

MA

MULTI PURPOSE UTILITY VEHICLE

# MAINTENANCE

MAINTENANCE SCHEDULE	MA–2
<b>MAINTENANCE OPERATIONS</b>	МА–6
	WSU91-MA001

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# MAINTENANCE SCHEDULE

Follow the distance and the period the vehicle has been driven whichever comes first, if without any notice.

	miles × 1000/months			0.0	6 14 0	0/40	40/04	15:00	10/00	01/40	0.4/40	27/54	20/60	Refer
Section	Inspection			3/0	0/12	9/10	12/24	15/30	10/30	21/42	24/40	27/34	30/00	page
	<ul> <li>Cylinder head</li> <li>Manifold</li> </ul>	• Tightness	0											MA-6
	Air cleaner element	• Cleaning* <sup>1</sup> • Change		0	0	0	•	0	0	0	•	0	0	MA-6
	• Valve clearance	Clearance	0		0		0		0		0		0	MA-7
	• Engine oil	• Leakage • Level	0	0	.0	0	0	0	0	0	0	0	0	MA-7
Engine	• Engine oli	• Change* <sup>2</sup>	•	0	•	0	•	0	•	0	•	0	•	MA-7
	• Oil filter	• Change			•		•		•		•		•	MA-7
	•Fuel filter	• Change					•				•			MA-8
	Fuel line & Connections	• Damage • Crack • Tightness • Leakage	0		0		0		0		•		0	MA-8
	Carburetor	<ul> <li>Idle speed</li> <li>Acceleration</li> </ul>	0		0		0		0		0		0	MA-7
	• Coolant	• Levei • Leakage • Change	0	0	0	0	•	0	0	0	•	0	0	MA-8
	• V-belt	• Tension • Crack • Damage	0	0	0	0	0	0	0	0	0	0	0	MA-9
	Blow-by gas     ventilation hose	Connection     Damage			0		0		0		0		0	MA-9
Power transmitting system	• Clutch pedal	Free play     Reserved working travel	0	0	0	0	0	0	0	0	0	0	0	MA-9

O ... Check 🛛 🕚 ... Change

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Section	Inspection	miles × 1000/months	1/1	3/6	6/12	9/18	12/24	15/30	18/36	21/42	24/48	27/54	30/60	Ref to S pag
	Transmission & differential	Oil level     Oil leakage     Oil change	0	0	0	•	0	0	•	0	0	•	0	MA-
	• Sub transmission	• Oil change	0	0	0	•	0	0	•	0	0	•	0	MA
	• Sub transmission W/P.T.O.	• Oil change	0	0	0	•	0	0	•	0	0	•	0	MA
Power transmitting system	• Transfer	• Oil change	0	0	0	•	0	0	•	0	0	•	0	МА
	• Transfer W/P.T.O.	• Oil change	0	0	0	•	0	0	•	0	0	•	0	MA
	• P.T.O. Rear case	•Oil change	0	0	0	•	0	0	•	0	0	•	0	MA
	Propeller shaft	Tightness     Rattle     Damage	0		0		0		0		0		0	MA
Suspension	Suspension arm     Control arm     Dust cover	• Tightness • Damage	0		0		0		0		0		0	МА
system	Shock absorber	<ul> <li>Function</li> <li>Oil leakage</li> <li>Damage</li> </ul>			0		0		0		0		0	MA
	• Tires	• Pressure • Damage • Wear	0	0	0	0	0	0	0	0	0	0	0	MA
Running system	<ul> <li>Front &amp; rear wheel bearings</li> </ul>	• Rattle			0		0		0		0		0	МА
	Front wheel     bearing lubrication	•Grease change					•	}			•			МА
Steering system	Steering wheel	• Tightness • Free play	0		0		0		0		0		0	MA
	Linkage     Dust cover	• Tightness • Rattle • Damage	0	0	0	0	0	0	0	0	0	0	0	МА
	Wheel alignment	• Check • Adjust			0		0		0		0		0	МА

O ... Check 🛛 🕘 ... Change

Section	Inspection	miles × 1000/months	1/1	3/6	6/12	9/18	12/24	15/30	18/36	21/42	24/48	27/54	30/60	Refer to See page
Brake system	Brake hose     Brake tube	• Leakage • Damage • Loose (clamps)	0	0	0	0	0	0	0	0	•* <sup>3</sup>	0	0	MA-15
	• Brake fluid	• Level • Change	0	0	0	0	•	0	0	0	•	0	0	MA-15
	Brake drum     Brake lining	• Wear • Damage			0		0		0		0		0	MA-15
	Brake pedal     & parking brake	Free play     Reserved working travel	0	0	0	0	0	0	0	0	0	0	0	MA-14
	<ul> <li>Parking brake cable</li> </ul>	• Damage			0		0		0		0		0	MA-14
Chassis & body	• Seat belt	Operation     Tightness	0	0	0	0	0	0	0	0	0	0	0	MA-16
	Chassis lubrication	<ul> <li>Condition</li> <li>Apply grease</li> </ul>	0	0	0	0	0	0	0	0	0	0	0	MA-16
	Wheel hub nuts     Other nuts & bolts	• Tightness	0	0	0	0	0	0	0	0	0	0	0	MA-16
	<ul> <li>Muffler</li> <li>Exhaust pipe</li> </ul>	• Tightness • Damage	0		0		0		0		0		0	MA-16
	All doors     Engine cover	<ul> <li>Lock operation</li> <li>Tightness</li> </ul>	0		0		0		0		0		0	MA-16
	• Distributor cap • Rotor	• Damage			0		0		0		0		0	MA-17
	• Spark plugs	• Cleaning		0	•	0	•	0	•	0	•	0	•	MA-17
Electrical system	• Ignition timing	• Timing	0		0		0		0		0		0	MA-17
	• Battery	Electrolyte level		0	0	0	0	0	0	0	0	0	0	MA-17
	• Wire harness	Tightness (clamps)     Damage	0	0	0	0	0	0	0	0	0	0	0	MA-17
	Lighting system     Meter & gauges	• Function	0	0	0	0	0	0	0	0	0	0	0	MA-18

MA-4

O ... Check • ... Change

Section	Inspection	miles × 1000/months	1/1	3/6	6/12	9/18	12/24	15/30	18/36	21/42	24/48	27/54	30/60	Refer to See page
Dump-Llft mechanism (only for Tipper and Liftpick- Tipper)	• Hydraulic oil	• Level • Change	0	0	0	0	•	0	0	0	•	0	0	MA-18
	Hydraulic lines	• Leakage • Damage • Tightness	0	0	0	0	0	0	0	0	0	0	0	MA-18
	Dumping-Lifting     operation	Tightness     Rattle     Smoothness	0	0	0	0	0	0	0	0	0	0	0	MA-19
	Lubrication	Apply grease	0	0	0	0	0	0	0	0	0	0	0	MA-19

\*1 Under dusty operating condition, clean the element every 1,500 mile (2,500 km).
 \*2 Change the oil every 6,000 mile (10,000 km) or 6 month whichever comes earlier.
 \*3 Chang the brake hose only.

# **MAINTENANCE OPERATIONS**

# ENGINE

### **CYLINDER HEAD & MANIFOLD**

Check of cylinder head bolts & manifold bolts tightening torque. Tightening Torque:

Cylinder Head:  $5.5 \pm 0.5$  kg-m (39.8  $\pm$  3.6 ft-lb, 53.9  $\pm$  4.9 N·m) Manifold (IN):  $1.95 \pm 0.39$  kg-m (14.1  $\pm$  2.8 ft-lb, 19.1  $\pm$  3.8 N·m) (EX):  $2.55 \pm 0.51$  kg-m (18.5  $\pm$  3.6 ft-lb, 25.0  $\pm$  4.9 N·m)

#### NOTE:

 This tightening torque means the torque check of the head bolts, not retightening.

Therefore, if you find any looseness during the torque check, retighten the bolt to specified tightening torque.



#### AIR CLEANER ELEMENT

Cleaning of air cleaner element.

(1) Remove the air element from the air cleaner case.

(2) Clean the element with compressed air, First blow from the back side thoroughly. Then, blow off the front side of the element.

CAUTION:

- The air pressure to be used for this cleaning operation should not exceed 4.0 kg/cm<sup>2</sup> (56.9 psi).
- (3) Install the air cleaner element in the air cleaner.

#### IDLE SPEED

Preparation to be made prior to idle check

- 1. Warm up the engine thoroughly.
- 2. Disconnect the vacuum hose of the vacuum motor so that the air cleaner may be set to the summer suction mode. Attach a blank plug to the disconnected vacuum hose.
- 3. Ensure that the exhaust system exhibits no gas leakage.
- 4. Turn OFF all accessory switches.









#### Adjustment

Adjust the throttle adjusting screw so that the engine idle speed may become the specified speed.

Engine Idle Speed: 950 ± 50 rpm

#### ACCELERATION

Ensure that the throttle valve is opened fully when the accelerator pedal is depressed fully.

#### VALVE CLEARANCE (Hot condition)

Specified Value: (IN) 0.25 mm (0.0098 inch) (EX) 0.30 mm (0.0118 inch)

NOTE:

• Carry out the check and adjustment between the valve stem and the rocker arm adjusting screw.

#### ENGINE OIL AND FILTER Engine oil change

Recommended Oil Grade: API SG or SF Oil Capacity: 2.9 Us qts (2.7 liters) 3.3 Us qts (3.1 liters) (When oil is changed including oil filter replacement.)

#### Engine oil filter change

- (1) Before installation, apply clean engine oil to the gasket of a new oil filter.
- (2) Screw the new filter into place and tighten it until the gasket contacts the seat. Then give it an additional <sup>3</sup>/<sub>4</sub> turn.

#### FUEL FILTER

- (1) Disconnect the hose clamp. Replace the fuel filter. NOTE:
  - Be sure to plug the disconnected hose so that no fuel flows out.
- (2) After replacing the fuel filter, inspect for fuel leakage from around the fuel filter.

#### **FUEL LINE & CONNECTION**

Visually inspect the fuel lines for cracks, leakage, loose connections, or deformation.



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#### **ENGINE COOLANT**

WARNING:

 To avoid the risk of burn or injuries, never remove the radiator cap or the drain plug if the engine is still hot.

#### CAUTION:

 As regards water to be used as cooling water, use soft water which does not contain salt of minerals, calcium, magnesium and so forth.

#### To drain coolant

- 1. Remove the radiator cap. Loosen the radiator drain plug and drain the cooling water.
- 2. Drain the coolant from the reserve tank.
- 3. Securely tighten the drain plug.

#### To fill coolant

- Remove the engine service hole cover at the cargo bed and loosen the bleeder plug provided at the intake manifold. For Tipper or Liftpick-Tipper remove the engine cover first by removing bolts.
- 2. Set the heater control lever to the "WARM" position. (Only for heater-equipped vehicle)
- 3. Fill the reserve tank until the coolant level reaches the "FULL" line.
- 4. Fill the radiator until the coolant overflows from the bleeder plug.
- 5. Tighten the bleeder plug. Specified Torque:  $0.75 \pm 0.15$  kg-m  $(5.5 \pm 1.05$  ft-lb,  $7.4 \pm 1.5$  N·m)







- 6. Fully depress the clutch pedal and start the engine. Warm up the engine by racing it until the electric cooling fan operates. Continue running the engine. The cooling fan will stop its rotation. When the cooling fan resumes its rotation, stop the engine.
- 7. Allow time for the engine to cool down. Then, remove the radiator cap. And add coolant until level with filler port.
- 8. Add coolant up to the "FULL" line of the reserve tank. Securely tighten the radiator cap.

#### V-BELT

- (1) Visually check the V belt for separation of the adhesive rubber above and below the core, core separation from the belt side, severed core, separation of the rib from the adhesive rubber, cracks or separation of the ribs, torn or worn ribs or cracks in the inner ridges of the ribs.
- (2) Measure the amount of the drive belt deflection when the midpoint of the drive belt between the alternator and the water pump pulley is pushed with a force of 98 N (10 kgf). Specified Belt Deflection

Used Belt: 7.5 - 8.5 mm (0.295 - 0.335 inch) New Belt: 6.0 - 7.0 mm (0.236 - 0.276 inch)

#### NOTE:

- "New belt" refers to a belt which has been used on a running engine for less than five minutes.
- After installing a new belt, run the engine for about five minutes and then recheck the tension.

#### **BLOW-BY GAS VENTILATION HOSE**

Checking of hose for damage, clogged and connection.

# POWER TRANSMITTING SYSTEM

### CLUTCH

#### **Reserve working travel**

- (1) Run the engine at the idle speed and fully apply the parking brake.
- (2) Fully depress the clutch pedal and shift the transmission to the L gear.
- (3) Slowly release the pedal and measure the distance shown in the illustration at the point when the clutch is engaged. Specified Reserve Working Travel: Not less than 20 mm





#### Free play

Lightly depress the clutch pedal by hand, until you feel resistance. Then, measure the free play.

Specified Free Play: 15 - 30 mm (0.6 - 1.2 inch)

Adjust the clutch reserve working travel and free play by moving the lock nut of the clutch cable.

# TRANSMISSION, TRANSFER, SUB TRANSMISSION & P.T.O. REAR CASE

Visually check for oil leakage.

If leakage is found, check for the cause and repair.



# Oil change

- 1. Remove the drain plug and drain the oil.
- 2. Reinstall the drain plug with a new gasket interposed.
- 3. Replenish the specified oil, until it begins to overflow from the filler hole.

Specified Transmission Oil: API GL-3 oil SAE 80W Cold Area Spec: 75W-90 or 75W-85

4. Reinstall the filler plug with a new gasket interposed.

#### DIFFERENTIAL

Visually check for oil leakage. If leakage is found, check for the cause and repair.

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#### Oil change

- 1. Remove the drain plug and drain the oil.
- 2. Reinstall the drain plug with a new gasket interposed.
- 3. Replenish the specified differential oil, until it begins to overflow from the filler hole.

Specified Differential Oil: API GL-5 SAE 80W or 80W-90 (Front) SAE 90 (Rear)

4. Reinstall the filler plug with a new gasket interposed.

#### **PROPELLER SHAFT**

Check propeller shaft for rattle and damage.





# SUSPENSION SYSTEM

#### SPRING

Visually inspect each spring for breakage and cracks.

#### Attaching sections and connecting sections

- 1. Inspect the attaching sections for tightness and damage.
- 2. Inspect the connecting sections for rattle.

#### SUSPENSION

Visually inspect the suspension for damage and deterioration.

Check the connecting section for rattle by rocking it by hand.





#### SHOCK ABSORBERS

Visually inspect each shock absorber for damage and leakage.

Bounce the end of the vehicle and check that the bound and rebound action should be quickly damped.

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#### **RUNNING SYSTEM**

#### TIRES

#### Air pressure

- Check to see if the tire air pressure conforms to the specification, using a tire gauge.
- Ensure that no air leaks from the tire valve and that the valve cap is attached.
   NOTE:
  - For the specified air inflation pressure, see the caution plate attached to the vehicle. Be very careful not to overinflate the tires excessively.

#### Wear

- Inspect the tread section for wear. Ensure that the groove depth is at least 1.6 mm (0.063 in.).
   NOTE:
  - Care must be exercised as to the wear indicator mark. (When the remaining groove depth is reduced to less than 1.6 mm (0.063 in.), the wear indicator mark will become visible.)
- Inspect the tire for uneven wear, ridge and other abnormal wear.

NOTE:

• If the tires exhibit an uneven wear pattern, check the wheel balancing and front wheel alignment.

#### Crack and damage

Check that the tread section and side wall section are free from cracks and damage.

#### Objects caught in tire pattern

Ensure that no nail, metal chip, gravel or other foreign matters lodge at the grooves of each tire, or none of them sticks into the tire.



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#### WHEEL BEARING Rattle

wheel nut wrench.

WHEELS

Looseness of hub nuts and bolts

Move the tire up and down while holding it at the top and bottom sections by your hands.

Check the wheel hub nuts and bolts for looseness, using a

Tightening Torque: 88.3 - 117.7 N·m (9.0 - 12.0 kg-m)

Ensure that the wheel bearing exhibits no excessive play.

Ensure that no abnormal sound is emitted when the wheel is rotated.

# BEARING GREASE

#### Grease change (Front wheel)

Apply the MP grease to those points specified in the right figure. (2WD only)

 Grease application points Space between bearing rollers Spindle inner race section Drum space (shaped portion) and entire space of hub cap

(For 4WD) Refer to the FS section.

#### STEERING WHEEL

#### Steering wheel free play

Set the vehicle in a straight-ahead condition. Inspect the steering wheel play by turning it lightly with your fingers. Specified Value: Less than 30 mm (1.2 inch)

#### Steering wheel for tightness

Check steering wheel for looseness in axial direction as well as in normal direction to the steering wheel shaft.

### Wheel alignment and turning angle.

Refer to "CHECKS AND ADJUSTMENT OF FRONT WHEEL" in the FS Section.



**BRAKE SYSTEM** 

#### **BRAKE PEDAL**

Free play

Specified Value: 1 - 5 mm (0.04 - 0.20 inch)

**Reserve travel** 

**PARKING BRAKE Reserve travel** 

Parking brake cable Visually check for damage.

slowly and count the notches.

Specified Value: More than 90 mm (3.5 inch)

Specified Value: 6 - 10 notches/44lb (20 kgf)

#### **BRAKE HOSE AND TUBE**

Inspect the following items.

- ① Hoses and tubes for damage, cracks
- ② Hoses for deformation or swelling
- ③ Tubes for corrosion or swelling
- ④ Connection for fluid leakage
- (5) Tube clamps for tightness
- 6 Hoses for extreme bending, twisting or pulling



#### **BRAKE FLUID**

Check the brake fluid level and replenish the brake fluid to the "MAX" line of the reserve tank, as required. NOTE:

• As for fluid change, see the BR Section. Specified Brake Fluid: DOT 3 or SAE J1703



#### **BRAKE DRUMS & BRAKE LININGS**

 Check the brake drum for damage, inner surface wear, scores, or uneven wear.
 Specified Diameter:

180 - 180.15 mm (7.087 - 7.093 in.) Allowable Limit: Drum Diameter Limit: 181.5 mm Lining Thickness Limit: 1 mm



# **CHASSIS & BODY**

#### SEAT BELT

- Checking of seat belts for operation and looseness
- (1) Check that the belt components are free from damage.
- (2) Check that the tongue plate can be released smoothly when the buckle button is pressed.
- (3) Check that the tongue plate can be locked securely when inserted into the buckle.

### **CHASSIS GREASE**

Apply grease to grease fittings of chassis.

- Check the each grease fittings of chassis for grease. condition.
- (2) Apply MP grease to the grease fittings given bellow.
  - (1) Steering related parts
  - (2) Propeller shaft
  - (3) Suspension related parts

Check of other bolts, nuts & wheel hub nuts Retightening of bolts and nuts on chassis and body.

- (1) Front suspension parts
- (2) Power train parts

(3) Rear suspension parts

(4) Steering system parts

Check of wheel hub nuts

Retighten the hub nuts.

Tightening torque: 9.0 - 12.0 kg-m (65.1 - 86.7 ft-lb)

#### **EXHAUST PIPE & MUFFLER**

Check that the attaching section of the exhaust pipe and muffler as well as their connecting section for looseness.

Visually check the exhaust pipe and muffler for damage or leak of exhaust gas.

WARNING:

• Never perform this check when the exhaust system is hot. Be very careful not to burn yourself.

#### **BODY PANEL**

Check for proper alignment and closing condition of the body panel.

- Engine hood
- All doors







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# ELECTRICAL SYSTEM

#### **DISTRIBUTOR CAP & ROTOR**

Checking of following parts

- 1. Check that the cap exhibits no crack, damage, rust or burning.
- 2. Check that the cap center piece has proper spring tension.
- 3. Check that the segment exhibits no damage.
- 4. Check that the cord insertion hole exhibits no corrosion or burning.
- 5. Check that the rotor exhibits or wear.

### SPARK PLUG

#### Removal

- 1. When removing the resistive cord, pull out it with the cap section held, never pull the cord.
- 2. Using a spark plug wrench, remove all of the spark plugs.

#### Cleaning

Clean the plugs with plug cleaner.



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#### **IGNITION TIMING**

Refer to EM section. Specified Value: B.T.D.C, 7°/950 rpm.

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### BATTERY

Check that the electrolyte level is between the upper and lower levels.

If the electrolyte level is below the lower level, add distilled water.



### WIRE HARNESS

Check of wire harness

- Check of wire harness for damage
- (1) Check the wiring for damage or looseness.
- (2) Check each clamp and connection for looseness.

# LIGHTING SYSTEM METER & GAUGE

Check of lighting system, meter & gauges

Check of lighting system, meter & gauges for function

- (1) Check headlamps, turn signal lamps, stop lamps, back-up lamps, tail lamps, licence plate lamps, hazard warning lamps and meter illumination lamps for function.
- (2) Check fuel gauge, water temperature gauge, charge warning lamp, oil pressure warning lamp, parking brake warning lamp, stop lamp warning lamp, brake fluid warning lamp and speedometer for function.

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# **DUMP-LIFE MECHANISM**

#### **HYDRAULIC OIL**

Check the oil level of the oil tank.

If the oil level is too low, add oil to the specified level. Specified Oil: DEXRON II



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#### HYDRAULIC LINES

Inspect the following items.

① Hoses and tubes for damage, crack

- ② Hoses for deformation or swelling
- ③ Tubes for corrosion or swelling
- ④ Connection for fluid leakage
- ⑤ Tube clamps for tightness
- 6 Hoses for extreme bending, twisting or pulling

#### **DUMPING-LIFTING OPERATION**

Check the hoist cylinder and arm for excessive play or damage. Ensure that no abnormal noise or vibration is emitted during the operation. Apply MP grease to the following points.



