Solis

OPERATOR MANUAL

FRONT END LOADER

SOLIS H24 HYDROSTATIC CABIN

CONTENTS:

1. IDENTIFICATION

Congratulation on our purchase of a Solis Front End Loader. Look a get it and it will give you many years of trouble-free service.

The model and serial number is stamped on a plate on the outside of the right-hand loader arm. Please quote both numbers when ordering spare parts or accessories.

Loader Serial No:_____

Date Purchased: _____

Authorized Dealer:

_____

Atachment Make &Model:_____

If ownership of this machine changes, this manual should accompany the machine.

Front loaders should be identified using the name pl te, which is permanently aaached to the main frame. The data included on the nameplate of Loader are shown fig 1.1

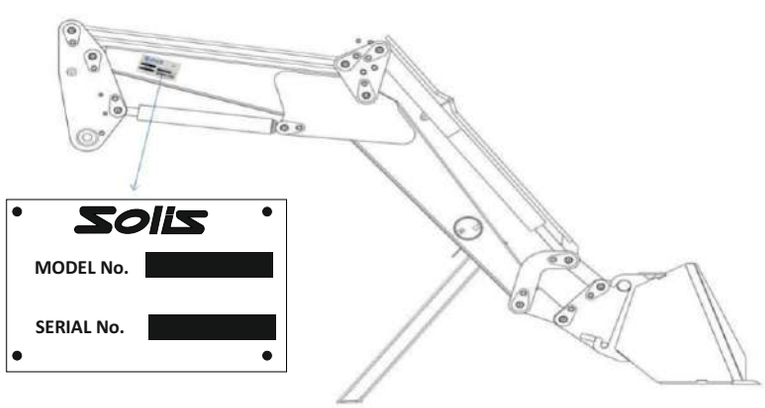


Fig .1.1 nameplate of loader

2. DESCRIPTION

The Front end Loader is an atachment to a tractor, used ffor lifting & moving the loads. The Front end Loader is activated by hydraulic cylinders powered by tractor's hydraulic system and controlled by the operator. The Front end Loader is atached or detached from the tractor quickly & effortlessly by quick change system. The support legs ensure that the detached Frontend Loader is stable. The implements are connected to the Frontend L oader via quick change frame to enable fast and safe implement change.

The Frontend Loader consists of:

1. Tilt cylinders
2. Quick change frame
3. Standard Bucket
4. Post cap (drive-in system for sub frame post)
5. Lifting cylindes

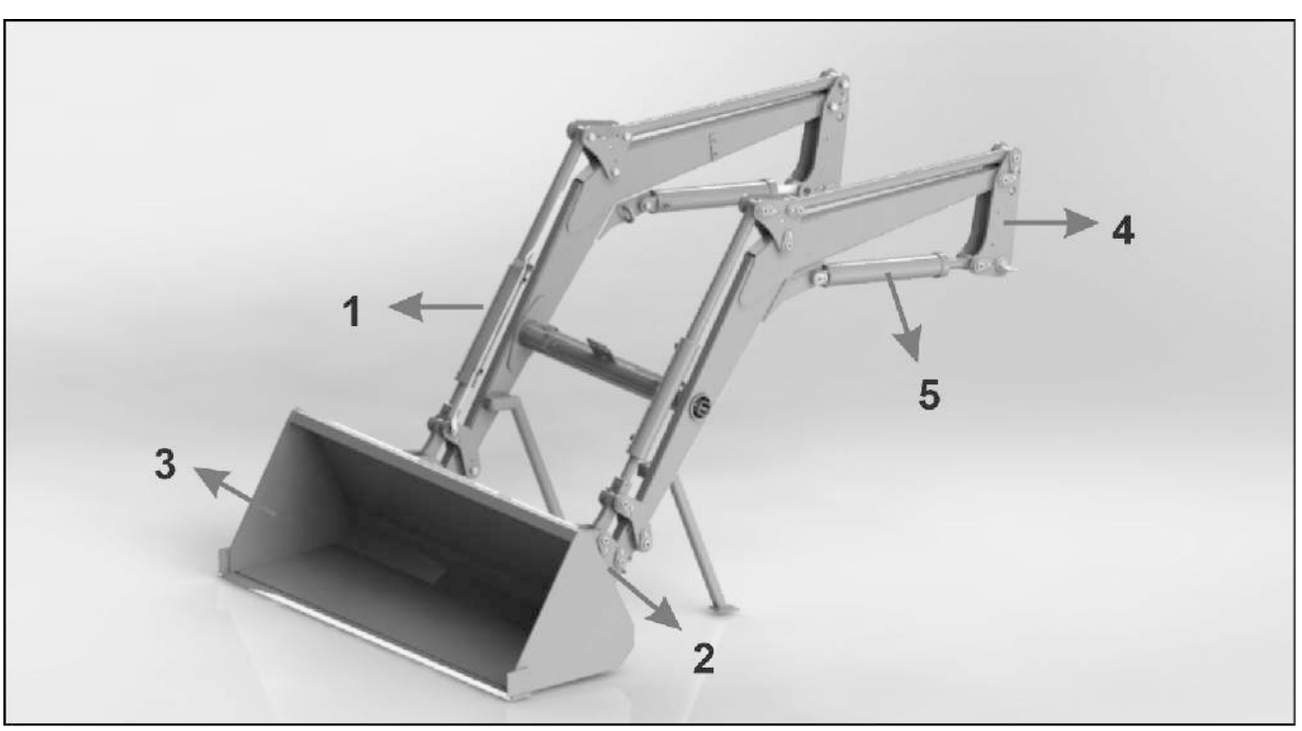


Fig 2.1 Front end loader parts.

3. SAFETY INSTRUCTION

TO AVOID ACCIDENTS AND INJURY, READ AND UNDERSTAND THESE INSTRUCTIONS

This machine is inherently dangerous to children and person unfamiliar to its operation. The ope tor should be a responsible adult and be familiar with the operation of this machine. arnings are used in this manual to avert bodily injury & machine damages.
Always read and comply with these warnings. Warnings are introduced with words in bold font.


CAUTION

The symbol points to especially important information and recommendations. Non- compliance with the described recommendations theatens serious damage to the machine due to its incorrect operation.


WARNING

The symbol indicates the possibility of occurrence of a hazard which, if not prevented, may result in death or serious injury. This symbol informs on a smaller level of the risk of injury than the symbol including the word "DANGER"


INFORMATION

The symbol indicates useful information.


NOTE

Upon purchase, check the compliance of the factory number located on the machine rating plate with the number writen in the insstruction manual and guarantee certifi ate. It is crucial for validating the guarantee. In the case of the user contact with the service, seller or manufacturer, the user is obliged to indicate the information included on the machine rating plate.


NOTE

The instruction manual is povided as the basic equipment of each loader. Entering public roads without the nameplate or with an illegible nameplate prohibited.

NOTE

In the case of the sale of the machine to another user it is obligatory to provide the instruction manual. It is recommended for the front loader supplier to archive the instruction manual eceipt confirmaton by the purchaser, submited with the machine to the new user detailed explanation regarding the design,functioing,operating principle and any other maters related to the machine can also be provided by authorised dealers/manufacturer.

The front loader is intended for the loading and unloading of loose and bulk agricultural materials such as:fertlizers, grain, gravel, root crops, manure, silage, bales of silage, hay and straw.

3.1 BEFORE USING THE LOADER

After fitting the loader to the tractor, operate it through all its movements, carefully checking hose movements, clearance and correct function.

3.2 USING THE LOADER

- Use your loader with care and common sense.
- Do not lift orc ary people on the loader or in its aaachments.
- Do not walk or work under a raised loader unless it is securely blocked.
- Never leave your loader unatended with the running engine.
- Never leave a loader raised. Always lower it to the ground when you leave it.
- Keep the bucket as low as possible when travelling for maximum stability.
- Be watchful for overhead wires and other obstacles.
- If loader is fited with a Quick-change atachment frame, be sure that the locking lever is fully engaged when ataching implements/atachments.

- Do not use the bucket in the dumped position or gading or bull dozing. This imposes severe loads on the bucket cylinders which will ofen cause bending of the rods.
- In some cases, when the loader is at full height, do not dump the bucket and lower it may go into a force lock, the same implies to when the loader just above the ground, Do not dump and lift the loader.
- Lower the bucket slowly. Rapid stops in the lowering movement can damage the loader's and/or tractor's hydraulic systems.
- Always exercise great care when ataching or detaching the loader and it’s implements.
- If you have questions egarding the operaating manua lontact SOLIS authorized dealer.
- Comply with the accident prevention egulaations as well as the technical safety, occupational health, and road traffic regulations of the country where the front end loader is used.
- Connect the brake pedals of the tractor together. Never use separated brakes if a front loader is mounted.
- Ensure that the front ties ae inflated to the prescribed pressure for load operaation as specified in the operating manual of the tractor.
- Ensure that the lights and reflectors of the tractor are not covered by the front end loader when driving on public roads.
- Switch o ffthe front axle suspension of the tractor (if applicable).

NOTE

The loader must not be operated by person who have not read this manual.

3.3 BACK GRADING

When back grading, the angle between the botom of the bucket and the ground must not be more than 15 degrees.

Failure to follow these instructions ould cause loader tilt cylinders to fail and void warranty.

Never use bucket or other atachmennt in position showno push or doze material. This will cause excessive pressure in bucket cylinder and will cause failure to your loader, which is not covered under warranty.

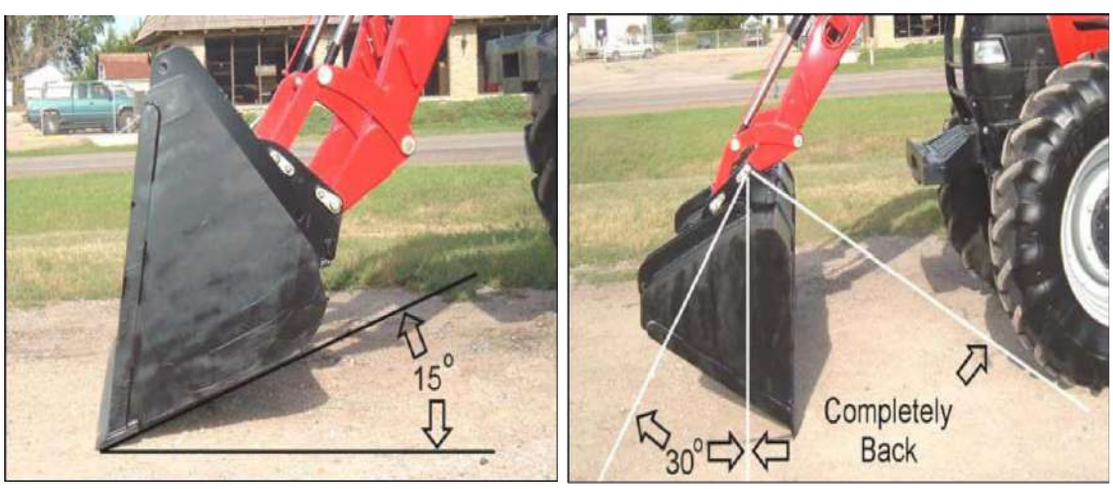


Fig 3.1 back grading

NOTE

NOTE: Never dump bucket over with grapple open and use grapple as a ripper. This will cause excessive pressure in bucket cylinder and will cause failure to your loader, which is not covered under warranty.

4.OPERATION

4.1Ballasting the tractor

Always use a counterweight in the rear of the tractor for front end loader work.

- This is necessary for operational and load safety reasons.
- Ensure that steerability remains intact and the minimum braking distance is also ensured for front end loader work.
- Remove the front weights for front end loader work.
- However, to exclude the possibility of tractor overload, the rear weight should not be selected too heavy. Comply with the values specified in the below table.

Tractor power		Front end Loader size	Maximum ballast weight / pound (0.8m behind the rear axle)
kw	HP		
7 - 18	10-25	250	100 – 2 00
11 - 22	15-30	350	200 – 3 00
18 – 37	25-50	450	300 – 4 00

At least 20% of the total weight (tractor, front end loader, implement, load and weight) must be on the rear axle, to ensure stability

- Use the equation below o calculate stability. If the equaation is satified, stability is achieved.

$$\frac{G L2 + M (L1 + L2) - Nb}{L2} \geq P + N + M(20\%)$$

5

- P…mass of tractor and front loader without counterweight and without implement
- G…rear axle load of the tractor with front loader without counterweight and without implement
- M…mass of the counterweight
- N…mass of the maximum permissible load including the implement
- b…horizontal distance between front axle and center of gravity
- Load L1…horizontal distance between rear axle and center of gravity
- L2…wheelbase of the tractor shown in figure 4.1

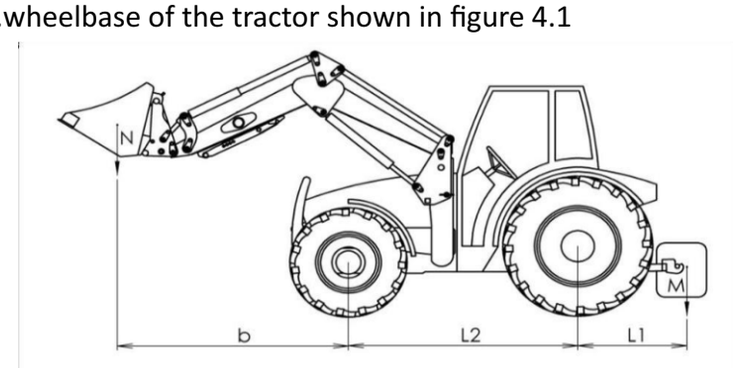


Fig. 4.1 Ballasting Schematic

FILLING THE BUCKET

- Approach and enter the pile with a level bucket. Ease lever back and toward you to lift and ollback the bucket shown in figure 4.2

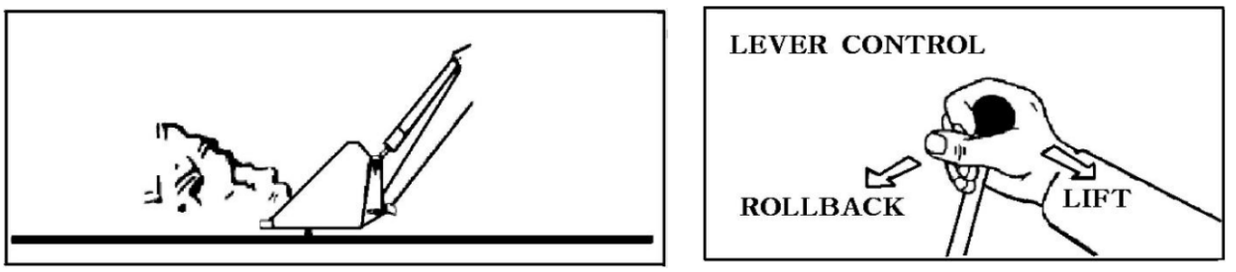


Fig 4.2 level control rollback

- The lift and rollback ofthe bu et will increase efficiency because a level bucket throughout the lifting circle resists bucket lift and ince ases breakaway effort shown in figure 4.3.

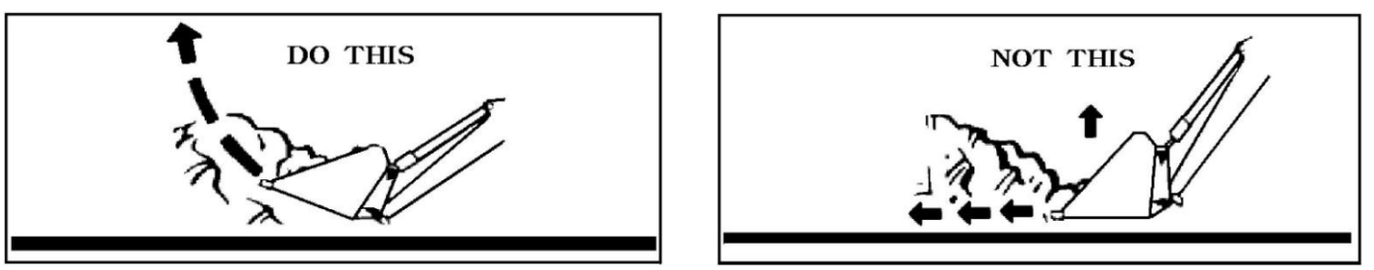


Fig 4.3 Scooping operation.

Note: Do not be concerned if the bucket is not completely filled during each pass Maximum productivity is determined by the amount of material loaded in a given period of time. Time is lost if two or more atempts are made to fill the bucket on each pass.

- Operating the loader on a hillside is dan erous. Extreme care is recommended shown in figure 4.4.

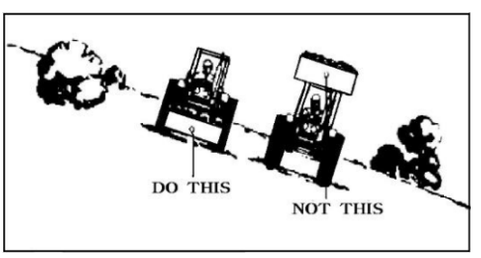


Fig .4.4.Driving on hillside.

- When transporting the load, keep the bucket as low as possible to avoid tipping, in case a wheel drops in a rutshown in figure 4.5

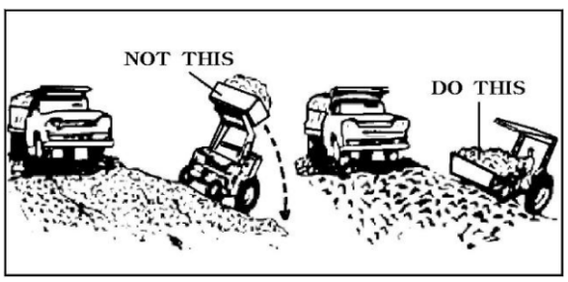


Fig 4.5. Operation during ansportaation

DUMPING THE BUCKET

- Lift the bucet high enough to clear the side of the vehicle.
- Move the tractor in as close to the side of the vehicle as possible, then dump the bucket shown in figure 4.6.

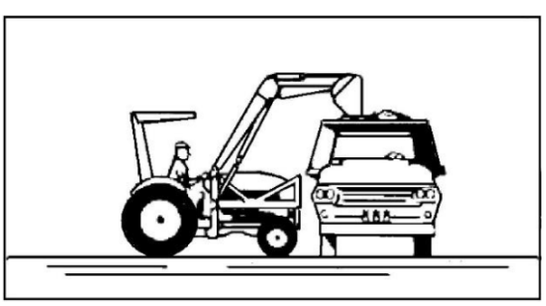


Fig 4.6.Dumping load

LOWERING THE BUCKET

- If your loader is equipped with float feature.
- Afer the bucket is dumped, back away from the vehicle while lowering and rolling back the bucket shown in figure 4.7.

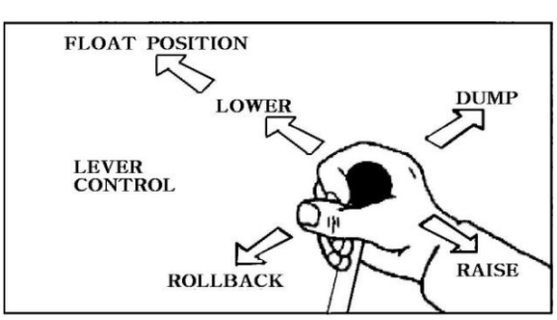


Fig 4.7.Lowering.

- If the pile sides are too high and liable to cause cave-in, Use the loader to break down the sides until a slot can be cut over the top shown in figure 4.11.

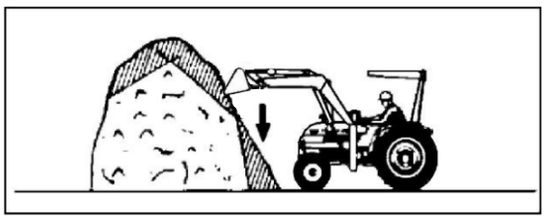


Fig 4.11.Break /cut big piles.

- Another method for large dirt piles is to build a ramp approach to the pile shown in figure 4.12.

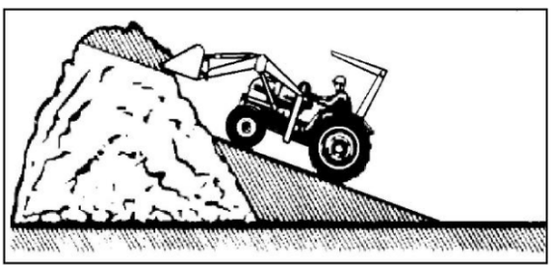


Fig 4.12.Scooping large piles

- It is important to keep the bucket level when approaching a bank or pile. This will help to prevent gouging the work area shown in figure 4.13

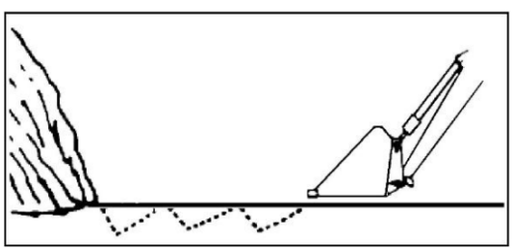


Fig 4.13. Prevent Gouging.

PEELING AND SCRAPING

- Use a slight bucket angle, travel forward, and hold the lift ontrol forward to start the cut. Make a short, angle cut approximately 6” deep and break out cleanly shown in figure 4.14.

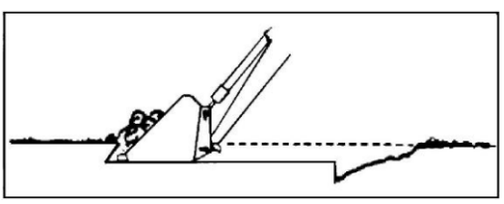


Fig 4.14.Peeling and scraping.

- With the bucket level, start a cut at the notch approximately 2 inches deep.
- Hold the depth by feathering the bucket control to adjust the cutting lip up or down. When the front ties e ter the notch, adjust the lift o maintain proper depth shown in figure 4.15.

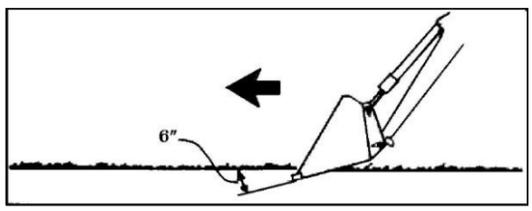


Fig 4.15. Adjustment to the bucket.

- Make additional passes u ntil the desed depth is reached. During each pass, only use the bucket control while at working depth. This will allow you to concentrate on controlling the bucket angle to maintain a precise cut shown in figure 4.16.

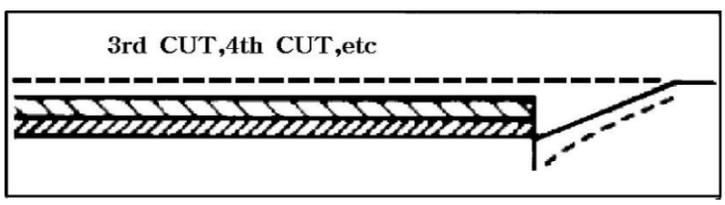


Fig 4.16. Addition of passes.

LOADING LOW TRUCKS OR SPREADERS FROM A PILE

- For faster loading, minimize the angle of turn and length of run between pile and spreader shown in figure 4.17.

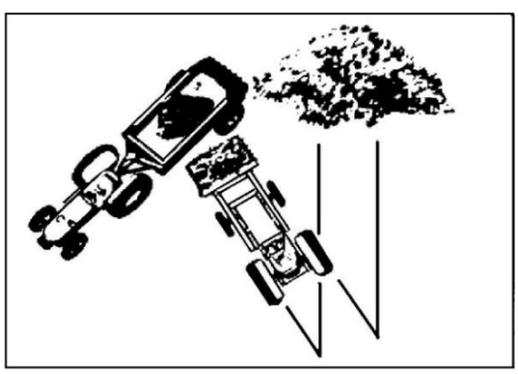


Fig 4.17.Faster loading.

BACK FILLING

- Back grade occasionally with a loaded bucket to keep the working surface free of ruts and holes. Hold the liftc o trol forward in FLOAT POSITION so that full weight of the bucket is scraping the ground. Use only the heel of the bucket while back grading shown in figure 4.18.

IMPORTANT: To prevent damage to Cylinders:

(1) Do not back grade with bucket cylinders extended.

(2) Always back grade with valve in float position.

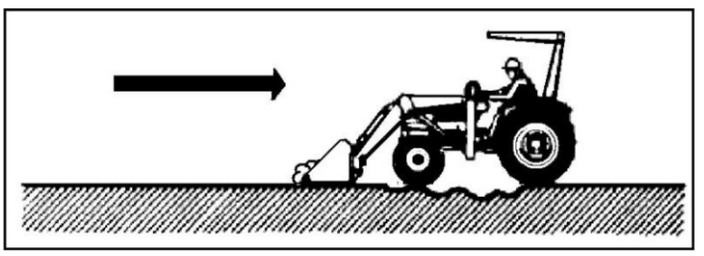


Fig 4.18.Back grading.

- Approach the pile with a flat bucket shown in figure 4.19.

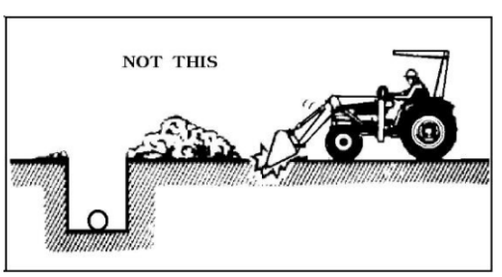


Fig 4.19. In appropriate approachability to a pile.

- Poor methods move no more dirt and make it more difficult to hold a level grade.
- Do not use the bucket in the dumped position or bulldozing or backgrading.

This method, shown above, will impose severe shock loadings on the dump linkage, the bucket Cylinder, and the Tractor shown in figure 4.20.

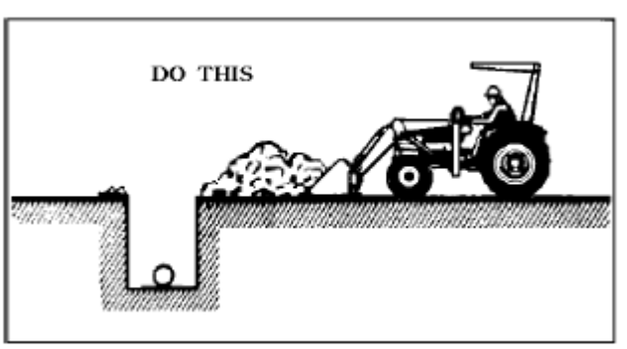


Fig4.20.Approach the pile with a flat bucket.

- Leave dirt in the bucket because dumping on each pass wastes time shown in figure 4.21.

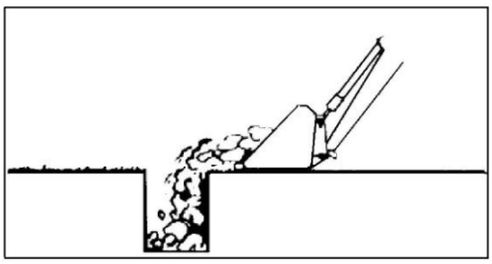


Fig 4.21. Dumping into a ditch.

- Operate at right angles to the ditch, take as big as the tractor can handle without lugging down shown in figure 4.22.

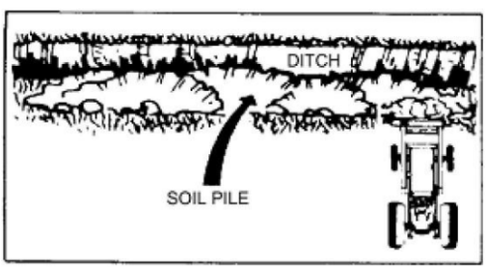


Fig 4.22. Maintain Right angles while dumping into a ditch.

- Leave dirt which drifts o er the side of the bucket for final clean-up shown in figure 4.23.

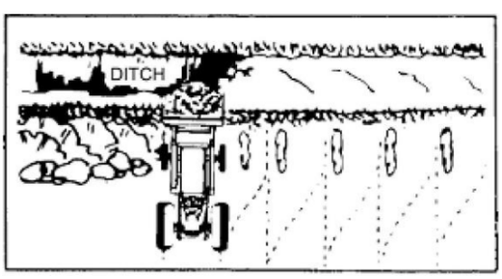


Fig 4.23 Leave drifts or final cleanup

- Pile dirt on the high side for easier back filling on a slope shown in figure 4.24.

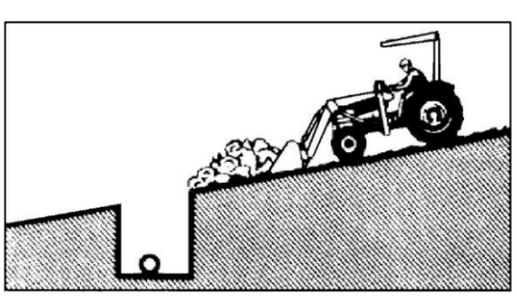


Fig 4.24.Pile dirt on the high side

5. SUBFRAME FITMENT INSTRUCTIONS:

The Subframe Consists of

1. Rams horn
2. Main plate
3. Cross Member
4. Rear Arm
5. Valve mount
6. Rear axle mount
7. Post

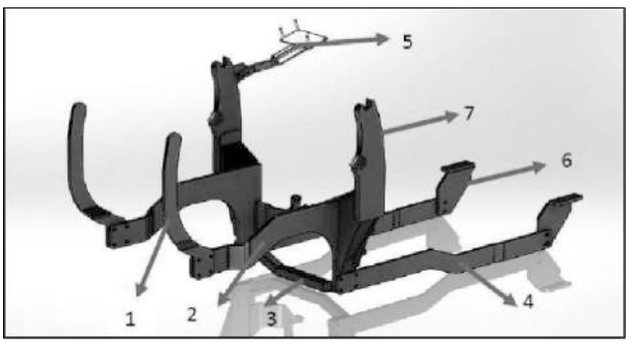


Fig. 5.1. Subframe parts

These are general instructions for fitting sub-frame kits to tractors:

- Note: This instruction is of a general nature and must be read in association with the specific tractor model fitting drawings and instructions (if a y) provided.

- Due to variations between one tractor and the next of the same model and creep-age during welding of the sub-frame, some variation may be expected and so the fi er will need to adapt to accommodate. All sub-frame bolts must be torqued to the correct settings (see documentation povided) and thread lock must be used. It is recommended that all bolts be fitted before any are fully tightened – it may be advisable to apply loctie only aaer the initial fitting has be completed.

Documentation Required:

- The document which p rovides general sub-frame fitting instructions.
- Sub-frame Bolts Kit (showing the sub-frame and where to fit all the bolts to mount it)
- Hydraulic Fitting Instructions (showing schem atally how to plumb the tractor to the valve).
- Joystick assembly instructions(if a j ysstick andables was ordered).
- Bolt torque chart.

5.1 CONNECTING THE LOADER HYDRAULIC SYSTEM

- Connect the loader valve block (4) to the hydraulic system of the tractor, as shown in the diagram below shown in figure 5.1.1.

  - 1 – Powercable
  - 2 - Outlet line
  - 3 - Overflow line
  - 4 - Loader valve block
  - 5 - Valve block connector
  - 6 - Tractor hydraulic pump
  - 7 - Tractor hydraulic valve block
  - 8 - Tractor hydraulic oil tank

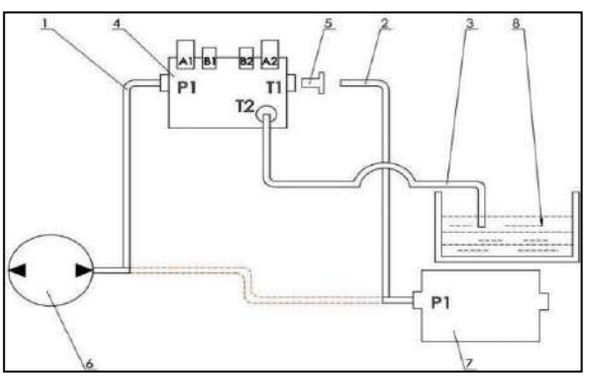


Fig. 5.1.1. General diagram of the Loader's hydraulic connectons

Procedure:

- Disconnect the tractor valve block (7) from the pump(6).
- Use line (1) to connect the tractor pump to port P1 of the Loader valve block(6).
- Install a valve block connector (5) in port T1 of the Loader valve block(4).
- Using connector (5), connect the loader valve block (4) to port P1 of the tractor's hydraulic valve block (7) with line(2).
- Using the overflow line (3), connect the overflow port T2 of the loader valve block (4) With the tractor's hydraulic oil tank.
- Ensure the proper purity of oil. The purity of oil in the tractor's hydraulic system must be compliant with condition20/18/15 of ISO-44061996.

CONNECTION OF THIRD FUNCTION WIRE HARNESS

The wire harness is only used for a loader with a third operation feature, this operation controls hydraulic cylinder of an atachment like 4 in 1 buckets, Grabber buckets and grapples shown in figure 5.1.2.

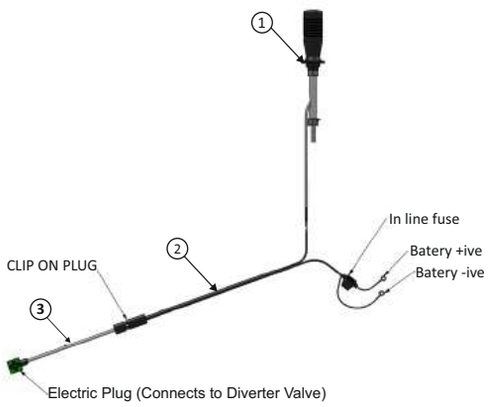


Fig 5.1.2 wire harness

- 1 is a push buton knob used to operate the aaachment.
- 2 will be connected to the batery of tractor.
- 3 will be connected to the female plug on the loader.

5.2 ARRANGEMENT OF ADJUSTMENT CONTROLS

The level indicator must be adjusted afer tool installaation.

Procedure:-

- Set the tool in the desired working position unlock the support.
- Set the support placing its center in the middle of the yellow indicator.
- Lock the support.
- The tool is at the horizontal position when the elbow (c) of the rod (a) is in the hole (b) shown in figure 5.2.1

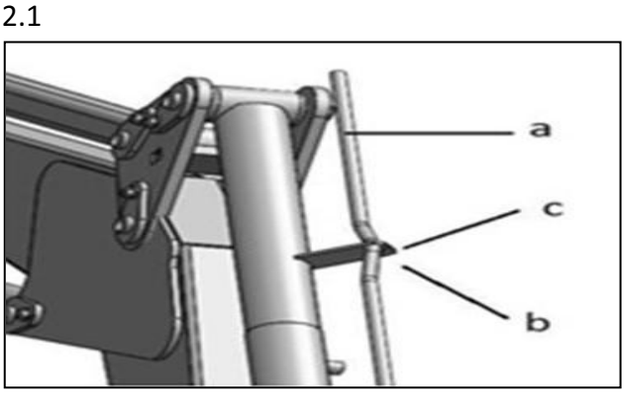


Fig 5.2.1 level indicator

5.3 CONTROL OPERATION

BEFORE USING THE LOADER

- Check the hydraulic oil level and top up as required in accordance with the tractor instructions.
- Add wheel ballast or rear weight for stability.
- Check all nuts, bolts, pins etc. for proper fit andtightness.
- Use front ties of the same size and keep equal pressure in both or Increase the pressure .
- Front ties to the pressure recommended bby the te manufacturer.
- Check load rating of fonnt tes and ensure correct pressure.
- Set the front wheel track to give clearance when on full lock and full oscillation.
- Use the same sized rear wheels and maintain equal pressure inthem.
- Adjust the rear wheel track to the widest practi al width.
- Hydraulic lines and threaded connectons that hydraulically connect the front end loader and tractor, are loosely pre -mounted in the factory, firmly tighten all threaded connections. After 5 operating hours re-tighten all threaded unions. The required tightening torques are specified in the manual.

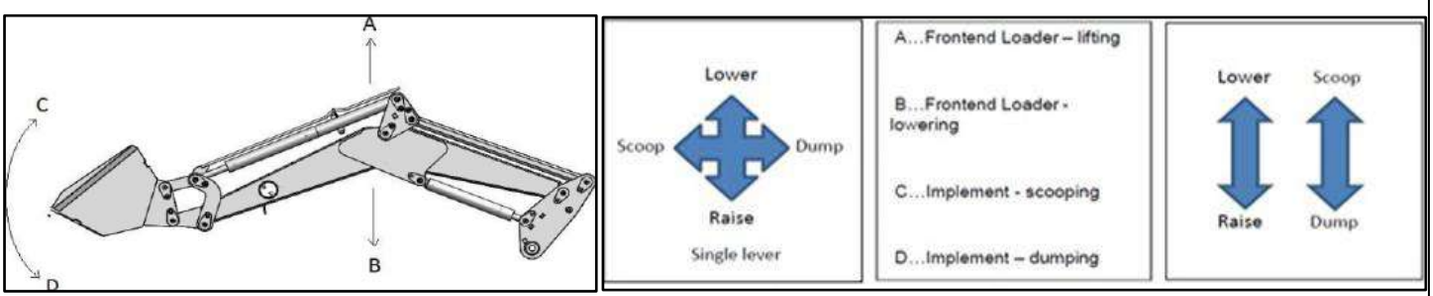


Fig 5.3.1loader operation

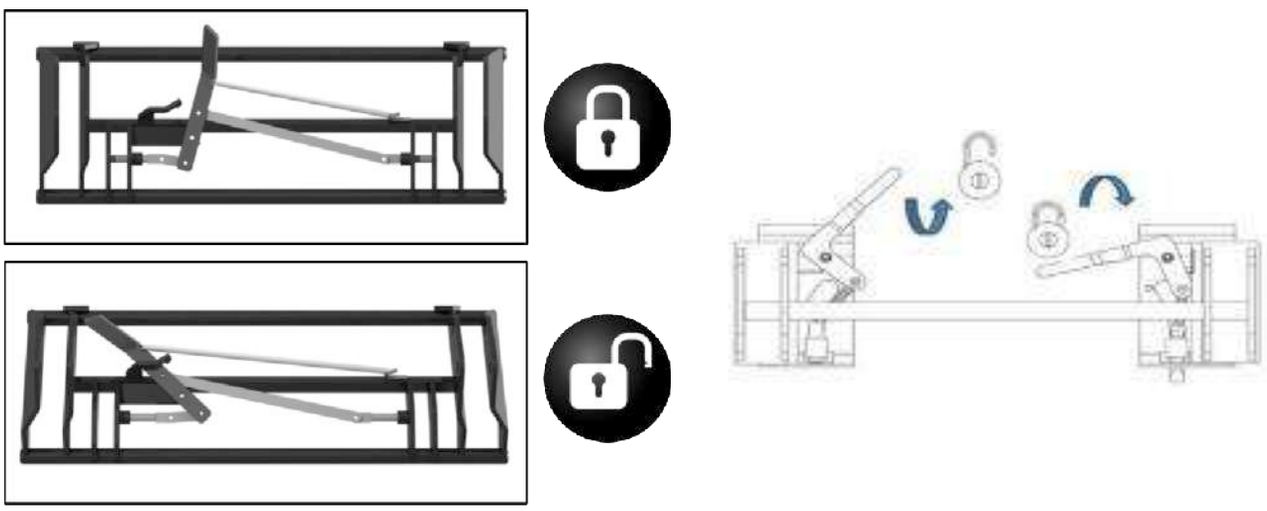


Fig 5.3.2 Euro work tool instruction& Skid steer lock and unlock instructions

6. QUICK DETACH INSTRUCTIONS

6.1 TO REMOVE THE LOADER (Quick Detach Models)

- Place the tractor on a level surface and raise the atachment approximately 4 feet from the ground.
- Standing outside the arms, (for higher range loaders) loose bolts, swing legs to down position on both sides and tig ten the bolts.
- Ensure legs are locked in the keepers, for compact loader.
- Pull out the upper leg with help of Lynch pin following the botom leg, ensure legs are locked in the keepers.
- Remove locking pins from the loader post (a), away from the pin and slide the pin out.
- Lower the loader arms until the tands are on the ground.
- Roll the bucket forward until the cutting edge is about 2 inches of the ground.
- Push the lift lever forward to close the lift cylindes. This will pull the bases of the post caps(b) away from the bushes in the post (d & c). When fully closed, pull the lever the other way for a moment to relieve pressure build up in the hoses.
- Drive the tractor forward about 1-1.5 inches.
- This will allow the loader to rock forward and be clear of the posts.
- Disconnect the hydraulic hoses and hang them on the loader, out of the way of the tractor.
- Reverse the tractor out from the loader.

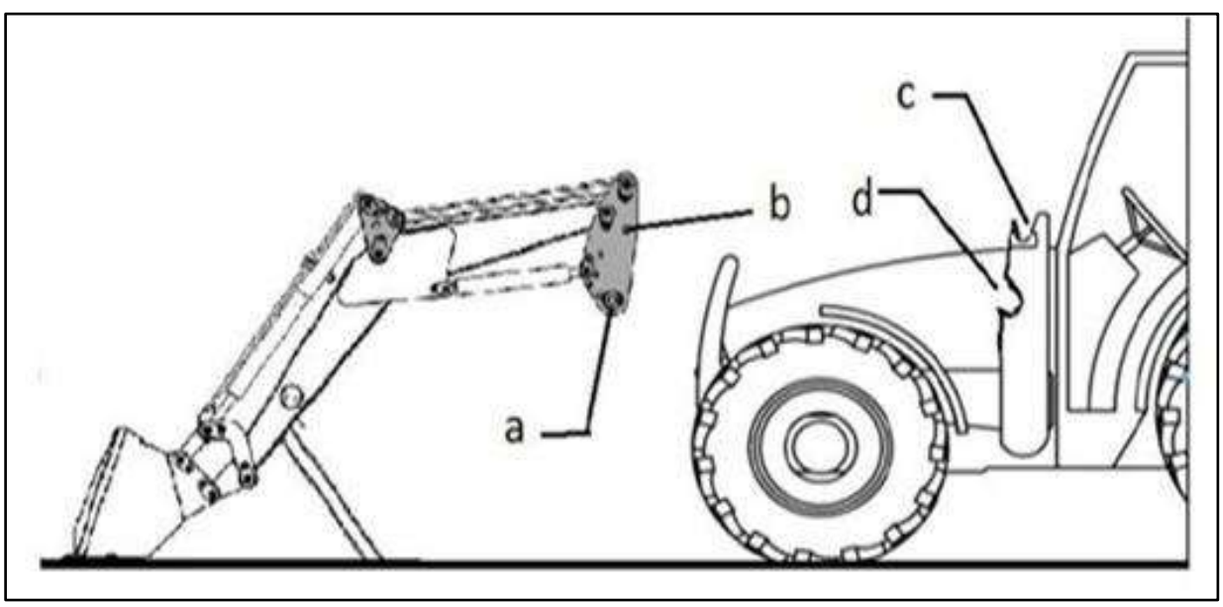


Fig 6.1.1 quick detach models

6.2 TO REFIT THE LOADER

- To re fit the loader, drive the tractor into the arms until the pot caps are over the posts.
- Connect the hydraulic hoses. If they are difficult to connect, stop the engine and move the hydraulic control levers to relieve the pressure in the hoses.
- Roll the bucket forward until the pot caps arre sitting on the posts.
- Extend the lift arms u ntil the pt caps engage the bush on the post.
- The post caps are fully engaged on to the bush on the post.
- Raise the atachment approximately 1.2m (4') from the ground and rreposition quick change.
- Pins and lock them with lynch pins provided.
- Standing outside the arms, loose belts, swing stand legs up into its keeper and fasten the belts.

Fig 6.2.1 refit the loader

In some loaders the supporting legs are folded into place then tightened in to place.

6.3 DISCONNECTING HYDRAULICS

- Turn your tractor off,and back on to accessory.Move your joystick from side to side with your diverter buton held in releasing pressure from the couplers and then disconnect.

- (3 Bank Valve and front remotes / Front remotes to Tractor remotes)
  Turn your tractor o ffand move the 3rd function lever up and down releasing pressure from the couplers and then disconnect.

6.4 RECONNECTING HYDRAULICS

- Turn your tractor off, and back on to accessory. Move your joystick fom side to side with your diverter buton held in releasing pressure from the couplers and connect the ties.

- (3 Bank Valve and front remotes/Front remotes toTractor remotes)Turn your tractor o ffand move the 3rdfunction lever up and down releasing pressure from the couplers and connect hoses.

7. ATTACHMENT AND REMOVAL OF THE IMPLEMENTS

- Drive into the atachment lining up the white line up to the right hand side of the quick change.
- Engage the top bar in the hook by liftng the quick chan e. Once the aaachment is o ffthe ground, tilt back until the aac hment hooks hit the stop.
- Reposition the atachm ent locking pins and secure with lynch pins or r clips.

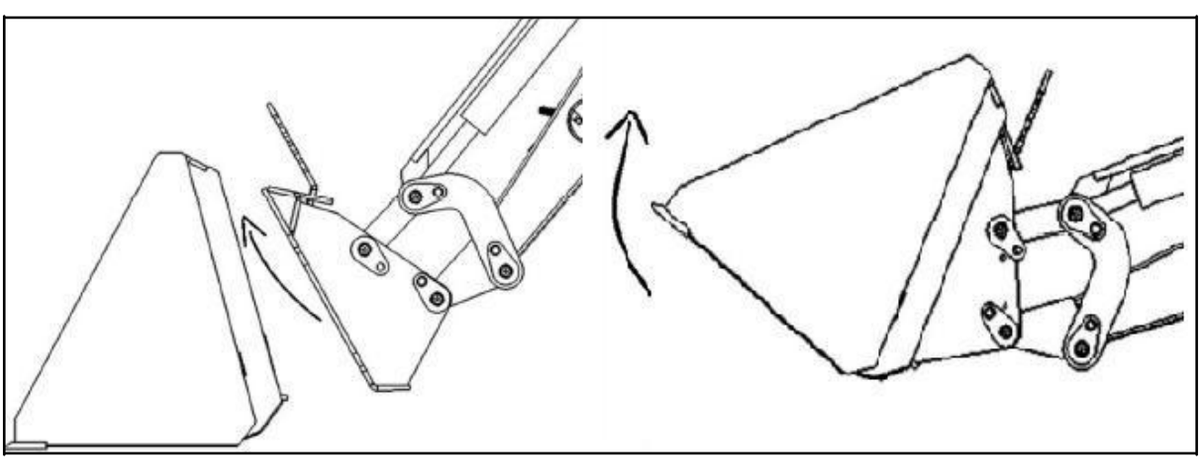


Fig 7.1 atachment

7.1 GRABBER BUCKET DO 'S AND DON' T

The Solis Grabber Bucket is a multipurpose bucket designed for the following functions:

- Excellent load grabbing
- Top-notch strength
- Rust resistant

Grabber bucket combines a normal bucket and a grabber and is therefore suitable for a multitude of jo s.This bucket is ideally designed to dig and grab difficult material. Heavy duty steel bucket design, combined with the center mounted hydraulic cylinder and efficiently designed grapple teeth, enable this bucket to do multiple jo s, from loading and grading loose soils and materials, to grabbing and loading awkward materials. It can be used for transporting and loading of banches, wood chips, compost, straw, manure, construction waste etc. It can also be used as a normal bucket with the grabber in the up right position.

Do's

1. Ensure you are familiar with the tractor, loader and bucket operation.
2. Ensure that the weight in the bucket when full does not exceed the SWL or ROL (whichever is lower) of the FEL. If necessary fit counterweights, taking into account that a grabber bucket is approximately 100kg heavier than a standard bucket.
3. In bucket operation, use the bucket for picking up loose material, soft soil, avel,etc.
4. In scraper and blade operation, use the bucket for finishing work on loose ground.
5. In grab operation,use the buc et to pick up and grapple loose objects.
6. Try to apply even force to both sides of the bucket and FEL, by centralizing loads in the bucket and picking up objects in the center.

Don't

1. Drag or pull backwards against a fixed object, such as a rock embedded in hard ground, as this will apply full tractor force to the front half of the bucket.
2. Scrap or blade at higher than crawl speeds.
3. Lower the bucket to the ground while travelling at higher than crawl speed.
4. Use the bucket as a lift in jib. Especially do not loop a chain or sling around the front edge or one side of the bucket.
5. Kit. (Note: a FEL lifting jib atachment is availa ble for this purpose).

7.2 4 - IN -1 BUCKET DO'S AND DON'T

The Solis 4-in-1 bucket is a multipurpose bucket designed for the following functions:-

Use as a plain bucket,

1. Use as a scooping scraper/levelling bucket,
2. Use as a blade,
3. Use as a grab.

With proper use, your Solis 4-in-1 Bucket will give many years of trouble-free service. However, operating the bucket and front end loader (FEL) for jobs other than those listed above, or applying excessive loads beyond their design intents may damage the bucket, the loader or the tractor. General advice on the safe and proper use of a FEL fited with any bucket is given in the loader Owner's manual. The present document provides extra guidelines specifically for a 4-in-1 bucket.

Do's

1. Ensure you are familiar with the tractor, loader and bucket operation.
2. Ensure that the weight in the bucket when full does not exceed the SWL or ROL (whichever is lower) of the FEL. If necessary fit counterweights, taking into account that a 4-in-1 bucket is approximately 100kg heavier than a standard bucket.
3. In bucket operation, use the bucket for picking up loose material, soft soil, gavel ,etc.
4. In scraper and blade operation, use the bucket for finishing work on loose ground.
5. In grab operation,use the buc et to pick up and grapple loose objects.
6. Try to apply even force to both sides of the bucket and FEL, by centralizing loads in the bucket and picking up objects in the center.
7. Be aware that, since the bucket is designed to grab and hold a load, there is no pressure relief in the hydraulic circuit lower than tractor pressure. This may be enough to bend the front edge of the bucket if full closing force is applied to small diameter hard object such as a post or stump.

Don't

1. Drag or pull backwards against a fixed object, such as a rock embedded in hard ground, as this will apply full tractor force to the front half of the bucket.
2. Scrap or blade at higher than crawl speeds.
3. Lower the bucket to the ground while travelling at higher than crawl speed.
4. Use the bucket as a lift in jib. Especially do not loop a chain or sling around the front edge or one side of the bucket.
5. Kit. (Note: a FEL lifting jib atachment for is available for this purpose).
6. Use the bucket to try to break up or dig in compacted or heavily rock-strewn soils.
7. Pull out objects embedded in the ground, such as stumps or posts. Especially, do not grab a fixed object and then drive the tractor backwards and forwards to atempt to 'rock' the object out of the ground.

8. HYDRAULICS

To connect the loader or fork lift o the tractor hydraulic kits are supplied with hydraulics comprising of Control valve, Hoses, Fittings Cables and Joystick control. (Each set up is different based on loader, tractor and customer's order and not all items are needed in all cases – **check the customer order**).

VALVE TYPE

Supplied according to customer order, the most common types of valves are as follows.

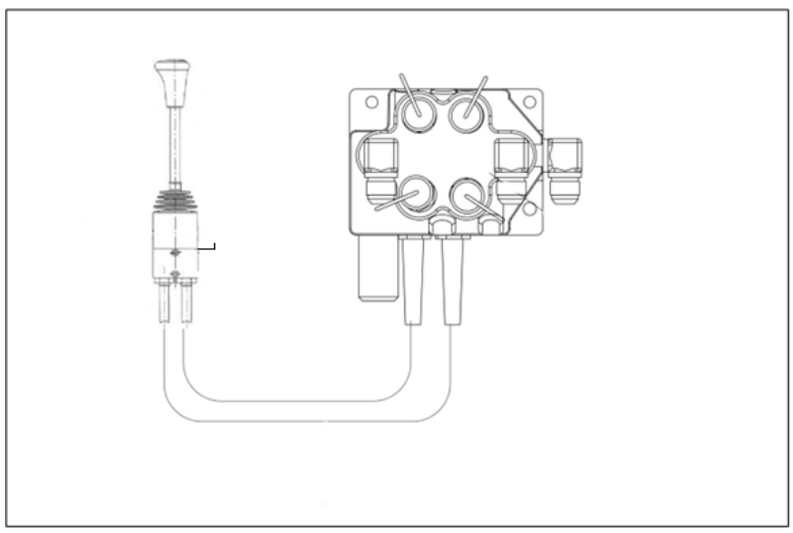


Fig 8.1 Cab valve with quick
Coupler release coupler

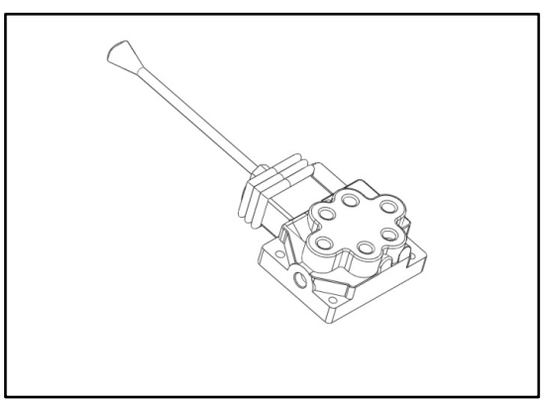


Fig 8.2 Rops valve with
quick release

- "Cab Valves" are cable controlled from a joystick (see use icon on joystick mou ts below).
- “Cab” valves are sometimes povided with OPS tractors if the customer wants a cable control joystick.
- ROPSValves are controlled by levers mounted directly on the valve. According to customer order, different types may be supplied with a joystick o be mounted directly on the valve.
- NO valve will be supplied if the loader is to be plumbed to the tractor’s remotes and the control joystick or levers already in the tractor are to be used to control the unit.

Joysticks of various kinds are supplied according to customer order shown in figure 8.4:-

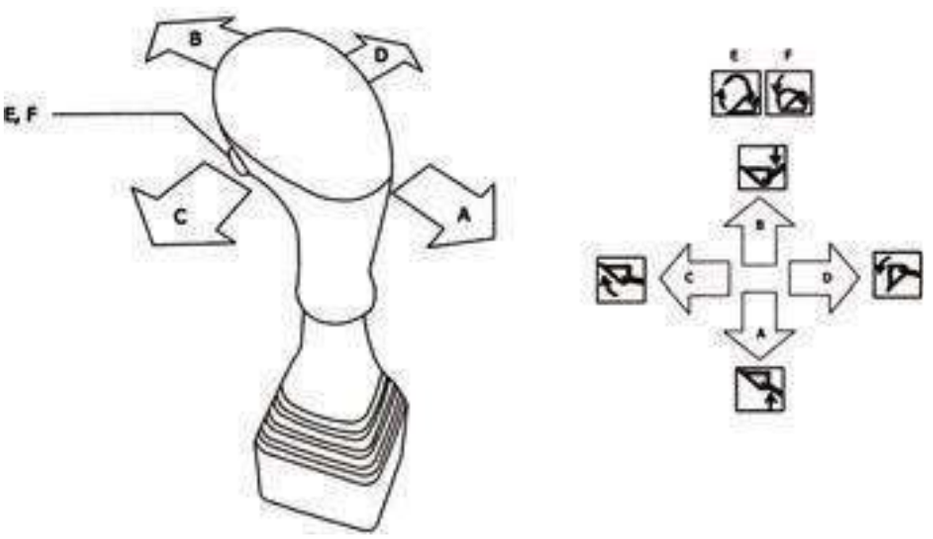


Fig 8.4 joysticks

Loader Control Lever Functions

- The joystick allows you to control the operation if the valve block and solenoid valve for smooth and precise control of the Loader. The valve block controls the operation of the boom and fork tool, while the solenoid valve allows you to close and open the grabber.

9. MAINTENANCE

GOOD MAINTENANCE IS YOUR RESPONSIBILITY. POOR MAINTENANCE INVITES TROUBLE.

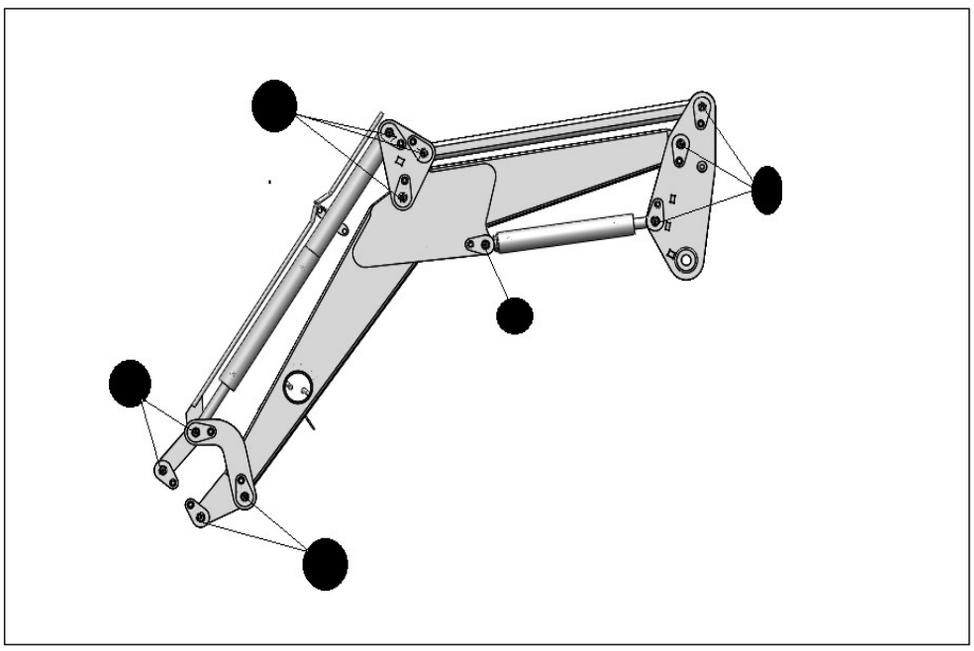


Fig 9.1 greasing lubrication

- Grease nipples are provided on pivot points that require greasing.

- Proper lubrication is essential o ensure maximum loader life. Grease all grease nipples prior to commencement of operation and then very eight hours of loader operation, or more ofen in extreme ccondition.Lower the loader to the ground before commencing greasing.

- Hydraulic oil and filters should be changed in accordance with the tractor manufacturer recommendations.

- Check all bolts for tightness after initial op aration and perioally there afer.Check regularly for worn parts, cracks, frayed hydraulic hoses and hydraulic leaks.

GREASING, LUBRICATION AND TORQUE STATEMENT

Greasing, Lubrication and Bolt torque

- Greasing, Lubrication and maintenance of bolt torque of your equipment is criti al for the longevity and safety of your equipment.
- Failure to correctly follow a maintenance program may result in product failure and and voiding of warranty.

Upon Delivery

- Check that all bolts and hydraulic fittings are torqued per the specificacations of the supplied chart.
- Visually inspect all hydraulic fittings or oil. If present, clean and tig ten as per specifications of the supplied chart.
- Visually inspect all pivot points to ensure grease is present.
- Prior to use Daily for the first 50 Hours of operations based on Tractor Hour Meter. Grease all pivot points.
- Visually inspect atachment, subfr ame and decals for integrity.
- Visually inspect and torque all bolts, fasteners and hydraulic fittings.

Every 10 Hours of operation thee aaer

- Grease all pivot points.
- Torque all bolts on atachment and subframe .
- Visually inspect atachment,subframe and decals for integrity.
- Inspect and replace damaged hydraulic hoses, pipes or clamps.

Yearly

- Check Joystick / Cables or operaations and setting.
- Inspect all pivot points for wear or excess clearance and replace parts if required. Inspect all welds for cracks.

Bolt Torque Settings

Scope:

This specification gives information about orque seettings.Metric & Imperial bolts and things to be noted down while fastening a bolt.

Special Notes:

- Use correct tools on bolts. Tools that do not fit properly may slip and cause injury.
- Replacement bolts must be the same or a higher grade. If a higher grade is used, it should only be tightened to the original torque settings.
- Make sure bolt threads are clean and engaged properly when starting. This will prevent them from failing when tightening.

Specifications:

SAE SERIES TORQUE CHART			
BOLT DIA.	SPANNER SIZE	GRADE 5	
		(N-m)	(ft-lbs)
1/4"	7/16"	7	5
5/16"	1/2"	15	11
3/8"	9/16"	27	20
1/2"	3/4"	66	49
5/8"	15/16"	130	96
3/4"	1 1/8"	230	170
7/8"	1 5/16"	370	273
1"	1 1/2"	560	413

METRIC SERIES TORQUE CHART			
BOLT DIA.	SPANNER SIZE	10.9	
		N-m	lb-ft
M8	13	33-35	24-25
M10	16	65-71	48-53
M12	18	110-122	81-90
M14	21	180-195	133-144
M16	24	270-299	199-221
M18	27	380-413	280-305
M20	30	530-585	391-432
M24	36	890-1011	656-747

Hydraulic Fitting Torque Settings

Scope:

This specification gives information about orque seettingson fittings and things to be noted down while fastening a fittings.

Special Notes:

- Use correct tools on fittings. Tools that do not fit properly may slip and cause injury.
- Make sure threads are clean and engaged properly when startingThis will prevent them from failing or leaking when tightening.

Specifications:

Straight thread O -ring Boss low pressure with 37° (SAEJ514)			
Dash Size	Thread Size (inches)	Jam Nut or Straight Fitting torque lb.ft	Jam Nut or Straight Fitting torque Newton Meters
-3	(3/8)-24	8-9	12-13
-4	(7/16)-20	13-15	18-20
-5	(1/2)-20	14-15	19-21
-6	(9/16)-18	23-24	32-33
-8	(3/4)-16	40-43	55-57
-10	(7/8)-14	43-48	59-64
-12	1 (1/16)-12	68-75	93-101
-14	1 (3/16)-12	83-90	113-122
-16	1 (5/16)-12	112-123	152-166
-20	1 (5/8)-12	146-161	198-218
-24	1 (7/8)-12	154-170	209-230
-32	2 (1/2)-12	218-240	296-325

Straight thread O-ring Boss High pressure with ORS (J1453)			
Dash Size	Thread Size (inches)	Jam Nut or Straight Fitting torque lb.ft	Jam Nut or Straight Fitting torque Newton Meters
-3	(3/8)-24	8-10	11-13
-4	(7/16)-20	14-16	20-22
-5	(1/2)-20	18-20	24-27
-6	(9/16)-18	24-26	33-35
-8	(3/4)-16	50-60	68-78
-10	(7/8)-14	72-80	98-110
-12	1 (1/16)-12	125-135	170-183
-14	1 (3/16)-12	160-180	215-245
-16	1 (5/16)-12	200-220	270-300
-20	1 (5/8)-12	210-280	285-380
-24	1 (7/8)-12	270-360	370-490

ORFS			
Dash Size	Thread Size (inches)	Swivel Nut Torque lb.ft	Swivel Nut Torque Newton Meters
-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	62-68
-12	1(3/16)-12	65-70	88-95
-16	1(7/16)-12	92-100	125-136
-20	1(11/16)-12	125-140	170-190
-24	2-12	150-165	204-224

SAE 37° (JIC)			
Dash Size	*Thread Size (inches)*	*Swivel Nut Torque lb.ft*	*Swivel Nut Torque Newton Meters*
-4	*(7/16)-20*	*11-12*	*15-16*
-5	*(1/2)-20*	*15-16*	*20-22*
-6	*(9/16)-18*	*18-20*	*24-28*
-8	*(3/4)-16*	*38-42*	*52-58*
-10	*(7/8)-14*	*57-62*	*77-85*
-12	*1(1/16)-12*	*79-87*	*108-119*
-16	*1(5/16)-12*	*108-113*	*148-154*
-20	*1(5/8)-12*	*127-133*	*173-182*
-24	*1(7/8)-12*	*158-167*	*216-227*
-32	*2(1/2)-12*	*245-258*	*334-352*

METRIC		
Thread Size	Straight Adapter or Locknut Torque	
mm	lb.ft	Newton Meters
M10 X 1	13-15	18-20
M12 X 1.5	15-19	20-25
M14 X 1.5	19-23	25-30
M16 X 1.5	33-40	45-55
M18 X 1.5	37-44	50-60
M20 X 1.5	52-66	70-90
M22 X 1.5	55-70	75-95
M26 X 1.5	81-96	110-130
M27 X 2	96-111	130-150
M33 X 2	162-184	220-250
M42 X 2	170-192	230-260
M48 X 2	258-347	350-470

BSPP		
Nominal Thread Size	Straight Adapter or Locknut Torque	
inches **	lb.ft	Newton Meters
G (1/8)-28	13-15	18-20
G (1/4)-19	19-23	25-30
G (3/8)-19	33-40	45-55
G (1/2)-14	55-70	75-95
G (3/4)-14	103-118	140-160
G1-11	162-184	220-250
G 1(1/4)-11	170-192	230-260
G 1(1/2)-11	258-347	350-470

- The torque wrench be used to assure proper fitti & assembly of the c onnections.ng
- Torque wrench is to be used for correct torque settings. Fittings and hose are to be torqued as per standards.
- Hand tightening may exceed the specified torque required.
- Over torque will damage the components seals, threads which can cause leakages.

10 SAFE WORKING LOADS

- Solis has undertaken a program of testing very model of loader supplied in order to determine Safe Working Load (SWL) limits. The SWL of your loader as stamped on the ID plate on the outside of the right-hand loader arm along with the model and serial numbers.

- This SWL applies to the loader fited with the standard bucket. If any other Solis atachment is used, the aaachment will have a similar ID plate a ached to it with a revised SWL rating. This aatingeplaces the original bucket rarating or t loader. Where a 4 in 1 bucket is fited to the loader, the original SWL must be reduced by 10% to allow for the greater tare of the 4 in 1bucket.

- For any given loader, the SWL applies to the machine static, on a had level surface. The SWL should be reduced according to the operatonal factors including speed, slope and terrain.

- The lifting point in the standard bucket has been tested to comply with AS 2359/1. The pallet fork tines and ound bale ffork tines alsoxceed the requirements set by AS2359/1.

- If the loader is to be used to lift over people heads, hose burst valves must be installed to prevent a burst hose allowing the loader to drop suddenly.

HYDRAULIC PRESSURE

- The control valve supplied with your loader has had the pressure factory preset. Any and all warranties will be voided if the preset pressure is tampered.

COUNTER-WEIGHTING

- Counter weighting with ater in the rear tyres, rear wheel weighhts or additionaleight on the rear of the tractor is recommended for all front end loaders.

- It is also recommended that the rear wheels be set at the widest practical setting for extra stability.

11. LOADER DISPOSAL

Disassembly and disposal should be performed by specialized service centers which are familiar with the design and operation of the loader. Only specialized service centers have the full and up- to-date knowledge on the applied materials and risk associated with the hazards of improper storage and transport. The authorized services offer both counseling as well as performance of the complete services concerning disposal of the machine. Proper tools and auxiliary equipment (hoist, lifting jack) mut be used for disassembly.

- Store the used oil in air-tight containers. Take it to a petrol station that collects used oil immediately.
- Disassemble the machine. Sort the disassembled parts. Supply the dismantled parts to the relevant recycling points.
- While dismantling the loader, use appropriate work clothing and footwear.

Front Loader Transport

Load Transport

- The loader is suitable for rail or road transport with the appropriate payload capacity for road transportloading,uselifting devices with a lifting capacity suitable for the loader weight.

- Use the elements of the frame marked with the pictogram as atachment points, or forklift truc s.

- It is prohibited to lift the loader using other means than the openings marked with appropriate pictograms, which are specially designed for this purpose, or lifting on special pallets using forklift trucks. Lifting equipment should be operated by trained operators holding relevant qualifications.

- Transporting the loader with a load is prohibited. The transported loader should be fixed in a solid way on a wooden transport support for the duration of tansport. The pallet should be firmly atached to the base.

Road Traffic Participa ts

The loader is adapted for driving on public roads as a machine installed on a farm tractor.

- Only tractors with counterweight atached on the rear three point linkage may be used for transport on public roads.

- Detach the worktool.

- Set the boom for the loader in the idle position (point of rotation of the ool at the min of 1 inch above ground).

- Make sure that the loader boom obscure the tractor lamps.

- Secure the controller (joystick) against accidental acti aationy sliding the lock bolt.
- Adjust the speed to the current condition avoid exceeding the speed of9.3 mile/hr.

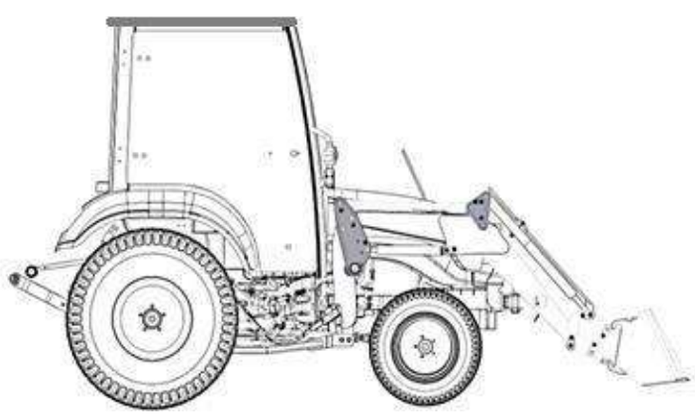


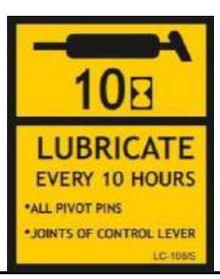
Fig 11.1. Loader boom in the idle position

. It Is prohibited to transport loader on public roads before merging withthe traffic on public roads, make sure that the tractor is fully maneuverable.

- The pressure on conditon the rear axle of the tractor must be atleast 20% of the tractor weight. If this conditionis not meet, an additional load must be added to the rear axle.

12. STICKER

The warning pictograms on the machine inform the operator about the dangers and hazards which may occur during operation. Ensue th t the symbols are clean and legible.

Sr. No.	STICKER	DESCRIPTION	LOCATION AREA
1		Crush hazard. Keep hands clear.	Leg mounting plate.
2		Hazard! Work tool may disengage. Always make sure that the tool is secured correctly.	Coupling plate
3		Torque all thread fastenings afer first hours. Every 50 hours thereafer .	Right mounting plate
4		Lubricate all lubrication points with grease every 10 hours.	Post cap, pivot points
5		Locking pins must be fite d and secured against falling out.	Post cap, quick change

13 .FRONTEND LOADER SPECIFICATIONS

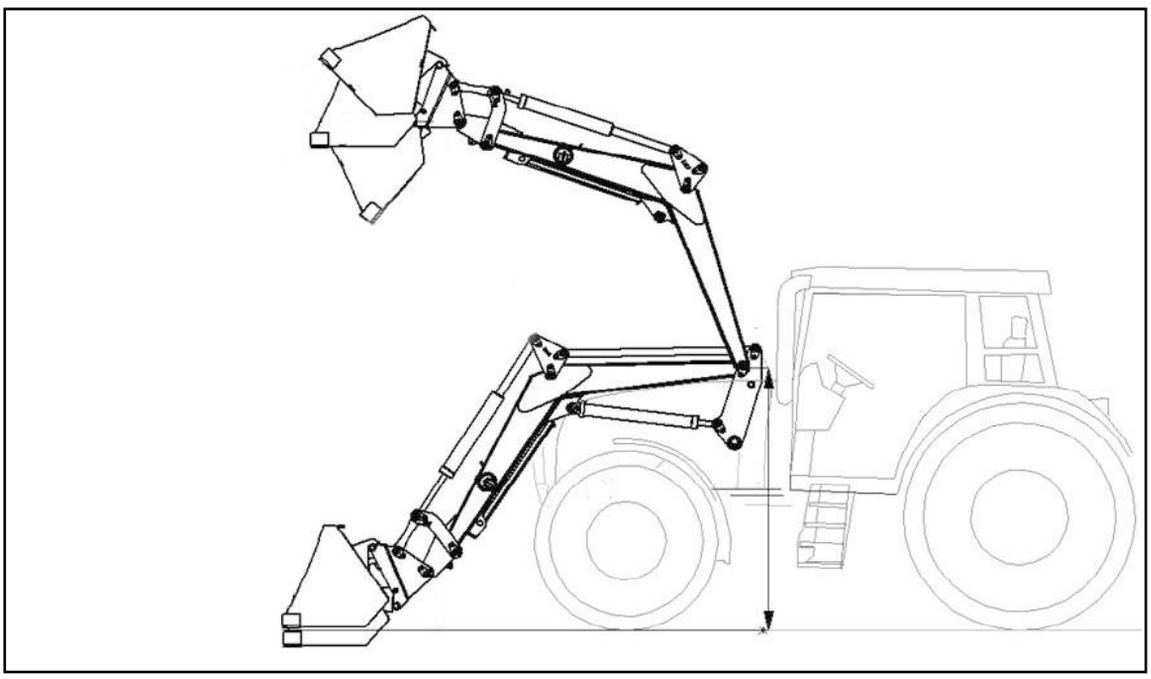


Fig 13.1 front end loader specificcation.

LOADER MODEL	3200 MSL/NSL	3200 V MSL/NSL
Max Lifting height at Pivot Point (inch)	85	85
Clearance with Attachment Dump (inch)	61	58
Reach at Maximum Height (inch)	17	17
Reach at Bucket on Ground (inch)	56	56
Max. Dump Angle (Deg.)	45	45
Attachment Rollback Angle (Deg)	43	43
Digging depth below grade (inch)	5.9	5.9
Breakout Force at Pivot Point (dig Position) (lbs)	1058	1146
Bucket width (inch)	52	52
Lifting capacity to full height at Pivot point (Lbs)	926	1411

14.TROUBLE SHOOTING PROCEDURES

This troubleshooting chart is povided for reference to possible loader operaational oblems. Determine the problem that best describes the operational poblem being xperienced and eliminate the possible causes as listed by following the correction pocedues.

For further assistance contact your dealer.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Lift and Tilt Cylindes inoperative	Low hydraulic fluid level in the tractor.	Check and refill hydraulic fluid.
	Quick disconnect coupler(s) are not fully connected.	Check coupler connections. Replace coupler(s) if necessary.
	Hydraulic hoses /couplers connected improperly or engaged.	Check and correct hydraulic hose connections.
	Hydraulic hoses to/from loader valve blocked.	Check for damaged(kinked) hoses, etc.
	Lowsystem pressures supplied from hydraulic pump.	Check systempressure.Repair or replace pump.
	Loader valve linkage broken.	Inspect. Repair as required.
	Hydraulic hose or tube line blockage.	Check all hoses and tubes for leaks, damage, or restrictions. Replace damaged or restricted hoses or tube lines.
	Cylinder piston assembly defective (not sealing).	Check cylinders for internal leakage as described in service section under cylinder leakage tests.
	Loader valve blockage.	Inspect for blockage. Disassemble valve if necessary.

Lift and/or tilt cylind s operate in wrong direction elaate to valve handle position	Hydraulic hoses connected incorrectly. Hydraulic circuit connected incorrectly. Low hydraulic fluid level. Cold hydraulic fluid.	Correct hydraulic hose connections, wrt. o color coding. Refer to plumbing diagram and correct hose connections. Check and replenish hydraulic fluid. Allow hydraulic system to warm up to operating emperature.
Slow or erratic lift	Engine R.P.M. too slow (hydraulic pump R.P.M. too slow). Excessive weight in bucket. Material weight exceeds maximum specified loader Loader valve linkage binding/defecti e. Quick disconnect coupler restriction or oupler. Hydraulic hose or tube line restriction (hoses/tube line kinked or pinched). Lift cylinder piton assembly leakage. Relief valve erratic or s t below specificaations. Loader valve leaking internally. (Bypassing fluid within valve.) Inadequate hydraulic pump capacity.	Increase engine speed to obtain satifactory loader operaation. Reduce material load. Check loader valve linkage and repair if worn/defecti e. Check coupler connections. Repair or replace. Check hoses and tube lines for evidence of restriction. Check cylinders for leakage. Repair as needed. Check and reset relief valve setting as needed. Replace loader valve and recheck operation. Refer to "Hydraulic Pump Capacity Inadequate".
Inadequate lifting apacity	Engine R.P.M. too slow. Excessive load – material weight exceeds specified loader capacity. Lift cylinder piton assembly leakage. Hydraulic pump defecti e.	Increase engine R.P.M. Reduce Load. Check cylinders for leakage. Repair as needed. Check with tractor user manual

Aeration of H draulic Fluid (generally indicated by foamy appearance of fluid).	Low hydraulic fluid level.	Check and refill hydraulic system to proper level.
	Air leaking into suction side of hydraulic pump.	Check for loose or defecti e connections b tween reservoir and hydraulic pump.
	Hydraulic fluid foaming due to improper hydraulic oil usage.	Refer to Tractor Operator's Manual and replace hydraulic oil using recommended hydraulic oil.
	Cold Hydraulic Fluid.	Allow hydraulic fluid to warm up to operating temperature.
System relief valve squeals.	Excessive load in bucket. Weight exceeds specified loader capacity.	Reduce load.
	Relief valve setting below specificaations.	Check and reset valve setting as needed.
	Hydraulic hose, tube line, or quick disconnect coupler restriction.	Check for evidence of restriction in ydraulic oil flow. Repair or replace defecti e components.
	Cylinder Piston assembly leakage.	Check cylinders for leakage.
	Loader valve internal leakage.	Replace loader valve and recheck.
Loader bucket moves freely afer dumping load	Tilt cylinder cavitation has occurred.	Use of region function (if equipped) while dumping load will eliminate problem.
		Contact Factory for optional orifice sizes.
External hydraulic fluid leakage	Loose hydraulic connection.	Tighten loose connections.
	Defecti e hydraulic hose, tube line, adapter fitting or adapter fitting o- ring.	Check for origin of oil leak and replace defecti e part.
	Loader valve O-rings defecti e Loader valve spool or body damaged or worn.	Replace defecti e O-rings. Replace loader valve.
	Cylinder rod packing set leakage.	Check cylinders for leakage. Repair as needed

Hydraulic pump capacity inadequate	Cold hydraulic fluid. Engine R.P.M. too slow. Low hydraulic fluid supply. Hydraulic hose restriction. Hydraulic pump defecti e.	Allow hydraulic fluid to warm up to operating emperature. Increase engine R.P.M. Refer to Tractor Operator's Manual for service recommendations. Check for evidence of restriction in hydraulic hoses. Refer to Tractor Operator's manual for recommended service procedures. Replace hydraulic pump if determined to be defecti e.
Bucket cutting e e wear is uneven side to side	Bucket is not level to ground. Hydraulic oil too heavy. Oil filter plugged. Hydraulic pump worn. Oil line restricted or leaking.	Check rear tie inflalation and ad t to level bucket to ground. Change to proper oil. Clean or replace filter. Repair or replace pump. Check all hoses and tubes for leaks, damage, or restrictions. eplace damaged or restricted hoses or tube lines.
Loader is slow and/or will not dump.	Loader valve does not shift properly. Cylinder leaks internally. Faulty valve.	Inspect clean, repair, or replace Valve. Replace seals. Repair or replace valve.
Loader chaters or vibrates when raising or lowering.	Air in hydraulic system. Oil level too low.	Cycle lift cylinders and tilt cylind s. Add oil as required.
Atachment will dump but will not rollback	Hydraulic circuit connected Incorrectly	Check that loader valve is connected to tilt cylinder correctly if valve is equipped with region function.

14.1 TROUBLE SHOOTING OPTIONAL LOADER VALVE

If your loader/tractor combination is equipped with an optional third functon valve and unit reacts in the following manner.

PROBLEM	POSSIBLE CAUSE	CORRECTION
Nothing happens when handle switch is acti ated	Tractor switch is not on.	Turn tractor switch on.
	Power circuit is not connected.	Connect to tractor power supply that is only activated when tractor switch is on.
	Power circuits connected but fuse blown off.	Replace the fuse.
If you have 12 volts at solenoid valve but valve does not function.	Spool is stickng.	Push in on each side of valve spool to free up spool.(manual override)
		Contamination in hydraulic oil causes spool to stick. Replace oil and filter.
		Solenoid valve section is damaged. Replace solenoid valve section.
	2 Pin connectors in loose connection(2 lo aations near Joystick or near loader valve)	Disconnect and reconnect the two pin connectors. Clean the part.
	Plug on loader diverter valve loose .	Disconnect and reconnect the plug, or replace the wiring kit.

14.2 TROUBLE SHOOTING OPTIONAL SELF LEVELING

PROBLEM	POSSIBLE CAUSE	CORRECTION
Bucket moves freely when putting down pressure on cutting edge.	Relief valve on loader manifold not working.	Remove and check for Contamination. Replace if required.
Loader bounces with lowering load.	Low hydraulic flow.	Increase tractor RPM to increase hydraulic flow.

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