

4300 Beet Harvester



TECHNICAL MANUAL 4300 Beet Harvester

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4300 BEET HARVESTER

TECHNICAL MANUAL
TM-1120 (Oct-75)

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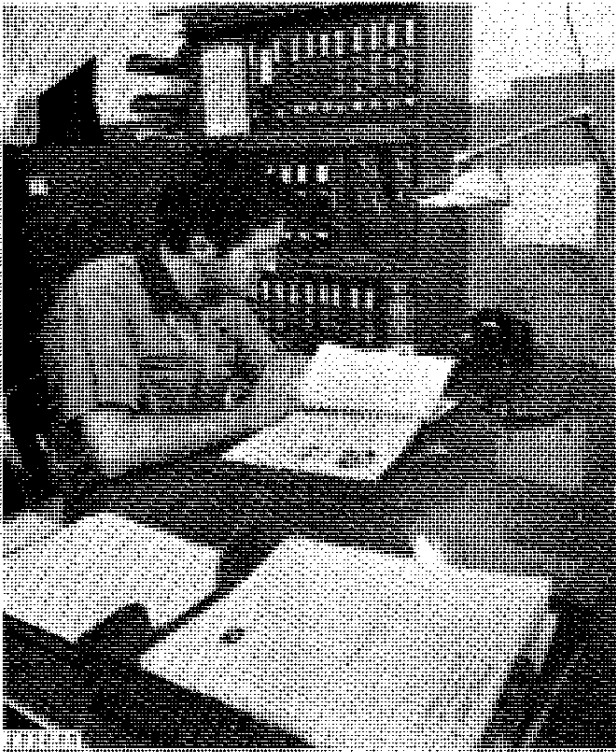
The specifications and design information contained in this manual were correct at the time this machine was manufactured. It is John Deere's policy to continually improve and update our machines. Therefore, the specifications and design information are subject to change without notice. Wherever applicable, specifications and design information are in accordance with SAE and IEMC standards.

FOR YOUR CONVENIENCE

Vertical lines appear in the margins of many of the pages. These lines identify new material and revised information that affects specifications, procedures, and other important instructions.

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INTRODUCTION



Use FOS Manuals for Reference

This technical manual is part of a twin concept of service:

- **FOS Manuals—for reference**
- **Technical Manuals—for actual service**

The two kinds of manuals work as a team to give you both the general background and technical details of shop service.

Fundamentals of Service (FOS) Manuals cover *basic* theory of operation *fundamentals* of trouble shooting, *general* maintenance, and *basic* types of failures and their causes. FOS Manuals are for training new people and for reference by experienced technicians.

Technical Manuals are *concise* service guides for a *specific* machine. Technical Manuals are on-the-job guides containing only the vital information needed by an experienced technician.

NOTE: Whenever the service technician should refer to a FOS Manual for more information, a specific reference is provided.




Use Technical Manuals for Actual Service

Some features of this technical manual:

- *Table of contents at front of manual*
- *Exploded views showing parts relationship*
- *Photos showing service techniques*
- *Specifications grouped for easy reference*

This technical manual was planned and written for you—an experienced technician. Keep it in a permanent binder in the shop where it is handy. Refer to it whenever in doubt about correct service procedures or specifications.

Using the technical manual as a guide will reduce error and costly delay. It will also assure you the best in finished service work.

 This safety alert symbol identifies important safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.

**Thanks very much for your reading,
Want to get more information,
Please click here, Then get the complete
manual**

JustClickHere 

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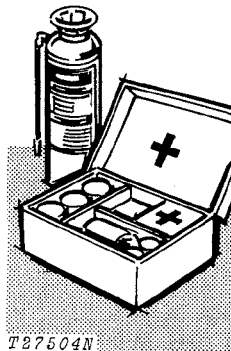
SAFETY AND YOU



T27999N

INTRODUCTION

 This safety alert symbol identifies important safety messages in this manual and on the harvester. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.



T27504N

Be prepared if an accident or fire should occur. Know where the first aid kit and the fire extinguishers are located—know how to use them.

PERSONAL SAFETY

Avoid working on equipment with the tractor engine running. If it is necessary to make checks with the engine running, **ALWAYS USE TWO PEOPLE**—with the operator at the controls able to see the person checking the machine. **KEEP HANDS AWAY FROM MOVING PARTS.**

Don't attempt to check roller chain tension while the tractor engine is running.

RIGHT



WRONG

H23440N

Always avoid loose clothing or any accessory—flopping cuffs, dangling neckties and scarves—that might catch in moving parts and cause an injury.

Always wear your safety glasses while on the job.

FLUIDS UNDER PRESSURE

Escaping fluid under pressure can have sufficient force to penetrate the skin, causing serious personal injury. Before disconnecting lines, be sure to relieve all pressure. Before applying pressure to the system, be sure all connections are tight and that lines, pipes and hoses are not damaged.

Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands, to search for suspected leaks.

If injured by escaping fluid, see a doctor at once. Serious infection or reaction can develop if proper medical treatment is not administered immediately.

Section 10 GENERAL

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Group 5 DESCRIPTION

The 4300 Beet Harvester is a lifter-loader or tank-type harvester which will harvest three 20 to 40-inch (51 to 102 cm) or four 20 to 30-inch (51 to 76 cm) spaced rows of topped beets.

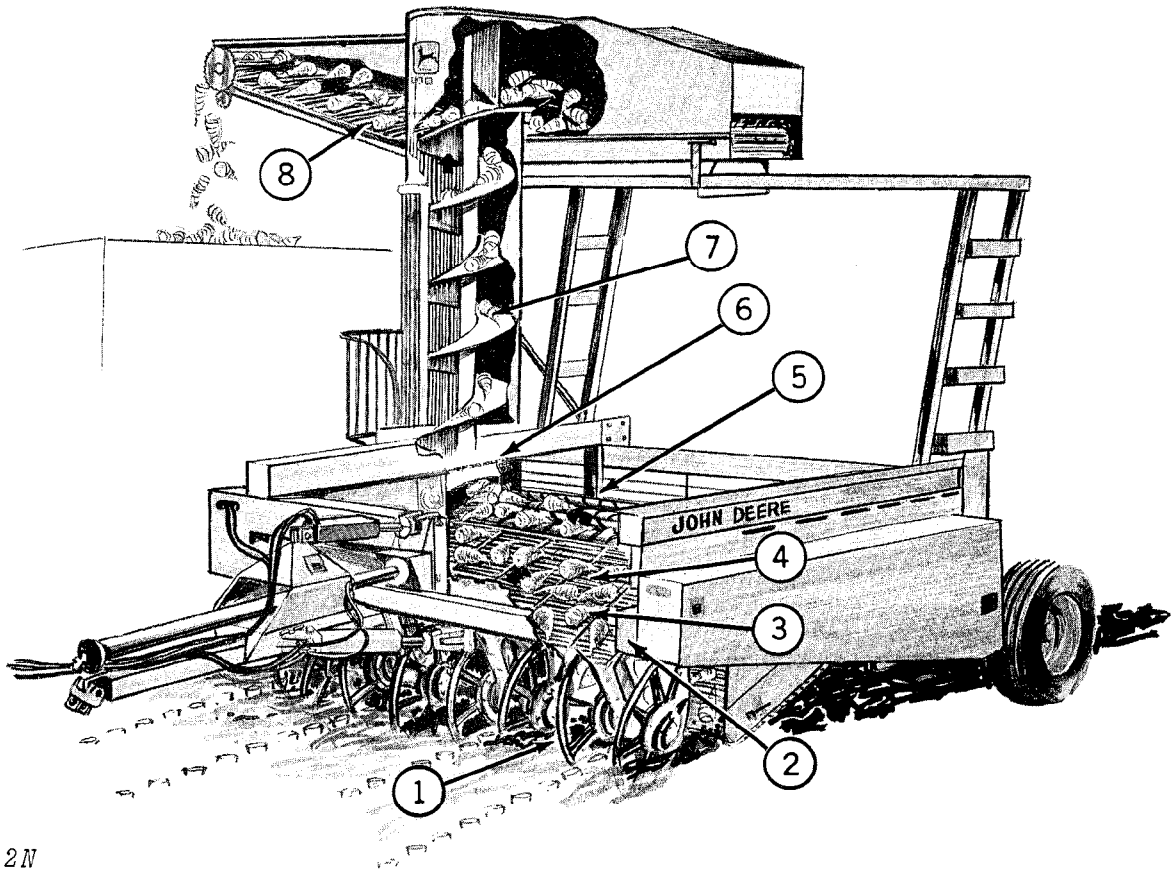
The lifter-loader includes a loader panel in the loading conveyor which allows the operator to store beets when turning at row ends or changing trucks in the field.

The optional holding tank has an 8,000 pound (3 629 kg) storage capacity, providing maximum storage time between unloading functions in high-yield beet crop conditions.

The basic components of the harvester include the frame and wheels, lifter wheels, lifter wheel paddles, potato chain primary conveyor or optional star wheel cleaning bed, grab rolls, flail paddles, vertical auger elevator, loading conveyor, and optional tank with bottom unloading conveyor.

The 4300 Beet Harvester may be used with tractors having 94 to 125 horsepower (70 to 93 kW) and equipped with 1000 rpm power take-off. Three remote cylinder outlets and controls are required, with power beyond outlets required for hydraulic override when row finder is installed. A 12-volt electrical system is required to operate the electromagnetic clutch on tank-equipped harvesters.

BEET FLOW



N30182N

Fig. 1-Beet Flow—Lifter-Loader

The following is a step-by-step description of the beet flow through the beet harvester:

The lifter wheels (1, Fig. 1) penetrate the soil and lift the beets out of the ground.

The revolving steel paddles (2) at the rear of the lifter wheels knock off dirt as they flip the beets against the rubber curtains (3), which deflect them onto the cleaning bed (4).

The cleaning bed consists of a potato chain or optional star wheels. The separation between the chain links (or star wheels) sifts out dirt and rocks as the beets are carried back to the grab rolls (5).

Four spiral grab rolls strip dirt, mud, and trash from the beets as they are moved into the flail paddles (6).

The flail paddles load the beets into the bottom of the vertical auger (7).

The vertical auger conveys the beets upward into the loading conveyor (8) which delivers them to a truck or the optional holding tank (not shown).

On tank-type harvesters, the bottom unloading conveyor is actuated by an electromagnetic clutch—moving the beets down across a baffle plate onto the rear of the grab rolls, through the flail paddles, into the vertical auger and loading conveyor.

Group 10 SPECIFICATIONS

Description.....3 or 4-row lifter-loader or
optional tank-type harvester

Row spacing:

3 rows20 to 40 inches (51 cm to 102 cm)
4 rows20 to 30 inches (51 cm to 76 cm)

Tractor requirements:

Dual wheels, and 94 to 125 PTO (70 to 93 kW) horsepower recommended. 1000 rpm PTO only. Three remote cylinder outlets and controls, with power beyond outlets required for hydraulic override of row finder. Maximum tractor front ballast. Drawbar support. 12-volt electrical supply (tank-type harvesters only). Minimum of 10 tractor quick-tatch weights (not furnished) recommended as left-hand side ballast on lifter-loader.

Operating speed .. 3 to 7 mph (4.8 to 11.3 km/h)

Lift and depth control*..... Hydraulic

Lateral hitch control* Hydraulic

Lifter wheels

(2 per row) 29-inch (737 mm)
diameter solid rim

Paddles:

Type Steel
Number 3 per row
Shaft speed 157 rpm

Primary Conveyor and Cleaning Bed:

Size46 x 102 inches (1.2 x 2.6 m)
Type: Three 32-inch (813 mm) wide potato chains, OR optional bed containing four shafts with 36 star wheels each and one shaft with 36 hexagon plates, all spaced with rubber to expel rocks.

Cross Conveyor:

Size30 x 110 inches (762 mm x 2.78 m)
Type: Four 5-1/2 inch (140 mm) grab rolls with 3/4-inch (19 mm) spiral rods, adjustable spring loading and spacing.

Vertical auger 26-inch (660 mm) diameter

**Requires 3 x 8-inch (76 x 203 mm) Remote Hydraulic Cylinder (Not furnished)*

Loading conveyor:

SizeWidth, 26-1/2 (673 mm)
Type: Hydraulic motor-driven chain, reversible for tank or truck loading, retractable for transport.

Tank (Optional):

ConstructionWelded steel
Capacity..... 8,000 pounds (3 629 kg)
Unloading: Chain-type-conveyor, actuated by 12-volt, 12-1/2-inch (318 mm) electromagnetic clutch

Light bulb for switch box Type 57, 12V

Tread width..... Adjustable to row spacing

Wheels and Tires:

Wheels**

Lifter-Loader 2 used
Tank-Type 4 used
Tires 12.5L x 15, 6 PR tubeless
implement
Operating pressure.....36 psi (248 kPa)

Over-all dimensions: (Approximate)

Height..... 12 feet 6 inches (3.81 m)
Length 18 feet 6 inches (5.64 m)
Width:
Loading conveyor
retracted 13 feet 10 inches (4.2 m)
Loading conveyor
extended 19 feet 3 inches (5.9 m)

Weight: (Approximate)

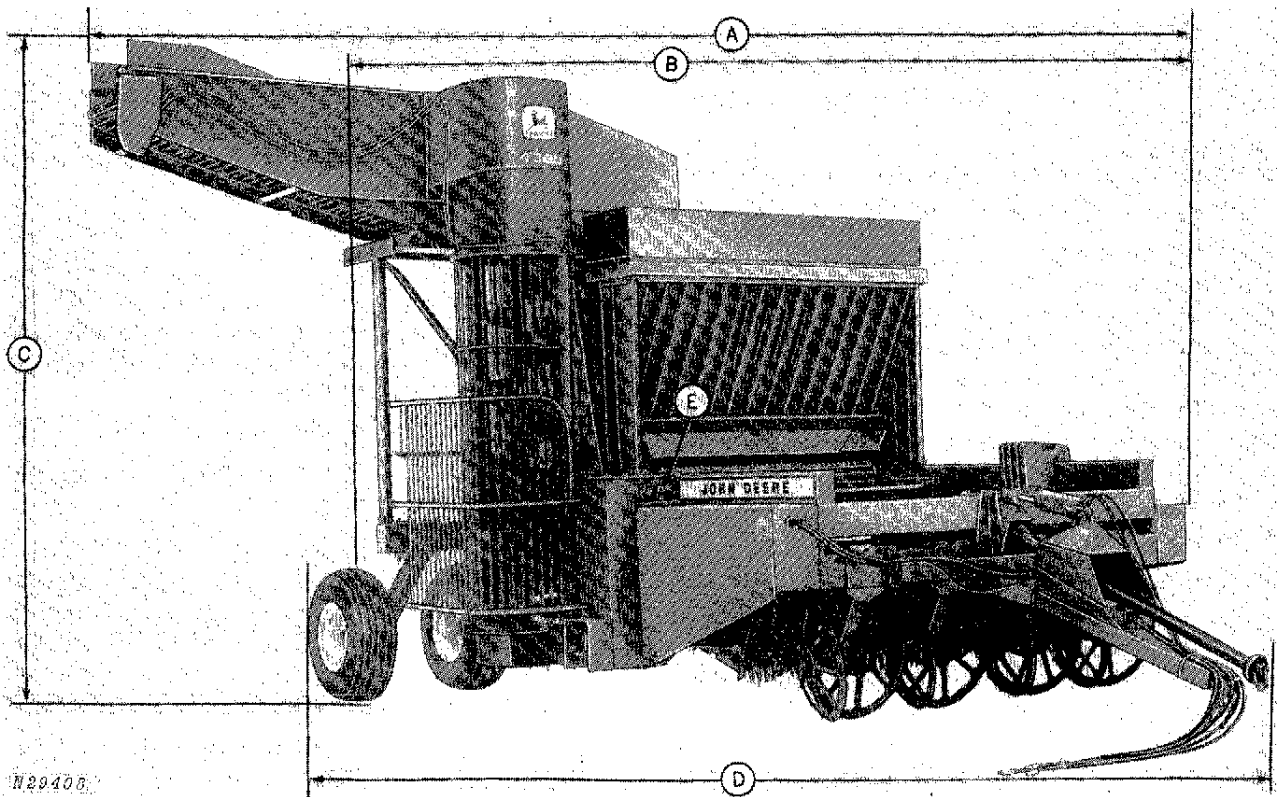
Lifter-loader
(2 wheels) 8,000 pounds (3 629 kg)
Tank-type
(4 wheels) 10,000 pounds (4 536 kg)

Attachments:

Hydraulic row finder (with or without hydraulic override)
Lifter wheel fillers: to prevent loss of small beets through lifter wheels.
Lifter wheel scrapers: to prevent mud buildup on lifter wheels.
Lifter wheel spacers: to increase lifter wheel opening by 1/4-inch (6.4 mm) increments.

***Wheels: to provide increased flotation.*

DIMENSION VIEW



A—WIDTH - 19 FEET 3 INCHES (5.87 m)
 B—WIDTH - 13 FEET 10 INCHES (4.15 m)
 C—HEIGHT - 12 FEET 6 INCHES (3.81 m)



D—LENGTH - 18 FEET 6 INCHES (5.64 m)
 E—Serial Number

Fig. 2-4300 Beet Harvester Dimensions (Approximate)

SERIAL NUMBER

The serial number plate (E, Fig. 2) is located above and to the rear of R.H. drive shield.

TORQUE VALUE CHART

Recommended Torque Values in Foot-Pounds (Nm) Coarse and Fine Threads		
		
Bolt Diameter (Inches)	Three Radial Dashes	Six Radial Dashes
1/4	10 (15)	14 (19)
5/16	20 (25)	30 (40)
3/8	35 (45)	50 (70)
7/16	55 (75)	80 (110)
1/2	85 (115)	120 (165)
9/16	130 (175)	175 (240)
5/8	170 (230)	240 (325)
3/4	300 (405)	425 (575)
7/8	445 (605)	680 (930)
1	670 (910)	1030 (1395)

Group 15 LUBRICATION

GENERAL LUBRICATION

Carefully written and illustrated lubrication instructions are included in the operator's manual furnished with your customer's machine. Remind him to follow these instructions.

For your convenience the following chart shows capacities and types of lubricants for the beet harvester. Additional specifications for lubricants follow the chart (page 10-15-2).

Component	Capacity	Type of Lubricant
Roller chains	-----	John Deere PT508 or equivalent spray lubricant <i>NOTE: As an alternative method of lubrication, flush the chains with SAE 30 engine oil sufficient to wash away accumulated dust. Wipe away excess oil.</i>
Internal telescoping surface of rotating power shaft shield	-----	Brush with John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
Front and rear universal joints and telescoping shaft (near center of rotating grease fittings)	Only 1 or 2 strokes from grease gun.	John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
Hitch pivot points (3 above and 3 underneath)	1 stroke or less	John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
Slip clutch (vertical auger)	1 stroke or less (more often in rocky conditions)	John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
Slip clutch (left-hand drives)	1 stroke or less	John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
Slip clutch (paddle drive)	1 stroke or less	John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
Slip clutch (flail drive)	1 stroke or less	John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
<i>NOTE: Examine clutch jaws closely after greasing to be sure lubricant does not seep into clutch jaws and facings - causing them to slip excessively</i>		
Electromagnetic clutch (optional equipment)	1 stroke or less	John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
<i>NOTE: Examine clutch facings closely after greasing to be sure lubricant does not seep into facings - causing them to slip excessively</i>		

GENERAL LUBRICATION—Continued

Component	Capacity	Type of Lubricant
Lifter wheels	2 or 3 strokes of grease gun	John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
Main drive gear case	Fill within 2 to 3-inches (51 to 76 mm) of filler opening IMPORTANT: Do not overfill. Overfilling will cause heating, leakage, and possible damage to components.	John Deere SAE 90 gear lubricant or an equivalent multi-purpose gear oil (change at end of season)
Flail gear case	Cover gear teeth	John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
Vertical auger gear case	Lubricate fitting (inside and beneath auger) with several strokes of grease gun	John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
Rear wheels	IMPORTANT: If dirt, moisture or other contamination is present, disassemble and clean bearings; then re-pack bearings and hub with grease and reassemble	Remove hub cap and add John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease as necessary

ROW FINDER (ATTACHMENT)

Pivot pins	2 or 3 strokes (or until grease appears at the joint)	John Deere Multi-Purpose lubricant or an equivalent SAE multi-purpose type grease
Valve rod	A few drops	SAE 30 engine oil

GREASES

John Deere Multi-Purpose lubricant or an equivalent SAE multipurpose-type grease is recommended for all grease fittings. Application of grease as instructed in the lubrication chart will provide proper lubrication and will prevent contamination of bearings.

STORING LUBRICANTS

This beet harvester can operate efficiently only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contaminants.

Group 20 DIAGNOSING MALFUNCTIONS

DIAGNOSING AND TESTING PROCEDURES

To prevent the unnecessary loss of time and money, use the following seven steps for a quick and accurate method of locating troubles:

1. Know the Unit

In other words, "Do your Homework." Study the Operator's Manual and this manual to know how the individual components work and what their function is in the overall system.

Keep up with the latest service information. Read and then file in a handy place. Information received today may have the cause and remedy of a problem being encountered.

2. Consult The Operator

Ask the operator how the unit was performing when it started to fail. Find out what was unusual about it.

Also find out if any "do-it-yourself" service was performed. (You may find the trouble somewhere else, but you should know if any corrective measures have already been taken).

Ask how the unit is used and how often it is serviced. Many problems are caused by poor maintenance or abuse.

3. Operate The Unit

If the unit is operable, operate it yourself. Don't rely completely on the operator's story - check it yourself.

Are gauges reading normally? (if not, perhaps the component being monitored is not functioning correctly or the gauge is faulty.)

How's the performance? Is the action perhaps too fast or too slow, erratic, or nil?

Do the controls feel solid or "spongy"? Do they seem to be "sticking"?

Do you smell or see any signs of smoke?

Do you hear any unusual sounds? Where? At what speeds or during what cycles?

4. Inspect The Unit

Get off the tractor and make a visual check. Use your eyes, ears, and nose to spot any signs of trouble.

Look closely at the components. Inspect for cracked welds, loose hardware, damaged linkages, worn or broken lines, etc.

During the inspection, make notes of all the trouble signs.

5. List The Possible Causes

With the information obtained during steps 1 through 4, make a list of the possible causes.

What were the signs you found while inspecting the unit? What is the most likely cause?

6. Reach Some Conclusions

Look over the list of possible causes and decide which are most likely and which are easiest to verify.

Review the "Diagnosing Malfunctions" section following as a helpful guide.

Reach your decision on the probable causes and plan to check them first.

7. Test Your Conclusions

Before repairing components in the system, test your conclusions to see which are correct.

Some of the possible causes may be verified without further testing. Check these possibilities first.

Tests will narrow the remaining list of possible causes and soon the actual cause(s) of trouble will be pinpointed.

With the cause(s) accurately located, it is now a simple matter to remove and repair the component(s) at fault.

POSSIBLE PROBLEMS AND REMEDIES

General

- Pulls too Hard
 - Dirty machine, or not lubricated. Page 10-15-1.
 - Lifters running too deep. Decrease penetration.
 - Tractor too small. Page 10-10-1.
- Main Gear Case Hot, Leaking
 - Breather clogged. Page 20-15-3.
 - Dirty machine, or not lubricated. Page 10-15-1.
 - Lubricant viscosity too low. Page 10-15-1.
- Hard to Keep on Rows
 - Lifting units improperly spaced. Space units properly, straddling "guess" rows. Harvest rows as planted. Need row finder. Install row finder attachment.
- Not Digging Deeply Enough
 - Tractor drawbar improperly set. See Operator's Manual. Improper depth control cylinder. Page 10-10-1.
- Losing Small Beets
 - Grab roll spacing too wide. Page 40-10-3.
 - Need wheel fillers. Install fillers. Ground speed too slow. Increase ground speed. Lifters too far apart. Page 40-20-1.
- Breaking off Beet Tails
 - Lifters running too shallow. Increase penetration.
 - Lifting units improperly spaced. Space units properly. Harvester not being steered accurately. Steer more accurately or install row finder attachment. Lifters too close together. Page 40-20-1.
- Too Many Clods in Load
 - Lifters running too deep. Decrease penetration.
 - Grab roll spacing too narrow. Increase spacing.
 - Need more cleaning. Install star wheel cleaning bed. Soil too dry and hard. Irrigate or wait for rain. Lifters too far apart. Page 40-20-1.
- Cleaning Bed Plugging
 - PTO speed slow. Increase PTO speed to 1000 rpm.
 - Ground speed too fast. Decrease ground speed.
 - Small beets lodging between rolls. Decrease roll spacing.
- Excessive Trash or Dirt in Truck
 - Cleaning areas plugged with trash and/or stones remove trash and stones.
 - Cloddy, stony fields. Increase grab roll spacing.
 - Improper harvester operation or adjustment. See Operator's Manual.

Drive Train - Section 20

- Excessive Noise or Vibration
 - Powershaft bearings defective. Page 20-10-3.
 - Powershaft bent or twisted. Page 20-10-3.
- Gear Case Noisy
 - Bearings or gears defective. Pages 20-15-3, 20-30-5, 20-35-4.
 - Lack of lubricant. Page 10-15-1.
 - Gear misalignment. Pages 20-15-4, 20-30-8, 20-35-6.
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- Hydraulic Motor
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 - Motor runs too slow. Dirty tractor filter. Clean filter.
 - Oil leaking around shaft. Page 30-10-2, 3.
 - Oil leaking around body. Page 30-10-2, 3.
- Row Finder Attachment
 - Lifters moving away from beets. Page 30-15-3, 4.
 - Lifters tracking improperly. Page 30-15-3, 4.
 - Feeler arms bouncing off rows. Page 30-15-3, 4.
 - Lifters jump off rows too easily. Page 30-15-3, 4.
 - Lifters missing loose beets. Page 30-15-3, 4.

Electromagnetic Clutch - Section 40

- Clutch Inoperative
 - Low voltage. Page 40-15-4.
 - Bad connections. Page 40-15-2.
 - Grease on drive surfaces - remove grease.
 - Faulty electrical switch. Page 40-15-2.

Lifter Wheels - Section 40

- Wheels Coming Loose
 - Loose bearings. Page 40-20-2.
 - Improper lubrication. Page 10-15-1.
 - Loose wheel bolts. Page 40-20-2.

Rear Wheels

- Wheels Coming Loose
 - Loose bearings. Page 40-25-1.
 - Improper lubrication. Page 40-25-1.
 - Loose wheel bolts. Page 40-20-2.

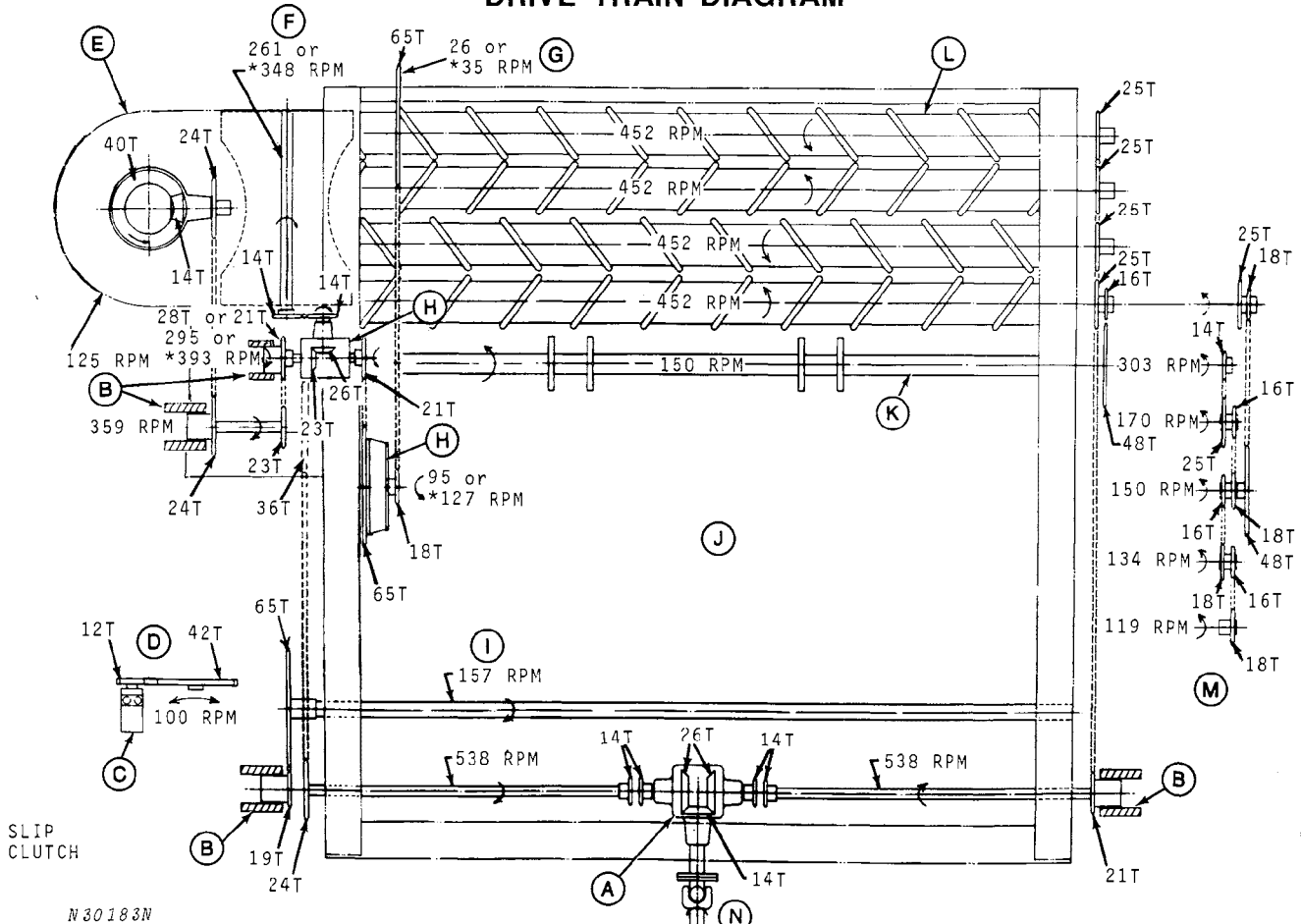
Section 20 DRIVE TRAIN

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Group 5 GENERAL INFORMATION

DRIVE TRAIN DIAGRAM



- | | | | |
|--------------------------|-----------------------|----------------|----------------------------|
| A—Main Gear Case | E—Vertical Auger | I—Paddles | M—Star Wheel Drives |
| B—Slip Clutches | F—Flail Paddle Shaft | J—Cleaning Bed | N—Powershaft |
| C—Hydraulic Motor | G—Tank Conveyor Drive | K—Drive Shaft | RPM—Revolutions per Minute |
| D—Loading Conveyor Drive | H—Flail Gear Case | L—Grab Roll(s) | T—Teeth (Sprocket or Gear) |

*Higher speeds occur when 21T Sprocket is used in lieu of 28T Sprocket on Flail Gear Case (H).

Fig. 1—Drive Train Diagram

DESCRIPTION

NOTE: Star wheel and grab roll references following were determined by counting from front to rear of harvester.

The powershaft connects the tractor PTO (1000 rpm only) to the main gear case input shaft. Two self-aligning sprockets on each side of the main gear case are chain-coupled to drive shafts supplying power to each side of the harvester.

The left-hand drive sprocket and slip clutch drive the four grab roll sprockets directly and the primary conveyor potato chain (or optional star wheel bed) through a double sprocket on the number 1 grab roll.

The slip clutch protects the left-hand drive in the event large rocks or other objects lodge in either the primary conveyor or the grab rolls. The spring-loaded grab rolls let smaller rocks pass through. The chain tightener, located above the number 4 grab roll, maintains constant tension on the drive chain throughout the full range of grab roll movements.

The primary conveyor potato chain is driven by the smaller sprocket on the number 1 grab roll. The conveyor consists of three 32-inch (813 mm) wide potato chains, inclined from front to rear.

If the harvester is equipped with the (optional) star wheel bed, the smaller sprocket on the number 1 grab roll drives a sprocket on the number 3 star wheel shaft. From the number 3 shaft, drive is directed to the other four star wheel shafts through a series of sprockets; forward to number 2 and number 1 shafts and rearward to number 4 and 5 shafts.

The grab rolls are driven to provide clockwise motion of numbers 1 and 3 grab rolls and counterclockwise motion of numbers 2 and 4 grab rolls. This provides the cleaning action as the beets are "rolled" to the vertical auger.

The smaller right-hand drive sprocket and slip clutch drive the paddle drive sprocket. The slip clutch prevents damage to the paddle drive in the event rocks or other objects lodge between the paddles and lifter wheels or primary conveyor.

The larger right-hand sprocket drives a sprocket on the countershaft which supplies drive to two areas; a) flail gear case and b) vertical auger gear case:

a) The inner sprocket on the countershaft drives the outer sprocket and slip clutch on the flail gear case. A sprocket at the rear of the gear case drives a sprocket on the front of the flail shaft, feeding the beets from the grab rolls into the vertical auger.

The inner sprocket on the flail gear case drives the larger sprocket on the electromagnetic clutch. When the clutch is engaged electrically from a switch on the tractor, the smaller sprocket on the clutch drives a sprocket on the holding tank unloading conveyor.

b) A sprocket and slip clutch on the outer end of the countershaft drive the input sprocket on the vertical auger gear case. The slip clutch prevents possible damage to the vertical auger drive in the event large rocks or other objects lodge in the auger.

The auger lifts the beets to the loading conveyor where they are either loaded into a truck or the (optional) holding tank.

A hydraulic motor on the right-hand end of the truck or tank loading conveyor is operated by a tractor hydraulic control lever to convey beets either to a truck or the holding tank. The hydraulic motor gear drives the conveyor gear, providing power to the conveyor potato chain.

