

Product: Kubota WSM M59,TL1350,BT1200 Tractor,Front Loader,Backhoe Service Repair Workshop Manual
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WSM

WORKSHOP MANUAL **TRACTOR, FRONT LOADER, BACKHOE**

M59, TL1350, BT1200

The Kubota logo is displayed in a bold, black, stylized font. The letters are thick and blocky, with a distinctive shape for the 'K' and 'O's.

Sample of manual. Download All 607 pages at:

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TO THE READER

This Workshop Manual has been prepared to provide servicing personnel with information on the mechanism, service and maintenance of KUBOTA Tractor M59, KUBOTA Front Loader TL1350 and KUBOTA Backhoe BT1200. It is divided into three parts, "General", "Mechanism" and "Servicing".

■ 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.

Due to covering many models of this manual, information or picture being used, have not been specified as one model.

January 2008

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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.



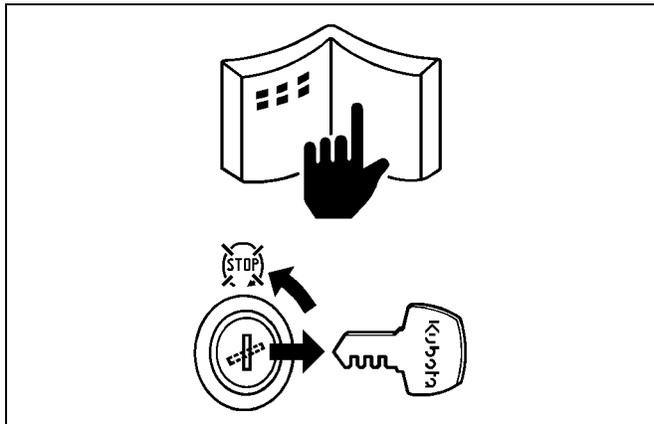
IMPORTANT

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



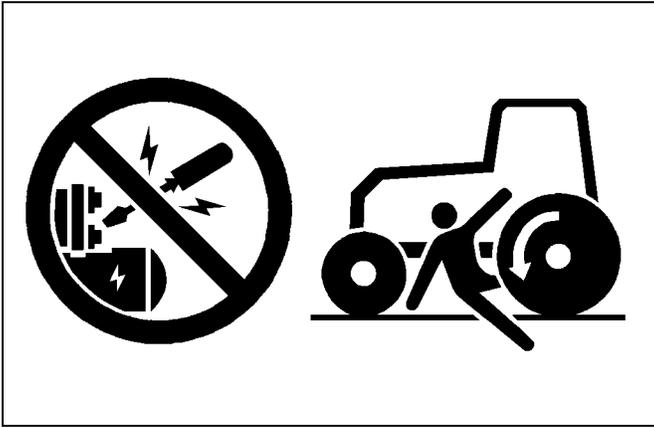
NOTE

: Gives helpful information.



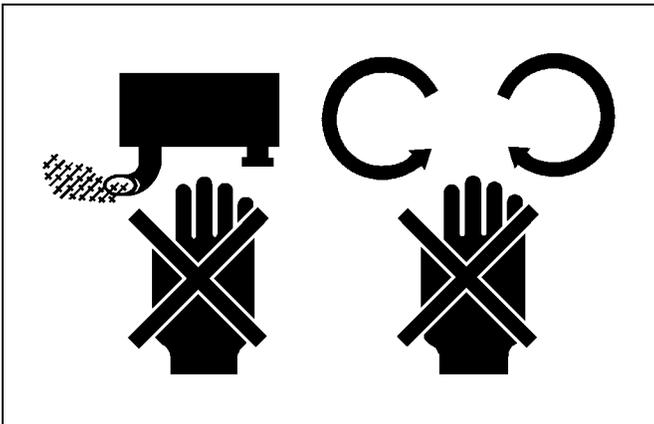
BEFORE SERVICING AND REPAIRING

- 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.



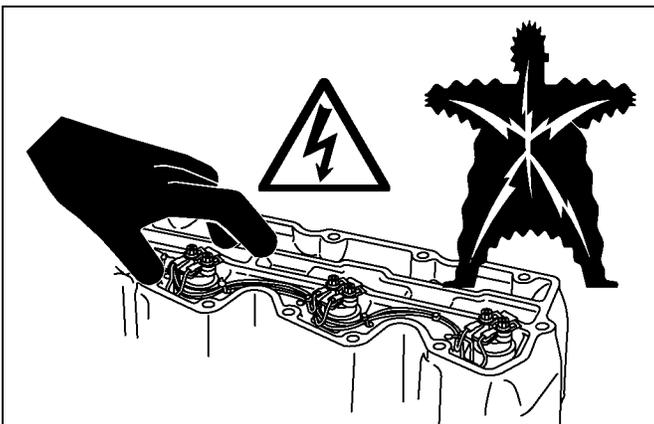
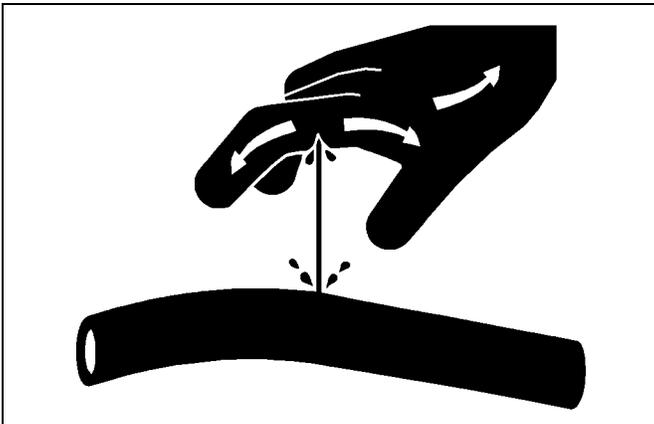
SAFETY STARTING

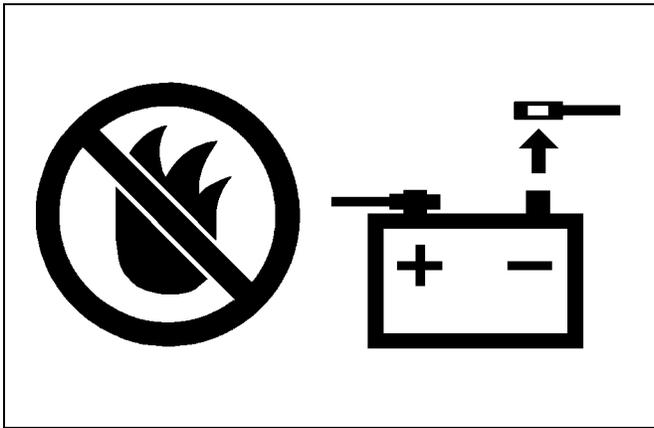
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine 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.
- Do not open high-pressure fuel system. High-pressure fluid remaining in fuel lines can cause serious injury. Do not disconnect or attempt repair fuel lines, sensors, or any other components between the high-pressure fuel pump and injectors on engines with high pressure common rail fuel system.
- High voltage exceeding 100 V is generated in the ECU, and is applied to the injector. Pay sufficient caution to electric shock when performing work activities.





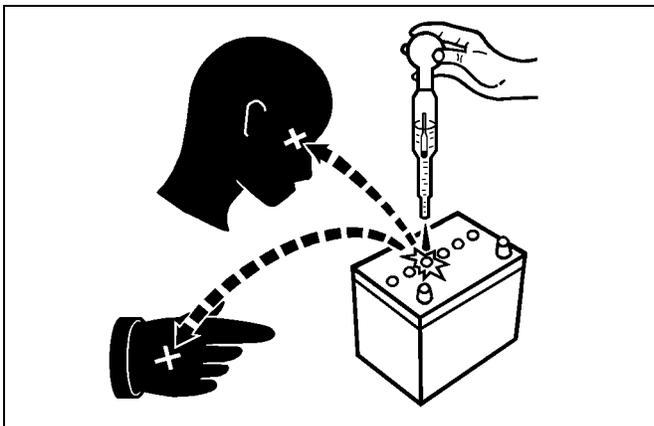
AVOID FIRES

- 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.



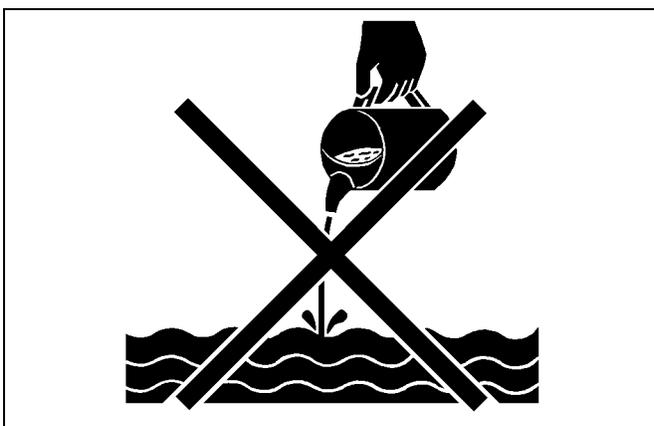
VENTILATE WORK AREA

- 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.



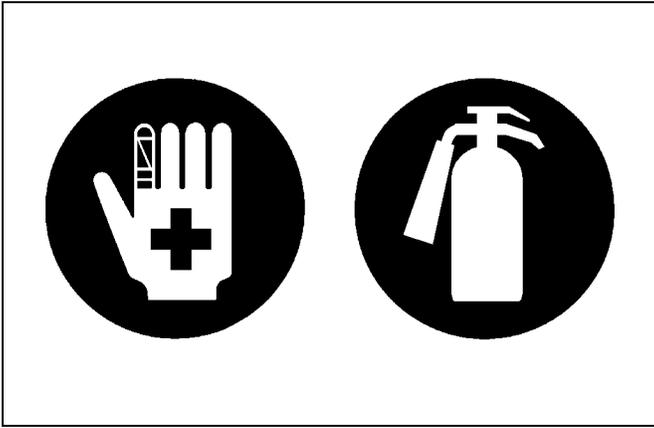
PREVENT ACID BURNS

- 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. TA040-4965-2

	<p style="text-align: center;">⚠ DANGER</p> <p>TO AVOID POSSIBLE INJURY OR DEATH FROM A MACHINE RUNAWAY.</p> <p>1. Do not start engine by shorting across starter terminals or bypassing the safety start switch. Machine may start in gear and move if normal starting circuitry is bypassed.</p> <p>2. Start engine only from operator's seat with transmission and PTO OFF.</p> <p>Never start engine while standing on the ground.</p>
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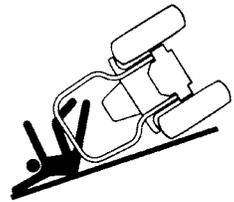
1AGAMAAAP3810

(4) Part No. TC230-4956-1

Diesel fuel only.	No fire
	
LOW SULFUR FUEL OR ULTRA LOW SULFUR FUEL ONLY	

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(2) Part No. 32771-4925-1

<p>⚠ WARNING</p> 	<p>TO AVOID PERSONAL INJURY OR DEATH FROM ROLL-OVER :</p> <p>1. Kubota recommends the use of a Roll-Over Protective structures (ROPS) and seat belt in almost all applications.</p> <p>2. To ensure ROPS protection, do not operate tractor without loader mainframe.</p> <p>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.</p>
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1HNACABAP0880

(5) Part No. TA040-4935-1

⚠ WARNING
<p>TO AVOID PERSONAL INJURY:</p> <p>1. Attach pulled or towed loads to the drawbar only.</p> <p>2. Use the 3-point hitch only with equipment designed for 3-point hitch usage.</p>

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(3) Part No. TA040-4959-3

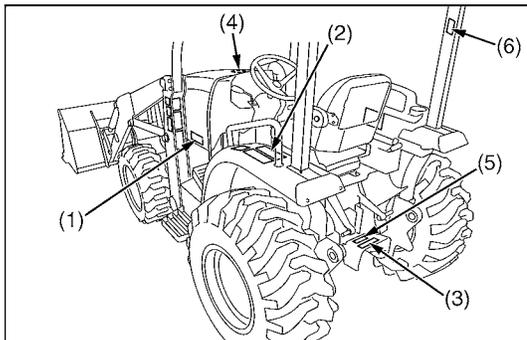
	<p style="text-align: center;">⚠ WARNING</p> <p>TO AVOID PERSONAL INJURY.</p> <p>1. Keep PTO shield in place at all times.</p> <p>2. Do not operate the PTO at speeds faster than the speed recommended by the implement manufacturer.</p> <p>3. For trailing PTO-driven implements, set drawbar at towing position (see operator's manual)</p>
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(6) Part No. 6C140-4746-1

⚠ WARNING
<p>TO AVOID PERSONAL INJURY:</p> <p>Do not modify or repair a ROPS because welding, grinding, drilling or cutting any portion may weaken the structure.</p>

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(1) Part No. TA240-4933-2

	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. Failure to comply to this warning may allow the wheels to slip, and could cause injury or death. 4. STOP THE ENGINE.

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(2) Part No. 35260-3491-4

CAUTION

TO AVOID PERSONAL INJURY:

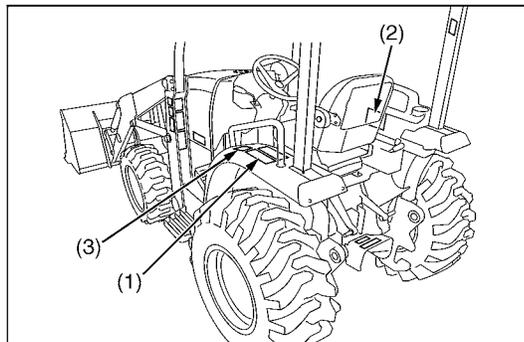
1. Read and understand the operator's manual before operation.
2. Before starting the engine, make sure that everyone is at a safe distance from the tractor and that the PTO is OFF.
3. Do not allow passengers on the tractor at any time.
4. Before allowing other people to use the tractor, have them read 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.

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(3) Part No. 32751-4921-2

 WARNING
TO AVOID SERIOUS PERSONAL INJURY OR DEATH:
<ol style="list-style-type: none"> 1. Keep tractor seat in forward position except when operating backhoe. 2. Using seat in reversed position while operating attachments other than backhoe may result in entanglement with PTO shaft or 3-point hitch.

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(1) Part No. 7J246-5643-1

⚠ DANGER



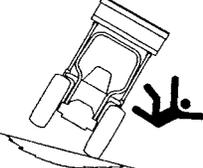
TO AVOID SERIOUS INJURY OR DEATH CAUSED BY FALLING LOADS :

1. Load on raised bucket or fork can fall or roll back onto operator causing serious injury or death.
2. Use approved clamping and / or guard attachments for handling large, loose or shiftable loads such as bales, posts, sheets of plywood etc.
3. Carry loads as low as possible.

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(2) Part No. 7J246-5641-1

⚠ DANGER



TO AVOID SERIOUS INJURY OR DEATH CAUSED BY ROLLOVERS :

1. ROPS and a fastened seat belt are strongly recommended in almost all applications. Foldable ROPS should be in upright and locked position if equipped.
2. Adjust rear wheels to the widest setting that is suitable for the work.
3. Add recommended wheel ballast and rear weight for stability.
4. DO NOT drive on steep slopes or unstable surfaces.
5. Carry loader arms at low position during transport. Move and turn tractor at slow speeds.

1AIABAHAP017A

(3) Part No. 7J246-5645-1

⚠ CAUTION

TO AVOID PERSONAL INJURY :

1. Observe safety precautions in loader and tractor Operator's Manual.
2. Operate the loader from tractor seat only.
3. Keep children, others and livestock away when operating loader and tractor.
4. Avoid holes, loose ground, and rocks which may cause tractor / loader to tip.
5. Make sure approved bucket is attached before removing loader from tractor.
6. When parking or storing, choose flat and hard ground. Lower the bucket to the ground, set brakes and remove key before leaving tractor.
7. Before disconnecting hydraulic lines, relieve all hydraulic pressure.

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(4) Part No. 7J246-5644-2
(Both sides)

⚠ WARNING



TO AVOID INJURY FROM FALLS OR BEING CRUSHED :

1. DO NOT stand or work under raised loader or bucket.
2. DO NOT use loader as jack for servicing.
3. DO NOT use loader as a work platform.
4. NEVER connect chain, cable or rope to loader bucket while operating loader.

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(5) Part No. 7J266-5649-2

⚠ CAUTION

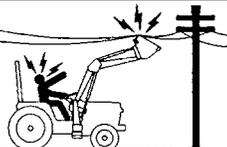
TO AVOID INJURY FROM CRUSHING :

1. Do not utilize the valve lock for machine maintenance or repair.
2. The valve lock is to prevent accidental actuation when implement is not in use or during transport.

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(6) Part No. 7J246-5642-1

⚠ DANGER



TO AVOID SERIOUS INJURY OR DEATH CAUSED BY CONTACT WITH ELECTRIC LINES:

- Check overhead clearance.

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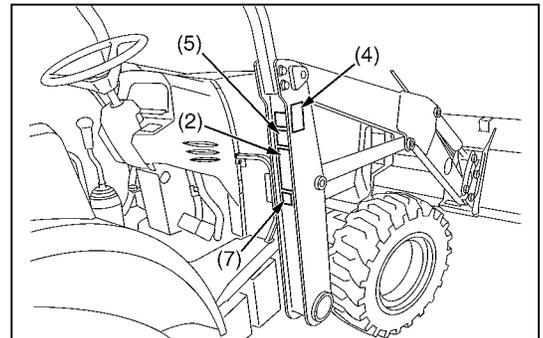
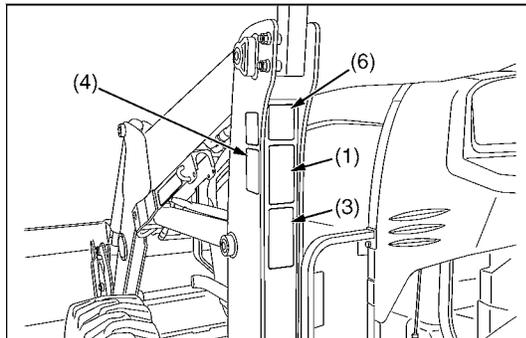
(7) Part No. 7J417-7778-1

⚠ CAUTION

TO AVOID PERSONAL INJURY :

Always be aware of the loader attachment angle. Self-leveling function may vary depending on the loader lever stroke.

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(1) Part No. 32791-3015-1

⚠ DANGER/POISON ¡PELIGRO/VENENO!			
 <p>SHIELD EYES. EXPLOSIVE GASES CAN CAUSE BLINDNESS OR INJURY.</p> <p>PROTÉGER LES YEUX. GAZ EXPLOSIFS PEUVENT RENDRE AVEUGLE OU PROVOQUER DES LÉSIONS.</p> <p>PROTEJA LOS OJOS. GASES EXPLOSIVOS PUEDEN CAUSAR CEGUERA O DAÑO.</p>	 <p>NO</p> <ul style="list-style-type: none"> • SPARKS • FLAMES • SMOKING <p>ÉLOIGNER</p> <ul style="list-style-type: none"> • ÉTINCELLES • FLAMMES • CIGARETTES <p>NO</p> <ul style="list-style-type: none"> • CHISPAS • FLAMAS • FUMAR 	<p>SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS.</p> <p>ACIDE SULFURIQUE PEUT RENDRE AVEUGLE OU PROVOQUER DES BRÛLURES GRAVES.</p>  <p>ACIDO SULFURICO PUEDE CAUSAR CEGUERA O QUEMADURAS SEVERAS.</p>	 <p>FLUSH EYES IMMEDIATELY WITH WATER. GET MEDICAL HELP FAST.</p> <p>RINCER IMMÉDIATEMENT LES YEUX À GRANDE EAU. CONTACTER RAPIDEMENT UN MEMBRE DE LA PROFESSION MÉDICALE.</p> <p>LAVE LOS OJOS DE INMEDIATO. CONSIGA AYUDA MEDICA RAPIDO.</p>
<p>KEEP OUT OF THE REACH OF CHILDREN. DO NOT TIP. DO NOT OPEN BATTERY! MAINTENIR HORS DE LA PORTEE DES ENFANTS. NE RENVERSEZ PAS. N'OUVREZ PAS LA BATTERIE! MANTENGASE FUERA DEL ALCANCE DE LOS NIÑOS. NO INCLINE. NO ABRA LA BATERIA!</p>			

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(2) Part No. 6C090-4958-2

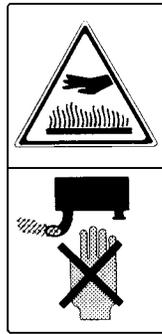
Do not get your hands close to engine fan and fan belt.



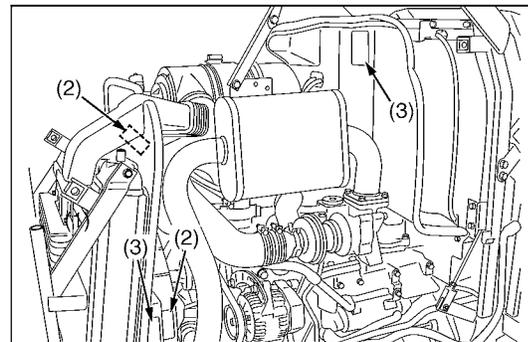
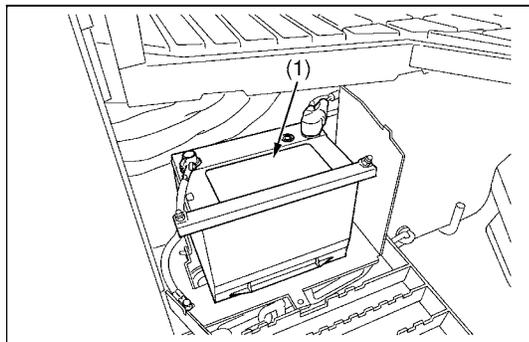
1AGAIAZAP110A

(3) Part No. TC030-z4958-1

Do not touch hot surface like muffler, etc..

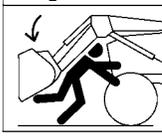


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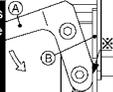
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(1) Part No. 7J802-5848-1

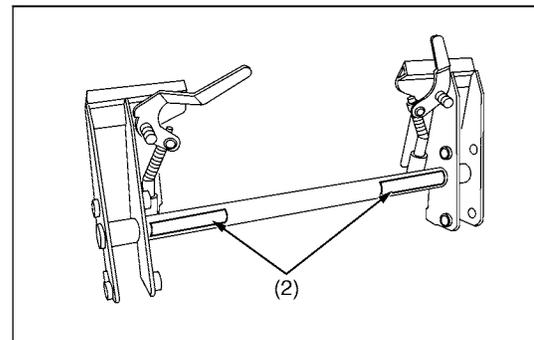
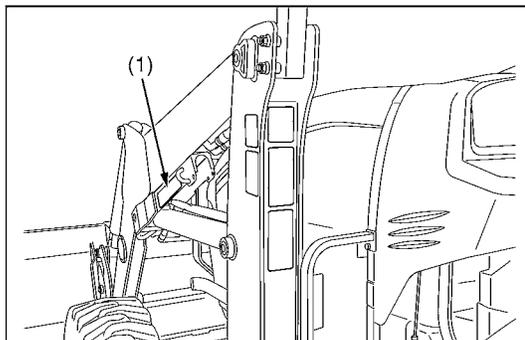
	<h2 style="margin: 0;">⚠ WARNING</h2>
	<p>Install cylinder locks before performing maintenance under raised loader arms. Failure to comply could result in death or serious injury.</p> <ul style="list-style-type: none"> ● Empty loader bucket and place in dump position, raise boom until boom lock channel can be positioned on cylinder rod, then stop engine. ● Pull pin and lower boom lock onto the cylinder rod, then insert pin into the hole of lower right corner of boom lock. ● Slowly lower boom until boom is stopped.

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(2) Part No. 7J802-3648-4

⚠ DANGER			
TO AVOID PERSONAL INJURY OR DEATH			
<p>1. Make sure both handles (LH, RH) (A) contact the ear plates (B) at the ※ points and are all the way down.</p>		<p>2. Make sure both lock pins (LH, RH) (C) protrude through the pin slots (D).</p>	<p>Kubota recommends the use of Kubota attachments on Kubota loaders. Non-Kubota attachments, if used, must comply with SAE J2513, published June 2000.</p> <p>Use of a non-Kubota attachment that does not comply with SAE J2513 or the improper positioning of handle(s) or non-protrusion of pin(s) may result in detachment of the attachment or deformation, causing loss of performance, personal injury or death.</p>
<p>(A) HANDLE (B) EAR PLATE (C) LOCK PIN (D) PIN SLOT</p>		<p>For information, contact your Kubota Dealer</p>	

1AIABAAAP118A



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.
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 OF THE TRACTOR

Model		M59
Engine	Model	V2403-M-TE3-TLB1
	Type	Indirect injection vertical, water-cooled, 4-cycle diesel
	No. of cylinders	4
	Bore and stroke	87 × 102.4 mm (3.4 × 4.0 in.)
	Engine gross power	44.0 kW (59 HP)
	PTO power (factory observed)	34.3 kW (46 HP)
	Net power	42.5 kW (57 HP) *
	Total displacement	2.434 L (148.5 cu. in.)
	Rated revolution	2700 min ⁻¹ (rpm)
	Battery	12 V, RC: 110 min., CCA: 650A
Capacities	Fuel tank	55 L (14.6 U.S.gals, 12.1 Imp.gals)
	Engine crankcase (with filter)	9.4 L (9.9 U.S.qts, 8.3 Imp.qts)
	Engine coolant	6.5 L (6.9 U.S.qts, 5.7 Imp.qts)
	Transmission case	46 L (12.2 U.S.gals, 10.1 Imp.gals)
	Front axle case	12.5 L (13.2 U.S.qts, 11.0 Imp.qts)
Tires	Front	10-16.5R4
	Rear	17.5L-24R4
Dimensions	Overall length (without 3P, with front guard)	3128 mm (123.1 in.)
	Overall width	2154 mm (84.8 in.)
	Overall height with ROPS and FOPS	2594 mm (102.1 in.)
	Wheel base	2050 mm (80.71 in.)
	Min. ground clearance	350 mm (13.8 in.) at transmission case
	Tread	Front
Rear		1462 mm (57.6 in.)
Weight (with ROPS and FOPS, main frame)		2230 kg (4916 lbs)
PTO shaft		Transmission case rear
Rear PTO		SAE 1-3/8, 6 Spline
Clutch		Dry
Steering		Hydraulic power
Transmission		Hydraulic transmission (3 speeds)
Min. turning radius		3.3 m (10.8 feet) **
Brake		Multiple wet disks operated by two foot pedals which can be locked together
Differential		Bevel gear

NOTE: * Manufacture's estimate
 ** with brake

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

W1028103

TRAVELING SPEEDS

Model			M59	
Tire size (Rear)			17.5L - 24R4	
Speed control pedal	H-DS lever	Range gear shift lever	km/h	mph
Forward	L	L	3.5	2.2
		M	7.1	4.4
		H	14.9	9.3
	H	L	5.8	3.6
		M	11.9	7.4
		H	24.9	15.5
Reverse	L	L	3.1	1.9
		M	6.4	4.0
		H	13.4	8.3
	H	L	5.2	3.2
		M	10.7	6.6
		H	22.4	13.9

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

W1035065

DIMENSIONAL SPECIFICATIONS

■ Loader Specifications

Loader Model		TL1350
Boom cylinder	Bore	65 mm (2.56 in.)
	Stroke	637.5 mm (25.1 in.)
Bucket cylinder	Bore	70 mm (2.76 in.)
	Stroke	464 mm (18.27 in.)
Control valve		One detent float position, power beyond circuit, hydraulic dual self-leveling valve
Rated flow		60.5 L/m (16 U.S.gals, 13.3 Imp.gals)
Maximum pressure		19.6 MPa, 200 kgf/cm ² , 2845 psi
Net weight		530 kg (1169 lbs)

W1029500

■ Bucket Specifications

Loader Model		TL1350
Model		Round 84
Width		2135 mm (84.0 in.)
Depth (L)		695 mm (27.4 in.)
Height (M)		673 mm (26.5 in.)
Length (N)		892 mm (35.1 in.)
Capacity	Struck	0.54 m ³ (19.1 CU.FT.)
	Heaped	0.66 m ³ (23.3 CU.FT.)
Weight		244 kg (538 lbs)

W1030200

■ Dimensional Specifications

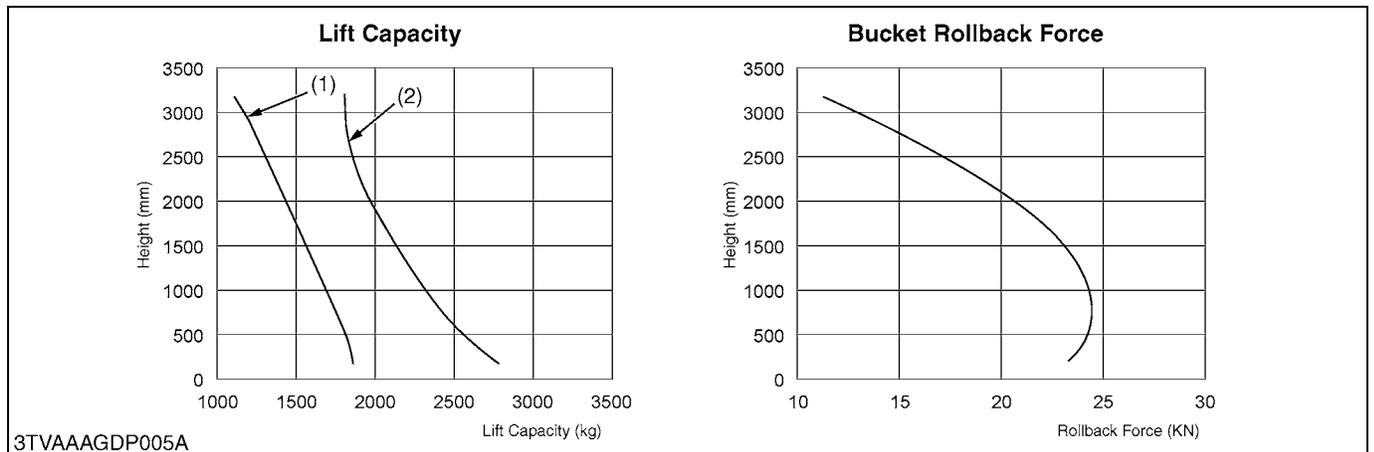
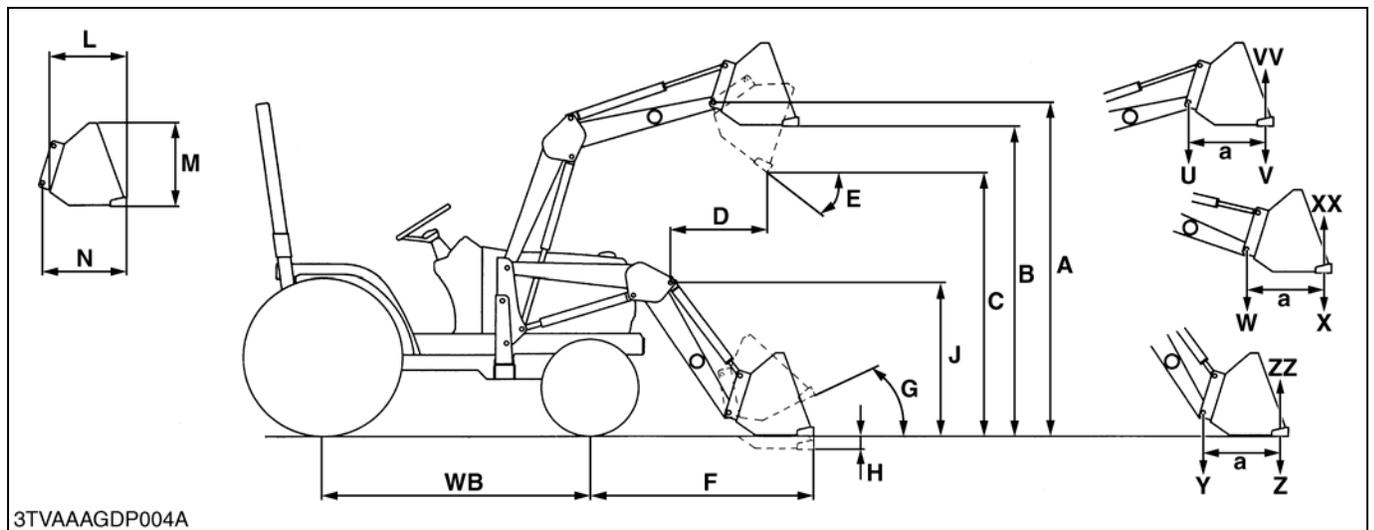
Loader Model		TL1350
A	Max. lift height (To bucket pivot pin)	3203 mm (126.1 in.)
B	Max. lift height under level bucket	2977 mm (117.2 in.)
C	Clearance with bucket dumped	2412 mm (95 in.)
D	Reach at max. lift height (Dumping reach)	582 mm (22.9 in.)
E	Max. dump angle	43 deg. (0.75 rad)
F	Reach with bucket on ground	1821 mm (71.7 in.)
G	Bucket roll-back angle	45 deg. (0.79 rad)
H	Digging depth	69 mm (2.7 in.)
I	Overall height in carrying position	1600 mm (63 in.)

W1031412

Operational Specifications

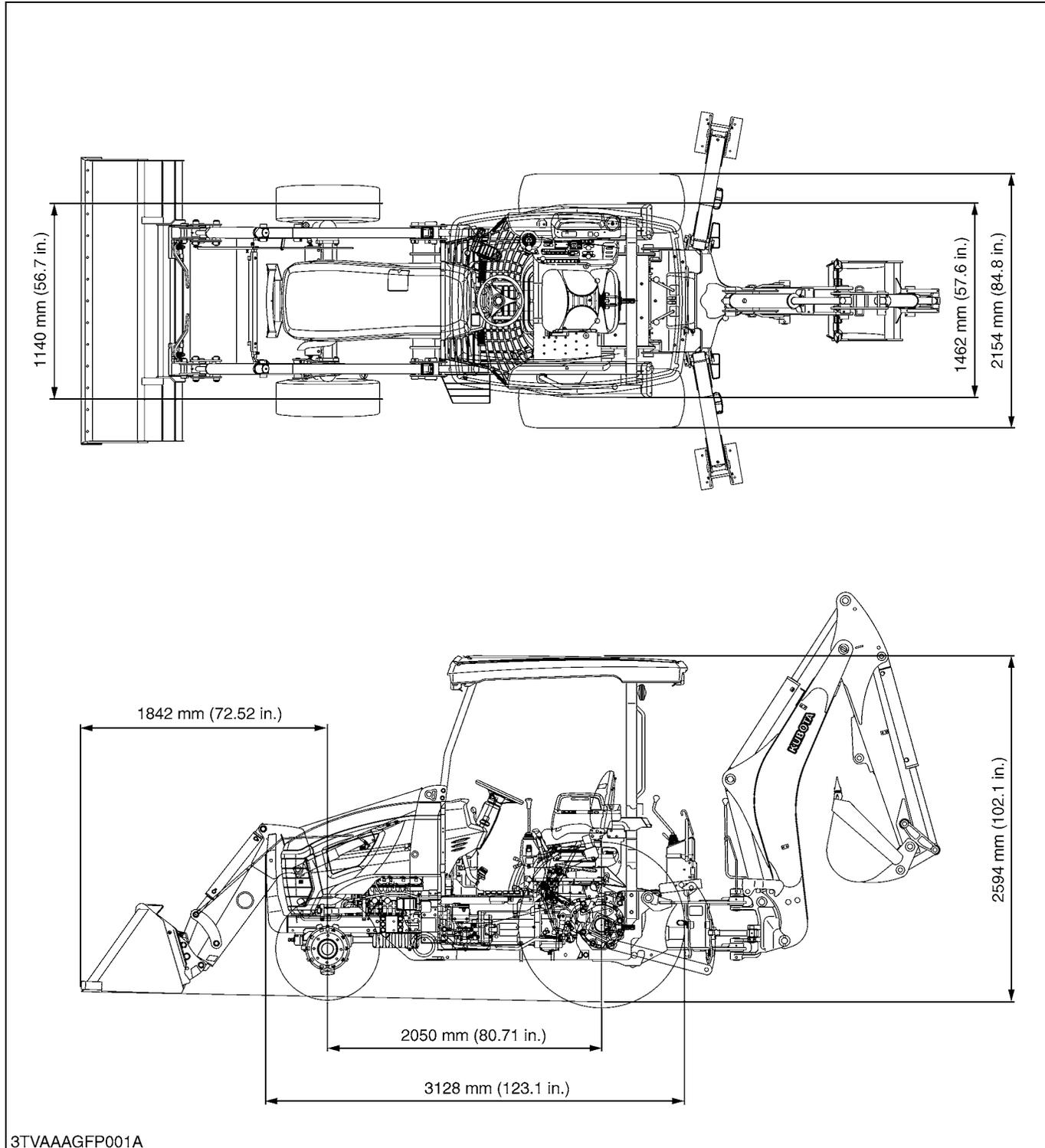
Loader Model		TL1350
Lift capacity to max. height (Bucket bottom mid point)		1350 kg (2976 lbs)
U	Lift capacity (Bucket pivot pin, max. height)	1796 kg (3960 lbs)
V	Lift capacity (500 mm forward, max. height)	1120 kg (2469 lbs)
W	Lift capacity (Bucket pivot pin, 1500 mm (59 in.) height)	2129 kg (4694 lbs)
X	Lift capacity (1500 mm height)	1548 kg (3413 lbs)
Y	Breakout force (Bucket pivot pin)	26654 N (5992 lbf)
Z	Breakout force (500 mm forward)	18064 N (4061 lbf)
VV	Bucket roll-back force at max. height	11768 N (2646 lbf)
XX	Bucket roll-back force at 1.5M (5.9 in.)	22496 N (5057 lbf)
ZZ	Bucket roll-back force at ground level	23487 N (5280 lbf)
Raising time	Self-level valve OFF (ON)	3.9 sec. (4.2 sec.)
Lowering time	Self-level valve OFF (ON)	3.1 sec. (4.3 sec.)
Bucket dumping time		2.4 sec.
Bucket rollback time		2.4 sec.
a	Length	800 mm (31.5 in.)

W1030633



(1) 800 mm Forward of Pivot Pin (2) At Pivot Pin

DIMENSIONS



G GENERAL

GENERAL

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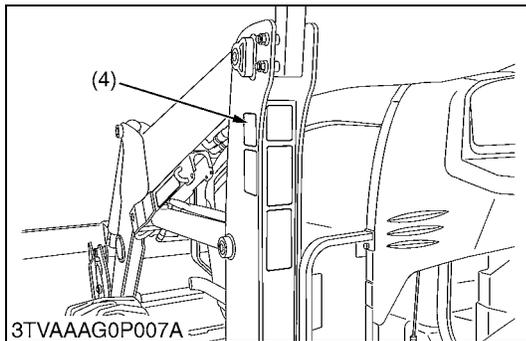
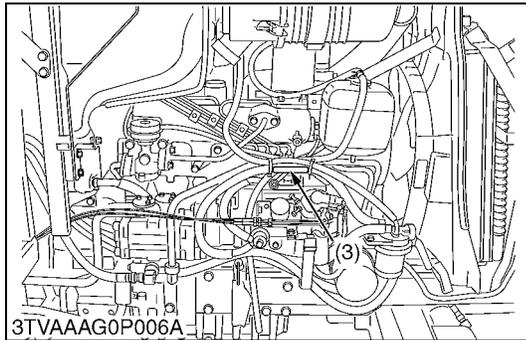
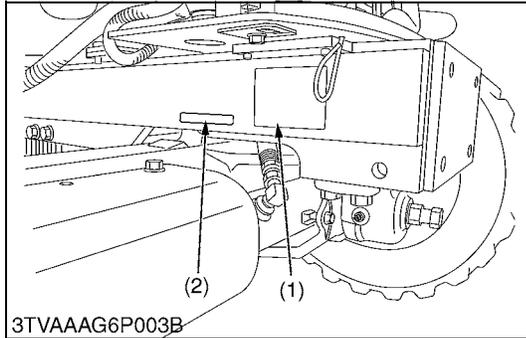
1. TRACTOR IDENTIFICATION

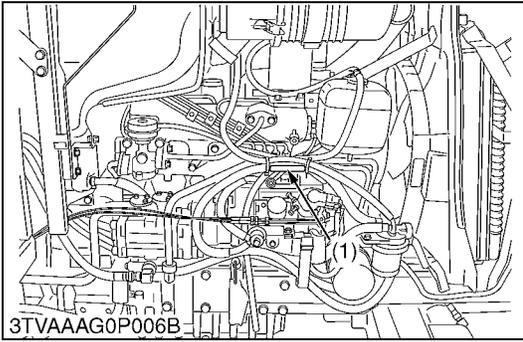
[1] MODEL NAME AND SERIAL NUMBERS

When contacting your local KUBOTA distributor, always specify engine serial number loader and tractor serial number and.

- | | |
|----------------------------------|--------------------------|
| (1) Tractor Identification Plate | (3) Engine Serial Number |
| (2) Tractor Serial Number | (4) Loader Serial Number |

W10106000





Engine Serial Number

When contacting the manufacture, always specify your engine model name and serial number.

The engine model and its serial number need to be identified before the engine can be serviced or parts replaced.

■ Engine Serial Number

The engine serial number is an identified number for the engine. It is marked after the engine model number.

It indicates month and year of manufacture as follows.

• Year of manufacture

Alphabet or Number	Year	Alphabet or Number	Year
1	2001	F	2015
2	2002	G	2016
3	2003	H	2017
4	2004	J	2018
5	2005	K	2019
6	2006	L	2020
7	2007	M	2021
8	2008	N	2022
9	2009	P	2023
A	2010	R	2024
B	2011	S	2025
C	2012	T	2026
D	2013	V	2027
E	2014		

• Month of manufacture

Month	Engine Serial Number	
	0001 ~ 9999	10000 ~
January	A0001 ~ A9999	B0001 ~
February	C0001 ~ C9999	D0001 ~
March	E0001 ~ E9999	F0001 ~
April	G0001 ~ G9999	H0001 ~
May	J0001 ~ J9999	K0001 ~
June	L0001 ~ L9999	M0001 ~
July	N0001 ~ N9999	P0001 ~
August	Q0001 ~ Q9999	R0001 ~
September	S0001 ~ S9999	T0001 ~
October	U0001 ~ U9999	V0001 ~
November	W0001 ~ W9999	X0001 ~
December	Y0001 ~ Y9999	Z0001 ~

“3” indicates 2003 and “A” indicates January.

So, 3A indicates that the engine was manufactured on January, 2003.

(1) Engine Model and Serial Number

W1010477

[2] E3 ENGINE

[Example : Engine Model Name V2403-M-TE3-TLB1]

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.

TYPE :	#####
FAMILY :	#####
APPROVAL NUMBER:	###/##-###/#####
	
####	

(1) (2)

EMISSION CONTROL INFORMATION	
THIS ENGINE MEETS 2008 ##### EMISSION REGULATIONS FOR U.S. EPA AND CALIFORNIA NONROAD CY ENGINES.	
	
MODEL :	###-ET-###
FAMILY:	8###
OUTPUT:	## kW / ## rpm
VALVE CLEARANCE (COLD):	IN ## mm EX ## mm
INJ. TIMING:	### DEG BTDC
LOW SULFUR FUEL OR ULTRA LOW SULFUR FUEL ONLY	LOW IDLE: ## - ## rpm
CONTACT KUBOTA FOR FUEL SETTING.	
####	

3EEAEAE0P002A

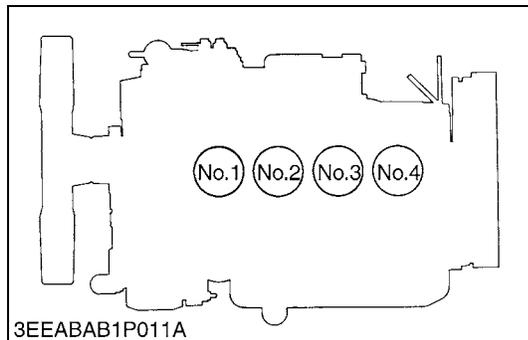
Category (1)	Engine output classification	EU regulation
K	From 19 to less than 37 kW	STAGE IIIA
J	From 37 to less than 75 kW	STAGE IIIA
I	From 75 to less than 130 kW	STAGE IIIA

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

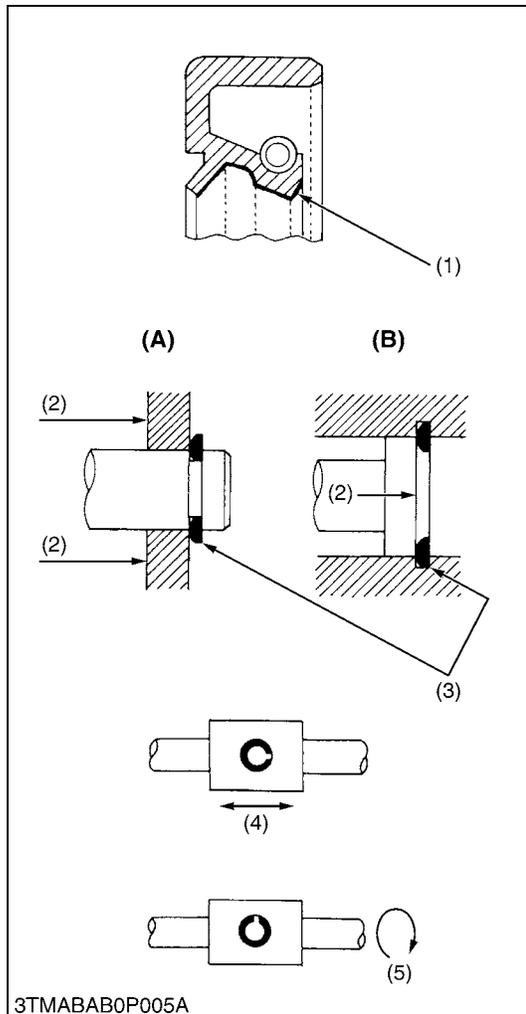


The cylinder numbers of KUBOTA diesel engine are designated as shown in the figure.

The sequence of cylinder numbers is given as No.1, No.2, No.3 and No.4 starting from the gear case side.

W1011077

2. GENERAL PRECAUTIONS



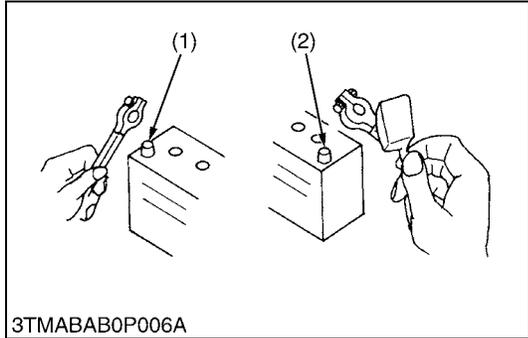
- During disassembly, carefully arrange removed parts in a clean area to prevent confusion later. Screws, bolts and nuts should be installed in their original position to prevent reassembly errors.
- When special tools are required, use KUBOTA genuine special tools. Special tools which are not frequently 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.

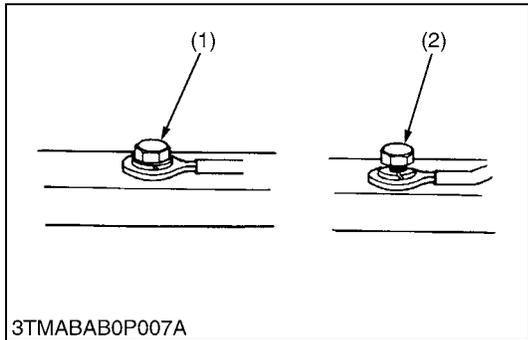
■ IMPORTANT

- 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

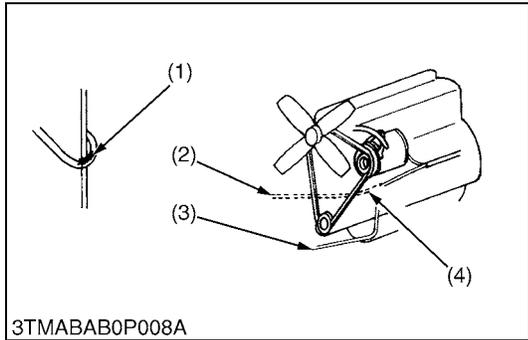


3TMABAB0P007A

- Securely tighten wiring terminals.

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

W10112160

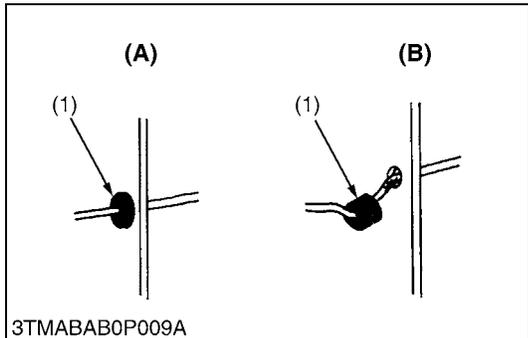


3TMABAB0P008A

- Do not let wiring contact dangerous part.

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

W10113130

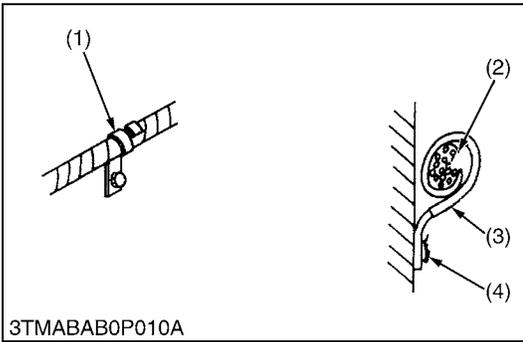


3TMABAB0P009A

- Securely insert grommet.

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

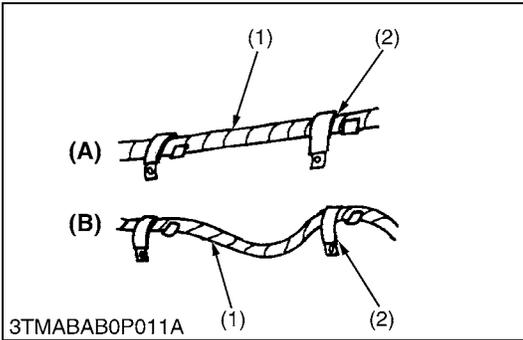
W10113880



- Securely clamp, being careful not to damage wiring.

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

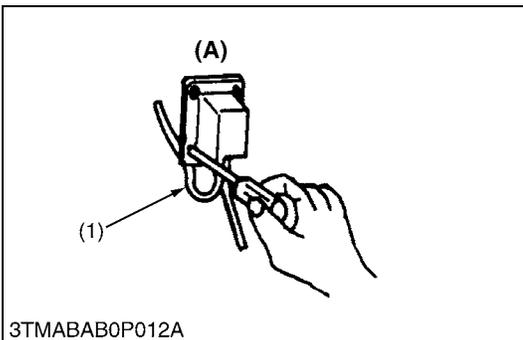
W10114580



- 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

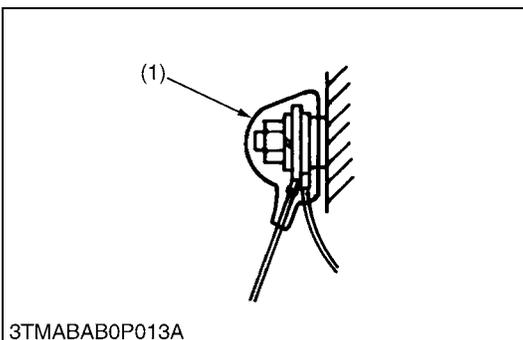
W10115870



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

- (1) Wiring
- (A) Incorrect

W10116700

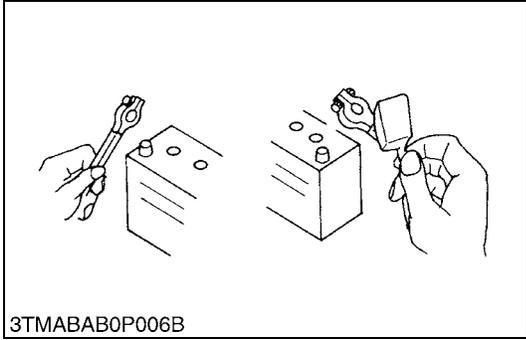


- After installing wiring, check protection of terminals and clamped condition of wiring, only connect battery.

- (1) Cover
 - Securely Install Cover

W10117350

[2] BATTERY



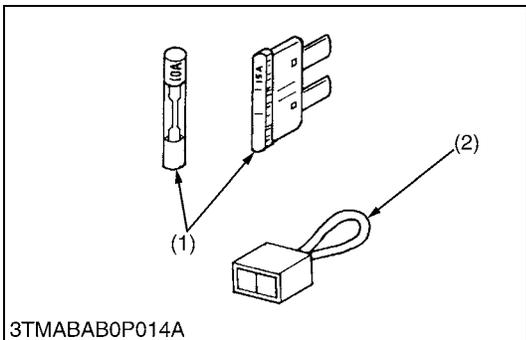
- Take care not to confuse positive and negative terminal posts.
- When removing battery cables, disconnect negative cable first. When installing battery cables, check for polarity and connect positive cable first.
- Do not install any battery with capacity other than is specified (Ah).
- After connecting 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



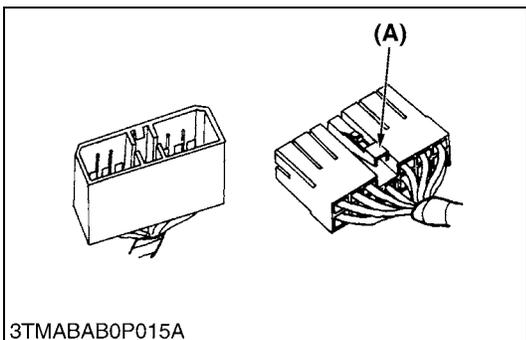
- Use fuses with specified capacity. Neither too large or small capacity fuse is acceptable.
- Never use steel or copper wire in place of fuse.
- Do not install working light, radio set, etc. on machine which is not provided with reserve power supply.
- Do not install accessories if fuse capacity of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

(1) Fuse

(2) Slow Blow Fuse

W10120920

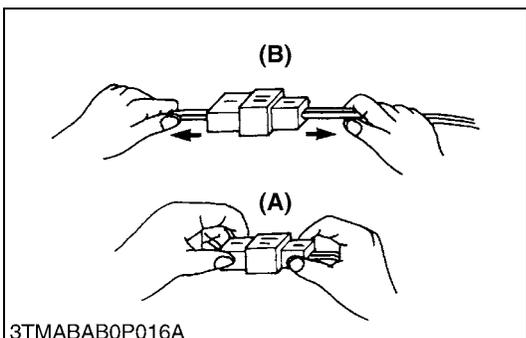
[4] CONNECTOR



- For connector with lock, push lock to separate.

(A) Push

W10122110

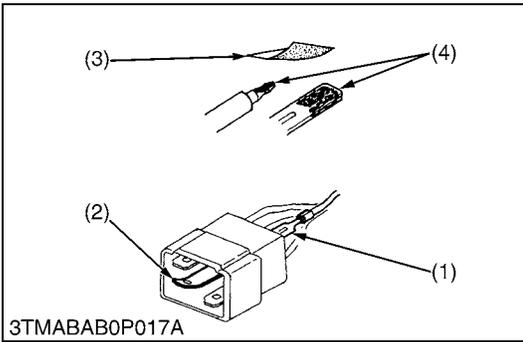


- In separating connectors, do not pull wire harnesses.
- Hold connector bodies to separate.

(A) Correct

(B) Incorrect

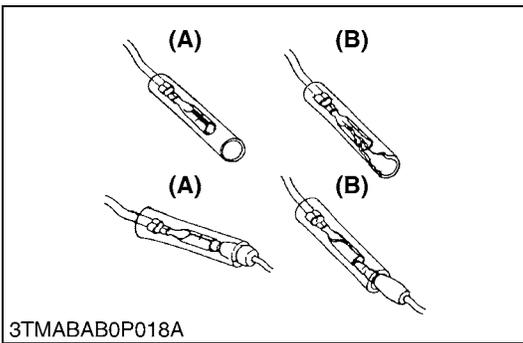
W10122720



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

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

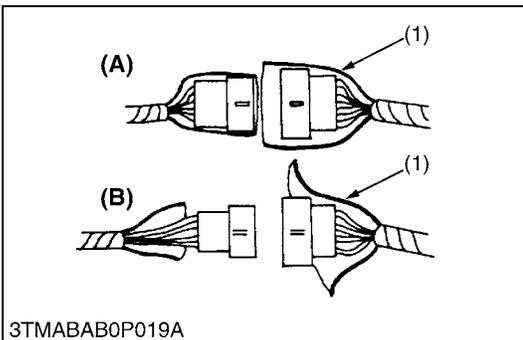
W10123460



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

(A) Correct (B) Incorrect

W10124300

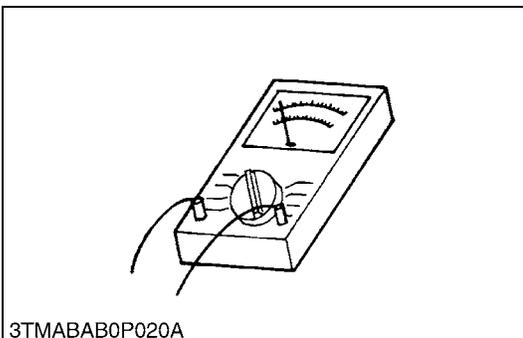


- Make certain plastic cover is large enough to cover whole connector.

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

W10125190

[5] HANDLING OF CIRCUIT TESTER



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

W10126840

4. LUBRICANTS, FUEL AND COOLANT

	Place	Capacity	Lubricants, fuel and coolant	
		M59		
1	Fuel	55 L 14.6 U.S.gals 12.1 Imp.gals	No. 2-D diesel fuel No. 1-D diesel fuel if temperature is below -10 °C (14 °F)	
2	Coolant (Recovery tank)	6.5 L (1 L) 6.9 U.S.qts (1.1 U.S.qts) 5.7 Imp.qts (0.88 Imp.qts)	Fresh clean water with anti-freeze	
3	Engine crankcase (with filter)	9.4 L 9.9 U.S.qts 8.3 Imp.qts	Engine oil : API service Classification CD, CE or CF Below 0 °C (32 °F) : SAE10W, 10W-30 or 10W-40 0 to 25 °C (32 to 77 °F): SAE20, 10W-30 or 10W-40 Above 25 °C (77 °F): SAE30, 10W-30 or 10W-40	
4	Transmission case	46 L 12.2 U.S.gals 10.1 Imp.gals	KUBOTA UDT or SUPER UDT fluid*	
5	Front axle case	12.5 L 13.2 U.S.qts 11.0 Imp.qts	KUBOTA UDT or SUPER UDT fluid* or SAE80, 90 gear oil	
Greasing				
	Place	No. of greasing point	Capacity	Type of grease
6	Front axle support	2	Until grease overflows.	Multipurpose grease NLGI-2 or MLGI-1 (GC-LB)
	Top link	2		
	Lift rod	1		
	Battery terminal	2	Moderate amount	
	Suspension adjuster	—		
	Lock plate	—		
	Spring hook	—		
	Reversible plate	—		
	Throttle cable	Oiling		

* 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 temperatures 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 of 10 minimum).
- Lubricating oil recommended when a low-sulfur or high-sulfur fuel is employed.
- Recommended API categorization
All models meeting Third Stage Exhaust Emissions Regulations Specification.

Fuel used	Engine oil classification (API classification)
	Oil class of engines with external EGR
High Sulfur Fuel (≥ 500 ppm)	-
Low Sulfur Fuel (< 500 ppm) or Ultra Low Sulfur Fuel (< 15 ppm)	CF or CI-4 (Class CF-4, CG-4 and CH-4 engine oils cannot be used on EGR type engines)

W1032862

• EGR: Exhaust Gas Re-circulation

- The CJ-4 engine oil is intended for DPF (Diesel Particulate Filter) type engines, and cannot be used on this tractor.

	with External EGR
Model	M59

W1034361

• 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

• 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

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	 No-grade or 4T						 7T						 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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[3] HYDRAULIC FITTINGS**Hydraulic Hose Fittings**

Hose size	Thread size	Tightening torque		
		N-m	kgf-m	lbf-ft
02	1/8	13.7 to 15.7	1.4 to 1.6	10.1 to 11.6
03	1/4	22.6 to 27.5	2.3 to 2.8	16.6 to 20.3
04				
05	3/8	45.1 to 53.0	4.6 to 5.4	33.3 to 39.0
06				

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Hydraulic Pipe Cap Nuts

Pipe size	Tightening torque		
	N-m	kgf-m	lbf-ft
φ4 × t1.0	19.6 to 29.4	2.0 to 3.0	14.5 to 21.7
φ6 × t1.0	24.5 to 34.3	2.5 to 3.5	18.1 to 25.3
φ8 × t1.0	29.4 to 39.2	3.0 to 4.0	21.7 to 28.9
φ10 × t1.0	39.2 to 49.0	4.0 to 5.0	28.9 to 36.1
φ12 × t1.5	49.0 to 68.6	5.0 to 7.0	36.1 to 50.6
φ15 × t1.6	107.9 to 117.7	11.0 to 12.0	79.6 to 86.8
φ18 × t1.6	107.9 to 117.7	11.0 to 12.0	79.6 to 86.8

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Adapters, Elbows and Nipples

Items	Thread size	Tightening torque		
		N-m	kgf-m	lbf-ft
POA-PF (Nipple with O-ring)	PF 1/8	44.1 to 53.9	4.5 to 5.5	32.5 to 39.8
	PF 1/4	73.5 to 83.4	7.5 to 8.5	54.2 to 61.5
	PF 3/8	93.2 to 103.0	9.5 to 10.5	68.7 to 75.9
	PF 1/2	112.8 to 122.6	11.5 to 12.5	83.2 to 90.4
POB-PF (Elbow with O-ring and no nut)	PF 1/8	22.6 to 26.5	2.3 to 2.7	16.6 to 19.5
	PF 1/4	35.3 to 43.1	3.6 to 4.4	26.0 to 31.8
	PF 3/8	53.9 to 63.7	5.5 to 6.5	39.8 to 47.0
	PF 1/2	73.5 to 83.4	7.5 to 8.5	54.2 to 61.5
Adapter (NPT)	PF 1/8	9.8 to 14.7	1.0 to 1.5	7.2 to 10.8
	PF 1/4	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3
	PF 3/8	49.0 to 68.6	5.0 to 7.0	36.2 to 50.6
	PF 1/2	68.6 to 88.3	7.0 to 9.0	50.6 to 65.1

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