

Model D4P Power Ditcher Operator's Manual



LANDOLL CORPORATION

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Chapter 1

Introduction

The Landoll Model D4P Power Ditcher is a quality product designed to give years of trouble free performance. By following each section of this manual, your system will perform as designed for you and your operation

CHAPTER 1 gives basic instructions on the use of this manual.

CHAPTER 2 gives product specifications. These specifications supply lengths and measures for your

equipment. A Standard Bolt Torque Table is provided to give guidelines for bolt torques to

be used when servicing this product.

CHAPTER 3 contains assembly instructions for your Model D4P Power Ditcher. When these

procedures are correctly followed, your equipment should provide you years of

trouble-free operation and service.

CHAPTER 4 instructs how to operate your equipment before using it, and describes adjustments

needed. It also gives practical advice for the care and maintenance of your Landoll equipment. Drawings in this section locate adjustment points on the equipment.

NOTE: IF THE EQUIPMENT IS IMPROPERLY ASSEMBLED OR MAINTAINED, THE

WARRANTY IS VOID. IF YOU HAVE ANY QUESTIONS CONTACT:

LANDOLL CORPORATION 1900 NORTH STREET MARYSVILLE, KANSAS 66508

> or phone: (785) 562-5381 or (800) 428-5655 or FAX: (888) 527-3909

CHAPTER 5 is a troubleshooting guide to aid in diagnosing and solving problems with the equipment.

PARTS LIST is a separate manual showing the various assemblies, subassemblies, and systems.

Refer to that manual when ordering Landoll replacement parts. Order parts from your

Landoll dealer.

WARRANTY The Warranty Registration form is included with the product documents. Fill it out and

mail it within 15 days of purchase.

NOTE: IMPROPER ASSEMBLY, MODIFICATION, OR MAINTENANCE OF YOUR

LANDOLL MACHINE CAN VOID YOUR WARRANTY.

COMMENTS Address comments or questions regarding this publication to:

LANDOLL CORPORATION
1900 NORTH STREET
MARYSVILLE, KANSAS 66508
ATTENTION: PUBLICATIONS -DEPT. 55

Understanding Safety Statements

You will find various types of safety information on the following pages and on the machine signs (decals) attached to the vehicle. This section explains their meaning.

The Safety Alert Symbol means ATTENTION! YOUR SAFETY IS INVOLVED!



DANGER

Danger means a life-threatening situation exists. Death can occur if safety measures or instructions on this label are not properly followed.



WARNING

Warning means serious injury or death can occur if safety measures or instructions on this label are not properly followed.



CAUTION

Caution means serious equipment or other property damage can occur if instructions on this label are not properly followed.

NOTE

Means that failure to follow these instructions could cause damage to the equipment or cause it to operate improperly.

NOTE

Make sure you read and understand the information contained in this manual and on the machine signs (decals) before you attempt to operate or maintain this vehicle.

The safety statements contained in this manual relate to the operation of the Model D4P Power Ditcher.

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Chapter 2

Standard Specifications

The heavy duty 35-R Universal Drive Shaft is connected to the #80 precision roller chain drive which is inside the steel tubing case. All four (4) bearings in the chain drive housing are the same size (1-15/16" diameter) and have tri-ply seals. Both the drive line and the cutter head are mounted on alloy steel shafts.

The bearings and the shafts within the drive housings are lubricated by a continuous oil bath while the ditcher is operating.

An anti-wrap ring protects the bearing behind the cutter head. Both sprockets are heat treated for long life. The cutter head blades are made of high carbon steel with hard surfaced cutting edges.

The D4P Power Ditcher is designed for use on tractors with 35 to 65 PTO horsepower and 540 RPM PTO.

Model D4P Specifications					
Horsepower Recommendation	For use on tractors with 540 RPM PTO from 35 to 65 PTO horsepower.				
"A" Frame	Category I and II 3-point hitch. Category II quick coupler.				
Cutter Head	Adjustable 16" to 18" Features four (4) replaceable high-carbon steel blades. Rotates at 540 RPM.				
Chain Drive	Heavy duty, endless #80H roller chain. Shafts 1-15/16" dia high carbon steel. Case hardened sprockets with 15 teeth top and bottom.				
Shear Bolt	Two - 5/16" dia. grade 8				
Universal Drive Shaft	1-3/8"- 6B Spline. Quick coupler connects to 540 RPM tractor PTO shaft. Shaft is telescoping and fully shielded.				
Chain Drive	3" x 8" x 1/4" tubing welded into rigid, one-piece, all-welded main frame				

Because of our continuing effort to improve our products, we reserve the right to change design and specifications without notice.

LANDOLL CORPORATION GENERAL TORQUE SPECIFICATIONS (REV. 4/97)

THIS CHART PROVIDES TIGHTENING TORQUES FOR GENERAL PURPOSE APPLICATIONS WHEN SPECIAL TORQUES ARE NOT SPECIFIED ON PROCESS OR DRAWING.

ASSEMBLY TORQUES APPLY TO PLATED NUTS AND CAPSCREWS ASSEMBLED WITHOUT SUPPLEMENTAL LUBRICATION (AS RECEIVED CONDITION).
THEY DO NOT APPLY IF SPECIAL GRAPHITE MOLY-DISULFIDE OR OTHER EXTREME PRESSURE LUBRICANTS ARE USED.

WHEN FASTENERS ARE DRY (SOLVENT CLEANED), ADD 33% TO AS RECEIVED CONDITION TORQUE.

BOLT HEAD IDENTIFICATION MARKS INDICATE GRADE AND MAY VARY FROM MANUFACTURER TO MANUFACTURER.

THICK NUTS MUST BE USED ON GRADE 8 CAPSCREWS.

USE VALUE IN [] IF USING PREVAILING TORQUE NUTS.

TORQUE IS SPECIFIED IN FOOT POUNDS

UNC Size	SAE	E Grade 2	SAE	E Grade 5	SAE	Grade 8	UNF Size	SAE	Grade 2	SAE	Grade 5	SAE	Grade 8
1/4-20	4	[5]	6	[7]	9	[11]	1/4-28	5	[6]	7	[9]	10	[12]
5/16-18	8	[10]	13	[16]	18	[22]	5/16-24	9	[11]	14	[17]	20	[25]
3/8-16	15	[19]	23	[29]	35	[43]	3/8-24	17	[21]	25	[31]	35	[44]
7/16-14	24	[30]	35	[43]	55	[62]	7/16-20	27	[34]	40	[50]	60	[75]
1/2-13	35	[43]	55	[62]	80	[100]	1/2-20	40	[50]	65	[81]	90	[112]
9/16-12	55	[62]	80	[100]	110	[137]	9/16-18	60	[75]	90	[112]	130	[162]
5/8-11	75	[94]	110	[137]	170	[212]	5/8-18	85	[106]	130	[162]	180	[225]
3/4-10	130	[162]	200	[250]	280	[350]	3/4-16	150	[188]	220	[275]	320	[400]
7/8-9	125	[156]	320	[400]	460	[575]	7/8-14	140	[175]	360	[450]	500	[625]
1-8	190	[237]	408	[506]	680	[850]	1-14	210	[263]	540	[675]	760	[950]
1-1/8-7	270	[337]	600	[750]	960	[1200]	1-1/8-12	300	[375]	660	[825]	1080	[1350]
1-1/4-7	380	[475]	840	[1050]	1426	[1782]	1-1/4-12	420	[525]	920	[1150]	1500	[1875]
1-3/8-6	490	[612]	110	[1375]	1780	[2225]	1-3/8-12	560	[700]	1260	[1575]	2010	[2512]
1-1/2-6	650	[812]	1460	[1825]	2360	[2950]	1-1/2-12	730	[912]	1640	[2050]	2660	[3325]
1-3/4-5	736	[920]	1651	[2063]	2678	[3347]	1-3/4-12	920	[1150]	2063	[2579]	3347	[4183]

METRIC

COARSE THREAD METRIC CLASS 10.9 FASTENERS AND CLASS 10.0 NUTS AND THROUGH HARDENED FLAT WASHERS, PHOSPHATE COATED, ROCKWELL "C" 38-45

USE VALUE IN [] IF USING PREVAILING TORQUE NUTS.

Nominal		Standard Torque					Standard Torque			
Thread Diameter mm		lewton- Meters	F	Foot- Pounds	Thread Diameter mm	1	Newton- Meters		Foot- Pounds	
6	10	[14]	7	[10]	20	385	[450]	290	[335]	
7	16	[22]	12	[16]	24	670	[775]	500	[625]	
8	23	[32]	17	[24]	27	980	[1105]	730	[825]	
10	46	[60]	34	[47]	30	1330	[1470]	990	[1090]	
12	80	[101]	60	[75]	33	1790	[1950]	1340	[1450]	
14	125	[155]	90	[115]	36	2325	[2515]	1730	[1870]	
16	200	[240]	150	[180]	39	3010	[3210]	2240	[2380]	
18	275	[330]	205	[245]						

Table 2-1: General Torque Specifications

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LANDOLL CORPORATION HYDRAULIC FITTING TORQUE SPECIFICATIONS 37° JIC, ORS, & ORB (REV. 10/97)

THIS CHART PROVIDES TIGHTENING TORQUES FOR HYDRAULIC FITTING APPLICATIONS WHEN SPECIAL TORQUES ARE NOT SPECIFIED ON PROCESS OR DRAWING.

ASSEMBLY TORQUES APPLY TO PLATED CARBON STEEL AND STAINLESS STEEL FITTINGS ASSEMBLED WITHOUT SUPPLEMENTAL LUBRICATION (AS RECEIVED CONDITION). THEY DO NOT APPLY IF SPECIAL GRAPHITE MOLY-DISULFIDE OR OTHER EXTREME PRESSURE LUBRICANTS ARE USED. BRASS FITTINGS AND ADAPTERS - 65% OF THE TORQUE VALUE FOR STEEL. STAINLESS STEEL, ALUMINUM AND MONEL - THREADS ARE TO BE

TORQUE IS SPECIFIED IN FOOT POUNDS

PARKER BRAND FITTINGS						
Dash Size	37 Degree JIC	O-Ring (ORS)	O-Ring Boss (ORB)			
-4	11-13	15-17	13-15			
-5	14-16	<u> </u>	21-23			
-6	20-22	34-36	25-29			
-8	43-47	58-62	40-44			
-10	55-65	100-110	57.5-62.5			
-12	80-90	134-146	75-85			
-16	115-125	202-218	109-121			
-20	160-180	248-272	213-237			
-24	185-215	303-327	238-262			
-32	250-290	_	310-340			

GATES BRAND FITTINGS

Dash Size	37 Degree JIC	O-Ring (ORS)	O-Ring Boss (ORB)	
-4	10-11	10-12	14-16	
-5	13-15	_	_	
6	17-19	18-20	24-26	
8	34-38	32-40	37-44	
10	50-56	46-56	50-60	
12	70-78	65-80	75-83	
14	_	65-80	_	
16	94-104	92-105	111-125	
20	124-138	125-140	133-152	
24	156-173	150-180	156-184	
32	219-243			

AEROQUIP BRAND FITTINGS

Dash Size	37 Degree JIC	O-Ring (ORS)	O-Ring Boss (ORB)
1	11-12	10-12	14-16
5	15-16	<u> </u>	18-20
6	18-20	18-20	24-26
3	38-42	32-35	50-60
10	57-62	46-50	72-80
12	79-87	65-70	125-135
4	_	<u> </u>	160-180
6	108-113	92-100	200-220
20	127-133	125-140	210-280
4	158-167	150-165	270-360
32	245-258	_	_

Table 2-2: Hydraulic Fitting Torque Specifications

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Assembly Instructions

Assembly - Safety

\triangle

CAUTION

- The person or persons who assemble this machine must have the ability to read, understand and follow the step by step assembly procedures and safety instruction outlined herein.
- 2. Assembly area should be level, clean and free of debris to prevent assembly personnel from tripping or falling.
- 3. Inspect all parts for sharp edges, grease, oil or dirt which might cause injury during assembly.

! WARNING

- Wear personal protective equipment (PPE) such as, but not limited to, protection for eyes, lungs, ears, head, hands and feet when operating, servicing or repairing equipment.
- 2. Use lift crane, jack, tackle or fork lift truck to lift heavy parts and assemblies.
- 3. Keep clear of parts which may move or drop when removing shipping straps or brackets.
- If machine requires blocking up, use blocking material of adequate strength and in good condition. Blocks must be on a smooth dry surface.
- 5. Never place any part of your body under blocked-up assemblies.
- 6. If welding or flame-cutting is required, be sure no flammable materials are in the area. Also, clear bystanders from area.

After Assembly - Safety

WARNING

- Be sure all nuts, bolts, other fasteners and hydraulic fittings are properly tightened.
 Refer to the bolt torque chart.
- 2. Be sure all safety guards and safety locking devices are in place and function properly.



CAUTION

Before operating the machine, be sure to read the safety and operation sections of the operator's manual.



CAUTION

Before delivering the machine, review machine maintenance, operation and safety with the customer.

General Assembly Instructions

- 1. The terms "right" and "left", "front" and "rear", refer to the machine as viewed by facing in the direction of forward travel.
- 2. Open all bundles. Do not mix parts of one bundle with those of another. Place all bundles where they will be easy to access.
- 3. Neatly arrange parts and tools within easy reach of work area.
- Use the correct grade of bolt in the proper locations as indicated. Refer to the bolt torque chart for descriptive markings on bolt heads.
- 5. After completing each assembly step, review next step in procedure before proceeding with that step.

Assembly Instuctions

- The D4P16A Power Ditcher is completely assembled at the factory, except for the universal drive shaft which is wired to the "A" frame.
- Thoroughly clean the end of the drive shaft and attach it to the input shaft of the ditcher with a 7/16" x 1" hex bolt, lock washer and special flat washer and with two 5/16" x 1-3/4" grade 8 shear bolts and lock nuts.
- 3. The power ditcher is now fully assembled and ready for attachment to the tractor.

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Physical Characteristics

See Figure 3-1 and list below for parts identication.

- 1. Shielded Universal Drive Shaft
- 2. Drive Case
- 3. Bearings and Tri-Ply Seals
- 4. Alloy Steel Shafts
- 5. Anti-Wrap Ring
- 6. Drive Sprockets
- 7. High Carbon Steel Blades
- 8. Hard Surfaced Cutting Edges

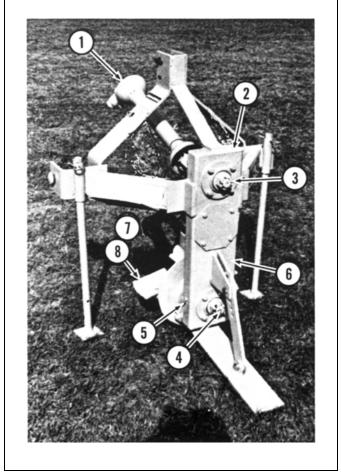


Figure 3-1: D4P Power Ditcher

Notes:

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Operation and Maintenance

The Landoll D4P Power Ditcher is a ditching machine for controlling field water drainage by improving water run-off conditions. The Power Ditcher can make shallow trenches for irrigation and be used to build fire lanes.

This manual provides suggested operating techniques to help you obtain efficient and dependable service from your new machine. This manual also contains general information, specifications, safety information, maintenance and service requirements for your machine. Read this manual carefully.

Keep this manual handy for future reference. If you have any questions, contact your Landoll equipment dealer. Your dealer is the best qualified to help you. He has qualified service technicians and genuine Landoll replacement parts to keep your machine in top operating condition. This manual should remain with the machine when sold.

This manual was prepared from the latest product information available at publication time. The Company reserves the right to make changes at any time without notice.

/ CAUTION

- 1. Remove tractor start key when tractor and implement will be unattended.
- 2. Never leave unattended equipment in the unlocked raised position. Lower the unit to the ground or use transport locks.
- 3. Do not leave tractor or implement unattended with tractor engine running.

DANGER

Never allow anyone to ride on this equipment.

! CAUTION

- Avoid injury or fatal accidents. Read these safety precautions completely and carefully! Utilize these instructions when operating your machine.
- The operator should be a responsible adult familiar with farm machinery and trained in this machine's operations. Do not allow persons to operate this machine until they have read this manual and have developed a thorough understanding of the safety precautions and of how the machine works.
- To prevent injury or death, use a tractor equipped with a roll-over protection structure (ROPS) and seat belt. Do not paint over, remove or deface any safety decals on your equipment. Observe all safety decals and follow the instructions on them.
- 4. Remember! Your best insurance is a careful and responsible operator. If there is any portion of this manual or of the machine's operation you do not understand, contact your local authorized Landoll dealer, or Landoll Corporation.

! WARNING

- 1. Do not clean, adjust or service when the machine is in motion.
- All hydraulically or mechanically elevated components must be blocked to prevent accidental lowering or must be lowered to the ground when adjustments or repairs are made.
- 3. Properly tighten all mounting hardware. see bolt torque chart.
- 4. Periodically inspect all moving parts for wear and replace with only authorized service parts if any excessive wear is present. If safety decals are missing, illegible, or damaged, they should be replaced.

DANGER

Clear the area of bystanders before starting operation.

CAUTION

- Avoid sharp turns using brakes. drive slowly over rough ground, side hills and around curves to avoid tipping.
- 2. Always shut off tractor, shift to "park" position (or shift to neutral), set brakes and cycle hydraulic levers before dismounting tractor or working around the machine.

CAUTION

- Wear personal protective equipment (PPE) such as, but not limited to, protection for eyes, lungs, ears, head, hands and feet when operating, servicing or repairing equipment. Do not wear loose clothing or jewelry as it may entangle or catch on moving parts.
- Never use your hands to locate a hydraulic leak. Use a piece of wood or cardboard. Hydraulic fluid escaping under pressure can penetrate the skin causing serious injury.
- Openings in the skin and minor cuts are susceptible to infection from hydraulic fluid. If injured by escaping fluid, see a doctor at once. without immediate medical treatment, serious infection can occur.
- Comply with your state and local laws governing highway safety, lighting & marking, and the movement of farm machinery on public roads.
- 5. Always drive at a reasonable speed to maintain control of the equipment. do not tow at speeds in excess of 20 mph.
- 6. Be a safe and courteous operator.

! CAUTION

Keep safety decals free of dirt and grime.

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Safety Decals

- The following decals are installed to alert operators to hazards in specific machine areas (See Figure 4-1.) The decals are for personal safety... READ AND UNDERSTAND THE DECALS!
 - a. Keep decals clean by wiping off regularly. Use a cleaning solution if necessary.
 - b. Replace missing, damaged or painted over decals.



- 1. Read Operator's Manual before operating.
- 2. Operate only with tractor equipped with fully enclosed ROPS cab and seat belt.
- 3. Keep riders off equipment.
- 4. Make certain everyone is clear before starting tractor engine and operating.
- 5. Keep all shields in place.
- 6. Keep hands, feet and clothing away from moving parts.
- 7. Disengage PTO, lower equipment to ground and stop tractor engine before leaving operator's platform.
- 8. Wait for all movement to stop before servicing.
- 9. Never lubricate, adjust, unclog or service equipment with tractor engine running.

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Stay clear of rotor and discharge area while tractor engine is running.

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d4p safety decals

Figure 4-1: Safety Decals

Power Ditcher Operation and Adjustments

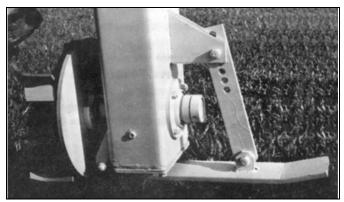


Figure 4-2: Adjusting Bar

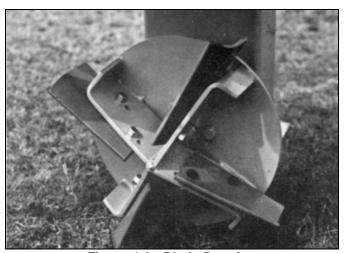


Figure 4-3: Blade Rotation



Figure 4-4: D4P Windrow

! WARNING

Stop the tractor and disengage the pto before making any adjustments. Keep all shields in place.

- The adjusting bar should be initially set with the bottom of the skid about 1/2" to 1" above the bottom of the blades (See Figure 4-2.) This will allow the ditcher to reach normal cutting depth after a few feet of forward travel. The adjusting bar should then be adjusted as required to hold a uniform cutting depth.
- The ditcher should be lowered slightly before engaging the tractor PTO shaft. The PTO should not be engaged with the ditcher blades resting on the ground (See Figure 4-3.) The sudden shock of starting with the blades on the ground will cause drive shaft, shear bolt, and chain failures. After the blades start rotating the tractor engine RPM should be set for a 540 RPM PTO speed. The ditcher should be lowered onto the ground and the tractor driven forward. The speed and depth should be matched to the soil conditions. In wet or loose soil the ditcher will cut a fairly deep ditch at 2 to 2-1/2 MPH. In dry soil or hard soil the travel speed must be greatly reduced. Cutting depth must also be reduced. It may be necessary to make two or more passes to obtain deeper water furrows. In general, keeping engine RPM set for proper PTO speed and avoiding sudden shock loads will greatly reduce down time and field failures. The ditcher should never be raised to maximum height with the PTO engaged. Always reduce engine RPM and raise the Power Ditcher to about 50 percent of the maximum height while turning.
- The deflector wing on the left side of your ditcher was mounted for maximum spreading of dirt in a neat windrow, close to the ditch, ready for easy back filling over irrigation pipe and similar uses (See Figure 4-4.)

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Attaching to the Tractor

! WARNING

Stop the tractor and disengage the PTO before making any adjustments. Keep all shields in place.

- 1. This Power Ditcher is set up for a Category I or II three point hitch or Category II quick coupler. Careful attention should be given to mounting the ditcher to the tractor. The three tractor lift links should be connected to the ditcher with the connecting pins. The universal drive shaft should be connected to the tractor PTO shaft by slipping the shaft forward until the quick disconnect pin slips into the groove on the tractor PTO shaft. Periodic cleaning and a few drops of oil on the splined surfaces and on the quick disconnect pin will simplify this operation. Be careful, the universal drive shaft could slip off the tractor PTO shaft if the quick disconnect pin is not properly seated.
- 2. The parking stands should be raised and pinned in the raised position. The ditcher should be slowly raised and lowered to check the drive shaft length. At least 4" of the square shaft should be engaged in the tubular portion of the universal drive shaft. Check the drive shaft in the fully retracted position to make sure it is not binding and will turn freely. Also check to be sure the drive shaft will not hit the tractor drawbar.
- 3. The tractor's top lift link should be extended or retracted until the chain case is vertical when lowered to the normal operating position. The universal drive shaft must have an equal offset in each joint (See Figure 4-5.) As an example, if the front joint is offset 6 degrees the rear joint must also have a 6 degree offset. Should the rear joint be offset 4 degrees or 8 degrees the cutter head will not run at a constant speed and will vibrate excessively. Operating the ditcher in this condition will cause drive shaft, shear bolt and chain failures.

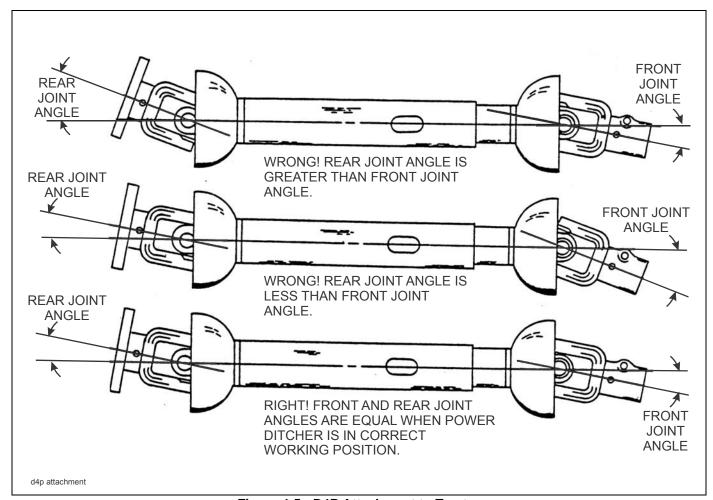


Figure 4-5: D4P Attachment to Tractor

Lubrication

WARNING

Do not clean, adjust or service when machine is in motion.

WARNING

All hydraulically or mechanically elevated components must be blocked to prevent accidental lowering or must be lowered to the ground when adjustments or repairs are made.



WARNING

Before working on this machine, disengage tractor P.T.O., shut off tractor and allow all moving parts to come to a complete stop.



WARNING

Replace all shields and guards after servicing and before starting machine. Always keep all safety shields in place when operating machine.

- Proper lubrication of your machine is instrumental in obtaining optimum performance and extended life. Neglect leads to needless breakdowns and unnecessary expenses.
- Check oil level at the check plug on the chain housing when the Power Ditcher is in an upright position. Oil should be level with the plug hole. The chain housing was filled to the proper level at the factory with one quart of SAE 90 oil or equivalent. A similar grade should be used for replacement.
- Lubricate the drive shaft with a good grade of Lithium Soap Base Grease every 25 to 50 hours of operation (See Figure 4-6.) Remove the male end of the drive shaft and pack tube with a generous amount of grease. The drive shaft has four grease fittings.

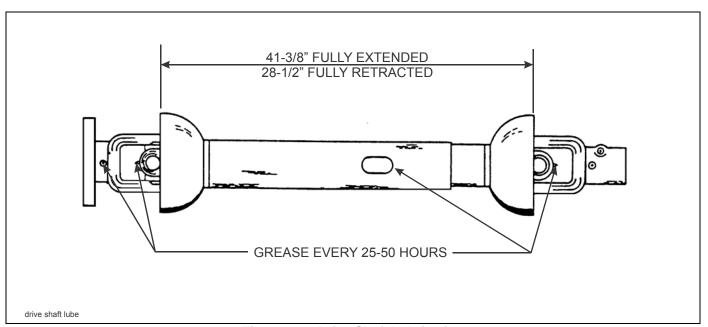


Figure 4-6: Drive Shaft Lubrication

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Maintenance



WARNING

Do not clean, adjust or service when machine is in motion.



WARNING

All hydraulically or mechanically elevated components must be blocked to prevent accidental lowering or must be lowered to the ground when adjustments or repairs are made.



WARNING

Before working on this machine, disengage tractor P.T.O., shut off tractor and allow all moving parts to come to a complete stop.



WARNING

Replace all shields and guards after servicing and before starting machine. Always keep all safety shields in place when operating machine.

Shear Bolts

1. The Power Ditcher has two 5/16" x 1-3/4" grade 8 shear bolts secured with locknuts. They are located in the flange of the main drive shaft at the PTO.

Notes

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Equipment from Landoll Corporation is built to exacting standards ensured by ISO 9001 registration at all Landoll manufacturing facilities.

Model D4P Power Ditcher Operator's Manual

Re-Order Part Number F-348-0411

LANDOLL CORPORATION

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