# WSM

## WORKSHOP MANUAL

# TRACTOR, FRONT LOADER,BACKHOE

# M59,TL1350,BT1200

Kubota



KiSC issued 02, 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 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**

# 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.**

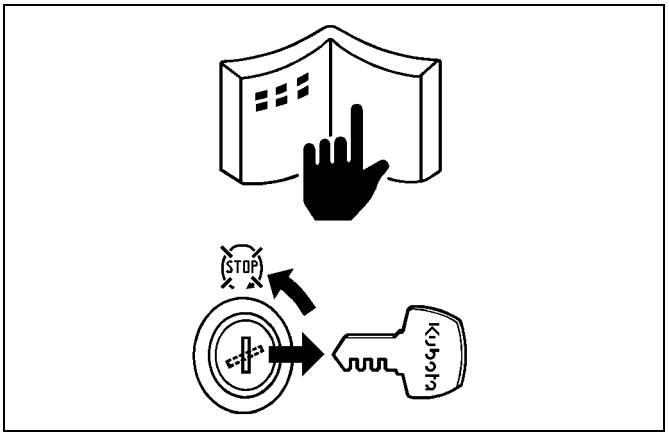
**DANGER : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

**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.**

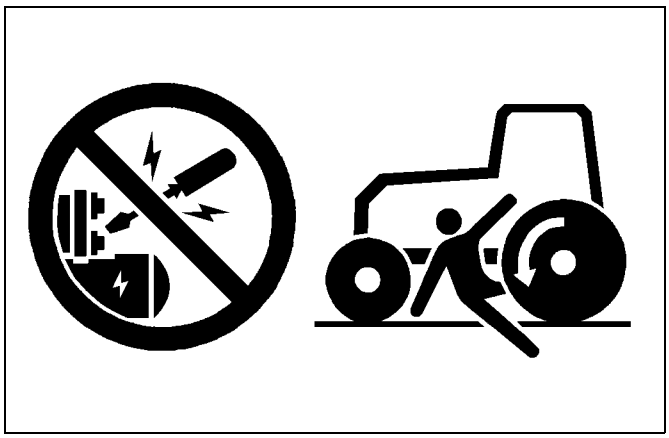
**■ IMPORTANT : Indicates that equipment or property damage could result if instructions are not followed.**

**■ NOTE : Gives helpful information.**



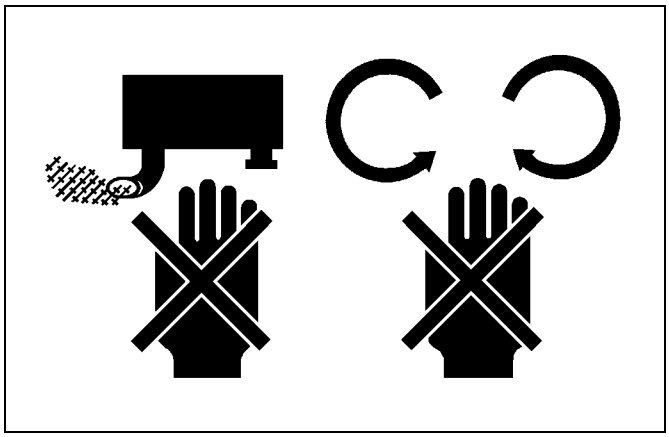

## BEFORE SERVICING AND REPAIRING

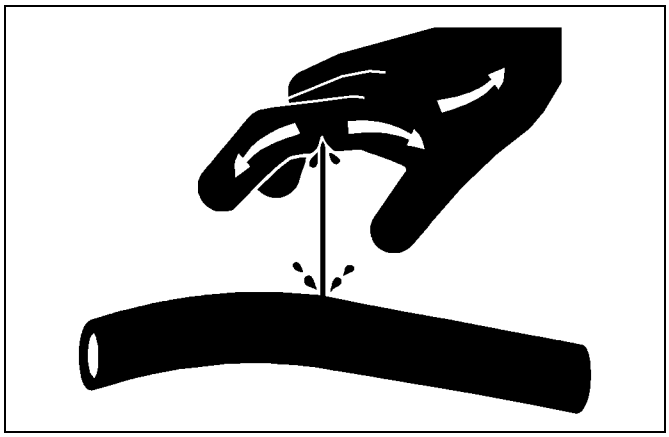
- Read all instructions and safety instructions in this manual and on your machine safety decals.
- Clean the work area and machine.
- Park the machine on a firm and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, and remove the key.
- Disconnect the battery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

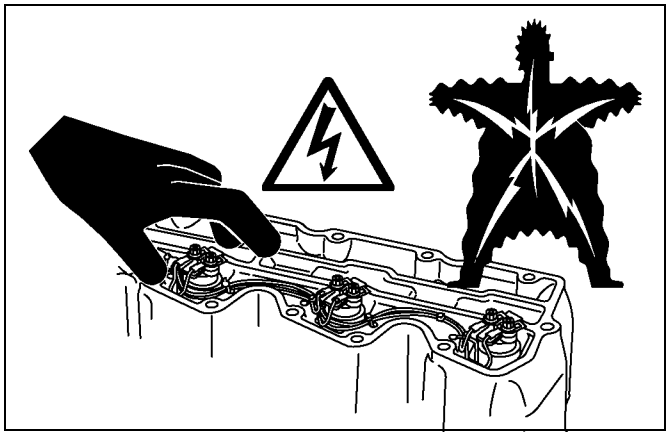


## SAFETY STARTING

- 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.

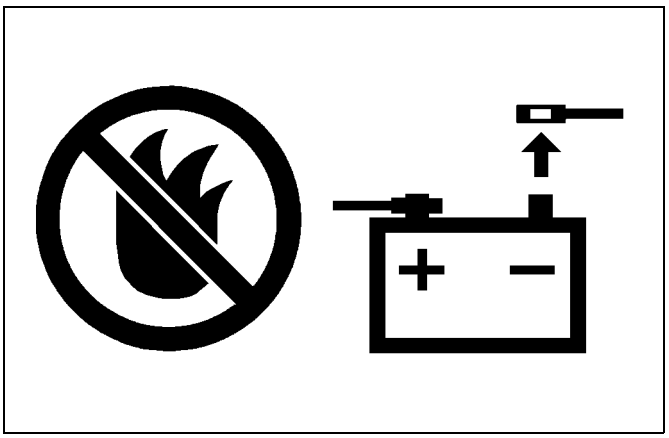






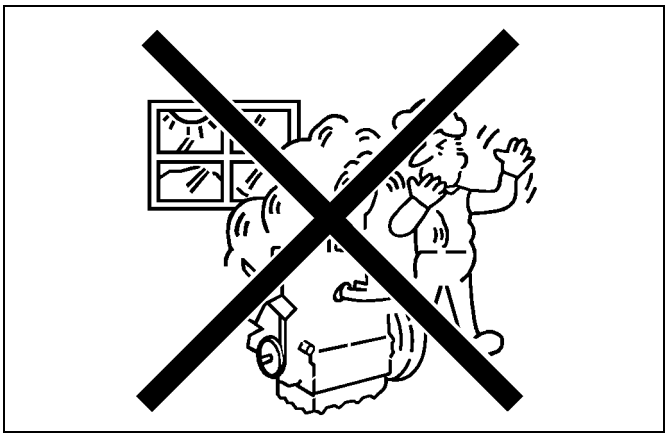
## SAFETY WORKING

- 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.



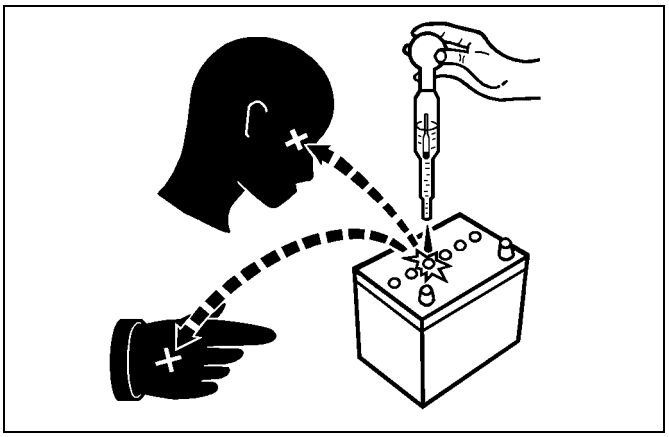
## AVOID FIRES

- 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.



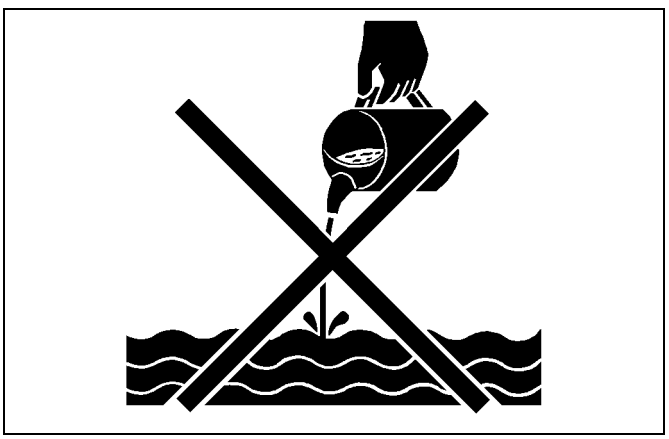
## VENTILATE WORK AREA

- 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.



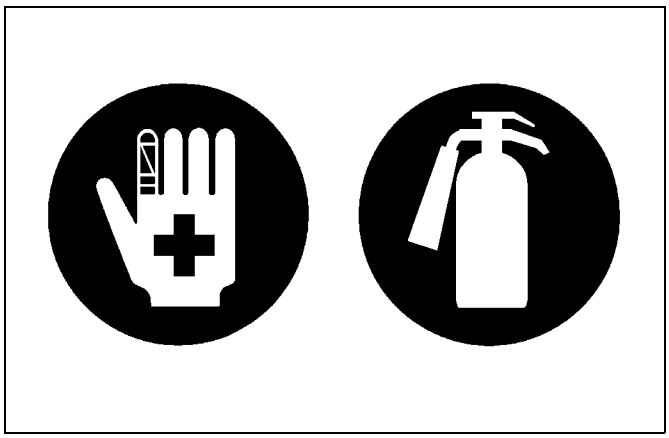
## PREVENT ACID BURNS

- 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.

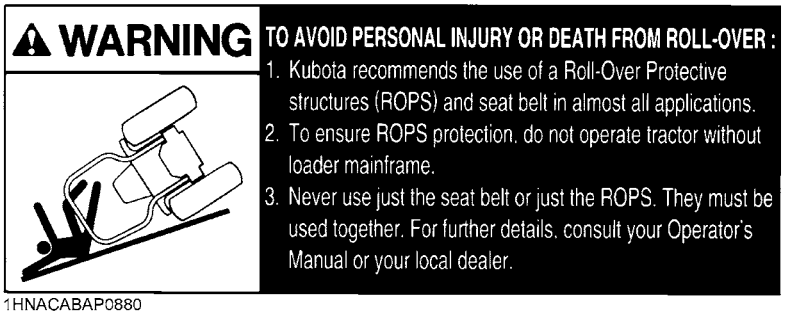
# SAFETY DECALS

**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

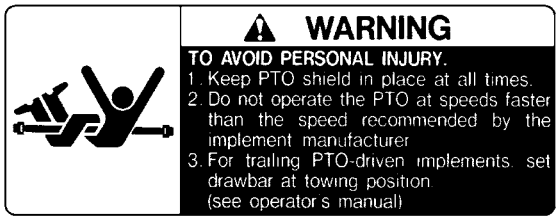

1AGAMAAAP3810

(2) Part No. 32771-4925-1




1HNACABAP0880

(3) Part No. TA040-4959-3

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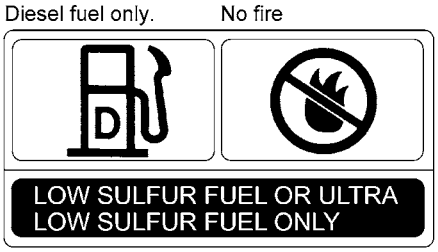
(4) Part No. TC230-4956-1



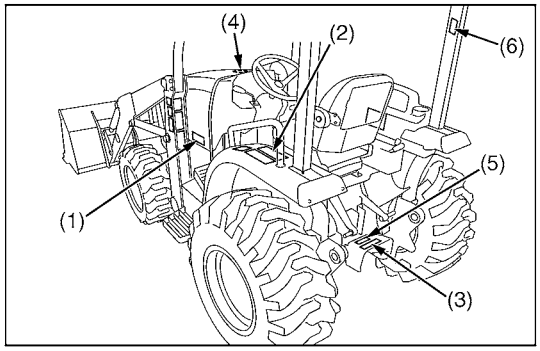

1AGAPAJAP068A

(5) Part No. TA040-4935-1


1AGAMAAAP3860

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


1AGAMAAAP3870




3TVAAAGCP002A

(1) Part No. TA240-4933-2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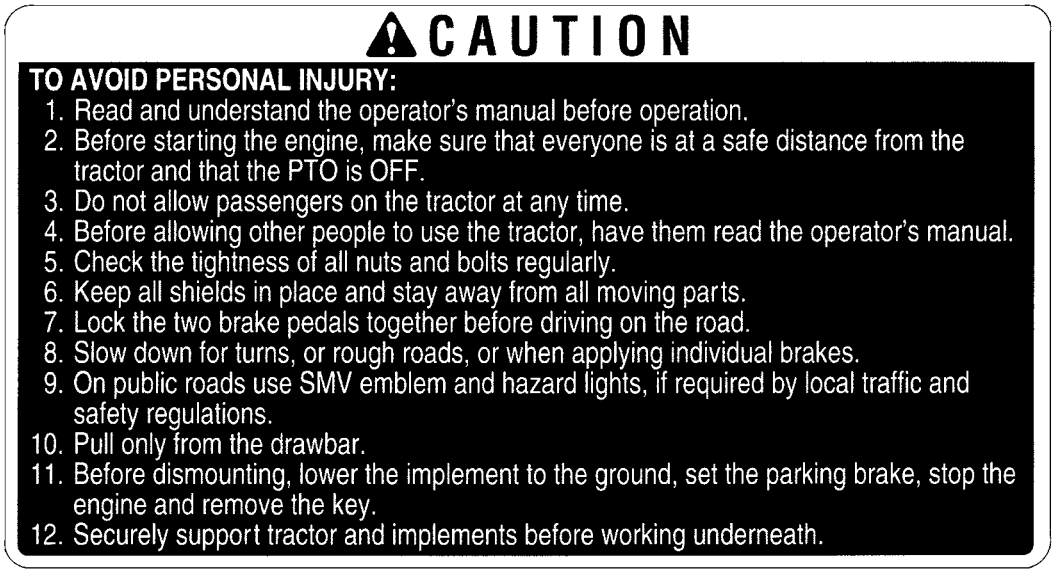
(2) Part No. 35260-3491-4

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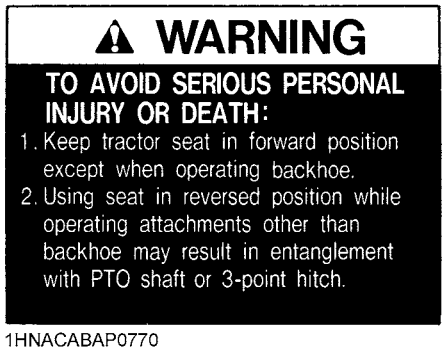
(3) Part No. 32751-4921-2

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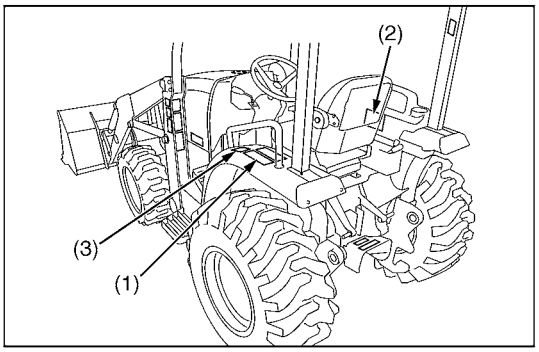



3TVAAAGCP003A

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


1AIABAHAP016A

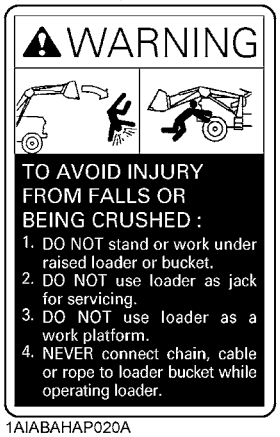
(2) Part No. 7J246-5641-1


1AIABAHAP017A

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


1AIABAHAP019A

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

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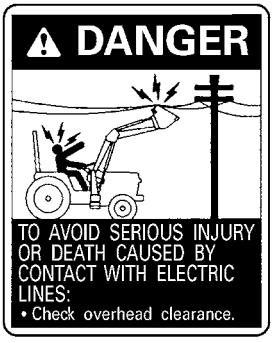
(5) Part No. 7J266-5649-2


1AIABACAP077A

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

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


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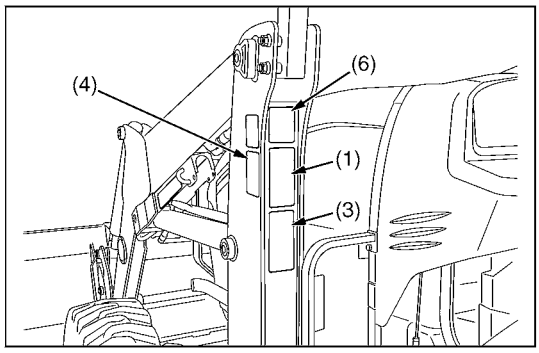
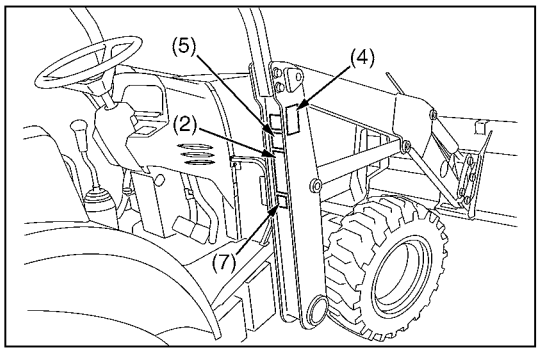



3TVAAAGCP004A

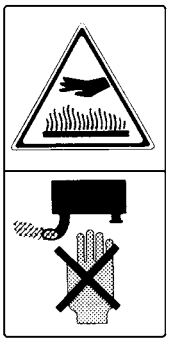
(1) Part No. 32791-3015-1


1HNADAAAP1090

(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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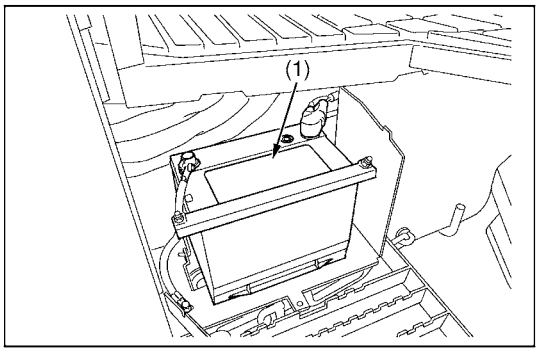


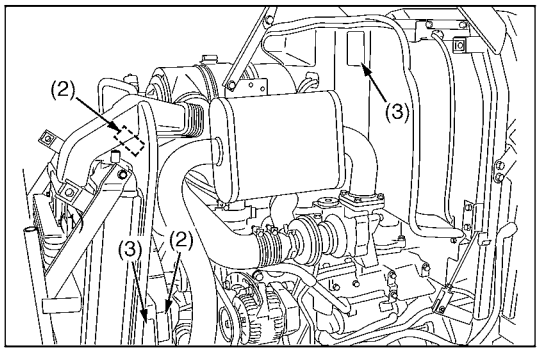


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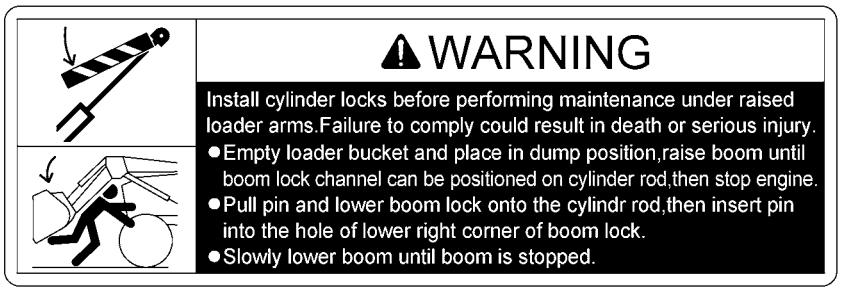
(1) Part No. 7J802-5848-1

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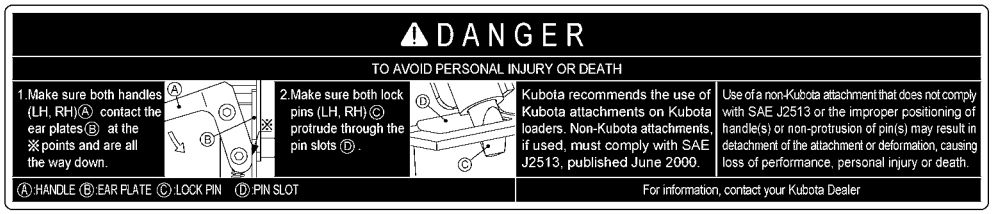
(2) Part No. 7J802-3648-4

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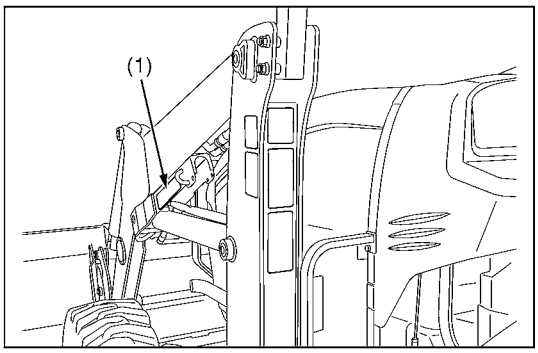


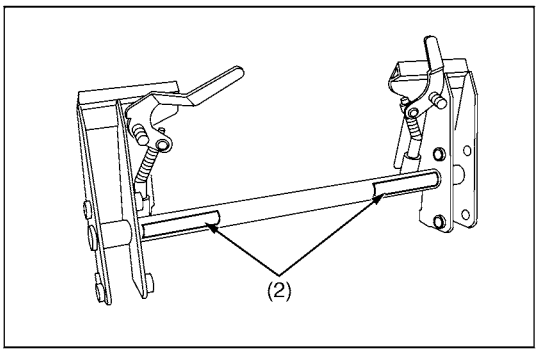


## CARE OF DANGER, WARNING AND CAUTION LABELS

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.
4. If a component with danger, warning and caution label(s) affixed is replaced with new part, mark 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 | 1140 mm (56.7 in.) |
| | | 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 The company reserves the right to change the specifications without notice.
** with brake

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.) |

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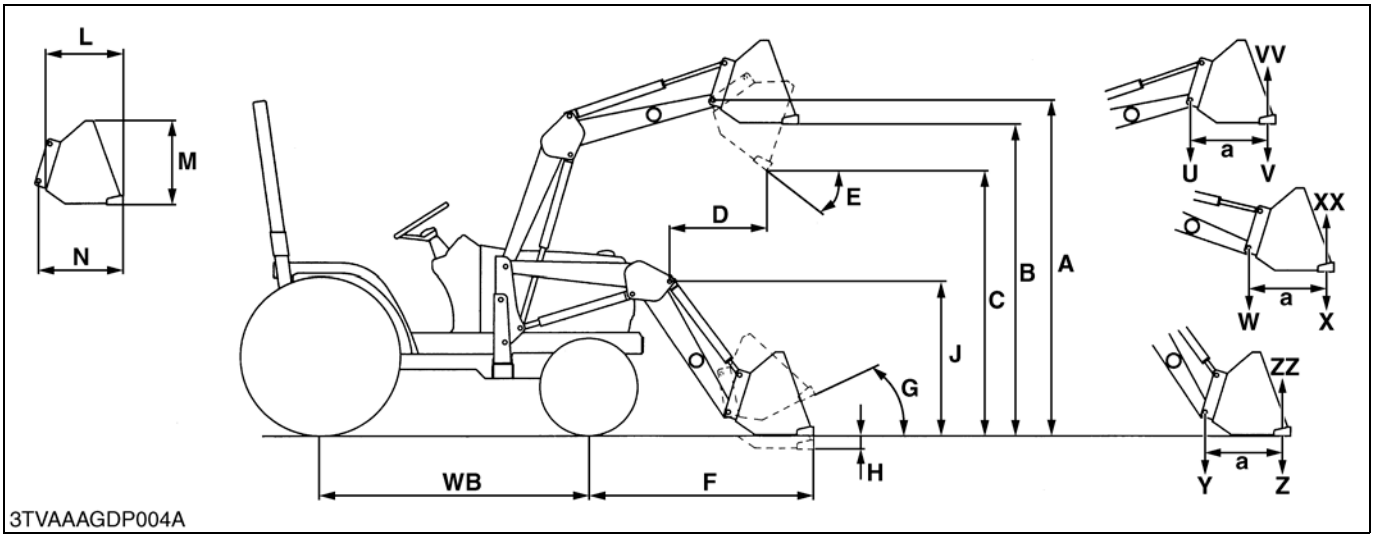


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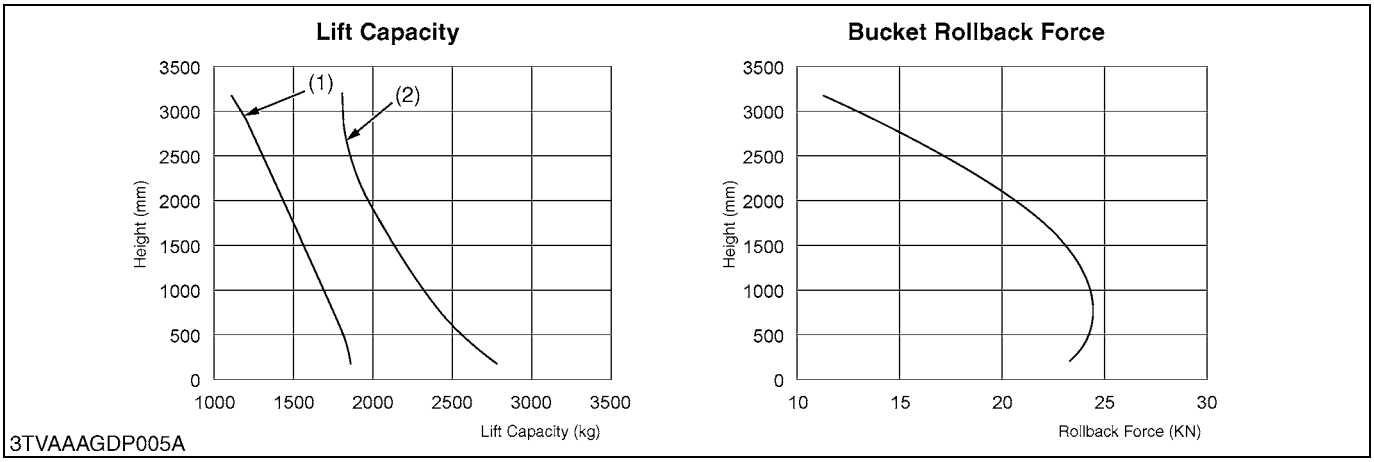
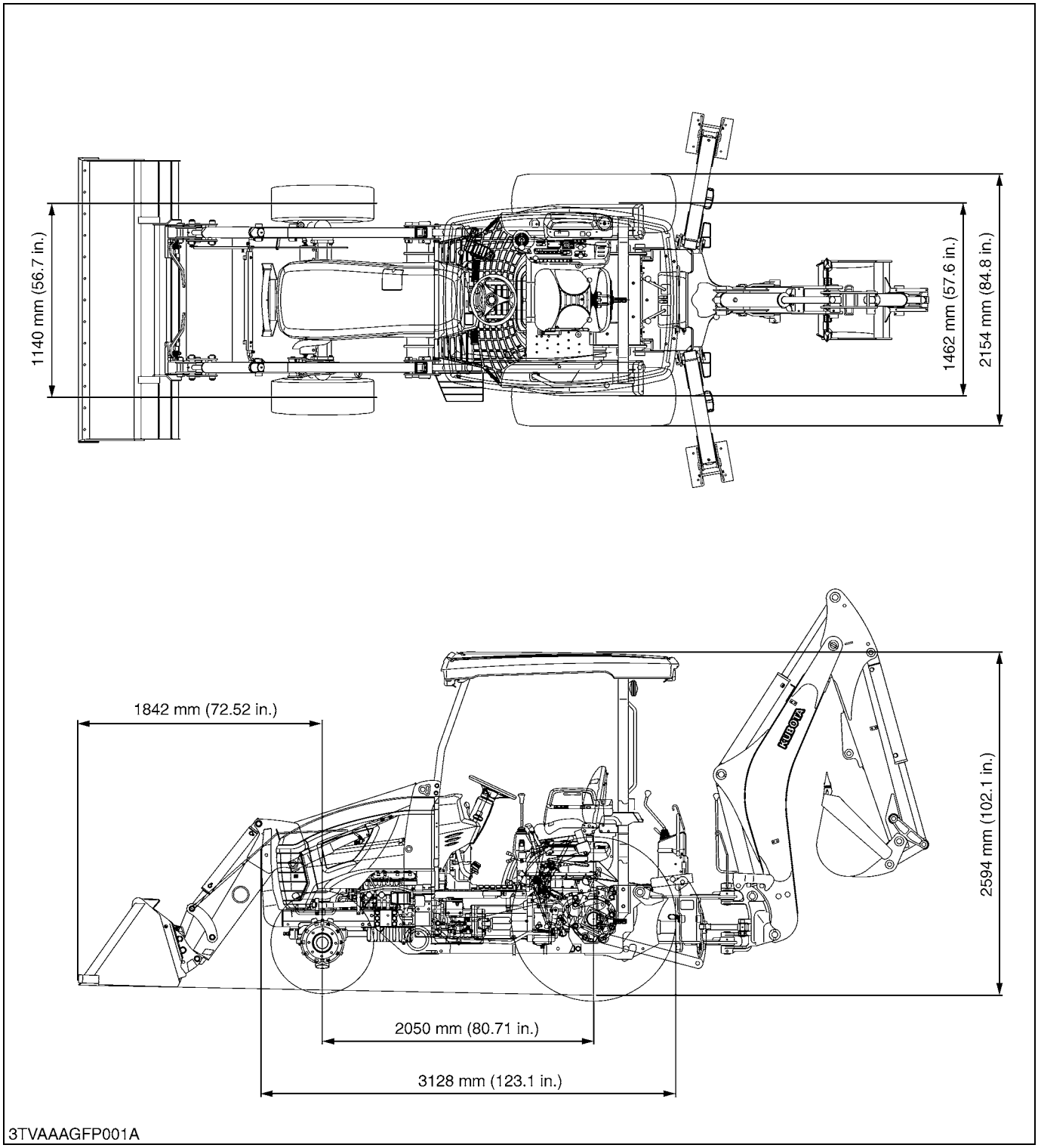



3TVAAAGDP005A

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

# DIMENSIONS




3TVAAAGFP001A

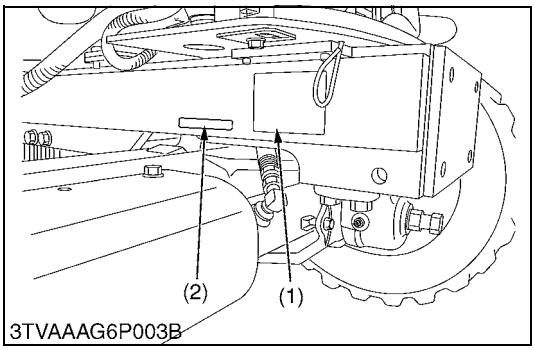
# G GENERAL

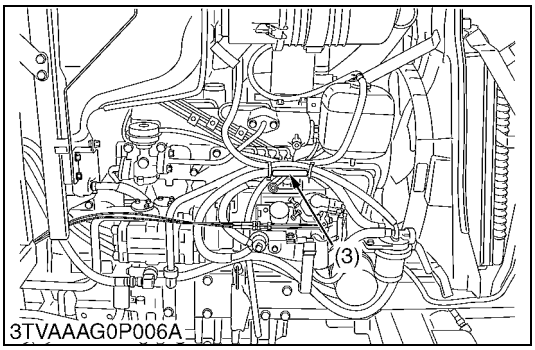
# GENERAL

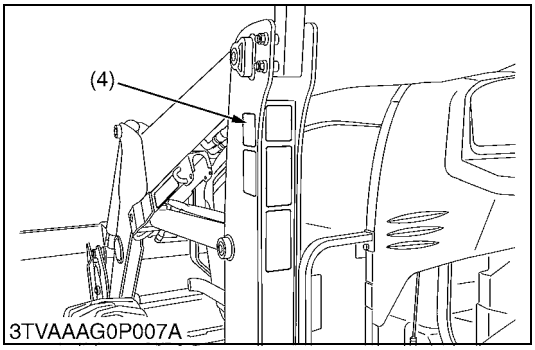
## CONTENTS

# 1. TRACTOR IDENTIFICATION

## [1] MODEL NAME AND SERIAL NUMBERS



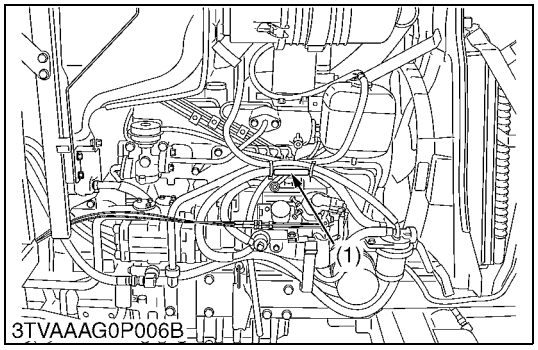




When contacting your local KUBOTA distributor, always specify engine serial number loader and tractor serial number and.

(1) Tractor Identification Plate
(2) Tractor Serial Number
(3) Engine 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

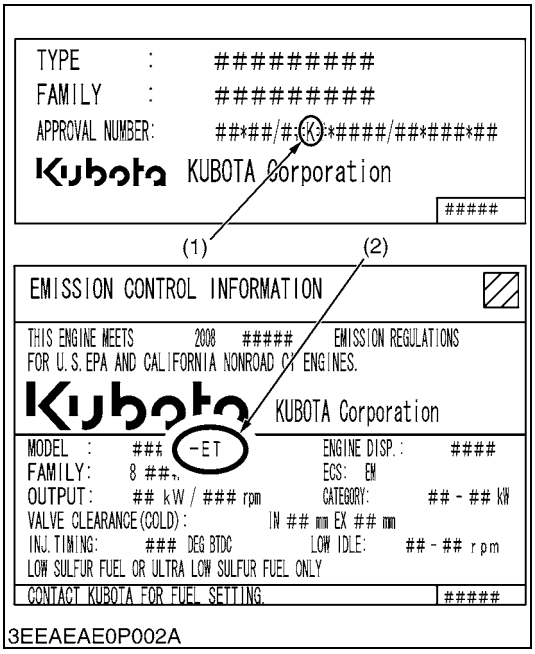
## [2] E3 ENGINE

[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.



3EEAEAE0P002A

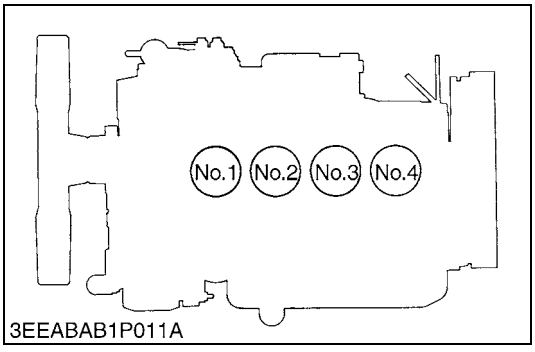
| Category (1) | Engine output classification | EU regulation |
|---|---|---|
| K | From 19 to less than 37 kW | STAGE IIIA |
| J | From 37 to less than 75 kW | STAGE IIIA |
| I | From 75 to less than 130 kW | STAGE IIIA |

| 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



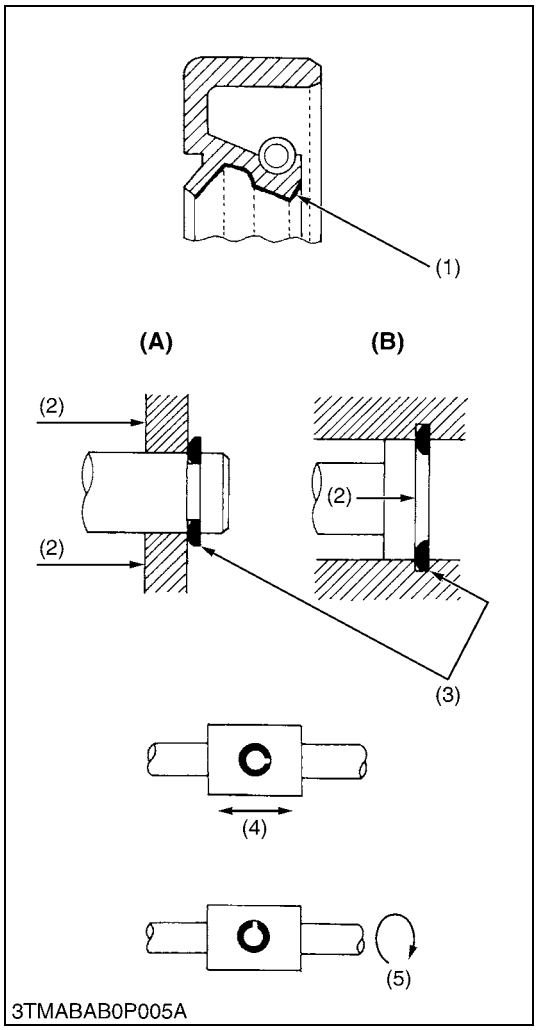
3EEABAB1P011A

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



3TMABAB0P005A

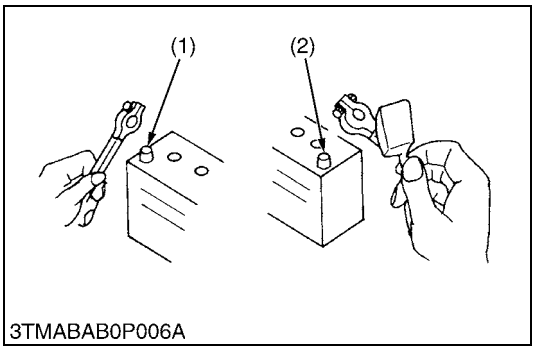
- During disassembly, carefully arrange removed parts in a clean area to prevent confusion later. Screws, bolts and nuts should be installed in their original position to prevent reassembly errors.
- When special tools are required, use KUBOTA genuine special tools. Special tools which are not frequently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




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

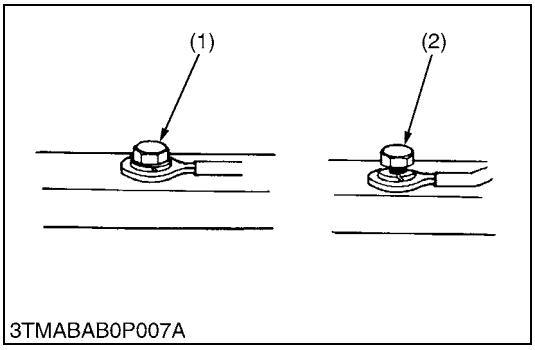
■ **IMPORTANT**

- **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

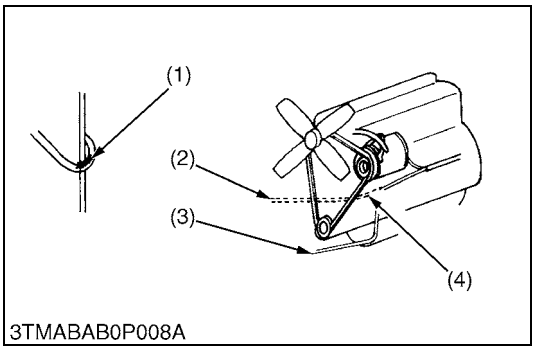
## [1] WIRING




- Securely tighten wiring terminals.

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

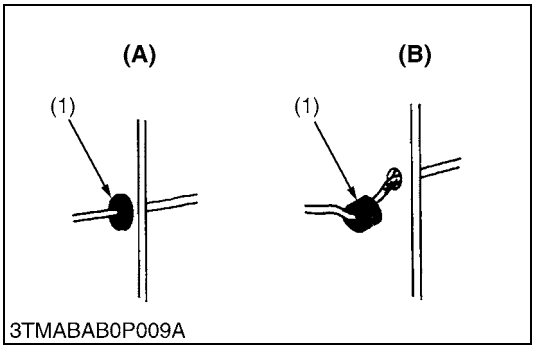
W10112160




- Do not let wiring contact dangerous part.

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

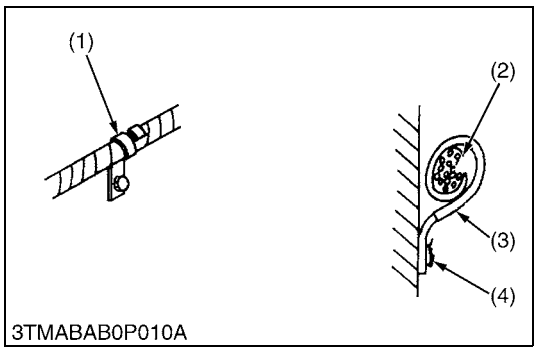
W10113130




- Securely insert grommet.

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

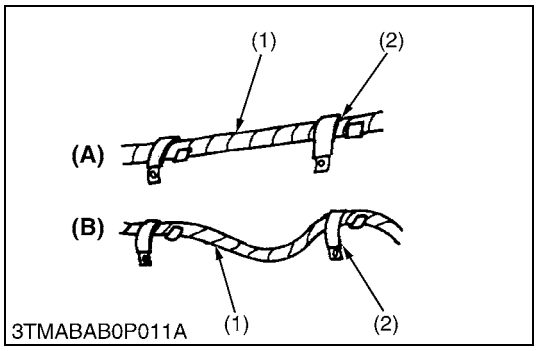
W10113880




- Securely clamp, being careful not to damage wiring.

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

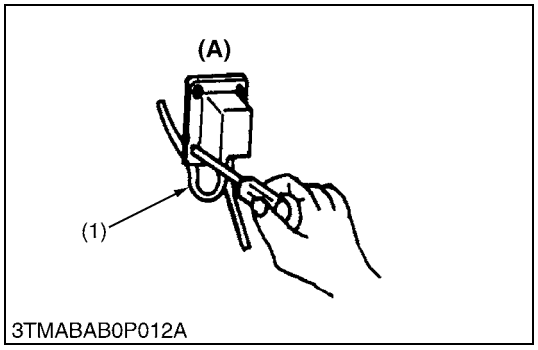
W10114580




- 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**

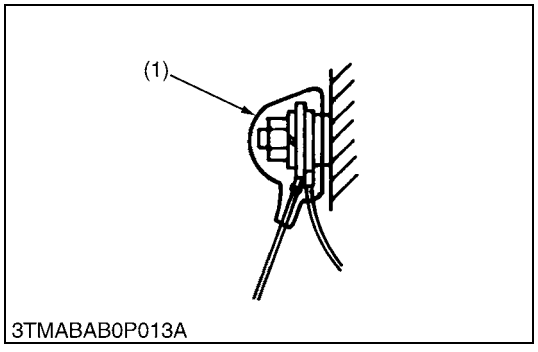
W10115870




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

(1) Wiring
**(A) Incorrect**

W10116700

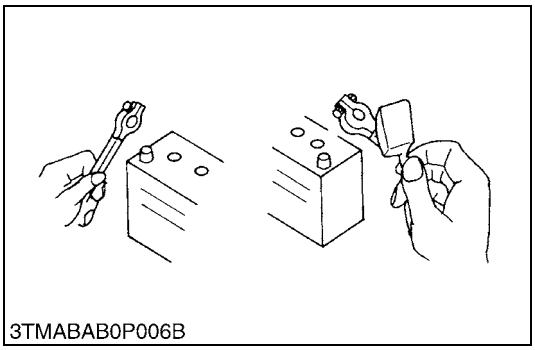



- After installing wiring, check protection of terminals and clamped condition of wiring, only connect battery.

(1) Cover
• Securely Install Cover

W10117350

## [2] BATTERY


3TMABAB0P006B

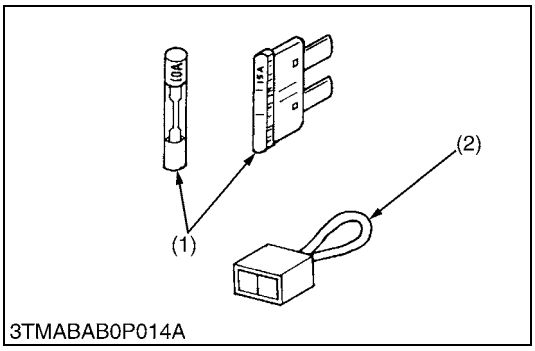
- Take care not to confuse positive and negative terminal posts.
- When removing battery cables, disconnect negative cable first. When installing battery cables, check for polarity and connect positive cable first.
- Do not install any battery with capacity other than is specified (Ah).
- After connecting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



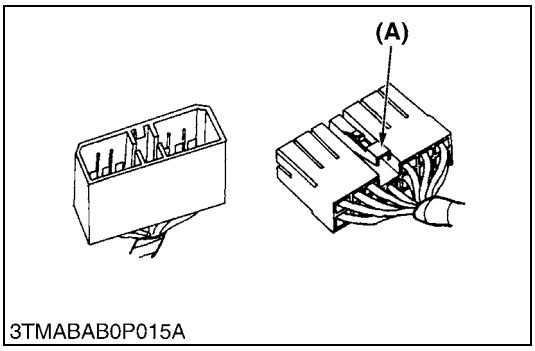
3TMABAB0P014A

- 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

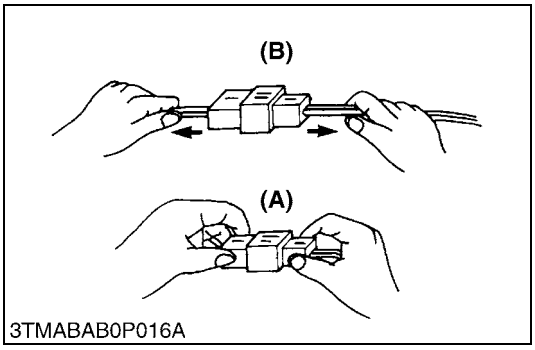


3TMABAB0P015A

- For connector with lock, push lock to separate.

**(A) Push**

W10122110

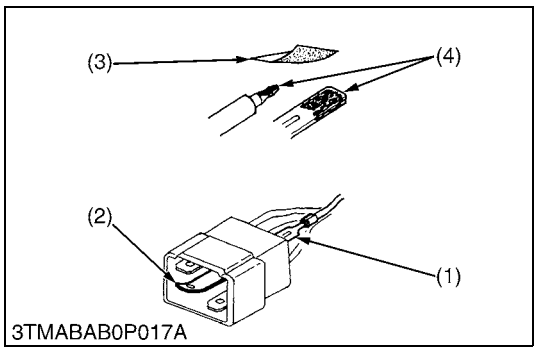


3TMABAB0P016A

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

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

W10122720

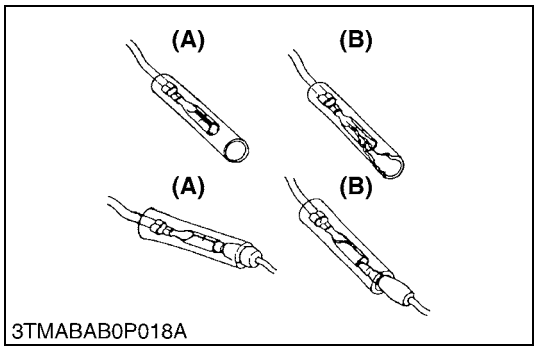


3TMABAB0P017A

- 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

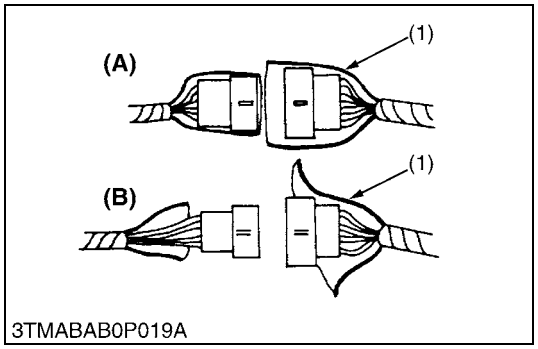


3TMABAB0P018A

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

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

W10124300



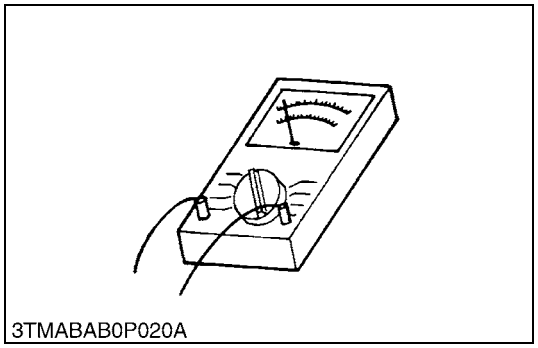
3TMABAB0P019A

- 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 | Lubricants, fuel and coolant |
|---|---|---|---|
| | | **M59** | |
| 1 | Fuel | 55 L<br>14.6 U.S.gals<br>12.1 Imp.gals | No. 2-D diesel fuel<br>No. 1-D diesel fuel<br>if temperature is below –10 °C (14 °F) |
| 2 | Coolant<br>(Recovery tank) | 6.5 L (1 L)<br>6.9 U.S.qts (1.1 U.S.qts)<br>5.7 Imp.qts (0.88 Imp.qts) | Fresh clean water with anti-freeze |
| 3 | Engine crankcase<br>(with filter) | 9.4 L<br>9.9 U.S.qts<br>8.3 Imp.qts | Engine oil : API service<br>Classification CD, CE or CF<br>Below 0 °C (32 °F) : SAE10W, 10W-30 or 10W-40<br>0 to 25 °C (32 to 77 °F): SAE20, 10W-30 or 10W-40<br>Above 25 °C (77 °F): SAE30, 10W-30 or 10W-40 |
| 4 | Transmission case | 46 L<br>12.2 U.S.gals<br>10.1 Imp.gals | KUBOTA UDT or SUPER UDT fluid* |
| 5 | Front axle case | 12.5 L<br>13.2 U.S.qts<br>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 | Moderate amount | |
| | Battery terminal | 2 | | |
| | Suspension adjuster | – | | |
| | Lock plate | – | | |
| | Spring hook | – | | |
| | Reversible plate | – | | |
| | Throttle cable | Oiling | | Engine oil |

* 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<br>(≥ 500 ppm) | – |
| Low Sulfur Fuel<br>(< 500 ppm) or<br>Ultra Low Sulfur Fuel<br>(< 15 ppm) | **CF** or **CI-4**<br>(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** | ⬡ ④ **No-grade or 4T** | | | | | | ⑦ **7T** | | | | | | ⑨ **9T** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Material of bolt** | SS400, S20C | | | | | | S43C, S48C | | | | | | SCr435, SCM435 | | |
| **Material of opponent part** | Ordinariness | | | Aluminum | | | Ordinariness | | | Aluminum | | | Ordinariness | | |
| **Unit** / **Diameter** | N·m | kgf·m | lbf·ft | N·m | kgf·m | lbf·ft | N·m | kgf·m | lbf·ft | N·m | kgf·m | lbf·ft | N·m | kgf·m | lbf·ft |
| M6 (6 mm, 0.24 in.) | 7.84 to 9.31 | 0.80 to 0.95 | 5.79 to 6.87 | 7.84 to 8.83 | 0.80 to 0.90 | 5.79 to 6.51 | 9.81 to 11.2 | 1.00 to 1.15 | 7.24 to 8.32 | 7.84 to 8.83 | 0.80 to 0.90 | 5.79 to 6.51 | 12.3 to 14.2 | 1.25 to 1.45 | 9.05 to 10.5 |
| M8 (8 mm, 0.31 in.) | 17.7 to 20.5 | 1.8 to 2.1 | 13.0 to 15.2 | 16.7 to 19.6 | 1.7 to 2.0 | 12.3 to 14.5 | 23.6 to 27.4 | 2.4 to 2.8 | 17.4 to 20.2 | 17.7 to 20.6 | 1.8 to 2.1 | 13.0 to 15.2 | 29.4 to 34.3 | 3.0 to 3.5 | 21.7 to 25.3 |
| M10 (10 mm, 0.39 in.) | 39.2 to 45.0 | 4.0 to 4.6 | 29.0 to 33.2 | 31.4 to 34.3 | 3.2 to 3.5 | 23.1 to 25.3 | 48.1 to 55.8 | 4.9 to 5.7 | 35.5 to 41.2 | 39.2 to 44.1 | 4.0 to 4.5 | 28.9 to 32.5 | 60.8 to 70.5 | 6.2 to 7.2 | 44.9 to 52.1 |
| M12 (12 mm, 0.47 in.) | 62.8 to 72.5 | 6.4 to 7.4 | 46.3 to 53.5 | – | – | – | 77.5 to 90.1 | 7.9 to 9.2 | 57.2 to 66.5 | 62.8 to 72.5 | 6.4 to 7.4 | 46.3 to 53.5 | 103 to 117 | 10.5 to 12.0 | 76.0 to 86.8 |
| M14 (14 mm, 0.55 in.) | 108 to 125 | 11.0 to 12.8 | 79.6 to 92.5 | – | – | – | 124 to 147 | 12.6 to 15.0 | 91.2 to 108 | – | – | – | 167 to 196 | 17.0 to 20.0 | 123 to 144 |
| M16 (16 mm, 0.63 in.) | 167 to 191 | 17.0 to 19.5 | 123 to 141 | – | – | – | 196 to 225 | 20.0 to 23.0 | 145 to 166 | – | – | – | 260 to 303 | 26.5 to 31.0 | 192 to 224 |
| M18 (18 mm, 0.71 in.) | 245 to 284 | 25.0 to 29.0 | 181 to 210 | – | – | – | 275 to 318 | 28.0 to 32.5 | 203 to 235 | – | – | – | 343 to 401 | 35.0 to 41.0 | 254 to 297 |
| M20 (20 mm, 0.79 in.) | 334 to 392 | 34.0 to 40.0 | 246 to 289 | – | – | – | 368 to 431 | 37.5 to 44.0 | 272 to 318 | – | – | – | 490 to 568 | 50.0 to 58.0 | 362 to 420 |

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.) | 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 | – | – | – |

W1048139

# [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 | | | | |

W1014711

## ■ 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 |

W1014848

## ■ 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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