

NEW HOLLAND

420FI 440FI Rotary Harvesting Headers

SERVICE MANUAL



S E R V I C E

420FI and 440FI Rotary Harvesting Units

TECHNICAL MANUAL
420FI and 440FI Rotary
Harvesting Units

84321453A (01MAR99) English

Introduction

FOREWORD

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.



This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. Operation and tests sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

Technical Manuals are concise guides for specific machines. They are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

Fundamental service information is available from other sources covering basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes.

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All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

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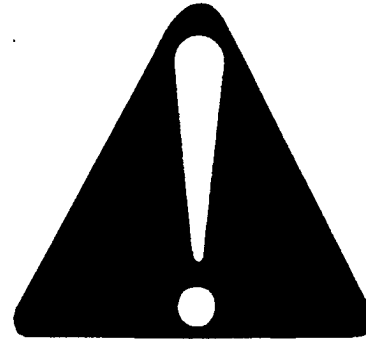
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Contents

RECOGNIZE SAFETY INFORMATION

This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.



DX,ALERT -19-29SEP98

T81389 -UN-07DEC88

FOLLOW SAFETY INSTRUCTIONS

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your New Holland dealer.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If you do not understand any part of this manual and need assistance, contact your New Holland dealer.



DX,READ -19-03MAR93

TS201 -UN-23AUG88

UNDERSTAND SIGNAL WORDS

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.



DX,SIGNAL -19-03MAR93

TS187 -19-30SEP88

OBSERVE ROAD TRAFFIC REGULATIONS

Always observe local road traffic regulations when using public roads.



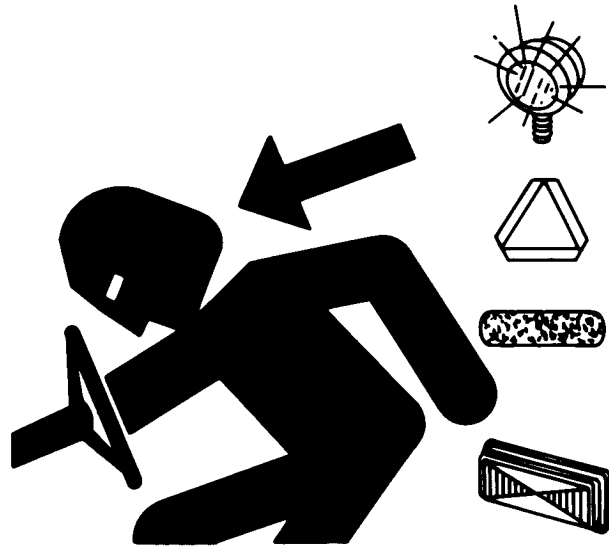
H28930 -UN-30JUN89

FX,ROAD -19-01MAY91

USE SAFTEY LIGHTS AND DEVICES

Prevent collisions between other road users, slow moving tractors with attachments or towed equipment and self-propelled machines on public roads. Frequently check for traffic from the rear, especially in turns, and use turn signal lights.

Use headlights, flashing warning lights, and turn signals day and night. Follow local regulations for equipment lighting and marking. Keep lighting and marking visible, clean, and in good working order. Replace or repair lighting and marking that has been damaged or lost. An implement safety lighting kit is available from your New Holland dealer.



TS951 -UN-12APR90

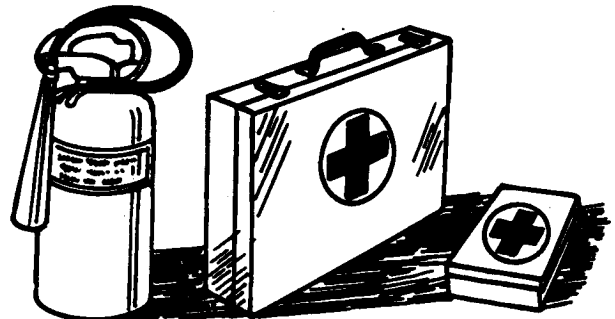
DX,FLASH -19-07JUL99

PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



TS291 -UN-23AUG88

DX,FIRE2 -19-03MAR93

STAY CLEAR OF HARVESTING UNIT

Due to their function, the cutting rotors as well as gathering, cross and feed drums cannot all be completely shielded. Stay clear of these moving elements during operation. Always disengage main clutch, shut off engine and remove key before servicing or unclogging harvesting unit.



ZX,CUT688 -19-10FEB98

ES118704 -UN-21MAR95

KEEP HANDS AWAY FROM KNIVES

Never attempt to clear obstructions in front of or on harvesting unit unless main clutch is disengaged, engine shut off and key removed.

Everyone must be clear of the forage harvester before starting the engine.



FX,KNIFE -19-21DEC90

TS254 -UN-23AUG88

STORE ATTACHMENTS SAFELY

Stored attachments such as dual wheels, cage wheels, and loaders can fall and cause serious injury or death.

Securely store attachments and implements to prevent falling. Keep playing children and bystanders away from storage area.



DX,STORE -19-03MAR93

TS219 -UN-23AUG88

REPLACE SAFETY SIGNS

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.



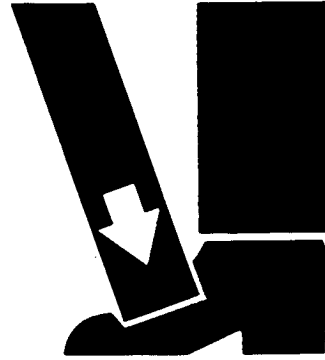
DX,SIGNS1 -19-04JUN90

TS201 -UN-23AUG88

USE PROPER LIFTING EQUIPMENT

Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.



DX,LIFT

-19-04JUN90

TS226
-UN-23AUG88

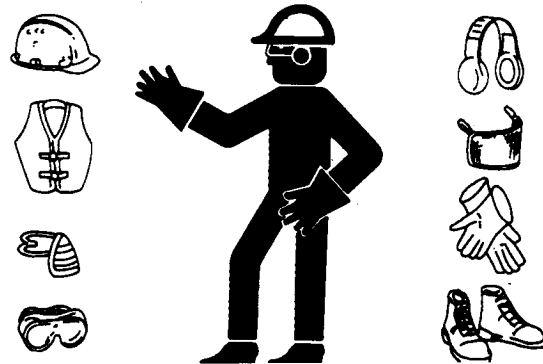
WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.



DX,WEAR

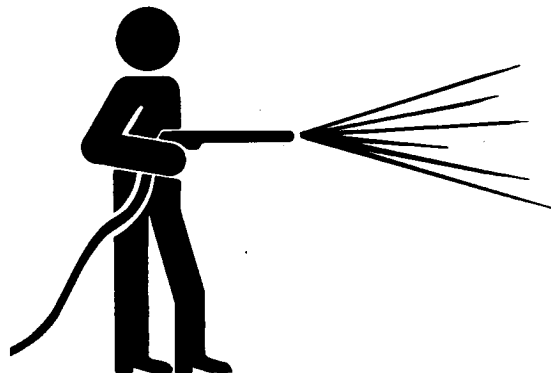
-19-10SEP90

TS206
-UN-23AUG88

WORK IN CLEAN AREA

Before starting a job:

- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.



DX,CLEAN

-19-04JUN90

T6642EJ
-UN-18OCT88

AVOID HEATING NEAR PRESSURIZED FLUID LINES

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area.



DX,TORCH

-19-03MAR93

TS953 -UN-15MAY90

PRACTICE SAFE MAINTENANCE

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate, service, or adjust machine while it is moving. Keep hands, feet, and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

On self-propelled equipment, disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.

On towed implements, disconnect wiring harnesses from tractor before servicing electrical system components or welding on machine.



DX,SERV

-19-04FEB99

TS218 -UN-23AUG88

USE PROPER TOOLS

Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards.

Use power tools only to loosen threaded parts and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only service parts meeting New Holland specifications.



-UN-08NOV89
TS779

DX,REPAIR -19-04JUN90

STAY CLEAR OF ROTATING DRIVELINES

Entanglement in rotating driveline can cause serious injury or death.

Keep machine master shield and driveline shields in place at all times. Make sure rotating shields turn freely.

Wear close fitting clothing. Stop the engine and be sure PTO driveline is stopped before making adjustments, connections, or cleaning out PTO driven equipment.



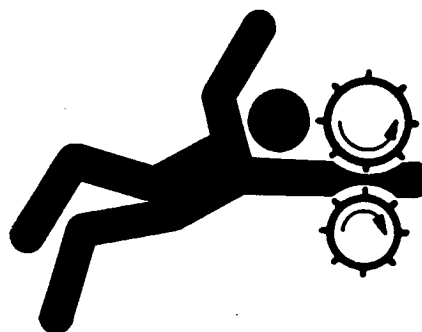
-UN-22AUG95
TS1644

DX,PTO -19-12SEP95

SERVICE MACHINES SAFELY

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



-UN-23AUG88
TS228

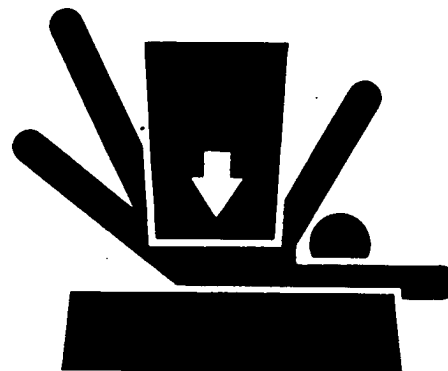
DX,LOOSE -19-04JUN90

SUPPORT MACHINE PROPERLY

Always lower the attachment or implement to the ground before you work on the machine. If you must work on a lifted machine or attachment, securely support the machine or attachment. If left in a raised position, hydraulically supported devices can settle or leak down.

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.

When implements or attachments are used with a machine, always follow safety precautions listed in the implement operator's manual.



TS229 -UN-23AUG88

DX,LOWER -19-04FEB99

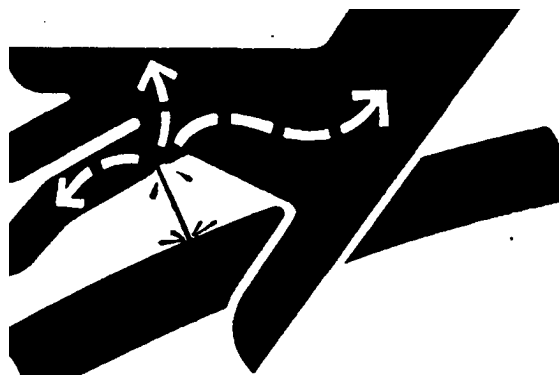
AVOID HIGH-PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source.

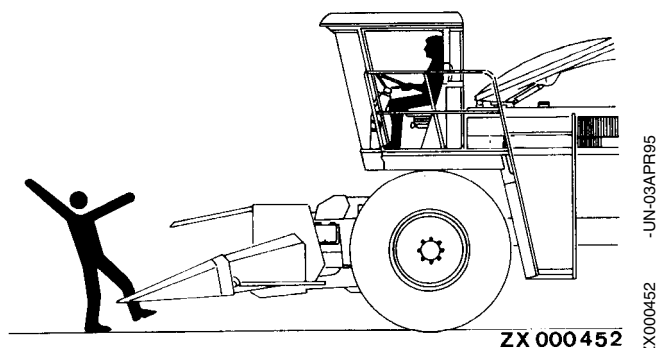


X9811 -UN-23AUG88

DX,FLUID -19-03MAR93

TRANSPORT WITH HARVESTING UNIT INSTALLED

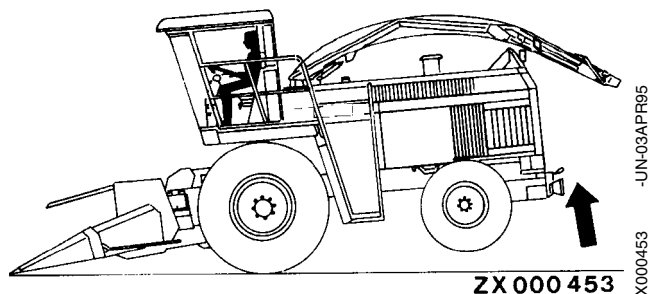
Before driving forage harvester on public roads, harvesting unit must be raised and secured in this position. It must not, however, obstruct operator's view of the road. Remove crop dividers (if equipped) and install protective cover.



ZX,HEADER -19-04DEC90

BALLASTING FOR SAFE GROUND CONTACT

Operating, steering and braking performance of forage harvester can be considerably affected by attachments which alter the center of gravity of the machine. To maintain safe ground contact, ballast the harvester at the rear end as necessary. Observe the maximum permissible axle loads and total weights.



ZX,WEIGHT -19-02OCT91

REMOVE PAINT BEFORE WELDING OR HEATING

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

Remove paint before welding or heating:

- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.



DX,PAINT -19-03MAR93

DISPOSE OF WASTE PROPERLY

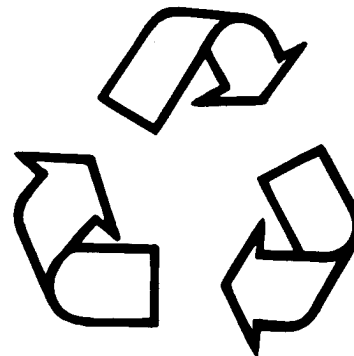
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with New Holland equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your New Holland dealer.



DX,DRAIN

-19-03MAR93

TS1133 -JUN-26NOV90

LIVE WITH SAFETY

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.



DX,LIVE

-19-15APR98

TS231 -19-07OCT88

Section 10
General

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420FI AND 440FI HARVESTING UNITS



420FI harvesting unit



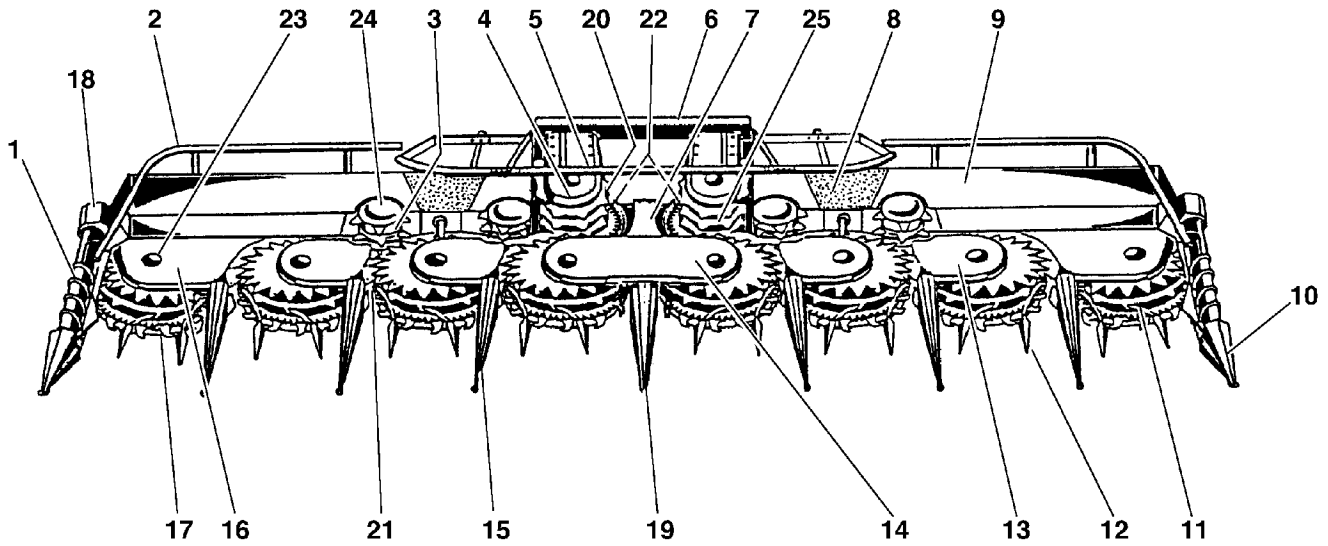
ZX014359

440FI harvesting unit

ZX014359
-UN-06MAY98

ZX, TM686R013520-19-01MAR99

COMPONENT LOCATION (PART 1)



ZX014361

440FI harvesting unit shown

ZX, TM688R011261-19-01MAR99

ZX014361
-JUN-02MAY98

Rotary Harvesting Unit

- 1-Rotating divider
- 2-Feed bar
- 3-Cross feed drums
- 4-Feed drums
- 5-Feed bar (central)
- 6-Mounting frame
- 7-Guide plate between feed drums
- 8-Rubber flap
- 9-Feed plate
- 10-Outer stalk lifters
- 11-Gathering drums (left-or right turning)
- 12-Small dividers (outside)
- 13-Inner covering plate
- 14-Central covering plate
- 15-Large dividers
- 16-Outer covering plate
- 17-Cutting rotor (rotary cutting blade)
- 18-Rotating divider drive
- 19-Center divider
- 20-Scrapers of feed drums
- 21-Scrapers of gathering drums

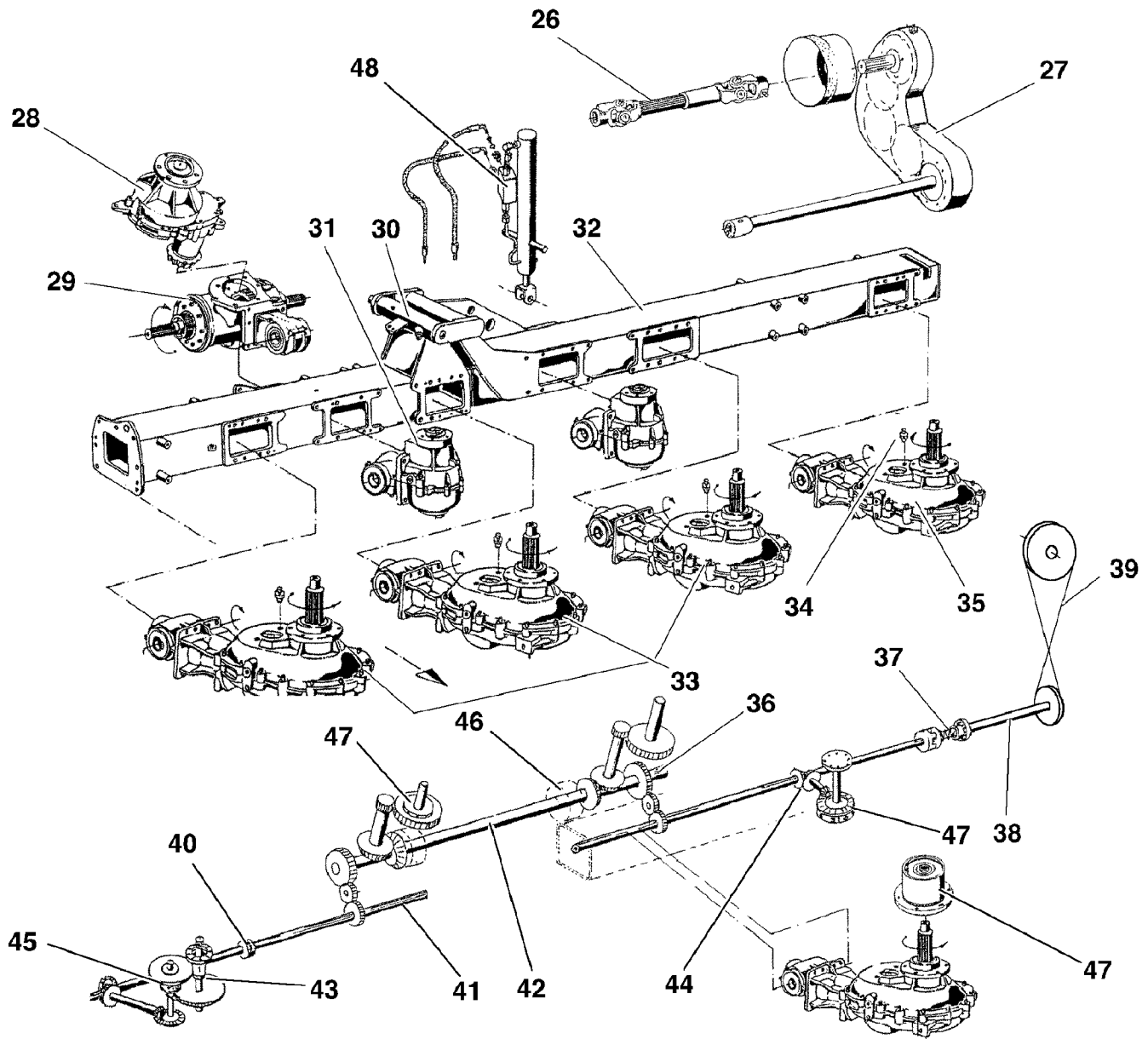
Clutches

- 22-Friction clutches of main drive
- 23-Radial-pin clutch of gathering drums
- 24-Radial-pin clutch of cross feed drums
- 25-Radial-pin clutch of feed drums

Continued overleaf

ZX,TM686R013521-19-01MAR99

COMPONENT LOCATION (PART 2)



ZX014362

440FI harvesting unit shown

ZX, TM688R011263-19-01MAR99

ZX014362 -UN-02MAY98

Main Transmission (U-Joint Shaft)

26-Main transmission (U-joint shaft)

Frame/Gear Case

27-L-gear case
28-Feed drum gear case
29-Feed drum transmission (left-right)
30-Hinge
31-Cross feed drum gear case
- (4 on 440FI, 2 on 420FI)
32-Foldable frame
33-Gathering drum gear case (left turning)
- (4 on 440FI, 3 on 420FI)
34-Breather
35-Gathering drum gear case (right turning)
- (4 on 440FI, 3 on 420FI)
36-Main drive shaft
37-Spring (hinges)
38-Hexagonal shaft outer side
39-V-belt for rotating crop divider (downed crops)
40-Claw-type clutch
41-Hexagonal shaft inner side
42-Connecting shaft for main drive
43-Spur gear angle drive
44-Bevel gear drive

Friction Disk Brake Mechanisms

45-Brake mechanism for gathering drum

Clutches

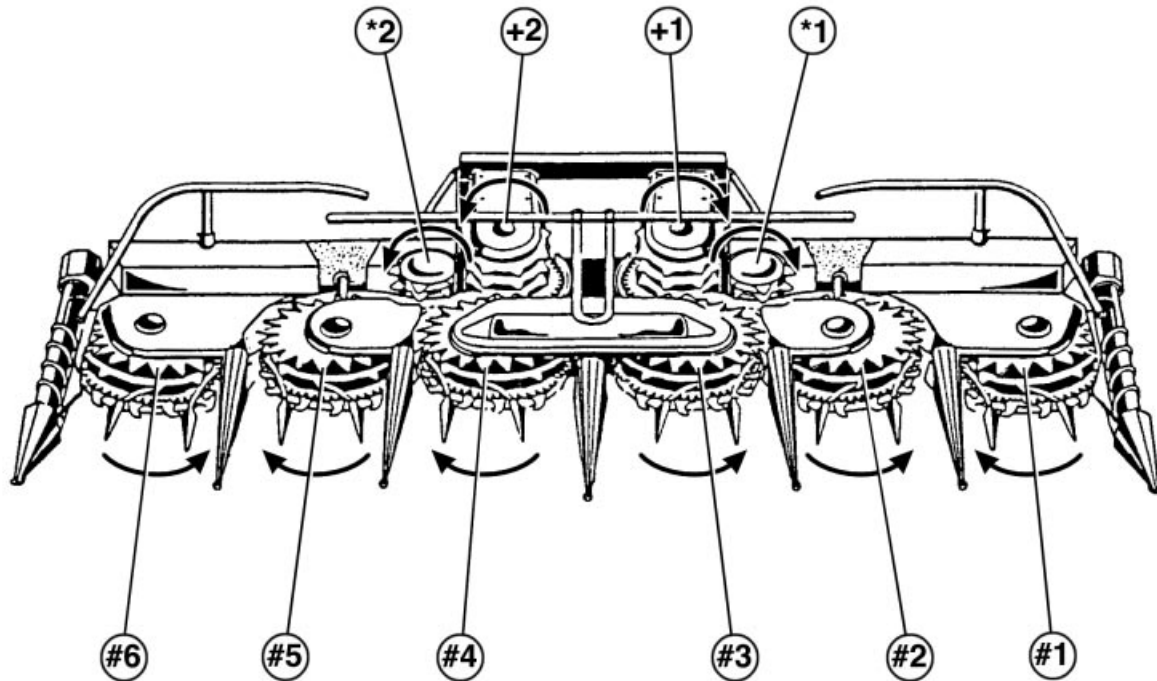
46-Friction clutch
47-Radial-pin clutch

Hydraulics

48-Hydraulic cylinder with safety valve

ZX,TM686R013522-19-01MAR99

420FI HARVESTING UNIT DRUM NUMBERING



ZX017148

IMPORTANT: This harvesting unit drum numbering will be used as a reference throughout this Technical Manual.

Gathering Drums (#):

- (#1)-Gathering drum No. 1-Right turning
- (#2)-Gathering drum No. 2-Left turning
- (#3)-Gathering drum No. 3-Left turning
- (#4)-Gathering drum No. 4-Right turning
- (#5)-Gathering drum No. 5-Right turning
- (#6)-Gathering drum No. 6-Left turning

Cross Feed Drums (*):

- (*1)-Cross feed drum No. 1-Right turning
- (*2)-Cross feed drum No. 2-Left turning

Feed Drums (+):

- (+1)-Feed drum No. 1-Right turning
- (+2)-Feed drum No. 2-Left turning

NOTE: Numbers shown above must not be used when ordering drum replacement parts. Always refer to the relevant parts catalog.

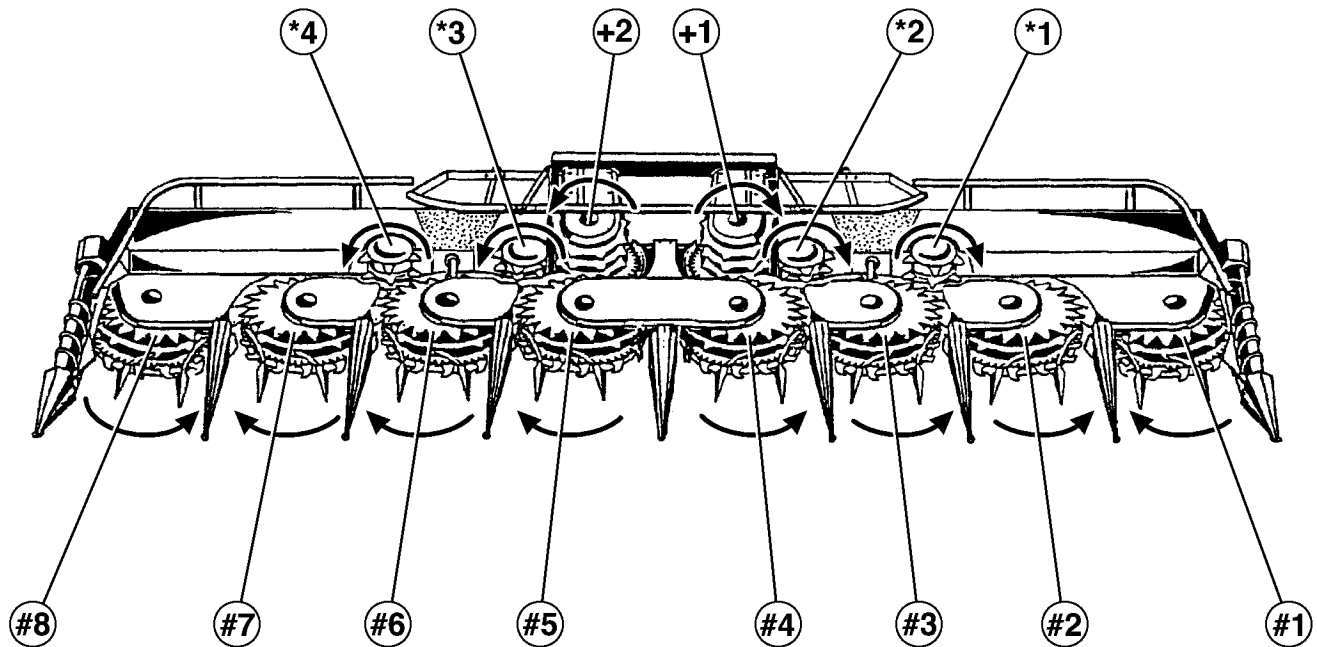
Right turning means: Clockwise

Left turning means: Anti-clockwise

ZX017148 -UN-12MAR99

ZX, TM686R013524-19-01MAR99

440FI HARVESTING UNIT DRUM NUMBERING



ZX014405 -UN-19MAY98

ZX014405

IMPORTANT: This harvesting unit drum numbering will be used as a reference throughout this Technical Manual.

Gathering Drums (#):

- (#1)-Gathering drum No. 1-Right turning
- (#2)-Gathering drum No. 2-Left turning
- (#3)-Gathering drum No. 3-Left turning
- (#4)-Gathering drum No. 4-Left turning
- (#5)-Gathering drum No. 5-Right turning
- (#6)-Gathering drum No. 6-Right turning
- (#7)-Gathering drum No. 7-Right turning
- (#8)-Gathering drum No. 8-Left turning

Cross Feed Drums (*):

- (*1)-Cross feed drum No. 1-Right turning
- (*2)-Cross feed drum No. 2-Right turning
- (*3)-Cross feed drum No. 3-Left turning
- (*4)-Cross feed drum No. 4-Left turning

Feed Drums (+):

- (+1)-Feed drum No. 1-Right turning
- (+2)-Feed drum No. 2-Left turning

NOTE: Numbers shown above must not be used when ordering drum replacement parts. Always refer to the relevant parts catalog.












Right turning means: Clockwise

Left turning means: Anti-clockwise

ZX, TM688R011262-19-01MAR99

Description/Harvesting unit drum numbering

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES

SAE Grade and Head Markings	1 or 2 ^b	5	5.1	5.2	8	8.2
	NO MARK 					
SAE Grade and Nut Markings	2	5			8	
	NO MARK 					

Size	Grade 1				Grade 2 ^b				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a	
	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	240	175	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	400	300	510	375	400	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

^a "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.





















^b Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

METRIC BOLT AND CAP SCREW TORQUE VALUES

Property Class and Head Markings	4.8		8.8		9.8		10.9		12.9	
										
Property Class and Nut Markings	5		10		10		10		12	
										

Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a	
	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	255	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

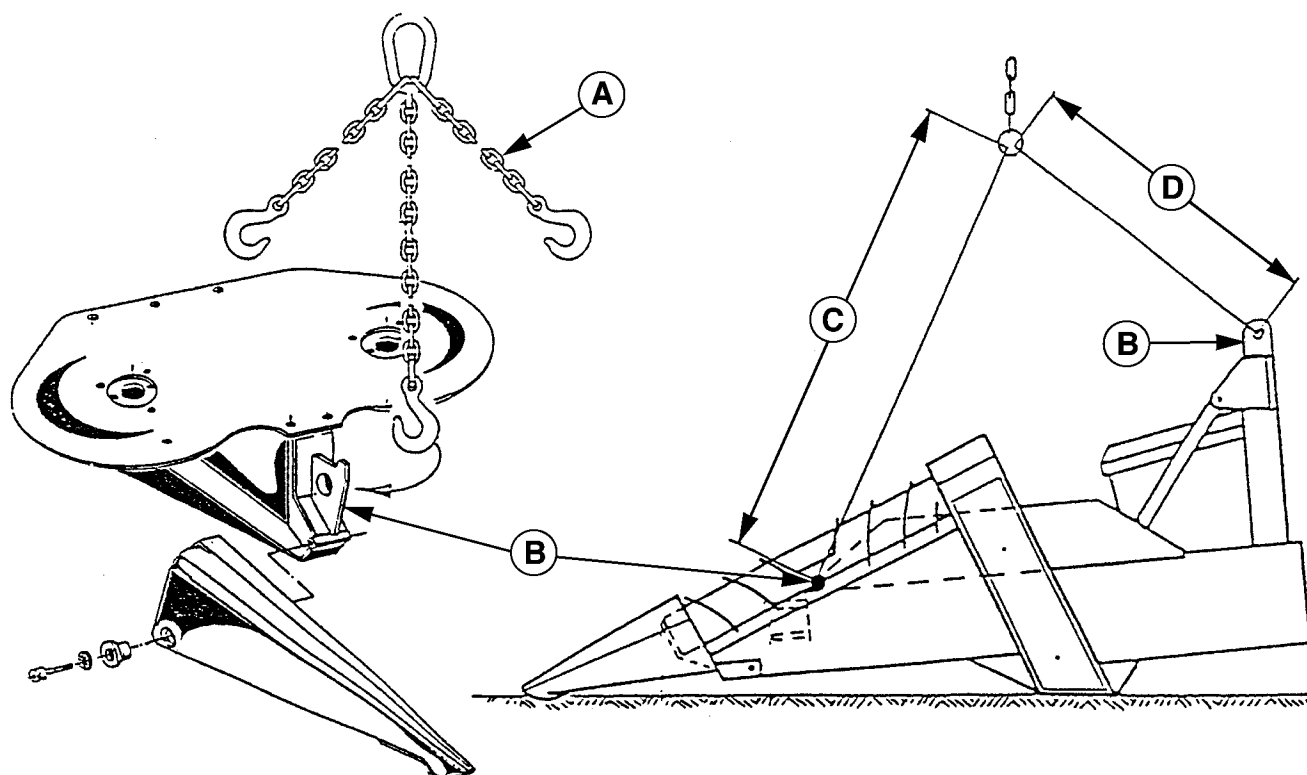
Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

^a "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

ATTACHING POINTS



ZX014360

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A—Securing chains or slings B—Attaching points

C—Approx. 1430 mm (4.7 ft) D—Approx. 1130 mm (3.7 ft)

CAUTION: To keep harvesting unit stable during handling, always use and connect slings or chains (A) that meet dimensions (C) and (D) to the handling attaching points (B).

The hoist must be able to support the weight of harvesting unit:

- 2880kg (6350 lb) on 440FI
- 2160kg (4762 lb) on 420FI

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