WSM

WORKSHOP MANUAL
TRACTOR

M6040,M7040

Kubota

KiSC issued 01, 2022 A

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GENERAL

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SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully.

It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.

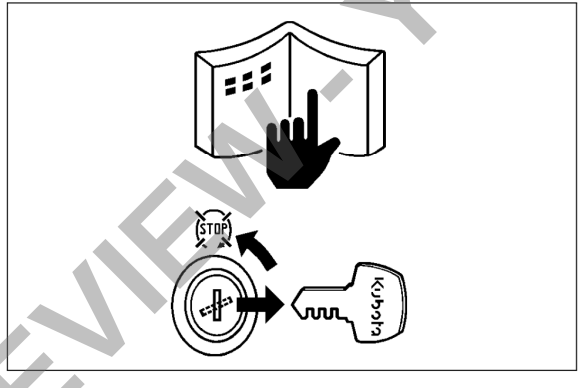
DANGER : **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

WARNING : **Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

CAUTION : **Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

■ **IMPORTANT** : **Indicates that equipment or property damage could result if instructions are not followed.**

■ **NOTE** : **Gives helpful information.**



BEFORE SERVICING AND REPAIRING

- Read all instructions and safety instructions in this manual and on your machine safety decals.
- Clean the work area and machine.
- Park the machine on a firm and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, and remove the key.
- Disconnect the battery negative cable.
- Hang a **"DO NOT OPERATE"** tag in operator station.

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SPECIFICATIONS

Model			M6040	M7040	
			4WD	2WD	4WD
Engine	Model		V3307-DI-E2	V3307-DI-E2-1	
	Type		Vertical, water-cooled, 4-cycle direct injection diesel engine		
	Number of cylinders		4		
	Total displacement		3331 cm^3 (203 cu.in.)		
	Bore and stroke		94 × 120 mm (3.7 × 4.7 in.)		
	Rated speed		2600 min^{-1} (rpm)		
	Net power*1		46.2 kW (62 HP)	50.7 kW (68 HP)	
	PTO power*1		41.0 kW (55 HP)	46.2 kW (62 HP)	
	Maximum torque		213 N·m (21.7 kgf·m, 157.1 lbf·ft) / 1300 to 1500 min^{-1} (rpm)	232 N·m (23.7 kgf·m, 171.1 lbf·ft) / 1300 to 1500 min^{-1} (rpm)	
	Battery capacity		12 V, RC : 160 min, CCA : 900 A		
	Fuel		Diesel fuel No. 1 [below –10 °C (14 °F], Diesel fuel No. 2-D [above –10 °C (14 °F)]		
	Fuel tank capacity	ROPS Model	70 L (18.5 U.S.gals., 15.4 Imp.gals.)		
		CABIN Model	90 L (23.8 U.S.gals., 19.8 Imp.gals.)		
	Engine oil capacity		11 L (11.6 U.S.qts., 9.7 Imp.qts.)		
	Coolant capacity		8 L (8.5 U.S.qts., 7.0 Imp.qts.)		
Dimensions	Overall length	ROPS Model	3445 mm (136 in.)	–	3445 mm (136 in.)
		CABIN Model	3505 mm (138 in.)		
	Overall width (min. tread)		1860 mm (73 in.)		
	Overall height	ROPS Model	2460 mm (96.85 in.)	2470 mm (97.2 in.)	
		CABIN Model	2555 mm (100.6 in.)	2565 mm (101 in.)	
	Wheel base	ROPS Model	2050 mm (81 in.)	–	2050 mm (81 in.)
		CABIN Model	2110 mm (83.1 in.)	2145 mm (84.4 in.)	2110 mm (83.1 in.)
	Tread	Front	1420, 1520 mm (55.9, 59.8 in.)	1420 to 1820 mm (55.9 to 71.7 in.)	1420, 1520 mm (55.9, 59.8 in.)
		Rear	1420 to 1720 mm (55.9 to 67.7 in.)		
	Minimum ground clearance	ROPS Model	390 mm (15.4 in.) (Fuel tank stay)	–	415 mm (16.3 in.) (Fuel tank stay)
		CABIN Model	430 mm (16.9 in.) (Fuel tank stay)	440 mm (17.3 in.) (Fuel tank stay)	
Weight	ROPS		2170 kg (4784 lbs)	–	2180 kg (4806 lbs)
	CABIN		2430 kg (5357 lbs)	2380 kg (5247 lbs)	2440 kg (5379 lbs)
Traveling system	Standard tire size	Front	9.5-24	7.5-16	9.5-24
		Rear	16.9-28	16.9-30*2	
	Clutch		Multiple wet discs	Dry, single plate	Multiple wet discs
	Shuttle		Hydraulic	Wet disc type synchro	Hydraulic
	Number of speed		F12/R12 (with creep)		
	Transmission		F8/R8 fully synchronized		
	Steering		Hydraulic power steering		
	Braking system		Multiple wet discs mechanical		
	Differential	Front	Bevel gears	–	LSD (Limited Slip Differential)
		Rear	Bevel gears with differential lock		

Note : *1 : Manufacture's estimate
*2 : Cast iron discs available for wheels
*3 : At lower link end with links horizontal.
The company reserves the right to change the specifications without notice.

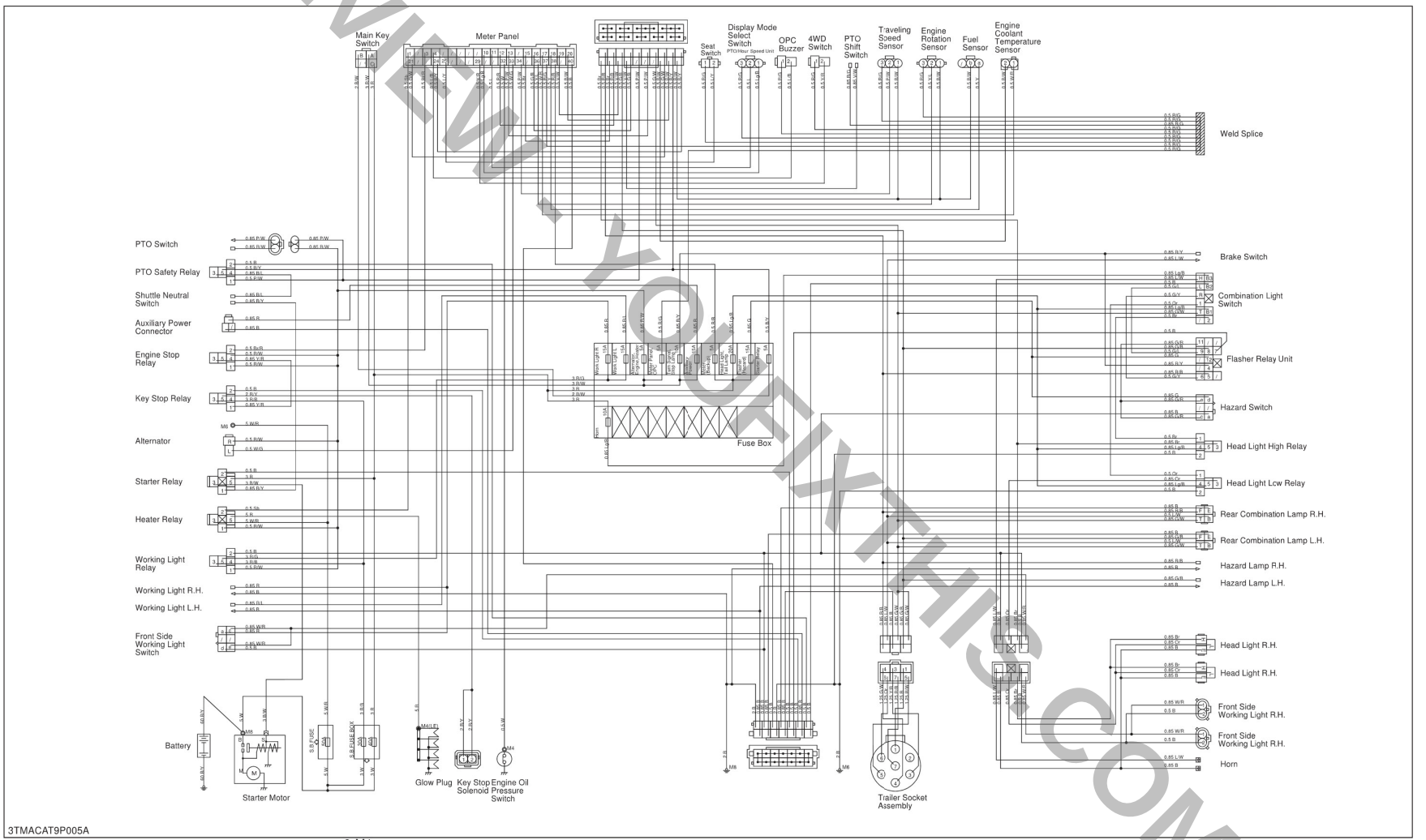
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1. WIRING DIAGRAM

[1] MAIN HARNESS (ROPS MODEL)



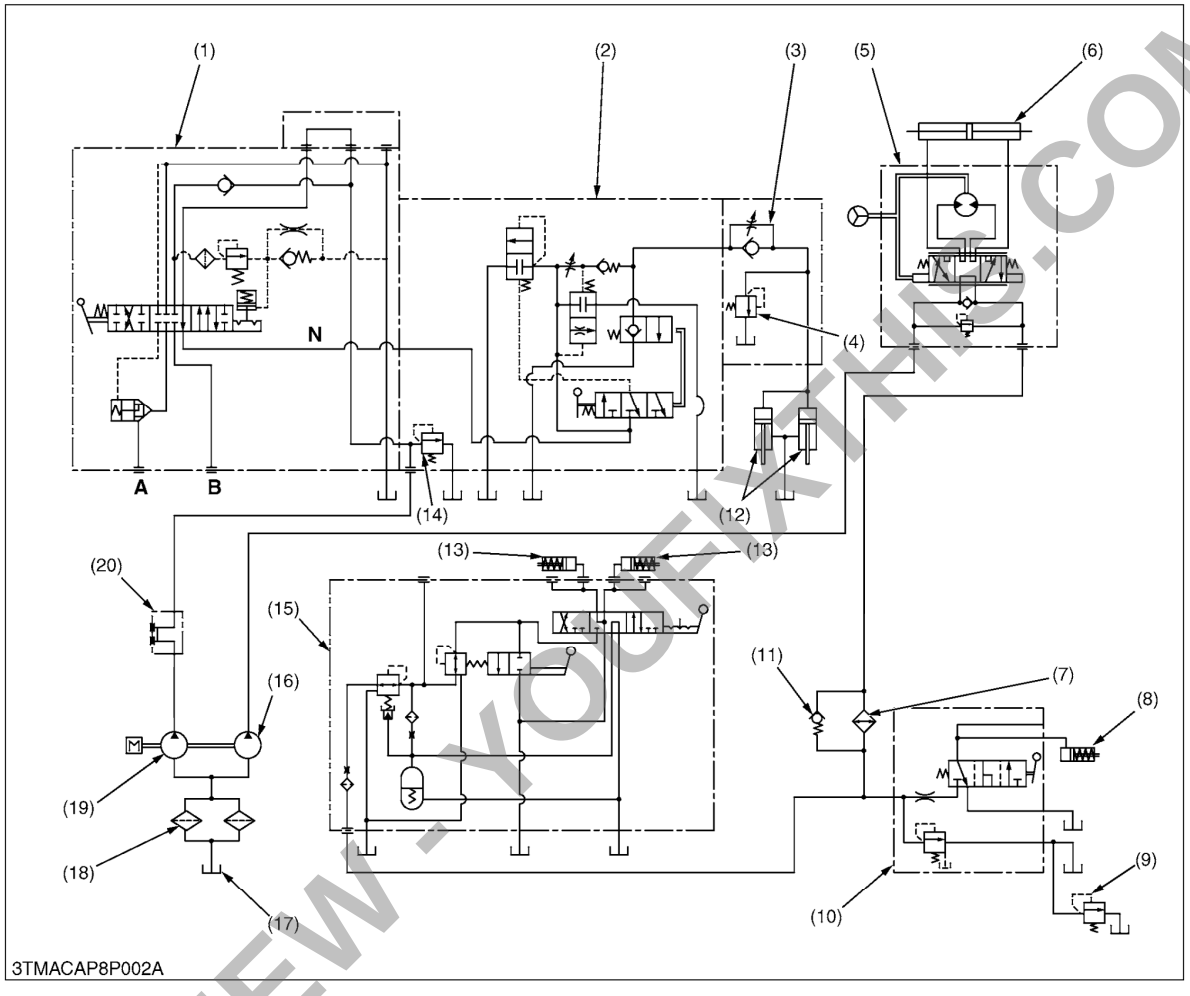
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2. HYDRAULIC CIRCUIT

[1] TOTAL HYDRAULIC CIRCUIT

(1) Hydraulic Shuttle Model



(1) Auxiliary Control Valve
(2) Control Valve (for 3-point Hitch)
(3) Lowering Speed Adjusting Valve
(4) Cylinder Safety Valve
(5) Power Steering Controller
(6) Steering Cylinder
(7) Oil Cooler
(8) PTO Clutch Pack
(9) Relief Valve (for Lubricating Line)
(10) PTO Valve
(11) Oil Cooler Check Valve
(12) Exterior Hydraulic Cylinder
(13) Shuttle Clutch Pack
(14) Relief Valve for 3-point Hitch
(15) Shuttle Valve
(16) Hydraulic Pump (Power Steering, PTO Clutch and Shuttle Clutch)
(17) Oil Tank (Transmission Case)
(18) Hydraulic Oil Filter Cartridge
(19) Hydraulic Pump (for 3-point Hitch)
(20) Hydraulic Outlet

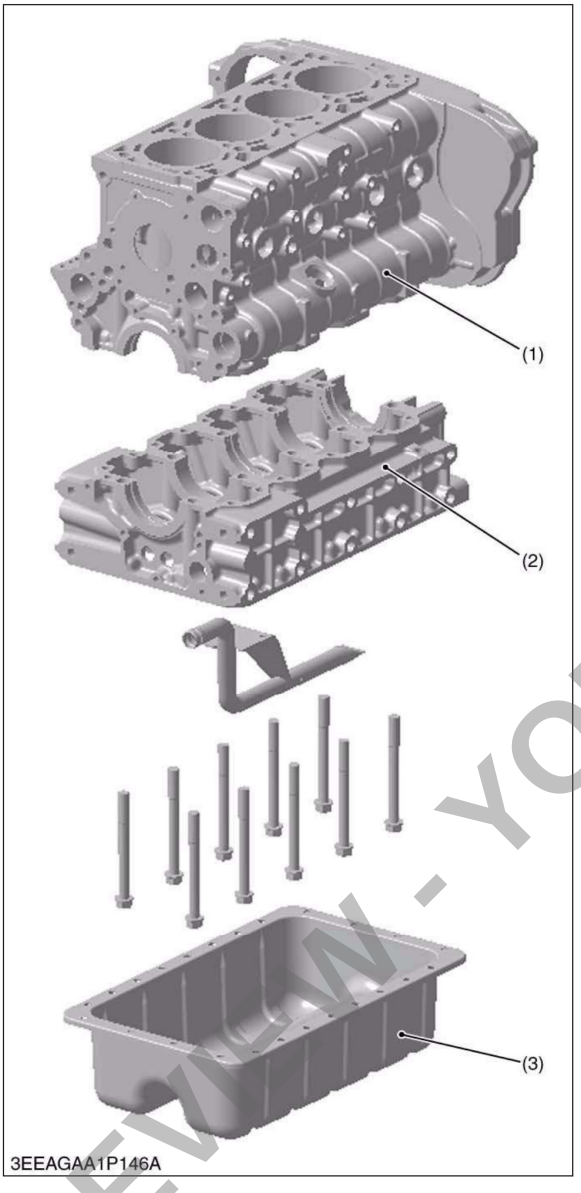
A : To Implement Cylinder
B : To Implement Cylinder
N : N Port

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2. ENGINE BODY

[1] CYLINDER BLOCK



The 07 series DI engine employs ladder frame structure type crankcases - the crankcase 1 (1) with combustion part and the crankcase 2 (2) which supports the crankcase 1 (1).

The following benefits are in the ladder frame structure.

1. Minimizing parts.
2. Noise reduction.
3. Reduction of loss and dispersion on friction thanks to accuracy of axial concentricity.

The cylinder is a linerless type which enables good cooling operation, less strain and good abrasion resistance.

(1) Crankcase 1
(2) Crankcase 2
(3) Oil Pan

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5. TIGHTENING TORQUES

Screws, bolts and nuts whose tightening torques are not specified in this Workshop Manual should be tightened according to the table below.

[1] GENERAL USE SCREWS, BOLTS AND NUTS

Indication on top of bolt	⬡ 4 No-grade or 4T						⬡ 7 7T						⬡ 9 9T		
Material of bolt	SS400, S20C						S43C, S48C						SCr435, SCM435		
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum			Ordinariness		
Unit / Diameter	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M6 (6 mm, 0.24 in.)	7.84 to 9.31	0.80 to 0.95	5.79 to 6.87	7.84 to 8.83	0.80 to 0.90	5.79 to 6.51	9.81 to 11.2	1.00 to 1.15	7.24 to 8.32	7.84 to 8.83	0.80 to 0.90	5.79 to 6.51	12.3 to 14.2	1.25 to 1.45	9.05 to 10.5
M8 (8 mm, 0.31 in.)	17.7 to 20.5	1.8 to 2.1	13.0 to 15.2	16.7 to 19.6	1.7 to 2.0	12.3 to 14.5	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2	17.7 to 20.6	1.8 to 2.1	13.0 to 15.2	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3
M10 (10 mm, 0.39 in.)	39.2 to 45.0	4.0 to 4.6	29.0 to 33.2	31.4 to 34.3	3.2 to 3.5	23.1 to 25.3	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2	39.2 to 44.1	4.0 to 4.5	28.9 to 32.5	60.8 to 70.5	6.2 to 7.2	44.9 to 52.1
M12 (12 mm, 0.47 in.)	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	–	–	–	77.5 to 90.1	7.9 to 9.2	57.2 to 66.5	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	103 to 117	10.5 to 12.0	76.0 to 86.8
M14 (14 mm, 0.55 in.)	108 to 125	11.0 to 12.8	79.6 to 92.5	–	–	–	124 to 147	12.6 to 15.0	91.2 to 108	–	–	–	167 to 196	17.0 to 20.0	123 to 144
M16 (16 mm, 0.63 in.)	167 to 191	17.0 to 19.5	123 to 141	–	–	–	196 to 225	20.0 to 23.0	145 to 166	–	–	–	260 to 303	26.5 to 31.0	192 to 224
M18 (18 mm, 0.71 in.)	245 to 284	25.0 to 29.0	181 to 210	–	–	–	275 to 318	28.0 to 32.5	203 to 235	–	–	–	343 to 401	35.0 to 41.0	254 to 297
M20 (20 mm, 0.79 in.)	334 to 392	34.0 to 40.0	246 to 289	–	–	–	368 to 431	37.5 to 44.0	272 to 318	–	–	–	490 to 568	50.0 to 58.0	362 to 420

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[2] STUD BOLTS

Material of opponent part	Ordinariness			Aluminum		
Unit / Diameter	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M8 (8 mm, 0.31 in.)	11.8 to 15.6	1.2 to 1.6	8.68 to 11.5	8.82 to 11.8	0.90 to 1.2	6.51 to 8.67
M10 (10 mm, 0.39 in.)	24.6 to 31.3	2.5 to 3.2	18.1 to 23.1	19.7 to 25.4	2.0 to 2.6	14.5 to 18.8
M12 (12 mm, 0.47 in.)	29.5 to 49.0	3.0 to 5.0	21.7 to 36.1	31.4	3.2	23.1
M14 (14 mm, 0.55 in.)	62 to 73.5	6.3 to 7.5	45.6 to 54	–	–	–
M16 (16 mm, 0.63 in.)	98.1 to 112.8	10.0 to 11.5	72.3 to 83.2	–	–	–
M18 (18 mm, 0.71 in.)	172 to 201.1	17.5 to 20.5	126.5 to 148.2	–	–	–

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7. CHECK AND MAINTENANCE

CAUTION

- **Be sure to check and service the tractor on a flat place with engine shut off, the parking brake on and chock the wheels.**

[1] DAILY CHECK

To prevent trouble from occurring, it is important to know the condition of the tractor. Check the following items before starting.

Checking

- Check areas where previous trouble was experienced.
- Walk around the tractor.

1. Check the tire pressure, and check for wear and damage.
2. Check for oil and water leak.
3. Check the engine oil level.
4. Check the transmission fluid level.
5. Check the coolant level.
6. Check the condition of ROPS attaching hardware. (ROPS model).
7. Check the washer liquid level. (CABIN model)
8. Check the water separator.
9. Check air cleaner evacuator valve.
10. Check and clean the radiator screen, grill and oil cooler.
11. Check and clean the radiator screen, grill, oil cooler and condenser (CABIN model).
12. Check and clean the air conditioner condenser screen. (CABIN model)
13. Check the nuts of tires are tight.
14. Check the number plate for damage and replace as necessary if equipped.
15. Care of danger, warning and caution labels.
16. Clean around the exhaust manifold and the muffler of the engine.

- While sitting in the operator's seat.

1. Check the throttle pedal, brake pedal and clutch pedal.
2. Check the throttle lever and shuttle lever.
3. Check the parking brake.
4. Check the steering wheel.
5. Check the seat belt.

- Turning the key switch.

1. Check the performance of the easy checker lights.
2. Check the head lights, turn signal lights, hazard lights and other light equipment. Clean if necessary.
3. Check the performance of the meters and gauges.

- Starting the engine.

1. Check to see that the lights on the easy checker go off.
2. Check the color of the exhaust gas.
3. Check the brakes for proper operation.

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	No fuel	Replenish fuel	G-10
	Air in the fuel system	Vent air	G-36
	Water in the fuel system	Change fuel and repair or replace fuel system	–
	Fuel hose clogged	Clean or replace	G-25
	Fuel filter clogged	Replace	G-30
	Excessively high viscosity of fuel or engine oil at low temperature	Use specified fuel or engine oil	G-10
	Fuel with low cetane number	Use specified fuel	G-10
	Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	1-S28
	Incorrect injection timing	Adjust	1-S19
	Fuel camshaft worn	Replace	1-S38
	Injection nozzle clogged	Repair or replace	1-S21, 28
	Injection pump malfunctioning	Repair or replace	1-S20, 40, 41, 42
	Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	–
	Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and nozzle holder	1-S28, 29, 30, 31, 32
	Improper valve timing	Correct or replace timing gear	1-S46
	Piston ring and cylinder worn	Replace	1-S48, 49, 66, 71
	Excessive valve clearance	Adjust	1-S14
	Stop solenoid malfunctioning	Replace	1-S35
Starter Does Not Run	Battery discharged	Charge	9-S8
	Starter malfunctioning	Repair or replace	9-S15, 40, 44
	Key switch malfunctioning	Replace	9-S12, 13
	Wiring disconnected	Connect	–

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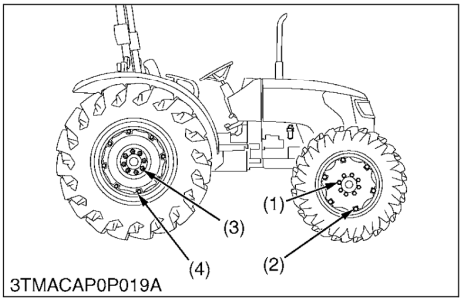
6. MAINTENANCE

No.	Item			Indication on hour meter														Interval	Important		Reference page
				50	100	150	200	250	300	350	400	450	500	550	600	650	700				
1	Engine start system		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr			G-21
2	Wheel bolt torque		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr			G-22
3	Battery condition		Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	*4		G-23
4	Greasing		–		☆		☆		☆		☆		☆		☆		☆	every 100 Hr			G-27
5	Fan/Air-conditioner belt		Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr			G-25
6	Alternator belt		Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr			G-25
7	Brake pedal		Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr			G-26
8	Clutch pedal [Synchro shuttle model]		Adjust	★	☆		☆		☆		☆		☆		☆		☆	every 100 Hr			G-18
9	Air cleaner element [Double type]	Primary element	Clean		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	*1	@	G-24
			Replace															every 1 year	*2		G-24
		Secondary element	Replace															every 1 year			G-24
10	Fuel line		Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr		@	G-26
			Replace															every 2 years			G-26
11	Toe-in		Adjust				☆				☆				☆			every 200 Hr			G-29
12	Fuel tank water		Drain				☆				☆				☆			every 200 Hr			G-29
13	Power steering oil line		Check				☆				☆				☆			every 200 Hr			G-28
			Replace															every 2 years			G-28
14	Radiator hose and clamp		Check				☆				☆				☆			every 200 Hr			G-28
			Replace															every 2 years			G-28
15	Intake air line		Check				☆				☆				☆			every 200 Hr		@	G-28
			Replace															every 2 years	*3		G-28
16	Engine oil		Change	★					☆						☆			every 300 Hr			G-18
17	Hydraulic oil filter		Replace	★					☆						☆			every 300 Hr			G-19
18	Greasing (2WD front wheel hub)		–								☆							every 400 Hr			G-31

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Checking Wheel Mounting Nuts Tightening Torque

CAUTION

- **Never operate tractor with a loose rim, wheel, or axle.**
- **Any time bolts and nuts are loosened, retighten to specified torque.**
- **Check all bolts and nuts frequently and keep them tight.**

1. Check the wheel mounting nuts regularly especially when new. If there are loosened, tighten as follows.

Tightening torque	Front wheel mounting nut (2WD)	M14	168 to 296 N·m 17.1 to 20.0 kgf·m 123.7 to 144.7 lbf·ft
	Front wheel mounting nut (4WD)	M16	259.9 to 304.0 N·m 26.5 to 31.0 kgf·m 191.7 to 224.2 lbf·ft
	Rear wheel mounting nut	M16	259.9 to 304.0 N·m 26.5 to 31.0 kgf·m 191.7 to 224.2 lbf·ft

Disc : Manufactured by TITAN INTERNATIONAL INC.

Tightening torque	Front disc mounting nut (waffle wheel) (4WD)	M16	298 to 366 N·m 30.4 to 37.3 kgf·m 220 to 270 lbf·ft
	Front disc mounting nut (Except waffle wheel) (4WD)	M16	244 N·m 24.9 kgf·m 180 lbf·ft
	Rear disc mounting nut (steel disc) (4WD)	M16	244 N·m 24.9 kgf·m 180 lbf·ft
	Rear disc mounting nut (cast iron disc) (4WD)	M16	259.9 to 304.0 N·m 26.5 to 31.0 kgf·m 191.7 to 224.2 lbf·ft

Disc : Other manufactured

Tightening torque	Front and rear disc mounting nut (Both steel disc and cast iron disc)	M16	259.9 to 304.0 N·m 26.5 to 31.0 kgf·m 191.7 to 224.2 lbf·ft

(1) Front Wheel Mounting Nut
(2) Front Disc Mounting Nut
(3) Rear Wheel Mounting Nut
(4) Rear Disc Mounting Nut

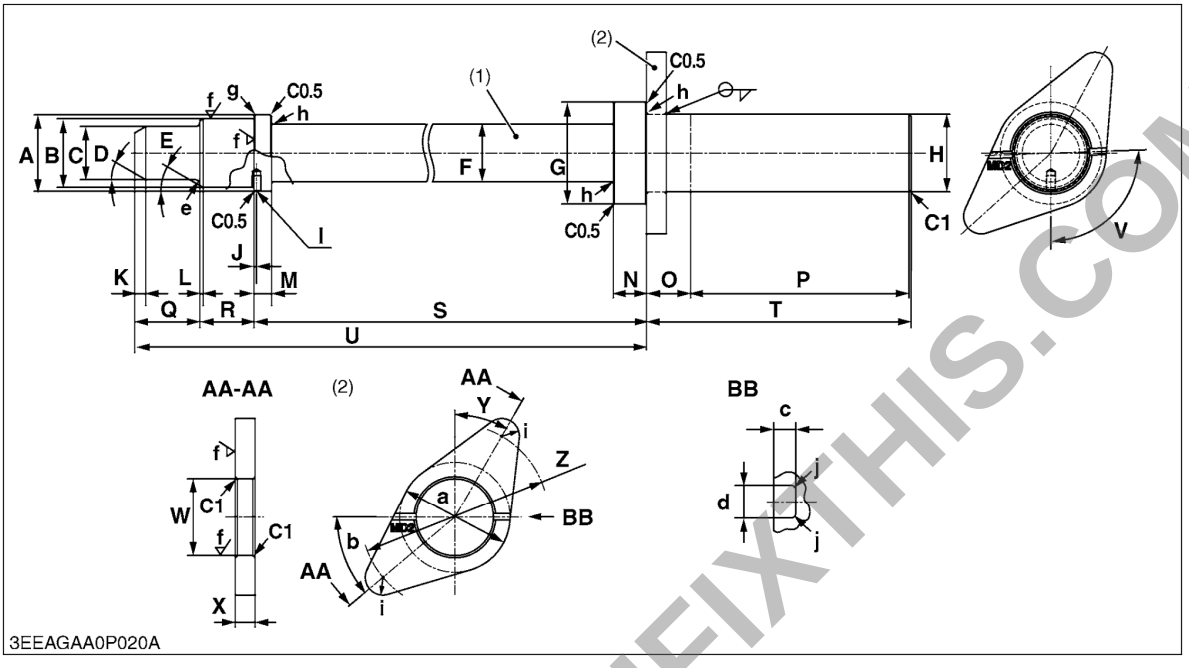
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Balancer Shaft 2 Bearing D Replacing Tool

Application: Use to press fit the bearing.

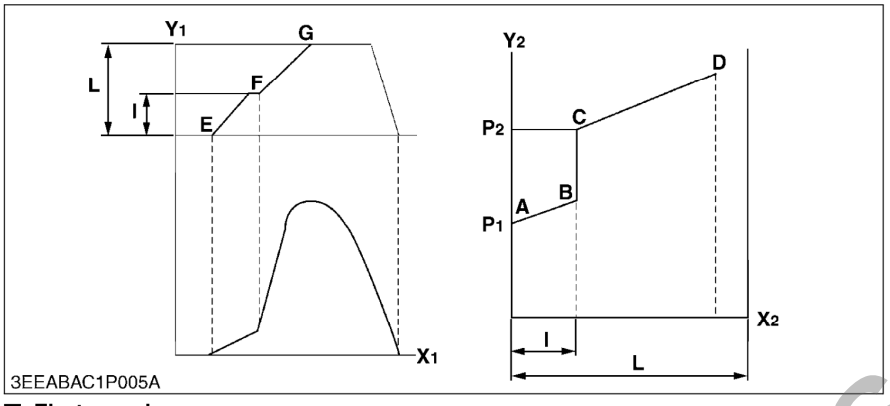


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A	34.5 mm dia. (1.3583 in. dia.)	**T**	120 mm (4.7244 in.)
B	30.8 to 30.9 mm dia. (1.2126 to 1.2165 in.)	**U**	479 mm (18.8583 in.)
C	24 mm dia. (0.9449 in. dia.)	**V**	1.605 rad (92 °)
D	0.523 rad (30 °)	**W**	35 mm dia. (1.3780 in. dia.)
E	0.523 rad (30 °)	**X**	9 mm (0.3543 in.)
F	26 mm dia. (1.0236 in. dia.)	**Y**	0.523 rad (30 °)
G	46 mm dia. (1.8110 in. dia.)	**Z**	84.5 to 85.5 mm (3.3268 to 3.3661 in.)
H	34.9 to 35.0 mm dia. (1.3740 to 1.3780 in. dia.)	**a**	50 mm (1.9685 in.)
I	4.000 to 4.018 mm dia., 7 mm depth (0.1575 to 0.1582 in. dia., 0.2756 in. depth)	**b**	0.698 rad (40 °)
J	1.2 mm (0.0472 in.)	**c**	2 mm (0.0787 in.)
K	5 mm (0.1969 in.)	**d**	3 mm (0.1181 in.)
L	1.5 mm (0.0591 in.)	**e**	2 mm radius (0.0787 in. radius)
M	8 mm (0.3150 in.)	**f**	Ra = 3.2 a
N	15 mm (0.5906 in.)	**g**	0.3 mm radius (0.0118 in. radius)
O	20 mm (0.7874 in.)	**h**	0.8 mm radius (0.0315 in. radius)
P	99 mm (3.8976 in.)	**i**	8.0 mm radius (0.3150 in. radius)
Q	29.5 mm (1.1614 in.)	**j**	0.4 mm radius (0.0157 in. radius)
R	24.5 mm (0.9646 in.)	**C0.5**	Chamfer 0.5 mm (0.0197 in.)
S	424.5 to 425.5 mm (16.7126 to 16.7520 in.)	**C1**	Chamfer 1.0 mm (0.0394 in.)

(1) Shaft (2) Stopper

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A-B : First Spring's Set Force
B-C-D : Combined Force of First and Second Springs
P1 : First Opening Pressure
P2 : Second Opening Pressure

L : Full Needle Valve Lift
I : Needle Valve Pre-lift

X1 : Cam Angle (°)
Y1 : Injection Rate (mm3/°)
X2 : Needle Valve Lift (mm)
Y2 : In-line Pressure

W1014795

■ **First opening pressure**

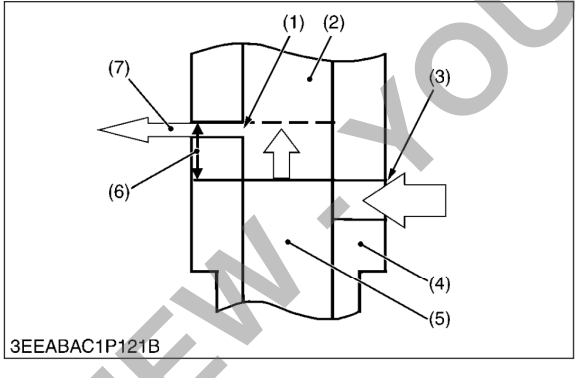
The force of the high pressure fuel delivered by the injection pump acts to push the needle valve up. When this force exceeds the set force of the first spring, the nozzle's needle valve pushes the first pushrod up and the valve opens. (First opening pressure is represented by point **E** in the left hand figure, and point **A** in the right hand figure.)

■ **Second opening pressure**

When the first pushrod has been lifted through the pre-lift, it contacts the second pushrod. As the set force of the second spring is acting on the second pushrod, the combined forces of both the first spring and the second spring then act on the needle valve, which will not lift unless these forces are overcome.

When the high pressure fuel (ie, in-line pressure) overcomes the combined forces of the first and second springs, the needle valve is again lifted and main injection can begin. (Second opening pressure is represemented by point **F** in the bottom left hand figure and **B-C** in the above figure.)

[3] INJECTION PUMP WITH F.S.P.



The fuel injection pump with F.S.P. (Fine Spill Port) mechanism is equipped with two functions: speed timer function and injection rate control function.

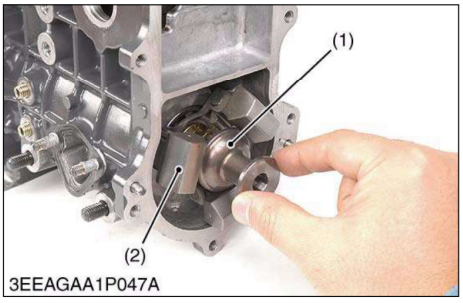
The former function works like this. As the rpm is low, the injection timing gets delayed. This helps cut down on NOx and operating noise.

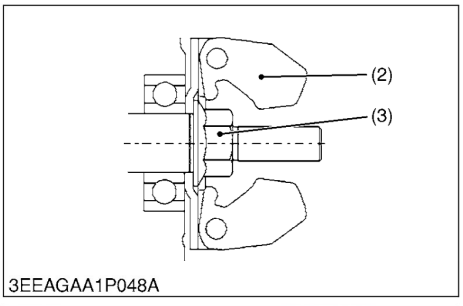
The latter function serves to keep down the initial injection rate and keep up the later injection rate, which cuts down on NOx and PM as well.

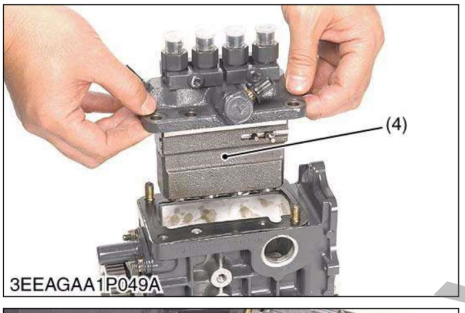
(1) Fine Spill Port (F.S.P.)
(2) Plunger Chamber
(3) Main Port
(4) Cylinder
(5) Plunger
(6) F.S.P. Stroke
(7) Leaking Fuel at Initial Fuel Pressure-Feed Stage

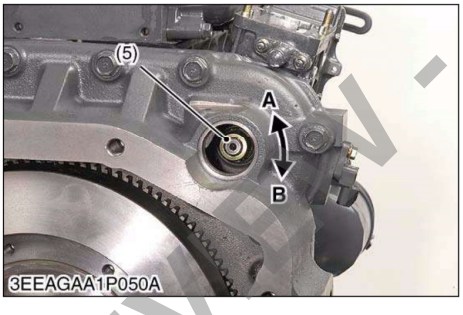
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Fuel Camshaft and Governor Weight

1. Separate the governor housing assembly from the injection pump unit. (See the “Injection Pump Unit”.)
2. Remove the governor sleeve (1).
3. Remove the injection pump assembly (4).
4. Remove the fuel camshaft lock screws.
5. Install the injection pump unit to the crankcase 1 again and temporarily tighten unit.
6. Fix the flywheel with the flywheel stopper and loosen the injection pump gear mounting nut (5).
7. Remove the governor weight mounting nut (3) and the governor weight (2).
8. Separate the injection pump unit from the crankcase 1.

■ **NOTE**

- **Do not use the fuel camshaft lock screws, when removing the governor weight mounting nut. Otherwise, the lock screws or injection pump housing might get damage.**

■ **IMPORTANT**

- **This injection pump gear mounting nut (3) has left-handed screw. To loose this nut, rotate clockwise (viewed from flywheel side).**

Tightening torque	Injection pump assembly mounting screw	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.3 to 20.3 lbf·ft
	Injection pump assembly mounting nut	17.7 to 20.6 N·m 1.8 to 2.1 kgf·m 13.0 to 15.2 lbf·ft
	Injection pump gear mounting nut (left-handed screw)	137.3 to 156.9 N·m 14.0 to 16.0 kgf·m 101.3 to 115.7 lbf·ft
	Governor weight mounting nut	62.8 to 72.6 N·m 6.4 to 7.4 kgf·m 46.3 to 53.5 lbf·ft

(1) Governor Sleeve
(2) Governor Weight
(3) Governor Weight Mounting Nut
(4) Injection Pump Assembly
(5) Injection Pump Gear Mounting Nut

A : To Tighten
B : To Loosen

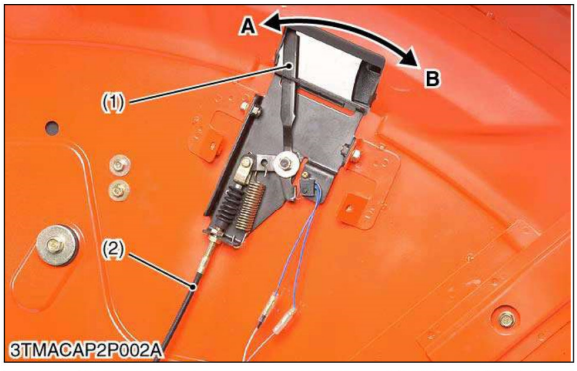
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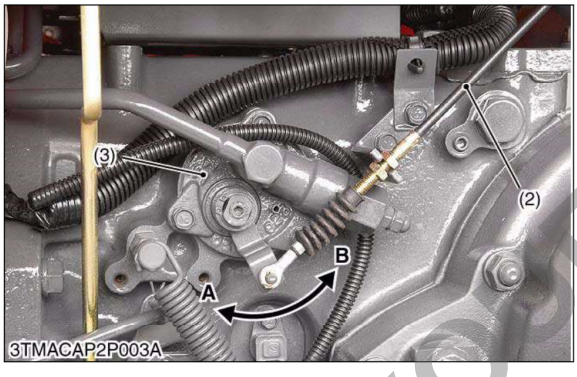
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2. PTO CLUTCH

[1] STRUCTURE





The PTO shift lever (1) and the PTO clutch valve (3) are connected by the PTO shift cable (2) as shown in the photo.

When the PTO shift lever (1) is moved to the **B** side, the PTO clutch valve (3) is set at **"Engaged"** position. Then the oil flows to clutch pack through the clutch valve (3). When the shift lever is moved to the **A** side, the PTO clutch is set at **"Disengaged"** position.

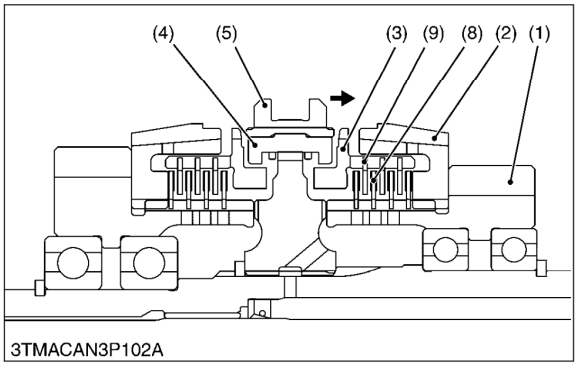
(1) PTO Shift Lever
(2) PTO Shift Cable
(3) PTO Clutch Valve

A : Disengage
B : Engage

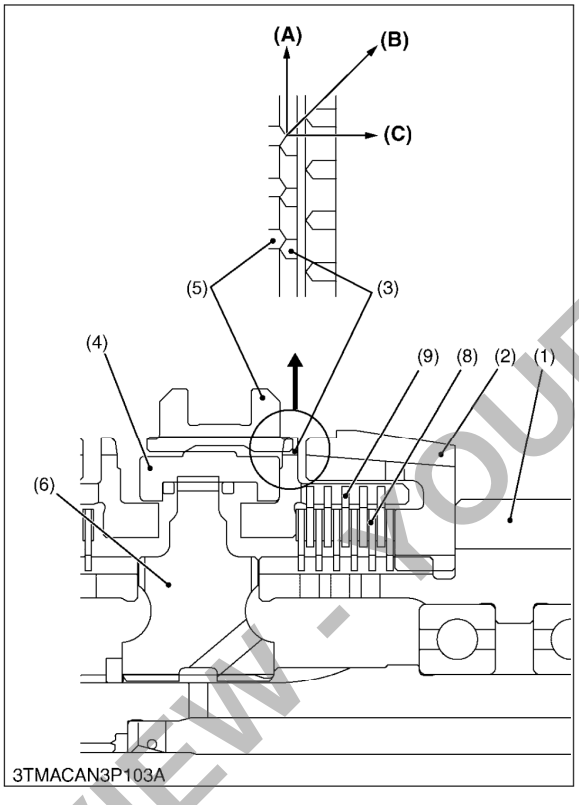
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● **First Stage**

An effort to place the shuttle lever to change the direction causes the shifter (5) and synchronizer keys (4) to move slightly. Then, the end surface of the synchronizer key (4) presses the holder 2 (3) against the plates (9) and discs (8). The frictional force generated at the plates (9) and discs (8) rotates the holder 2 (3), holder 1 (2) and gear (1).

(1) Gear
(2) Holder 1
(3) Holder 2
(4) Synchronizer Key
(5) Shifter
(8) Disc
(9) Plate

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● **Second Stage**

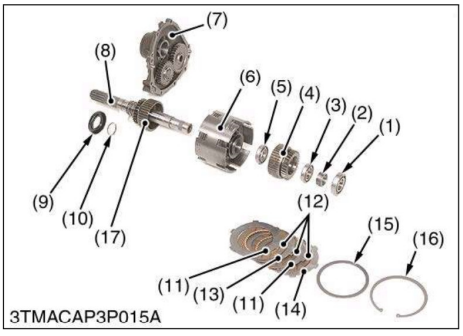
When synchronizer keys (4) are prevented by the holder 2 (3) from sliding, the synchronizer keys (4) are disengaged from the shifter (5). The synchronizer keys (4) fixed in the grooves provided on the holder 2 (3), however, since the width of the grooves are wider than that of the keys, the synchronizer keys begin rotating at the same speed with the holder 2 (3) and holder 1 (2) with a time lag. In the meantime, the shifter (5) has sliding direction toward the holder 2 (3) in its rotating direction press each other at their chamfered portions to synchronize the holder 2 (3) speed with the holder 1 (2) and gear (1) speed.

(1) Gear
(2) Holder 1
(3) Holder 2
(4) Synchronizer Key
(5) Shifter
(A) Turning Effort
(B) Composition of force
(C) Force to Shift

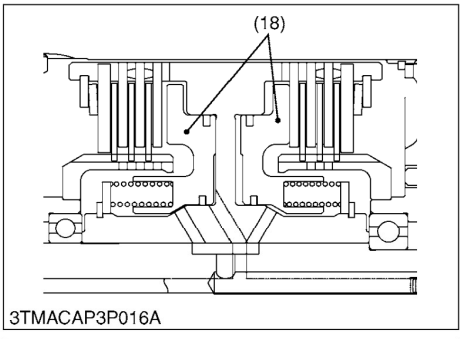
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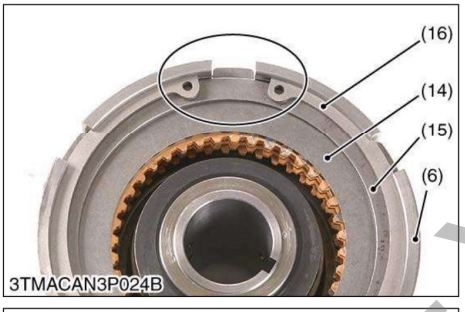
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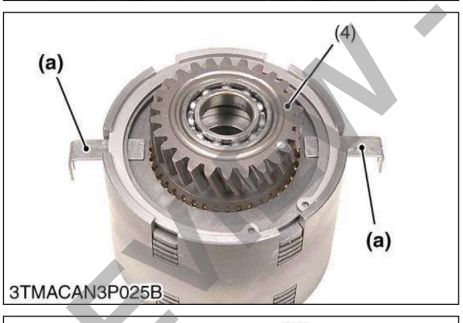
3TMACAP3P015A



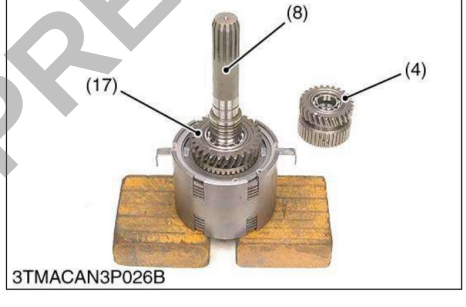
3TMACAP3P016A



3TMACAN3P024B



3TMACAN3P025B



3TMACAN3P026B

Disassembling Shuttle Clutch Assembly

1. Remove the ball bearing (1) and collar (2).
2. Remove the 29T gear (4).
3. Remove the oil seal (9) and external circlip (10).
4. Tap out the input shaft (8) with shuttle clutch (6).
5. Remove the internal circlip (16) and belleville washer (cupped spring washer) (15).
6. Take out the pressure plate (14), clutch discs (12) and steel plates (11), (13).

(When reassembling)

- Install the clutch discs (12) and steel plate (11), (13) together.
- Apply enough transmission fluid to the discs (12).
- Do not confuse the two types of steel plates.
  The steel plate with rubber plugs (13) and without rubber plugs (11).
- Do not confuse the pressure plates (14) and steel plate (11). The pressure plate (14) is thicker than the steel plate.
- Be sure to assemble the belleville washer (cupped spring washer) (15) direction as shown in figure.
- When installing the internal circlip (16) to the clutch body (6), align its split portion to the notched portion of clutch body as shown in photo.
- When assembling the input shaft (8) with 27T gear (17) for reverse side, temporary align the spline and clutch disc's teeth using the 29T gear (4).
  - Insert the steel piece **(a)** between belleville washer (cupped spring washer) (15) and pressure plate (14) to prevent turn the clutch discs (12) during assemble.
  - Draw out the 29T gear (4) after inserted the steel piece **(a)**. Then tap in the input shaft (8) with 27T gear (17).
  - Same procedure for forward side.
- Confirm the moving of the piston (18) smoothly when pressure air at 0.5 to 1.0 MPa (5 to 10 kgf/cm^2, 71 to 142 psi) is sent to clutch pack.

(1) Bearing
(2) Collar
(3) Bearing
(4) 29T Gear
(5) Bearing
(6) Clutch Body
(7) Shuttle Case
(8) Input Shaft
(9) Oil Seal
(10) External Circlip
(11) Steel Plate
(11) Steel Plate
(12) Clutch Disc
(13) Steel Plate
(14) Pressure Plate
(15) Belleville Washer (Cupped Spring Washer)
(16) Internal Circlip
(17) 27T Gear
(18) Piston

(a) Steel Piece

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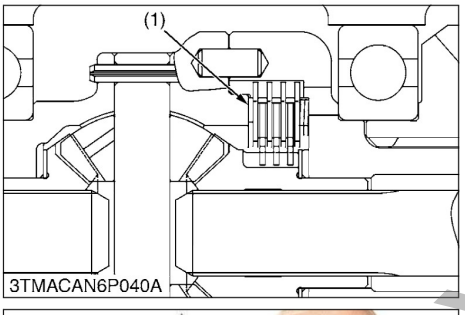
5 BRAKES

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3TMACAN6P029A


3TMACAN6P030A



3TMACAN6P040A


3TMACAN6P031A


3TMACAN6P032A

Slip Torque of LSD Disc

1. Set the differential assembly in the vice securely.
2. Check the LSD slip torque using a jig as shown in the photo.
3. If the LSD slip torque is not within the factory specification, adjust with LSD shim (1).

■ **IMPORTANT**

- **When measuring the slip torque for LSD, apply ample lubricant to the LSD disc.**
- **Turn the LSD side gear using a jig to clockwise and counterclockwise each direction several times to mesh the LSD disc and steel plate.**

LSD slip torque	Factory specification	34 to 44 N·m 3.5 to 4.5 kgf·m 25.4 to 32.5 lbf·ft

(Reference)

- Jig in the photo is : Spline from yoke shaft and welded with box wrench. (Refer to “8. SPECIAL TOOLS” at “G. GENERAL” section.)
- Thickness of LSD shim :
  0.1 mm (0.004 in.) [Code No.: 35533-43010]
  0.2 mm (0.008 in.) [Code No.: 35533-43020]
  0.4 mm (0.016 in.) [Code No.: 35533-43030]
  0.8 mm (0.032 in.) [Code No.: 35533-43040]
  1.0 mm (0.039 in.) [Code No.: 35533-43050]
  1.2 mm (0.047 in.) [Code No.: 35533-43060]

Thickness of steel plate	Factory specification	1.32 to 1.48 mm 0.05197 to 0.05827 in.
Thickness of LSD disc	Factory specification	2.55 to 2.65 mm 0.10039 to 0.10433 in.

- Slip torque changes per 0.1 mm (0.004 in.) shim :
  Approx. 5 to 7 N·m (0.5 to 0.7 kgf·m, 3.6 to 5.1 lbf·ft)

(1) Shim

W1022263

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2. SERVICING SPECIFICATIONS

HYDRAULIC PUMP

Item		Factory Specification	Allowable Limit
Hydraulic Pump for Three Point Linkage **Condition** • Engine speed : Approx. 2600 min^{-1} (rpm) • Rated pressure : 18.6 MPa 190 kgf/cm^2 2703 psi • Oil temperature : 50 to 60 °C 122 to 140 °F	Delivery	Above 38.3 L/min. 10.12 U.S.gals/min. 8.42 Imp.gals/min.	32.2 L/min. 8.51 U.S.gals/min. 7.08 Imp.gals/min.

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RELIEF AND SAFETY VALVE

Relief Valve	Setting Pressure	18.2 to 19.1 MPa 185 to 195 kgf/cm^2 2632 to 2773 psi	–
Safety Valve	Opening Pressure	23.1 to 24.5 MPa 235 to 250 kgf/cm^2 3342 to 3556 psi	–

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POSITION AND DRAFT CONTROL LINKAGE

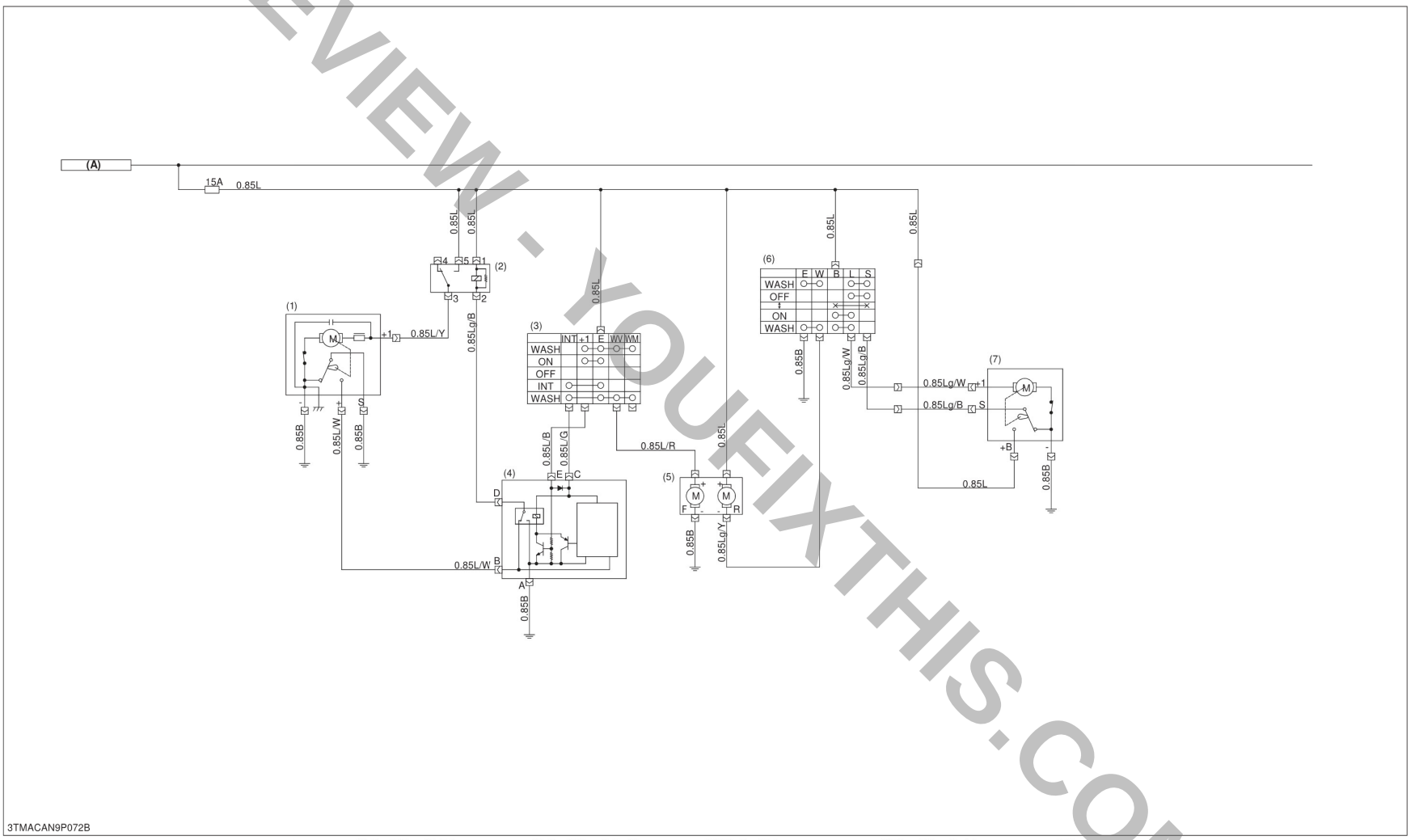
Position Control Rod (ROPS)	Length	Approx. 159 mm 6.26 in.	–
Draft Control Rod (ROPS)	Length	Approx. 146 mm 5.75 in.	–
Position Control Rod (CABIN)	Length	Approx. 185 mm 7.28 in.	–
Draft Control Rod (CABIN)	Length	Approx. 182 mm 7.17 in.	–
Position Feedback Rod (ROPS and CABIN)	Length	156 mm 6.14 in.	–
Draft Feedback Rod (ROPS and CABIN)	Length	252 mm 9.92 in.	–
Position Control	Floating Range	10 to 30 mm 0.39 to 1.18 in.	–
Uppermost Position of Lift Arm	Cylinder Free Play	5 to 8 mm 0.197 to 0.315 in.	–
Draft Lever Free Range	Floating Range	Less than 25.0 mm 0.984 in.	–
Draft Floating Range Check	Floating Range	More than 15.0 mm 0.59 in.	–
Position and Draft Control Lever	Operating Force	20 to 40 N 2.0 to 4.1 kgf 4.5 to 9.0 lbf	–

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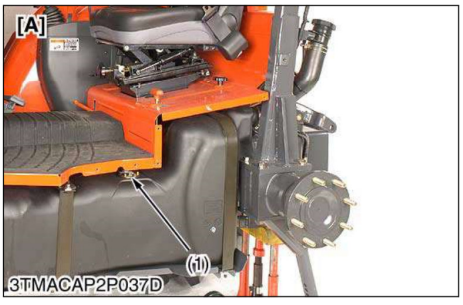
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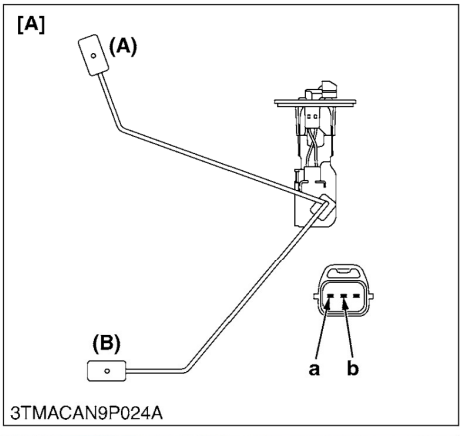
(6) Wiper System

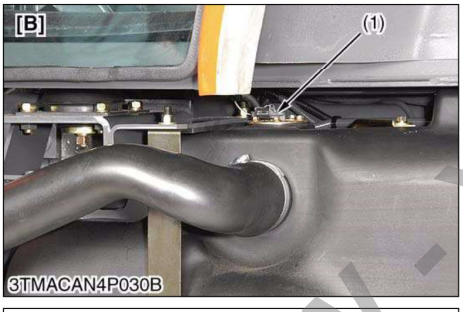


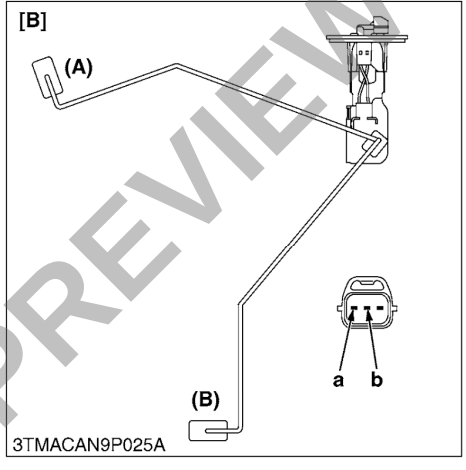
(1) Front Wiper Motor (2) Front Wiper Motor Relay (3) Front Wiper Switch (4) Front Wiper Relay/Timer (5) Washer Motor (6) Rear Wiper Switch (7) Rear Wiper Motor **(A) Key ACC**

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Checking Fuel Level Sensor

1. Remove the fuel level sensor from the fuel tank.
2. Measure the resistance with an ohmmeter across the terminal **a** and terminal **b**.
3. If the measurement is not indicated, the sensor is faulty.

Resistance (Sensor terminal **a** – terminal **b**)	Factory specification	Float at uppermost position	3.0 to 5.0 Ω
		Float at lowermost position	107.5 to 112.5 Ω

(1) Fuel Unit

[A] ROPS Model
[B] CABIN Model

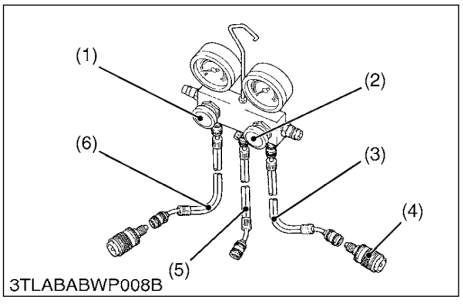
(A) Float at Uppermost Position
(B) Float at Lowermost Position
a : Terminal 1
b : Terminal 2

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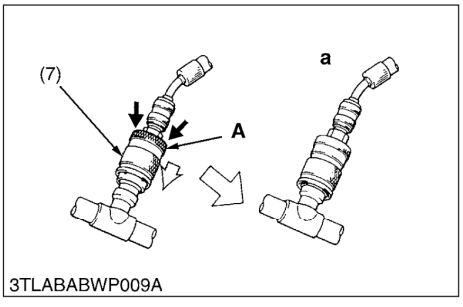
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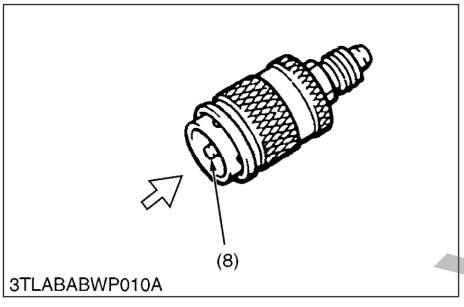
(2) Refrigerant Charging Hose



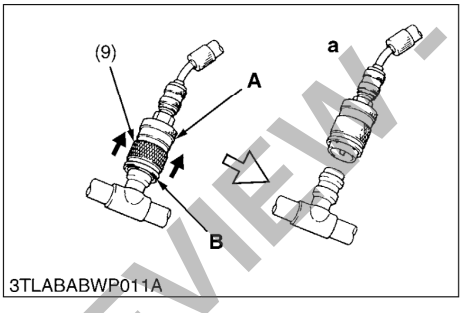
3TLABABWP008B



3TLABABWP009A



3TLABABWP010A



3TLABABWP011A

The charging hoses are classified into three colors. Each charging hose must be handled as follows :

- The air conditioner manufacture recommends that the blue hose (6) is used for the **LO** pressure side (suction side), the green hose (5) for refrigeration side (center connecting port) and the red hose (3) for **HI** pressure side (discharged side).

(When connecting)

- Push the quick disconnect adaptor (4) into the charging valve, and push on part **A** until a click is heard.

■ **NOTE**

- **When connecting, push carefully so the pipe does not bend.**
- **When connecting the quick disconnect connector, should the sleeve (7) move before the quick link connector can be connected to the charging valve, move the quick sleeve to its original position and try again.**
- **When some refrigerant remains in the charging hose at the time of connections, it may be difficult to connect the quick link connector. In this case, perform the operation after removing any residual pressure in the hose. (Remove the residual pressure by pushing the pusher (8).)**

(When reassembling)

- While holding on to part **A** of the quick disconnect adaptor, slide part **B** up.

■ **NOTE**

- **After removing the adaptor, ensure to cap the quick disconnect adaptor service valve.**

(1) **LO** Pressure Side Valve
(2) **HI** Pressure Side Valve
(3) Red Hose
(4) Quick Disconnect Adaptor
(5) Green Hose
(6) Blue Hose
(7) Sleeve
(8) Pusher
(9) Sleeve

a : CLICK

W1014039

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