

Challenger®
MT297
Compact Tractor - Power Shuttle

SERVICE MANUAL
79028569 A Rev.

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01 - General Information

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Contents

NOTES

INTRODUCTION

INTRODUCTION

The purpose of this manual is to assist dealers and distributors in the efficient repair and maintenance of farm machinery. Carrying out the procedures as detailed, together with the use of special tools where appropriate will enable the operations to be completed within the time stated in the repair time schedule.

NOTE: To assist with location information, each division of the manual is proceeded by a contents page listing the operations in numerical order.

Each instruction within an operation has a sequence number, and to complete the operation in the minimum time it is essential that these instructions are performed in numerical sequence commencing at 1 unless otherwise stated. When applicable, these sequence numbers identify the components in the appropriate illustration. Where performance of an operation requires the use of a special tool. The tool is called out in that operation.

Indexing

For convenience, the manual is divided into parts, sections and sub-sections with each page number bearing the part and section number. Page numbers are located at top outside of each page. Beneath the page number is written title of manual division

Page number example: 01-15

Division 01, page 15

This simplifies cross-referencing and enables the subject to be found easily.

NOTE: Page numbers will be consecutive within each sub-section. A void of page numbers may be used between these sub-sections in order to provide space for future amendments and also to indicate the beginning/end of adjustments and also to indicate the beginning/end of adjacent sub-sections.

Special Tools

Where the use of a special tool is specified in an operation, the tool will be called out.

The use of the special tools mentioned in the text contributes to a safe, efficient and profitable repair. Some operations are impracticable without their use.

Make certain proper tools are available when starting the job.

Repair and Replacements

When service parts are required, it is essential that only genuine AGCO / Challenger / Massey Ferguson replacements are used.

- Attention is particularly drawn to the following points concerning repairs and the fitting of replacement parts accessories:
- Safety features embodied in the tractor may be impaired if other than genuine parts are fitted.
- In certain territories, legislation prohibits the fitting of parts not to the tractor manufacturer's specification.
- Torque wrench setting figures given in the Workshop manual must be strictly adhered to.
- Locking devices where specified must be fitted. If the efficiency of a locking device is impaired during removal it must be renewed.
- The tractor warranty may be invalidated by the fitting of other than genuine AGCO / Challenger / Massey Ferguson parts. All replacements have the full backing of the manufacturers warranty. AGCO / Challenger / Massey Ferguson Distributors and Dealers are obliged to supply only genuine service parts.

Repair Time Schedule

The operation listed in the Repair Time Schedule refer to those described in this manual. The time set against each operation in the schedule is established by performing the actual operation standard machines using special tools where applicable. The Repair Time Schedule for use with this manual is issued as a separate publication.

NOTE: Repair Time Schedules are issued to Challenger / Massey Ferguson Distributors and Dealers only and are not for general publication.

Introduction

Amendments

Under normal conditions, revised pages issued carry the same number as the existing pages requiring amendment. The new pages are inserted in place of the existing ones. The old pages should then be discarded.

In some cases additional pages or completely new sections may be issued. These pages are to be inserted immediately following the page carrying the next lowest page number, or section number as appropriate.

Where new pages are required to be positioned between existing pages, the new page numbers will contain a suffix letter.

Example New Page Number: 07-16a.

This page is inserted after existing page number 07-16 and before page number 07-17. Correspondingly a further new page numbered 07-16b would be positioned after 07-16a.

NOTE: Service bulletins and Amendments Sheets are issued to the AGCO Distributors and Dealers only and are not for general publication.

SAFETY PRECAUTIONS

SAFETY PRECAUTIONS

- Make sure that all persons are in a safe position before starting the engine, or operating ANY of the controls.
- Always stop the engine before leaving the operator's platform.
- Wait for all moving parts to stop COMPLETELY before starting any work on the tractor.
- Before starting service procedures, attached equipment should be resting on the ground and all hydraulic control levers operated back and forth several times with engine stopped.
- If it becomes necessary to go under raised attachment (i.e.: to perform adjustments, etc.), safety stands must be used to support the attachment.
- Make sure the battery ground cable is disconnected before working on or near the electrical system of electrical system components.
- Keep hands, feet and clothing a safe distance away from moving belts, pulleys and other moving parts. Make sure all safety shields are installed.
- Be extra careful when performing any checks, inspections, adjustments or tests that require operating the engine, the hydraulic controls, OR with the machine in motion.
- Make sure dependable jacks of adequate lifting capacity AND suitable stands (or wooden blocking) are used to securely block up the machine when removing any of the wheels or axles.
- Before any attempt is made to disconnect or remove any hydraulic component, make sure the hydraulic pressure within the system is relieved and the engine is stopped.
- Carry out the repair procedures in a "common sense" manner. Safety procedures cannot be overemphasized when working on, or around machinery, especially when working on engine driven and /or hydraulically actuated equipment.
- Safety also depends upon the skill of the serviceman in the use of tools and other shop equipment while performing the recommended service procedures.
- Exercise extreme caution when testing hydraulic or fuel system components as fluid ejected under high pressure can easily penetrate skin causing serious infection.
- When it is necessary to remove hoods, shields, ROPS, etc. to conduct repair operation, all items must be reinstalled to unit and secured in original fashion.
- Do not bend, drill holes, or weld on the ROPS structure, if the ROPS is damaged in any way it must be replaced.
- Personal injury may result if these precautions are not followed.
- Look for this symbol to point out important safety precautions. It means: ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED.

Safety Precautions

NOTES

TRACTOR IDENTIFICATION

TRACTOR IDENTIFICATION

Model / Serial Numbers

Each tractor is identified by means of Tractor model and serial numbers. As a further identification, engine and chassis are provided with identification numbers.

To assist the parts department in ordering parts, list the tractor model and serial numbers on the parts order form.

FIGS. 1–3: Tractor identification plate (1) located below operator's seat on left-hand side of vertical floor panel. Contains model number, machine series number and weight in addition to Tractor serial number.

Tractor Model	M.S.N.

Tractor Serial Number

Engine Model Number

Engine Serial Number

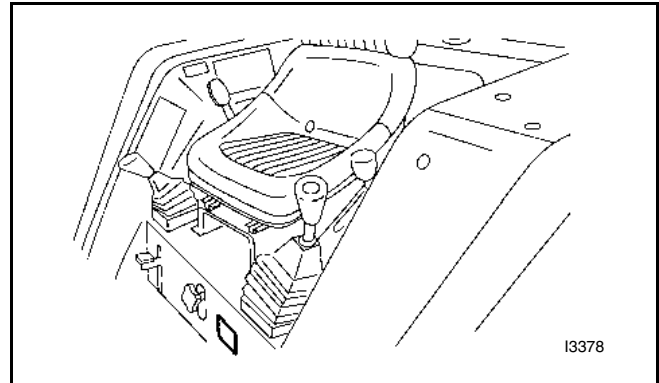


FIG. 1

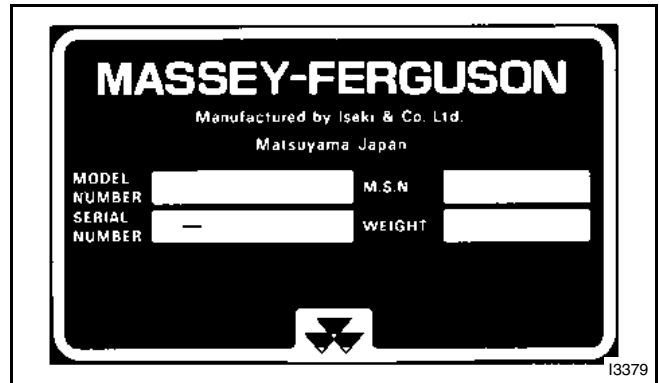


FIG. 2

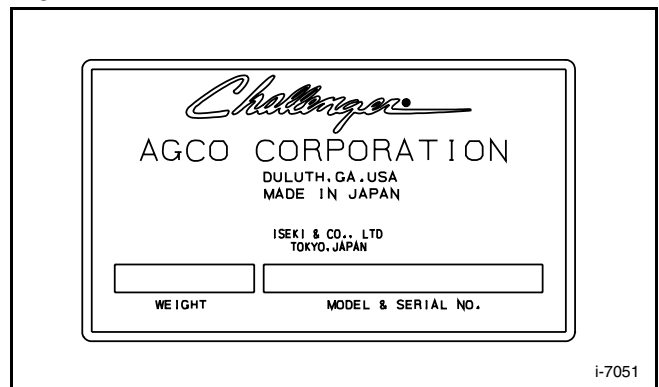


FIG. 3

Tractor Identification

FIG. 4: Engine model number (1) is cast on left side of engine block, below the injection pump.

Engine serial number (2) is stamped into cylinder block, above engine model number.

Chassis Number

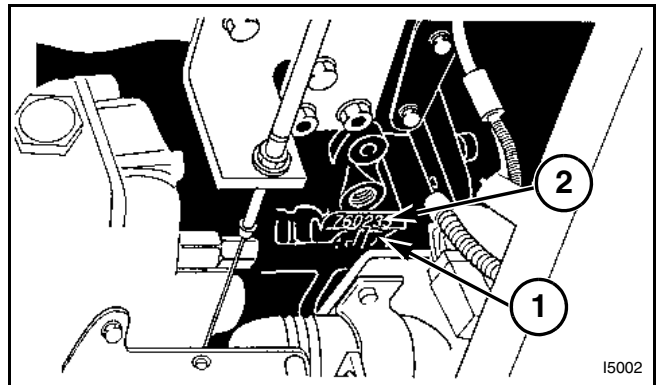


FIG. 4

FIG. 5: Chassis number (1) is stamped in right side of front frame.

NOTE: Reference to left-hand and right hand, uses throughout this book, refers to the position when seated in operator's seat and facing forwards.

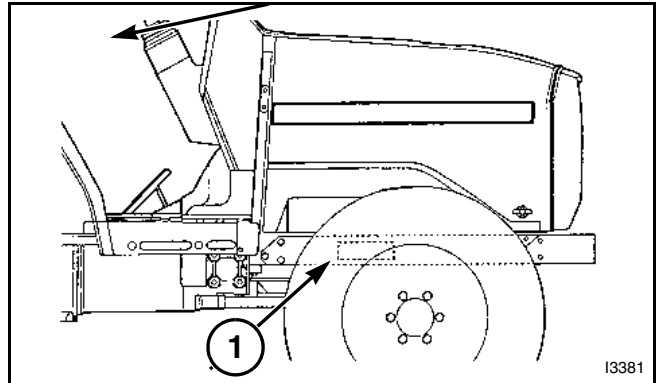


FIG. 5

TORQUE CHARTS

SPECIAL TORQUES

Description	Bolt and Nut (Hardness)	Torque Nm (ft.-lbs.)
Front Axle - 4WD		
Axle bracket - engine bolt torque	M14 (7T)	127-147 (94-109)
Front pivot casting (support) - bolt torque	M12 (7T)	88-108 (65-80)
Rear pivot casting (support) - bolt torque	M18 (7T)	119-136 (88-101)
Front axle final drive - bolt torque	M12 (7T)	88-108 (65-80)
Bearing cover - bolt torque	M8 (7T)	24-33 (18-25)
Wheel shaft cover - bolt torque	M10 (7T)	54-69 (40-51)
Front wheel - bolt torque	M16 (7T)	157-176 (116-130)
Bevel gear case - bolt torque	M8	12-17 (9-13)
Differential Support - bolt torque	M8	12-17 (9-13)
Rear gear - differential support-bolt torque	M8	12-17 (9-13)
Bevel pinion lock nut	See torque procedure - chapter 6A	
Transmission		
Front transmission to engine bolts nuts	M12 (7T)	88-108 (65-80)
Front transmission to spacer transmission - bolts and nuts	M12 (7T)	88-108 (65-80)
Spacer transmission to differential housing - bolt and nuts	M12 (7T)	88-108 (65-80)
Input housing - bolts and nuts	M12 (7T)	88-108 (65-80)
Drive pinion housing - bolts	M10 (7T)	54-69 (40-51)
Drive pinion nut	See torque procedure - chapter 5A	
Differential case - bolts	M12	48-68 (36-51)
Differential case - ring gear nuts	M10 (7T)	54-69 (40-51)
Rear Axle		
Rear axle to differeintal housing bolts	M10 (7T)	54-69 (40-51)
Brake housing - bolts	M10 (7T)	54-69 (40-51)
Rear wheel - bolts and nuts	M22	363-382 (268-282)
Cylinder Cover and Other		
Hydraulic cylinder cover to differential housing bolts and nuts	M10 (7T)	54-69 (40-51)
Hydraulic cylinder head bolts	M12 (7T)	88-108 (65-80)
Hydraulic control valve bolts	M8	12-17 (9-13)
Lower link bracket bolts and nuts	M14	69-78 (51-58)

Torque Charts

STANDARD TORQUE CHART

Torque Chart for Metric Fasteners (Zinc Coated)						
Nominal Size In mm	Strength Class ISO 4.6 (4T)		Strength Class ISO 8.8 (7T)		Strength Class ISO 10.9 (9T)	
	Torque Nm (lbf-ft)		Torque Nm (lbf-ft)		Torque Nm (lbf-ft)	
	Min.	Max.	Min.	Max.	Min.	Max.
M3	0.5 (0.3)	0.7 (0.5)	1.3 (0.9)	1.7 (1.3)	1.8 (1.3)	2.4 (1.8)
M4	1.2 (0.9)	1.6 (1.2)	3.1 (2.3)	4.1 (3.0)	4.3 (3.2)	5.7 (4.2)
M5	2.2 (1.6)	3.0 (2.2)	6.0 (4.4)	8.0 (5.9)	8.5 (6.3)	11.5 (8.5)
M6	4.2 (2.9)	5.0 (3.7)	10 (7.4)	14 (10.3)	14 (10.3)	20 (14.8)
M8	9.5 (7.0)	12.5 (9.2)	25 (18.4)	35 (26)	36 (26)	46 (34)
M10	19 (14)	25 (18)	50 (37)	70 (52)	72 (53)	96 (71)
M12	33 (24)	43 (32)	90 (66)	120 (89)	120 (89)	160 (118)
M20	160 (118)	210 (155)	420 (310)	560 (413)	600 (443)	800 (590)
M24	280 (207)	360 (266)	720 (531)	860 (634)	1000 (738)	1300 (959)
M30	540 (398)	720 (531)	1400 (1033)	1800 (1328)	2100 (1549)	2800 (2065)
M36	950 (700)	1250 (922)	2500 (1844)	3300 (2434)	3600 (2655)	4800 (3540)

Torque Chart for Inch Fasteners (Zinc Coated)						
Nominal Size	Strength Class - Below SAE5 (plain head)		Strength Class SAE 5		Strength Class in inches SAE 8	
	Torque Nm (lbf-ft)		Torque Nm (lbf-ft)		Torque Nm (lbf-ft)	
	Min.	Max.	Min.	Max.	Min.	Max.
1/4	6.8 (5)	8.1 (6)	10.8 (8)	15 (11)	16.2 (12)	21.7 (16)
5/16	13.5 (10)	16.2 (12)	22 (16)	30 (22)	31 (23)	42 (31)
3/8	24 (18)	28 (21)	39 (29)	53 (39)	56 (41)	75 (55)
7/16	41 (30)	46 (34)	64 (47)	85 (63)	91 (67)	121 (89)
1/2	61 (45)	70 (52)	99 (73)	131 (97)	140 (103)	185 (137)
5/8	122 (90)	142 (105)	198 (146)	263 (194)	279 (206)	371 (274)
3/4	217 (160)	250 (185)	350 (258)	464 (342)	495 (365)	658 (485)
7/8	--	--	569 (420)	800 (759)	800 (590)	1071 (790)
1	--	--	847 (635)	1119 (825)	1200 (885)	1580 (1165)
1-1/8	--	--	1051 (775)	1390 (1025)	1681 (1240)	2224 (1640)
1-1/4	--	--	1491 (1033)	1966 (1450)	2386 (1760)	3159 (2330)
1-1/2	--	--	2576 (1900)	3390 (2500)	4121 (3040)	5437 (4010)

NOTE: Above torques are for "rigid" joints or joints meeting the following conditions:

- 1. Damage will not occur to jointed members of an assembly.*
- 2. It is desirable to use a higher clamping force.*
- 3. Fastener threads are not lubricated prior to assembly.*

The following conditions will require a torque value different than stated above:

- 1. Reduce torque required: non-parallel clamping surfaces, thick or highly compressible gaskets are used. Or when a higher torque may damage joined assemblies.*
- 2. Clip nuts, weld nuts, self-tapping hardware. Or any condition that causes reduced thread engagement will warrant a torque less than stated above.*
- 3. Special torque values, stated in this manual, must be strictly adhered to as stated in the specific operation.*

NOTE: A number of special torques are used in assembly of tractors. See list.

Torque Charts

NOTES

SPECIFICATIONS AND CAPACITIES

CAPACITIES

Engine Oil

Use appropriate SAE approved oil.

Capacity (Crankcase and Filter)..... 9.0 liters (9.5 US qts.)

Recommended Viscosity

25 Degrees Celsius (78 Degrees Fahrenheit) and above..... SAE 30W, 10W-30

0 to 25 Degrees Celsius (32 to 78 Degrees Fahrenheit)..... SAE 20W, 10W-30

Below 0 Degrees Celsius (32 Degrees Fahrenheit)..... SAE 10W, 10W-30

Recommended Change interval

Initial Oil and Filter Change 50 hours

Oil and Filter Change, Thereafter..... Every 100 hours

Engine Coolant

Freezing Protection (Original Factory Fill)..... -34 Degrees Celsius (-30 Degrees Fahrenheit)

Recommended Coolant 50/50 mixture ethylene glycol and water

System Capacity..... 9.5 liters (10.0 US qts.)

Fuel Tank

Capacity 48.0 liters (12.7 gals.)

Fuel Recommended, Above 4 Degrees Celsius (39 Degrees Fahrenheit) No. 2 or No. 2-D

Fuel Recommended, Below 4 Degrees Celsius (39 Degrees Fahrenheit) No. 1 or No. 1-D

Transmission & Differential Housing (Including Hydraulic System)

Capacity 35.0 liters (9.2 US gals.)

Lubricant Permatran 3 or 821XL

Change Interval First 50 hours, every 600 hours thereafter

Front Axle

Common Reservoir 8.5 liters (9.0 US qts.)

Lubricant Permatran 3 or 821XL

Change Interval First 50 hours, every 600 hours thereafter

Grease Fittings

Grease Interval (All Fittings)..... Every 50 hours

Grease Lithium base grease No. 2

SPECIFICATIONS

Engine

Make..... Iseki Diesel

Model E4

Specifications and Capacities

Type.....	Indirect injection, overhead valve
Aspiration	Natural
Displacement	2835 cc (173 cu. in.)
4 Cylinders	
Bore.....	95 mm (3.740 in)
Stroke.....	100 mm (3.937 in)
Engine Horsepower at 2500 rpm	
Gross.....	41 kw (55 hp)
Net.....	39 kw (52 hp)
PTO Horsepower at 577 PTO rpm.....	34 kw (45.6 hp)
Firing Order.....	1-3-4-2
Compression Ratio.....	20.8 to 1
Low Idle Speed	950 rpm
High Idle Speed	2750 rpm
Valve Clearance Cold	
Intake.....	.35 mm (.014 in)
Exhaust	.35 mm (.014 in)
Air Cleaner	Dual stage, dry element
Engine Cooling	Liquid, forced circulation
Cold Starting Aid.....	Glow Plugs (4)

Transmission

Type	
Primary.....	4-speed fully synchronized, constant mesh
Range.....	4-speed constant mesh
Shuttle	
Power Shuttle.....	Electro-hydraulic control with multi-plate wet disc, 95% reverse reduction
Gear Speeds.....	16 forward gears, 16 reverse gears
Clutch	Split torque, single stage dry with disc 275 mm (10.8 in)
Brakes	Mechanically actuated sealed wet disc

Power Take-Off (PTO)

Type.....	Independent, engine driven
Control.....	Electro-hydraulic control
Clutch	Hydraulically engaged, multi-plate wet disc
Rear PTO; Shaft six spline	35 mm (1.375 in)
Output	Clockwise rotation
Engine Speed at 540 PTO rpm.....	2340 rpm

Hydraulics

Hydrostatic Steering System	
Pump.....	Engine mounted gear pump
Maximum Output	22.4 l/min (5.9 US gals/min)

Specifications and Capacities

Pressure..... 11,797 kPa (1711 PSI)

Main Hydraulic System

Pump..... Engine-mounted gear pump

Maximum Output 43.2 l/min (11.4 US gal/min)

Pressure..... Relief valve setting 15,692 kPa (2276 psi)

Rear Linkage

Type..... Three-point hitch

Size Category 1

Control..... Position and draft control

Draft Control..... Top link sensing

Lift Capacity at Ball End 1400 kg (3083 lbs)

Lift Capacity at 61 cm (24 in) Ball Ends..... 1180 kg (2600 lbs)

Electrical System

System Voltage 12 volt, negative (-) ground

Battery cca at -18 degrees Celsius (0 degrees Fahrenheit) 781 cca

Charging..... 45 amp alternator with internal regulator/rectifier

Specifications and Capacities

WHEELS AND TIRES

Examine wheels and tires periodically for correct inflation pressures, tight wheel bolts, and any physical damage that may be a detriment to tractor operation and operator safety. Correct condition prior to tractor operation.

Tire Inflation Pressures

Maintaining correct tire pressure will help insure tire long life. If tires have deep scratches, cuts or punctures, the respective tire should be repaired or replaced by qualified personnel as soon as possible.

IMPORTANT: If necessary to replace any tire(s), ensure original tire size is used. This is particularly true on 4WD models to ensure correct amount of front axle overspeed (or lead) is maintained.

Type Tires	Tire Location / Size		Pressure PSI (KPA)
Ag	Front	9.5-16 - 6PR	31 (216)
Ag	Rear	13.6-28 - 6PR	20 (137)
Ag	Front	35 x 12.0 - 16.5	25 (174)
Ag	Rear	14.9 - 28 - 6PR	16 (111)
Turf	Front	29 x 12.00-15 - 4PR	23 (157)
Turf	Rear	475/65D - 20 - 4PR	11 (78)
Industrial R4	Front	10 x 16.5	30 (209)
Industrial R4	Rear	17.5L - 24	20 (137)

Wheel Bolt Torque

FIG. 6: Periodically check all wheel bolt torques. Correct bolt torques:

1	Front Wheel Bolts	120 ft/lbs (163 Nm)
2	Rear Wheel Bolts	120 ft/lbs (163 Nm)
3	Rear Wheel Center to Rim Bolts (Ag. Tires Only)	120 ft/lbs (163 Nm)



CAUTION: Correct wheel bolt torque must be maintained. Installation of front mounted implements (ex; loaders) impose increased loads and require frequent checking of wheel bolts.

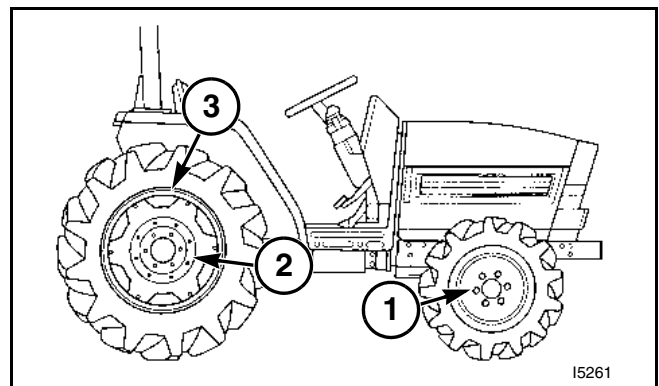


FIG. 6

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Front Wheel Alignment

FIG. 7: Correct toe-in dimension of front wheels (A minus B) is 0.08 to 0.24 in (2-6 mm).

NOTE: Measure toe-in from the tire center to tire center at a point halfway up on face of each tire.

To adjust, remove clip securing rubber boot to tie rod (3). Loosen lock nut (2), and rotate the tie rod (3) to adjust. Tie roll ball joints (1) should freely rotate in cylinder ends. Adjust each side evenly. Ball joints must move freely after lock nuts are tightened.

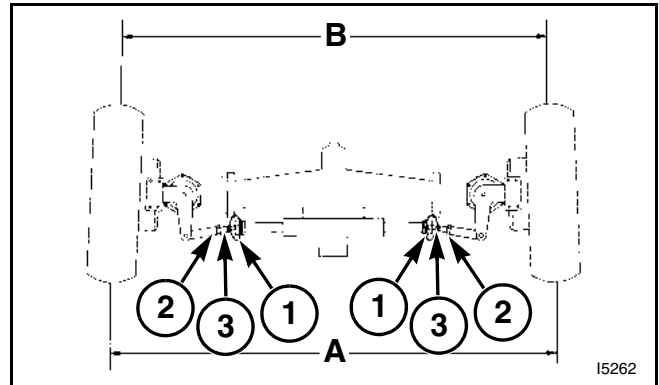
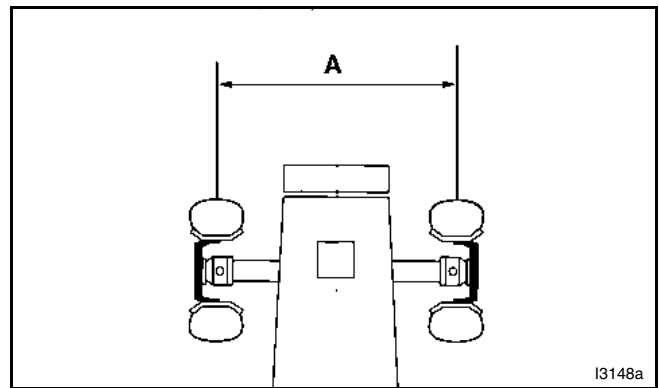
Wheel Spacing

Tread widths may be varied by using the following methods, as applicable. Tread widths are measured tire center to tire center as close to the ground as possible.

NOTE: Make certain desired settings are compatible with implements to be used to prevent clearance and interference problems.

FIG. 8: Front wheels - Due to design, agricultural tires or turf tires can not be reversed.

Ref.	Tires	Settings
A (4WD)	9.5 - 16 Ag	51.8" (1315 mm)
A (4WD)	35 x 12.00 - 16.5	54.5" (1384 mm)
A (4WD)	Turf	53.0" (1345 mm)
A (4WD)	R4	52.5" (1334 mm)

**FIG. 7****FIG. 8**

Specifications and Capacities

Agricultural-Type Rear Wheels

Four different rear tread width settings may be achieved by reversing wheel centers, switching rear tires and wheels from side to side, and/or by repositioning wheel rim on the wheel center.

NOTE: *Agricultural lug-type tires must always be installed so when viewed from the rear, the V pattern of the tread points upward.*

FIG. 9: To adjust rear tread width, jack Tractor sufficiently and securely block in raised position.

To change rim offset - Remove rim (2) from wheel center (1). Rotate wheel center slightly (so rim brackets can move past outer edge of wheel center) and reposition rim on opposite side of wheel center.

Repeat procedure with remaining side.

To reverse entire wheel and tire assembly - Raise both rear tires of Tractor. Remove bolts securing both rear wheel assemblies to rear axle hubs and switch wheel assemblies to opposite sides of Tractor.



CAUTION: Rear wheels are heavy. Use care when moving. Make sure Tractor is blocked securely.

Tighten all wheel bolts securely and recheck after short period of operation.

FIG. 10: Agricultural rear tire settings.

Ref.	Tires	13.6-28 Setting	14.9-28 Setting
1	Ag	45.7" (1160 mm)	
2	Ag	50.0" (1270 mm)	
3	Ag	53.5" (1360 mm)	57.5" (1460 mm)
4	Ag	57.9" (1470 mm)	62.0" (1575 mm)

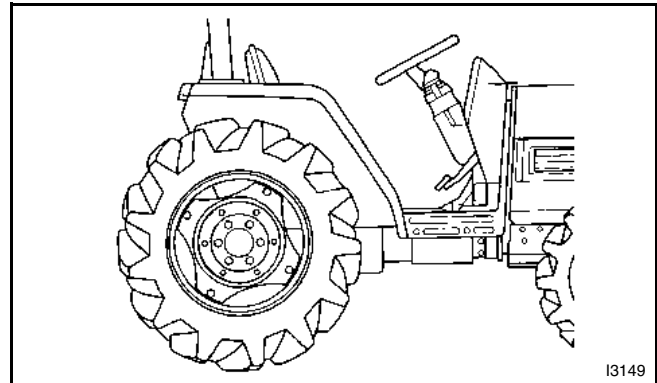


FIG. 9

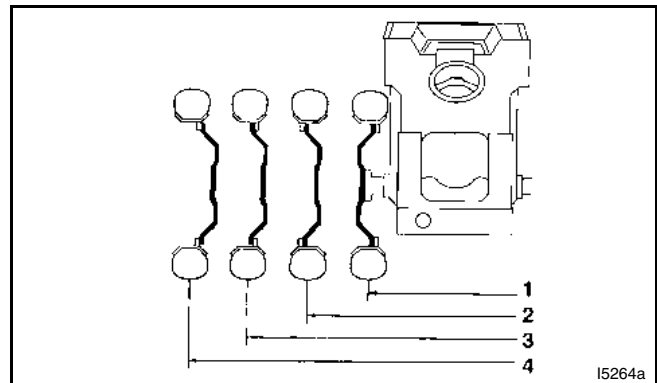


FIG. 10

FIG. 11: Turf and R4 rear tire settings for 4WD Tractors:

Ref.	Tires	Settings
A	Turf	53.7" (1365 mm)
A	R4	52.9" (1344 mm)

IMPORTANT: *Rear turf and R4 wheels cannot be reversed to (dished in) position. The valve stem will interfere and may be cut off.*

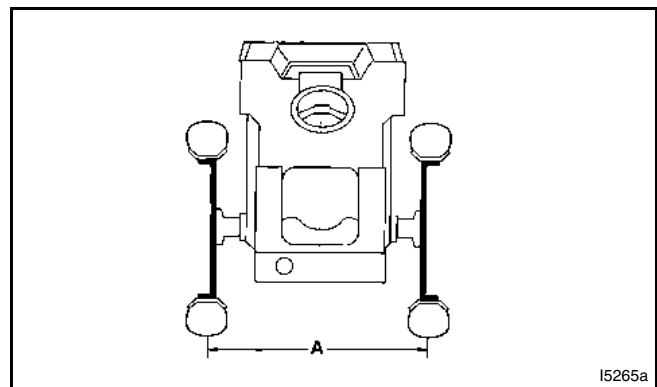


FIG. 11

TRANSMISSION SPEEDS

Shift Positions		MPH	KPH	MPH	KPH
Range	Gear				
Tire		Agri		Turf	
Forward					
	1	0.45	0.73	0.37	0.60
	2	0.55	0.89	0.46	0.74
	3	0.63	1.02	0.52	0.84
	4	0.89	1.44	0.74	1.19
	1	1.36	2.19	1.12	1.81
	2	1.67	2.69	1.38	2.22
	3	1.92	3.09	1.58	2.55
	4	2.70	4.34	2.22	3.58
1 	1	3.73	6.00	3.08	4.95
	2	4.59	7.39	3.78	6.09
	3	5.26	8.46	4.34	6.98
	4	7.39	11.90	6.10	9.82
2 	1	9.54	15.36	7.87	12.67
	2	11.74	18.90	9.69	15.59
	3	13.45	21.65	11.10	17.86
	4	18.93	30.46	15.62	25.13
Reverse					
	1	0.43	0.69	0.35	0.57
	2	0.52	0.84	0.43	0.70
	3	0.60	0.97	0.50	0.80
	4	0.85	1.36	0.70	1.12
	1	1.29	2.07	1.06	1.71
	2	1.58	2.55	1.30	2.10
	3	1.81	2.92	1.50	2.41
	4	2.55	4.10	2.11	3.39
1 	1	3.52	5.67	2.91	4.68
	2	4.34	6.98	3.58	5.76
	3	4.97	8.00	4.10	6.60
	4	6.99	11.25	5.77	9.28
2 	1	9.02	14.52	7.44	11.97
	2	11.10	17.86	9.15	14.73
	3	12.71	20.46	10.49	16.88
	4	17.89	28.79	14.76	23.75

Specifications and Capacities

Arrangement of gears with appropriate ground speeds, in order from slow to fast, are shown in the chart.

NOTE: Ground speed indicated for at 2500 engine rpm with 14.9-28 agricultural type rear tires and 475/65D-20 turf rear tires. Ground speed with R4 (industrial tread) tires will vary slightly.

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Challenger®

MT297

Compact Tractor - Power Shuttle

SERVICE MANUAL

79028569 A Rev.

02 - Major Components

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GENERAL PRECAUTIONS

GENERAL PRECAUTIONS FOR SEPARATION AND INSTALLATION

Before Operation

- Always be safety-conscious in selecting clothes to wear and suitable tools to use.
- Before disassembly, be sure that you familiarize yourself with the assembled condition for subsequent reference in reassembly.
- Keep parts and tools in proper order during operation.
- When servicing electrically charged parts, be sure to disconnect the negative battery terminal.
- To prevent oil or water leaks, use liquid gasket as required.
- When reassembling disassembled parts, discard used gasket, O-rings, or oil seals and install new ones.
- When lifting up only the front or rear part of the tractor, be sure to wedge the grounded wheels.
- When the tractor is jacked up, be sure to support the entire tractor with something like a stand. Lifting it up with a jack only, is a dangerously unstable procedure.
- When replacing parts, use authorized, genuine AGCO / Challenger / Massey Ferguson parts only. AGCO assumes no responsibility for accidents, operating problems or damaged caused by the use of imitation parts. Also, the use of unauthorized parts will result in relatively poor machine performance.

PRECAUTIONS TO BE FOLLOWED WHEN INSTALLING STANDARDIZED PARTS

Roller or Ball Bearings

- When a bearing is installed in a housing by the outer race, use an installer, which is specially designed to push only the outer race and vice versa.
- The installer must be designed to install the bearing on the shaft in a parallel position
- When installing a bearing which appears the same on both sides, install it so that the face which has the identification number faces in a direction for easy visual identification. All the bearings which are to be installed in the transmission case should be placed so that their identification number faces outward.
- If a shaft or a hole where a bearing is to be installed has an inner seat the bearing should be pushed in completely until it is seated.
- Installed bearing should turn smoothly.

Oil Seals

- Oil seal installer should be used so as not to deform the oil seals.
- During installation, be careful not to damage the lips, and assure that it is pushed in parallel to the shaft or hole.
- When oil seals are installed, there should be no turnover of the lips nor dislocation of the springs.
- When a multi-lip seal is installed, the grooves between lips should be filled with grease.
- Use a lithium-based grease.
- There should not be oil or water leaks past new seals.

O-Rings

- O-rings should be coated with grease before installing.
- Installed O-rings should have no slack or twist.
- Installed O-rings should maintain proper tightness.

Snap Rings

- Snap ring installers should be designed so as not to permanently deform the snap rings.
- Installed snap rings should be seated securely in the groove.
- Be careful not to overload the snap ring to the extent that it is permanently deformed.

General Precautions

FIG. 1: How to install the snap ring:

When installing a snap ring (1) install it as shown with its round edge (2) turned toward the part to be retained. This round edge is formed when the snap ring is pressed out.

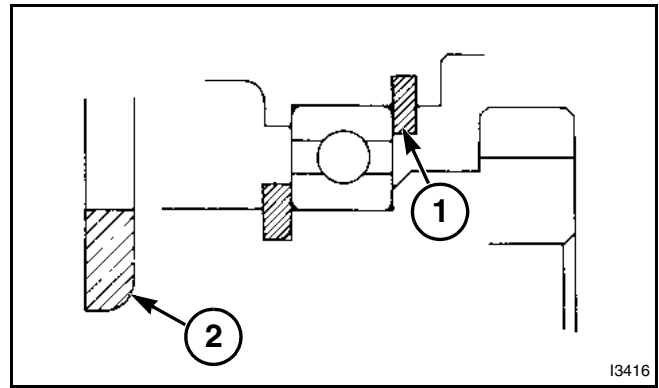


FIG. 1

Spring (Roll) Pin

FIG. 2: Spring pins should fit tightly.

Spring pins should be installed so that their seams face the direction from which the load is applied.

The roll pins installed in the transmission or other parts where much force is applied should be retained with wire.

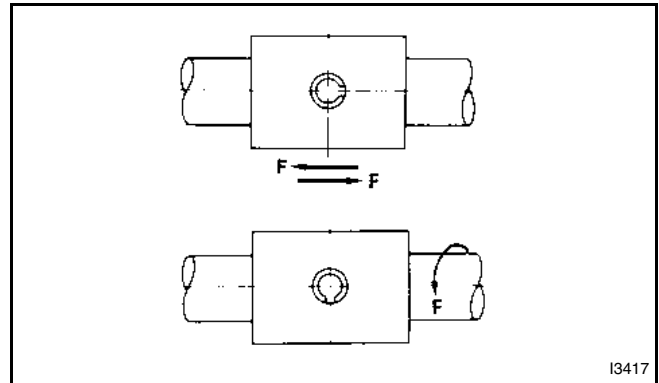


FIG. 2

Cotter Pins

FIG. 3: When installed, cotter pins should be bent securely at the ends as shown in the figure.

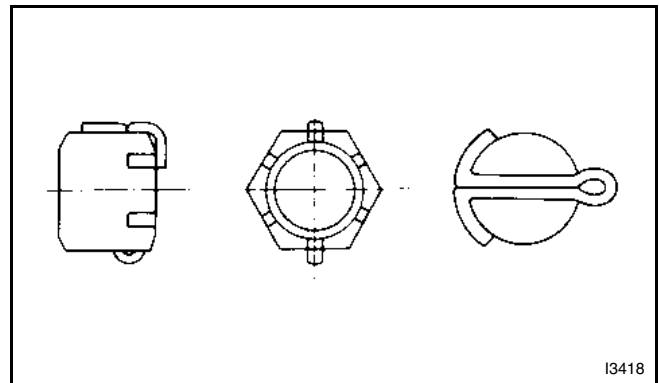


FIG. 3

Bolts and Nuts

Special bolts are installed at several locations, so be sure not to interchange them with other bolts.

Bolts and nuts should be tightened to their specified torques with a torque wrench.

When locking the bolts or nuts with wire pay particular attention to winding direction. To hold the bolt tight.

When locking the bolts or nuts with a tab lock washer. Bend the tab against the hex, to provide secure locking.

When locking bolts and nuts with an adhesive apply the adhesive on the thread and tighten securely.

Apply a sealant to parts which have any possibility of oil leaks, such as stud bolts and threaded holes.

Each lock nut must be tightened securely.

When tightening bolts and nuts, refer to the tightening torque table, in introduction section.

After installation, each grease fitting should be filled with grease.

When installing 45° or 90° grease fittings be sure to turn the fitting in a direction, that will provide easy access for a grease gun.

Other Precautions

Be sure not to damage any finished surfaces or parts.

Always refrain from forcing installation.

Each lever knob should be installed coated with an adhesive.

Each contact surface should be coated with an adhesive and tightened evenly with bolts. Adhesive coated surfaces should be installed within 30 minutes after application of the adhesive. The contact surfaces should be smooth, free from foreign matter, and especially from grease before application of the adhesive.

Precautions for Applying Adhesives

The surface or the thread where an adhesive is to be applied should be completely free of chips.

The surface or the thread where an adhesive is to be applied should be completely free of oil.

Component Sealant

The three bond TB 1215 sealant use at factory in place of gaskets, forms an excellent seal which is difficult to break loose when disassembling.

Use a hammer with a dull chisel against a raised edge of part being separated to start the separation.

General Precautions

NOTES

SEPARATION OF MAJOR COMPONENTS

SEPARATION OF MAJOR COMPONENTS

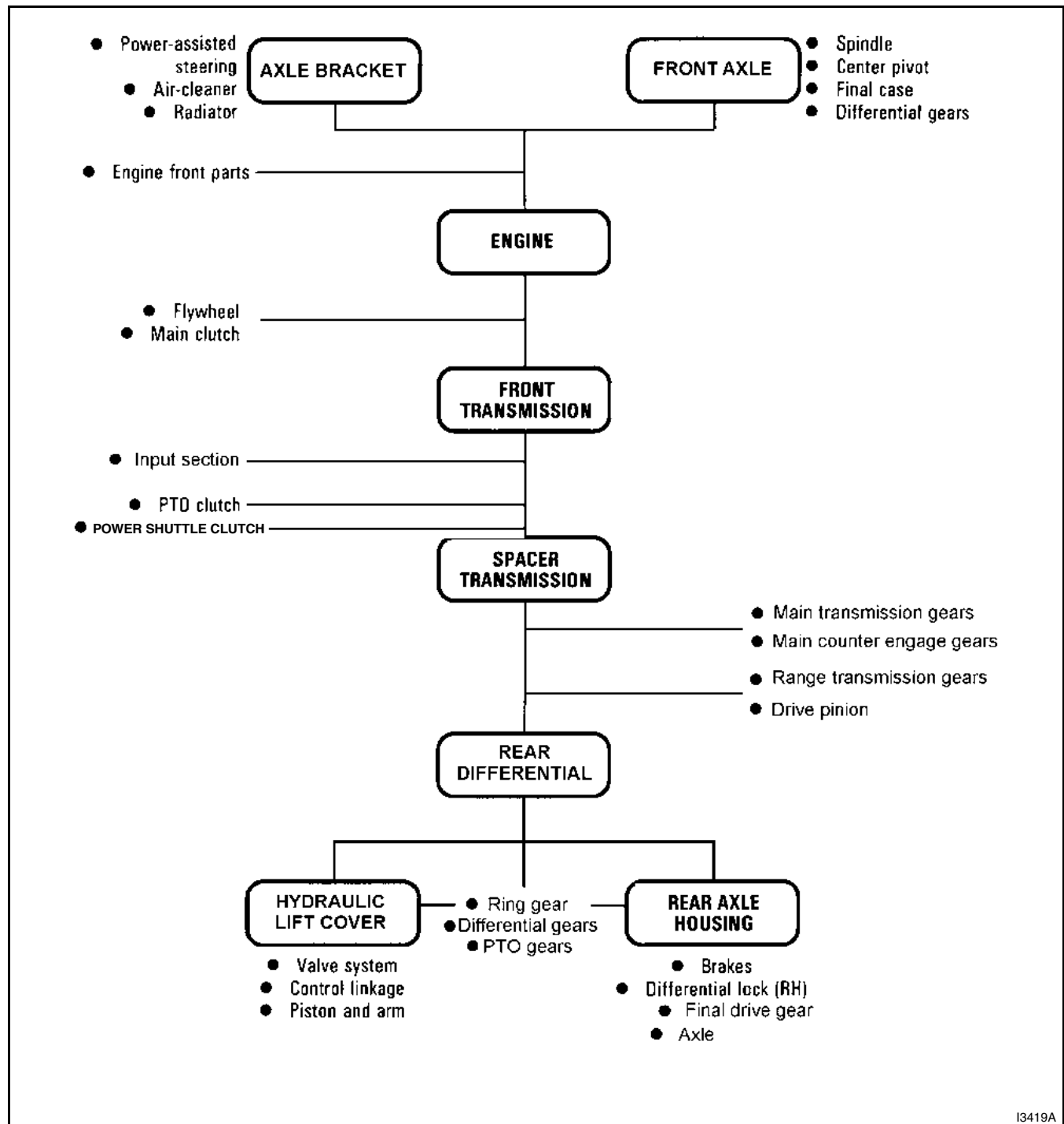


FIG. 4

FIG. 4: Operation chart for major separation.

FIG. 5: Four-wheel drive gear train

Separation Of Major Components

FRONT WHEEL DRIVE SHAFT (4WD)

FIGS. 6–7: Drive shaft component list.

1. Drive shaft
2. Snap ring
3. Coupling
4. Tube
5. Tube
6. O-ring
7. O-ring
8. Clamp
9. Clamp bolt
10. Bolt

Removal and Installation

Loosen clamp bolt (9) holding telescoping drive tubes.

Remove bolt (10).

Slide tubes (4) and (5) together to expose couplers (3) and snap rings (2).

Move snap rings in toward center of shaft.

Slide couplers (3) up shaft and remove shaft.

Reverse procedures to install drive shaft, making certain snap rings are located in groove.

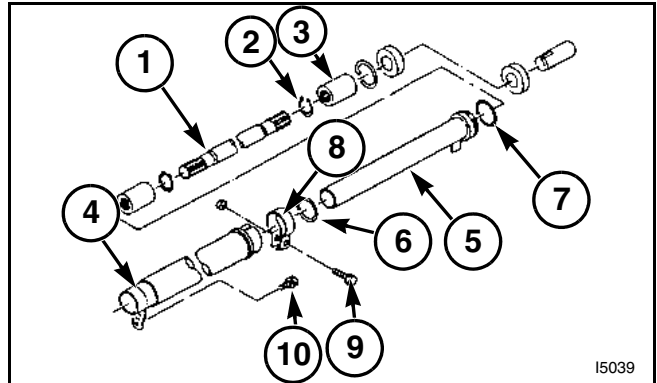


FIG. 6

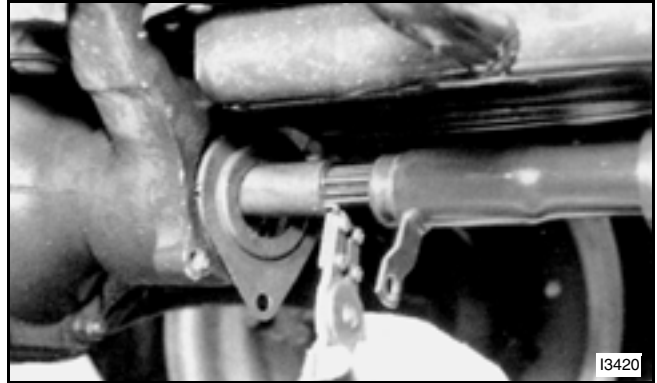


FIG. 7

Separation Of Major Components

FRONT AXLE AND FRONT AXLE BRACKET

Parts which can be inspected during this operation:

- Spindle
- Center Pivot
- Final Drive at Wheel
- Differential Gears

Removal

Remove front wheel drive shaft (4wd only).

Support front bracket or front bumper securely with a crane or stands.

FIG. 8: Support front axle with a jack.

Remove both right-hand and left-hand tie rod.

Support the steering cylinder to the front frame with a tie strap or rope.

Remove pivot casting bolts.

Move front axle assembly forward.

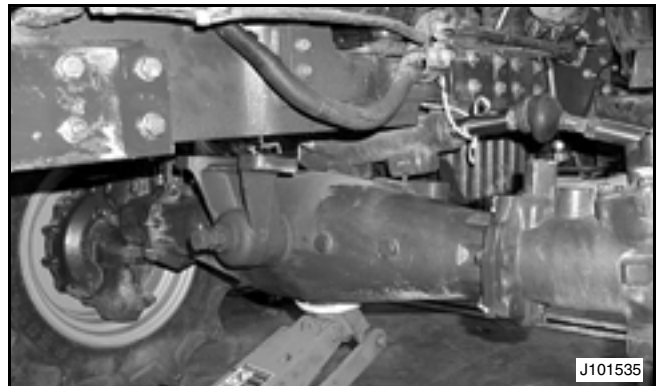


FIG. 8

Installation

Install front axle housing.

Install front pivot casting and steering cylinder. Steering cylinder bolt has fine threads, pivot bolt has coarse threads. Use loctite on pivot casting bolts.

NOTE: Apply grease to the bushing and fill the oil seal with grease ahead of time. Install the oil seal carefully to keep lips from turning over.

Install both right and left tie-rods.

Adjust axle end play as outlined in front axle chapter.

FIG. 9: Axle component list (4wd)

1. Front axle housing
2. Pivot casting (front)
3. Pivot casting (rear)

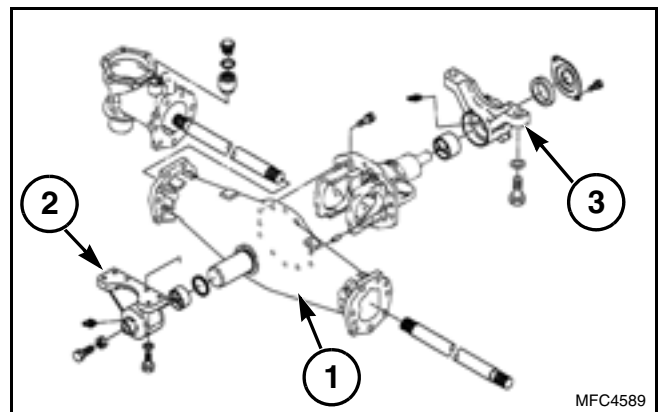


FIG. 9

FRONT FRAME SEPARATION FROM ENGINE

Parts which can be inspected during this operation:

- Air Cleaner
- Radiator
- Power-Assist Steering System
- Battery
- Engine Front Area

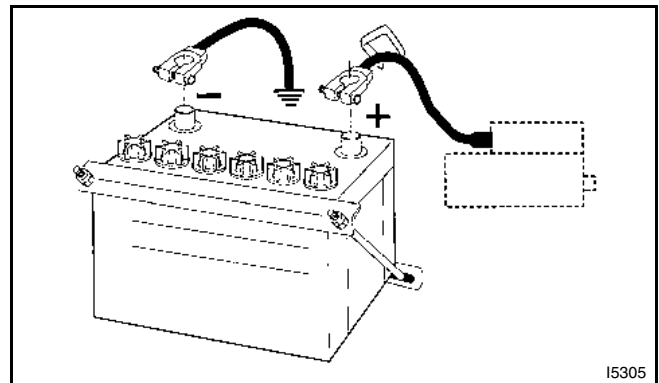
Removal

Remove front wheel drive shaft.

Hold or support engine with a crane or stands.

Support the front frame or axle bracket in a manner that a component other than engine can be removed if required.

FIG. 10: Disconnect positive and negative battery cables.



I5305

FIG. 10

FIG. 11: Open front grill. Remove side covers (RH and LH) and engine hood.



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FIG. 11

Separation Of Major Components

FIG. 12: Detach headlight wiring and remove front grille.

Remove the air cleaner assembly.

Drain coolant and remove radiator hoses.

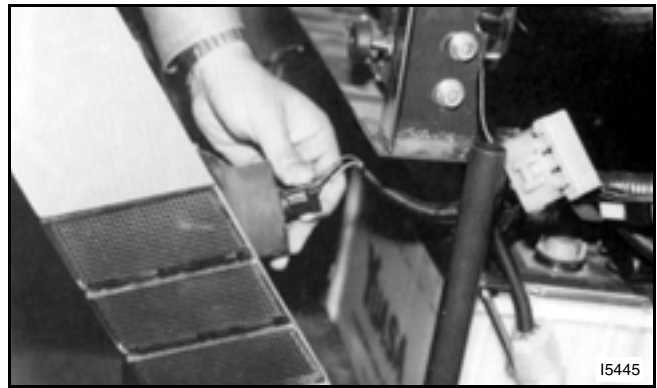


FIG. 12

FIG. 13: Remove front axle assembly as outlined in this chapter. Remove the lines to the steering cylinder. Cap off lines to prevent contamination.

NOTE: It is easier to separate front frame with front axle removed, but it is not required to remove the front axle.



FIG. 13

FIG. 14: Make match marks on steering shaft and universal joint located below the left hand side of the radiator to aid in assembly. Remove bolt from u-joint.



FIG. 14

FIG. 15: Remove power-steering unit (1).

Remove hardware securing front frame to engine and carefully remove frame.

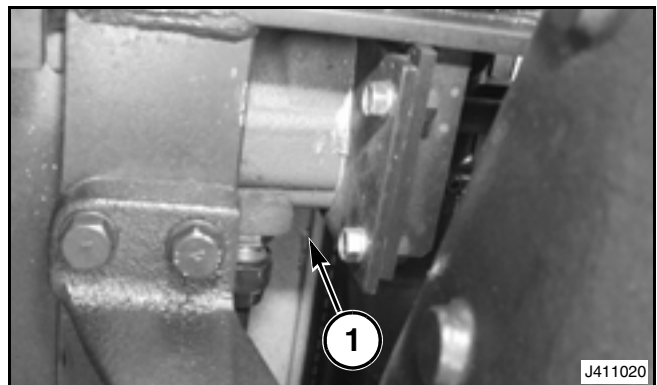


FIG. 15

Installation

Assemble in reverse order of removal.

Install front frame using loctite on hardware.

Install radiator hoses and replace coolant.

Install axle bracket on frame.

Connect oil lines to power steering system and install universal joint on steering shaft.

Connect wiring of headlights and other harness. Then install front grille.

Connect ground strap and battery cables.

Install engine hood.

Install side covers.

Separation Of Major Components

SPLITTING TRACTOR BETWEEN ENGINE AND FRONT TRANSMISSION

Parts which can be inspected during this operation:

- Flywheel
- Main Clutch
- Input Gears

Removal

Drain transmission oil.

FIG. 16: Remove front wheel drive shaft (4wd only).

Support engine on the bottom with a jack or stands.

Support transmission with a jack or a crane so that rear of tractor can be moved when needed.



FIG. 16

FIG. 17: Remove both side covers (RH and LH) engine and hood.



FIG. 17

FIG. 18: Disconnect negative battery cable.

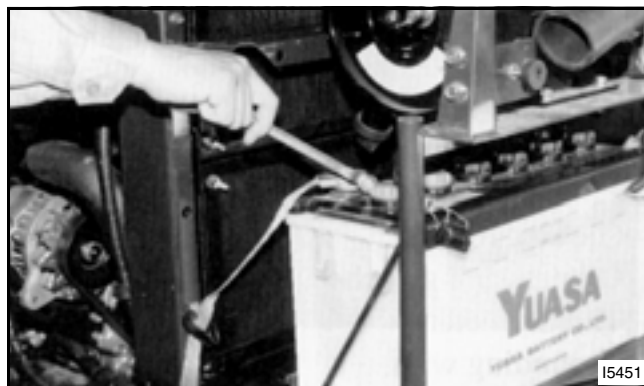


FIG. 18

Separation Of Major Components

FIG. 19: Remove instrument panel.



FIG. 19

FIG. 20: Remove steering column cover.

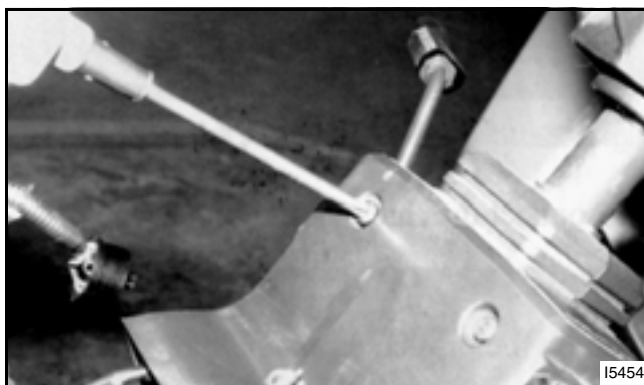


FIG. 20

FIG. 21: Remove the shroud around the instrument panel.

NOTE: When removing shroud, take care not to damage the panel brace and observe how the couplers pass through the upper part of the brace.



FIG. 21

FIG. 22: Remove both brake rods (RH and LH) by removing retaining pins from upper ends.



FIG. 22

Separation Of Major Components

FIG. 23: Remove clutch rod by removing retaining pin from its upper part or loosen the turnbuckle completely.

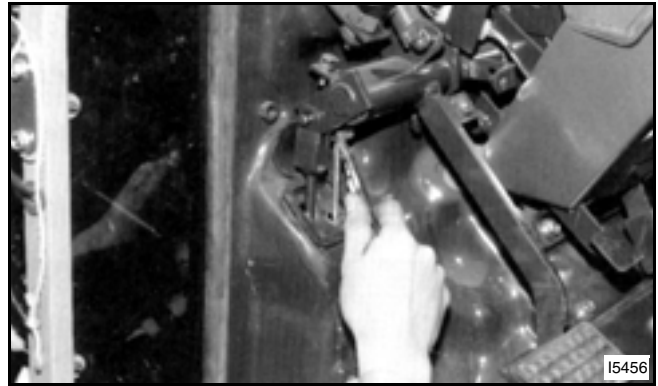


FIG. 23

FIG. 24: Remove hand throttle cable from injection pump.

Disconnect foot throttle cable from injection pump and accelerator pedal.

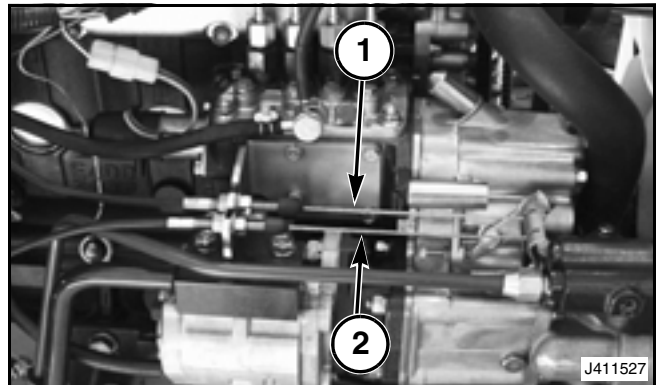


FIG. 24

Separation Of Major Components

FIGS. 25–26: Disconnect the wiring for the following parts and disconnect related couplers:

- Glow plugs
- Oil pressure switch
- Temperature gauge
- Grounding wire
- Slow Blow Fuses
- Fuel shut off solenoid
- Main harness



FIG. 25



FIG. 26

FIG. 27: Remove fuse holder.



FIG. 27

FIG. 28: Remove bolt from u-joint (1) of steering shaft assembly.

Make match marks on steering shaft and universal joint to aid in assembly.

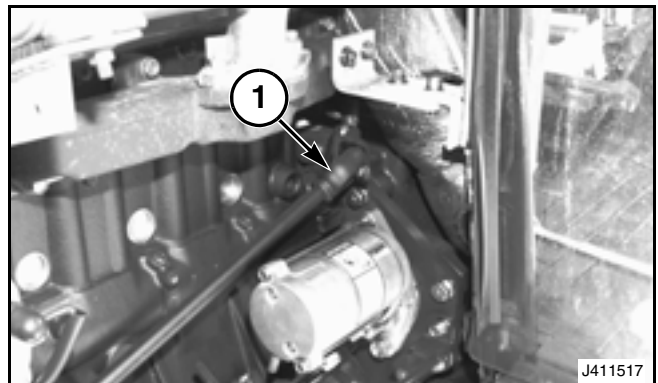


FIG. 28

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