

MANDAKO



MINI AND SINGLE LAND ROLLER

50 SERIES

OPERATORS MANUAL

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Section 1: INTRODUCTION

Congratulations on your choice of a Mandako Mini or Single Land Roller 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 Mini and Single Land Roller requires that you and anyone else who will be using or maintaining the Mini and Single Land Roller, read and understand the Safety, Operation, Maintenance and Trouble Shooting information contained within this Operator's Manual.

This manual covers all sizes of the Mandako Mini and Single Land Roller. 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 or pickup driver's seat and facing in the direction of travel.

1.1 SERIAL NUMBER LOCATION



Fig. 1 Model/Serial Number Location

Always give your dealer the serial number of your Mini and Single Land Roller 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.

a. Serial Number _____

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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 Mini and Single Land Roller 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

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

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

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

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 Mini and Single Land Roller. Ensure that you and anyone else who will use, maintain or work around the Mini and Single Land Roller 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 will make you aware of all safety practices that should be used while using the Mini and Single Land Roller.


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:

- Mini and Single Land Roller 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 operating and safety instructions is not qualified to use the machine. An untrained operator exposes himself and bystanders to the possibility of 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 Mini and Single Land Roller. 

- 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 Mini and Single Land Roller.

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.
- If the tow vehicle is a tractor, it should be equipped with a Roll Over Protective Structure (ROPS) and a seat belt. 
- Never exceed the limits of the Mini and Single Land Roller. 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 span of the equipment, and result in serious injury or death.

2.4 SAFETY SIGNS

- Keep safety signs clean and legible at all times.
- Replace signs that are missing or have become illegible.
- Replaced parts that displayed a safety sign should also display the current sign.
- Safety signs 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 signs are available from your authorized Distributor, Dealer Parts Department or the factory.

2:4:1 How to Install Safety Signs:

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 sign 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 sign in place.
7. Small air pockets can be pierced with a pin and smoothed out using 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 person will use the machinery.



A person who has not read and understood all operating and safety instructions is not qualified to use the machine. An untrained operator exposes himself and bystanders to the possibility of 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 Mini and Single Land Roller until you have read this Manual, header and header power unit Operator's Manual. Take note of each Safety Message found on the safety signs on the Mini and Single Land Roller, header and power units.



- 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 (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 signs are properly installed and in good condition.
- If a pickup truck is used as the tow vehicle, be sure the unit is properly hitched to the truck. Be sure to use safety chains to prevent unplanned separation. Cross the chains under the hitch to support the hitch should unplanned separation occur.

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 roller or tractor during operation or transporting.
- Clear the area of all bystanders, especially children, before starting.
- Clean the 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 wheel cylinder lock brackets before transporting or working under frame.
- 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.
- If a pick-up truck is used as the tow vehicle be sure the trailer is properly hitched to the truck. Be sure to use safety chains to prevent unplanned separation. Cross the chains under the hitch to support the hitch should unplanned separation occur.
- It is recommended that only 3/4 ton or larger capacity trucks be used for towing on the road. This size of truck plus careful driving will provide the recommended stability and control when towing.
- Always refer to the towing vehicle owner's manual trailer towing section to determine the vehicle's towing capacity and to ensure compatibility and maximum safety.
- Shift towing unit to a lower gear before going down steep down-grades to use engine as retarding force. Keep towing vehicle in gear at all times.
- 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 rollers to ground and raise tires 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 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 backstop 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 Mini and Single Land Roller in the field and/or on the road. 
- Maintain wheel bolts to specified torque.
- Check with local authorities regarding Mini and Single Land Roller 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 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. Cross chains under the hitch to support hitch should unplanned separation occur.
- It is recommended that only 3/4 ton or larger capacity trucks be used for towing on the road. This size of truck plus careful driving will provide the recommended stability and control when transporting.
- Always refer to the towing vehicle owner's manual trailer towing section to determine the vehicle's towing capacity and to ensure compatibility and maximum safety.
- 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.
- Always use hazard warning flashers on tractor when transporting unless prohibited by law.
- Shift towing unit to a lower gear before going down steep down-grades to use engine as retarding force. Keep towing vehicle in gear at all times. 
- Do not drink and drive.

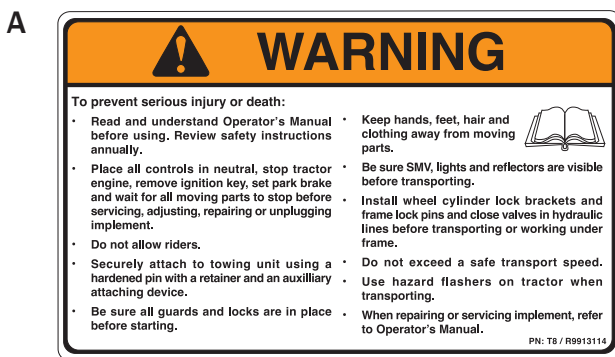
2.13 SAFETY SIGNS

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

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

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

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



Part No. T8 / R9913114



Part No. MLR-14-D / R9913110



Part No. R9913101



Part No. R9913101

Remember - Safety Signs are for your protection!

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

2.14 SAFETY SIGN LOCATIONS





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.
 - Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
 - Do not allow riders on the roller or tractor during operation or transporting.
 - Clear the area of all bystanders, especially children, before starting.
 - Clean reflectors, SMV (Slow Moving Vehicle) emblem when towing with a tractor 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.
 - Attach securely to pickup towing unit using a hardened pin with a retainer and a safety chain. Cross the chains under the hitch to support the hitch should unexpected separation occur.
 - Do not exceed a safe travel speed.
 - Use hazard flasher on tractor when transporting.
 - It is recommended that only 3/4 ton or larger capacity trucks be used for towing on the road. This size of truck plus careful driving will provide the recommended stability and control when transporting.
 - Shift towing unit to a lower gear before going down steep down-grades to use engine as retarding force. Keep towing vehicle in gear at all times.
 - Do not drink and drive.
 - Install wheel cylinder lock brackets before transporting or working under frame.
 - Before applying pressure to the hydraulic system, make sure all components are tight and that steel lines, hoses and couplings are in good condition.
-

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 roller to provide maximum field efficiency. By following the operating instructions in conjunction with a good maintenance program, your roller will provide many years of trouble-free service.

3.1 MACHINE COMPONENTS

The Mandako Mini and Single Land Roller consists of a large roller centered in a frame. The Single Land Roller model is a roller in a towing frame. The Mini Land Roller model is a roller in a towing frame with a pivoting set of wheels for transporting.

The tractor provides hydraulic pressure to raise and lower the wheels for transporting or field operation. Cylinder Stops on each wheel cylinder are used for transporting and working under the frame.

An adjustable pintle hitch allows the operator to move it to level the frame and attach to any tow unit. A storage plate on the hitch provides storage spots for hydraulic hoses and wiring harness terminal.

The main components of the unit are as follows:

- a. Roller
- b. Frame
- c. Wheels
- d. Cylinder Stops/Transport Lock Bracket
- e. Pintle Hitch
- f. Storage Plate
- g. Turnbuckle
- h. Jack
- j. Safety Chain
- k. Manual Canister
- l. Lights
- m. Single Land Roller Model
- n. Mini Land Roller Model



Fig. 2 Machine Components



3.2 MACHINE BREAK-IN

There are no operational restrictions on the Mini and Single Land Roller 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 drum bearings.

After 5 hours and 10 hours of operation:

1. Re-torque all wheel bolts, fasteners and hardware.
2. Inspect all hydraulic lines, hoses, fittings and couplers for leaks. Tighten any leaking fittings.
3. 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 Mini and Single Land Roller requires that each operator reads the manual. They must understand the procedures, and all related safety precautions.

A pre-operation checklist is provided for the operator. It is important for personal safety, and to maintain the good mechanical condition of the roller that this checklist is followed.

Before operating roller and each time thereafter, the following areas should be checked off:

1. Lubricate the machine according to the schedule outline in the Maintenance Section.
2. Use only a tractor of adequate power and weight to operate the roller.
3. Be sure that the roller is hitched properly to the tractor and a retainer is used through the hardened drawbar pin. Always attach safety chains to the tractor.
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.
8. Be sure that all lights, reflectors and SMV emblem required by the local highway authorities are installed, clean and in good working order.

3.4 EQUIPMENT MATCHING

To ensure the safe and reliable operation of the Mini and Single Land Roller, it is necessary to use a tractor with appropriate specifications.

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

1. Horsepower:
The roller 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 (Mini Land Roller model only):
The tractor’s hydraulic system must be capable of 5 gpm (19 lpm) at 2800 psi (19,320 kPa).

Only the Mini Land Roller model Roller requires a hydraulic circuit as only this model has a wheeled transport capability.



Fig. 3 Single Land Roller Model

Size (ft)	Horsepower	
	Single Land Roller	Mini Land Roller
4	24+	NA
6	24+	24+
8	32+	32+
10	40+	40+
12	48+	48+
15	60+	60+
20	80+	80+

Table 1 - Horsepower Recommendation



Fig. 4 Mini Land Roller Model

3.5 ATTACHING/UNHOOKING

The Mini and Single Land Roller can be attached to a pickup or a tractor depending on the application. Since the roller generates a vertical load on the hitch, care must be taken to properly attach to the tow vehicle.

3.5.1 ATTACHING MINI and SINGLE LAND ROLLER to PICKUP

Follow this procedure when attaching the Mini and Single Land Roller to a pickup:

1. Ensure all bystanders, especially small children, are clear of the working area.
2. Make sure there is enough room and clearance to safely back up to the roller.
3. Use the jack to move the hitch to the required height.
4. Slowly back the tow vehicle until the hitch is aligned.

5. Lower the hitch onto the post.



Fig. 5 Transport Locks



Fig. 6 Align Hitch



Fig. 7 Hitch Lowered

6. Install the lock bolt spacer and the lock nut. Tighten to its specified torque.



Fig. 8 Lock Bolt

7. Attach the safety chain to the truck frame to prevent unexpected separation.



Fig. 9 Safety Chain

8. Connect the wiring harness to plug on the pickup. Always use the optional adaptor in harness to convert 7 pin terminal to plug on pickup if necessary.



Fig. 10 Wiring Harness

9. Retract the jack.
 - Pull out the pin.
 - Rotate 90° and store in stowed position.
 - Install the pin.



Fig. 11 Jack Stowed

3.5.2 ATTACHING MINI and SINGLE LAND ROLLER to TRACTOR

Follow this procedure when attaching the Mini or Single Land Roller to a tractor:

1. Ensure all bystanders, especially small children, are clear of the working area.
2. Make sure there is enough room and clearance to safely back up to the roller.
3. Connect the hydraulic hoses to a tractor, raise frame and install transport lock brackets.
4. Use the jack to move the clevis to the required height.
5. Slowly back the tractor until the tongue and hitch are aligned.



Fig. 12 Transport Lock Brackets



Fig. 13 Aligning

6. Install the drawbar pin and the retainer.

IMPORTANT:

Use a drawbar pin with provisions for a mechanical retainer. Always install the retainer.



Fig. 14 Drawbar Pin and Retainer

7. Attach the safety chain around the drawbar cage to prevent unexpected separation.



Fig. 15 Safety Chain

3.6 CONNECT HYDRAULIC AND ELECTRICAL SYSTEM



WARNING: High Pressure Fluid
Wear eye and hand protection when searching for leaks. Relieve pressure before adjusting. Keep components in good repair.

1. Use a clean cloth or paper towel to clean the dirt and build-up from around the couplers and male tips.
2. Route the hoses through the hose retainer on the hitch stand to prevent the hoses from dragging on the ground.
3. Insert the male tips into the couplers. Be sure they are locked in place.
4. Attach the hoses to each hydraulic circuit.

5. Connect the wiring harness to the tractor when transporting on a public road.

Be sure to route the harness through the hose retainer on the stand to prevent it from dragging on the ground.

IMPORTANT:

It is recommended that extra lights and pilot vehicles be used during times of limited light or visibility.

6. Insert plug into holder when not in use. See Fig. 15
7. Put hose tips into the hydraulic hose storage holder. See Fig. 15.
8. Retract the jack.
 - Pull out the pin.
 - Rotate 90° and store in stowed position.
 - Install the pin.

Reverse the above procedures when unhooking from the tractor.



Fig. 16 Hose and Plug Storage Holder



Fig. 17 Hydraulic Couplers



Fig. 18 Wiring Harness



Fig. 19 Jack

3.7 FIELD OPERATION

The Mini and Single Land Roller is easy to use. Still, 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 3.5
3. Check the unit to be sure it is level and set.
4. Transport to the working area.
5. Remove lock brackets and store for the Mini Land Roller model.

3:7:1 STARTING:

With the tractor engine at approximately 1/3 throttle position, release the clutch and move forward. Increase throttle position until desired engine RPM is reached.

3:7:2 STOPPING:

Reduce engine RPM and press clutch to stop machine.

3:7:3 ROLLER WEIGHT:

Rollers are hollow and equipped with a Bung. Water may be added to the roller to increase its weight. This is helpful for rolling pasture land or an area with heavy plant growth.

The axle assembly and frame are not designed to lift and carry more weight than the base unit. Ensure the rollers are drained of liquid before lifting the frame and transporting on the Mini Land Roller model.



Fig. 20 Mini Land Roller Model



Fig. 21 Single Land Roller Model



Fig. 22 Transport Lock Brackets



Fig. 23 Roller Bung



ATTENTION: Equipment Damage Imminent
Always remove fluid from roller before transporting the Mini Land Roller model.

3:7:4 BALLASTING:

Ballasting or adding weight to the rollers is optional for certain applications including, but are not limited to; forage crops, pasture and grazing land.

The extra weight assists in pushing over the plant material and contact the uneven ground surface features.

Normally water is used for ballast:

- Rotate unit, bringing the Bung to the top of roller.
- Remove Bung and add water.
- Generally, filling 1/4 to 1/2 full provides sufficient extra weight for most applications.

Note:

On uneven terrain, it is recommended to fill drum completely in order to increase stability and prevent weight shift.

- Install and tighten the Bung.

Note:

Adding weight to roller substantially increases the weight of the machine. Increase size of tractor accordingly.

To drain the ballast:

- Remove the Bung.
- Move roller to bring the Bung to the bottom.
- Allow water to drain fully.
- Rotate the machine to bring the Bung to top again.
- Install and tighten Bung.

3:7:5 SOIL MOISTURE:

Do not use the machine to roll a field if the soil sticks together or adheres to the roller. In addition to sticking to the rollers, wet conditions can cause the soil to form a crust on the surface of the field. This will prevent plant emergence.

Wait until the surface is dry before rolling.

Note:

Manufacturer will not be liable for damage caused by misuse of machine.



Fig. 24 Roller Bungs

3:7:6 HITCH TYPE:

The Land Roller is designed with a clevis or pintle hitch, installed at the factory. It works well with bar or clevis type hitch on the tractor.

The alternate attachment is available if required.

Be sure to match the machine and tractor hitches before attaching to the tractor and moving the machine.



Fig. 25 Hitch: Clevis/Pintle

3:7:7 HITCH HEIGHT:

The height of the pintle hitch can be adjusted by the mounting position on the front of the hitch frame or the turnbuckles on the Mini Land Roller model.

Use the jack to match the machine hitch height to the tractor hitch.



Fig. 26 Hitch Height: Turnbuckles

3:7:8 TRAVEL SPEED:

The operator must determine the appropriate speed for the terrain and field conditions. It is not recommended to travel faster than 10 km/h (6 mph) in the field to prevent bouncing.

Slow down for rough, hilly or rolling terrain. To be effective, the roller must keep contact with the ground during operation. Select a speed that will keep the roller operating properly.



Fig. 27 Travel Speed: Single Land Roller



Fig. 28 Travel Speed: Mini Land Roller

3:7:9 TURNING (CORNERING) SPEED:

It is recommended that the speed be reduced by half when approaching the end of the field, or a corner. By slowing to half speed or less, the roller will be more controllable.

If the terrain results in the turn taking place while going down-hill, you must slow down well before the turn.

Note:

Slowing down ensures control is maintained.
This prevents pushing the tractor
into a jackknife condition.
Particularly important in hard soil conditions.

Slowing down before turning allows the driver to better judge what distance the outer end of the roller is from the end of the field or corner.

Note:

Misjudging the distance can result in hitting
an obstacle at the end of the field.
Do not take the chance.



Fig. 29 Cornering: Mini Land Roller



Fig. 30 Cornering: Single Land Roller

3:7:10 OPERATING HINTS:

- Raise machine into its fully up position (wheels down) and install lock brackets over cylinder rams before transporting for the Mini Land Roller model.

- Once cylinder stops have been installed and secured, release pressure from tractor to lift cylinders.

- When ballasting the machine, bring the water truck to the field.
 - Add water to the rollers.
 - Level field.
 - Drain water before leaving the field.

ATTENTION: Equipment Damage Imminent
 Frame is not designed to carry the weight of a ballasted machine. It will damage the machine and void warranty.



Fig. 31 Transport Lock Brackets



Fig. 32 Transport Lock Brackets



Fig. 33 Bungs

3.8 TRANSPORT TO FIELD CONVERSION

The Single Land Roller model roller always moves on its roller and doesn't need its configuration changed for transport. However, it is recommended a truck or trailer be used for longer moves.

The Mini Land Roller model roller is designed to be easily converted from transport to field configuration with minimal effort.

Follow this procedure when converting:

1. Clear the area of bystanders, especially small children.
2. Move the machine into an open area.
3. Raise the machine into its fully UP position (fully extend lift cylinder).
4. 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.
5. Remove the wheel lift cylinder lock brackets.
6. Stow wheel lock brackets on storage rod on center roller frame.
7. Reverse procedure when converting from field to transport configuration.



Fig. 34 Single Land Roller Model



Fig. 35 Cylinder Stops Installed



Fig. 36 Removing Cylinder Stops



Fig. 37 Stowed

3.9 TRANSPORTING

Mandako Mini and Single Land Rollers are designed to be easily and conveniently moved from place to place. The Single Land Roller model always moves on its roller as it travels from location to location. Use a truck or trailer when moving long distances. For the Mini Land Roller model, it is recommended to use the wheel assembly when moving or transporting.

When transporting, follow this procedure:

1. Be sure all bystanders are clear of the unit.
2. Be sure that the unit is hitched properly to the towing vehicle and a retainer is used through the hardened drawbar pin. Always attach safety chains between the tow vehicle and unit. Cross the chains under the hitch to support the hitch should unplanned separation occur.
3. Convert into transport configuration for the Mini Land Roller model only (Refer to Section 3.8).

IMPORTANT:

Do not raise the frame or transport with ballast in the roller.

4. Prepare machine for transport:
5. Raise the machine into its fully up position.
6. Install the cylinder stops over the roller wheel lift cylinders.



Fig. 39 Single Land Roller Model



Fig. 40 Frame Up



Fig. 38 Installing Bracket

- 7. Lower the wheel assembly and rest the machine weight on the lock brackets.
- 8. Relieve the hydraulic system pressure.



Fig. 41 Installed



Fig. 42 Transporting: Mini Land Roller Model

- 9. Keep to the right and yield right-of-way to allow faster traffic to pass. Drive on shoulder of road if permitted by law.
- 10. 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.
- 11. 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 roller weight.
- 12. Do not allow riders on the machine.
- 13. During periods of limited visibility, use pilot vehicles and extra lights on the machine.
- 14. Always use hazard flashers on the tractor when transporting unless prohibited by law.

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. 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.
5. Touch up all paint nicks and scratches to prevent rusting.
6. Move the unit to its storage area. Inside a building is ideal.
7. Select an area that is dry, level and free of debris.
8. Place the machine into its transport configuration or rest the rollers on the ground to relieve pressure in the hydraulic system.
9. Place planks under the jack for added support if required.
10. Unhook the machine from the tow vehicle (refer to section 3.5.2).
11. Store unit in an area away from human activity.
12. Do not allow children to play on or around stored roller.
13. 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. 43 Stored: Mini Land Roller Model



Fig. 44 Stored: Single Land Roller Model

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. Lubricate all grease fittings (except for drum bearings).
5. Clean rust inhibitor or grease from exposed cylinder ram ends.
6. Replace any worn or defective parts.
7. Go through the pre-operation checklist (See section 3.4) before using unit.

Section 4: SERVICE AND MAINTENANCE

-
- 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.
-

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.

IMPORTANT:

The Mini and Single Land Roller is designed with sealed bearings on the rollers and bushings in all other locations.

Only give the roller bearings one shot of grease once a year..

4:2:1 ANNUALLY OR EVERY 1000 ACRES:

1. Grease the roller bearings with one shot of grease (2 locations).
2. Grease turnbuckles on Single Land Roller model with one shot of grease.
3. Grease jack with one shot of grease.



Fig. 45 Roller Bearing - Single Land Roller



Fig. 46 Roller Bearing - Mini Land Roller



Fig. 47 Turnbuckles



Fig. 48 Jack

4. Grease wheel bearings.



Fig. 49 Wheel Bearing Fittings

5. Clean and wash machine.



Fig. 50 Wash Machine: Mini Land Roller



Fig. 51 Wash Machine: Single Land Roller

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																		
ANNUALLY OR EVERY 1000 ACRES																			
Grease Roller Bearing																			
Grease Turnbuckles																			
Grease Jack																			
Grease Wheel Bearings																			
Clean Machine																			

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

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Grease Jack																	
Grease Wheel Bearings																	
Clean Machine																	

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Section 5: TROUBLE SHOOTING

This Mini and Single Land Roller 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
----------------	-------------------

Unit sways during transport

Leaking wheel cylinder	Replace cylinder seals
Leaking tractor hydraulic control valve	Repair tractor

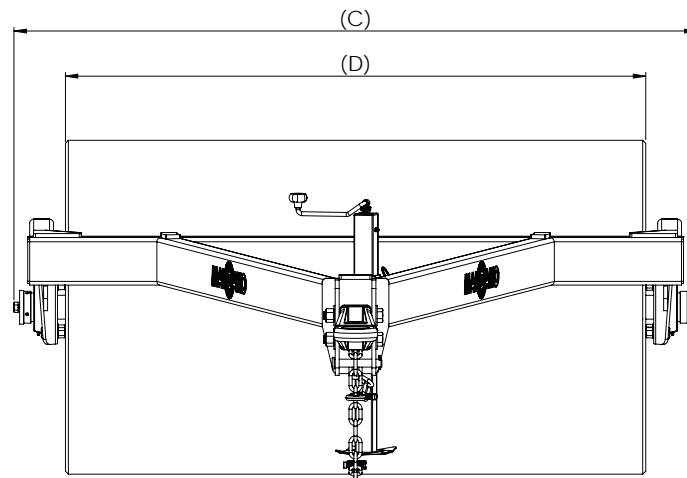
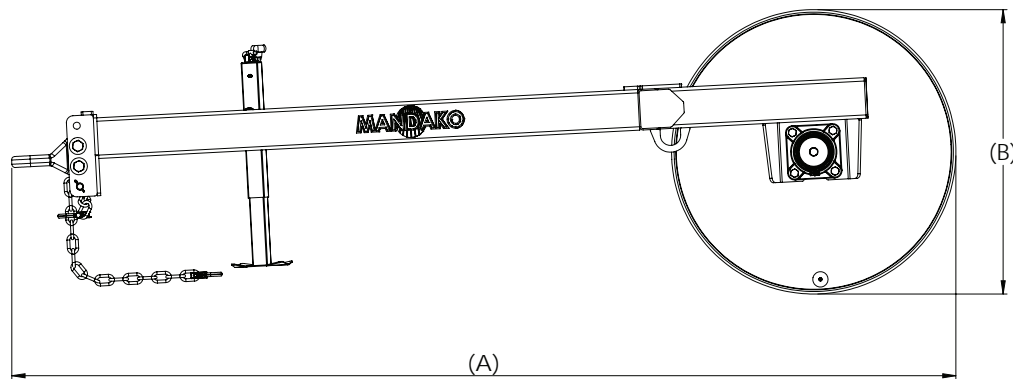
Section 7: REFERENCE

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

Specifications may change without notice.

7.1 SINGLE LAND ROLLER MECHANICAL SPECIFICATIONS

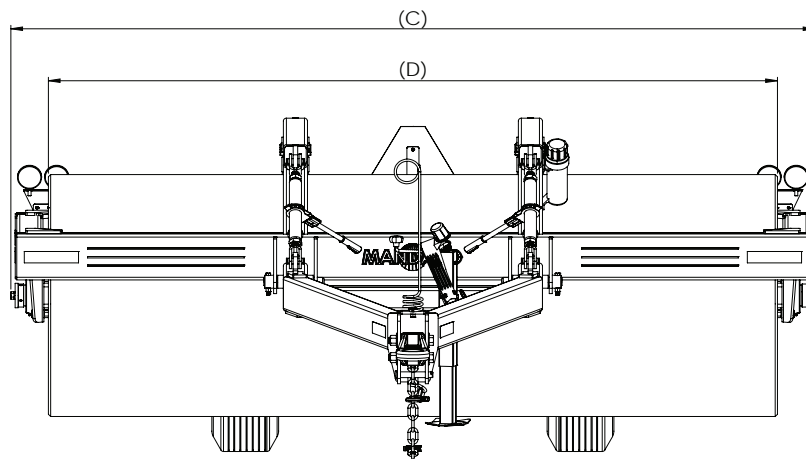
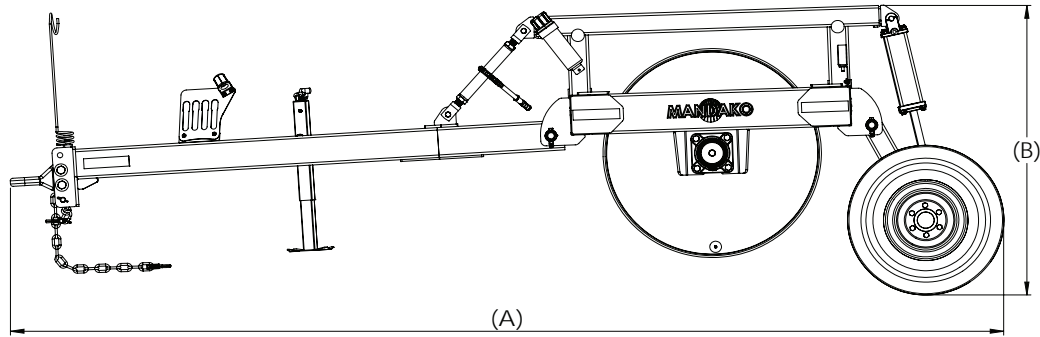
SINGLE LAND ROLLER SPECIFICATIONS



Dimension	Unit Size						
	4'	6'	8'	10'	12'	15'	20'
Transport Length (A)	11'-8"	11'-8"	11'-8"	11'-8"	11'-8"	11'-8"	11'-8"
Overall Height (B)	3' / 3'-6"	3' / 3'-6"	3' / 3'-6"	3' / 3'-6"	3' / 3'-6"	3' / 3'-6"	3' / 3'-6"
Overall Width (C)	5'-2"	7'-2"	9'-2"	11'-1"	13'-1"	16'-1"	21'-1"
Working Width (D)	4'-1"	6'-1"	8'-1"	10'-1"	12'-1"	15'-1"	20'-1"
Horsepower Req.	24+	24+	32+	40+	48+	60+	80+
Approx. Weight (lbs/ft) 42" x 3/4" Drum	540	490	455	445	430	410	395
Drum Size	36" x 1/2" W 42" x 5/8" W 42" x 3/4" W						

7.2 MINI LAND ROLLER ROLLER MECHANICAL SPECIFICATIONS

MINI LAND ROLLER SPECIFICATIONS



Unit Size						
Dimension	6'	8'	10'	12'	15'	20'
Transport Length (A)	15'-11"	15'-11"	15'-11"	15'-11"	15'-11"	15'-11"
Overall Height (B)	5'	5'	5'	5'	5'	5'
Overall Width (C)	7'-2"	9'-2"	11'-1"	13'-1"	16'-1"	21'-1"
Working Width (D)	6'-1"	8'-1"	10'-1"	12'-1"	15'-1"	20'-1"
Hyd. Req. (@2800PSI)	5 GPM (19 LPM)	5 GPM (19 LPM)	5 GPM (19 LPM)	5 GPM (19 LPM)	5 GPM (19 LPM)	5 GPM (19 LPM)
Hyd. Req. (Ports)	1	1	1	1	1	1
Horsepower Req.	24+	32+	40+	48+	60+	80+
Approx. Weight (lbs/ft) 42" x 3/4" Drum	725	640	585	550	515	480
Drum Size	36" x 1/2" W 42" x 5/8" W 42" x 3/4" W					
Tire Size	ST235/80R16E 10 Ply	ST235/80R16E 10 Ply	ST235/80R16E 10 Ply	ST235/80R16E 10 Ply	ST235/80R16E 10 Ply	ST235/80R16E 10 Ply

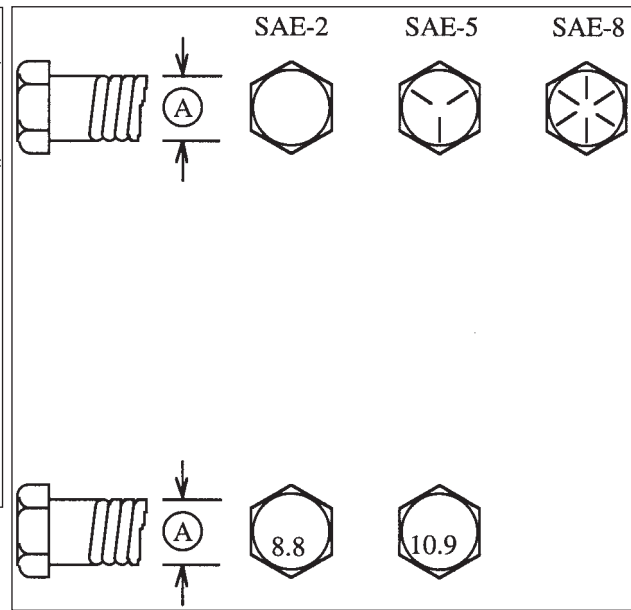
7.3 BOLT TORQUE

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.

7.4 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.
- The torque values shown are based on lubricated connections as in reassembly.

Pipe Rigid - Tapered Pipe Threads (NPTF, N/NF) - Carbon Steel			
Pipe Size	Turns-from-finger	Max ft-lbs	Max N-m
1/8" (-2)	3/4 - 1 3/4	12	16
1/4" (-4)	3/4 - 1 3/4	25	34
3/8" (-6)	3/4 - 1 3/4	40	54
1/2" (-8)	1/2 - 1 1/2	54	73
3/4" (-12)	1/2 - 1 1/2	78	106
1" (-16)	1/2 - 1 1/2	112	152
1 1/4" (-20)	1/2 - 1 1/2	154	209
1 1/2" (-24)	1/2 - 1 1/2	211	286
2" (-32)	1/2 - 1 1/2	300	407

For reference only, Source: Air-Way Manufacturing Co. - Carbon Steel Hydraulic

Stud End O-Ring Boss (ORB) SAE (U/UF)			
		Carbon Steel	
Tube Size	Thread UNF-2A	Max ft-lbs	Max N-m
-2	5/16" - 24	6-7	8-9
-3	3/8" - 24	8-9	11-12
-4	7/16" - 20	13-15	18-20
-5	1/2" - 20	17-19	23-26
-6	9/16" - 18	22-24	29-33
-8	3/4" - 16	40-43	49-53
-10	7/8" - 14	43-48	59-64
-12	1 1/16" - 12	68-75	93-102
-14	1 3/16" - 12	90-99	122-134
-16	1 5/16" - 12	112-123	151-166
-20	1 5/8" - 12	146-161	198-218
-24	1 7/8" - 12	154-170	209-231

For reference only, Source: Air-Way Manufacturing Co. - Carbon Steel Hydraulic

O-Ring Face Seal Fitting (ORFS) (F/FF)			
Tube Size	Thread UNF-2A	Torque ft-lbs	Torque N-m
-4	9/16 - 18	10-12	14-16
-6	11/16 - 16	18-20	24-27
-8	13/16 - 16	32-35	43-47
-10	1 - 14	46-50	60-68
-12	1 3/16 - 12	65-70	90-95
-16	1 7/16 - 12	92-100	125-135
-20	1 11/16 - 12	125-140	170-190
-24	2 - 12	150-165	200-225

For reference only, Source: SAE J1453 Rev Jun 98

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