

Maintenance Manual

Husky Tri-Axle



This manual focuses solely on the self steering independent suspension axle. For manual information relating to the tank, please refer to the Elite and Slimline Operators Manual that was given to you at time of purchase of your Tri-Axle or Tandem Axle Steering Husky Tank. If you do not have this information please contact Husky Farm Equipment.

The axles and suspension systems produced by FAD ASSALI for Husky Farm Equipment Limited are intended for use on agricultural vehicles that are regularly used for road transfers as part of their normal work.

INTRODUCTION

For this reason, in order to ensure the safety of end users and persons in close proximity to these vehicles, the instructions in this manual must form an integral part of the vehicle owners manual.

Particular attention must be paid to the warnings indicated as '**IMPORTANT**' or '**ESSENTIAL**', which give information on the risks associated with not following the recommended procedures.

AXLE IDENTIFICATION

The axle has an identification plate which gives the following information:

- Model Type
- Manufacturing Code



SAFETY INFORMATION

This manual gives information on maintaining the safety, reliability and performance characteristics of axles designed by FAD ASSALI. Read this manual carefully before carrying out any installation or maintenance operations. Before executing any installation or maintenance operations requiring the vehicle to be lifted, it is **ESSENTIAL** to ensure that the lifting equipment used is adequate for the weight of the vehicle and that the wheel chocks are correctly positioned under the wheels. Failure to use correct equipment and/or take adequate safety measures and/or personnel without proper training or qualifications could result in serious accidents, with possible loss of life. Carefully read this manual and the procedures set out in it before beginning any work associated with the axles. All operations involving installation, maintenance and checking of the axle must be carried out by qualified personnel with suitable safety equipment, tools and the required professional training.

Axles or axle/suspension systems transmit the vehicle load to the ground. All the structural elements (beams, bearings, hubs, elastic elements etc.) have been designed to match the load indicated on the diagram or on the identification plate. Different speeds, vehicle configurations and different wheels used correspond to different axle carrying capacities, as a result of the dynamic stresses that occur during use.

Hence it is **ESSENTIAL** not to overload the axles or the suspension by exceeding the carrying capacity, the speed or wheel size indicated in the diagram, on the identification plate or in the vehicle regulations: any breakage that occurs due to exceeding the carrying capacity, using unapproved wheels or exceeding the recommended design speed will present a serious risk to the safety of anyone in close

proximity to the vehicle. If a bearing, beam or hub gives way it could cause the loss of a wheel, with obvious serious consequences, and if the elastic elements in the suspension give way then it could seriously jeopardise the control of the vehicle.

WARNING: Except where otherwise specified, the carrying capacities indicated on the axle diagram apply to wheels with zero offset and a tyre radius of not more than 600 mm.

The bearings in the hub have been dimensioned to work at the carrying capacity and at the speed indicated on the diagram or on the axle's identification plate. To guarantee that the bearings work correctly over time, it is **ESSENTIAL** to carry out all the checks and maintenance operations described below. If the checks and maintenance operations are not carried out, then the increase in the hours of use exposes the wheel hub bearings to the risk of breaking, with the resulting danger of losing a wheel and causing a road accident. **WARNING:** When a bearing breaks, it can happen completely without warning, and is all the more serious for this reason.

If the axles are equipped with brakes, this contributes to the safety of the tractor-trailer assembly by reducing the braking distance. The effectiveness of the braking system is fundamental to guaranteeing this effect. Therefore it is **ESSENTIAL** to carry out all the periodic checks and maintenance operations on the braking system described below in order to avoid the risk of losing control of the vehicle during braking or going downhill, and the serious consequences that this would bring.

WARNING: EXTREMELY IMPORTANT

- 1 Do not overload the axles or suspension system, i.e. do not exceed the load specified on the axle diagram, on the axle's identification plate or in the vehicle regulations.
- 2 Do not use wheels that are larger than those indicated on the axle diagram or in the vehicle regulations.
- 3 Do not use the axles or suspension systems at higher speeds than those specified on the axle diagram, on the axle's identification plate or in the vehicle regulations.

IMPORTANT ADVICE

- 1 Distribute the weight evenly in order to avoid overloading the vehicle on one side only.
- 2 Only use tyres of the type and size specified, and correctly balanced. Use wheels with the exact offset specified, if the offset is different from zero.
- 3 Avoid lateral shocks and heavy impacts on the axles.
- 4 Adjust the speed of the vehicle to the road conditions and the load being transported.

- 5 Do not use the vehicle if even the smallest irregularity is noted.
- 6 For repairs requiring the replacement of a component, use only original parts from FAD ASSALI.
- 7 Always use a suspension system. If an axle is directly affixed to the chassis then the carrying capacity is reduced due to the increase in stress.
- 8 Contact a specialised workshop/garage for carrying out the more critical checks and maintenance operations.

BRAKE SETUP

NOTE: The dimensioning of the trailer's braking system (type of operation, operating force, length of operating lever arm) must be carried out in accordance with the regulations currently in force in the country where the vehicle will be used (for vehicles capable of speeds of ≤ 40 km/h) or in accordance with EC directive 98/12. Make certain that you have carried out this dimensioning correctly.

IMPORTANT: Before carrying out adjustments to the braking system, make sure that the vehicle is prevented from making any movement whatsoever, and raise the axle on which you intend to work so that the hub is free to rotate. Make sure that the lifting equipment used is adequate for the weight of the vehicle and that the vehicle is kept absolutely immobile, even after the axle is raised.

FIXED LEVER

Mechanical operation via tie-rod: Pull the braking lever in the direction of braking until the brake shoes are in contact with the drum. Adjust the tie-rod so that the lever is kept in that position and then gently release the tie-rod until the hub is completely free to rotate.

IMPORTANT: Verify, by rotating the hub, that the brake shoes do not rub against the drum and that they are free to rotate. The path of the lever must be the shortest possible, without causing the brake shoes to rub against the drum.

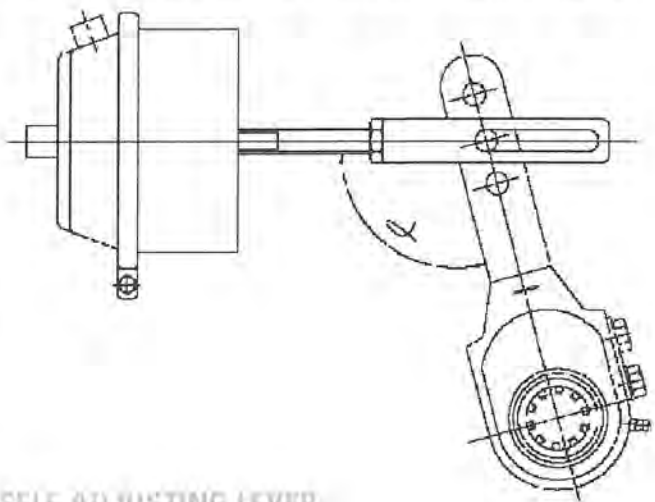
Pneumatic operation: Pull the braking lever in the direction of braking until the brake shoes are in contact with the drum. Work the nut and locknut arrangement to adjust the length of the actuating cylinder rod so that the lever is kept in that position and then gently reduce the length of the rod until the hub is completely free to rotate. **IMPORTANT:** Verify, by rotating the hub, that the brake shoes do not rub against the drum and that they are free to rotate. The path of the lever must be the shortest possible, without causing the brake shoes to rub against the drum. Verify that the lever's path is not too great: pushing it by hand should not

make the braking lever move through an angle of more than 5° - 10° .

SLACK ADJUSTER

Work the nut and locknut arrangement to adjust the length of the actuating cylinder rod so that it is able to correctly couple with the control lever. Verify that the angle \therefore between the cylinder rod and the braking lever is between 100° and 105° when the brakes are not operated. Work the hexagonal head screw to adjust the braking lever in the direction of braking, while at the same time making the wheel hub rotate, until the brake shoes come into contact with the drum. Then gently turn the adjusting screw in the opposite direction until the hub is completely free to rotate. Make sure that the adjusting screw is locked in this position.

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SELF-ADJUSTING LEVER

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NOTE: For detailed instructions and explanations, see the installation and maintenance manual supplied by the maker of the self-adjusting lever used.

BRAKING OPERATION

To ensure that the braking action is not excessive when the vehicle is unloaded, we advise you to use a pressure valve to regulate the operation of the cylinders according to the load (ALB or anti-lock braking system).

It is **ESSENTIAL** to remember that drum brakes require running-in before they reach an adequate level of performance. On a new vehicle, therefore, it is advisable to run in the brakes by following the procedure described below:

- Execute 10 braking cycles at 30-40 km/h until the vehicle is stopped, with an operating force on the lever equal to about 50-60% of the force calculated for normal foot braking force. Allow the drum to cool.
- Drive at a speed of 20-25 km/h with continuous braking, increasing the braking pressure, for around 2-3 km. Begin with a low braking pressure on the cylinder (less than 1.0 bar for pneumatic braking systems) and increase it gradually, keeping the temperature of the drum under control (the drum must not reach a temperature which is too high as this would risk damaging the brake lining). At intervals of 50-60 seconds, release the brake for 10-20 seconds. Increase the frequency and the duration of these rest periods as the brakes heat up. If the temperature rises to a value which is too high, release the brake completely for a period of time long enough to allow the temperature to fall. The dust generated by the brake lining during this phase of running-in improves the brake's operation.
- At the end of the running-in procedure, allow the vehicle to rest for 2-3 hours, then execute 10 braking cycles at 40 km/h until the vehicle is stopped, with an operating force on the lever equal to about 50-60% of the force calculated for normal foot braking force.

IMPORTANT: If the running-in procedure is not carried out, remember that for a period of time the trailers contribution to the overall braking will be only partial.

CHECKS AND MAINTENANCE

1. SERVICE CALENDAR

The table below gives an indication of the intervals and regularity at which checking and maintenance operations on the axle elements should be carried out. The service intervals may vary depending on the loading conditions and driving conditions the vehicle is subjected to. Always clean the parts to be inspected carefully.

Operation	After 50 km	After 200 km	Every 500 km	Every 2000 km
Verify tightness of the wheel nuts	X		X	
Check lining of brake shoes		X	X	
Check clearance in taper roller bearings	X		X	
Check brake adjustment *	X		X	
Greasing			X	
Check brgs and replace grease				X
Inspection				X (or at least every 6 months)

* every time the brake shoes are replaced

2. MAINTENANCE OPERATIONS

VERIFY TIGHTNESS OF THE WHEEL NUTS

IMPORTANT: Position the vehicle on a level surface, with the parking brake on. Make sure that the vehicle is kept absolutely immobile.

Diagonally tighten the wheel fixing screws with a dynamometric key, to the tightening torque value indicated by the maker of the wheel, based on the class of resistance of the hub stud bolts. Do not use lubricants on the stud bolts or on the nuts.

IMPORTANT: Excessive tightening of the nuts can cause the wheel disc to deform or the stud bolts and/or nuts to bend or break, with consequent serious risk of losing the wheel. Insufficient tightening can cause the fixings of the wheel disc to loosen and consequently lead to the stud bolts or the wheel disc itself to break, with consequent serious risk of losing the wheel.

CHECKING THE BRAKE LININGS

IMPORTANT: Position the vehicle on a level surface, with the parking brake on. Make sure that the vehicle is kept absolutely immobile.

Remove the plastic protection from the inspection holes (if any) and visually check that the brake linings do not show evident signs of imperfection, damage or excessive or unusual wear.

If the brake linings are worn out then they must be replaced, using only original parts from FAD ASSALI.
WARNING: The type of brake lining must be the same as the original brake lining, in order to conform to the regulations in force for the vehicle. If the brake shoes are to be replaced, check the condition of the camshaft: if necessary, this must also be replaced. If a brake shoe is being replaced, then since the drum and the hub have to be dismantled we advise you to also replace the grease in the bearings and check the wear on the bearings themselves. To carry out this operation, follow the instructions in the procedure outlined below for replacing the grease and adjusting the clearance of the taper roller bearings. Replacement of the brake shoes must be carried out by qualified personnel with suitable safety equipment, tools and the required professional training.

CHECKING FOR AND ADJUSTING CLEARANCE IN TAPER ROLLER BEARINGS

IMPORTANT: Position the vehicle on a level surface. Let the axle hub that you need to work on free to rotate. Make sure that the vehicle is kept absolutely immobile. Lift the axle you need to work on until the tyres are no longer touching the ground. Make sure that the lifting equipment used is adequate for the weight of the vehicle and that the vehicle is kept absolutely immobile, even after the axle is raised.

Place two levers between the tyre and the ground and, by raising and lowering the levers, verify that there is no clearance in the hub. If there is clearance, adjust the bearings as described below.

ADJUSTING CLEARANCE IN THE BEARINGS

- 1) Dismantle the hubcap and put it in a clean place to avoid dirt getting into it.
- 2) Remove the split pin from the castellated nut.
- 3) Tighten the castellated nut until the bearings come into contact with the surface, i.e. until the key used for tightening requires considerably more force to turn the nut

further.

- 4) After gently turning the hub once, slightly loosen the castellated nut and tighten it until once more in contact with the surface.
- 5) Check the position of the holes for the split pin and turn the castellated nut in order to align the slits with the nearest hole.
- 6) Verify that the hub is free to rotate and that it does not offer excessive resistance.
- 7) Insert a new split pin into the free hole and bend it back.
- 8) Reassemble the hubcap.

CHECKING THE BRAKE ADJUSTMENT

IMPORTANT: Position the vehicle on a level surface, with the trailer brake released and the motor of the tractor switched off and parked (with the parking brake on). Make sure that the trailer is kept absolutely immobile.

FIXED LEVER

Push the braking lever in the direction of operation. Verify that the lever's path is not too great: it must not move through an angle of more than 5°-10°. If the movement is greater than this, then the brake must be adjusted.

If possible raise the axle that you need to work on, leaving the hub free to rotate. Make sure that the lifting equipment used is adequate for the weight of the vehicle and that the vehicle is kept absolutely immobile, even after the axle is raised.

- **Mechanical operation** via tie-rod: Pull the braking lever in the direction of braking until the brake shoes are in contact with the drum. Adjust the tie-rod so that the lever is kept in that position and then gently release the tie-rod until the hub is completely free to rotate.

IMPORTANT: Verify, by rotating the hub, that the brake shoes do not rub against the drum and that they are free to rotate. The path of the lever must be the shortest possible, without causing the brake shoes to rub against the drum.

- **Pneumatic operation:** Pull the braking lever in the direction of braking until the brake shoes are in contact with the drum. Work the nut and locknut arrangement to adjust the length of the actuating cylinder rod so that the lever is kept in that position and then gently reduce the length of the rod until the hub is completely free to rotate.

IMPORTANT: Verify, by rotating the hub, that the brake shoes do not rub against the drum and that they are free to rotate. The path of the lever must be the shortest possible,

without causing the brake shoes to rub against the drum.

If it is not possible to lift the axle to be worked on, then adjust the braking operation in the direction of braking, thus reducing the free movement of the lever. After adjustment, verify that the lever's path is not too excessive but also not too limited: pushing it by hand should make the braking lever move through an angle of between 5° and 10°.

SLACK ADJUSTER

Push the braking lever in the direction of operation. Verify that the lever's path is not too great: it must not move through an angle of more than 5°-7°. If the movement is greater than this, then the brake must be adjusted.

If possible raise the axle that you need to work on, leaving the hub free to rotate. Make sure that the lifting equipment used is adequate for the weight of the vehicle and that the vehicle is kept absolutely immobile, even after the axle is raised.

Work the hexagonal head screw to adjust the braking lever in the direction of braking, while at the same time making the wheel hub rotate, until the brake shoes come into contact with the drum. Then gently turn the adjusting screw in the opposite direction until the hub is completely free to rotate. Make sure that the adjusting screw is locked in this position.

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Push the braking lever in the direction of operation. Verify that the lever's path is not too great: it must not move through an angle of more than 5°-7°. If the movement is

greater than this, then the brake must be adjusted.

If possible raise the axle that you need to work on, leaving the hub free to rotate. Make sure that the lifting equipment used is adequate for the weight of the vehicle and that the vehicle is kept absolutely immobile, even after the axle is raised. Work the hexagonal head screw to adjust the braking lever in the direction of braking, while at the same time making the wheel hub rotate, until the brake shoes come into contact with the drum. Then gently turn the adjusting screw in the opposite direction until the hub is completely free to rotate. Make sure that the adjusting screw is locked in this position.

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NOTE: For detailed instructions and explanations, see the installation and maintenance manual supplied by the maker of the self-adjusting lever used.

GREASING

IMPORTANT: Position the vehicle on a level surface, with the parking brake on. Make sure that the vehicle is kept absolutely immobile. Carefully clean the greasing points before carrying out the greasing operation. We recommend greasing points subject to manure contamination more frequently to help reduce the ingress of moisture into these areas. Points subject to manure should be greased daily!

Fixed axles: Grease the two camshaft housing bushings, the braking lever (if adjustable or self-adjusting) and any other points which are fitted with a lubricator.

Self-steering axles: As above, plus grease the steering hinge bushings, the silent-block on the steering bar and any other points which are fitted with a lubricator.

REPLACING BEARING GREASE AND CHECKING FOR WEAR

IMPORTANT: Position the vehicle on a level surface. Let the axle hub that you need to work on free to rotate. Make sure that the vehicle is kept absolutely immobile. Lift the axle you need to work on until the tyres are no longer touching the ground. Make sure that the lifting equipment used is adequate for the weight of the vehicle and that the vehicle is kept absolutely immobile, even after the axle is raised. The operation described below must be carried out by qualified personnel with suitable safety equipment, tools and the required professional training. Dismantle the hub and clean it carefully, both internally and externally.

Remove any residue of old grease. Wash the dismantled bearings with a suitable solvent, rotating them slowly, and dry them. Carefully check the surfaces of the rollers and of the hub bearing races, to see if there are any signs of wear, scratches or other signs of damage. If there is the slightest sign of wear, replace the bearings.

IMPORTANT: Replacing the bearings must always include both the internal cone and the hub bearing races.

GREASING

Carefully lubricate the bearings with a suitable lithium soap grease (we recommend FL TUTELA MR3 grease). It is important to insert the grease inside the bearing, in the space between the cage containing the rollers and the rolling race along which the rollers rotate, in order to guarantee that all moving elements are correctly and completely lubricated. Fill the bearing with grease as described above and also lubricate the rear part of the bearing cone. In particular, put grease on the surface of the base for the rollers. Apply a thin layer of grease to the rolling race of the hub bearing races.

Verify that the internal retaining ring in the hub is in good condition and that it does not show signs of wear or damage. Replace the ring in its correct position. If there is the slightest sign of damage or wear, replace it. Lightly grease the sliding surface of the ring.

Never mix different types of grease, in order to avoid reducing the life of the bearings.

After correctly greasing the bearings, reassemble the hub, being careful to not damage the rear ring during the operation. Insert the external bearing, the washer (if any) and the castellated nut. Tighten the castellated nut, following the procedure described above for adjusting clearance in the bearings. Insert a new split pin and put on the hubcap.

INSPECTION

IMPORTANT: Position the vehicle on a level surface, with the parking brake on. Make sure that the vehicle is kept absolutely immobile.

Inspect the axle beam for cracks and/or signs that the axle is beginning to break. Any cracks or signs of breakage detected on the axle beam require immediate replacement of the entire axle. Do not under any circumstances repair an axle beam by welding. Check the straightness of the axle beam. Overloaded and/or bent axles must be replaced immediately. Do not under any circumstances repair a bent axle beam. Carefully inspect the external camshaft supports, the supports for the actuating cylinders of the brake, and the brake support welds. Check that these show no signs of damage. A break in any of these elements could cause the braking system to malfunction and could lead to the possible loss of control of the vehicle. Carefully inspect the suspension supports and components and check that these show no signs of damage. A break in any of these elements could lead to the loss of control of the vehicle. Verify the correct alignment of the axle with the trailer frame. Incorrect alignment of the axle with the trailer frame could lead to unusual wear of the tyres and/or the possible loss of the ability to maintain control of the vehicle.

IMPORTANT: Failure to respect these instructions regarding the periodic inspection of the condition of the axle and its components could result in a sudden malfunction or breakage of the axle, leading to possible loss of control of the vehicle and the resulting serious consequences.

HUSKY FARM EQUIPMENT TRI & TANDEM STEERING GUARANTEE

All Husky Farm Equipment manufactured by Husky Farm Equipment Limited is guaranteed.

- A. Guarantee covers replacement cost or repairs of all parts found to be defective from manufacture.
- B. Guarantee also covers labour installing said parts if they are installed at Husky's manufacturing plant.
- C. Time and use is the essence of the guarantee. If equipment is used on a private property for an individual's use, guarantee will be in effect for twelve months from date of invoice. If equipment is used to do commercial work for money, then guarantee will be in effect for three months from date of invoice.

EXEMPTIONS FROM GUARANTEE

- A. Cost of transporting equipment to or from Husky Farm Equipment Limited either by customer or by Husky's service staff or cost of mail or public transportation is not covered.
- B. Purchased parts are covered by manufacturer's warranty and although Husky may assist to get warranty, Husky will not be responsible other than that allowed by manufacturer's warranty.
- C. Items subject to normal wear from use are not covered by guarantee if faulty part is simply worn.
- D. Any equipment and parts used for liquid manure with sand bedding.

2 YEAR TRI & TANDEM STEERING AXLE WARRANTY

FAD ASSALI SPA and Husky Farm Equipment Limited will guarantee for 2 years from date of invoice, all Manure Spreader undercarriages and axle assemblies, if used on a farm for farm purposes.

Husky will replace free of charge:

- 1. Any part of the axle which should break or collapse through overload.
- 2. Any spindles or hub which should break.
- 3. Any wheel and rim assemblies which should fail.

Exempt from extended warranty are:

- 1. Overloading of axle.
- 2. Shock loading.
- 3. Bearings and tires which are covered under normal warranty and do require maintenance to avoid failure.
- 4. Spindles damaged through bearing failure.
- 5. Wheel or rim damage resulting from owner failing to keep wheel bolts tight.
- 6. Any equipment and parts used for liquid manure with sand bedding.

To qualify for extended warranty, damaged parts must be returned to Husky Farm Equipment Limited, prepaid, along with the Serial number and copy of the original invoice.

All parts supplied by Husky on warranty, will be shipped Freight Collect. Extended warranty covers damaged parts only and does not cause liability on Husky for any damage resulting from such failure.

TEN YEAR WARRANTY AGAINST RUSTOUT

Husky Farm Equipment provides a 10 year warranty against premature perforation (rust out) of any liquid manure spreader. Providing the manure spreader is used for manure or sludge and not for chemical products. Truck mounted tanks are not included.

Extended warranty is prorated and will be paid only through the crediting off of the then current list price of a replacement manure spreader that portion of the warranty not used up in time.

Warranty will be effective toward replacing spreader only and no cash payments will be made. It will be understood that the original equipment to be replaced will then become the property of Husky Farm Equipment.

This extended warranty will be effective through Husky Farm Equipment factory, copy of the original invoice to be supplied along with serial number. This warranty will not be effective for commercial custom haulers or to owners other than the original.

Transportation to and from the factory is to be paid for by the owner of the equipment and not by Husky Farm Equipment.

GENERAL POLICIES

All prices subject to change without notice

All installations work extra by hour

Sales tax extra where applicable, Prices F.O.B. Alma



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