



## CH3500 HARVESTER REPAIR MANUAL

GENERAL SPECIFICATIONS

GENERAL CAPACITIES

TORQUE SPECIFICATIONS

FLUID RECOMMENDATIONS

GENERAL INFORMATION

SERVICE POINTS

ENGINE SYSTEM

OPERATOR'S STATION

HYDROSTATIC TRANSMISSION

FINAL DRIVE

WHEEL AND TRACK

MAIN HYDRAULIC SYSTEM

STEERING SYSTEM

TOPPER SYSTEM

CROP DIVIDER SYSTEM

FEED ROLLER SYSTEM

BASECUTTER SYSTEM

CHOPPER SYSTEM

CLEANING SYSTEM

ELEVATOR SYSTEM

INDEX

# CH3500 Harvester Repair Manual

**CAMECO**<sup>®</sup>

## Table of Contents

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### GENERAL SPECIFICATIONS

Specifications .....	0001-1
John Deere 6081 Engine .....	0001-2
Description .....	0001-2
Preliminary Service Intervals .....	0001-2
Common Wear Parts .....	0001-2

### GENERAL CAPACITIES

Harvester Capacities .....	0002-1
Tire Inflation Pressure .....	0002-1

### TORQUE SPECIFICATIONS

Suggested Torque Values For Grades 5.6, 8.8, 10.9, 12.9 Zinc Plated Cap Screws .....	0003-1
Suggested Torque Values For Grades 5.6, 8.8, 10.9, 12.9 Zinc Plated Cap Screws .....	0003-1
Torque for Grade 2 NC Weld Studs .....	0003-1
Suggested Torque Values And Clamp Loads For Grades 2, 5 & 8 Cap Screws .....	0003-2
Grade or Property Class Head Marking for SI Bolts .....	0003-2
Conversion Factors .....	0003-2

### FLUID RECOMMENDATIONS

John Deere Engine Coolant Requirements† ..	0004-1
John Deere Prediluted Antifreeze/ Summer Coolant .....	0004-1
John Deere Cool-Gard .....	0004-1
John Deere Antifreeze/Summer Coolant Concentrate .....	0004-1
John Deere Antifreeze/Summer Coolant .....	0004-1
Hydraulic Fluid .....	0004-2
Diesel Fuel .....	0004-2
Engine Break-in Oil (John Deere) .....	0004-2
Diesel Engine Oil .....	0004-3
Gear Oil—Pump Drive, Chopper Box and Basecutter .....	0004-3
Gear Oil—Final Drive .....	0004-3
Grease .....	0004-3

### GENERAL INFORMATION

Straight O-Ring Boss Fittings .....	0005-1
Angled O-Ring Boss Fittings .....	0005-1
37° Flare Cone Fittings .....	0005-1
Hex Flats Recommended Rotation .....	0005-2
Four Bolt Flange Fittings .....	0005-2
Flange Metric Bolt Torque Chart .....	0005-3
Flange SAE Bolt Torque Chart .....	0005-3
Conversions .....	0005-4
Weight Measure .....	0005-4
Length Measure .....	0005-4
Metric (SI†) Measurements .....	0005-4
Metric to English .....	0005-4
English to Metric .....	0005-4
Multiplication Factors .....	0005-5
Temperature Conversion Chart .....	0005-5
Conversion Formulas .....	0005-5
Recommended Supplies .....	0005-6
Hydraulic Gauge Kit .....	0005-8
CH3500 Specialty Tools and Part Numbers ..	0005-9

### SERVICE POINTS

Harvester Component Locations .....	0006-1
Harvester Service Point Locations .....	0006-2
Harvester Grease Point Locations .....	0006-3
Grease Point Locations .....	0006-4

### ENGINE

Pump Drive .....	0100-1
Pump Drive Removal .....	0100-2
Disassembly .....	0100-2
Clean and Inspect .....	0100-3
Assembly .....	0100-3

### OPERATOR'S STATION

Other Material .....	0200-1
Remove and Install Cab Windshield .....	0200-1
Remove and Install Cab Roof .....	0200-4
Remove and Install Instructional Seat .....	0200-6
Cab Door Latch Striker .....	0200-8



## HYDROSTATIC TRANSMISSION

Hydrostatic Pump .....	0500-1
Hydrostatic Pump .....	0500-2
Manual and Electrical Displacement Control	0500-3
Suggested Tools And Supplies .....	0500-3
General Repair Instructions .....	0500-3
Manual and Electrical Displacement	
Control Replacement † .....	0500-3
Orifice Check Valve Replacement .....	0500-4
Charge Pressure Relief Valve Replacement ..	0500-4
Shaft Seal Replacement .....	0500-5
Multifunction Valve Cartridge Replacement	
(2 Per Pump) .....	0500-5
Charge Pump Disassembly .....	0500-5
Charge Pump Reassembly .....	0500-6
Variable Displacement Motor (Wheel) .....	0500-7
Shaft Seal Disassembly .....	0500-8
Inspect .....	0500-8
Assembly .....	0500-8
About Servicing The Motor .....	0500-9
Cartridge Disassembly .....	0500-10
Housing Disassembly .....	0500-11
Reconditioning and Replacement of	
Shaft Assembly .....	0500-12
Piston Ring Reconditioning and	
Replacement .....	0500-13
Reconditioning and Replacement of Bearing Plate,	
Valve Segment, and Cylinder Block .....	0500-14
4-Way Valve and Feedback Springs .....	0500-15
Housing Assembly .....	0500-16
Housing Assembly .....	0500-17
Fixed Displacement Motor (Track) .....	0500-18
Cartridge Assembly .....	0500-19
Reconditioning and Replacement of	
Piston Rings .....	0500-20
Cylinder Block Assembly .....	0500-21
Cylinder Block Assembly .....	0500-22
End Cap to Main Housing Assembly .....	0500-23
Track Fixed Displacement Motor .....	0500-24
Disassembly .....	0500-24

## FINAL DRIVE

Safety Information .....	0600-3
Installation of the Gearbox to the harvester .	0600-3
Gearbox Lubrication .....	0600-3
Oil Filling .....	0600-4
Oil Draining and Replacement .....	0600-4
Disassembly .....	0600-5
Reassembly .....	0600-13
Reassembly .....	0600-14
Reassembly .....	0600-24
Brake Check .....	0600-24

## WHEEL AND TRACK

Right Side View .....	0700-1
Track Assembly .....	0700-1
Track Assembly .....	0700-2
Track Alignment .....	0700-2
Roller Lubrication .....	0700-2
Idler Lubrication .....	0700-3
Track Shoe Tightening .....	0700-3
Track Shoe Inspection Torque .....	0700-3
Sprocket Tightening .....	0700-3
Rear Axle Maintenance .....	0700-3
Track Adjustment .....	0700-4
Front Idlers .....	0700-5
Lubrication .....	0700-5
Identifying Master Link For Chain Removal .	0700-6
Recoil Spring Repair .....	0700-6
Recoil Spring Adjustment .....	0700-6
Specifications .....	0700-6
Link Rail Wear .....	0700-7
Link Rail Measurement .....	0700-7
Rebuildability .....	0700-7
Link Percentage Worn Chart .....	0700-7
Sealed Track Bushings & Pins .....	0700-8
Bushing and Pin Wear .....	0700-8
Wear Measurement .....	0700-8
Wear Limits—Service and Destruction .....	0700-8
Track Bushing Allowable Wear Chart .....	0700-8
Internal Pitch Wear .....	0700-9
Measurement Technique .....	0700-9
Detrimental Effects of Excessive Pitch .....	0700-9
Allowable Wear .....	0700-9
Internal Pitch Percentage Worn Chart .....	0700-9
Track Rollers .....	0700-10
Track Roller Lubrication .....	0700-10
Seal Assembly .....	0700-10
Specifications .....	0700-10
Carrier Roller .....	0700-11
Carrier Roller Lubrication .....	0700-11
Carrier Roller Assembly .....	0700-11
Specifications .....	0700-11
Sprocket Wear Patterns .....	0700-12
Sprocket Replacement .....	0700-12
Tip Gouged .....	0700-12
Rolling Undercarriage .....	0700-13
Roller Wear Diagnosis .....	0700-13
How To Measure Roller Wear .....	0700-13
Specifications .....	0700-13
Carrier Roller Percentage Worn .....	0700-13
Track Roller Percentage Worn .....	0700-14
Rolling Undercarriage .....	0700-14
Flange To Boss Measurement .....	0700-14
Idler Tread Wear Measurement .....	0700-14
Swapping Idlers .....	0700-14
Check Idler Flange Wear .....	0700-15
Flange Top Wear .....	0700-15

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Flange Side Wear .....	0700-15
Idlers Percentage Worn Chart .....	0700-15
Track Shoe Problems .....	0700-16
Grouser Wear Measurement .....	0700-16
Wear Limits—Service and Destruction .....	0700-16
Grouser Wear .....	0700-16
Plate Wear and Leading/Trailing Edge Wear .....	0700-17
Bolt Hole Wallowing Out .....	0700-17
Self-Locking Track Nut .....	0700-17
Sprocket Chain Roller Alignment .....	0700-18
Wheel Assembly .....	0700-19
Wheel Assembly .....	0700-20
Remove And Replace Front Wheel Bearings .....	0700-20
Suggested Tools .....	0700-20
Remove Rear Wheel Assembly .....	0700-20
To Remove And Mount Tire Onto	
Wheel Assembly .....	0700-20
Install Wheel Assembly .....	0700-21
Tire Pressure Specifications .....	0700-21

### MAIN HYDRAULIC SYSTEM

Multiple Gear Pump .....	2000-1
World Multiple Gear Pump .....	2000-2
World Multiple Gear Pump (Piggyback) .....	2000-3
Multiple Gear Pump Repair .....	2000-4
Suggested Tools .....	2000-4
Repair Precautions .....	2000-4
Bushing Removal Tool .....	2000-4
Seal Removal Tool .....	2000-4
Bushing Installation Tool .....	2000-4
Special Steel Sleeve .....	2000-4
Seal Installation Tool .....	2000-5
Disassembly .....	2000-5
Clean and Inspect .....	2000-5
Assembly .....	2000-6
Start Up Procedure .....	2000-7
Recommended Test Procedure .....	2000-7
Suggested Tools .....	2000-10
External Relief Settings .....	2000-10
Overhaul .....	2000-10
Valve Bank Disassembly .....	2000-10
Front and Rear Feed Roller Valves .....	2000-11
Assembly Procedure .....	2000-12
Track Fixed Displacement Motor .....	2000-14
Seal Replacement .....	2000-14
Disassembly .....	2000-15
Clean and Inspect .....	2000-15
Assembly .....	2000-15

### STEERING SYSTEM

Relief Valve Adjustment .....	2100-1
Relief Valve Repair .....	2100-1
Priority Valve .....	2100-1
Disassembly/Reassembly .....	2100-4
Troubleshooting .....	2100-6

Steering Linkage .....	2100-8
Remove and Install Steering Cylinder .....	2100-9
Repair Steering Cylinder .....	2100-10
Check Front Axle Toe-In .....	2100-12
Adjust Front Axle Toe-In .....	2100-13

### TOPPER SYSTEM

Collector, Crop Divider, Feed Roller, and Elevator Motor .....	3000-2
Suggested Tools .....	3000-3
Collector Motor .....	3000-3
Disassembly .....	3000-3
Clean and Inspect .....	3000-4
Assembly .....	3000-5
Topper .....	3000-6
Topper Repair .....	3000-7
Collector Drum and Motor Removal .....	3000-7
Topper Assembly Removal .....	3000-7
Clean and Inspect .....	3000-7
Drum and Topper Assembly .....	3000-7
Shredder Topper .....	3000-8
Topper Repair .....	3000-9
Collector Drum and Motor Removal .....	3000-9
Topper Assembly Removal .....	3000-9
Clean and Inspect .....	3000-9
Drum and Topper Assembly .....	3000-10
Scroll Cylinder .....	3000-11
Suggested Tools .....	3000-12
Disassembly .....	3000-12
Clean And Inspect .....	3000-12
Assembly .....	3000-13
Topper Lift .....	3000-14
Disassemble and Assemble Topper	
Lift Cylinder .....	3000-14
Gear Motor .....	3000-16
Gear Motor Repair .....	3000-17
Suggested Tools .....	3000-17
Repair Precautions .....	3000-17
Bushing Removal Tool .....	3000-17
Seal Removal Tool .....	3000-17
Bushing Installation Tool .....	3000-17
Disassembly .....	3000-18
Clean And Inspect .....	3000-18
Assembly .....	3000-19
Start Up Procedure .....	3000-20
Recommended Test Procedure .....	3000-20

### CROP DIVIDER SYSTEM

Crop Divider .....	3100-1
Crop Divider Removal .....	3100-2
Disassembly .....	3100-2
Clean and Inspect .....	3100-2
Assembly .....	3100-2
Crop Divider Shoe Assembly .....	3100-2
Crop Divider Shoe Removal .....	3100-2



## FEEDROLLER SYSTEM

Knockdown Roller .....	3400-1
Removal .....	3400-2
Disassembly .....	3400-2
Clean And Inspect .....	3400-2
Assembly .....	3400-2
Buttliifter Roller (B1) .....	3400-3
Repair .....	3400-4
Clean and Inspect .....	3400-4
Assembly .....	3400-4
Bottom Feed Roller (B2, B3, B4, B5) .....	3400-5
Repair .....	3400-6
Clean and Inspect .....	3400-6
Assembly .....	3400-6
Top Floating Feed Roller (T1, T2, T3, T4, T5) .	3400-7
Repair .....	3400-8
Clean and Inspect .....	3400-8
Assembly .....	3400-8

## BASECUTTER SYSTEM

Basecutter Gearbox .....	3500-1
Basecutter .....	3500-2
Gearbox Removal .....	3500-3
Gearbox Installation .....	3500-3
Gearbox Disassembly .....	3500-3
Leg Shaft Removal .....	3500-4
Clean and Inspect .....	3500-4
Before Assembly .....	3500-4
Basecutter High Drive Assembly .....	3500-5
Basecutter Lift Cylinder (Wheel) .....	3500-7
Wheel Basecutter Lift Cylinder Disassembly	3500-8
Clean and Inspect .....	3500-8
Reassembly .....	3500-9
Basecutter Lift Cylinder (Track) .....	3500-11
Suggested Tools .....	3500-12
Track Basecutter Lift Cylinder Disassembly .	3500-12
Clean and Inspect .....	3500-12
Reassembly .....	3500-13

## CHOPPER SYSTEM

Remove .....	3600-2
Chopper Gearbox PreAssembly and Installation	3600-3
Top and Bottom Drum Installation .....	3600-4
Final Assembly of Chopper Box .....	3600-5
Differential Chopper Blade and Kicker	
Installation .....	3600-6
Differential Chopper Timing and	
Adjustments .....	3600-7
Chopper System .....	3600-8
Differential Chopper Timing .....	3600-8
Slip Clutch .....	3600-9
Disassembly .....	3600-10
Assembly (Flywheel, Slip Clutch	
Assembly and Adjustment) .....	3600-10

Field Setting of Slip Clutch .....	3600-11
Clean and Close Box .....	3600-11
Assembly Chopper Motors .....	3600-11
Assembly Chopper Deflector Shields and	
Adjustments .....	3600-11
Install and Adjust Sill Plate .....	3600-11
Chopper Motor Repair and Overhaul .....	3600-13
Shaft Seal and Cover .....	3600-13
Drive End Cover and Seal .....	3600-13
Distributor End Cover and Seal .....	3600-13
Distributor Housing and Seal Dismantling ...	3600-13
Assembly .....	3600-14
Distributor Piston Rings .....	3600-14
Crankshaft and Cylinder Block Assembly ....	3600-14
Inspection and Repair .....	3600-14
Assembly .....	3600-15
Procedure for Preloading Taper Roller	
Bearing on Motor .....	3600-15
Bearings .....	3600-16
Pistons and Piston Seals .....	3600-16
Piston Pads .....	3600-16
Testing .....	3600-16
Hydraulic Test .....	3600-17

## CLEANING SYSTEM

Fan Assy .....	3700-1
Installing The Hub To Motor Shaft .....	3700-2
Installing Fan Blades, Doubler Plates, and	
Backing Plate .....	3700-2
Safety Start Up .....	3700-3
Variable Primary Extractor Pump .....	3700-4
Manual Displacement Control .....	3700-5
Suggested Tools .....	3700-5
Multi-Function Valve Adjustment .....	3700-5
Stroke Limiter Adjustment† .....	3700-6
Charge Relief Adjustment .....	3700-6
Minor Repair .....	3700-6
General Repair .....	3700-6
Manual Displacement Control Replacement .	3700-6
Orifice Check Valve Replacement .....	3700-7
Charge Pressure Relief Valve Replacement ..	3700-7
Shaft Seal Replacement .....	3700-8
Multi-Function Valve Cartridge Replacement	
(2 per pump) .....	3700-8
Charge Pump Disassembly .....	3700-8
Reassembly .....	3700-8
Primary Extractor Motor .....	3700-10
Tools Required .....	3700-11
Disassembly Shaft Seal .....	3700-12
Disassembly Shaft Seal continued .....	3700-13
Disassembly End Cover with Integral Shuttle	
and Low Pressure Relief Valve .....	3700-13
Disassembly of End Cover .....	3700-14
Disassembly of Rotating Group .....	3700-14
Reassembly .....	3700-17





Reassembly of Shaft Seal .....	3700-20
Reassembly of End Cover .....	3700-21
Shaft Bearing Cone Driver (End Cover end) .	3700-22
Low Clearance Bearing Puller .....	3700-24

## **ELEVATOR SYSTEM**

Standard Capacity Elevator System .....	3800-1
Elevator Group .....	3800-2
Chain Adjustment .....	3800-2
Changing Chain and Sprockets .....	3800-2
HEADSHAFT REPAIR .....	3800-3
Disassembly .....	3800-3
Assembly .....	3800-3
Chain Removal On Repair .....	3800-4
High Capacity Elevator System .....	3800-5
High Capacity Elevator Drive .....	3800-6
High Capacity Elevator .....	3800-7
Grease Cylinder Elevator Chain Adjustment	3800-7
Elevator Swing Table .....	3800-8
Description .....	3800-9
Removal .....	3800-9
Clean and Inspect .....	3800-9
Assembly .....	3800-9
Elevator Swing Cylinder .....	3800-10
Disassembly .....	3800-11
Clean and Inspect .....	3800-11
Guide Rod Seal Installation .....	3800-11
Piston Seal Installation .....	3800-11
Cylinder Assembly .....	3800-12
Elevator Lift Cylinder .....	3800-13
Disassembly .....	3800-14
Clean and Inspect .....	3800-14
Piston Seal Installation .....	3800-15
Cylinder Assembly .....	3800-15

*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.*



## GENERAL SPECIFICATIONS

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### Specifications

*For additional information, refer to the John Deere Engine Manual.*

Engine Type .....	John Deere 8081, 8.1L
Number of Cylinders .....	6
Horsepower .....	337 HP at 2100 RPM
Aspiration .....	Turbocharger and Air to Air Aftercooler
Oil Capacity .....	29.5 Liters (31 US Quarts)
Oil Filter .....	Top Load Oil Filter
Coolant Capacity .....	62.5 Liters (16.5 US Gallons)
Coolant Additive Element .....	Canister Type (Optional)

**IMPORTANT: Do Not Mix Coolant Additive and Additive Elements or Use Together. Use Only One Method Exclusively.**

Fuel Filters .....	Primary: Spin-On/Spin-Off Element with Water .. Separator Final: Spin-On/Spin-Off Element
Safety Shutoff .....	Swing Out Door with Shutoff Override Control.
Electrical System .....	12 Volt Battery





## GENERAL SPECIFICATIONS

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### John Deere 6081 Engine

#### Description

The John Deere 6081 engine has 8.1 L, six in-line cylinders, 337 HP, is turbocharged and after-cooled.

#### Preliminary Service Intervals

After the first 100 hours of operation, or after rebuilding your engine, do the following:

1. Change the engine oil and filter.
2. Change all fuel filters.

Every 250 hours of operation thereafter, do the following:

1. Change the engine oil and filter.
2. Change all fuel filters.

Refer to the Maintenance Section for complete service intervals.

#### Common Wear Parts

Primary Fuel Element .....	RE503676 (Washable Screen)
Final Fuel Element .....	RE509596
Oil Filter .....	RE509672
Belt (Crank Shaft) .....	R135604



## GENERAL CAPACITIES

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### Harvester Capacities

<b>Component</b>	<b>Approximate Capacity</b>
Fuel Tank—Diesel .....	568 L (150 US Gal)
Hydraulic Oil Tank—10W30 Motor Oil .....	405 L (107 US Gal) (World)
Radiator Coolant—50% Clean Water & 50% Ethylene Glycol .....	62.5 L (16.5 US Gal)
Track Final Drive—85W140 .....	4.2 L (4.4 US Qt)
Wheel Final Drive—85W140 .....	4.2 L (4.4 US Qt)
Chopper Gearbox—85W140 .....	7.6 L (8 US Qt)
Basecutter Gearbox (With Legs)—85W140 .....	Dry 10.4 L (11 US Qt)
Four Pump Drive—85W140 .....	7.1 L (7.5 US Qt)
John Deere 6081 Engine—SAE 15W40 Oil .....	28.5 L (31 US Qt)
Air Conditioner—R134A Refrigerant (Empty System) .....	2.6 Kg (5.75 Lb)
—R134A Compressor Oil: ND-8 .....	118 mL (4.0 Oz)

### Tire Inflation Pressure

<b>TIRE SIZE</b>	<b>PSI</b>	<b>KPA</b>
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#### Front

Skidder 17.5 x 14—10 Ply (Galaxy) .....	75	517
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#### Rear

23.5 x 25-20 Ply (Galaxy) .....	54	372
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## TORQUE SPECIFICATIONS

The torque values listed in the following charts are for general use only. Do not use these values if a different torque value or tightening procedure is listed for a specific application.

### Suggested Torque Values For Grades 5.6, 8.8, 10.9, 12.9 Zinc Plated Cap Screws

Nominal Diameter	Grade 5.6 Coarse		Grade 8.8 Coarse		Grade 10.9 Coarse		Grade 12.9 Coarse	
	Nm	ft-lb.	Nm	ft-lb.	Nm	ft-lb.	Nm	ft-lb.
M3	0.56	0.41	1.28	0.94	1.80	1.33	2.15	1.59
M4	1.28	0.94	2.90	2.14	4.10	3.02	4.95	3.65
M5	2.50	1.84	5.75	4.24	8.10	5.97	9.70	7.15
M6	4.30	3.10	9.90	7.30	14	10.30	16.50	12.10
M7	7.10	5.20	15.50	12.10	23	16.9	27	19.90
M8	10.50	7.70	24	17.70	34	25	40	29
M10	21	15	48	35	67	49	81	59
M12	36	26	83	61	117	86.2	140	103
M14	56	42	132	97	185	136	220	162
M16	88	64	200	147	285	210	340	250
M18	121	89	275	202	390	287	470	346
M20	171	126	390	287	550	405	660	486
M22	230	169	530	390	745	549	890	656
M24	295	217	675	497	960	708	1140	840
M27	435	320	995	733	1400	1032	1680	1239
M30	590	435	1350	995	1900	1401	2280	1681
M33	800	590	1830	1349	2580	1902	3090	2278
M36	1030	759	2360	1740	3310	2441	3980	2935
M39	1340	988	3050	2249	4290	3163	5450	3798

### Suggested Torque Values For Grades 5.6, 8.8, 10.9, 12.9 Zinc Plated Cap Screws

Nominal Diameter	Grade 5.6 Fine		Grade 8.8 Fine		Grade 10.9 Fine		Grade 12.9 Fine	
	Nm	ft-lb.	Nm	ft-lb.	Nm	ft-lb.	Nm	ft-lb.
M8 X 1	N/A	N/A	25	18	35	25	42	30
M10 X 1.25	N/A	N/A	49	36	68	50	82	60
M12 X 1.25	N/A	N/A	88	64	125	92	150	110
M14 X 1.5	N/A	N/A	140	103	195	143	235	173
M16 X 1.5	N/A	N/A	210	154	295	217	350	258
M18 X 1.5	N/A	N/A	305	224	425	313	510	376
M20 X 1.5	N/A	N/A	425	313	600	442	720	531
M22 X 1.5	N/A	N/A	570	420	800	590	960	708
M24 X 2	N/A	N/A	720	531	1000	737	1200	885

#### Torque for Grade 2 NC Weld Studs

1/4" Weld Studs ..... 8 NM (6 Lb-Ft)  
 3/8" Weld Studs ..... 32 NM (25 Lb-Ft)  
 1/2" Weld Studs ..... 80 NM (60 Lb-Ft)



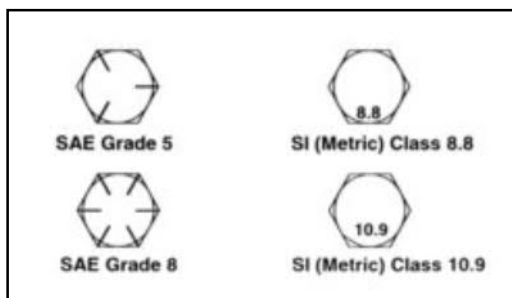
## TORQUE SPECIFICATIONS

### Suggested Torque Values And Clamp Loads For Grades 2, 5 & 8 Cap Screws

Nominal Diameter And TPI (Inches)	Thread Stress Area (Sq-In)	SAE Grade 2 Capscrews		SAE Grade 5 Capscrews		SAE Grade 8 Capscrews	
		Clamp Load 60-90% Proof (Pounds)	Tightening Torque (Ft-Lb)	Clamp Load 60-90% Proof (Pounds)	Tightening Torque (Ft-Lb)	Clamp Load 60-90% Proof (Pounds)	Tightening Torque (Ft-Lb)
1/4-20	0.0318	1049-1574	4-7	1622-2433	7-10	2290-3434	10-4
1/4-28	0.0364	1201-1802	5-8	1856-2785	8-12	2621-3931	11-16
5/16-18	0.0524	1729-2594	9-14	2672-4009	14-21	3773-5659	20-29
5/16-24	0.0580	1914-2871	10-15	2958-4437	15-23	4176-6264	22-33
3/8-16	0.0775	2558-3868	16-24	3953-5929	25-37	5580-8370	35-52
3/8-24	0.0878	2897-4346	18-27	4478-6717	28-42	6322-9482	40-59
7/16-14	0.1063	3508-5262	26-38	5421-8132	40-59	7654-11480	56-84
7/16-20	0.1187	3917-5876	29-43	6054-9081	44-66	8546-12820	62-93
1/2-13	0.1419	4683-7024	39-59	7237-10855	60-90	10217-15325	85-128
1/2-20	0.1599	5277-7915	44-66	8155-12232	68-102	11513-17269	96-144
9/16-12	0.1820	6006-9009	56-84	9282-13923	87-131	13104-19656	123-184
9/16-18	0.2030	6699-10049	63-94	10353-15530	97-146	14616-21924	137-206
5/8-11	0.2260	7458-11187	78-117	11526-17289	120-180	16272-24408	170-254
5/8-18	0.2560	8448-12672	88-132	13056-19584	136-204	18432-27648	192-288
3/4-10	0.3340	11022-16533	138-207	17034-25551	213-319	24048-36072	301-451
3/4-16	0.3730	12309-18464	154-231	19023-28535	238-357	26856-40284	336-504
7/8-9	0.4620	15246-22869	222-334	23562-35343	344-515	33264-49896	485-728
7/8-14	0.5090	16797-25196	245-367	25959-38939	379-568	36648-54972	534-802
1-8	0.6060	19998-29997	333-500	30906-46359	515-773	43632-65448	727-1091
1-14	0.6790	22407-33611	373-560	34629-51944	577-866	48888-73332	815-1222
1 1/8-7	0.7630	25179-37769	472-708	33877-50816	635-953	54936-82404	1030-1545
1 1/8-12	0.8560	28248-42372	530-794	38006-57010	713-1069	61632-92448	1156-1733
1 1/4-7	0.9690	31977-47966	666-999	43024-64535	896-1344	69768-104652	1454-2180
1 1/4-12	1.0730	35409-53114	738-1107	47641-71462	993-1489	77256-115884	1610-2414

### Grade or Property Class Head Marking for SI Bolts

SAE Grade	Diameter	Tensile Strength	SI Class	Diameter	Tensile Strength
5	1/4"	105,000 PSI	8.8	Up to 16 MM	800 MPA
5	1" — 1-1/2"	120,000 PSI	8.8	17 MM to 36 MM	830 MPA
8	1/4" — 1-1/2"	150,000 PSI	10.9	Up to 36 MM	1040 MPA



### Conversion Factors

Torque In NM x 0.737 = Torque In Lb-Ft  
 Torque In Lb-Ft x 1.356 = Torque In NM  
 Torque In Lb-Ft x 12 = Torque In Lb-In



## FLUID RECOMMENDATIONS

### John Deere Engine Coolant Requirements†

Contact your engine distributor or servicing dealer to determine what the cooling system of this engine is filled with and the winter freeze protection level.

Solutions of antifreeze and supplemental coolant additives *Must* be used year-round for freeze protection, boil-over protection, and to provide a stable, noncorrosive environment for seals, hoses, and metal engine parts.

The following engine coolant is preferred for service:

1. John Deere Prediluted Antifreeze/Summer Coolant.
2. John Deere Cool-Gard, where available.

The following engine coolant is also recommended:

John Deere Antifreeze/Summer Coolant Concentrate in a 40 to 60 percent mixture of concentrate with quality water.

### John Deere Prediluted Antifreeze/Summer Coolant

This product contains all the necessary ingredients that make up the proper coolant solution: chemically pure water, ethylene glycol (low silicate antifreeze), and supplemental coolant additives (SCA's). It is ready to use, no mixing is required.

John Deere Prediluted Antifreeze/Summer Coolant permits extended service life to 5000 hours or 60 months of operation.

### John Deere Cool-Gard

In certain geographical areas, John Deere Cool-Gard is marketed for use in the engine cooling system. This product contains all the necessary ingredients that make up the proper coolant solution: chemically pure water, ethylene glycol (low silicate antifreeze), and supplemental coolant additives (SCA's). It is ready to add to cooling system as is, no mixing or supplemental coolant additives required. Contact your John Deere Parts Network for local availability.

John Deere Cool-Gard has a service life of 2000 hours or 24 months of operation.

### John Deere Antifreeze/Summer Coolant Concentrate

This product contains ethylene glycol (low silicate antifreeze) and supplemental coolant additives (SCA's). It *Must Be* mixed with quality water, as described later in this section, before adding to the engine cooling system. The proportion of water to be used depends upon the lowest freeze protection temperature desired according to the following table:

% Concentrate	Freeze Protection Limit
40	-24°C (-12°F)
50	-37°C (-34°F)
60	-52°C (-62°F)

### John Deere Antifreeze/Summer Coolant

Concentrate permits extended service life to 5000 hours or 60 months of operation.



## FLUID RECOMMENDATIONS

	Air (Ambient) Temperature Range for Hydraulic Fluid								
Fahrenheit (°F)	-10	-4	14	32	50	68	86	104	122
Celsius (°C)	-23	-20	-10	0	10	20	30	40	50

Figure 1

### Hydraulic Fluid

Engine oil SAE 10W30 in the hydraulics. Engine oil may be used provided it meets one of the following: API Service EC, SG, SH, or SJ.

If John Deere Engine Break-In Oil is not available, use a diesel oil meeting one of the following during the first 100 hours of operation:

- API Service Classification CE
- ACEA Specification E1
- CCMC Specification D4

### Diesel Fuel

For fuel specifications, refer to Engine Manual. After buying good quality, clean fuel from a reputable supplier, proper storage is extremely important. The fuel must be stored in clean storage and transfer tanks. (The water and sediments from the bottom of the storage tanks must be periodically drained.) A fuel conditioner to prevent water condensation must be added if fuel is stored for an extended period of time.

After the break-in period, use John Deere Plus-50® other diesel engine oil as recommended in this manual.

To avoid condensation in the combine fuel tank, fill at the end of each day's operation. Capacity is 568 L (150 gallons).

### Engine Break-in Oil (John Deere)

New engines are filled at the factory with John Deere Engine Break-In Oil. During the break-in period, add John Deere Engine Break-In Oil as needed to maintain the specified oil level. The engine oil part number is TY22041.

**Important:** Do not use John Deere Plus-50 oil or engine oils meeting API CG4, API CF4, ACEA E3, ACEA E2, or CCMC D5 performance levels during the first 100 hours of operation of a new or rebuilt engine. These oils will not allow the engine to break-in properly.



## FLUID RECOMMENDATIONS

### Diesel Engine Oil

Use oil viscosity based on the expected air temperature range during the period between oil changes.

The following oil is preferred:

- John Deere Plus-50®

If John Deere Plus-50 engine oil and a John Deere oil filter are used, the service interval for oil and filter changes may be extended by 50 percent.

The following oil is also recommended:

- John Deere Torq-Gard Supreme®

Other oils may be used if they meet one or more of the following:

- John Deere Uni-Gard
- API Service Classification CG-4
- API Service Classification CF-4
- ACEA Specification E3
- ACEA Specification E2
- CCMC Specification D5
- CCMC Specification D4

*Multi-Viscosity Diesel Engine Oils Are Preferred.*

If diesel fuel with sulfur content greater than 0.5% is used, reduce the service interval by 50%.

### Gear Oil—Pump Drive, Chopper Box and Basecutter

Use a 85W140 multigrade oil that meets extreme pressure (EP) gear lubricant specification MIL-L-2105C or API classification GL-5.

### Gear Oil—Final Drive

The recommended type oil is SAE 85W/140 with EP features complying with MIL-L-210RC and API GL5.

### Grease

Use a SAE multipurpose grease containing 3 to 5% molybdenum disulfide and having extreme pressure (EP) performance.

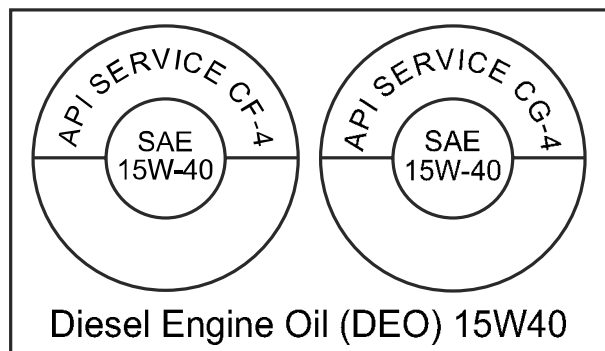


Figure 2





## GENERAL INFORMATION

### Straight O-Ring Boss Fittings

1. Inspect the o-ring boss seat of fitting for dirt or defects.
2. Lubricate the o-ring with o-ring lube or petroleum jelly.
3. Place tape (preferably electrical tape) over the threads to protect the o-ring.
4. Slide the o-ring over the tape and into the o-ring groove of fitting.
5. Tighten fitting until the hex bottoms out.

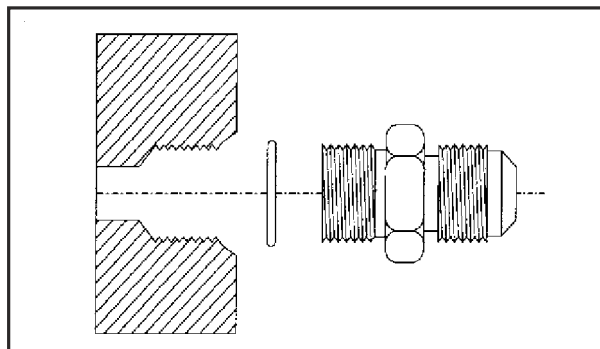


Figure 1

### Angled O-Ring Boss Fittings

1. Back off the locknut and backup washer completely to the “head-end” of the fitting.
2. Screw the fitting into the threaded boss until the backup washer contacts the face of the boss.
3. Turn the fitting “head-end” counterclockwise to the proper index (a maximum of one turn).
4. Hold the fitting “head-end” with a wrench and tighten the locknut until the backup washer bottoms out. Be careful when installing fittings. *Do Not* twist hoses when tightening.

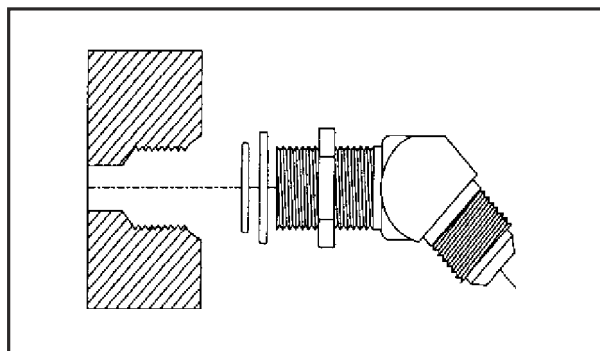


Figure 2

### 37° Flare Cone Fittings

1. Inspect flare and flare seat. They both must be free of dirt or obvious defects.
2. Defects in tube flare cannot be repaired. Overtightening a defective flared fitting will not stop leaks.
3. Align tube with fitting before attempting to start nut.
4. Lubricate male threads with hydraulic fluid or petroleum jelly.
5. Index angle fittings and tighten by hand.
6. After fittings are hand tight, mark the male and female sides. Rotate the male fitting according to the chart on the following page.

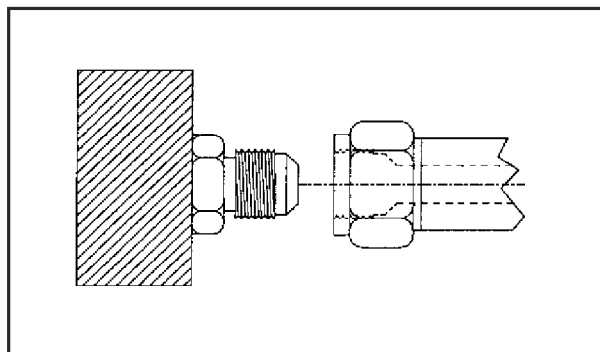


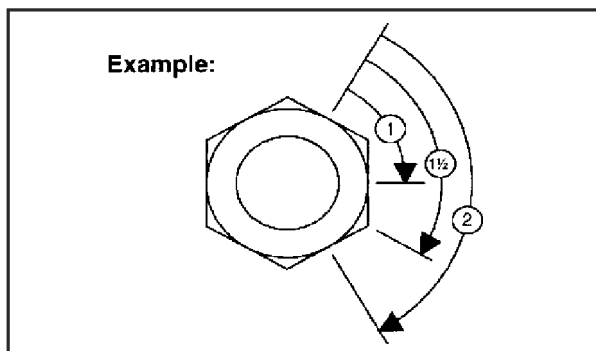
Figure 3



## GENERAL INFORMATION

### Hex Flats Recommended Rotation

Dash Size	37° Flared Tube	37° Machined Fitting Seat
	Ferrule & Nut	Fitting & Hose
-4	2- <sup>1</sup> / <sub>4</sub> — 2- <sup>3</sup> / <sub>4</sub>	1- <sup>1</sup> / <sub>2</sub> — 1- <sup>3</sup> / <sub>4</sub>
-6	2- <sup>1</sup> / <sub>4</sub> — 2- <sup>3</sup> / <sub>4</sub>	1 — 1- <sup>1</sup> / <sub>2</sub>
-8	2- <sup>1</sup> / <sub>4</sub> — 2- <sup>3</sup> / <sub>4</sub>	1- <sup>1</sup> / <sub>4</sub> — 1- <sup>3</sup> / <sub>4</sub>
-12	2 — 2- <sup>1</sup> / <sub>2</sub>	1 — 1- <sup>1</sup> / <sub>2</sub>
-16	2- <sup>1</sup> / <sub>4</sub> — 2- <sup>3</sup> / <sub>4</sub>	<sup>3</sup> / <sub>4</sub> — 1
-20	1- <sup>1</sup> / <sub>4</sub> — 1- <sup>3</sup> / <sub>4</sub>	<sup>1</sup> / <sub>2</sub> — <sup>3</sup> / <sub>4</sub>

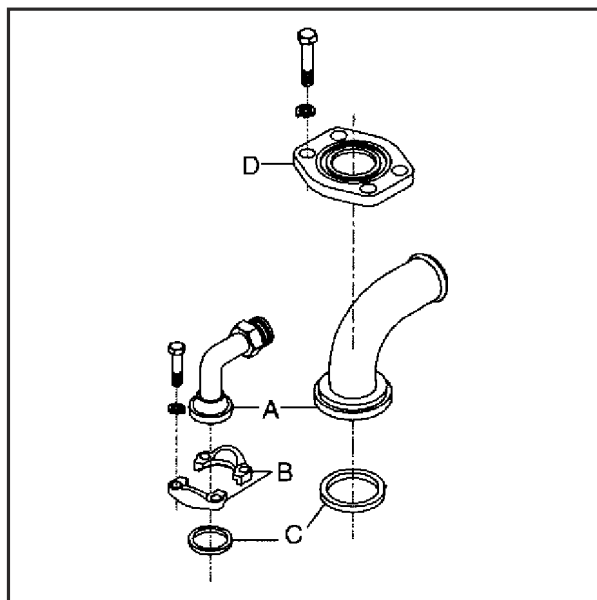


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Figure 4

### Four Bolt Flange Fittings

1. Clean sealing surfaces (A) and inspect. Scratches cause leaks. Roughness causes seal wear and unevenness causes seal extrusion; therefore, if defects cannot be polished out, replace component.
2. Install the correct o-ring (and backup washer if required) into groove using petroleum jelly to hold it in place.
3. Split flange (B): Loosely assemble split flange halves. Make sure split is centrally located and perpendicular to port. Hand-tighten bolts to hold parts in place. Do not pinch o-ring (C).
4. One piece flange (D): Place hydraulic line in center of flange and install four bolts. Flange must be centrally located on port. Hand-tighten bolts to hold flange in place. Do not pinch o-rings.
5. After components are properly positioned and bolts are hand tightened, tighten one bolt, then tighten the diagonally opposite bolt. Tighten the two remaining bolts. Tighten all bolts as specified in the chart below.
6. *Do Not* use air wrenches. *Do Not* tighten one bolt fully before tightening the others. *Do Not* over tighten.



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Figure 5



## GENERAL INFORMATION

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### Flange Metric Bolt Torque Chart

Bolt Size	NM	LB-FT
M6	12	9
M8	30	22
M10	57	42
M12	95	70
M14	155	115
M16	215	160
M18	335	245
M20	420	320

Tolerance  $\pm 10\%$

### Flange SAE Bolt Torque Chart

Flange Size	Bolt Size UNC	LB-FT		NM	
		Min	Max	Min	Max
1/2"	5/16 — 18	15	23	20	30
3/4"	3/8 — 16	21	40	28	55
1"	3/8 — 16	27	40	37	55
1-1/4"	7/16 — 14	35	63	47	85
1-1/2"	1/2 — 13	46	97	62	130
2"	1/2 — 13	55	97	73	130
2-1/2"	1/2 — 13	80	97	105	130
3"	5/8 — 11	115	195	160	265
3-1/2"	5/8 — 11	115	195	160	265
4"	5/8 — 11	115	195	160	265
5"	5/8 — 11	115	195	160	265



## GENERAL INFORMATION

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### Conversions

The following pages contain information that will be useful to you as you work with non-metric fasteners.

You may find frequent use for the fraction-decimal-millimeter conversion chart on this page, especially when you have to cut or restore threads.

Although there are metric equivalents for all English measurements (length, weight, volume, and so on), the only ones you are likely to deal with in your work with fasteners are linear (length) measurements. The tables which follow are provided to help you compare metric to English measurements, or to make conversions when you are required to do so.

### Weight Measure

1 Gross or Long Ton	= 2,240 Lb
1 Net or Short Ton	= 2,000 Lb
1 Cubic Foot of Water	= 62.5 Lb
1 Gallon of Water	= 8.33 Lb

### Length Measure

1 Mile	= 8 Furlongs
1 Mile	= 80 Chains
1 Mile	= 320 Rods
1 Mile	= 1,760 Yards
1 Mile	= 5,280 Feet
1 Furlong	= 10 Chains
1 Furlong	= 220 Yards
1 Station	= 6.06 Rods
1 Station	= 33.3 Yards
1 Station	= 100 Feet
1 Chain	= 4 Rods
1 Chain	= 22 Yards
1 Chain	= 66 Feet
1 Chain	= 100 Links
1 Rod	= 5.5 Yards
1 Rod	= 16.5 Feet
1 Yard	= 3 Feet
1 Yard	= 36 Inches
1 Foot	= 12 Inches

### Metric to English

1 Millimeter (mm)	= 0.03937 Inches
1 Centimeter (cm)	= 0.3937 Inches
1 Meter (M)	= 39.37 Inches
	= 3.2808 Feet
	= 1.0936 Yards

### English to Metric

1 Inch	= 25.4 Millimeters (mm)
	= 2.54 Centimeters (cm)
1 Foot	= 304.8 Millimeters (mm)
	= 30.48 Centimeters (cm)
	= 0.3048 Meter (M)
1 Yard	= 91.44 Centimeters (cm)
	= 0.9144 Meter (M)

### Metric (SI†) Measurements

The use of metric measurements and metric fasteners has greatly increased in recent years. You'll encounter them even more frequently as they are gradually adopted in the United States. Furthermore, many foreign-made products have become commonplace. These are usually manufactured to metric measurements. For instance, the fasteners used in foreign-built cars and tractors are made to metrics and many require metric wrenches to remove and install them. In some cases, inch-size wrenches will fit metric fasteners. Consult tool manufacturer literature to determine these sizes.

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† SI stands for System International D 'Unites (International System of Units). In English the term is abbreviated to "SI", and is called the "International System of Measurements".