

Product: Kubota WSM L45 Tractor, TL1000A Front Loader, BT1000A Backhoe Service Repair Workshop Manual
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WSM

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

L45, TL1000A, BT1000A

Kubota

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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 L45, KUBOTA Front Loader TL1000A and KUBOTA Backhoe BT1000A. 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.

December 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.



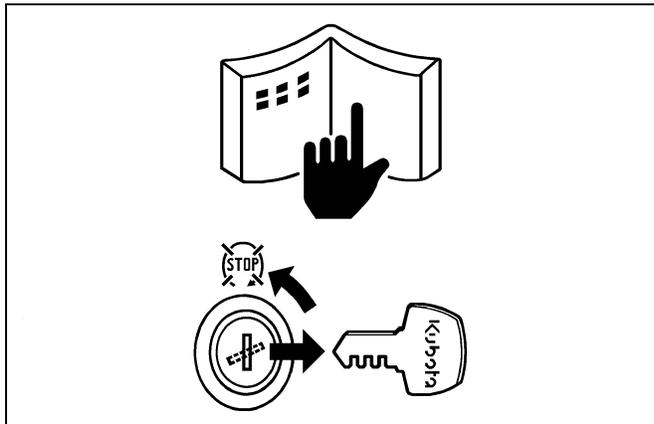
IMPORTANT

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



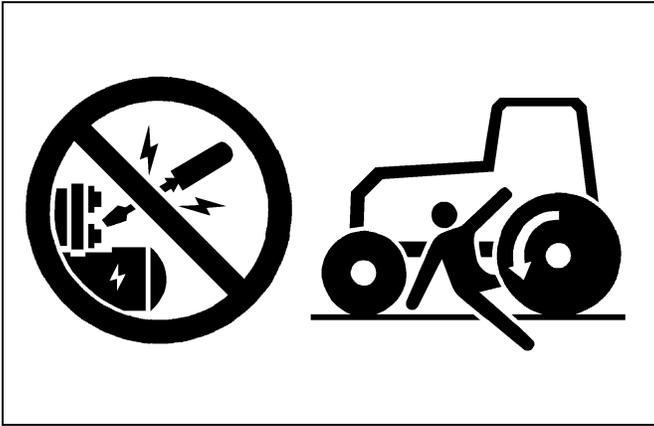
NOTE

: Gives helpful information.



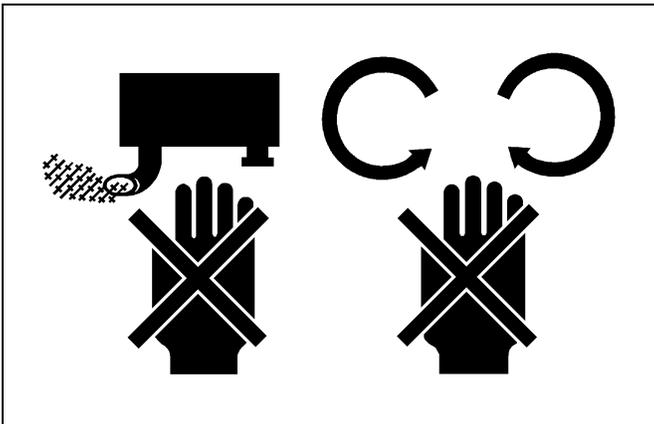
BEFORE SERVICING AND REPAIRING

- 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.



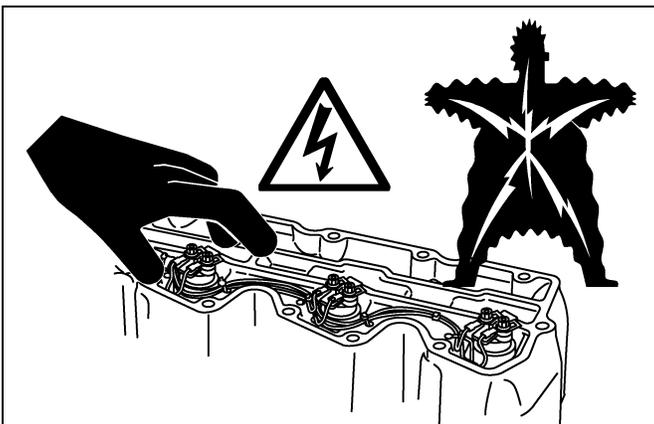
SAFETY STARTING

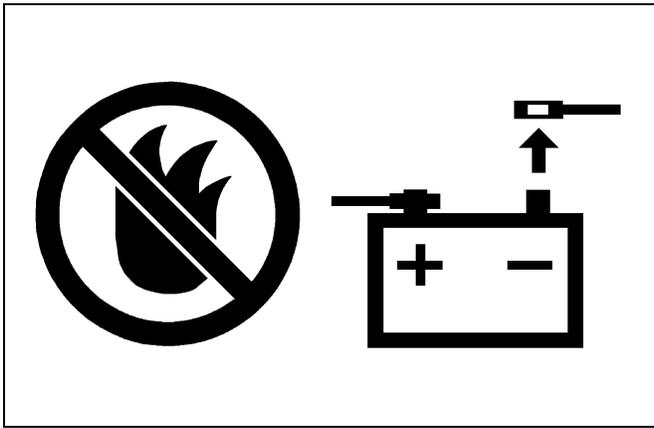
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine 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.





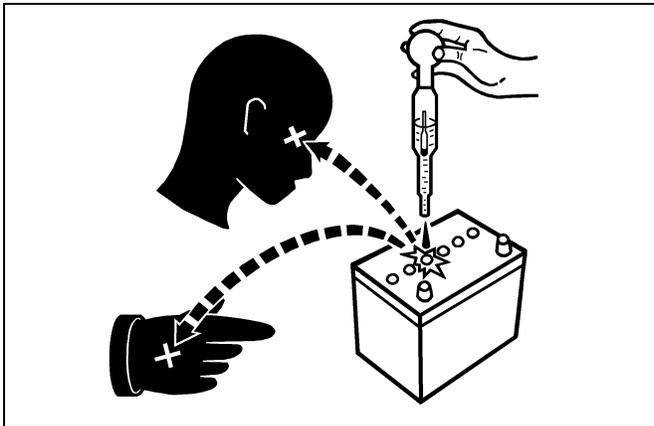
AVOID FIRES

- 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.



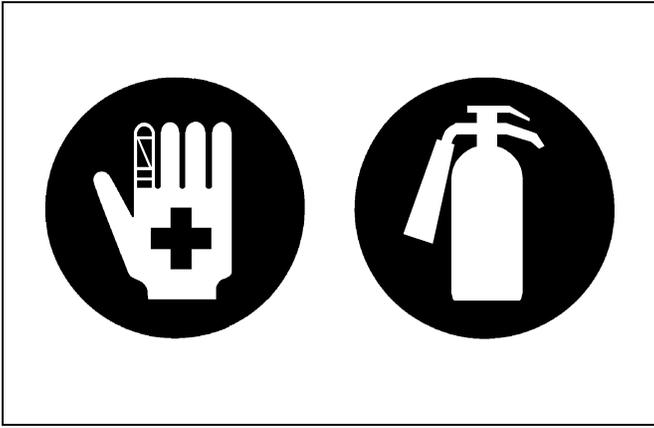
PREVENT ACID BURNS

- 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> <ol style="list-style-type: none"> 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. 2. Start engine only from operator's seat with transmission and PTO OFF. <p>Never start engine while standing on the ground.</p> |
|---|---|

1AGAMAAAP3810

(4) Part No. TC230-4956-1

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

1AGAPAJAP068A

(2) Part No. 32771-4925-1

| | |
|--|--|
| <p>⚠ WARNING</p>  | <p>TO AVOID PERSONAL INJURY OR DEATH FROM ROLL-OVER :</p> <ol style="list-style-type: none"> 1. Kubota recommends the use of a Roll-Over Protective structures (ROPS) and seat belt in almost all applications. 2. To ensure ROPS protection, do not operate tractor without loader mainframe. 3. Never use just the seat belt or just the ROPS. They must be used together. For further details, consult your Operator's Manual or your local dealer. |
|--|--|

1HNACABAP0880

(5) Part No. TA040-4935-1

| |
|--|
| <p>⚠ WARNING</p> |
| <p>TO AVOID PERSONAL INJURY:</p> <ol style="list-style-type: none"> 1. Attach pulled or towed loads to the drawbar only. 2. Use the 3-point hitch only with equipment designed for 3-point hitch usage. |

1AGAMAAAP3860

(3) Part No. TA040-4959-3

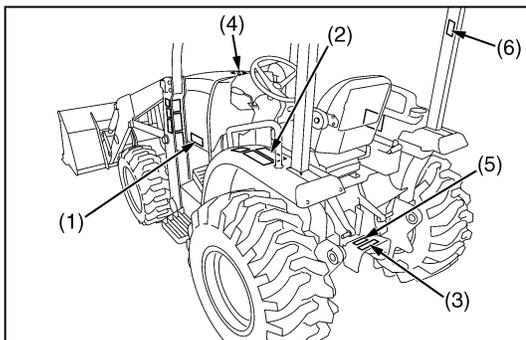
| | |
|---|---|
|  | <p style="text-align: center;">⚠ WARNING</p> <p>TO AVOID PERSONAL INJURY.</p> <ol style="list-style-type: none"> 1. Keep PTO shield in place at all times. 2. Do not operate the PTO at speeds faster than the speed recommended by the implement manufacturer. 3. For trailing PTO-driven implements, set drawbar at towing position. (see operator's manual) |
|---|---|

1AGAMAAAP3830

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

| |
|--|
| <p>⚠ WARNING</p> |
| <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> |

1AGAMAAAP3870



3TVAAAGCP002A

(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. |
|  | |

1AGAMAAAP3720

(2) Part No. 35260-3491-4

⚠ CAUTION

TO AVOID PERSONAL INJURY:

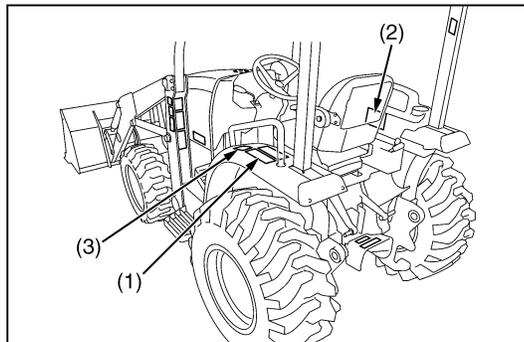
1. Read and understand the operator's manual before operation.
2. Before starting the engine, make sure that everyone is at a safe distance from the tractor and that the PTO is OFF.
3. Do not allow passengers on the tractor at any time.
4. Before allowing other people to use the tractor, have them read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

1AGAMAAAP3750

(3) Part No. 32751-4921-2

| |
|---|
|  WARNING |
| TO AVOID SERIOUS PERSONAL INJURY OR DEATH: 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. |

1HNACABAP0770



3TVAAAGCP003A

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

⚠ DANGER



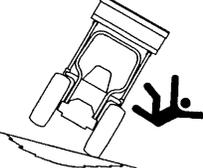
TO AVOID SERIOUS INJURY OR DEATH CAUSED BY FALLING LOADS :

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.

1AIABAHAP016A

(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.

1AIABAHAP019A

(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.

1AIABAHAP020A

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

⚠ CAUTION

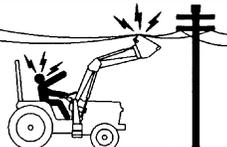
TO AVOID INJURY FROM CRUSHING :

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.

1AIABACAP077A

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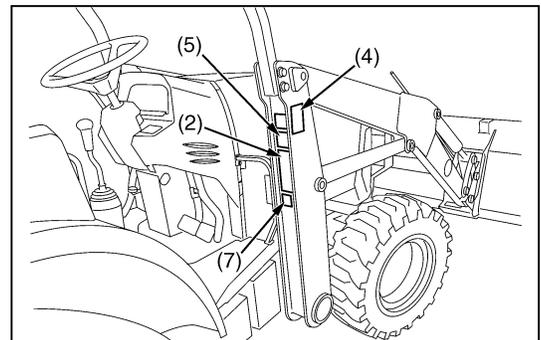
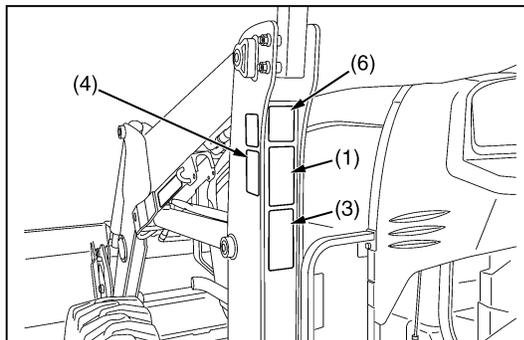
(7) Part No. 7J417-7778-1

⚠ 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. 32781-3015-1



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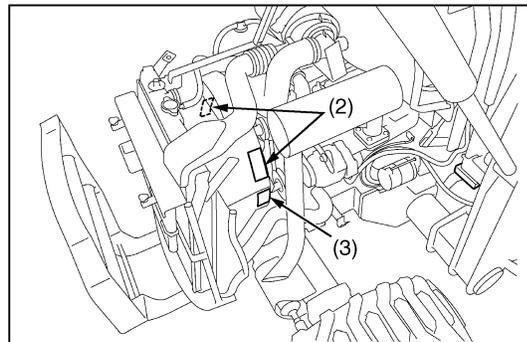
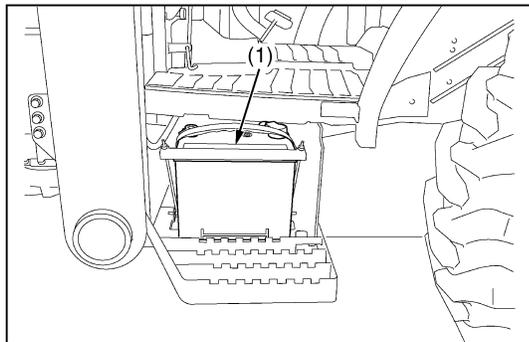
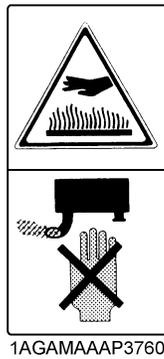
(2) Part No. 32751-4958-1

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



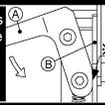
(3) Part No. TC030-4958-1

Do not touch hot surface like muffler, etc..

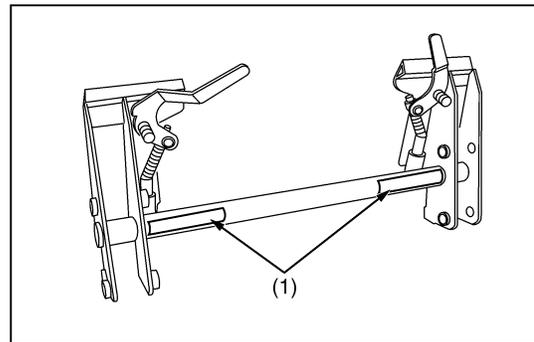


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(1) Part No. 7J802-3648-4

| ⚠ DANGER | | | |
|--|---|---|---|
| TO AVOID PERSONAL INJURY OR DEATH | | | |
| 1. Make sure both handles (LH, RH) (A) contact the ear plates (B) at the (C) points and are all the way down. |  | 2. Make sure both lock pins (LH, RH) (D) protrude through the pin slots (E) . |  |
| (A) : HANDLE (B) : EAR PLATE (C) : LOCK PIN (D) : PIN SLOT | | Kubota recommends the use of Kubota attachments on Kubota loaders. Non-Kubota attachments, if used, must comply with SAE J2513, published June 2000. | |
| | | 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. | |
| For information, contact your Kubota Dealer | | | |

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, 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.

9Y1210267ICI002A

SPECIFICATIONS OF THE TRACTOR

| Model | | L45 |
|---|---|---|
| Engine | Model | V2203-M-TE3-TLB1 |
| | Type | Indirect injection vertical, water-cooled, 4-cycle diesel |
| | No. of cylinders | 4 |
| | Bore and stroke | 87 × 92.4 mm (3.4 × 3.6 in.) |
| | Engine gross power | 33.6 kW (45 HP) |
| | PTO power (factory observed) | 32.0 kW (23.9 HP) |
| | Net power | 31.7 kW (42.5 HP) * |
| | Total displacement | 2.197 L (134.0 cu. in.) |
| | Rated revolution | 2700 min ⁻¹ (rpm) |
| | Low idling revolution | 900 to 980 min ⁻¹ (rpm) |
| | Battery | 12 V, RC: 90 min., CCA: 550A |
| Capacities | Fuel tank | 45 L (11.9 U.S.gals, 9.9 Imp.gals) |
| | Engine crankcase (with filter) | 8.2 L (8.7 U.S.qts, 7.2 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 | 7.0 L (7.4 U.S.qts, 6.2 Imp.qts) |
| Tires | Front | 27 x 10.5-15R4 |
| | Rear | 15-19.5R4 |
| Dimensions | Overall length (without 3P, with front guard) | 2948 mm (116.1 in.) |
| | Overall width | 1842 mm (72.5 in.) |
| | Overall height with ROPS and FOPS | 2415 mm (95.1 in.) |
| | Wheel base | 1841 mm (72.5 in.) |
| | Min. ground clearance | 365 mm (14.4 in.) at transmission case |
| | Tread | Front |
| Rear | | 1426 mm (56.1 in.) |
| Weight (with ROPS and FOPS, main frame) | | 1954 kg (4308 lbs) |
| PTO shaft | | Transmission case rear |
| Rear PTO | | SAE 1-3/8, 6 Spline |
| Clutch | | Dry |
| Steering | | Hydraulic power |
| Transmission | | Hydrostatic transmission (3 speeds) |
| Min. turning radius | | 3.4 m (11.2 feet) ** |
| Brake | | Multiple wet disks operated by two foot pedals which can be locked together |
| Differential | | Bevel gear |

NOTE: * Manufacture's estimate
 ** without brake

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

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TRAVELING SPEEDS

| Model | | | L45 | |
|---------------------|------------|------------------------|-----------|------|
| Tire size (Rear) | | | 15-19.5R4 | |
| Speed control pedal | H-DS lever | Range gear shift lever | km/h | mph |
| Forward | L | L | 3.1 | 1.9 |
| | | M | 6.3 | 3.9 |
| | | H | 13.4 | 8.3 |
| | H | L | 5.2 | 3.2 |
| | | M | 10.6 | 6.6 |
| | | H | 22.5 | 14.0 |
| Reverse | L | L | 2.8 | 1.7 |
| | | M | 5.7 | 3.5 |
| | | H | 12.1 | 7.5 |
| | H | L | 4.7 | 2.9 |
| | | M | 9.5 | 5.9 |
| | | H | 20.2 | 12.6 |

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

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DIMENSIONAL SPECIFICATIONS

■ Loader Specifications

| Loader Model | | TL1000A-2 |
|--------------------------|--------|---|
| Boom cylinder | Bore | 55.0 mm (2.17 in.) |
| | Stroke | 550 mm (21.65 in.) |
| Bucket cylinder | Bore | 60.0 mm (2.36 in.) |
| | Stroke | 365 mm (14.37 in.) |
| Control valve | | One detent float position, power beyond circuit, hydraulic dual self-leveling valve |
| Rated flow | | 43.4 L/m (11.5 U.S.gals/m, 9.55 Imp.gals/m) |
| Maximum pressure | | 19.6 MPa, 200 kgf/cm ² , 2845 psi) |
| Net weight (Approximate) | | 435 kg (960 lbs) |

W1029500

■ Bucket Specifications

| Loader Model | | TL1000A-2 |
|--------------|--------|-----------------------------------|
| Model | | Round 72 |
| Width | | 1830 mm (72.0 in.) |
| Depth (L) | | 470 mm (18.5 in.) |
| Height (M) | | 660 mm (26.0 in.) |
| Length (N) | | 610 mm (24.0 in.) |
| Capacity | Struck | 0.36 m ³ (12.7 CU.FT.) |
| | Heaped | 0.44 m ³ (15.5 CU.FT.) |
| Weight | | 190 kg (420 lbs) |

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■ Dimensional Specifications

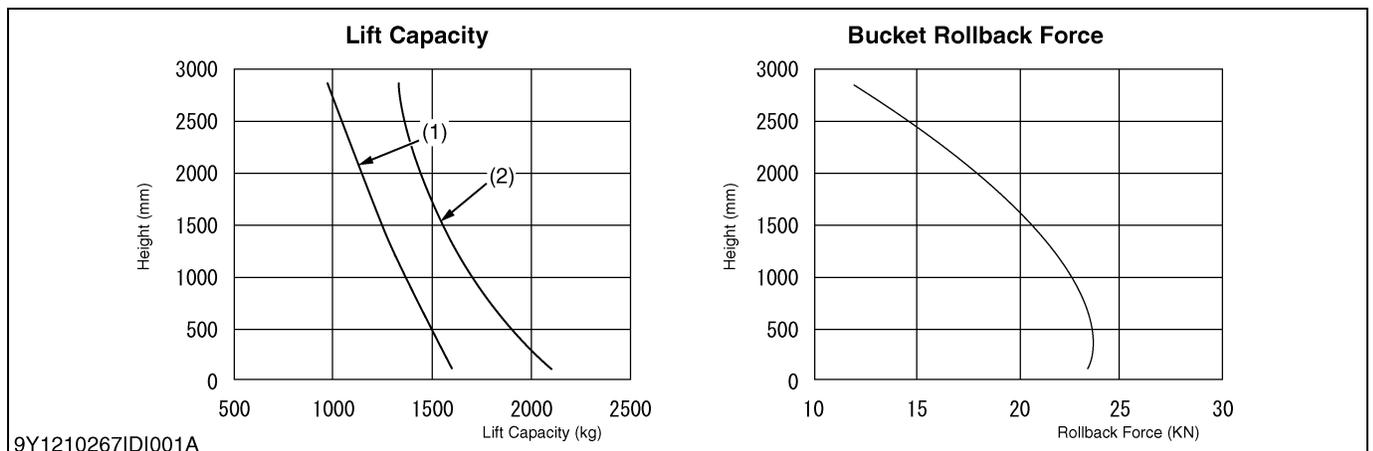
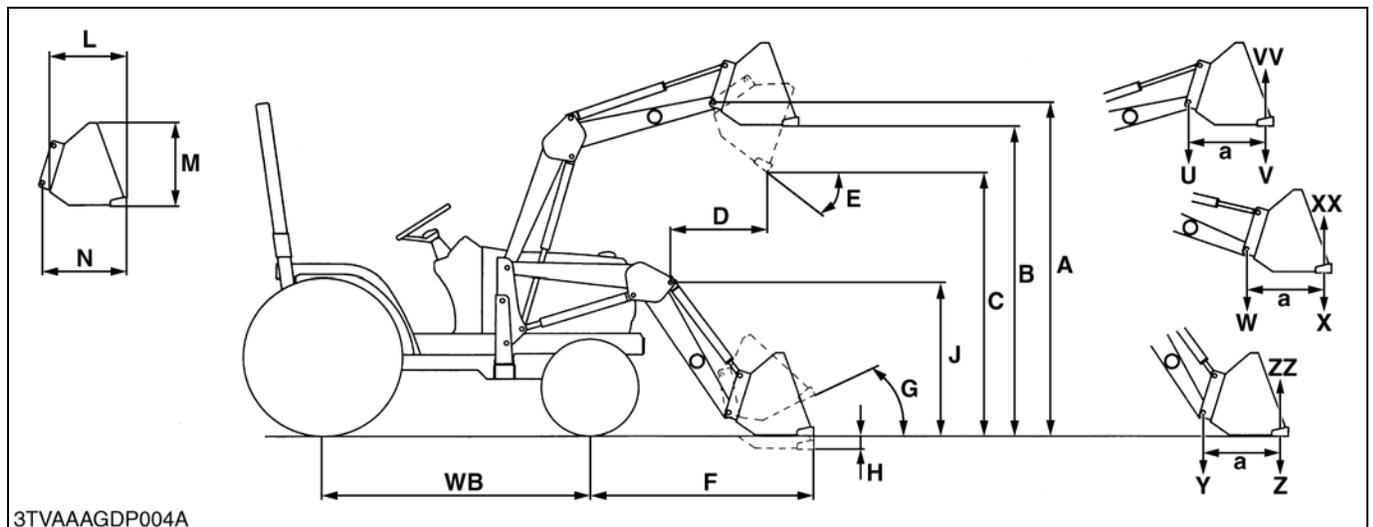
| Loader Model | | TL1000A-2 |
|--------------|---|---------------------|
| A | Max. lift height (To bucket pivot pin) | 2893 mm (113.9 in.) |
| B | Max. lift height under level bucket | 2694 mm (106.1 in.) |
| C | Clearance with bucket dumped | 2287 mm (90.0 in.) |
| D | Reach at max. lift height (Dumping reach) | 426 mm (16.8 in.) |
| E | Max. dump angle | 0.77 rad (44 deg.) |
| F | Reach with bucket on ground | 1739 mm (68.5 in.) |
| G | Bucket roll-back angle | 0.84 rad (48 deg.) |
| H | Digging depth | 89 mm (3.5 in.) |
| I | Overall height in carrying position | 1402 mm (55.2 in.) |

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Operational Specifications

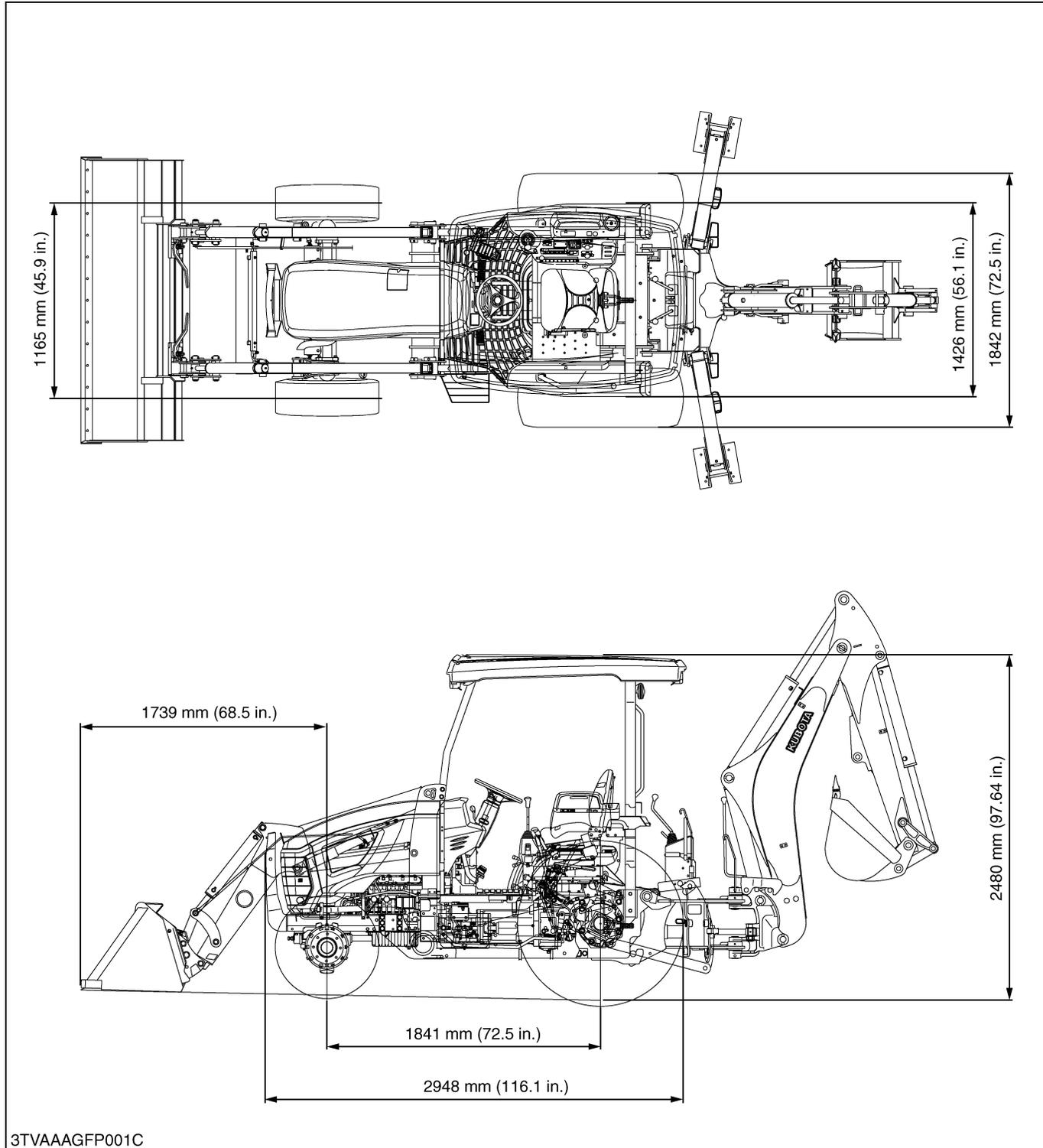
| Loader Model | | TL1000A |
|---|---|---------------------|
| U | Lift capacity (Bucket pivot pin, max. height) | 1292 kg (2848 lbs) |
| V | Lift capacity (500 mm (20 in.) forward, max. height) | 936 kg (2063 lbs) |
| W | Lift capacity (Bucket pivot pin, 1500 mm (59 in.) height) | 1535 kg (3384 lbs) |
| X | Lift capacity (500 mm (20 in.) forward 1500 mm height) | 1232 kg (2716 lbs) |
| Y | Breakout force (Bucket pivot pin) | 20153 N (4531 lbf) |
| Z | Breakout force (500 mm forward) | 15563 N (3499 lbf) |
| VV | Bucket roll-back force at max. height | 11650 N (2619 lbf) |
| XX | Bucket roll-back force at 1.5M (5.9 in.) | 20613 N (4634 lbf) |
| ZZ | Bucket roll-back force at ground level | 23556 N (23487 lbf) |
| Raising time Self-level valve OFF (ON) | | 3.2 sec. (3.6 sec.) |
| Lowering time Self-level valve OFF (ON) | | 2.9 sec. (5.8 sec.) |
| Bucket dumping time | | 2.2 sec. |
| Bucket rollback time | | 1.9 sec. |
| a | Length | 500 mm (19.7 in.) |

W1030633



(1) 500 mm (19.7 in.) Forward of Pivot Pin (2) At Pivot Pin

DIMENSIONS



G GENERAL

GENERAL

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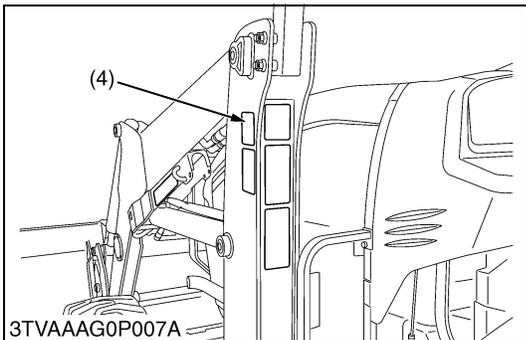
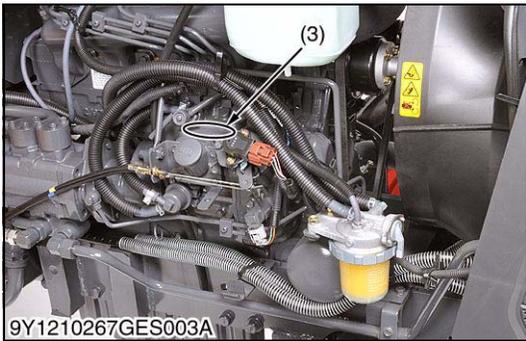
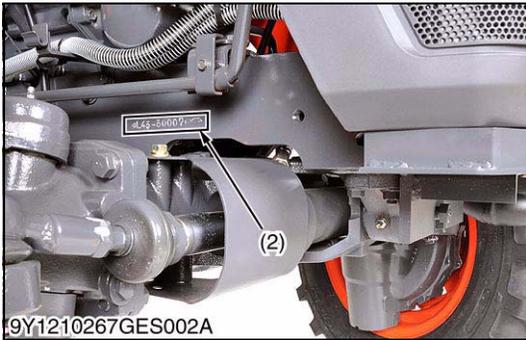
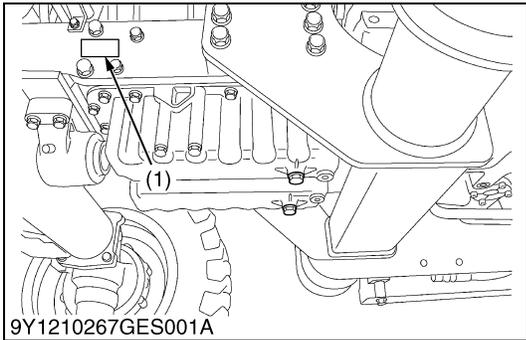
1. TRACTOR IDENTIFICATION

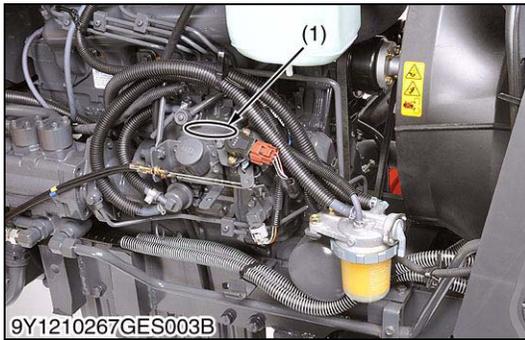
[1] MODEL NAME AND SERIAL NUMBERS

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

- (1) Tractor Identification Plate
- (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 ~ |

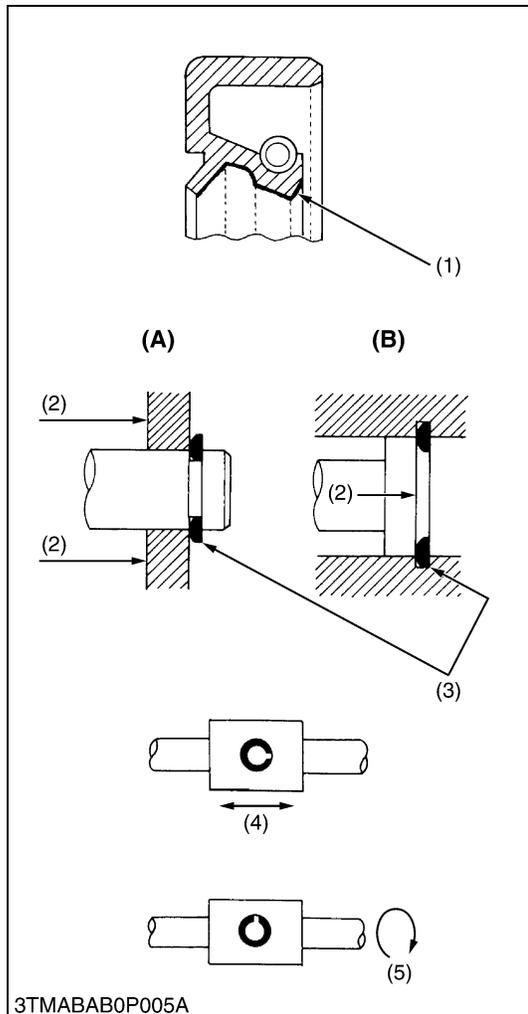
“3” indicates 2003 and “A” indicates January.

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

(1) Engine Model and Serial Number

W1010477

2. GENERAL PRECAUTIONS



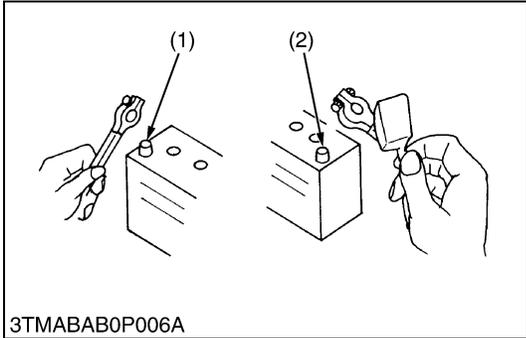
- During disassembly, carefully arrange removed parts in a clean area to prevent confusion later. Screws, bolts and nuts should be installed in their original position to prevent reassembly errors.
- When special tools are required, use KUBOTA genuine special tools. Special tools which are not frequently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

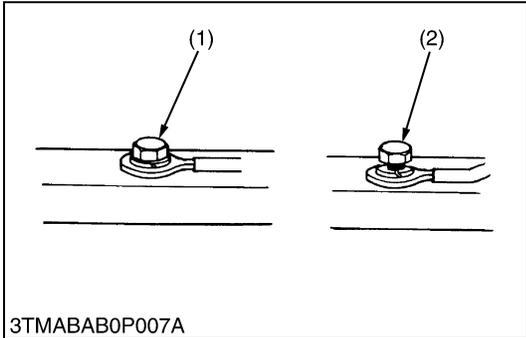
■ IMPORTANT

- 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

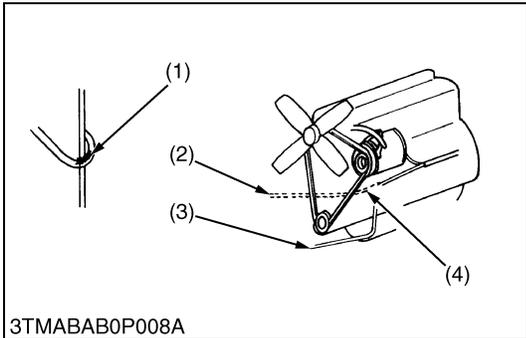


3TMABAB0P007A

- Securely tighten wiring terminals.

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

W10112160

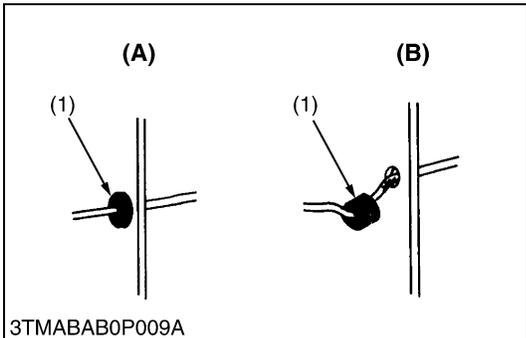


3TMABAB0P008A

- Do not let wiring contact dangerous part.

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

W10113130

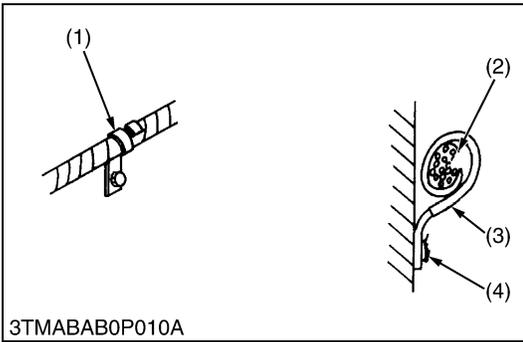


3TMABAB0P009A

- Securely insert grommet.

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

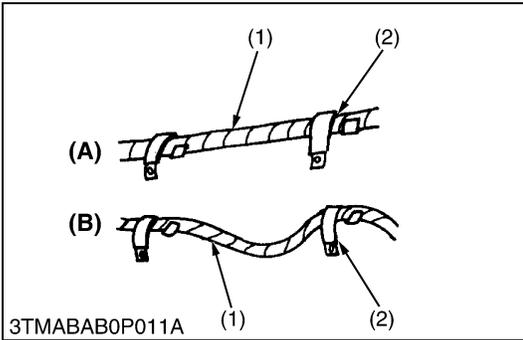
W10113880



- Securely clamp, being careful not to damage wiring.

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

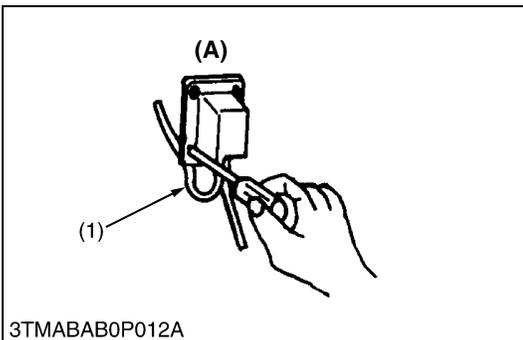
W10114580



- 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

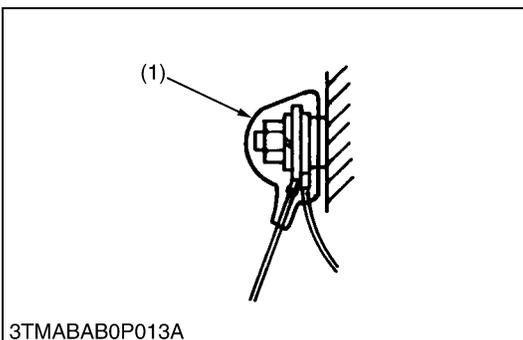
W10115870



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

- (1) Wiring
- (A) Incorrect

W10116700

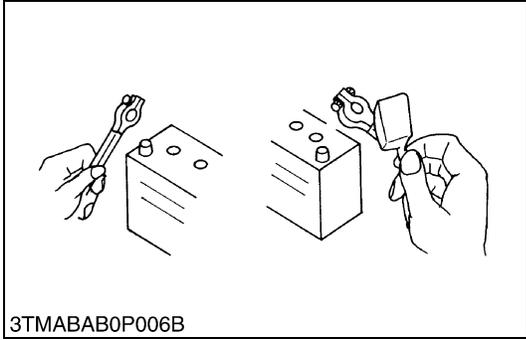


- After installing wiring, check protection of terminals and clamped condition of wiring, only connect battery.

- (1) Cover
 - Securely Install Cover

W10117350

[2] BATTERY



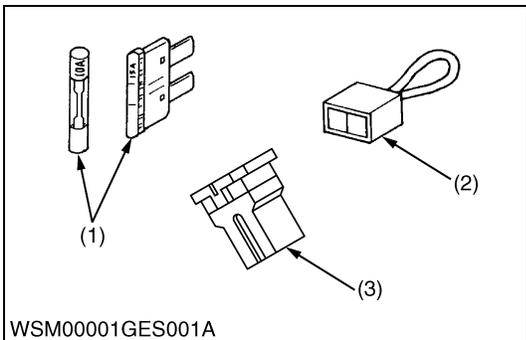
- Take care not to confuse positive and negative terminal posts.
- When removing battery cables, disconnect negative cable first. When installing battery cables, check for polarity and connect positive cable first.
- Do not install any battery with capacity other than is specified (Ah).
- After connecting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



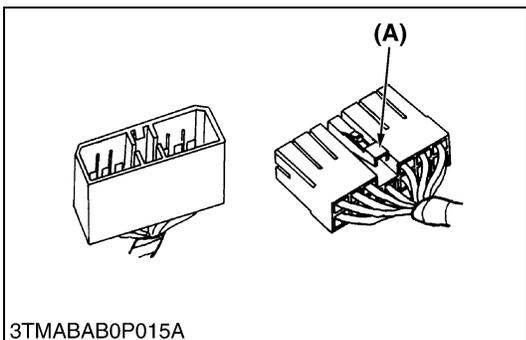
- Use fuses with specified capacity. Neither too large or small capacity fuse is acceptable.
- Never use steel or copper wire in place of fuse.
- Do not install working light, radio set, etc. on machine which is not provided with reserve power supply.
- Do not install accessories if fuse capacity of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

(1) Fuse
(2) Fusible Link

(3) Slow Blow Fuse

W10120920

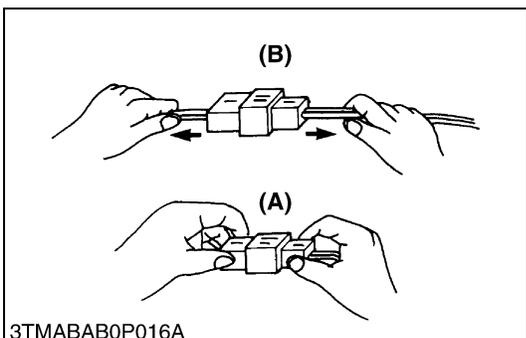
[4] CONNECTOR



- For connector with lock, push lock to separate.

(A) Push

W10122110

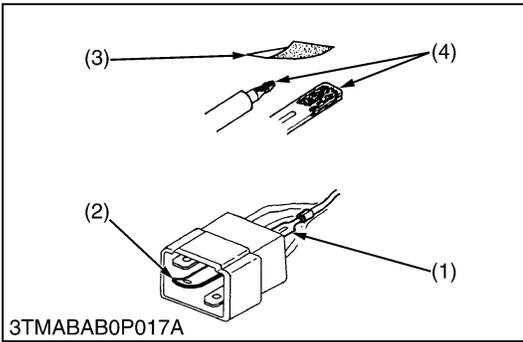


- In separating connectors, do not pull wire harnesses.
- Hold connector bodies to separate.

(A) Correct

(B) Incorrect

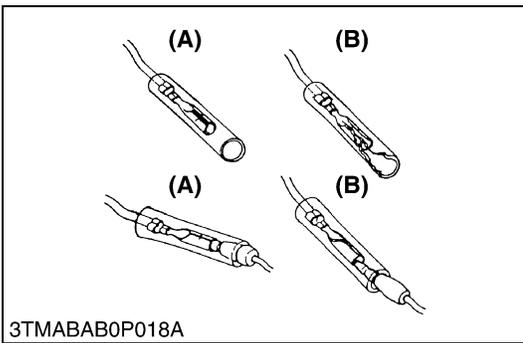
W10122720



- 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

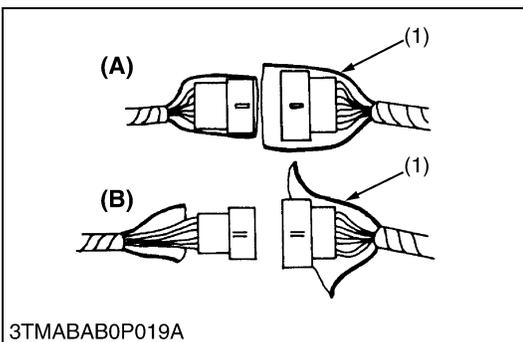
W10123460



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

(A) Correct (B) Incorrect

W10124300

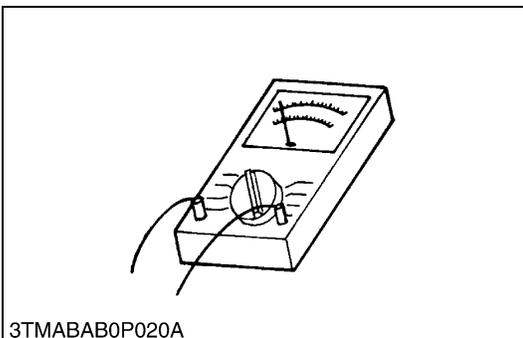


- Make certain plastic cover is large enough to cover whole connector.

(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 | |
|-----------------|-----------------------------------|--|--|--|
| | | L45 | | |
| 1 | Fuel | 45 L 12 U.S.gals 9.9 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) | 8.2 L 8.7 U.S.qts 7.2 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 | 7.0 L 1.8 U.S.qts 1.5 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).
- Refer to the following table for the suitable API classification engine oil according to the engine type (with internal EGR, external EGR or non-EGR) and the fuel (low-sulfur or high-sulfur fuel).

| Fuel used | Engine oil classification (API classification) |
|--|---|
| | Oil class of engines except external EGR |
| High Sulfur Fuel (≥ 500 ppm) | CF (If the “CF-4, CG-4, CH-4 or CI-4” lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals. (approximately half)) |
| Low Sulfur Fuel (< 500 ppm) or Ultra Low Sulfur Fuel (< 15 ppm) | CF, CF-4, CG-4, CH-4 or CI-4 |

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.

| | without EGR |
|--------|-------------|
| Models | L45 |

• Fuel:

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

• Transmission Oil:

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

Do not mix different brands together.

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

5. TIGHTENING TORQUES

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

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

| Indication on top of bolt |  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.) | 7.9 to 9.3 | 0.80 to 0.95 | 5.8 to 6.8 | 7.9 to 8.8 | 0.80 to 0.90 | 5.8 to 6.5 | 9.81 to 11.2 | 1.00 to 1.15 | 7.24 to 8.31 | 7.9 to 8.8 | 0.80 to 0.90 | 5.8 to 6.5 | 12.3 to 14.2 | 1.25 to 1.45 | 9.05 to 10.4 |
| M8 (8 mm, 0.31 in.) | 18 to 20 | 1.8 to 2.1 | 13 to 15 | 17 to 19 | 1.7 to 2.0 | 13 to 14 | 24 to 27 | 2.4 to 2.8 | 18 to 20 | 18 to 20 | 1.8 to 2.1 | 13 to 15 | 30 to 34 | 3.0 to 3.5 | 22 to 25 |
| M10 (10 mm, 0.39 in.) | 40 to 45 | 4.0 to 4.6 | 29 to 33 | 32 to 34 | 3.2 to 3.5 | 24 to 25 | 48 to 55 | 4.9 to 5.7 | 36 to 41 | 40 to 44 | 4.0 to 4.5 | 29 to 32 | 61 to 70 | 6.2 to 7.2 | 45 to 52 |
| M12 (12 mm, 0.47 in.) | 63 to 72 | 6.4 to 7.4 | 47 to 53 | – | – | – | 78 to 90 | 7.9 to 9.2 | 58 to 66 | 63 to 72 | 6.4 to 7.4 | 47 to 53 | 103 to 117 | 10.5 to 12.0 | 76.0 to 86.7 |
| M14 (14 mm, 0.55 in.) | 108 to 125 | 11.0 to 12.8 | 79.6 to 92.5 | – | – | – | 124 to 147 | 12.6 to 15.0 | 91.2 to 108 | – | – | – | 167 to 196 | 17.0 to 20.0 | 123 to 144 |
| M16 (16 mm, 0.63 in.) | 167 to 191 | 17.0 to 19.5 | 123 to 141 | – | – | – | 197 to 225 | 20.0 to 23.0 | 145 to 166 | – | – | – | 260 to 304 | 26.5 to 31.0 | 192 to 224 |
| M18 (18 mm, 0.71 in.) | 246 to 284 | 25.0 to 29.0 | 181 to 209 | – | – | – | 275 to 318 | 28.0 to 32.5 | 203 to 235 | – | – | – | 344 to 402 | 35.0 to 41.0 | 254 to 296 |
| M20 (20 mm, 0.79 in.) | 334 to 392 | 34.0 to 40.0 | 246 to 289 | – | – | – | 368 to 431 | 37.5 to 44.0 | 272 to 318 | – | – | – | 491 to 568 | 50.0 to 58.0 | 362 to 419 |

W1034542

[2] STUD BOLTS

| Material of opponent part | Ordinariness | | | Aluminum | | |
|---------------------------------|--------------------|--------------------|--------------------|-----------------|-------------------|------------------|
| Unit | | | | | | |
| Diameter | N·m | kgf·m | lbf·ft | N·m | kgf·m | lbf·ft |
| M8 (8 mm, 0.31 in.) | 12 to 15 | 1.2 to 1.6 | 8.7 to 11 | 8.9 to 11 | 0.90 to 1.2 | 6.5 to 8.6 |
| M10 (10 mm, 0.39 in.) | 25 to 31 | 2.5 to 3.2 | 18 to 23 | 20 to 25 | 2.0 to 2.6 | 15 to 18 |
| M12 (12 mm, 0.47 in.) | 29.5 to 49.0 | 3.0 to 5.0 | 21.7 to 36.1 | 31.4 | 3.2 | 23.1 |
| M14 (14 mm, 0.55 in.) | 62 to 73 | 6.3 to 7.5 | 46 to 54 | – | – | – |
| M16 (16 mm, 0.63 in.) | 98.1 to 112 | 10.0 to 11.5 | 72.4 to 83.1 | – | – | – |
| M18 (18 mm, 0.71 in.) | 172 to 201 | 17.5 to 20.5 | 127 to 148 | – | – | – |

W1048139

[3] 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 |

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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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