WSM

WORKSHOP MANUAL
TRACTOR

M4500(A/AC),M5500(A/AC), M7500(A/AC)

Kubota

KiSC issued 07, 2016 A

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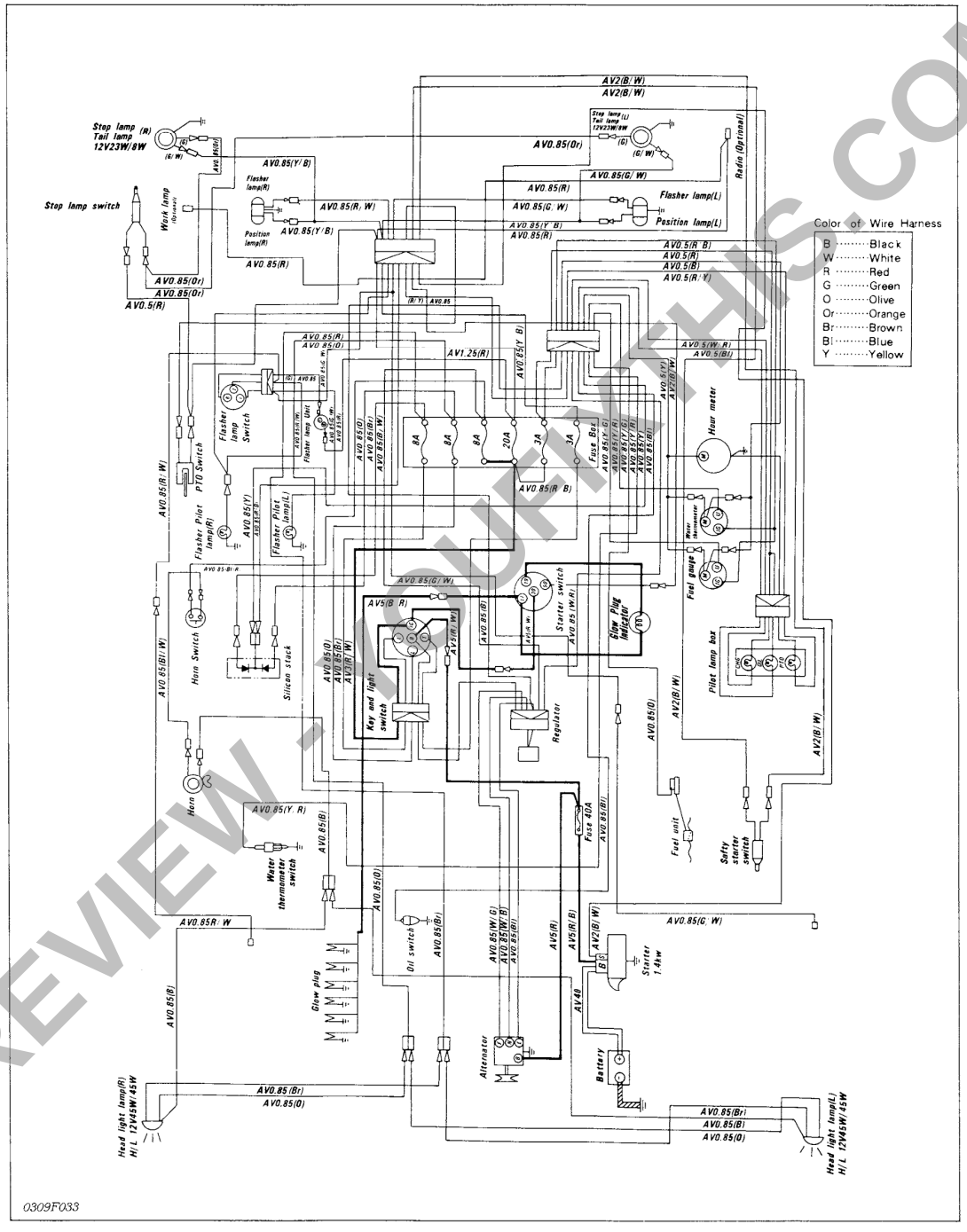
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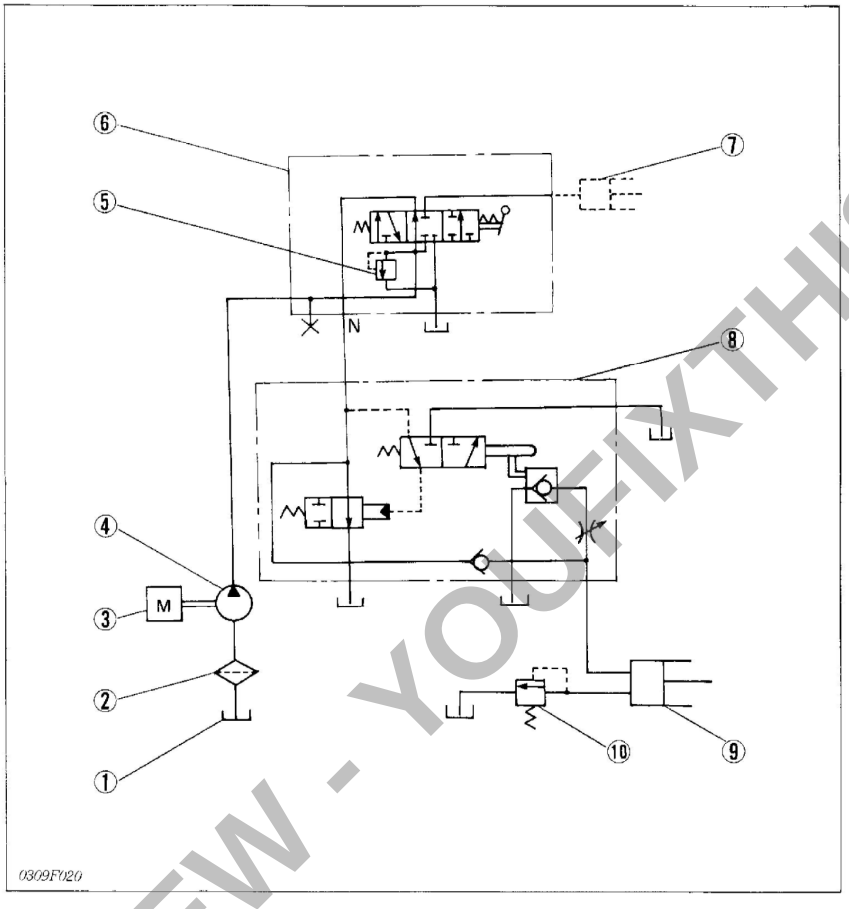
[2] WIRING DIAGRAM



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[1] HYDRAULIC CIRCUIT



(1) Oil Tank (Transmission Case)
(2) Oil Filter
(3) Engine
(4) Hydraulic Pump
(5) Relief Valve
(6) Auxiliary Control Valve
(7) Auxiliary Cylinder (Implement Side)
(8) Control Valve
(9) Hydraulic Cylinder
(10) Cylinder Safety Valve

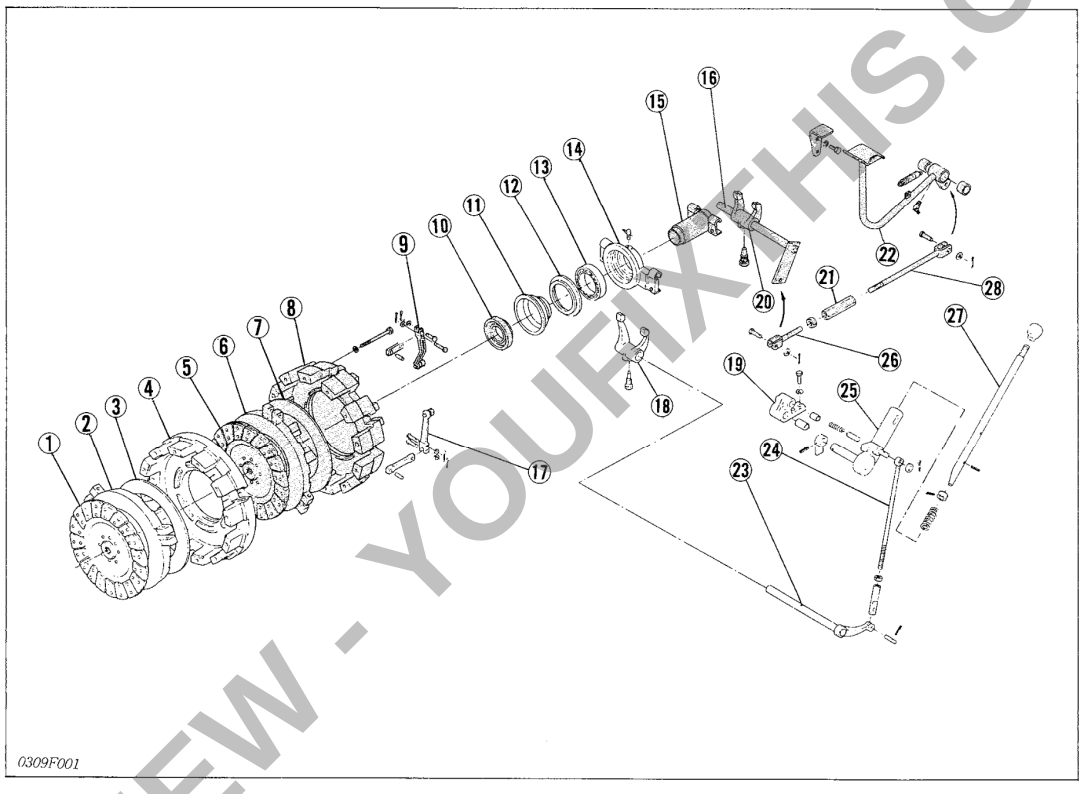
Hydraulic Oil Flow

1. When the engine is started, the hydraulic pump (4) rotates to suck oil from the transmission case (1) through the pipe.
2. When oil is sucked, it is filtered by the oil filter (2).
3. Filtered oil is forced out by the hydraulic pump to the auxiliary control valve (6) through the delivery pipe.
4. With the auxiliary control valve in neutral position, oil is sent from the "N" port to the control valve (8).
5. The control valve controls the direction of oil flow and oil is either sent to the hydraulic cylinder (9) or returns to the transmission case.
6. The hydraulic system has a relief valve (5) which restricts maximum pressure in the circuit. The hydraulic cylinder has a cylinder safety valve (10) to protect the hydraulic mechanism from impacts caused by the implement.

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1 CLUTCH

The clutch, located between the engine and the transmission, shuts off or transmits torque from the flywheel to the transmission.
Tractor models M4500(DT), M5500(DT) and M7500(DT) have the dry, single-plate type dual clutch that shuts off or transmits torque to the traveling and PTO systems. The two clutches can be operated independently of each other.



[PTO Clutch]

(1) Clutch Disc
(2) Pressure Plate
(3) Diaphragm Spring
(4) Clutch Cover
(11) Clutch Release Hub
(12) Release Bearing Cover
(13) Bearing
(14) Release Coupling
(17) Release Levers
(18) Release Fork
(19) Bracket
(23) PTO Lever Shaft
(24) PTO Rod
(25) Lever Guide
(27) Clutch Lever

[Traveling Clutch]

(5) Clutch Disc
(6) Pressure Plate
(7) Diaphragm Spring
(8) Clutch Cover
(9) Release Levers
(10) Clutch Release Bearing
(15) Release Hub
(16) Control Lever Shaft
(20) Release Fork
(21) Turnbuckle
(22) Clutch Pedal
(26) Clutch Rod 1
(28) Clutch Rod 2

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[4] TIGHTENING TORQUES

1) Tightening Torques for Important Bolts and Nuts

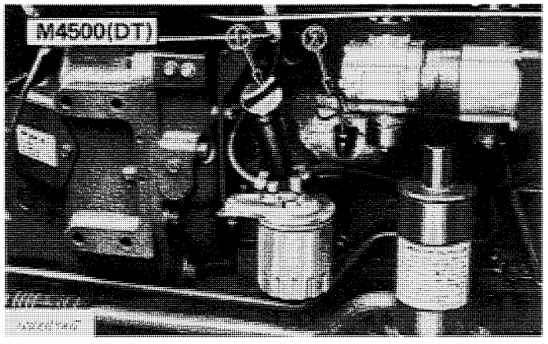
Section	Bolts and Nuts	Tightening Torque		
		N·m	kgf·m	ft-lbs
Clutch Housing	Engine mounting bolts	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
	Counter shaft staking nut	225.6 to 264.8	23.0 to 27.0	166.4 to 195.3
Transmission Case and Rear Cover	Transmission mounting bolts	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
	PTO shaft staking nut	225.6 to 264.8	23.0 to 27.0	166.4 to 195.3
	Creep shaft fork rod set bolt	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
	Spiral bevel pinion shaft staking nut	274.6 to 343.2	28.0 to 35.0	202.5 to 253.2
	Differential bevel gear mounting bolts	103.0 to 117.7	10.5 to 12.0	75.9 to 86.8
Brake and Rear Axle Case	Rear wheel mounting bolts	362.8 to 402.1	37.0 to 41.0	267.6 to 296.6
	Brake pedal mounting bolt	166.8 to 186.3	17.0 to 19.0	123.0 to 137.4
	Brake shaft support mounting bolts	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
	Rear axle case mounting bolts and nuts	123.6 to 147.1	12.6 to 15.0	91.1 to 108.5
	Brake case mounting bolts	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
	Planetary gear support mounting bolt	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
	Rear axle shaft staking nut	392.3 to 490.3	40.0 to 50.0	289.3 to 361.7
	Cam plate 2 mounting nuts	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Clutch	Clutch mounting bolts	24.5 to 27.5	2.5 to 2.8	18.1 to 20.3
	Lock nuts of release lever adjusting bolts	25.5 to 29.4	2.6 to 3.0	18.8 to 21.7
	Release fork 1,2 set bolts	176.5 to 196.1	18.0 to 20.0	130.2 to 144.7
Hydraulic System	Suction pipe mounting bolts	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
	Delivery pipe mounting bolts	9.8 to 11.8	1.0 to 1.2	7.2 to 8.7
	Hydraulic cylinder body mounting bolts and nuts	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
	Cylinder safety valve	49.0 to 58.8	5.0 to 6.0	36.2 to 43.4
	Control valve mounting bolts	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
	Cylinder liner mounting bolts	103.0 to 117.7	10.5 to 12.0	75.9 to 86.8
	Pilot spool plug	34.3 to 49.0	3.5 to 5.0	25.3 to 36.2
	Check valve plug	58.8 to 68.6	6.0 to 7.0	43.4 to 50.6
	Lowering valve plug	24.5 to 34.3	2.5 to 3.5	18.1 to 25.3
	Auxiliary control valve mounting bolts	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
	Auxiliary control valve spool plug	34.3 to 49.0	3.5 to 5.0	25.3 to 36.2
	Auxiliary control valve relief valve plug	49.0 to 68.6	5.0 to 7.0	36.2 to 50.6

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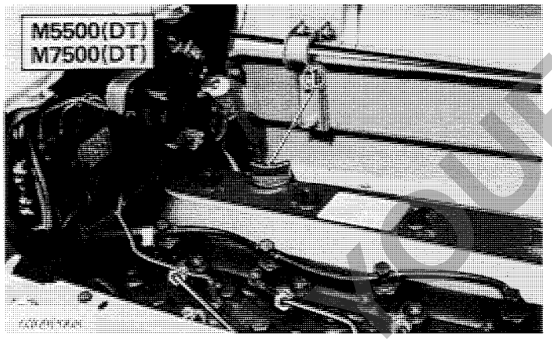
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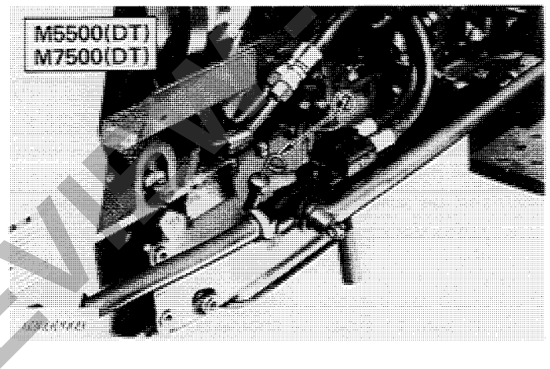
[8] CHECK AND MAINTENANCE

1) Engine Oil



(1) Oil Port (2) Dipstick





Checking Oil Level

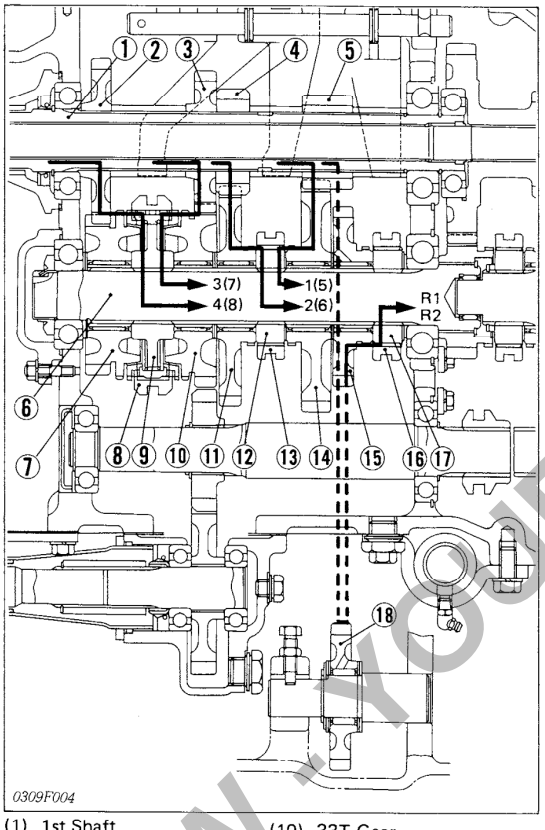
1. Check engine oil before starting the engine and 5 minutes or more after the engine has stopped.
2. To check the oil level, draw out the dipstick (2), wipe it clean, replace it, and draw it out again. Check to see that the oil level lies between the two notches.
3. If the level is too low, add new oil to the specified level at the oil port (1).
4. When using an oil of different maker or viscosity from the previous one, remove all old oil. Never mix two different types of oil.
5. Use the proper Engine Oil SAE according to the ambient temperatures.
   Refer to "LUBRICANTS". (See page S.G-3)

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[1] MAIN GEAR SHIFT SECTION

[M4500(DT) - A(AC)]



(1) 1st Shaft
(2) 30T Gear
(3) 25T Gear
(4) 18T Gear
(5) 16T Gear
(6) Counter Shaft
(7) 29T Gear
(8) Shifter
(9) Coupling
(10) 33T Gear
(11) 40T Gear
(12) Coupling
(13) Shifter
(14) 44T Gear
(15) 33T Gear
(16) Shifter
(17) Coupling
(18) 26T Gear

Besides neutral, five ways of power flow (from 1st shaft to counter shaft) are available by operating the main gear shift lever to shift positions of the shifter (8), (13), (16) on the counter shaft (6).

■ 1 · 5 Position
1st Shaft (1) ⟶ 16T Gear (5) ⟶ 44T Gear (14) ⟶ Shifter (13) ⟶ Coupling (12) ⟶ Counter Shaft (6).

■ 2 · 6 Position
1st Shaft (1) ⟶ 18T Gear (4) ⟶ 40T Gear (11) ⟶ Shifter (13) ⟶ Coupling (12) ⟶ Counter Shaft (6).

■ 3 · 7 Position
1st Shaft (1) ⟶ 25T Gear (3) ⟶ 33T Gear (10) ⟶ Shifter (8) ⟶ Coupling (9) ⟶ Counter Shaft (6).

■ 4 · 8 Position
1st Shaft (1) ⟶ 30T Gear (2) ⟶ 29T Gear (7) ⟶ Shifter (8) ⟶ Coupling (9) ⟶ Counter Shaft (6).

■ R1 · R2 Position
1st Shaft (1) ⟶ 16T Gear (5) ⟶ 26T Gear (18) ⟶ 33T Gear (15) ⟶ Shifter (16) ⟶ Coupling (17) ⟶ Counter Shaft (6).

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[5] TROUBLESHOOTING

CLUTCH

Symptom	Probable Cause	Solution	Reference Page
Clutch Drags	• Clutch pedal or lever play excessive	Adjust	S.G-42, S.1-1
	• Clutch disc boss spline worn or rusted	Replace (or remove rust)	S.1-2
	• Dust on clutch disc generating from clutch disc facing	Remove dust	S.1-3
	• Clutch disc warped	Replace	
	• Pilot bearing sticking	Replace	
	• Grease or oil on clutch disc facing	Replace	
	• Clutch release lever imporperly adjusted	Adjust	S.1-1
Clutch Slips	• Clutch pedal or lever play too small	Adjust	S.G-42, S.1-1
	• Clutch disc excessively worn	Replace	S.1-3
	• Grease or oil on clutch disc facing	Replace	S.1-3
	• Pressure plate warped	Replace	S.1-3
	• Diaphragm spring weaken or broken	Replace	S.1-4
	• Release lever improperly adjusted	Adjust	S.1-4
Rattle During Running	• Clutch disc boss spline worn	Replace	S.1-2
	• Release bearing worn	Replace	S.1-1
	• Pilot bearing worn	Replace	
	• Diaphragm spring weaken or broken	Replace	S.1-4
Clutch Squeaks	• Release bearing sticking or dry	Replace or lubricate	
	• Pilot bearing sticking or dry	Replace or lubricate	
Vibration	• 1st shaft or PTO propeller shaft bent	Replace	
	• Clutch to flywheel improper assembly	Reassemble	S.1-1
	• Clutch parts broken	Replace	S.1-1

TRANSMISSION

Symptom	Probable Cause	Solution	Reference Page
Noise from Transmission	• Transmission fluid insufficient	Replenish	S.G-3, S.G-29
	• Gears worn or improper backlash	Replace	S.2-8, S.3-5
	• Shifters and shift forks worn	Replace	S.2-18
	• Improper backlash between spiral bevel pinion and spiral bevel gear	Adjust	S.2-23

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GENERAL

[1] SPECIFICATIONS

Model				M4500-A(AC) (2WD)	M4500DT-A(AC) (4WD)
Maximum PTO power				36.55kW (49.7PS, 49HP)*	
Engine	Model			S2600–A	
	Type			Vertical, water-cooled, 4-cycle diesel engine	
	Number of cylinders			6	
	Total displacement			2598cm³ (158.5 cu.in.)	
	Bore and stroke			82 x 82mm (3.23 x 3.23 in.)	
	Engine gross power			41.4kW (56.3PS, 55.5HP)	
	Rated revolution			2600 rpm	
	Maximum torque			158N·m (16.2kgf·m, 117.6ft-lbs)/1400 rpm	
	Battery			12V 150Ah	
	Fuel			Diesel fuel No.1-D [below –10°C (15°F)] Diesel fuel No.2-D [above –10°C (15°F)] (ASTM D975)	
	Fuel tank capacity			54ℓ (57.0 U.S. qts., 47.5 Imp. qts.)	
	Engine crankcase capacity			12ℓ (13.0 U.S. qts., 10.6 Imp. qts.)	
	Engine coolant capacity			8.4ℓ (8.9 U.S. qts., 7.4 Imp. qts.)	
Dimensions	Overall length			3365mm (132.5 in.)	3495mm (137.6 in.)
	Overall width			1685mm (66.3 in.)	1785mm (70.3 in.)
	Overall height			2260mm (89.0 in.)	2290mm (90.2 in.)
	Wheel base			1985mm (78.1 in.)	2020mm (79.5 in.)
	Tread	Front		1280 to 1880mm (50.4 to 74.0 in.)	1420mm (55.9 in.)
		Rear	with extension steps	1500 to 1900mm (59 to 75 in.)	
			without extension steps	1300 to 1900mm (51 to 75 in.)	
	Minimum ground clearance			395mm (15.6 in.)	340mm (13.4 in.) (at the bottom of front differential case)
Weight				1920kg (4233 lbs)	2200kg (4850 lbs)
Traveling system	Tire size		Front tires	6.00–16–6PR (AG)	8.3/8–24–6PR (AG)
			Rear tires	14.9/13–28–6PR (AG)	
	Clutch			Dry, single plate	
	Steering			Power steering	
	Transmission			16 forward and 4 reverse (AC type) 8 forward and 2 reverse (A type) F: 1st. 2nd constant mesh 3rd. 4th Synchronized mesh R: Constant mesh	
	Brake			Multiple wet discs operated by two foot pedals	
	Differential			Bevel gears (with differential lock)	
Hydraulic system	Hydraulic control system			Position control, draft control and mixed control	
	Pump-up capacity			35ℓ/min (37.0 U.S. qts./min, 30.8 Imp. qts./min)	
	Three-point hitch			Category I·II	
	Maximum lifting force			1700kg (3740 lbs)	
PTO				Independent	
	Live PTO (A type / AC type)		Direction of turning	Clockwise, viewed from tractor rear	
			PTO speed	540 rpm at 2193 engine rpm (1000 rpm at 2521 engine rpm according to specifications)	
	Ground PTO (AC type)		Direction of turning	Clockwise, viewed from tractor rear	
			PTO speed	1.59 turns/m (0.48 turns/ft) (with 14.9 –28 tires)	
Traction system				Swing drawbar, adjustable in direction and height	

Note: *Maximum PTO horse power in Official Test.

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[3] LUBRICANTS

<table>
<tr><th rowspan="2">Place</th><th colspan="3">Capacity</th><th rowspan="2">Lubricants</th></tr>
<tr><th>M4500(DT)</th><th>M5500(DT)</th><th>M7500(DT)</th></tr>
<tr><td>Engine crankcase</td><td>12.0ℓ
12.7 U.S. qts.
10.56 Imp. qts.</td><td>9.8 ℓ
10.4 U.S. qts.
8.62 Imp. qts.</td><td>11.8 ℓ
12.5 U.S. qts
10.38 Imp. qts.</td><td>Engine oil: API Service CC or CD
Above 25°C (77°F) SAE 30 or 10W – 30
0° to 25°C (32° to 77°F) SAE 20 or 10W – 30
Below 0°C (32°F) SAE 10W or 10W – 30</td></tr>
<tr><td>Transmission</td><td colspan="3">50.0ℓ
52.8 U.S. qts.
44.00 Imp. qts.</td><td>Multi-grade transmission fluid
The fluid listed below or equivalent are recommended.
<table><tr><th>Maker</th><th>Brand (Standard)</th></tr><tr><td>Allis Chalmers</td><td>821 Power Fluid</td></tr><tr><td>Atlantic Richfield (Arco)</td><td>Acro Tractor Fluid</td></tr><tr><td>Case</td><td>TCH</td></tr><tr><td>Chevron</td><td>Tractor Hydraulic</td></tr><tr><td>Exxon</td><td>Torque Fluid 56</td></tr><tr><td>Ford</td><td>M2C41 Tractor Hydraulic Oil</td></tr><tr><td>International</td><td>Hy Trans</td></tr><tr><td>John Deere</td><td>303, J14C</td></tr><tr><td>Massey</td><td>M1127 Fluid</td></tr><tr><td>Penzoil</td><td>Hydra-Trans and Wet Brake</td></tr><tr><td>Phillips</td><td>H.T. Fluid</td></tr><tr><td>Shell</td><td>Donax T–4</td></tr><tr><td>Texaco</td><td>T.D.H. Oil</td></tr><tr><td>Union</td><td>Hydraulic/Tractor Fluid</td></tr><tr><td>Valvoline</td><td>Uni-Trac</td></tr></table></td></tr>
<tr><td>Power steering system</td><td colspan="3">2.0ℓ
2.1 U.S. qts.
1.76 Imp. qts.</td><td>Turbine oil ISO VG 32 or equivalent</td></tr>
<tr><td>Steering gear box</td><td colspan="3">0.5 ℓ
0.5 U.S. qts.
0.44 Imp. qts.</td><td>Gear oil SAE80 or SAE90</td></tr>
<tr><td>Front axle differential case [4WD]</td><td colspan="2">6.0ℓ
6.3 U.S. qts.
5.28 Imp. qts.</td><td>8.0ℓ
8.5 U.S. qts.
7.04 Imp. qts.</td><td>Gear oil SAE80 or SAE90</td></tr>
<tr><td>Front axle gear case [4WD]</td><td colspan="2">0.6 ℓ x 2
0.6 U.S. qts. x 2
0.53 Imp. qts. x 2</td><td>0.7 ℓ x 2
0.7 U.S. qts. x 2
0.62 Imp. qts. x 2</td><td>Gear oil SAE80 or SAE90</td></tr>
<tr><td>Front axle case [4WD]</td><td colspan="2">2.5 ℓ x 2
2.6 U.S. qts. x 2
2.20 Imp. qts. x 2</td><td>3.5 ℓ x 2
3.7 U.S. qts. x 2
3.08 Imp. qts. x 2</td><td>Gear oil SAE80 or SAE90</td></tr>
<tr><td>Brake pedal shaft (3 spots)
Steering lever shaft (1 spot)
3-point linkage and link bracket (4 spots)
Knuckle shaft (2 spots) [2WD]
Center pin (1 spot) [2WD]
Power steering cylinder (1 spot)
Clutch release bearing (1 spot)
Front wheel hub bearings (right and left) [2WD]</td><td colspan="3">Moderate amount</td><td>SAE lithium based grease</td></tr>
</table>

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[7] MAINTENANCE CHECK LIST

Service Interval	Check Points	Reference Page
Every 50 hours	Grease the 3 point linkage group (3 spots).	S.G-34
	Grease the top link bracket (2 spots).	S.G-34
	Grease the king pin (2 spots). [2WD]	S.G-33
	Grease the brake pedal shaft (3 spots).	S.G-33
	Grease the steering lever shaft (1 spot).	S.G-33
	Grease the center pin (1 spot) [2WD].	S.G-34
	Grease the power steering cylinder (1 spot).	S.G-34
	Drain water in the fuel filter [M7500(DT)].	S.G-39
Every 150 hours	Check the clutch pedal free play.	S.G-42
	Check the brake pedal free play.	S.G-42
	Check the PTO clutch control lever free play.	S.G-42
	Check the battery electrolyte level.	S.G-44
	Change engine oil [M4500(DT)].	S.G-28
	Replace engine oil filter cartridge [M4500(DT)].	S.G-28
	Check the toe-in.	S.5-6
	Check to see if the water pipe bands are slack.	S.G-36
Every 200 hours	Change engine oil [M5500(DT)·M7500(DT)].	S.G-28
	Grease the clutch release bearing (1 spot).	S.G-34
	Clean the fuel feed pump [M5500(DT)·M7500(DT)].	
	Check the fan belt tension. Adjust as necessary.	S.G-37
	Clean transmission oil filter.	S.G-30
Every 400 hours	Replace fuel filter 1 element [M5500(DT)·M7500(DT)].	S.G-39
	Replace fuel filter cartridge [M4500(DT)].	S.G-39
	Check the steering box oil level.	S.G-31
	Replace engine oil filter cartridge [M5500(DT)·M7500(DT)].	S.G-28
	Change power steering oil.	S.G-32
	Grease the front wheel hub bearings [2WD].	S.G-33
Every 600 hours	Change transmission fluid.	S.G-29
	Change oil in the right and left front axle cases [4WD].	S.G-31
	Change oil in the front axle differential case [4WD].	S.G-30
	Change oil in the right and left front axle gear cases [4WD].	S.G-31
Every 800 hours	Remove sediment in the fuel tank.	
	Replace fuel filter 2 element [M7500(DT)].	S.G-39
	Clean the cooling system.	S.G-36
	Check the valve clearance.	See Engine WSM
	Check the fuel injection pressure of the nozzle	See Engine WSM

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