

# 4310 and 4310A Beet Harvesters



## TECHNICAL MANUAL 4310 and 4310A Beet Harvesters

TM1166 (01JUL82) English

**Des Moines Works  
TM1166 (01JUL82)**

LITHO IN U.S.A.  
ENGLISH





# 4310 AND 4310A BEET HARVESTERS

TECHNICAL MANUAL  
TM-1166 (Jul-82)

## CONTENTS

### INTRODUCTION

### SAFETY

### SECTION 10 - GENERAL

- Group 5 - Description
- Group 10 - Specifications
- Group 15 - Lubrication
- Group 20 - Diagnosing Malfunctions

### SECTION 20 - DRIVE TRAIN

- Group 5 - General Information and Diagram
- Group 10 - Powershaft
- Group 15 - Main Gear Case
- Group 20 - L.H. Drive Components
- Group 25 - R.H. Drive Components
- Group 30 - Specifications and Torque Values

### SECTION 30 - HYDRAULIC SYSTEM

- Group 5 - General Information and Flow Diagrams
- Group 10 - Hydraulic Motor and Drive System
- Group 15 - Hydraulic Row Finder
- Group 20 - Specifications and Torque Values

### SECTION 40 - MISCELLANEOUS

- Group 5 - Cleaning Beds
- Group 10 - Grab Rolls
- Group 15 - Electromagnetic Clutch
- Group 20 - Pedestal and Lifter Wheels
- Group 25 - Rear Wheels
- Group 30 - Rotary Conveyor
- Group 35 - Truck and Tank Conveyor
- Group 40 - R. H. Diversion Roll
- Group 45 - Specification and Torque Values

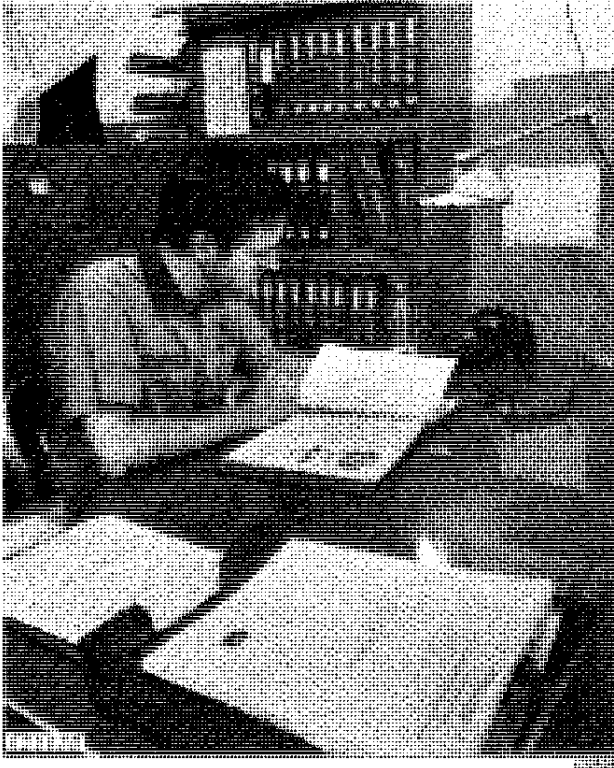
### SECTION 50 - ALPHABETICAL INDEX

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.

Because John Deere sells its products worldwide, U.S. units of measure are shown with their respective Metric equivalents throughout this technical manual. These equivalents are the SI (International System) Units of Measure.

Copyright © 1982 DEERE & COMPANY  
Moline, Illinois All rights reserved  
Previous Editions  
Copyright © 1981 DEERE & COMPANY  
Copyright © 1978 DEERE & COMPANY  
Copyright © 1978 DEERE & COMPANY

## 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 troubleshooting, *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 for a specific machine.

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

Litho in U.S.A.




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.

### 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.

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

**JustClickHere** 

**NOTE:**

**If there is no response to click on the link above,  
please download the PDF document first, and then  
click on it.**


**Have any questions please write to me:  
[admin@servicemanualperfect.com](mailto:admin@servicemanualperfect.com)**

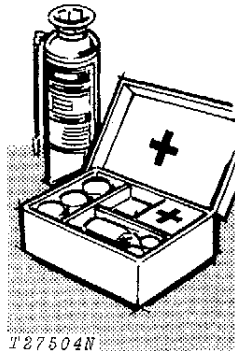
## SAFETY AND YOU



T27999

### 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

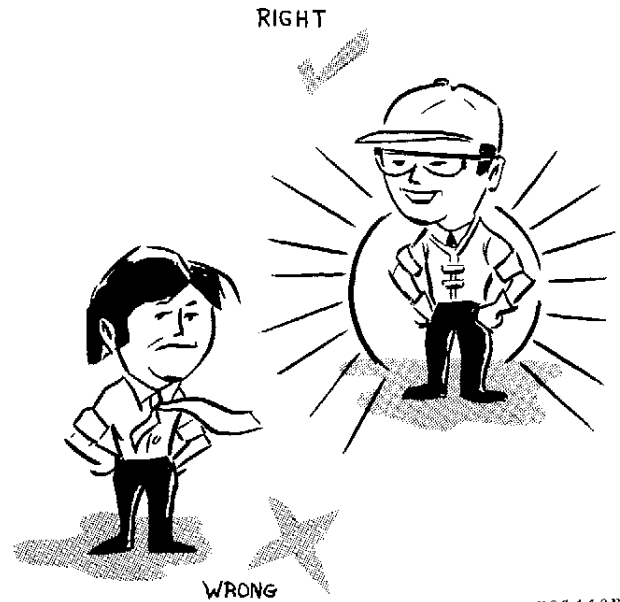
Be prepared if an accident or fire should occur. Know where the first aid kit and the fire extinguishers are located—know how to use them.

### PERSONAL SAFETY

Shut off tractor engine and remove switch key before working on the beet harvester.

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.



1123440N

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.

Before removing any housing covers, stop engine. Take all objects from your pockets which could fall into the opened housings. Don't let adjusting wrenches fall into opened housings.

### 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

### CONTENTS OF THIS SECTION

	Page		Page
GROUP 5 - DESCRIPTION		GROUP 15 - LUBRICATION	
Description.....	5-1	General Lubrication.....	15-1
Beet Flow.....	5-2	Row Finder.....	15-2
		Greases.....	15-2
GROUP 10 - GENERAL SPECIFICATIONS		Storing Lubricants.....	15-2
General Specifications.....	10-1	GROUP 20 - DIAGNOSING MALFUNCTIONS	
Dimension View and Torque Value Chart..	10-3	Diagnosing and Testing Procedures.....	20-1
Serial Number.....	10-4	Possible Problems and Remedies.....	20-2

## Group 5 DESCRIPTION

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, rotary conveyor, loading conveyor and tank with bottom unloading conveyor.

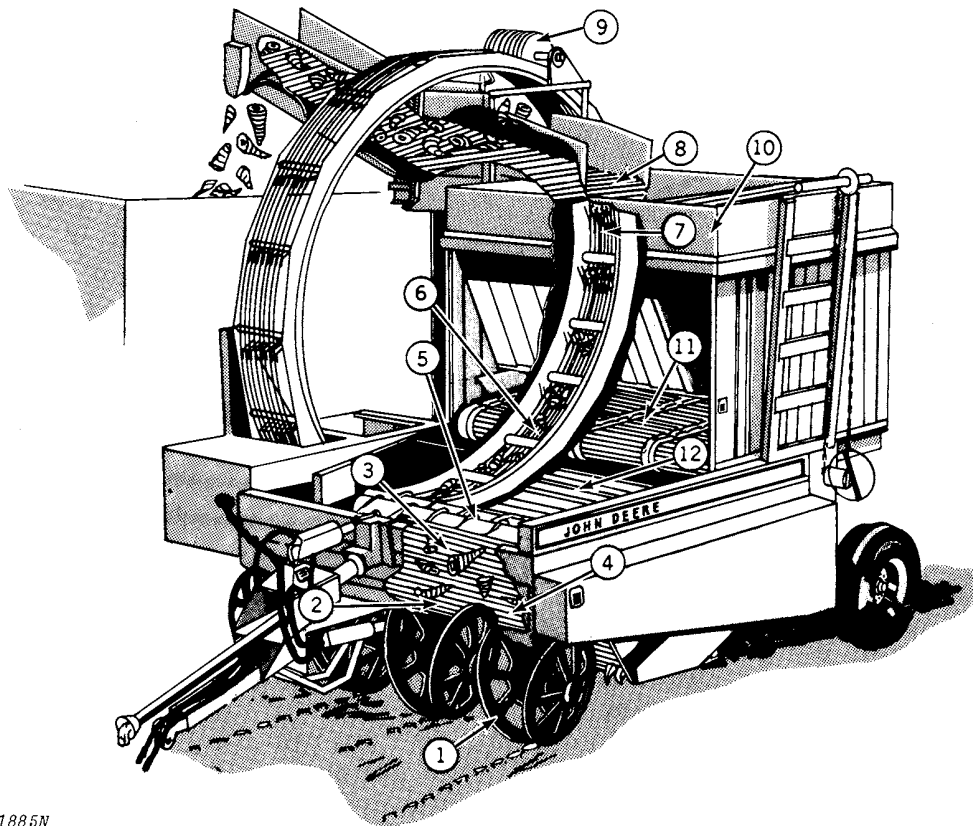
The tank has an 8,000 pound (3 629 kg) storage capacity, providing maximum storage time between unloading functions in high-yield beet crop conditions.

The 3- or 4-row harvester can be used with tractors having 100-180 HP (75-134 kW); the 6-row harvester can be used with 130-180 HP (97-134 kW). All tractors must be 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.

Attachments include an auxiliary hydraulic system for the truck conveyor. The hydraulic system should be used when ambient temperatures during digging are 85°F. (29°C.) or more, or if tractor Power Front Wheel Drive is used, or if the tractor is not capable of supplying 14 gallons (53 L) per minute of hydraulic oil flow continuously. The need for a third selective control valve and outlet is eliminated when the auxiliary hydraulic system is used.



### BEET FLOW



N31885N

Fig. 1 - Beet Flow—Lifter-Loader

N31885N

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 (3- or 4-row only). 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 rotary conveyor (6).

The rotary conveyor revolves at approximately 12 rpm in the direction of travel, (at 1000 PTO rpm) carrying the beets up to the truck-or-tank conveyor. A retainer (7) holds the beets in the wheel until they reach the top and fall into the truck-or-tank conveyor (8). A stripper (9) clears the wheel of any rocks or beets that wedge between the rods.

The truck-or-tank conveyor delivers the beets to a truck or the holding tank.

The tank (10) bottom unloading conveyor (11) is actuated by an electromagnetic clutch — moving the beets down across a baffle plate (12) (optional) onto the rear of the grab rolls, into the rotary conveyor and truck-or-tank conveyor.

## Group 10 SPECIFICATIONS

### TRACTOR REQUIREMENTS

#### Recommended Horsepower Rating:

- 3, 4-Row..... 100-180 PTO HP (75-134 kW)
- 6-Row..... 130-180 PTO HP (97-134 kW)

*NOTE: Recommended for two-wheel drive tractors only.*

#### Hydraulic Requirements:

Tractor must be equipped with three remote hydraulic outlets (one of which may be the "Power Beyond") when the harvester is equipped with the auxiliary hydraulic system. If the tractor hydraulic system is used to drive the truck conveyor, four remote hydraulic outlets are needed (one of which is the "Power Beyond") and the tractor must be capable of supplying 14 gallons per minute continuously. In both cases the "Power Beyond" is used to operate the row finder.

#### PTO Shaft:

Tractors must have 1.38-inch (35 mm) diameter 1000 rpm PTO shaft. (For 4640 and 4840 John Deere Tractors, order AR72476 PTO Shaft Adapter Kit).

#### Front Ballast:

Maximum tractor front ballast is required.

#### Drawbar Support (Standard):

Used with 1-3/8 x 2-1/2-inch (35 x 64 mm), 1-1/2 x 2-1/2-inch (38 x 64 mm) and 1-3/4 x 3-inch (44 x 76 mm) drawbars.

#### Electrical system:

12-Volt

### HARVESTER

Description..... 3, 4, or 6-row tank-type harvester

#### Row Spacing:

- 3 rows.....22 to 30 inches (0.54 to 76 m)
- 4 rows.....22 to 30 inches (0.54 to 76 m)
- 6 rows.....22-inches (0.54 m)

Operating Speed..... 3 to 7 mph (5 to 11 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.....4 per row
- Shaft speed.....157 rpm (fast) or 132 rpm (slow)

#### Primary Conveyor and Cleaning Bed:

- Size...3, 4-row-46 x 102-inches (1168 x 2591 mm)
- 6-row-46 x 125.2-inches (1168 x 3180 mm)

Type: 3, 4-Row — 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.

6-Row — Two 32-inch (813 mm) potato chains. Two 27-inch (686 mm) potato chains.

#### Cross Conveyor:

- Size.....30 x 110-inches (762 x 2794 mm)
- Type: Four 5-1/2-inch (140 mm) grab rolls with 3/4-inch (19 mm) spiral rods, adjustable spring loading and spacing.

*\*Requires 3-1/2 x 8-inch (89 x 203 mm) Remote Hydraulic Cylinder (not furnished)*

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

Rotary Conveyor:

Size..... 12 feet (3 658 mm) O.D. x 18 in.  
(457 mm) wide  
Speed..... 12 rpm

Loading Conveyor:

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

Tank:

Construction.....Welded Steel  
Capacity.....8,000 pounds (3 632 kg)  
Unloading: Chain-type-conveyor, actuated by  
12-volt, 12-1/2-inch (318 mm) elec-  
tro-magnetic clutch.  
Light bulb for switch box..(Early Models) Type 57  
(Later Models) Type 1895TR

Tread Width.....Adjustable to row spacing

Wheels and Tires.....2-12.5L x 15 — 6 PR Impl.  
2-12.5L x 16 — 8 PR Impl.  
Operating pressure.....36 psi  
(250 kPa)

Weight: (Approximate).....11,300 lbs. (5 130 kg)

**ATTACHMENTS**

Lifter wheel fillers: to prevent loss of small beets  
through lifter wheels (two types available).

Lifter wheel scrapers: to prevent mud buildup on  
lifter wheels.

Lifter wheel spacers: to increase lifter wheel open-  
ing by 1/4-inch (6.3 mm) increments.

Lifter wheel rocksprings: to protect lifter wheels in  
rocky soil conditions.

Flashing Warning Light Kit: recommended where  
regulations allow when towing harvester. Order  
JD No. TY9305.

Tractor installed electrical outlet socket: installed  
with flashing warning light kit. Order JD No.  
AR75694.

Tractor installed electric remote control switch: to  
control electromagnetic clutch and auxiliary  
hydraulic system, if equipped. (JD No. AR62360  
Electric Remote Control Switch.)

Truck conveyor height extension: to increase dump  
height 11 inches (279 mm).

Auxiliary hydraulic system: to eliminate truck con-  
veyor hydraulic motor from tractor hydraulics.

Grab roll wear plates: to extend grab roll life.

Lifter wheels: to convert a three-row harvester to a  
four-row harvester.

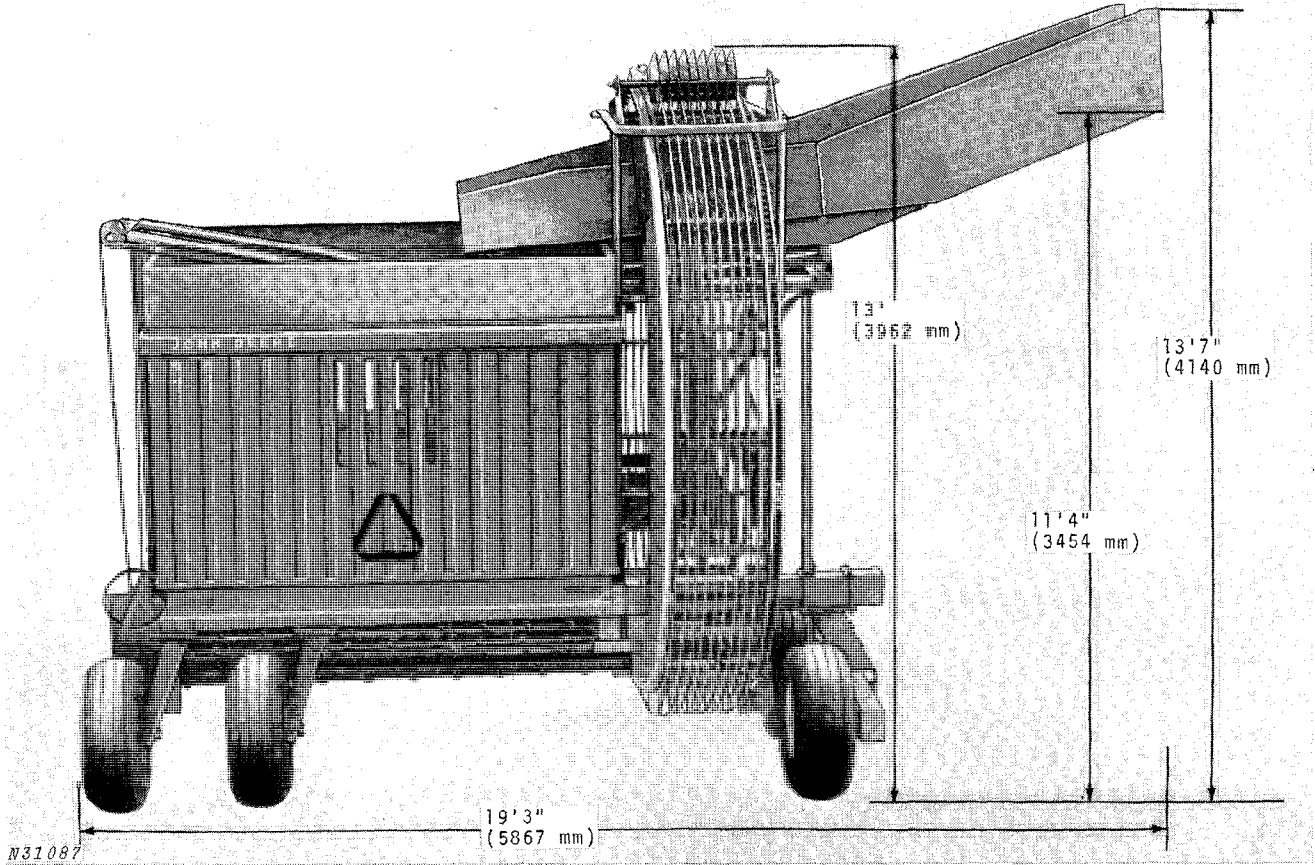
Wheel and tire assembly: a third single wheel and  
tire can be installed for additional flotation.

Cleaning Bed: to convert a star wheel or potato  
chain cleaning bed to the other type.

Diversion Roll — install on right-hand side of  
machine to improve cleaning of beets. Cannot be  
installed with star wheel bed.

Tank unload baffle: diverts beets being unloaded  
from tank onto the grab rolls. Helps reduce loss  
of small beets between primary conveyor and  
No. 1 Grab Roll.

**DIMENSIONS**

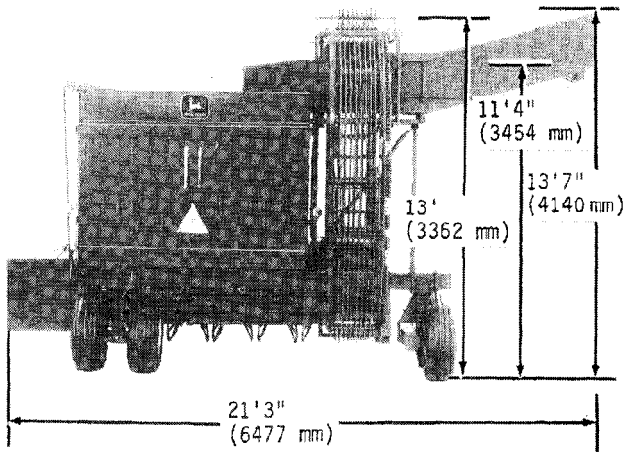


4310 Beet Harvester with Truck Conveyor Height Extension Installed

**STANDARD TORQUE VALUE CHART**

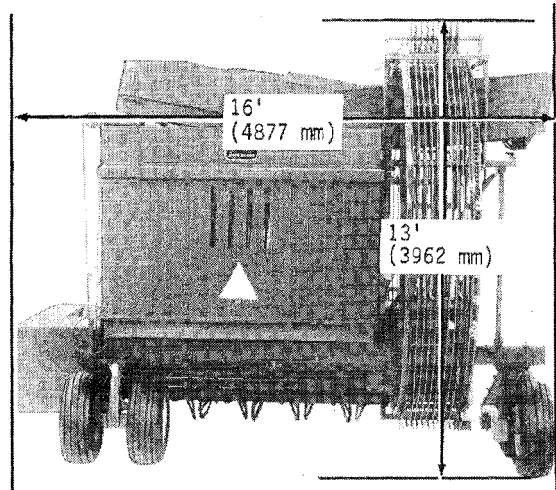
TORQUE VALUES		
Recommended Torque Value In lb-ft (N·m) Coarse and Fine Threads		
Bolt Diameter	Three Radial Dashes	Six Radial Dashes
1/4	10 ( 14)	14 ( 19)
5/16	20 ( 27)	30 ( 41)
3/8	35 ( 47)	50 ( 68)
7/16	55 ( 75)	80 ( 108)
1/2	85 ( 115)	120 ( 163)
9/16	130 ( 176)	175 ( 237)
5/8	170 ( 230)	240 ( 325)
3/4	300 ( 407)	425 ( 576)
7/8	445 ( 603)	685 ( 929)
1	670 ( 908)	1030 (1396)
1-1/8	910 (1234)	1460 (1979)
1-1/4	1250 (1695)	2060 (2793)

### DIMENSIONS



N80324J1

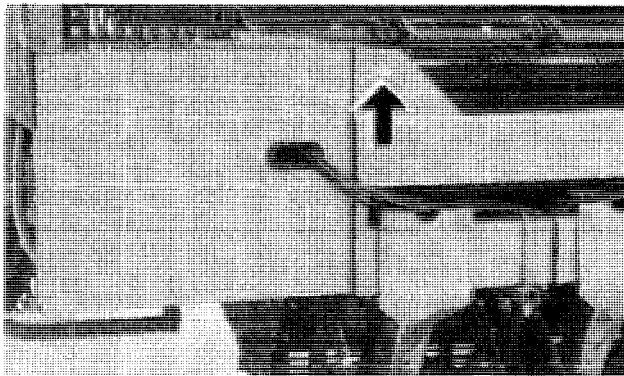
6-Row — Field Position With Truck Conveyor Height Extension  
\*12'8" (3 861 mm) Without Height Extension



N80324K1

6-Row Transport Position

### SERIAL NUMBER



N80324A1

For All Models

The serial number plate is located on the front of the upper main frame tube (bold arrow).