

OWNER'S MANUAL

DARF OVERHEAD RAKES



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INTRODUCTION

Thank you for purchasing a Darf Rake. We hope it will provide you with many years of productive use from it. This rake is designed to be pulled by a ROPS protected tractor of proper size or a pickup truck of proper size. The purpose of this rake is to provide a means for harvesting forage. All product users must read and understand this manual prior to equipment operation. This manual is considered part of your machine and should remain with the machine at all times. Do not allow anyone to operate or maintain this equipment that has not fully read and comprehended this manual. Failure to follow the recommended procedures may result in personal injury or death, or equipment damage.

Information in this manual is designed to help owners and operators to obtain the best results and safest operation from their investment. The life of any machine depends largely on the care it is given and we suggest that the manual should be read and understood and referred to frequently. If for any reason you do not understand the instructions and safety requirements, please contact your authorized dealer. The intent of this manual is to provide guidelines to cover general use and to assist in avoiding accidents and injuries.

There may be times when circumstances occur that are not covered in the manual. At those times it is best to use common sense and/or contact your authorized dealer or our factory.

The requirements of safety cannot be emphasized enough in this publication. We urge you to make safety your top priority when using and maintaining the equipment. We strongly advise that anyone allowed to operate this equipment be thoroughly trained and tested, to prove they understand the fundamentals of safe operation.

Some photographs, diagrams or illustrations in this manual may show doors, guards and shields opened or removed to aid in clarity and understanding of a particular procedure. All guards, shields and safety devices must be in their proper position prior to operation.

WARRANTY

Nikkel Iron Works has manufactured Darf rakes for over 30 years and has an excellent reputation for quality and workmanship. Please contact your dealer if you feel a component has not lasted to your expectation. These concerns will be handled on a case-by-case basis. Contact your dealer for replacement parts.



SAFETY

Read and understand this manual and all safety signs before operating and maintaining your overhead rake. Review the safety instructions and precautions annually.

TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY AND THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.



THIS SYMBOL MEANS

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



SAFETY SIGNAL WORDS

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



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



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



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



GENERAL SAFETY GUIDELINES

Safety of the operator and any bystanders is one of the main concerns in designing and developing a new piece of equipment. Designers and manufacturers integrate as many safety features as possible. 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 observing the following precautions in this section. To avoid personal injury, study the following precautions and insist those working with you or for you, follow them.

Replace any CAUTION, WARNING, DANGER or instruction safety decal that is not readable or is missing. The locations of such decals are indicated in this booklet on page 4.

Do not attempt to operate this equipment under the influence of drugs or alcohol. Do not use the equipment if alertness or coordination is impaired.

Review the safety instructions with all users annually.

This equipment is dangerous to children and persons unfamiliar with its operation. The operator should be a responsible adult familiar with farm machinery and trained in this equipment's operations. **Do not allow persons to operate or assemble this unit until they have read this manual and have developed a thorough understanding of the safety precautions and of how it works.**

Do not read, eat, drink, talk or text or use a mobile phone while using this equipment.

To prevent injury or death, use a tractor equipped with a Roll Over Protective System (ROPS). Do not paint over, remove or deface any safety signs or warning decals on your equipment. Observe all safety signs and practice the instructions on them.

Never exceed the limits of a piece of machinery. If its ability to do a job, or to do so safely, is in question - **DON'T TRY IT.**

Stay clear of any moving parts, such as rake wheels, couplings and universal joints.

If adjustments need to be made, make them in small steps, shutting down all motions for each adjustment.

Do not allow anyone to ride on any part of the equipment for any reason.

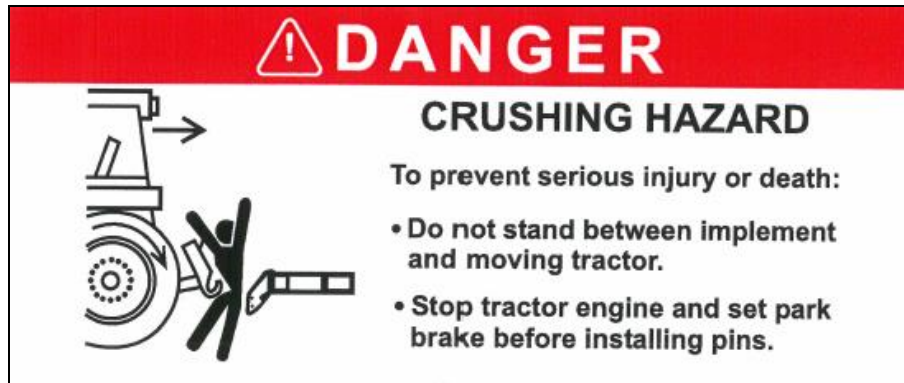
Assure that all bystanders are at a safe distance before operating or maintaining this equipment.



SAFETY SIGN/DECAL LOCATIONS

Safety Sign/Decal locations are shown below.

Located on the jack side of the hitch.



Located on both raking frames near cylinders, the tongue near hitch and the valve cover.



Located on both raking frames ahead of leg struts near cylinders (hydraulic model only.)



REMEMBER: If Safety Signs/Decals have been damaged, removed, become illegible or parts replaced without decals, new decals must be applied. New decals are available from your authorized dealer.



SAFETY DECAL/DECAL CARE

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

How to Install Safety Signs/Decals:

- Be sure that the installation area is clean and dry.
- Decide on the exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place.
- Small air pockets can be pierced with a pin and smoothed out using the piece of decal backing paper.



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.
- Inflating or servicing tires can be dangerous. Whenever possible, trained personnel should be called to service and/or mount tires.
- Always order and install tires and wheels with appropriate capacity to meet or exceed the anticipated weight to be placed on the equipment.
- Be sure you have proper tire pressure and the lug nuts are properly tightened. Check wheel bearings on a regular basis and grease semiannually.



LIGHTING AND MARKING

- It is the responsibility of the customer to know the lighting and marking requirements of the local highway authorities and to install and maintain the equipment to provide compliance with the regulations. Add extra lights when transporting at night or during periods of limited visibility.
- Lighting kits are available from your dealer.



BEFORE OPERATION

- Carefully study and understand this manual.
- Do not wear loose-fitting clothing which may catch in moving parts.
- Always wear protective clothing and substantial shoes.
- Keep wheel lug nuts or bolts tightened to specified torque.
- Insure that agricultural implement tires are inflated evenly.
- Give the unit a visual inspection for any loose bolts, worn parts or cracked welds, and make necessary repairs. Follow the maintenance safety instructions included in this manual.
- Be sure that there are no tools lying on or in the equipment.
- Do not use the unit until you are sure that the area is clear, especially children and animals.
- Don't hurry the learning process or take the unit for granted. Ease into it and become familiar with your new equipment.
- Practice operation of your equipment and its attachments. Completely familiarize yourself and other operators with its operation before using.
- Use a tractor equipped with a Roll Over Protective System (ROPS) and fasten your seat belt prior to starting the engine.
- The manufacturer does not recommend usage of tractor with ROPS removed.
- Securely attach to towing unit. Use a high strength, appropriately-sized hitch pin with a mechanical retainer and attach a safety chain.
- Do not allow anyone to stand between the tongue or hitch and the towing vehicle when backing up to the equipment.



DURING OPERATION

- Clear the area of small children and bystanders before moving the equipment.
- Securely attach equipment to towing unit, using a hardened 1.0” pin, a metal retainer, and safety chains if required. Shift towing unit to a lower gear before going down steep downgrades, thus using the engine as a retarding force. Keep towing vehicle in gear at all times. Slow down for corners and rough terrain.
- Make sure you are in compliance with all local and state regulations regarding transporting equipment on public roads and highways. Lights and slow moving signs must be clean and visible by overtaking or oncoming traffic when the rake is transported.
- **SAFETY CHAIN** - If equipment is going to be transported on a public highway, a safety chain should be obtained and installed. Always follow state and local regulations regarding a safety chain and auxiliary lighting when towing farm equipment on a public highway. Be sure to check with local law enforcement agencies for your own particular regulations. Only a safety chain (not an elastic or nylon/plastic tow strap) should be used to retain the connection between the towing and towed machines in the event of separation of the primary attaching system.
- Install the safety chain by crossing the chains through the tongue and secure to the draw bar cage or hitch or bumper frame.
- Beware of bystanders, **particularly children!** Always look around to make sure that it is safe to start the engine of the towing vehicle or move the unit. This is particularly important with higher noise levels and quiet cabs, as you may not hear people shouting.
- **NO PASSENGERS ALLOWED** - Do not carry passengers anywhere on, or in, the tractor or equipment, except as required for operation.
- Keep hands and clothing clear of moving parts.
- Always keep all shields and guards in place and securely fastened.
- Do not clean, lubricate or adjust your equipment while it is moving.
- When halting operation, even periodically, set the tractor or towing vehicle brakes, shut off the engine and **remove the ignition key.**
- Be especially observant of the operating area and terrain - watch for holes, rocks or other hidden hazards. Always inspect the area prior to operation.
 - **DO NOT** operate near the edge of drop-offs or banks.
 - **DO NOT** operate on steep slopes as overturn may result.
 - Operate up and down (not across) intermediate slopes. Avoid sudden starts and stops.



HIGHWAY AND TRANSPORT OPERATIONS

- Adopt safe driving practices:
 - Keep the brake pedals latched together at all times. **NEVER USE INDEPENDENT BRAKING WITH MACHINE IN TOW AS LOSS OF CONTROL AND/OR UPSET OF UNIT CAN RESULT.**
 - Always drive at a safe speed relative to local conditions and ensure that your speed is low enough for an emergency stop to be safe and secure. Keep speed to a minimum.
 - Reduce speed prior to turns to avoid the risk of overturning.
 - Avoid sudden uphill turns on steep slopes.
 - Always keep the tractor or towing vehicle in gear to provide engine braking when going downhill. Do not coast.
 - Do not drink and drive!
- Comply with state and local laws governing highway safety and movement of farm machinery on public roads.
- Use approved accessory lighting flags and necessary warning devices to protect operators of other vehicles on the highway during daylight and nighttime transport. Safety lights and devices are available from your dealer.
- The use of flashing amber lights is acceptable in most localities. However, some localities prohibit their use. Local laws should be checked for all highway lighting and marking requirements.
- When driving the tractor and equipment on the road or highway under 20 mph, use flashing amber warning lights and a slow moving vehicle (SMV) identification emblem.
- Plan your route to avoid heavy traffic.
- Be a safe and courteous driver. Always yield to oncoming traffic in all situations, including narrow bridges, intersections, etc.
- Be observant of bridge loading ratings. Do not cross bridges rated lower than the gross weight at which you are operating.
- Watch for obstructions overhead and to the side while transporting.
- Always operate equipment in a position to provide maximum visibility at all times. Make allowances for increased length and weight of the equipment when making turns, stopping the unit, etc.

- Pick the most level route possible when transporting across fields. Avoid the edges of ditches or gullies and steep hillsides.
- Be extra careful when working on inclines.
- Maneuver the tractor or towing vehicle at safe speeds.
- Avoid overhead wires or other obstacles. Contact with overhead lines could cause serious injury or death.
- Avoid loose fill, rocks and holes; they can be dangerous for equipment operation or movement.
- Allow for unit length when making turns.
- Operate the towing vehicle from the operator's seat only.
- Never stand alongside a unit with engine running or attempt to start engine and/or operate machine while standing alongside of unit.
- Never leave running equipment attachments unattended.
- As a precaution, always recheck the hardware on equipment following every 100 hours of operation. Correct all problems. Follow the maintenance safety procedures.



FOLLOWING OPERATION

- Following operation, or when unhitching, stop the tractor or towing vehicle, set the brakes, shut off the engine and **remove the ignition keys**.
- Store the unit in an area away from human activity.
- Do not park equipment where it will be exposed to livestock for long periods of time. Damage and livestock injury could result.
- Do not permit children to play on or around the stored unit.
- Make sure all parked machines are on a hard, level surface and engage all safety devices.
- Wheel chocks may be needed to prevent unit from rolling.



PERFORMING MAINTENANCE

- Good maintenance is your responsibility. Poor maintenance is an invitation to trouble. Proper servicing and adjustments are key to the long life of any implement. With careful inspection and routine maintenance, costly downtime and repairs can be avoided.
- Some parts and assemblies can be quite heavy. Before attempting to detach any part or assembly, arrange to support it by means of a hoist, by blocking or by use of an adequate arrangement to keep it from falling, tipping, swinging or moving in any manner which may hurt somebody or damage the equipment.
- Always use lifting equipment that is adequately rated to do the job. Never lift equipment over people.
- Make sure there is plenty of ventilation. Never operate the engine of the towing vehicle in a closed building. The exhaust fumes may cause asphyxiation.
- Before working on the equipment, stop the towing vehicle, set the brakes, shut off the engine and **remove the ignition keys**.
- Be certain all moving parts on attachments have come to a complete stop before attempting to perform maintenance.
- **Always** use a safety support and block the wheels. Never use a jack to fully support the equipment.
- Always use the proper tools or equipment for the job at hand.
- Use extreme caution when making adjustments.
- Never replace hex bolts with less than grade five bolts unless otherwise specified.
- After servicing, be sure all tools, parts and service equipment are removed.
- Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts must be used to restore your equipment to original specifications. The manufacturer will not claim responsibility for use of unapproved parts and/or accessories and other damages as a result of their use.
- If equipment has been altered in any way from original design, the manufacturer does not accept any liability for injury or warranty.
- If repairs require the use of a torch or electric welder, be sure that all flammable and combustible materials are removed prior to the repair.
- Do not weld or cut on any tank containing oil, fuel, or their fumes, or other flammable material, or any container whose previous contents are unknown.

- Cleaning solvents should be used with care. Petroleum based solvents are flammable and present a fire hazard. Don't use gasoline. All solvents must be used with adequate ventilation and their vapors should not be inhaled.



HYDRAULIC FLUID AND EQUIPMENT SAFETY

Only adequately trained and qualified persons should work on hydraulics systems. You may be severely injured or killed by being crushed under a falling piece of equipment. Always have transport locks in place and frame sufficiently blocked when working on any implement.

Hydraulic fluid escaping under pressure can have sufficient force to cause injury. Keep all hoses and connections in good serviceable condition. Failure to heed may result in serious personal injury or death. Escaping hydraulic fluid under pressure can have sufficient pressure to penetrate the skin causing serious injury. Avoid the hazard by relieving the pressure before disconnecting lines or performing work on the system.

Make sure hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system. Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. DO NOT DELAY! If an accident occurs, see a doctor familiar with this type of injury immediately. Any fluid injected into the skin or eyes must be treated within a few hours or gangrene may result.

Always secure equipment with solid supports before working on or under it. Never work under equipment supported by hydraulics. Hydraulics can drop equipment if controls are actuated or hydraulic lines burst or pressure is lost while disconnecting lines. Either situation can drop machinery instantly even when power to hydraulics is off. Do not attempt to disconnect a hydraulic cylinder or hose while the system is under pressure!

Check hydraulic hoses and fittings frequently. Brush and other debris can damage hoses and fittings. Inspect and maintain equipment daily. Loose, broken, and missing hardware can cause equipment to not perform properly and can result in bodily injury or death.

Hydraulic systems and oil can be hot and cause burns. Before working on any system, wait until the oil has cooled.



LOCKOUT / TAGOUT

Think, plan and check. **Think** through the entire procedure and identify all the steps that are required. **Plan** what personnel will be involved, what needs to be shut down, what guards need to be removed, and how (and under what conditions) the power will be restarted. **Check** the machine to verify all power sources and stored energy have been identified including engines, hydraulic and pneumatic systems, springs and accumulators, and suspended loads. Shutoff

and lockout power before adjusting, servicing, maintaining, or clearing an obstruction from this machine. Failure to heed may result in serious injury or death. Communicate with everyone involved in a repair or maintenance operation, including bystanders, that work is being done which involves keeping this machine safety at a ZERO ENERGY STATE.

OSHA's requirements for lockout/tagout are covered in Section 1910.147 of the OSHA standards. The LOTO standard establishes the employer's responsibility to protect workers from hazardous energy. Employers are required to train each worker to ensure that they know, understand, and are able to follow the applicable provisions of the hazardous energy control procedures:

- Proper lockout/tagout (LOTO) practices and procedures safeguard workers from the release of hazardous energy. The OSHA standard for The Control of Hazardous Energy (Lockout/Tagout) for general industry outlines specific action and procedures for addressing and controlling hazardous energy during servicing and maintenance of machines and equipment. Employers are also required to train each worker to ensure that they know, understand, and are able to follow the applicable provisions of the hazardous energy control procedures. Workers must be trained in the purpose and function of the energy control program and have the knowledge and skills required for the safe application, usage and removal of the energy control devices.
- All employees who work in the area where the energy control procedure(s) are utilized need to be instructed in the purpose and use of the energy control procedure(s) and about the prohibition against attempting to restart or reenergize machines or equipment that is locked or tagged out.
- All employees who are authorized to lockout machines or equipment and perform the service and maintenance operations need to be trained in recognition of applicable hazardous energy sources in the workplace, the type and magnitude of energy found in the workplace, and the means and methods of isolating and/or controlling the energy.
- Specific procedures and limitations relating to tagout systems where they are allowed.
- Retraining of all employees to maintain proficiency or introduce new or changed control methods.

OSHA outlines a six-step procedure for controlling hazardous energy:

- **Step 1: Prepare for shutdown.** It must be determined what type of power system is going to be deactivated including electrical, hydraulic, pneumatic or other energy sources. Knowledge of shut down methods is necessary.
- **Step 2: Shutdown the equipment.** This should be completed consistent with the manufacturer's instructions for the shutdown procedure and could be as simple as placing a switch in the "off" position or pressing a button.
- **Step 3: Isolate the equipment.** This step involves closing of valves, throwing the main disconnects or circuit breakers and disconnecting or capping any auxiliary power sources or secondary electrical systems.
- **Step 4: Apply the lockout/tagout device.** This is done to prevent restoration of the flow of energy and is done at all disconnect switches, valves or other energy isolating

devices. Locks are the preferred method of controlling energy and should be supplemented with tags. Various lockout devices are available including group lockout hasps. Locks should be individually assigned and have only one key.

- **Step 5: Control the stored energy.** This step includes the release, disconnect or restraint of any residual hazardous energy which may be present and a check that all moving parts have stopped moving. It may also include the installation of “pancakes” or blanking of pipe flanges, the installation of ground wires to discharge electrical capacitors and the blocking or supporting of elevated equipment.
- **Step 6: Verify isolation of equipment.** Double-check the steps and verify that the equipment indeed has been shut down and that the lock and tag do control the stored energy. Employees should be warned and the system tested, including pressing of all start buttons to assure that the equipment will not start.



REFUELING SAFETY

Observe usual fuel handling precautions; do not smoke while refueling, do not fill tank with engine running or while engine is hot. Clean up any gasoline spills. Allow engine to cool before storing machine inside a building. Keep fuel away from open flame or spark and store machine away from open flame or spark if there is fuel in the tank. Use extra caution when handling gasoline and other fuels. They are flammable and vapors are explosive. A fire or explosion from gasoline can burn you and others and can damage property. Refuel outdoors preferably, or in well ventilated areas. Never attempt to start engine when there is a strong odor of gasoline fumes present. Locate and correct cause. Store gasoline in an approved container and keep it out of the reach of children.

Never buy more than a 30 day supply of gasoline. Do not fill gasoline containers inside a vehicle or on a truck or trailer as interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge. When practical, remove equipment from the truck or trailer and refuel the equipment with its wheels on the ground. If this is not possible, then refuel the equipment on the truck or trailer using a portable container and not a gasoline dispenser nozzle. If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.

MAINTENANCE CHART

ITEM	INTERVAL
Check tire pressure.	Before transporting.
Check that ground wheel hubs are tight.	Before transporting.
Check that safety lights work.	Before transporting.
Check tire pressure.	Before operating.
Check hydraulic tips hoses and connections for leaks.	Before operating.
Grease ball hitch.	Monthly.
Lubricate extension tube slides.	Monthly.
Lubricate spring & rod slides.	Monthly.
Check that bearing cranks are tight.	Monthly.
Grease ground wheel hubs.	Monthly.
Check tires for uneven wear – adjust toe-in.	Monthly
Grease wheel bearings.	Two times per year.
Check all electrical connections	Seasonally.
Grease leg strut fittings.	Seasonally.
Rotate HD walking beam bearing 90°.	Seasonally.
Review safety instructions.	Annually.
Clean or replace safety decals.	As needed.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Rake will not open/close	Open center tractor	Change valve to open center
“	Low hydraulic oil	Check & add if low
“	Hoses incorrectly located	Review hose chart & correct
“	Air in hydraulic system	Operate cylinders till air is removed
“	Bad coupling/leak	Check for leaks & replace
“	Hydraulic oil volume too high	Relieve pressure and adjust GPM
Unable to level rake	Overhead frame not adjusted	Correct with ratchet jack
“	Raking frame(s) not square/level	Square & level raking frame to overhead
Not raking properly	Raking wheels not adjusted	Adjust each rake wheel properly
“	Raking wheels not adjusted	Adjust front wheels deeper than rear
Rake skipping product	Transport tires too firm	Adjust tire pressure to 15 PSI
Hay wraps rear wheels	Raking angle too severe	Adjust for less angle
“	Heavy crop	Raise wheels slightly
Undue rake tooth wear	Raking wheels not adjusted	Adjust each rake wheel properly

USE AND CARE TIPS FROM THE FACTORY

1. Keeping the rake cleaned and painted will help to prolong the value of this product.
2. Failure to check rake teeth height routinely may cause excessive wear or missed pick-up of forage.
3. When opening the overhead, the rake must be moving forward so as not to damage the transport tires.
4. When not attached to the tractor, chock the wheels and ensure that the jack is securely planted. Park this rake in a level area whenever possible.
5. When stopped or parked, do not leave the raking teeth in contact with the ground fully supporting the weight of the raking frame. This will result in permanent damage to the rake teeth.
6. Grease the zerks on the leg struts as needed.
7. Check tire air pressure prior to highway transport.
8. Inspect for hydraulic leaks frequently.

ASSISTANCE

If you have questions not answered in this manual, require additional copies, or the manual is damaged, please contact your dealer, print from our website: www.nikkelironworks.com or call the factory @ 661-746-4904.