bracket for the wing cylinder attachment. Fully extending cylinders allows the wing frames to move up and down to follow the contour of the field.



Fig. 19 Anchor Bracket Slots - Left



Fig. 20 Anchor Bracket Slots - Right

9. Tine Harrows:

Harrows are mounted on the back of the frame to distribute and break up any piles of trash or debris that has formed behind the Chisel Flex. Each harrow assembly can have its angle or stiffness changed appropriately for the application.



Fig. 21 Harrows

a. Angle:

Use the adjusting hole options on the top of the harrow frame to adjust and set the angle of the harrows. Always set all harrows to the same angle to obtain consistent field performance.



Fig. 22 Harrow Angle

b. Stiffeners:

The frame of each set of harrows is held in position by a compression spring that is preset with down pressure from the factory to resist the tines moving back when they encounter an obstruction in the field. Loosen the nuts on both ends of the spring and move the internal pipe spacer to adjust tine angle. Tighten nuts to their specified torque.



Fig. 23 Harrow Stiffeners

10. Soil Moisture:

Although the Chisel Flex will work in most soil moisture conditions, it is the responsibility of the operator to monitor the condition of the soil after being tilled. Clay soils that are wet will compress and compact during tilling and not be satisfactory. Sandy soils are less likely to compact during tilling. Allow the soil to dry out before tilling if compacting or mudding up occurs.



Fig. 24 Field

11. Shovel Wear:

All shovels will wear as the Chisel Flex moves through the fields while working. The rate of wear depends on how abrasive the soil is. Always replace the shovels when they wear down and before the sweeps break off. Operating when the sweeps are gone means the shovels are not tilling the soil as the Chisel Flex passes over the field. Always replace all the shovels at the same time to keep the performance even over the width of the machine. Always replace when shovel is chipped, bent or worn down.



Fig. 25 Shovel

12. Shank Trip:

Each shank in the Chisel Flex is spring-loaded to allow the shank to move back if the shovel or shank hits a rock, stump or other obstruction. By moving back, the chance of damaging the machine is reduced. The trip pressure or load can be adjusted with the spring at the top of the assembly. Increase spring load when soil conditions are hard and compacted. Raise the machine to lift harrows out of the ground to reset the trip.



Fig. 26 Shank Trip

13. Operating Depth:

The shovels on the bottom of the shanks are designed to penetrate the soil 2 to 4 inches (50 to 100 mm) and cut off the plant roots while leaving the plant residue on top of the surface to minimize erosion. It is the responsibility of the operator to monitor the machine performance and set the shovel depth appropriate for the application.



Fig. 27 Wheel Position - Up



Fig. 28 Wheel Position - Down

14. Travel Speed:

The operator must determine the appropriate speed for the terrain and field conditions but it is not recommended to travel faster than 4-6 mph (7-10 kph). Slow down for rough, hilly or rolling terrain. To be effective, the shovels must remain in the ground during operation to allow for the cutting of the weed roots but keeping residue cover in place on the surface of the field to minimize erosion. Select a speed that will keep the shovels in ground, however a minimum of 4 mph (6.5 kph) is required to obtain the desired performance.

NOTE:

Do not travel faster than 6 mph (10 kph) to prevent damaging the tines or the frame from overloading.



Fig. 29 Travel Speed

15. Single Point Depth Control:

Each machine is designed with a shut off valve in the hydraulic line to the wheel assembly position cylinder. A mechanical linkage attached to the wheel assembly contacts the shut off valve to stop the wheel assembly motion and the shovels will always return to the same depth.

Determine the desired shovel depth for the application and set the linkage lock pin position accordingly. Use the lock pin position to change the shovel depth to fit the application.

It is not recommended to operate the Chisel Flex deeper than 6 inches (150 mm). Generally 4 to 6 inches (100 to 150 mm) deep will provide good performance.

The system consists of the following components:

- a. Arm to Wheel Assembly Frame.
- b. Shut-Off Valve.
- c. Valve Engage Rod.
- d. Position Adjust Anchor.
- e. Position Adjust Lock Pin.
- f. Position Anchor Holes.

Setting this system to the appropriate operating depth will mean the machine will return to this depth whenever the unit is lowered into the ground when operating in the field.

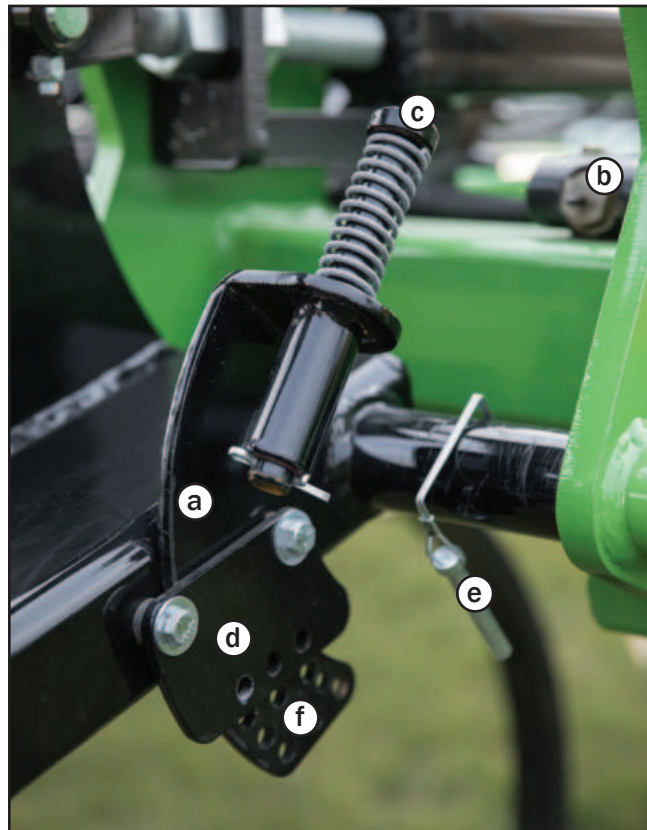


Fig. 30 Single Point Depth Control

16. Field Operation:

The following procedure should be used to monitor the tillage and residue work-up to get the best performance for the application. Monitor and adjust the machine per these steps:

- a. Lower the wings and lower shovels to the ground.
- b. Start moving across the field at 3 - 4 mph (5 - 7 kph).
- c. Lower the shovels into the ground.
- d. Drive 100 feet (30 m) and look at the ground in front of the Chisel Flex and behind it.
- e. The residue on the surface should mostly remain on the surface.
- f. All weeds and plants should be cut off under the soil surface.
- g. Adjust/set the depth of the shovels in small increments to get the job done and minimize horsepower requirements.
- h. Monitor performance in the field at operating speed.
- j. Use the single point depth control system to set and control the depth of the shovels.
- k. Monitor the job as the conditions change and adjust the shovel depth as required.
- l. The residue should remain on top of the soil with roots of weeds and plants cut off below the surface.



Fig. 31 Field



Fig. 32 Single Point Depth Control

17. Operating Hints:

- a. Be sure there is sufficient space and clearance to fully extend the wings. Do not stand next to frame when extending to prevent hitting something. Keep others away.
- b. Stay away from overhead power lines when raising or lowering the wings to prevent electrocution. Remember, electrocution can occur without direct contact.
- c. Always set the Single Point Depth Control linkage and valve system when the desired performance is obtained. In that way, the machine will always return to same settings when operating.
- d. Always monitor field conditions behind the machine to determine the performance. Shovel depth, ground speed, soil conditions and soil moisture all have an impact on performance. The machine should remove weeds and leave some of the crop material on the surface. Retaining some crop material on the surface is desirable to resist erosion and retain snow and moisture.



Fig. 33 Single Point Depth Control System

- e. Always replace the shovels when they wear, chip, bend or break. Always replace all the shovels at the same time to keep performance the same across the width of the machine.



Fig. 34 Shovels

- f. Remove plug from wheel hub, install grease fitting and grease hubs at the end of the season before storing and at the start of the season. Remove fittings and install plugs before working in the field.



Fig. 35 Wheel Hub Grease Fitting

- g. Set the angle of the tine harrows on the back of the frame. Angle the harrows back if the field is covered with a lot of crop material. Angling back allows the material to be shed by the tines as the machine moves over the field. Use the adjustment holes in the top of the tine harrow frame to adjust and set the tine harrow angle.



Fig. 36 Tine Harrows: Adjustment Angle

3.8 TRANSPORT TO FIELD CONVERSION

The Chisel Flex is designed to be easily converted from transport to field configuration with minimal effort.

When converting, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Move the machine into an open area large enough to have space to lower the Chisel Flex wings. Do not move it into an area with overhead power lines or obstructions.
3. Raise frame into its fully up position.
4. Stop engine, set park brake, remove ignition key before dismounting.
5. Remove cylinder stops from wheel assembly cylinders and stow:
 - a. Cylinder Stop
 - b. Left side.



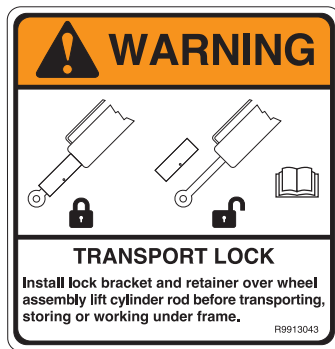
Fig. 37 Transporting



Fig. 38 Cylinder Stop: Pinned/Pin Removed



Fig. 39 Stop



c. Right side.

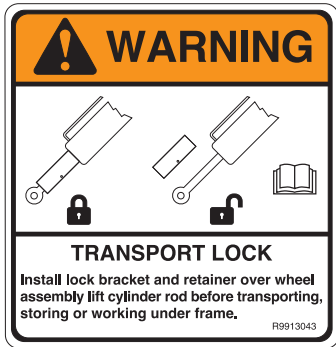


Fig. 40 Lower Wing: Starting

6. Use the hydraulic lever in the cab to lower one wing until it is completely down.



Fig. 41 Lower Wing: Down

7. Continue to hold the hydraulic lever to lower the second wing.



Fig. 42 Lower Wing: Starting/Almost Down

8. Hold hydraulic lever until the hydraulic system goes over relief to insure the cylinders are fully extending into the slotted bracket on each wing that allows wing to follow the ground contour.



Fig. 43 Anchor Bracket Slots - Left



Fig. 44 Anchor Bracket Slots - Right

9. Reverse the above procedure to convert to transport configuration.

3.9 TRANSPORTING

The Mandako Chisel Flex is designed to be easily and conveniently moved from field to field. When transporting, follow this procedure:

1. Be sure all bystanders are clear of the machine.
2. Be sure that the machine is hitched positively to the towing vehicle. Always attach the safety chain between the machine and the tractor and install a retainer through the drawbar pin.
3. Raise wings until both are fully over-center and system goes over relief.
4. Raise frame to its fully up position.
5. Install transport cylinder stops over wheel lift cylinders on both sets of wheels.



Fig. 45 Over - Center



Fig. 46 Cylinder Stop (Typical)

6. Keep to the right and yield right-of-way to allow faster traffic to pass. Drive on shoulder of road if permitted by law.
7. Make sure the SMV (Slow Moving Vehicle) emblem and all lights and reflectors that are required by local highway and transport authorities are in place, clean and can be seen clearly by all overtaking and on-coming traffic.
8. It is not recommended that the machine be transported faster than 20 mph (32 kph). Table 2 gives acceptable transport speed as the ratio of tractor weight to Chisel Flex weight.
9. Do not allow riders on the machine.
10. During periods of limited visibility, use pilot vehicles and extra lights on the machine.
11. Always use hazard flashers on the tractor when transporting unless prohibited by law.



Fig. 47 Transporting

Road Speed	Weight of fully equipped or loaded implement(s) relative to weight of tow vehicle
Up to 32 kph (20 mph)	1 to 1, or less
Up to 16 kph (10 mph)	2 to 1, or less
Do not tow	More than 2 to 1

Table 2 - Travel Speed vs. Weight Ratio

3.10 STORAGE

3:10:1 PLACE IN STORAGE:

At the end of the season, the unit should be thoroughly inspected and prepared for storage. Repair or replace any worn or damaged components to prevent any unnecessary down time at the beginning of the next season.

Follow this procedure before storing:

1. Remove all entangled material.
2. Thoroughly wash the unit with a pressure washer or water hose to remove all dirt, mud or debris.
3. Lubricate all grease points. Make sure all grease cavities have been filled with grease to remove any water residue from washing.
4. Install grease fittings in each wheel hub and lubricate to remove water and dirt from around seals.
5. Grease wheel bearings until grease comes out around hub.



Fig. 48 Grease Fittings

IMPORTANT

Remove the plug from the wheel hub and install grease fitting. Grease wheel bearing. Remove fitting and store in a clean, secure location. Re-install plug. Machine operates in a dirt-filled environment that can damage grease fittings and allow dirt to get into the hub. Dirt will damage bearings very quickly. Always install plugs in wheel hub before operating.

6. Inspect all hydraulic hoses, couplers and fittings. Tighten any loose fittings. Replace any hose that is badly cut, nicked, abraded or is separating from the crimped end of a fitting.
7. Touch up all paint nicks and scratches to prevent rusting.
8. Move the unit to its storage area. Inside a building is ideal.



Fig. 49 Transport

9. Place the machine into its transport configuration or rest the machine on the ground to relieve pressure in the hydraulic system.
10. Place planks under the jack for added support if required.
11. Unhook the Chisel Flex from the tow vehicle (refer to section 3.6).
12. Store unit in an area away from human activity.
13. Do not allow children to play on or around stored Chisel Flex.
14. Apply a rust inhibitor or heavy grease to the exposed hydraulic cylinder rams to prevent rusting. Remove inhibitor or grease before using machine again.



Fig. 50 Field

3:10:2 REMOVING FROM STORAGE:

When removing this unit from storage, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Attach the unit to the tractor (see section 3.5.2).
3. **Check:**
 - a. Electrical harness connections and components.
 - b. All hardware. Tighten as required.
 - c. Tire pressure.
 - d. All hydraulic lines, fittings and connections. Tighten as required.
4. Remove grease fittings and install plugs in each shovel hub to prevent dirt from entering.
5. Lubricate all grease fittings.
6. Clean rust inhibitor or grease from exposed cylinder ram ends.
7. Replace any worn or defective parts.
8. Go through the pre-operation checklist (See section 3.4) before using unit.



Fig. 51 Hub: Fitting

Section 4: SERVICE AND MAINTENANCE

-
- Good maintenance is your responsibility. Poor maintenance is an invitation to trouble.
 - Follow good shop practices.
 - Keep service area clean and dry.
 - Be sure electrical outlets and tools are properly grounded.
 - Use adequate light for the job at hand.
 - Lower machine to ground, place all controls in neutral, stop engine, set the park brake, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
 - Place stand or blocks under the frame before working beneath the machine or when changing tires.
 - Always use personal protective devices such as safety glasses, gloves and hearing protection, when performing any service or maintenance work.
 - Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts must be used to restore your equipment to original specifications.
 - A fire extinguisher and first aid kit should be kept readily accessible while performing maintenance on this equipment.
 - Relieve pressure on hydraulic system before servicing, connecting or disconnecting from tractor.
 - Before applying pressure to a hydraulic system, make sure all components are tight and that steel lines, hoses and couplings are in good condition.
 - When completing a maintenance or service function, make sure all safety shields and devices are installed before placing unit in service.
-

4.1 FLUIDS AND LUBRICANTS

4:1:1 GREASE:

Use an SAE multipurpose high temperature grease with extreme pressure (EP) performance. Also acceptable is an SAE multipurpose lithium base grease.

4:1:2 STORING LUBRICANTS:

Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contaminants.

4:1:3 GREASING:

Refer to Section 4.1.1 for the type of recommended grease.

Use the Maintenance Checklist provided to keep a record of all scheduled maintenance.

1. Use a hand-held grease gun for all greasing.
2. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.
3. Replace and repair broken fittings immediately.
4. If fittings will not take grease, remove and clean thoroughly. Also, clean lubricant passageway. Replace fittings if necessary.

4.2 SERVICING INTERVALS

The periods recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent checks of the equipment and lubrication.

4:2:1 EVERY 40 HOURS OR WEEKLY:

1. Grease the front wheel assembly castor bushing.



Fig. 52 Castor Bushing - Left



Fig. 53 Castor Bushing - Right

4:2:2 ANNUALLY.

1. Grease wheel bearings until grease is expelled from bearings.



Fig. 54 Wheel Bearings

2. Check condition of shovels. Replace if worn, chipped or broken.



Fig. 55 Shovel

3. Clean and wash machine.



Fig. 56 Machine: Transport Configuration



Fig. 57 Machine: Field Configuration

4.3 SERVICE RECORD

The Servicing Intervals section is only a guide under good conditions. Under extreme, or unusual circumstances adjust service timing accordingly.

Copy this page to continue record.

Maintenance	Date																		
	Serviced By																		
EVERY 40 HOURS OR WEEKLY																			
Grease Castor Bushings																			
ANNUALLY																			
Grease Wheel Bearings																			
Grease Jack																			
Check Shovel Condition																			
Clean and Wash Machine																			

Maintenance	Date																		
	Serviced By																		
EVERY 40 HOURS OR WEEKLY																			
Grease Castor Bushings																			
ANNUALLY																			
Grease Wheel Bearings																			
Grease Jack																			
Check Shovel Condition																			
Clean and Wash Machine																			

Section 5: TROUBLE SHOOTING

This Chisel Flex is a simple and reliable system that requires minimal maintenance.

The problems which you may encounter, their causes and solutions, are listed below.

If you encounter a problem which is difficult to solve, even after having read through this section, please contact your local distributor or dealer. Before you call, please have this Operator's Manual and the unit's serial number ready.

Problem

Possible Cause	Possible Solution
----------------	-------------------

Weeds not removed.

Shovels not deep enough.	Increase depth of shovels.
	Replace worn shovels.
	Reset return to depth position.

Wing not following ground contours.

Cylinder not fully extended.	Fully extend lift cylinder.
------------------------------	-----------------------------

Machine lifts unevenly.

Cylinders not in phase.	Extend re-phasing lift cylinders fully for 5 - 30 seconds to allow resetting of cylinders (can be done regularly during operation). Important with new machine to purge air from hydraulic system.
-------------------------	--

Rows of weeds left behind machine.

Rear wheel assemblies set too low.	Raise rear wheel assemblies to lower rear shovels into the ground.
	Replace worn shovels.

Harrows plugging

Harrows set too straight.	Increase harrow angle.
---------------------------	------------------------

Section 6: SIGN-OFF FORM

Mandako follows the general Safety Standards specified by the American Society of Agricultural and Biological Engineers (ASABE), and the Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/ or maintaining the unit must read and clearly understand all Safety, Operating and Maintenance information presented in this manual.

Do not operate, or allow anyone else to operate, this equipment until this document has been read. Review this information annually, before the season start-up.

Make periodic reviews of SAFETY and OPERATION a standard practice for all of your equipment.

The following Sign-Off Form is provided for your record keeping. Use it to show that all personnel who will be working with the equipment have read and understand the provided information. They also have been instructed in the operation of the equipment. Copy this page to continue the record.

DATE	EMPLOYEE’S SIGNATURE	EMPLOYER’S SIGNATURE

Sign Off Form (Continued)

DATE	EMPLOYEE'S SIGNATURE	EMPLOYER'S SIGNATURE

Section 7: REFERENCE

For information not included here, or for a digital copy of this manual, please call your dealer, or Mandako Agri Marketing (2010) Ltd. directly for assistance (1-888-525-5892).

Specifications may change without notice.

7.1 MECHANICAL SPECIFICATIONS

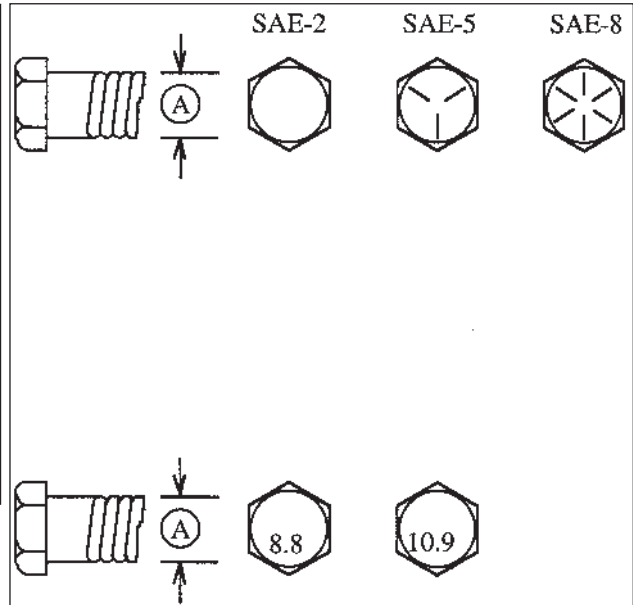
7.2 BOLT TORQUE

CHECKING BOLT TORQUE

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with the same strength bolt.

IMPERIAL BOLT TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque •					
	SAE 2 (N.m) (lb-ft)		SAE 5 (N.m) (lb-ft)		SAE 8 (N.m) (lb-ft)	
1/4"	8	6	12	9	17	12
5/16"	13	10	25	19	36	27
3/8"	27	20	45	33	63	45
7/16"	41	30	72	53	100	75
1/2"	61	45	110	80	155	115
9/16"	95	60	155	115	220	165
5/8"	128	95	215	160	305	220
3/4"	225	165	390	290	540	400
7/8"	230	170	570	420	880	650
1"	345	225	850	630	1320	970



Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

- Torque value for bolts and capscrews are identified by their head markings.

7.3 HYDRAULIC FITTING TORQUE

Tightening Flare Type Tube Fittings *

1. Check flare and flare seat for defects that might cause leakage.
2. Align tube with fitting before tightening.
3. Lubricate connection and hand tighten swivel nut until snug.
4. To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body and with the second tighten the swivel nut to the torque shown.

Tube Size OD	Nut Size Across Flats	Torque Value •		Recommended Turns To Tighten (After Finger Tightening)	
		(N.m)	(lb-ft)	(Flats)	(Turn)
3/16	7/16	8	6	1	1/6
1/4	9/16	12	9	1	1/6
5/16	5/8	16	12	1	1/6
3/8	11/16	24	18	1	1/6
1/2	7/8	46	34	1	1/6
5/8	1	62	46	1	1/6
3/4	1-1/4	102	75	3/4	1/8
7/8	1-3/8	122	90	3/4	1/8

- The torque values shown are based on lubricated connections as in reassembly.

SECTION 8: INDEX

I	
INTRODUCTION	1
Serial Number Location	1
O	
OPERATION	15
Attaching to Tractor	22
Equipment Matching	20
Field Operation	25
Machine Break-In	19
Machine Components	16
Storage	38
Transporting	36
Transport to Field Conversion	33
R	
REFERENCE	49
Bolt Torque	50
Hydraulic Fitting Torque	51
Mechanical Specifications	49
S	
SAFETY	3
Equipment Safety Guidelines	5
General Safety	4
Hydraulic Safety	9
Maintenance Safety	9
Operating Safety	8
Preparation	7
Safety Decals	6
Safety Decals	11
Safety Decal Location	13
Safety Orientation	4
Safety Training	6
Storage Safety	9
Tire Safety	9
Transport Safety	10
SERVICE AND MAINTENANCE	41
Fluids and Lubricants	41
Servicing Intervals	42
Service Record	44
SIGN-OFF FORM	47
T	
TROUBLE SHOOTING	45

RELEASED: 01-JAN-2018

PART #: R9912009

REVISION: 1.0



MANDAKO AGRI MARKETING (2010) LTD.

Box 379 | 12159B Hwy 306
Plum Coulee, MB R0G 1R0
(888) 525-5892
info@mandako.com
www.mandako.com



Printed in Canada