

**ZL50G** 轮式装载机  
**ZL50G WHEEL LOADER**

**维修手册**  
**SERVICE MANUAL**

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# 1. Preface



## 1.1 Preface

This manual is designed to help service people understand the machine structure and its working components, guiding service people how to make correct breakdown diagnosis and give trouble-shooting remedies to the machine. This manual also outlines the standards on maintenance and service for the machine under the normal and special working condition, so that it will help service people improve service quality for the machine.

This manual totally consists of the following chapters:

"Preface" is consisted of How To Use This Manual, Instruction on Hoisting and Standard Fastening Torque.

"Safety Precautions" mainly includes General Safety Precautions and Safety Measures To Be Taken Before And During Service Work.

"General Profile" includes the Assembly Diagram, Technical Specification, Component Weight and Oil Liquid List And Grease.

"Disassembling And Assembling" mainly describes the process and methods to be taken for machine components dismounting and assembly as well as the tools, lifting methods and precautions that should be taken during the process of dismounting and assembly of the machine.

"Test And Adjustment" mainly illustrates the practices and process on testing the machine components performance and machine technical data. This chapter will give helpful reference for maintaining the proper performance of the machine.

"Trouble And Trouble-Shooting Remedies" mainly describes the trouble phenomena, trouble causes, trouble diagnosis and trouble-shooting remedies. It also outlines the trouble diagnosis process by giving some examples of normal-seen troubles, which is very helpful to improve the service people qualification. The troubles, troubles causes and trouble-shooting remedies for some normal-seen problems are also listed in this chapter.

"Maintenance And Its Standards" mainly provides the machine operators with the illustration on the maintenance guidance and relative precautions for hydraulic system, electrical system and other working mechanism, as well as the special maintenance for the machine under the special working condition and maintenance standards (e.g: articulation holes, bearing clearance and torques, etc.), which is totally consisted of 3 parts.

"Attachment Specification And Wearing Parts List" mainly gives the models and specification of some other working attachments of the machine, and outlines the wearing parts list for specific 500 working hours, 1000 working hours, 1500 working hours and 2000 working hours.

"Basic Service Knowledge" mainly describes the basic knowledge of general service, and gives the some examples of service practices for welding seam, steel plate cracking, pin shafts, shaft sleeves and holes wearing as well hydraulic cylinders.

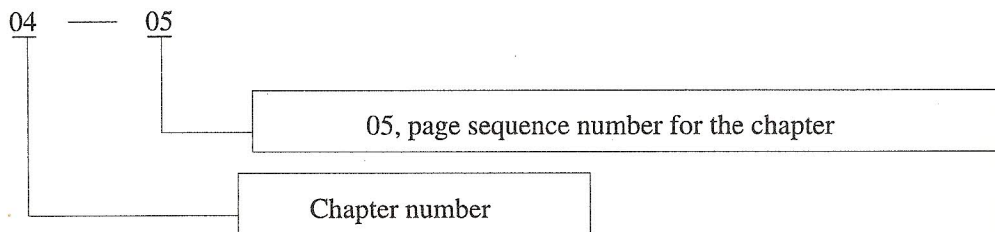
If you have any comment to this manual or good suggestion for improvement, please don't hesitate to contact us.

We will reserve the right to make improvement modification on the machine without giving prior notification.

## 1.2 How to Use This Manual

(1) Printing method: This manual is printed in the page sequence. The page number of this manual is shown at the bottom of each page.

(2) The following diagram shows how to read this manual.



(3) Adding pages: Behind the page number, it is shown with a mark of "-" and adding pages. Following is the example.

04-05

04-05-01

04-05-02

04-06

(4) Edition Modification Number



When it is needed to modify the current manual, edition number ( 1, 2, 3...) will be shown at the bottom of the cover page.






(5) All the modification or complimentary information will be sent to XCMG dealers. Before carrying out any work with this type of machines, please inquire the latest technical information about the machines from authorized XCMG dealers.

(6) Symbols

The symbols as shown in the table 01-01 will be used for highlighting the safety and quality instruction.

Table 01-01: Symbols

Symbols	Description	Notes
	Safety	Safety measures must be taken and followed during executing works.
	Caution	Technical precautionary measures or other service means must be taken during working.

	Weight	To show the weight of machine component or working system. Care should be taken when selecting hoisting ropes and operation methods.
	Fastening Torque	To show that the required fastening torque should be applied during the assembly.
	Coating	To show the area or points that need to be coated with sealing globe or grease.
	Water and oil	To show the working system that needs to be replenish with oil, water or fuel.
	Drainage	To show that water drainage or water drainage must be made at some parts of the machine.

### 1.3 Hoisting Instruction

**!** The heavy components (25kg plus) must be hoisted with crane machine. In the chapter of "Dismounting And Assembly", explicit marks are given for the machine parts with weight of 25kg or 25kg plus.

#### 1. Hoisting

If a part of the machine could not be removed away by using a crane hook, then make the following checks:

- (1) Check to see if all the mounting bolts on the part have been removed away.
- (2) Check to see if there is any conflict between the part which is being removed away and other machine parts.

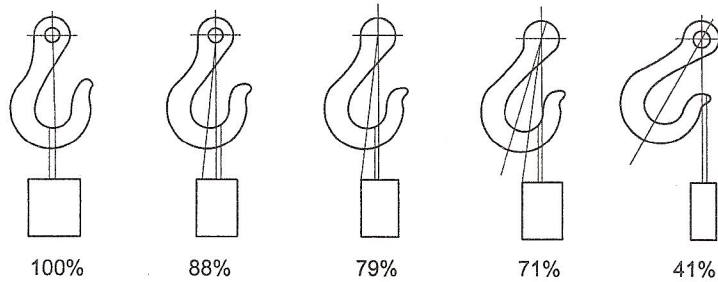
#### 2. Steel Ropes

- (1) According to the weight of the part which needs to be hoisted, select the proper steel ropes.

Steel Ropes ( standard S-shape steel rope)	
Steel ropes diameter (mm)	Allowable loading capacity (t)
10	1.0
14	2.2
16	2.8
18	3.6
20	4.4
30	10.0
40	18.0
50	28.0
60	40.0

Note:

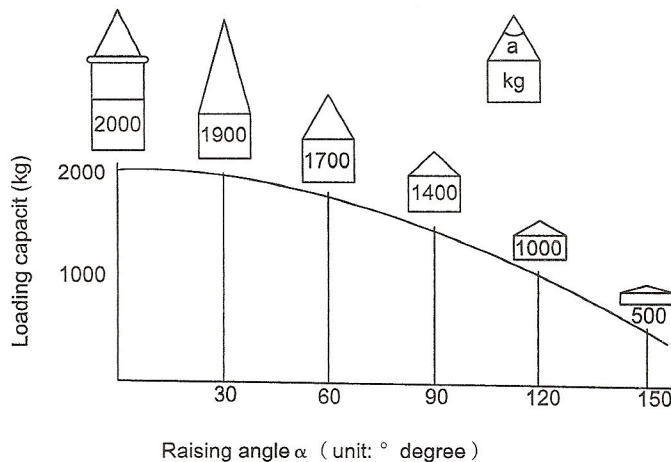
- (1) The allowable loading capacity as shown in the above table is estimated on the basis of 1/6-1/7 steel rope breaking strength.
- (2) The steel rope should be suspended in the middle of the hoisting hook. Otherwise, it will cause the risk of sever safety hazards if the steel rope is very near to the hook edge and possibly falls down from the hook. Bear it in mind that the most strong strength of the hook is at its middle.



- (3) It is recommended to use more than one steel rope when hoisting a machine part.

**!** To hoisting a machine part with only one steel rope could possibly have the part turn, steel rope get loose or slide away from the part during the process of hoisting, which will cause sever accident hazards.

- (4) Never let the steel ropes hoist a machine part in a large angle during hoisting. And please know that when hoisting the machine part with two or more steel ropes the loading force on each steel rope will be enlarged with the increasing of hoisting angle. The following diagram shows the changing allowable hoisting capacity of each steel ropes when hoisting a machine part with two steel ropes. In this example, the allowable hoisting weight of each steel rope is 1000kg. When the two steel ropes hoist a heavy staff in perpendicular angle, the total hoisting weight can be 2000kg. However, when hoisting a staff in an angle of 120° the maximum allowable hoisting weight can only be 1000kg. Let's we consider this issue from another point of view: if two steel ropes are used to hoist, in the angle of 150° , a heavy staff with weight of 2000kg, then the maximum loading capacity of each steel rope should be up to 4000kg.



## 1.4 Standard Fastening Torque

### Standard Fasten Torque of Bolts And Nuts

Table 01-02 lists the standard fastening torque of mounting bolts and nuts. The special torque as stated in the chapter "Dismounting And Assembly" is not shown here.

Table 01-02: Standard Fastening Torque

Bolts thread diameter (mm)	Spanner open-idth (mm)	Fastening Torque	
		Kg.m	N.m
6	10	$1.35 \pm 0.15$	$13.2 \pm 1.4$
8	13	$3.2 \pm 0.3$	$31.4 \pm 2.9$
10	16	$6.7 \pm 0.7$	$65.7 \pm 6.8$
12	18	$11.5 \pm 1.0$	$112 \pm 9.8$
14	21	$18.0 \pm 2.0$	$177 \pm 19$
16	24	$28.5 \pm 3$	$279 \pm 29$
18	27	$39 \pm 4$	$383 \pm 39$
20	30	$56 \pm 6$	$549 \pm 58$
22	34	$76 \pm 8$	$745 \pm 78$
24	36	$94.5 \pm 10$	$927 \pm 98$
30	46	$175 \pm 20$	$1720 \pm 190$
33	50	$225 \pm 25$	$2210 \pm 240$
36	55	$280 \pm 30$	$2750 \pm 290$

Note:

(1) The fastening torques as listed in this table don't apply to the bolts with Nylon pads or other metal pads or other special bolts with designed fastening torques.

(2)  $1\text{Kg.m} = 9.8\text{N.m}$

### Fastening Torque for Separate Flange Mounting Bolts

The mounting bolts for separate flanges should adopt the fastening torques as listed in table 01-03.

Table 01-03: Fastening Torque

Bolts thread diameter (mm)	Spanner open-idth (mm)	Fastening Torque	
		Kg.m	N.m
10	16	$6.7 \pm 0.7$	$65.7 \pm 6.8$
12	18	$11.5 \pm 1.0$	$112 \pm 9.8$
14	21	$18.0 \pm 2.0$	$177 \pm 19$
16	24	$28.5 \pm 3$	$279 \pm 29$


## **2. Safety Notice**

## Safety

### 2.1 Safety Notice

**Important safety notice:**

Proper services are very important for safe operations of the machine!

In order to prevent personal injury, signals with  in this handbook represent safety measures which should be observed strictly; if dangerous situation occurs or may occur, safety should be considered first and take necessary preventive measures according to the real situation at the site.

### 2.2 General Safety Preventive Measures

Incorrect operations are very dangerous. Read the safety notice in the Service Handbook carefully before operating the machine.

- (1) Before lubricating or servicing, please read all the safety preventive measures specified on the tags and labels stuck or tied on the machine.
- (2) When doing any operations, safety shoes and helmet should be put on, loose work clothes or those with missing buttons should not be allowed. Besides:
  - Have the goggles on when hammering the parts.
  - Have the goggles on when grinding the parts.
- (3) If welding is necessary, only skillful welders after being trained are allowed to do it, and put on the welding gloves, goggles, helmets and proper welding clothes when welding.
- (4) When two or more workers are doing operations on the machine, consult the operation steps with each other before doing anything; let your partner know before you start any operation. Hang the label of "On Service" on the control lever in the cab before doing any operations or services.
- (5) Keep all tools in good condition, and learn how to use them correctly.
- (6) In the service workshop, a proper area should be specified for keeping tools and disassembled parts. Tools and parts should be stored in a right place, and the working site should be kept clean and no dust or oily dirt on the ground. Smoking is only allowed in specified area. No smoking when working.

### 2.3 Preparations

- (1) Before adding oil or doing services, stop the machine on a stable and horizontal ground, and put a wedge under the wheels in order to prevent the machine from moving.
- (2) Before doing services, lower the bucket or other distortional working apparatus to the ground. If being unable to do this, insert safety pins or fix on the service supporting apparatus so as to prevent the working apparatus from falling down which may cause accidents; meanwhile, make sure that all the control levers should be locked and hang the safety signs on them.
- (3) Support the machine with a heel block, jack or bracket before doing any dismantling or assembling.
- (4) Clear away all mud and oil on the ladder or other steps for getting on or down the machine; use the handrail, ladder or footplate for getting on or down the machine, do not allow jumping up or down the machine directly. If it is impossible to use a handrail, ladder or footplate, make a platform as a safe treadboard instead.

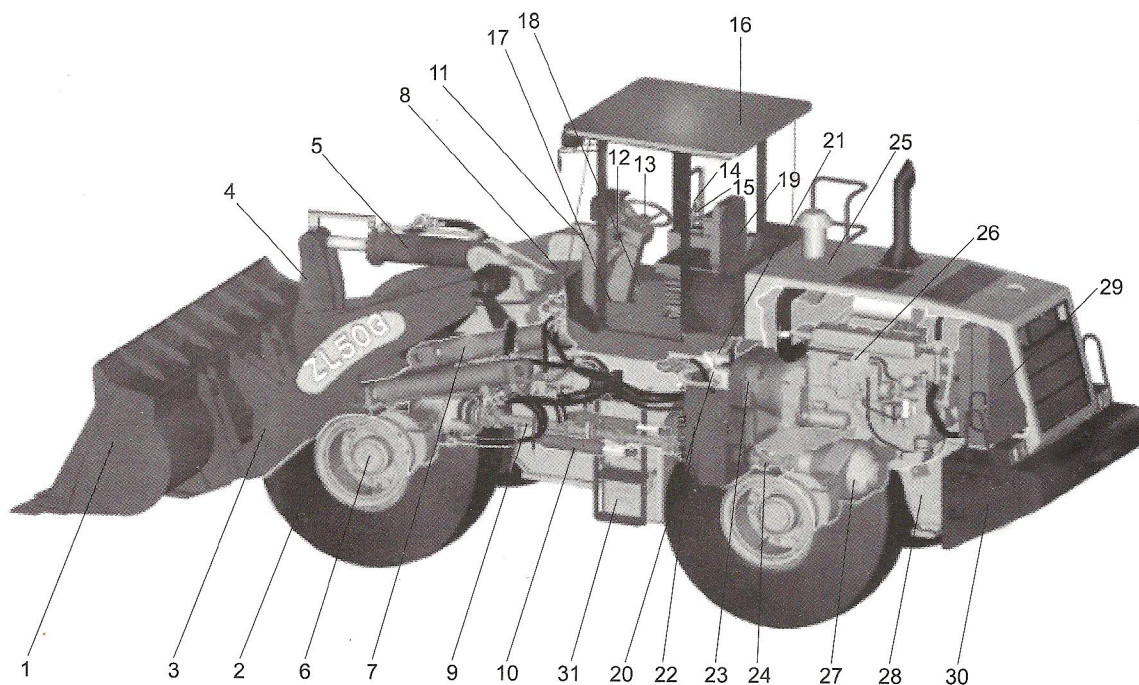
## 2.4 Safety Preventive Measures During Operating

- (1) Slowly loose oil caps, oil drainage plugs or plugs for measuring oil pressure at hydraulic mouths in case oil may splash out; when dismantling the components of the oil, water or air pipelines, release pressure inside first.
- (2) When the engine is extinguished, water and oil inside of the pipelines are very hot, be careful not to be scalded. Only after the oil and water is getting cooled can service be made on the pipelines.
- (3) Disconnect wires from the battery cell before operating, wires on the negative pole should be always disconnected first.
- (4) Use a hoist or crane when lifting up heavy components. Check whether the steel wires, chains and lifting hooks are broken. Lifting equipment with enough capacity should be used. Place the lifting equipment at a correct position, and operate the hoist or crane slowly in case of colliding with other components. Do not work on any components which are lifted up by a hoist or crane.
- (5) When dismantling caps which are bearing the inside pressure or spring pressure, leave two bolts at the symmetrical position and release the pressure slowly, then loose the bolts slowly for dismantling.
- (6) When dismantling component units, be careful not to break off or damage the electrical wires which may cause electrical fire.
- (7) When dismantling pipelines, be careful not to sprinkle fuel or engine oil on the ground and wipe away if necessary. Any fuel or engine oil on the ground may cause you slip and fall and even a fire.
- (8) Normally do not use gasoline for cleaning components, especially for electrical components.
- (9) When assembling, make sure that all the components are assembled to their original position and change with new ones for those broken; special reminding is that when assembling hoses or wires, be careful not to collide with other components in case of lacerating or damaging.
- (10) Do not twist the high pressure hoses when assembling; broken hoses are very dangerous, so check carefully when assembling the high pressure return hoses; especially check whether the assemblies to the connecting components are correct.
- (11) Adopt required torque when assembling or fixing components with fasteners. Especially for assembling the safety protection components, such as protection shield and components which are severely shaking or high-speed rotating, check whether their assemblies are correct.
- (12) When aligning two holes, do not use your finger or hand, be careful not to insert your finger into holes.
- (13) When measuring the hydraulic pressure, check whether the measuring tools are precise first.



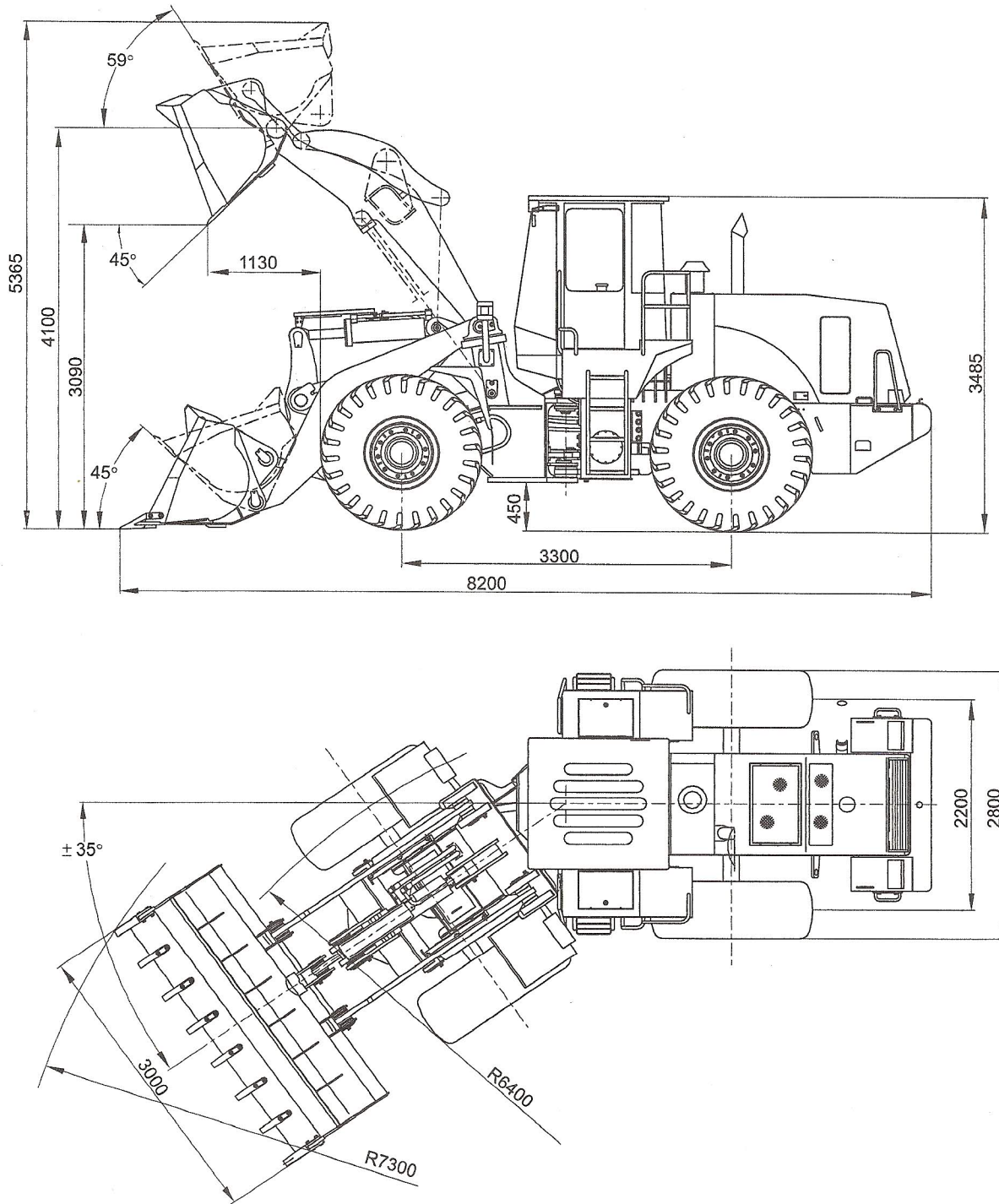
### **3. General Regulations**

### 3.1 Assembly Drawing of the Machine (Fig. 03-01 )



- |                             |   |                             |
|-----------------------------|---|-----------------------------|
| 1. Bucket Assembly          | 12. Shift Selector                            | 22. Gearbox                 |
| 2. Tyre                     | 13. Steering Wheel                            | 23. Torque Converter        |
| 3. Boom                     | 14. Control Lever of Boom Cylinder            | 24. Rear Transmission Shaft |
| 4. Rocker                   | 15. Control Lever of Tilt Cylinder            | 25. Hood                    |
| 5. Tilt Cylinder            | 16. Cab                                       | 26. Engine Assembly         |
| 6. Front Axle               | 17. Brake Pedal                               | 27. Rear Axle               |
| 7. Cylinder of Boom         | 18. Accelerator Pedal                         | 28. Rear Framework          |
| 8. Front Framework          | 19. Seat                                      | 29. Radiator Assembly       |
| 9. Front Transmission Shaft | 20. Working Pump                              | 30. Counterweight           |
| 10. Steering Cylinder       | 21. Two-way Flow Pump of Leading and Steering | 31. Hydraulic Oil Box       |
| 11. Instrument Panel        |   |                             |

### Assembly Drawing of the Machine (Fig. 03-02)





## 3.2 Specifications and Technical Data (Table 03-01)

Model		ZL50G			
Model	Type of working apparatus	Rock bucket	Standard bucket	Light material bucket	
Model	Operating weight (Kg)	175 000	175 000	175 000	
	Distribution (front) (Kg)	7 850	7 850	7 850	
	Distribution (rear) (Kg)	9 650	9 650	9 650	
Feature	Bucket capacity (fully loaded) (m <sup>3</sup> )	2.5	3.0	3.5	
	Rated load (Kg)	5 000	5 000	5 000	
	Traveling speed				
	Forward 1st (km/h)	6.5			
	Forward 2nd (km/h)	11.0			
	Forward 3rd (km/h)	24.0			
	Forward 4th (km/h)	38.0			
	Reverse 1st (km/h)	6.5			
	Reverse 2nd (km/h)	11.0			
	Reverse 3rd (km/h)	24.0			
Max. gradeability (deg)		28.0			
Max. drawing force (N/kg)		150 000 ± 5 000			
Min. steering radius	At the center of outside tire (mm)		6 700		
	At the outside of the bucket (mm)		7 300		
Dimension	Overall length (mm)	8 200			
	Overall width (chassis) (mm)	2 800			
	Bucket width (mm)	3 000			
	Overall height (roof of the cab) (mm)	3 485			
	(Bucket at full lift) (mm)	5 365			
	Wheel base (mm)	3 300			
	Min. ground clearance (mm)	450			
	Articulated pin height of bucket (mm)	4 100			
	Dumping clearance (edge of bucket teeth) (mm)	2 955			
	Dumping reach(edge of bucket teeth) (mm)	1 205			
	Dumping angle of bucket (deg)	45			
	Drawing back angle of bucket (at conveying position) (deg)	49			
Digging depth(slope to 10 degree) (mm)	50				