Shop Manual

VEBM310100

WA75-3 FLEET
WHEEL LOADER

SERIAL NUMBER HA300051 AND UP

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Safety notice

Important Safety Notice
Proper service and repair is extremely important for safe machine operation. Some of the described service and repair techniques require the use of tools specially designed by Komatsu for the specific purpose.
To prevent injury to workers, the symbol ⚠ is used to mark safety precautions in this manual. The cautions accompanying these symbols must always be followed carefully. If any dangerous situation arises or may possibly arise, first consider safety, and take the necessary actions to deal with the situation.

General Precautions
Mistakes in operation are extremely dangerous. Read the OPERATION AND MAINTENANCE MANUAL carefully before operating the machine! Always follow the safety rules valid in your country carefully!

1. Before carrying out any greasing or repairs, read all the precautions given on the decals which are fixed to the machine.
2. When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.
   - Always wear safety glasses when hitting parts with a hammer.
   - Always wear safety glasses when grinding parts with a grinder, etc.
3. If welding repairs are needed, always have a trained, experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, glasses, cap and other clothes suited for welding work.
4. When carrying out any operation with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR signs on the controls in the operator's compartment.

5. Keep all tools in good condition and learn the correct way to use them.

6. Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt or oil on the floor. Never smoke while working. Smoke only in the areas provided for smoking.

Preparations for work

1. Before adding oil or making any repairs, park the machine on hard, level ground, and block the wheels or tracks to prevent the machine from moving.

2. Before starting work, lower blade, ripper, bucket or any other work equipment to the ground and install the safety bar on the frame. If this is not possible, insert the safety pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning signs on them.

3. When disassembling or assembling, support the machine with blocks, jacks or stands before starting work.

4. Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine. Never jump on or off the machine. If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

Precautions during work

1. When measuring hydraulic pressure, check that the measuring tool is correctly assembled before taking any measurements.

2. When removing the oil filler cap, drain plug or hydraulic pressure measuring plugs, loosen them slowly to prevent the oil from spurting out.
   Before disconnecting or removing components of the oil, water or air circuits, first remove the pressure completely from the circuit.

3. The water and oil in the circuits are hot when the engine is stopped, so be careful not to get burned.
   Wait for the oil and water to cool before carrying out any work on the oil or water circuits.

4. Before starting work, remove the leads from the battery. Always remove the lead from the negative (-) terminal first.

5. When raising heavy components, use a hoist or crane.
   Check that the wire rope, chains and hooks are free from damage.
   Always use lifting equipment which has ample capacity.
   Install the lifting equipment at the correct places. Use a hoist or crane and operate slowly to prevent the component from hitting any other part.
   Do not work with any part still raised by the hoist or crane.

6. When removing covers which are under internal pressure or under pressure from a spring, always leave two bolts in position on opposite sides. Slowly release the pressure, then slowly loosen the bolts to remove.

7. When removing components, be careful not to break or damage the wiring. Damaged wiring may cause electrical fires.

8. When removing piping, stop the fuel or oil from spilling out. If any fuel or oil drips onto the floor, wipe it up immediately. Fuel or oil on the floor can cause you to slip, or can even start fires.

9. As a general rule, do not use gasoline to wash parts. In particular, use only the minimum of gasoline when washing electrical parts. Do not smoke!

10. Be sure to assemble all parts again in their original places.

    Replace any damaged parts with new parts.

    When installing hoses and wires, be sure that they will not be damaged by contact with other parts when the machine is being oper ated.

11. When installing high pressure hoses, make sure that they are not twisted.

    Damaged tubes are dangerous, so be extremely careful when installing tubes for high pressure circuits. Also, check that connecting parts are correctly installed.

12. When aligning two holes, never insert your fingers or hand. Be careful not to get your fingers caught in a hole.

13. When assembling or installing parts, always use the specified tightening torques. When installing protective parts such as guards, or parts which vibrate violently or rotate at high speed, be particularly careful to check that they are installed correctly.

Foreword

General

This shop manual has been prepared as an aid to improve the quality of repairs by giving the service personnel an accurate understanding of the product and by showing them the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every opportunity.

This shop manual mainly contains the necessary technical information for operations performed in a service workshop. For ease of understanding, the manual is divided into the following chapters; these chapters are further divided into the each main group of components:

Structure and function

This section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting.

Testing and adjusting

This section explains checks to be made before and after performing repairs, as well as adjustments to be made at completion of the checks and repairs. Troubleshooting charts correlating "Problems" to "Causes" are also included in this section.

Disassembly and assembly

This section explains the order to be followed when removing, installing, disassembling or assembling each component, as well as precautions to be taken for these operations.

Maintenance standard

This section gives the judgement standards when inspecting disassembled parts.

NOTE
The specifications contained in this shop manual are subject to change at any time and without any advance notice. Use the specifications given in the book with the latest date.

How to read the shop manual

Volumes

Shop manuals are issued as a guide to carrying out repairs.

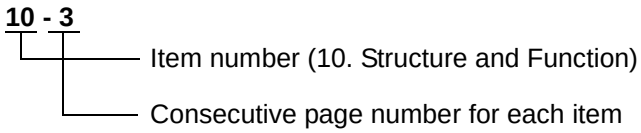
Distribution and updating

Any additions, amendments or other changes will be sent to Komatsu distributors.
Get the most up-to-date information before you start any work.

Filing method

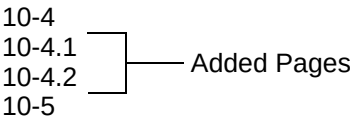
1. See the page number on the bottom of the page. File the pages in correct order.
2. Following examples show how to read the page number.

   Example 1 (Chassis volume):

3. Additional pages: Additional pages are indicated by a point (.) and number after the page number. File as in the example.

   Example:

Symbols

So that the shop manual can be of ample practical use, important safety and quality portions are marked with the following symbols:

Symbol	Item	Remarks
	Safety	Special safety precautions are necessary when performing the work.
	Caution	Special technical precautions or other precautions for preserving standards are necessary when performing the work.
	Weight	Weight of parts of systems. Caution necessary when selecting hoisting wire, or when working posture is important, etc.
	Tightening torque	Places that require special attention for the tightening torque during assembly.
	Coat	Places to be coated with adhesives and libricants, etc.
	Oil, water	Places where oil, water or fuel must be added, and the capacity.
	Drain	Places where oil or water must be drained, and quantity to be drained.

Hoisting instructions

Heavy parts (25kg or more) must be lifted with a hoist, etc. In the DISASSEMBLY AND ASSEMBLY section, every part weigthing 25 kg or more is indicated clearly with the symbol:

If a part cannot be smoothly removed from the machine by hoisting, the following checks should be made:

1. Check for removal of all bolts fastening the part to the relative parts.
2. Check for existence of another part causing interference with the part to be removed.

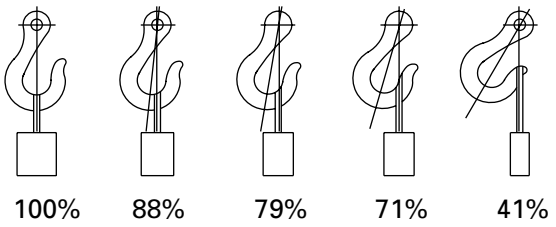
Wire ropes

1. Use adequate ropes depending on the weight of parts to be hoisted, refering to the table below:
   - The allowable load in tons, is given by vertical tensible force.
   - The allowable load value is estimated to be one-sixth or one-seventh of the breaking strength of the rope used.

Wire ropes: (Standard "Z" or "S" twist ropes without galvanizing)	
Rope diameter (mm)	**Allowable load (tons)**
10	1.0
11.2	1.4
12.5	1.6
14	2.2
16	2.8
18	3.6
20	4.4
22.4	5.6
30	10.0
40	18.0
50	28.0
60	40.0

2. Sling wire ropes from the middle portion of the hook.

   Slinging near the edge of the hook may cause the rope to slip off the hook during hoisting, and a serious accident can result. Hooks have maximum strength at the middle portion.



3. Do not sling a heavy load with one rope alone, but sling with two or more ropes symmetrically wound onto the load.

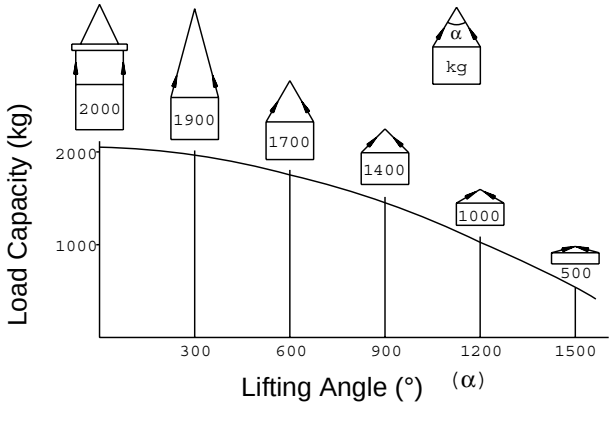
Slinging with one rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original winding position on the load, which can result in a dangerous accident.

4. Do not sling a heavy load with ropes forming a wide hanging angle from the hook.

   When hoisting a load with two or more ropes, the force subjected to each rope will increase with the hanging angles.

   The table below shows the variation of allowable load (kg) when hoisting is made with two ropes, each of which is allowed to sling up to 1000 kg vertically, at various hanging angles.

   When two ropes sling a load vertically, up to 2000 kg of total weight can be suspended. This weight becomes 1000 kg when two ropes make a 120° hanging angle. On the other hand, two ropes are subjected to an excessive force as large as 4000 kg if they sling a 2000 kg load at a lifting angle of 150°.



01 GENERAL

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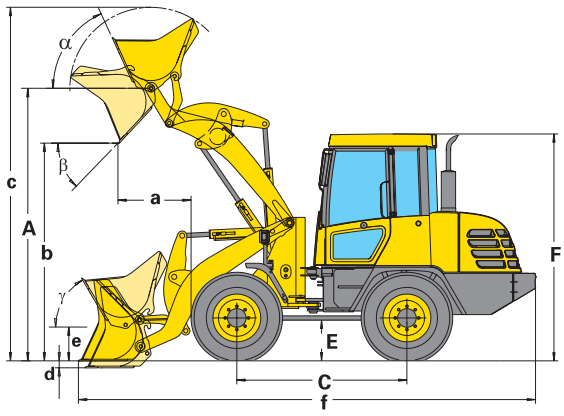
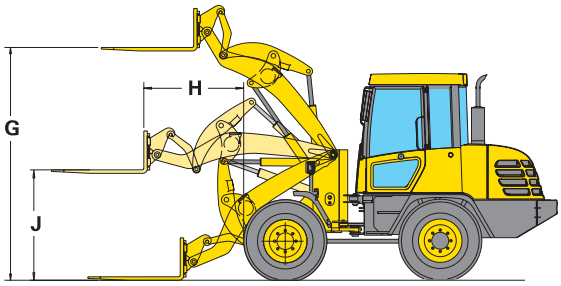
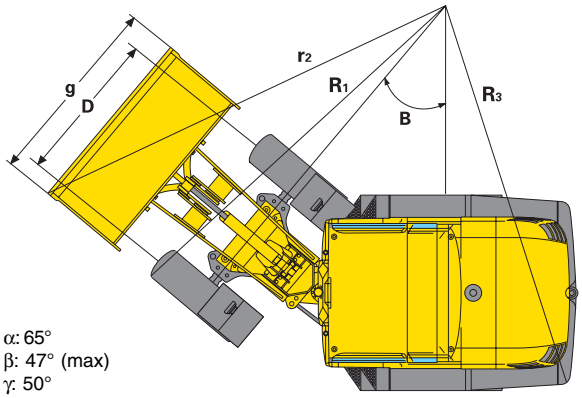
Dimensions, weights and operating data







α: 65°
β: 47° (max)
γ: 50°

Dimensions - main datas		
A	Bucket pivot point	3,125 mm
R1	Turn radius	3,640 mm
R3	Turn radius	3,700 mm
B	Angle	40°
C	Wheel base	1,950 mm
D	Track width	1,450 mm
E	Ground clearance	405 mm
F	Height over all	2.600 mm

Dimensions - with fork beaks		
G	max. stack height	2,925 mm
H	max. reach	1,210 mm
J	Fork height at max. reach	1,385 mm
max. tipping load straight ISO 8313		2,740 kg
max. tipping load angled		2,375 kg
max. load capacity - EN 474-3, 80%		1,900 kg
max. load capacity EN 474-3, 60%		1,420 kg

(Fork lift and beaks in standard design)

Work value - bucket application *

Bucket type		Universal bucket	Light material bucket		Multi purpose bucket	High tip bucket
Buckets (piled loading)	**m³**	**0.8**	**1.0**	**1.25**	**0.65**	**1.25**
Pour weight	t/m³	1.6	1.4	1.0	1.8	0.8
Bucket weight w. o. teeth	kg	335	380	410	535	700
Static tipping load, straightn	kg	3.650	3.570	3.520	3.150	2.880
Static tipping load, 40° angled	kg	3.180	3.070	3.030	2.680	2.430
Max. breakout force	kN	39,8	34,3	29,8	32,8	18
Max. lift force	kN	33,3	32,9	32,7	33,4	31
Operating weight	kg	4.500	4.545	4.575	4.825	4.865
a Reach at 45°	mm	790	815	900	830	1.395**
b Dump height at 45°	mm	2.490	2.425	2.335	2.380	3.750**
c Height of bucket top edge	mm	4.030	4.030	4.150	3.890	5.080
d Digging depth	mm	80	110	110	130	110
e Height of bucket transport	mm	350	350	350	350	350
f Total length	mm	5.120	5.230	5.295	5.350	5.905
g Bucket width	mm	1.850	2.100	2.100	2.000	2.100
r2 Turning radius over bucket	mm	4.025	4.180	4.205	4.080	4.400

* All datas with tire 335/80 R18 SPT9 ** at max. dump angel

Specifications

Machine model		WA75-3 FLEET
Serial No.		HA300051 and up
Engine	Model	4D94E-1HC
	Type	4-cycle Diesel naturally aspirated
	No. of cylinders - bore/stroke [mm]	4 - 94 / 100
	Piston displacement [cm³]	3318
	Flywheel horsepower [kw(PS)]	38.0 (52)
	Maximum torque [Nm at rpm]	180 / 1600
	Starting motor	12V - 2.3 kw
	Alternator	12V - 60 A
	Battery	12V - 92 Ah
Power train	Reduction gear	1-stage
	Differential	Limited slip differential, locking value 25%
	Drive type	Front-, rear-wheel drive
Axle, wheel	Tire	335/80R18 SPT9
	Turning radius 40°	Over tires 3640 mm Over bucket 4025 mm Over rear frame 3640 mm
Brakes	Service brake	Wet-type disc brake in the rear axle (acting on all 4 wheels)
	Parking brake	Wet-type disc brake in the rear axle (acting on all 4 wheels)

Machine model			WA75-3 FLEET
Serial No.			HA300051 and up
Steering system		Type	articulated steering
		Structure	hydrostatic
Hydraulic system		Main pump	Gear pump
		Delivery [cm³/1 revolution]	23
	Control valve	Operating pressure [bar]	3-spool type 200 - 205
		Steering pressure [bar]	Orbit-roll valve type 175 - 185
	Cylinder	Boom cylinder No. - bore × stroke [mm]	1 - 95 × 670
		Tilt cylinder No. - bore × stroke [mm]	1 - 80 × 473
		Steering cylinder No. - bore × stroke [mm]	1 - 70 × 376
Work equipment		Work equipment lever type	Multi function lever
Speed		Travel speed [km/h]	
		1st travel range	0 - 5.6
		2nd travel range	0 - 20.0
Weight		Operating weight [kg]	4500

Weight table

This weight table is a guide for use when transporting or handling components.

Components	Weight [kg]
Engine	225
Radiator	22
Drive shaft	10.5
Front axle	189
Rear axle with reduction gear	216
Wheel (each)	75
Tire (each)	50
Orbit-roll valvel	6.5
PPC valve	5.0
Steering cylinder	19
Variable-displacement motor	32
Variable-displacement pump	39
Hydraulic pump	4.2
Main control valve	11.6
Boom cylinder	39

Components	Weight [kg]
Bucket cylinder	29
Engine hood	33
Engine hood carrier	29
Front frame	250
Rear frame	520
Quick-coupler	103
Bellcrank	49
Boom (including bushing)	283
Bucket	335
Counterweight	222
Counterweight, rear frame	100
Counterweight, front axle	2 x 70
Battery	24.5
Floor, Cab assembly	450
Operator's seat	32

Lubricants and operating mediums

The specified filling volumes represent approximate values; the testing devices are binding. The selection of a viscosity class depends on the ambient temperature prevailing over a longer period of time. The temperature limits are to be regarded as guiding values; for a brief period, the actual temperature may be higher or lower than these guiding values.

Components	Lubricants and service fluids	BI-codes *)	Quality classes	Temperature ranges	Viscosity classes	Filling volume in litres approx.
Engine	Engine Oil EO	EO 1540 A EO 1030 A NRS	CCMC D4 or, if not available: API CE or API CF-4 [2])	-15°C to 45°C -20°C to 30°C -15°C to 20°C	SAE 15W-40 [1]) SAE 10W-30 SAE 5W-30	9.4
Transfer Gear Box	Gear Oil GO	GO 90 LS	API-GL5+LS or MIL-L-2105D+LS	–	SAE 90LS	1.0
Front Axle	Gear Oil GO	GO 90LS	API-GL5+LS or MIL-L-2105D+LS	–	SAE 90LS [1]) SAE 85W-90LS SAE 80W-90LS	Final Drive: 2 × 0.9 Differential: 4.3
Rear Axle	Gear Oil GO	GO 90 LS	API-GL5 +LS or MIL-L-2105D+LS	–	SAE 90LS [1]) SAE 85W-90LS SAE 80W-90LS	Final Drive: 2 × 0.9 Differential: 4.3
Driving Direction, Hydraulic System, Steering	Hydraulic Oil HYD	HYD 0530 HYD 1030 HYD 1540	HVLP HVLP D	-15° to 20°C -20° to 30°C -15° to 45°C	ISO VG 46 [1]) ISO VG 68 ISO VG 100	70
	or Engine Oil EO	EO 1540 A EO 1030 A NRS	CCMC D4 or, if not available: API CE or API CF-4 [2])	-15° to 45°C -20° to 30°C -15° to 45°C	SAE 15W-40 SAE 10W-30 SAE 05W-30	
	or Hydraulic Oil BIO-E-HYD	BIO-E-HYD 0530	HEES (acc. to VDMA fluid technology)	-15° to 20°C	ISO VG 46	
Service Brake	Automatic Transmission Gear Oil	ATF	TYP A, Suffix A	–	–	0.6
Cooling System	Long-Time Coolant	SP-C	Antifreeze and Corrosion Protection	Proportion of Mixture: 50% Coolant: 50% Water Min. Freeze Proofing: -34°C		10
Fuel Tank	Diesel Fuel [3])	CFPP Class B CFPP Class D CFPP Class E CFPP Class F	DIN-EN 590	up to 0°C up to -10°C up to -15°C up to -20°C	–	77
Grease Nipple	Lithium-Based Multi-Purpose Grease	MPG-A	KP 2N-20	–	NLGI 2	–

[1]) Factory filling

[2]) If engine oil of either the API CE or the API CF - 4 specification is not available, engine oil of either the API CC or the API CD specification may be used. In these cases, the oil change intervals must be cut in halves.

[3]) If fuels with a sulphur content between 0.5 and 1.0% are used, the oil change intervals for the engine must be cut in halves; if the sulphur content exceeds 1.0%, the oil change intervals must be quartered.

*) BI-codes are the "standard lubricants" (Regelschmierstoffe) for construction machinery and vehicles of the Hauptverband der Deutschen Bauindustrie e.V. (BI) (head association of the German construction industry). The brochure "Regelschmierstoffe für Baumaschinen- und Fahrzeuge" ("standard lubricants for construction machinery and vehicles") can be obtained from bookstores or the German Bauverlag GmbH Wiesbaden and Berlin under the ISBN-No. 3-7625-3102-1.

Basic procedures of maintenance

Oil

- The oil in the engine and in the hydraulic system is subject to extreme conditions (high temperatures, high pressures). Therefore, the oil quality will decrease with extended operation.

  Always use oils prescribed for the works and temperatures indicated in the operating and maintenance manual. Always observe the prescribed oil change intervals.

- Always handle oils with extreme care so that they are not contaminated.When storing or refilling oil, make sure that it is not contaminated. The majority of all malfunctions is caused by the penetration of dirt and other contaminations.

- Never mix oil of different brands or types.

- Always refill the prescribed oil quantity. Too little or excessive oil may cause malfunctions.

- If the oil in the hydraulic system is not clear (milky), water or air is propably introduced into the circuit. In such cases, call your Komatsu dealer.

- Upon each oil change, the related filter must be replaced as well.

- We recommend to have an oil analysis carried out in regular intervals in order to check the machine condition. Customers who desire such an oil analysis should contact their Komatsu dealer.

Fuel

- The fuel pump is a precision instrument; if fuel containing water or dirt is used, it cannot work properly.

- Be extremely careful not to let impurities penetrate when storing or adding fuel.

- Always use the fuel specified in the Operation and Maintenance Manual. Fuel may congeal depending on the temperature (particularly at low temperatures below -15°C), so change to a fue matching this temperature.

- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank after completing the day's work.

- Before starting the engine, or when 10 minutes have passed after adding fuel, drain the sediment and water from the fuel tank.

- If the engine runs out of fuel, or if the filters have been replaced, it is necessary to bleed the air from the circuit.

- If the fuel sulphur content is between 0.5 and 1.0%, the oil change interval must be 1/2 normal. If the fuel sulphur content is more 1.0%, the oil change interval must be 1/4 normal.

Coolant

- River water contains large amounts of calcium and other impurities, so if it is used, scale will stick to the engine and radiator causing a defective heat exchange and overheating.
- Do not use water that is not suitable for drinking.
- When using anti-freeze, always observe the precautions given in the Operation and Maintenance Manual.
- Komatsu machines are supplied with Komatsu original anti-freeze in the coolant when the machine is shipped. This anti-freeze prevents corrosion in the cooling system. The anti-freeze can be used continuously for two years or 4000 hours. Therefore, it can be used as it is even in hot areas.
- Anti- freeze is flammable, so be extremely careful not to expose it to open flame or fire.
- The proportion of anti-freeze to water differs according to the ambient temperature. For details of the mixing ratios, see Operation Manual: CLEANING THE INSIDE OF THE COOLING SYSTEM".
- If the engine overheats, wait for the engine to cool before adding coolant.
- If the coolant level is low, it will cause overheating and corrosion due to the air in the coolant.

Grease

- Grease is used to prevent twisting and noise at the joints.
- The nipples not included in the maintenance section are nipples for overhaul, so they need not be lubricated. If any part becomes stiff after being used for a long time, add grease.
- Always wipe off all of the old grease that is pushed out when greasing. Be particularly careful to wipe off the old grease in places where sand or dirt in the grease would cause the rotating parts to wear.

Storing oil and fuel

- Keep oil and fuel indoors to prevent any water, dirt or other impurities from penetrating.
- When keeping barrels for a long period, lay down the barrel on its side so that the filler port is at the side (to prevent moisture from being sucked in).
  If barrels have to be stored outside, cover them with a waterproof sheet or take other measures to protect them.
- To prevent any change in quality during long term storage, be sure to use in the order of 'first in - first out' (use the oldest oil or fuel first).