WSM

WORKSHOP MANUAL

TRACTOR,FRONT LOADER, BACKHOE

B26,TL500,BT820

Kubota

KiSC issued 10, 2008 A

TO THE READER

This Workshop Manual has been prepared to provide servicing personnel with information on the mechanism, service and maintenance of KUBOTA Tractor BX26, KUBOTA Front Loader TL500 and KUBOTA backhoe BT820. It is divided into three parts, “General”, “Mechanism” and “Servicing” for each section.

■ **General**

Information on the tractor identification, the general precautions, maintenance check list, check and maintenance and special tools are described.

■ **Mechanism**

Information on the construction and function are included. This part should be understood before proceeding with troubleshooting, disassembling and servicing.

Refer to Diesel Engine / Tractor Mechanism Workshop Manual (Code No. 9Y021-01874 / 9Y021-18201) for the one which has not been described to this workshop manual.

■ **Servicing**

Information on the troubleshooting, servicing specification lists, tightening torque, checking and adjusting, disassembling and assembling and servicing which cover procedures, precautions, factory specifications and allowable limits.

All information illustrations and specifications contained in this manual are based on the latest product information available at the time of publication.

The right is reserved to make changes in all information at any time without notice.

January 2007

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.

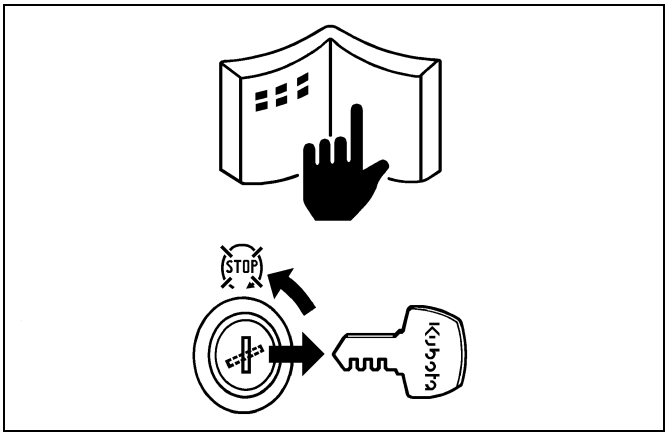
DANGER : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

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.

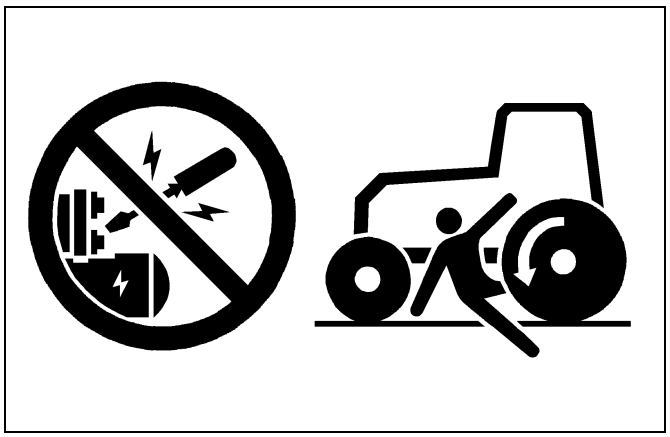
■ IMPORTANT : Indicates that equipment or property damage could result if instructions are not followed.

■ NOTE : Gives helpful information.



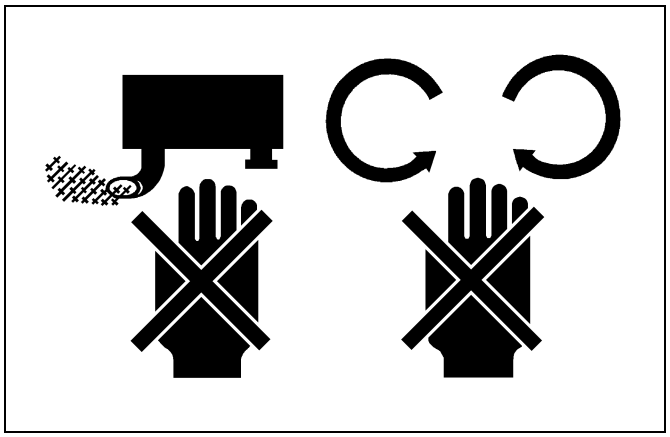
BEFORE SERVICING AND REPAIRING

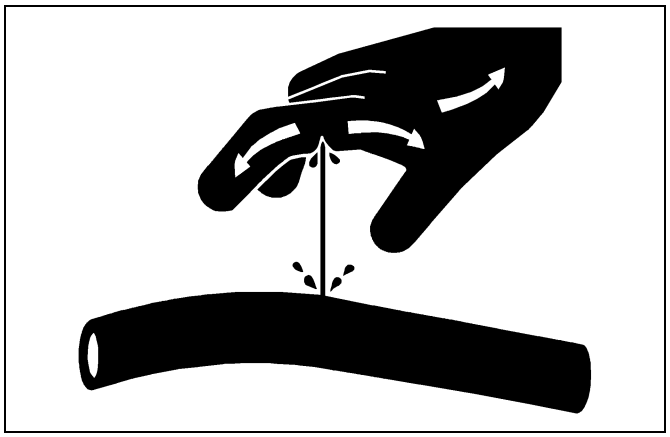
- Read all instructions and safety instructions in this manual and on your machine safety decals.
- Clean the work area and machine.
- Park the machine on a firm and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, and remove the key.
- Disconnect the battery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



SAFETY STARTING

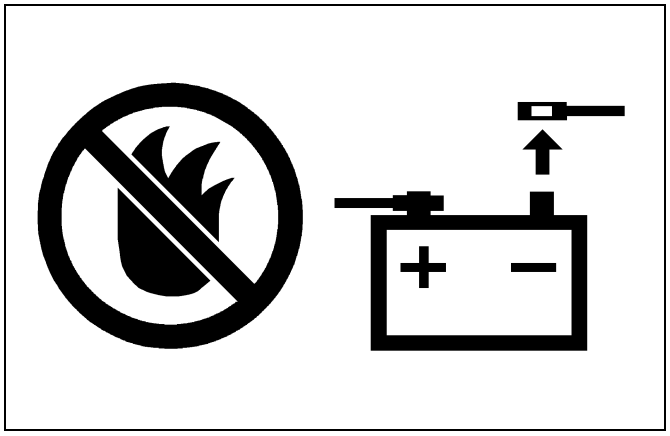
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine while standing on ground. Start the engine only from operator's seat.





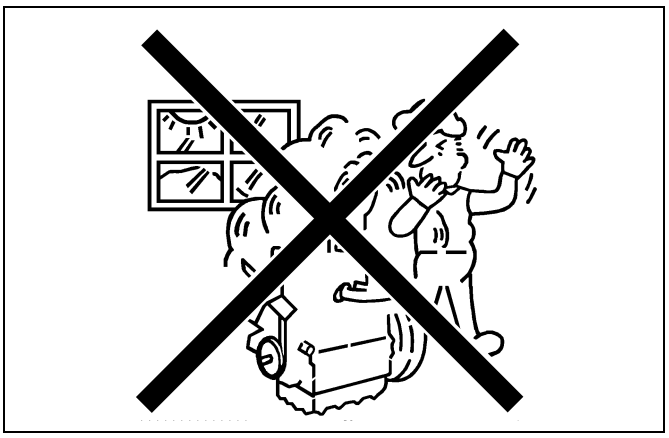
SAFETY WORKING

- Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
- Wear close fitting clothing and safety equipment appropriate to the job.
- Use tools appropriate to the work. Makeshift tools, parts, and procedures are not recommended.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Do not work under the machine that is supported solely by a jack. Always support the machine by safety stands.
- Do not touch the rotating or hot parts while the engine is running.
- Never remove the radiator cap while the engine is running, or immediately after stopping. Otherwise, hot water will spout out from radiator. Only remove radiator cap when cool enough to touch with bare hands. Slowly loosen the cap to first stop to relieve pressure before removing completely.
- Escaping fluid (fuel or hydraulic oil) under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or fuel lines. Tighten all connections before applying pressure.



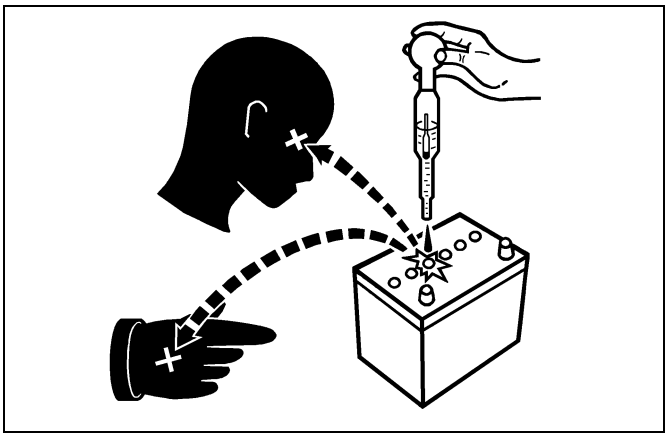
AVOID FIRES

- Fuel is extremely flammable and explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.
- To avoid sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
- Battery gas can explode. Keep sparks and open flame away from the top of battery, especially when charging the battery.
- Make sure that no fuel has been spilled on the engine.



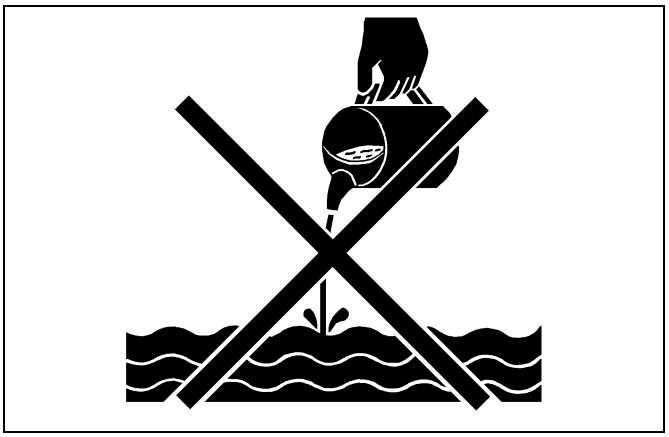
VENTILATE WORK AREA

- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in a closed area. The exhaust gas contains poisonous carbon monoxide.



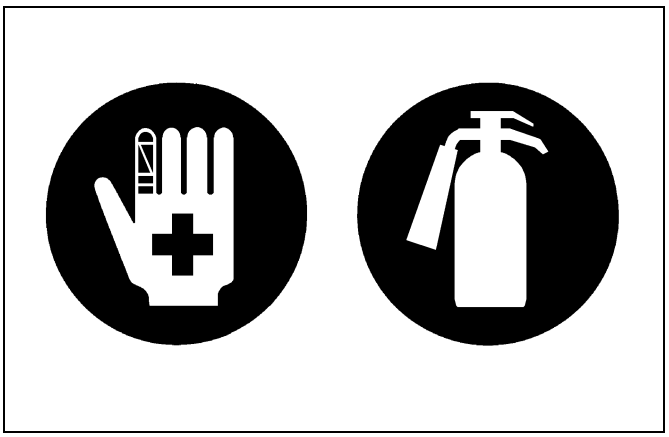
PREVENT ACID BURNS

- Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, clothing and cause blindness if splashed into eyes. Keep electrolyte away from eyes, hands and clothing. If you spill electrolyte on yourself, flush with water, and get medical attention immediately.



DISPOSE OF FLUIDS PROPERLY

- Do not pour fluids into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, electrolyte and other harmful waste.



PREPARE FOR EMERGENCIES

- Keep a first aid kit and fire extinguisher handy at all times.
- Keep emergency numbers for doctors, ambulance service, hospital and fire department near your telephone.

SAFETY DECALS

The following safety decals are installed on the machine.
If a decal becomes damaged, illegible or is not on the machine, replace it. The decal part number is listed in the parts list.

(1) Part No. 6C070-4742-2

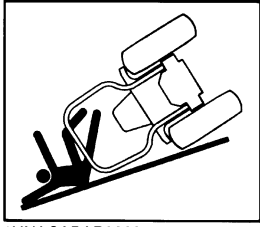
⚠ C A U T I O N

TO AVOID PERSONAL INJURY:
1. Read and understand the operator's manual before operation.
2. Before starting the engine, make sure that everyone is at a safe distance from the tractor and that the PTO is OFF.
3. Do not allow passengers on the tractor at any time.
4. Before allowing other people to use the tractor, have them read the operator's manual.
5. Check the tightness of all nuts and bolts regularly.
6. Keep all shields in place and stay away from all moving parts.
7. Lock the two brake pedals together before driving on the road.
8. Slow down for turns, or rough roads, or when applying individual brakes.
9. On public roads use SMV emblem and hazard lights, if required by local traffic and safety regulations.
10. Pull only from the drawbar.
11. Before dismounting, lower the implement to the ground, set the parking brake, stop the engine and remove the key.
12. Securely support tractor and implements before working underneath.

1AGAEBMAP068E

(2) Part No. 32771-4925-1

⚠ WARNING



TO AVOID PERSONAL INJURY OR DEATH FROM ROLL-OVER :
1. Kubota recommends the use of a Roll-Over Protective structures (ROPS) and seat belt in almost all applications.
2. To ensure ROPS protection, do not operate tractor without loader mainframe.
3. Never use just the seat belt or just the ROPS. They must be used together. For further details, consult your Operator's Manual or your local dealer.

1HNACABAP0880

(3) Part No. 32741-4751-1

⚠ C A U T I O N

TO AVOID PERSONAL INJURY:
BEFORE STARTING THE ENGINE
1. Make sure the parking brake is set.
2. Make sure the range gear shift lever (L-M-H) is in "NEUTRAL" position.

1HNABABAP065E

(4) Part No. 6C150-4743-1

⚠ WARNING

BEFORE DISMOUNTING TRACTOR:
1. **ALWAYS SET PARKING BRAKE.**
   Leaving transmission in gear with the engine stopped will not prevent tractor from rolling.
2. **PARK ON LEVEL GROUND WHENEVER POSSIBLE.**
   If parking on a slope, position tractor across the slope.
3. **LOWER ALL IMPLEMENTS TO THE GROUND.**
4. **STOP THE ENGINE.**

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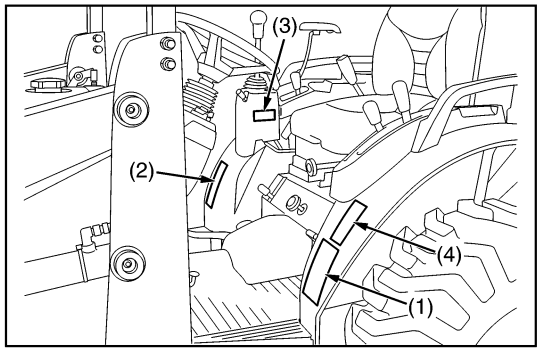

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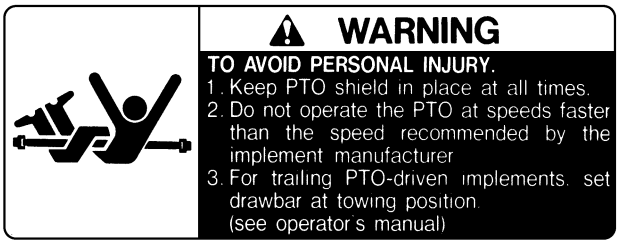
(1) Part No. TA040-4959-3



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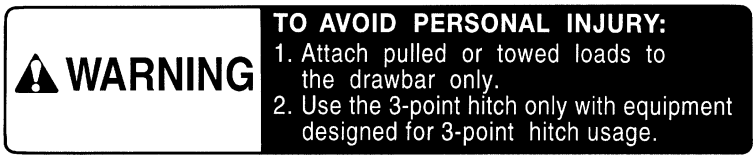

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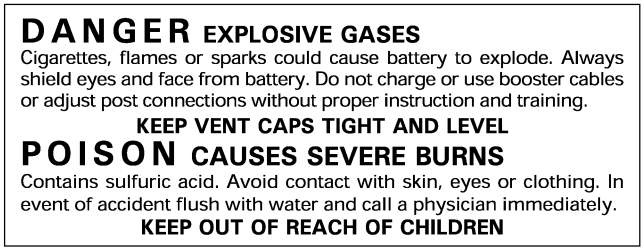
(3) Part No. 6C040-5559-1



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(4) Part No. 6C300-4741-3

No fire

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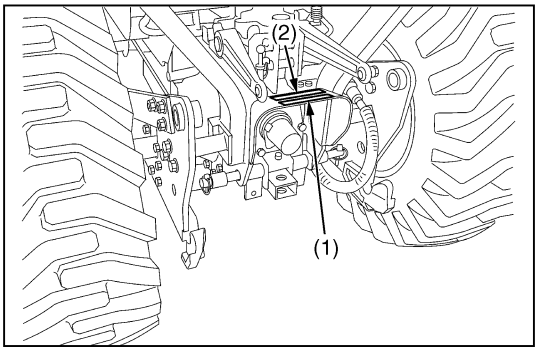

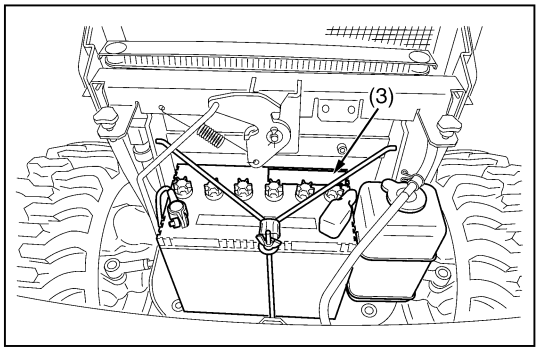

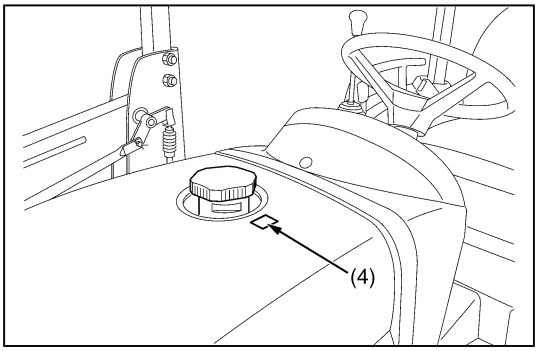

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(1) Part No. 6C090-4965-1

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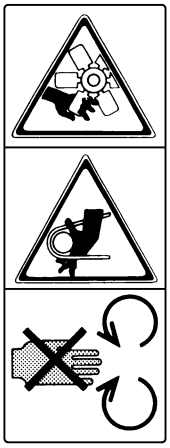
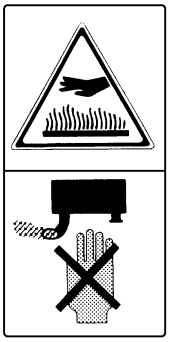
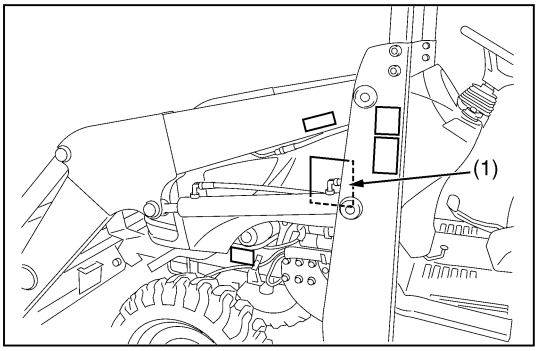
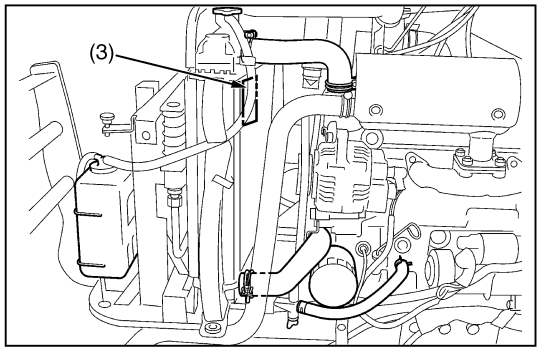
(2) Part No. 32751-4958-1
Do not get your hands close to engine fan and fan belt.

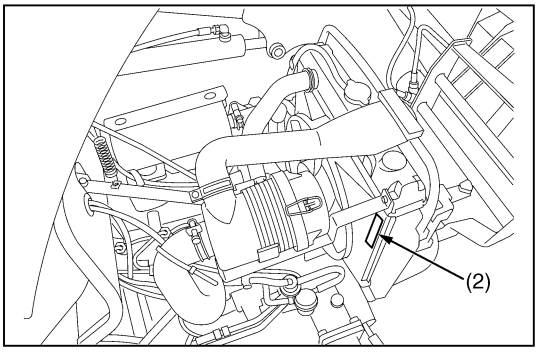


(3) Part No. TA040-4958-1
Do not touch hot surface like muffler, etc..









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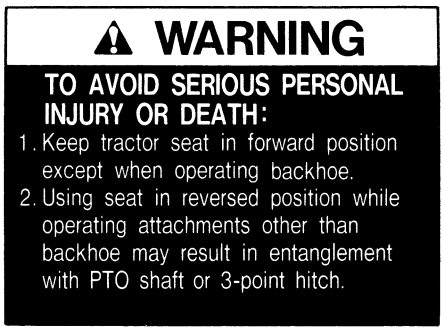

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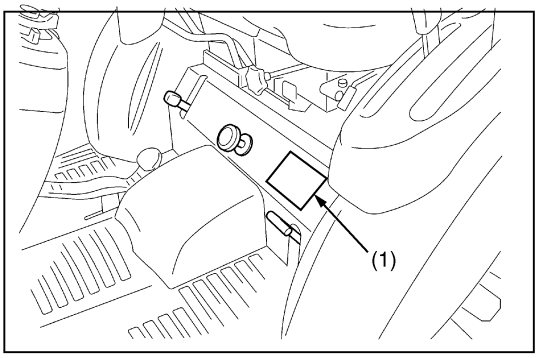

(2) Part No. 6C140-4746-1

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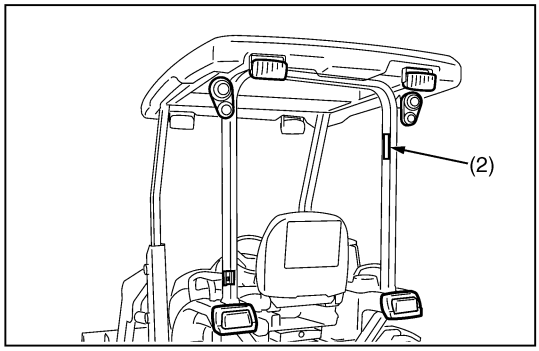

CARE OF DANGER, WARNING AND CAUTION LABELS

1. Keep danger, warning and caution labels clean and free from obstructing material.
2. Clean danger, warning and caution labels with soap and water, dry with a soft cloth.
3. Replace damaged or missing danger, warning and caution labels with new labels from your local KUBOTA distributor.
4. If a component with danger, warning and caution label(s) affixed is replaced with new part, make sure new label(s) is (are) attached in the same location(s) as the replaced component.
5. Mount new danger, warning and caution labels by applying on a clean dry surface and pressing any bubbles to outside edge.

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SPECIFICATIONS

Model			B26
			4WD
PTO power			14.5 kW (19.5 HP)*
Engine	Maker		KUBOTA
	Model		D1105-E2-D21 / D1105-E3-TLB
	Type		Indirect injection. Vertical, water-cooled 4-cycle diesel
	No. of cylinders		3
	Bore and stroke		ϕ 78 $\times$ 78.4 mm (ϕ 3.1 $\times$ 3.1 in.)
	Total displacement		1123 cm^3 (68.5 cu. in.)
	Engine gross power		19.4 kW (26.0 HP)*
	Rated revolution		2800 min^{-1} (rpm)
	Maximum torque		77.6 N·m (57.2 lbf·ft)
	Battery		12 V, RC: 79 min., CCA: 433A
	Fuel		Diesel fuel No. 1 [below −10 °C (14 °F)], Diesel fuel No. 2 [above −10 °C (14 °F)]
Capacities	Fuel tank		31 L (8.1 U.S.gals, 6.8 Imp.gals)
	Engine crankcase (with filter)		3.0 L (3.2 U.S.qts, 2.6 Imp.qts)
	Engine coolant		4.5 L (4.7 U.S.qts, 4.0 Imp.qts)
	Transmission case (with oil tank)		26 L (6.9 U.S.gals, 5.7 Imp.gals)
Dimensions	Overall length (without 3P)		2557 mm (100.7 in.)
	Overall width (min. tread)		1365 mm (53.7 in.)
	Overall height (with canopy)		2273 mm (89.5 in.)
	Wheel base		1581 mm (62.2 in.)
	Min. ground clearance		350 mm (13.8 in.)
	Tread	Front	905 mm (35.6 in.)
		Rear	1050 mm (41.3 in.)
Weight (with ROPS and FOPS, main frame)			1182 kg (2606 lbs)
Clutch			N/A
Traveling system	Tires	Front	23 $\times$ 8.50-14
		Rear	12.4-16
	Steering		Hydrostatic type power steering
	Transmission		Main-hydrostatic transmission, 3 range gear shift (3 forward, 3 reverse)
	Brake		Wet disk type
	Min. turning radius (without brake)		2.5 m (8.2 feet)
Hydraulic unit	Hydraulic control system		Position control
	Pump capacity		3P : 26.3 L/min. (7.0 U.S.gals/min., 5.8 Imp.gals/min.) Power steering : 16.0 L/min. (4.2 U.S.gals/min., 3.5 Imp.gals/min.)
	Three point hitch		SAE Category 1
	Max. lift force	At lift points	970 kg (2139 lbs)
		24 in. behind lift point	760 kg (1676 lbs)
PTO	Rear PTO		SAE 1-3/8, 6 splines
	PTO / Engine speed		1 speed 540 min^{-1} (rpm) / 2768 min^{-1} (rpm)

NOTE: * Manufacture's estimate The company reserves the right to change the specifications without notice.

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TRAVELLING SPEEDS

(At rated engine rpm)

Model		**B26**			
Tire size (Rear)		12.4-16 R4 IND		12.4-16 Farm	
	Range gear shift lever	km/h	mph	km/h	mph
Forward	Low	0 to 4.5	0 to 2.8	0 to 4.8	0 to 3.0
	Middle	0 to 8.4	0 to 5.2	0 to 8.9	0 to 5.5
	High	0 to 17.8	0 to 11.1	0 to 18.6	0 to 11.5
Reverse	Low	0 to 4.0	0 to 2.5	0 to 4.2	0 to 2.6
	Middle	0 to 7.4	0 to 4.6	0 to 7.9	0 to 4.9
	High	0 to 15.8	0 to 9.8	0 to 16.5	0 to 10.3

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Model		**B26**	
Tire size (Rear)		13.6-16 Turf	
	Range gear shift lever	km/h	mph
Forward	Low	0 to 4.9	0 to 3.1
	Middle	0 to 9.1	0 to 5.7
	High	0 to 19.0	0 to 11.8
Reverse	Low	0 to 4.3	0 to 2.7
	Middle	0 to 8.1	0 to 5.0
	High	0 to 16.9	0 to 10.5

The company reserves the right to change the specifications without notice.

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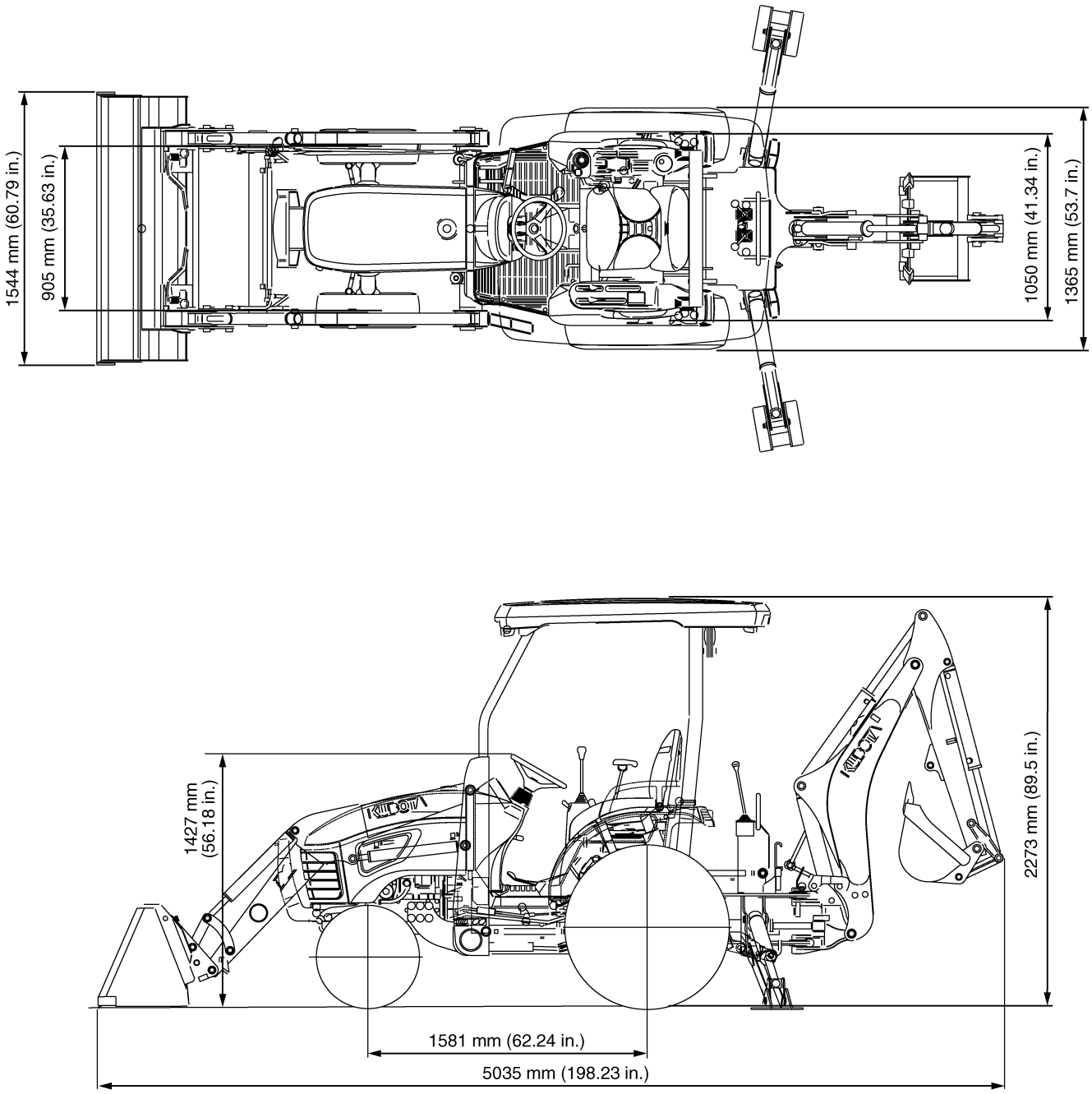
DIMENSIONS



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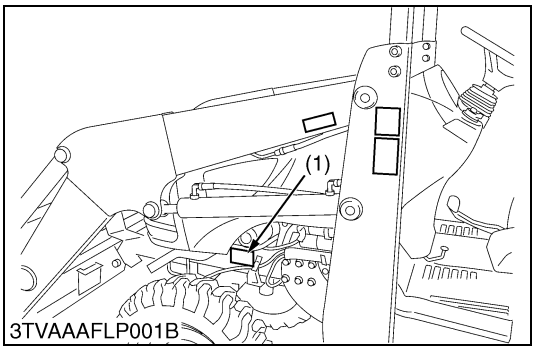
G GENERAL

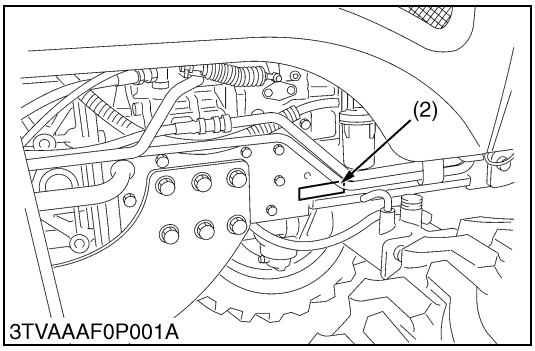
GENERAL

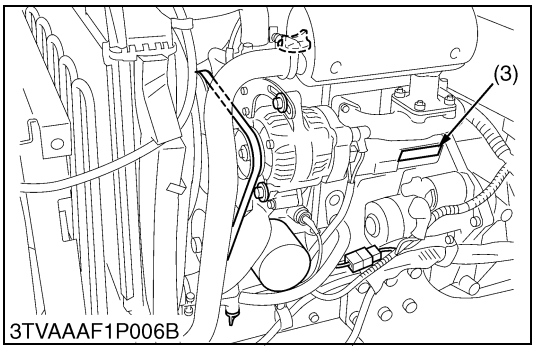
CONTENTS

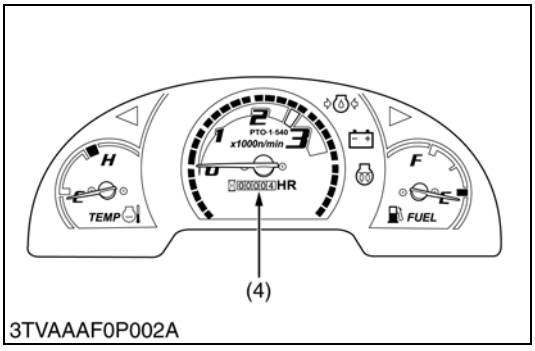
1. TRACTOR IDENTIFICATION

[1] MODEL NAME AND SERIAL NUMBERS









When contacting your local KUBOTA distributor, always specify engine serial number, tractor serial number and hour meter reading.

(1) Tractor Identification Plate
(2) Tractor Serial Number
(3) Engine Serial Number
(4) Hour Meter (IntelliPanel Display)

W10106000

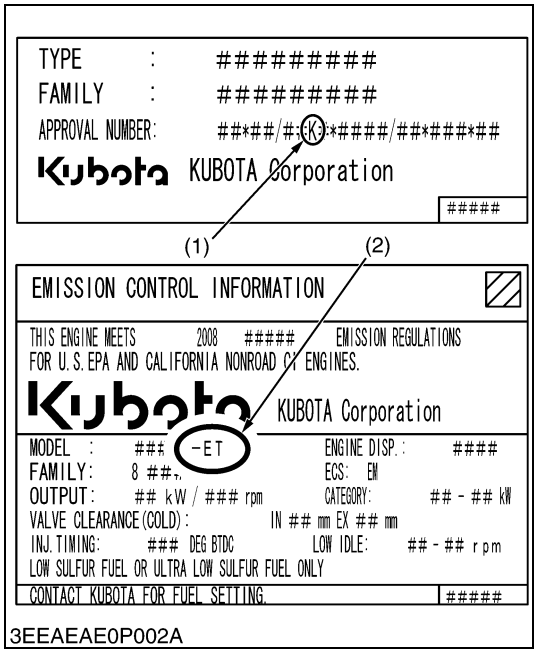
[2] E3 ENGINE

[Example : Engine Model Name V2403-M-TE3-XXX]

The emission controls previously implemented in various countries to prevent air pollution will be stepped up as Non-Road Emission Standards continue to change. The timing or applicable date of the specific Non-Road Emission regulations depends on the engine output classification.

Over the past several years, Kubota has been supplying diesel engines that comply with regulations in the respective countries affected by Non-Road Emission regulations. For Kubota Engines, E3 will be the designation that identifies engine models affected by the next emission phase (See the table below).

When servicing or repairing ###-E3 series engines, use only replacement parts for that specific E3 engine, designated by the appropriate E3 Kubota Parts List and perform all maintenance services listed in the appropriate Kubota Operator's Manual or in the appropriate E3 Kubota Workshop Manual. Use of incorrect replacement parts or replacement parts from other emission level engines (for example: E2 engines), may result in emission levels out of compliance with the original E3 design and EPA or other applicable regulations. Please refer to the emission label located on the engine head cover to identify Output classification and Emission Control Information. E3 engines are identified with "ET" at the end of the Model designation, on the US EPA label. Please note : E3 is not marked on the engine.



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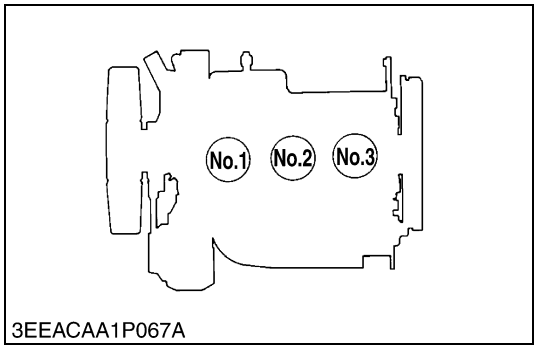
Category (1)	Engine output classification	EU regulation
K	From 19 to less than 37 kW	STAGE IIIA
J	From 37 to less than 75 kW	STAGE IIIA
I	From 75 to less than 130 kW	STAGE IIIA

Category (2)	Engine output classification	EPA regulation
ET	Less than 19kW	Tier 4
	From 19 to less than 56 kW	Interim Tier 4
	From 56 to less than 75 kW	Tier 3
	From 75 to less than 130 kW	Tier 3

(1) EU regulation engine output classification category
(2) "E3" engines are identified with "ET" at the end of the Model designation, on the US EPA label.
"E3" designates Tier 3 and some Interim Tier 4 / Tier 4 models, depending on engine output classification.

W1031971

[3] CYLINDER NUMBER



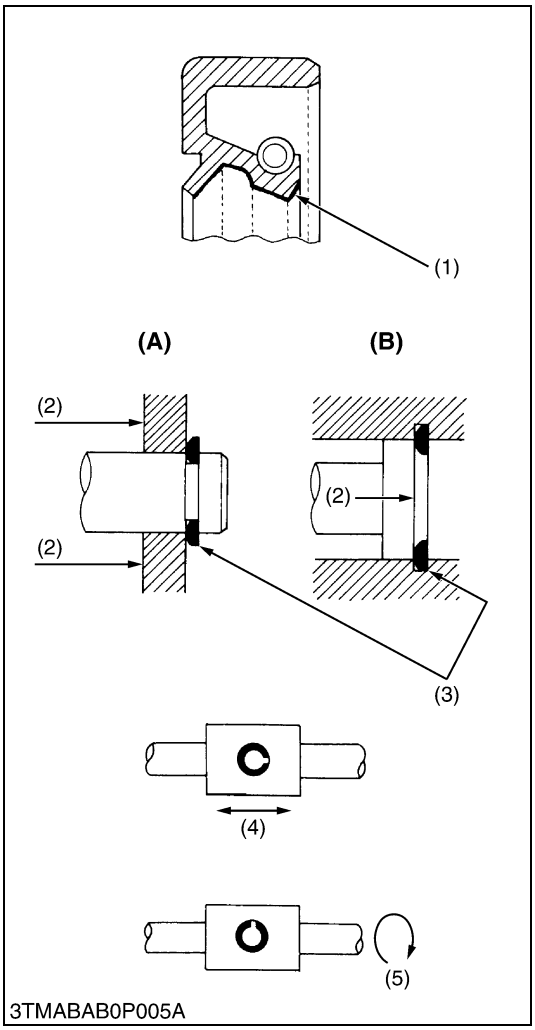
3EEACAA1P067A

The cylinder numbers of KUBOTA diesel engine are designated as shown in the figure.

The sequence of cylinder numbers is given as No.1, No.2 and No.3 starting from the gear case side.

W1011077

2. GENERAL PRECAUTIONS



3TMABAB0P005A

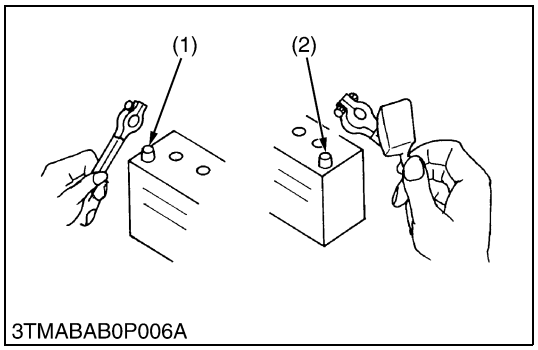
- During disassembly, carefully arrange removed parts in a clean area to prevent confusion later. Screws, bolts and nuts should be installed in their original position to prevent reassembly errors.
- When special tools are required, use KUBOTA genuine special tools. Special tools which are not frequently used should be made according to the drawings provided.
- Before disassembling or servicing electrical wires, always disconnect the ground cable from the battery first.
- Remove oil and dirt from parts before measuring.
- Use only KUBOTA genuine parts for parts replacement to maintain machine performance and to assure safety.
- Gaskets and O-rings must be replaced during reassembly. Apply grease to new O-rings or oil seals before assembling. See the figure left side.
- When reassembling external snap rings or internal snap rings, they must be positioned so that sharp edge faces against the direction from which a force is applied. See the figure left side.
- When inserting spring pins, their splits must face the direction from which a force is applied. See the figure left side.
- To prevent damage to the hydraulic system, use only specified fluid or equivalent.

(1) Grease
(2) Force
(3) Sharp Edge
(4) Axial Force
(5) Rotating Movement

(A) External Snap Ring
(B) Internal Snap Ring

W10109040

3. HANDLING PRECAUTIONS FOR ELECTRICAL PARTS AND WIRING



3TMABAB0P006A

To ensure safety and prevent damage to the machine and surrounding equipment, heed the following precautions in handling electrical parts and wiring.

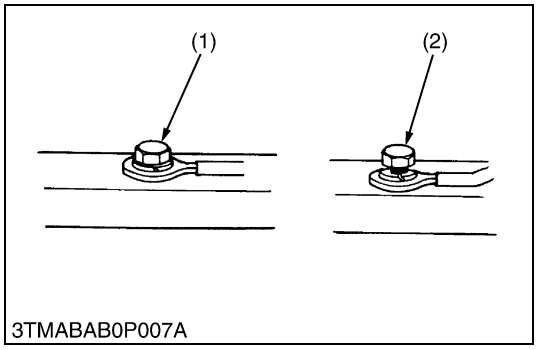
■ **IMPORTANT**

- **Check electrical wiring for damage and loosened connection every year. To this end, educate the customer to do his or her own check and at the same time recommend the dealer to perform periodic check for a fee.**
- **Do not attempt to modify or remodel any electrical parts and wiring.**
- **When removing the battery cables, disconnect the negative cable first. When installing the battery cables, connect the positive cable first.**

(1) Negative Terminal (2) Positive Terminal

W10111140

[1] WIRING

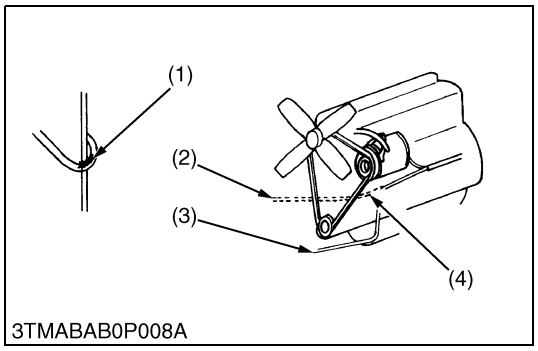


3TMABAB0P007A

- Securely tighten wiring terminals.

(1) Correct (Securely Tighten) (2) Incorrect (Loosening Leads to Faulty Contact)

W10112160

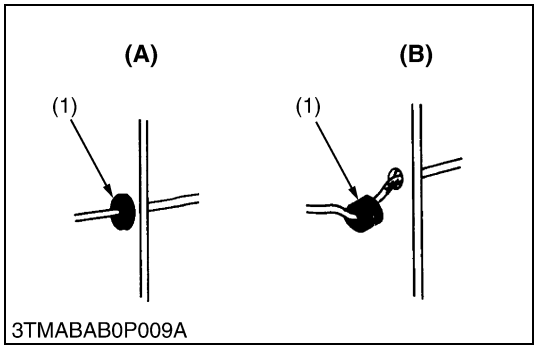


3TMABAB0P008A

- Do not let wiring contact dangerous part.

(1) Dangerous Part (3) Wiring (Correct)
(2) Wiring (Incorrect) (4) Dangerous Part

W10113130

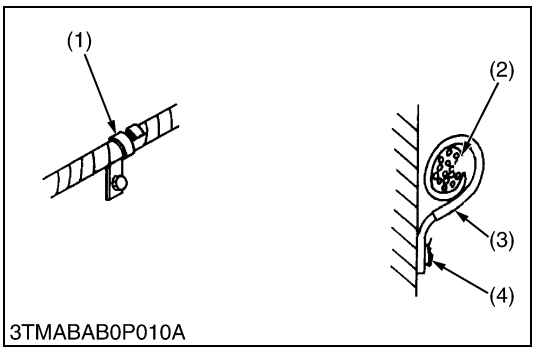


3TMABAB0P009A

- Securely insert grommet.

(1) Grommet **(A) Correct** **(B) Incorrect**

W10113880

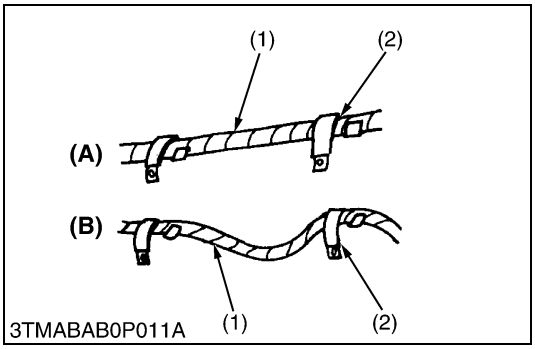


3TMABAB0P010A

- Securely clamp, being careful not to damage wiring.

(1) Clamp
• Wind Clamp Spirally
(2) Wire Harness
(3) Clamp
(4) Welding Dent

W10114580

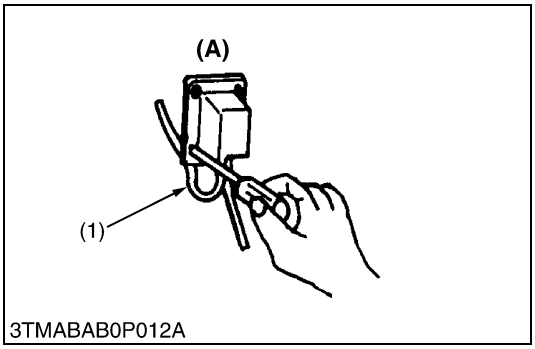


3TMABAB0P011A

- Clamp wiring so that there is no twist, unnecessary sag, or excessive tension, except for movable part, where sag be required.

(1) Wiring
(2) Clamp
(A) Correct
(B) Incorrect

W10115870

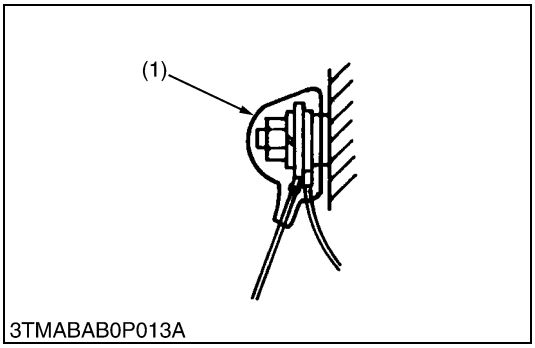


3TMABAB0P012A

- In installing a part, take care not to get wiring caught by it.

(1) Wiring
(A) Incorrect

W10116700



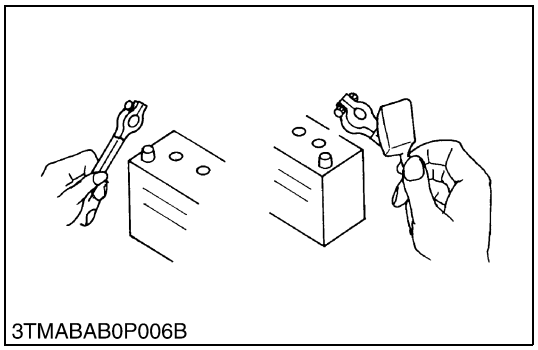
3TMABAB0P013A

- After installing wiring, check protection of terminals and clamped condition of wiring, only connect battery.

(1) Cover
• Securely Install Cover

W10117350

[2] BATTERY


3TMABAB0P006B

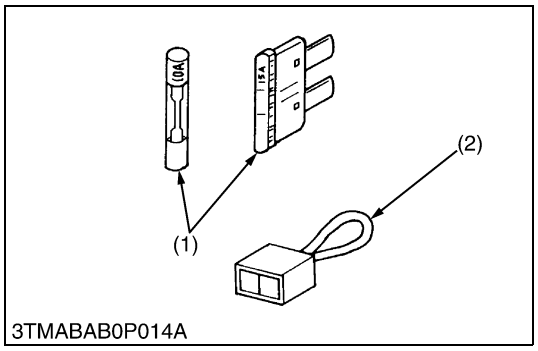
- Take care not to confuse positive and negative terminal posts.
- When removing battery cables, disconnect negative cable first. When installing battery cables, check for polarity and connect positive cable first.
- Do not install any battery with capacity other than is specified (Ah).
- After connecting cables to battery terminal posts, apply high temperature grease to them and securely install terminal covers on them.
- Do not allow dirt and dust to collect on battery.

CAUTION

- **Take care not to let battery liquid spill on your skin and clothes. If contaminated, wash it off with water immediately.**
- **Before recharging the battery, remove it from the machine.**
- **Before recharging, remove cell caps.**
- **Do recharging in a well-ventilated place where there is no open flame nearby, as hydrogen gas and oxygen are formed.**

W10118160

[3] FUSE



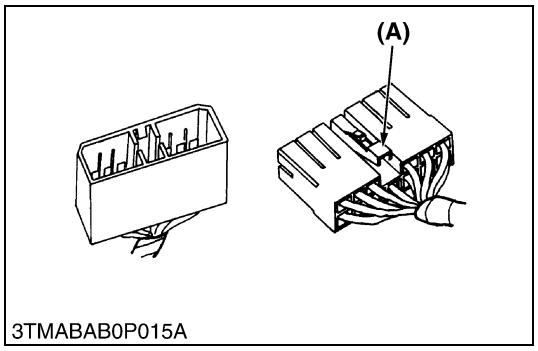
3TMABAB0P014A

- Use fuses with specified capacity.
  Neither too large or small capacity fuse is acceptable.
- Never use steel or copper wire in place of fuse.
- Do not install working light, radio set, etc. on machine which is not provided with reserve power supply.
- Do not install accessories if fuse capacity of reserve power supply is exceeded.

(1) Fuse (2) Slow Blow Fuse

W10120920

[4] CONNECTOR

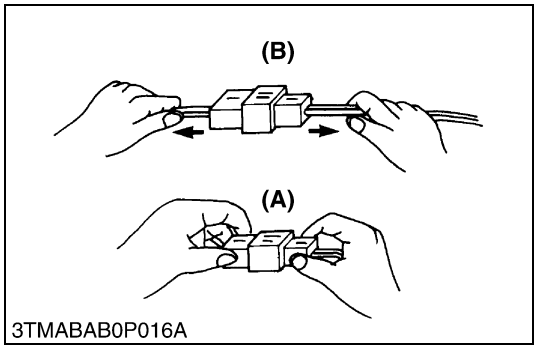


3TMABAB0P015A

- For connector with lock, push lock to separate.

(A) Push

W10122110

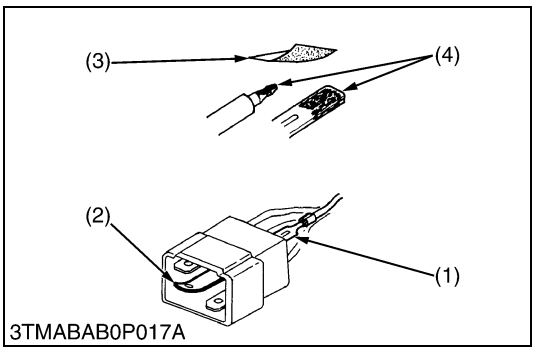


3TMABAB0P016A

- In separating connectors, do not pull wire harnesses.
- Hold connector bodies to separate.

(A) Correct **(B) Incorrect**

W10122720

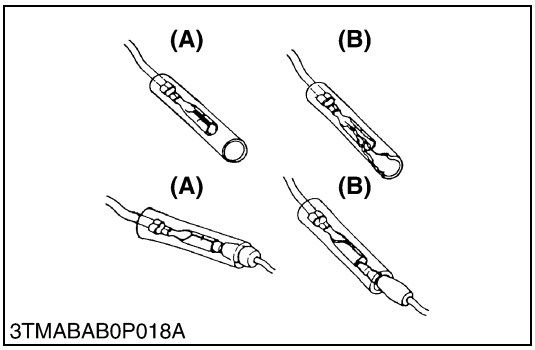


3TMABAB0P017A

- Use sandpaper to remove rust from terminals.
- Repair deformed terminal. Make certain there is no terminal being exposed or displaced.

(1) Exposed Terminal
(2) Deformed Terminal
(3) Sandpaper
(4) Rust

W10123460

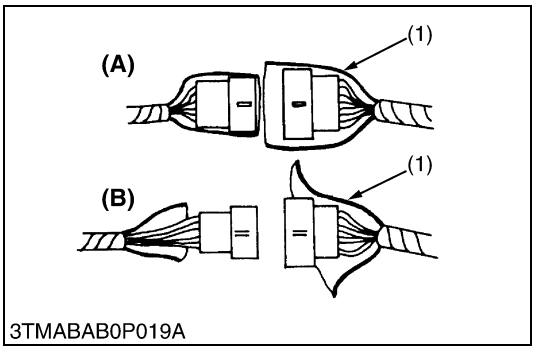


3TMABAB0P018A

- Make certain that there is no female connector being too open.

(A) Correct
(B) Incorrect

W10124300



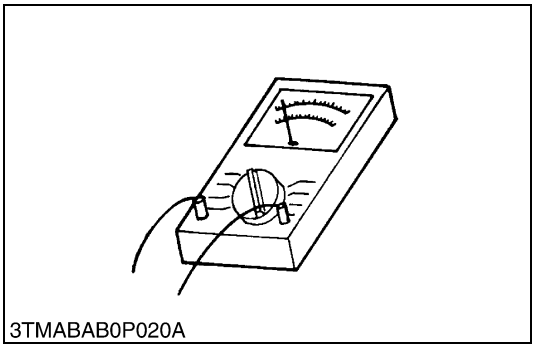
3TMABAB0P019A

- Make certain plastic cover is large enough to cover whole connector.

(1) Cover
(A) Correct
(B) Incorrect

W10125190

[5] HANDLING OF CIRCUIT TESTER


3TMABAB0P020A

- Use tester correctly following manual provided with tester.
- Check for polarity and range.

W10126840

4. LUBRICANTS, FUEL AND COOLANT

	Place	Capacity	Grade
		B26	
1	Fuel	31 L 8.1 U.S.gals 6.8 Imp.gals	No. 2-D diesel fuel No. 1-D diesel fuel if temperature is below −10 °C (14 °F)
2	Coolant (with recovery tank)	4.5 L 4.7 U.S.qts 4.0 Imp.qts	Fresh clean water with LLC
3	Engine crankcase (with filter)	3.0 L 3.2 U.S.qts 2.6 Imp.qts	Engine oil : API service Classification [E2 Engine] CF or better [E3 Engine] Refer to next page. Below 0 °C (32 °F) : SAE10W, 10W-30 or 15W-40 0 to 25 °C (32 to 77 °F): SAE20, 10W-30 or 15W-40 Above 25 °C (77 °F): SAE30, 10W-30 or 15W-40
4	Transmission case (with oil tank)	26 L 6.9 U.S.gals 5.7 Imp.gals	KUBOTA UDT or SUPER UDT fluid*
5	Front axle case	4.7 L 5.0 U.S.qts 4.1 Imp.qts	KUBOTA UDT or SUPER UDT fluid* or SAE80, 90 gear oil

Greasing

	Place	No. of greasing point	Capacity	Type of grease
6	Top link	1	Until grease overflows	Multipurpose type grease NLGI-2 or NLGI-1 (GC-L8)
	Left rod (RH)	2		
	Speed control pedal	1		
	Battery terminal	2	Moderate amount	
	Suspension adjuster	–		
	Lock plate	–		
	Spring hook	–		
	Reversible seat	–		

* KUBOTA UDT or SUPER UDT fluid ... KUBOTA original transmission hydraulic fluid.

■ **NOTE**

Engine Oil :

- Oil used in the engine should have an American Petroleum Institute (API) service classification and Proper SAE Engine Oil according to the ambient temperature as shown above.
- With the emission control now in effect, the CF-4 and CG-4 lubricating oils have been developed for use of a low-sulfur fuel on on-road vehicle engines. When an off-road vehicle engine runs on a high-sulfur fuel, it is advisable to employ the "CF or better" lubricating oil with a high Total Base Number (TBN). **If the "CF-4, CG-4, CH-4 or CI-4" lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals. (approximately half)**
- Lubricating oil recommended when a low-sulfur or high-sulfur fuel is employed.

Lubricating oil class	Fuel		Remark
	Low-sulfur	High-sulfur	
CF	❍	❍	TBN ≥ 10
CF-4	❍☆	X	
CG-4	❍☆	X	
CH-4	❍☆	X	
CI-4	❍	X	

❍ : Recommendable X : Not recommendable

- ☆ : Class CF-4, CG-4 and CH-4 engine oils cannot be used on EGR (Exhaust Gas Re-circulation) type engines.
- The CJ-4 engine oil is intended for DPF (Diesel Particulate Filter) type engines, and cannot be used on this tractor.

Fuel :

- Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for temperatures below -20 °C (-4 °F) or elevations above 1500 m (5000 ft).
- If diesel fuel with sulfur content greater than 0.5 % sulfur content is used, reduce the service interval for engine oil and filter by 50 %.
- DO NOT use diesel fuel with sulfur content greater than 1.0 %.
- Diesel fuels specified to EN 590 or ASTM D975 are recommended.
- No. 2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87)
- Since this engine adopts EPA Tier 4 and Interim Tier 4 standards, the use of low sulfur fuel or ultra low sulfur fuel is mandatory in EPA regulated area (North America). Therefore, please use No. 2-D S500 or S15 diesel fuel as an alternative to No. 2-D, or use No. 1-D S500 or S15 diesel fuel as an alternative to No. 1-D if outside air temperature is below -10 °C (14 °F).

Transmission Oil :

The oil used to lubricate the transmission is also used as hydraulic fluid. To insure proper operation of the hydraulic system and to complete lubrication of the transmission, it is important that a multi-grade transmission fluid is used in this system. We recommend the use of **KUBOTA UDT** or **SUPER UDT fluid** for optimum protection and performance.

Do not mix different brands together.

- Indicated capacities of water and oil are manufacture's estimate.

5. TIGHTENING TORQUES

[1] GENERAL USE SCREWS, BOLTS AND NUTS

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

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.)	7.9 to 9.3	0.80 to 0.95	5.8 to 6.8	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5	12.3 to 14.2	1.25 to 1.45	9.05 to 10.4
M8 (8 mm, 0.31 in.)	18 to 20	1.8 to 2.1	13 to 15	17 to 19	1.7 to 2.0	13 to 14	24 to 27	2.4 to 2.8	18 to 20	18 to 20	1.8 to 2.1	13 to 15	30 to 34	3.0 to 3.5	22 to 25
M10 (10 mm, 0.39 in.)	40 to 45	4.0 to 4.6	29 to 33	32 to 34	3.2 to 3.5	24 to 25	48 to 55	4.9 to 5.7	36 to 41	40 to 44	4.0 to 4.5	29 to 32	61 to 70	6.2 to 7.2	45 to 52
M12 (12 mm, 0.47 in.)	63 to 72	6.4 to 7.4	47 to 53	–	–	–	78 to 90	7.9 to 9.2	58 to 66	63 to 72	6.4 to 7.4	47 to 53	103 to 117	10.5 to 12.0	76.0 to 86.7
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	–	–	–	197 to 225	20.0 to 23.0	145 to 166	–	–	–	260 to 304	26.5 to 31.0	192 to 224
M18 (18 mm, 0.71 in.)	246 to 284	25.0 to 29.0	181 to 209	–	–	–	275 to 318	28.0 to 32.5	203 to 235	–	–	–	344 to 402	35.0 to 41.0	254 to 296
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	–	–	–	491 to 568	50.0 to 58.0	362 to 419

W1034542

[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.)	12 to 15	1.2 to 1.6	8.7 to 11	8.9 to 11	0.90 to 1.2	6.5 to 8.6
M10 (10 mm, 0.39 in.)	25 to 31	2.5 to 3.2	18 to 23	20 to 25	2.0 to 2.6	15 to 18
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	6.3 to 7.5	46 to 54	–	–	–
M16 (16 mm, 0.63 in.)	98.1 to 112	10.0 to 11.5	72.4 to 83.1	–	–	–
M18 (18 mm, 0.71 in.)	172 to 201	17.5 to 20.5	127 to 148	–	–	–

W1048139

[3] METRIC SCREWS, BOLTS AND NUTS

Grade	Property class 8.8 (8.8)			Property class 10.9 (10.9)		
Unit / Nominal Diameter	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M8	24 to 27	2.4 to 2.8	18 to 20	30 to 34	3.0 to 3.5	22 to 25
M10	48 to 55	4.9 to 5.7	36 to 41	61 to 70	6.2 to 7.2	45 to 52
M12	78 to 90	7.9 to 9.2	58 to 66	103 to 117	10.5 to 12.0	76 to 86.7
M14	124 to 147	12.6 to 15.0	91.2 to 108	167 to 196	17.0 to 20.0	123 to 144
M16	197 to 225	20.0 to 23.0	145 to 166	260 to 304	26.5 to 31.0	192 to 224

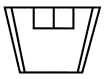
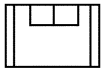
W1016172

[4] AMERICAN STANDARD SCREWS, BOLTS AND NUTS WITH UNC OR UNF THREADS

Grade	SAE GR.5			SAE GR.8		
Unit / Nominal Diameter	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
5/16	23.1 to 27.7	2.35 to 2.83	17.0 to 20.5	32.6 to 39.3	3.32 to 4.00	24.0 to 29.0
3/ 8	48 to 56	4.9 to 5.8	35.0 to 42.0	61.1 to 73.2	6.23 to 7.46	45.0 to 54.0
1/ 2	109 to 130	11.1 to 13.2	80.0 to 96.0	149.2 to 178.9	15.21 to 18.24	110.0 to 132.0
9/16	149.2 to 178.9	15.21 to 18.24	110.0 to 132.0	217.0 to 260.3	22.12 to 26.54	160.0 to 192.0
5/ 8	203.4 to 244	20.74 to 24.88	150.0 to 180.0	298.3 to 357.9	30.42 to 36.49	220.0 to 264.0

W1022485

[5] PLUGS

Shape	Size	Material of opponent part					
		Ordinariness			Aluminum		
		N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
Tapered screw 	**R1/8**	13 to 21	1.3 to 2.2	9.4 to 15	13 to 21	1.3 to 2.0	9.4 to 15
	R1/4	25 to 44	2.5 to 4.5	18 to 32	25 to 34	2.5 to 3.5	18 to 25
	R3/8	49 to 88	5.0 to 9.0	37 to 65	49.0 to 58	5.0 to 6.0	37 to 43
	R1/2	59 to 107	6.0 to 11.0	44 to 79.5	59 to 78	6.0 to 8.0	44 to 57
Straight screw 	**G1/4**	25 to 34	2.5 to 3.5	18 to 25	–	–	–
	G3/8	62 to 82	6.3 to 8.4	46 to 60	–	–	–
	G1/2	49 to 88	5.0 to 9.0	37 to 65	–	–	–

0000001666E

[6] HYDRAULIC FITTINGS

■ Adaptors, Elbows and Others

Item	Thread size	Tightening torque		
		N·m	kgf·m	lbf·ft
Adjustable elbow, Adaptor	9/16	37 to 44	3.8 to 4.5	27 to 33
	3/4	48 to 54	4.9 to 5.5	35 to 40
Hose fitting, Flare nut	9/16	22 to 25	2.3 to 2.6	16 to 19
	3/4	36 to 40	3.6 to 4.1	26 to 30
Adaptor (NPT)	3/8	38 to 43	3.9 to 4.4	28 to 32
	1/2	49 to 58	5.0 to 5.9	36 to 43

■ **NOTE**

- **When connecting a hose with flare nut, after tightening the nut with specified torque, return it approximately 45 degrees and re-tighten it to specified torque.**

W1015484

■ Hydraulic Pipe Cap Nuts

Pipe size	Tightening torque		
	N·m	kgf·m	lbf·ft
Φ6	25 to 34	2.5 to 3.5	18 to 25
Φ8	30 to 39	3.0 to 4.0	22 to 28
Φ10	40 to 49	4.0 to 5.0	29 to 36
Φ12	49 to 68	5.0 to 7.0	37 to 50
Φ15	108 to 117	11.0 to 12.0	79.6 to 86.7
Φ16	138 to 147	14.0 to 15.0	102 to 108
Φ18	108 to 117	11.0 to 12.0	79.6 to 86.7

W1014848

6. MAINTENANCE

No.	Item		Indication on hour meter														Inter-val	Refe-rence page	Impor-tant	
			50	100	150	200	250	300	350	400	450	500	550	600	650	700				
1	Greasing	–	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-21		
2	Engine start system	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-22		
3	Wheel bolt torque	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-22		
4	Main frame bolt torque	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-23		
5	Air cleaner element [Double element type] Primary element	Clean		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-24	*1	@
		Replace															every 1 year	G-33	*2	
	Air cleaner element [Double element type] Secondary element	Replace															every 1 year	G-33		
6	Fuel filter element	Clean		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-24		@
		Replace								☆							every 400 Hr	G-31		
7	Fan belt	Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-25		
8	Fuel line	Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-25		@
		Replace															every 2 year	G-36	*3	
9	Brake	Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-25		
10	Battery condition	Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-26	*4	
11	Spark arrester	Clean		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-28		
12	Engine oil	Change	★			☆				☆				☆			every 200 Hr	G-29		
13	Engine filter	Replace	★			☆				☆				☆			every 200 Hr	G-29		
14	HST oil filter	Replace	★			☆				☆				☆			every 200 Hr	G-29		
15	Radiator hose and clamp	Check				☆				☆				☆			every 200 Hr	G-29		
		Replace															every 2 year	G-36		

W1050775

No.	Item		Indication on hour meter														Since then	Reference page	Important	
			50	100	150	200	250	300	350	400	450	500	550	600	650	700				
16	Intake air line	Check				☆				☆				☆			every 200 Hr	G-29		@
		Replace															every 2 year	G-21	*3	
17	Toe-in	Adjust				☆				☆				☆			every 200 Hr	G-30		
18	Power steering oil line	Check				☆				☆				☆			every 200 Hr	G-30		
		Replace															every 2 year	G-36		
19	Transmission fluid	Change								☆							every 400 Hr	G-31		
20	Transmission oil filter	Replace	★							☆							every 400 Hr	G-31		
21	Front axle case oil	Change								☆							every 400 Hr	G-32		
22	Front axle pivot	Adjust								☆							every 400 Hr	G-32		
23	Engine valve clearance	Adjust															every 800 Hr	G-33		
24	Fuel injection nozzle injection pressure	Check															every 1500 Hr	G-33		@
25	Injection pump	Check															every 3000 Hr	G-33		@
26	Cooling system	Flush								☆							every 2 year	G-34		
27	Coolant	Change															every 2 year	G-34		
28	Fuel system	Bleed															Service as required	G-37		
29	Clutch housing water	Drain																G-37		
30	Fuse	Replace																G-38		
31	Light bulb	Replace																G-38		

W1028983

■ **IMPORTANT**

- **The jobs indicated by ★ must be done after the first 50 hours of operation.**
- ***1 : Air cleaner should be cleaned more often in severe dusty conditions.**
- ***2 : Every year or after 6 cleanings.**
- ***3 : Replace only if necessary.**
- ***4 : When the battery is used for less than 100 hours per year, check the fluid level annually.**
- **The items listed above (@ marked) are registered as emission related critical parts by KUBOTA in U.S.EPA nonroad emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.**
  Please see the Warranty Statement in detail.

7. CHECK AND MAINTENANCE

CAUTION

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

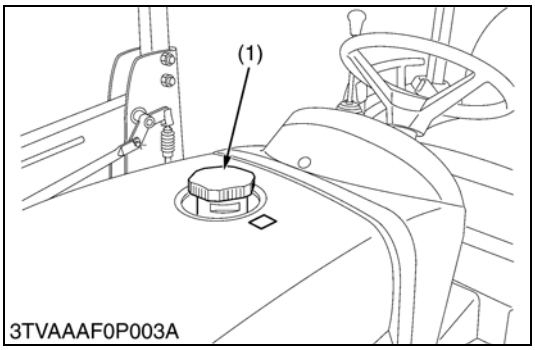
[1] DAILY CHECK

For your own safety and maximum service life of the machine, make a through daily inspection before operating the machine to start the engine.

Walk Around Inspection

Look around and under the tractor for such items as loose bolts, trash build-up, oil or coolant leaks, broken or worn parts.

W1033559



Checking and Refueling

CAUTION

- **Do not smoke while refueling.**
- **Be sure to stop the engine before refueling.**

1. Turn the key switch to "**ON**", check the amount of fuel by fuel gauge.
2. Fill fuel tank when fuel gauge shows 1/4 or less fuel in tank.
3. Use grade No. 2 Diesel fuel at temperature above -10 °C (14 °C). Use grade No. 1 Diesel fuel at temperature below -10 °C (14 °C).

■ **IMPORTANT**

- **Do not permit dirt or trash to get into the fuel system.**
- **Be careful not to let the fuel tank become empty, otherwise air will enter the fuel system, necessitating bleeding before next engine start.**
- **Be careful not to spill during refueling. If should spill, wipe it off at once, or it may cause a fire.**
- **To prevent condensation (water) accumulation in the fuel tank, fill the tank before parking overnight.**

■ **NOTE**

- **No. 2 Diesel is a distillate fuel of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87)**
- **Grade of Diesel Fuel Oil According to ASTM D975.**

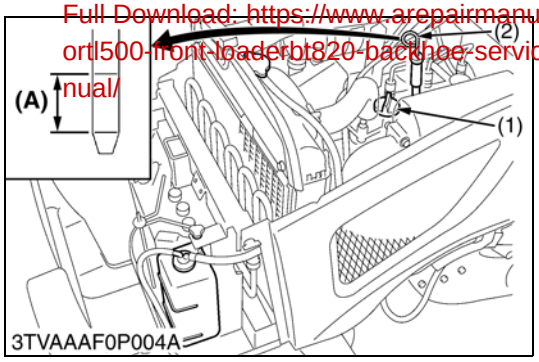
Flash Point, °C (°F)	Water and Sediment, volume %	Carbone Residue on, 10 percent Residuum, %	Ash, weight %
Min	Max	Max	Max
52 (125)	0.05	0.35	0.01

Distillation Temperatures, °C (°F) 90 % Point		Viscosity Kinematic cSt or mm^2/s at 40 °C		Viscosity Saybolt, SUS at 100 °F		Sulfur weight %	Copper Strip Corrosion	Cetane Number
Min	Max	Min	Max	Min	Max	Max	Max	Max
282 (540)	338 (640)	1.9	4.1	32.6	40.1	0.50	No. 3	40

Fuel tank capacity	31 L 8.1 U.S.gals 6.8 Imp.gals

(1) Fuel Tank Cap

W1053886



Checking Engine Oil Level

CAUTION

- **Be sure to stop the engine before checking the oil level.**

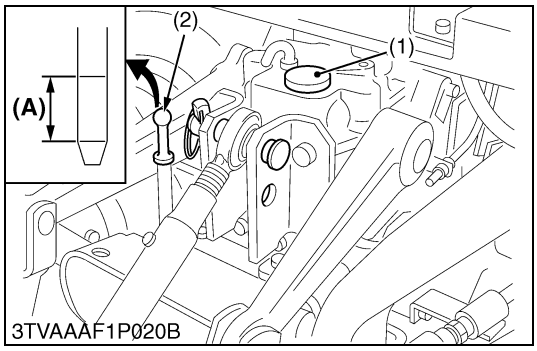
1. Park the machine on a flat surface.
2. Check engine oil before starting the engine or 5 minutes or more after the engine has stopped.
3. To check the oil level, draw out the dipstick, wipe it clean, replace it, and draw it out again. Check to see that the oil level lies between the two notches.
   If the level is too low, add new oil to the prescribed level at the oil inlet. (See page G-8.)

■ IMPORTANT

- **When using an oil of different maker or viscosity from the previous one, remove all of the old oil.**
  Never mix two different types of oil.
- **If oil level is low, do not run engine.**

(1) Oil Inlet
(2) Dipstick
(A) Oil level is acceptable within this range.

W1034155



Checking Transmission Fluid Level

1. Park the machine on a flat surface, lower the implement and shut off engine.
2. To check the oil level, draw out the dipstick, wipe it clean, replace it, and draw it out again. Check to see that the oil level lies between the two notches.
   If the level is too low, add new oil to the prescribed level at the oil inlet. (See page G-8.)

■ IMPORTANT

- **If oil level is low, do not run engine.**
- **When using BT820 Backhoe on a flat surface, set the loader / backhoe as illustrated below.**

(1) Oil Inlet
(2) Dipstick
(A) Oil level is acceptable within this range.

W1034473