

Shop Manual

BULLDOZER

D65EX -17

D65PX -17

D65WX -17

SERIAL NUMBERS

D65EX- 1001

D65PX- 1001

D65WX-1001

and up

KOMATSU

Bulldozer

D65EX-17 D65PX- 17 D65WX-17

| Model | Serial Number |
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| D65EX-17 D65PX-17 D65WX-17 | 1001 and up |
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Foreword, safety and general information

Important safety notice

(Rev. 2011/02)

- Appropriate servicing and repair are extremely important to ensure safe operation of the machine. The Shop Manual describes the effective and safe servicing and repair methods recommended by Komatsu. Some of these methods require the use of special tools designed by Komatsu for the specific purpose.
- The symbol mark  is used for such matters that require special precautions during the work. The work indicated with the warning mark should be performed according to the instructions with special attention to the precautions. Should a hazardous situation occur or be anticipated during such work, be sure to keep safe first and take every necessary measure.

General precautions

 **Inappropriate handling creates an extreme danger. Read and understand what is described in the Operation and Maintenance Manual before operating the machine. In addition read this manual carefully and understand its contents before starting work.**

- Before performing any greasing or repairs, read all the safety labels stuck to the machine. For the locations of the safety labels and detailed explanation of precautions, see the Operation and Maintenance Manual.
- Locate 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, water, or oil on the floor. Smoke only in the areas provided for smoking. Never smoke while working.
- When performing any work, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.
 1. Always wear the protective eyeglasses when hitting parts with a hammer.
 2. Always wear the protective eyeglasses when grinding parts with a grinder, etc.
- When performing any work with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the work. During the work, hang UNDER REPAIR warning tag in the operator's compartment.
- Only qualified workers must perform the work and operation which require license or qualification.
- Keep all tools in good condition. Learn the correct way to use them, and use the proper ones of them. Before starting work, thoroughly check the tools, machine, forklift truck, service car, etc.
- If welding repairs are needed, always have a trained and experienced welder perform the work. When performing welding work, always

wear welding gloves, apron, shielding goggles, cap and other clothes suited for welding work.

- Before starting work, warm up your body thoroughly to start work under good condition.
- Avoid continuing work for long hours and take rests at proper intervals to keep your body in good condition. Take rests in specified safe places.

Safety points

| | |
|----|--|
| 1 | Good arrangement |
| 2 | Correct work clothes |
| 3 | Following work standard |
| 4 | Making and checking signals |
| 5 | Prohibition of operation and handling by unlicensed workers |
| 6 | Safety check before starting work |
| 7 | Wearing protective goggles (for cleaning or grinding work) |
| 8 | Wearing shielding goggles and protectors (for welding work) |
| 9 | Good physical condition and preparation |
| 10 | Precautions against work which you are not used to or you are used to too much |

Preparation work

- Before adding oil or making any repairs, park the machine on a hard and level ground, and apply the parking brake and chock the wheels or tracks to prevent the machine from moving.
- Before starting work, lower the work equipment (blade, ripper, bucket, etc.) to the ground. If this is not possible, insert the lock pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning tag on them.
- When disassembling or assembling, support the machine with blocks, jacks, or stands before starting the work.
- 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. When a scaffolding is not

provided, use steps or a step ladder to secure your footing.

Precautions during work


- For the machine equipped with a battery disconnect switch, before starting the work, check that the system operating lamp is turned OFF, and then turn the battery disconnect switch to the OFF (○) position and pull the switch key out. For machines without a battery disconnect switch, before starting the work, remove the cables from the battery. Always remove the cable from the negative (–) terminal first.
- Before disconnecting or removing components of the oil, water, or air circuits, first release the remaining pressure completely from the circuit. When removing the oil filter cap, a drain plug, or an oil pressure pickup plug, loosen it slowly to prevent the oil from spurting out.
- The coolant and oil in the circuits are hot when the engine is shut down. Be careful not to get scalded. Wait for the oil and coolant to cool before performing any work on the oil or water circuits.
- Before starting work, shut down the engine. When working on or around a rotating part, in particular, shut down the engine. When checking the machine without stopping the engine (measuring oil pressure, revolving speed, temperature, etc.), take extreme care not to get rolled or caught in rotating parts or moving parts.
- When raising a heavy component (heavier than 25 kg), use a hoist or crane. Before starting work, check that the slings (wire ropes, chains, and hooks) are free from damage. Always use slings which have ample capacity and install them to proper places. Operate the hoist or crane slowly to prevent the component from hitting any other part. Do not work with any part still raised by the hoist or crane.
- When removing a cover which is under internal pressure or under reaction force of a spring, always leave two bolts in diagonal positions. Loosen those two bolts gradually and alternately to release the pressure, and then remove the cover.
- When removing components, be careful not to break or damage the electrical wiring. Damaged wiring may cause electrical fires.
- When removing piping, stop the fuel or oil from spilling out. If any fuel or oil drips onto the floor, wipe it off immediately. Fuel or oil on the floor can cause you to slip and can even cause fires.
- As a general rule, do not use gasoline to wash parts. Do not use it to clean electrical parts, in particular.
- Be sure to assemble all parts again in their original places. Replace any damaged parts and parts which must not be reused 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 operated.

- When installing high pressure hoses and tubes, make sure that they are not twisted. Damaged hoses and tubes are dangerous, so be extremely careful when installing hoses and tubes for high-pressure circuits. In addition, check that connections of them are correct.
- When assembling or installing parts, always tighten them to the specified torques. When installing protective parts such as guards, or parts which vibrate violently or rotate at high speeds, be particularly careful to check that they are installed correctly.
- When aligning two holes, never insert your fingers or hand. Be careful not to get your fingers caught in a hole.
- When measuring hydraulic pressure, check that the measuring tools are correctly installed.
- Take care when removing or installing the tracks of track-type machines. When removing the track, the track separates suddenly, so never let anyone stand at either end of the track.
- If the engine is operated for a long time in a place which is not ventilated well, you may suffer from gas poisoning. Accordingly, open the windows and doors to ventilate well.

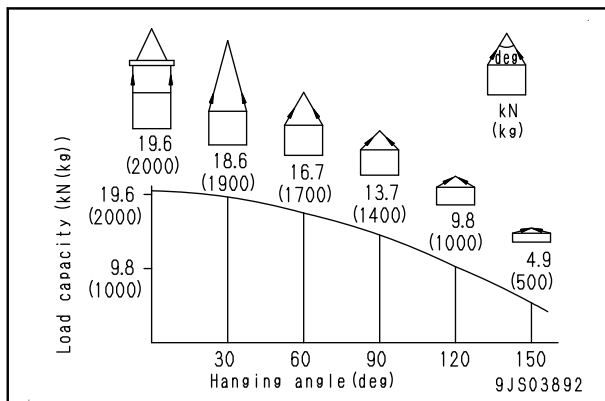
Precautions for slinging work and making signals

- Only one appointed worker must make signals and co-workers must communicate with each other frequently. The appointed signaler must make specified signals clearly at a place where he (she) is well seen from the operator's seat and where he (she) can see the working condition easily. The signaler must always stand in front of the load and guide the operator safely.
 1. Do not stand under the load.
 2. Do not step on the load.
- Check the slings before starting sling work.
- Keep putting on gloves during sling work. (Put on leather gloves, if available.)
- Measure the weight of the load by the eye and check its center of gravity.
- Use proper sling according to the weight of the load and method of slinging. If too thick wire ropes are used to sling a light load, the load may slip and fall.
- Do not sling a load with one wire rope alone. If it is slung by one wire rope, it may rotate and slip out of the rope. Install two or more wire ropes symmetrically.

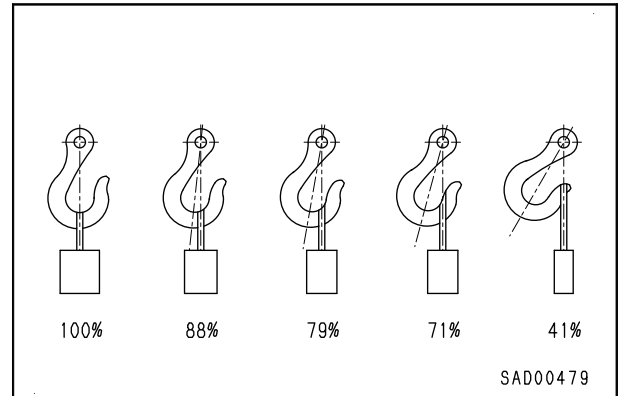
 Slings with one rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original

winding position on the load, which can result in a dangerous accident.

- Limit the hanging angle to 60 degrees, as a rule.
- Do not sling a heavy load (25 kg or more) 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 angle. The figure below shows the variation of allowable load in kN {kg} when hoisting is made with two ropes, each of which is allowed to sling up to 9.8 kN {1,000 kg} vertically, at various hanging angles. When the two ropes sling a load vertically, up to 19.6 kN {2,000 kg} of total weight can be suspended. This weight is reduced to 9.8 kN {1,000 kg} when the two ropes make a hanging angle of 120 degrees. If the two ropes sling a 19.6 kN {2,000 kg} load at a lifting angle of 150 degrees, each rope is subjected to a force as large as 39.2 kN {4,000 kg}.



- When installing wire ropes to an angular load, apply pads to protect the wire ropes. If the load is slippery, apply proper material to prevent the wire rope from slipping.
- Use the specified eyebolts and fix wire ropes, chains, etc. to them with shackles, etc.
- Apply wire ropes to the middle portion of the hook.
- ★ Slings near the tip of the hook may cause the rope to slip off the hook during hoisting. The hook has the maximum strength at the middle part.




- Do not use twisted or kinked wire ropes.
- When lifting up a load, observe the following.
 1. Wind in the crane slowly until wire ropes are stretched. When settling the wire ropes with the hand, do not grasp them but press them from above. If you grasp them, your fingers may be caught.
 2. After the wire ropes are stretched, stop the crane and check the condition of the slung load, wire ropes, and pads.
 3. If the load is unstable or the wire rope or chains are twisted, lower the load and lift it up again.
 4. Do not lift up the load at an angle.
- When lowering a load, observe the following.
 1. When lifting down a load, stop it temporarily at 30 cm above the floor, and then lower it slowly.
 2. Check that the load is stable, and then remove the sling.
 3. Remove kinks and dirt from the wire ropes and chains used for the sling work, and put them in the specified place.

Precautions for using mobile crane

- ★ Read the Operation and Maintenance Manual of the crane carefully in advance and operate the crane safely.

Precautions for using overhead traveling crane

- ⚠ When raising a heavy part (heavier than 25 kg), use a hoist, etc. . In disassembly and assembly, the weight of a part heavier than 25 kg is indicated after the mark of .

- Before starting work, inspect the wire ropes, brake, clutch, controller, rails, over wind stop device, ground fault circuit interrupter, crane collision prevention device, and power application warning lamp, and check safety.
- Observe the signals for sling work.
- Operate the hoist at a safe place.
- Check the direction indicator plates (north, south, east, and west) and the directions of the control buttons without fail.

00 Index and foreword

Foreword, safety and general information

- Do not sling a load at an angle. Do not move the crane while the slung load is swinging.
- Do not raise or lower a load while the crane is moving longitudinally or laterally.
- Do not drag a sling.
- When lifting up a load, stop it just after it leaves the ground and check safety, and then lift it up.
- Consider the travel route in advance and lift up a load to a safe height.
- Place the control switch in a position where it will not be an obstacle to work and passage.
- After operating the hoist, do not swing the control switch.
- Remember the position of the main switch so that you can turn off the power immediately in an emergency.
- If the hoist stops because of a power failure, turn the power switch OFF. When turning on a switch which was turned OFF by the ground fault circuit interrupter, check that the devices related to that switch are not in operating condition.
- If you find an obstacle around the hoist, stop the operation.
- After finishing the work, stop the hoist at the specified position and raise the hook to at least two meters above the floor. Do not leave the sling attached to the hook.

Selecting wire ropes

- Select adequate ropes depending on the weight of parts to be hoisted, referring to the table below

Wire ropes (standard "Z" twist ropes without galvanizing) (JIS G3525, No. 6, Type 6x37-A)

| Nominal diameter of rope | Allowable load | |
|--------------------------|----------------|------|
| | kN | ton |
| mm | | |
| 10 | 8.8 | 0.9 |
| 12 | 12.7 | 1.3 |
| 14 | 17.3 | 1.7 |
| 16 | 22.6 | 2.3 |
| 18 | 28.6 | 2.9 |
| 20 | 35.3 | 3.6 |
| 25 | 55.3 | 5.6 |
| 30 | 79.6 | 8.1 |
| 40 | 141.6 | 14.4 |
| 50 | 221.6 | 22.6 |
| 60 | 318.3 | 32.4 |

- ★ The allowable load is one-sixth of the breaking strength of the rope to be used (Safety coefficient: 6).

Precautions for disconnecting and connecting hoses and tubes in air conditioner circuit

Disconnection

⚠ Disconnection although the refrigerant (refrigerant gas: R134a) used on the machine's air conditioner is less destructive to the ozone layer for environmental friendliness, it is not allowed to be released into the atmosphere as is. Whenever disconnecting the air conditioner gas circuit, be sure to recover the refrigerant gas to reuse it.

- ★ Ask a qualified person for collection, and charge of the refrigerant (R134a).
- ★ Never release the refrigerant (R134a) to the atmosphere.

⚠ If refrigerant gas (R134a) gets in your eyes, you may lose your sight. And if it touches your skins, you may suffer from frostbite. Accordingly, put on protective eyeglasses, gloves and working suits with long sleeves while you are collecting or filling the refrigerant (R134a).

- When loosening the nuts fixing air conditioner hoses and tubes, be sure to use two wrenches; use one wrench to fix and use the other one to loosen the nut.

Connection

- When installing the air conditioner hoses and tubes, take care to prevent any dirt, dust or water from entering.
- When installing the air conditioner hoses and tubes, check that O-rings are fitted to their joints.
- Once an O-ring is used, it is deformed and deteriorated. Accordingly, do not reuse it.
- When removing O-rings, use a soft tool so that the piping will not be damaged.
- Check that there is no defect or deterioration on the O-ring.
- Apply compressor oil for refrigerant (R134a) to the O-ring.
 - ★ However, do not apply oil to the threads portion of a bolt, nut or union.

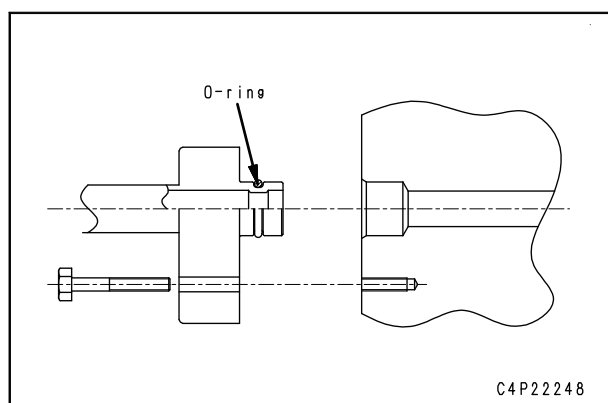
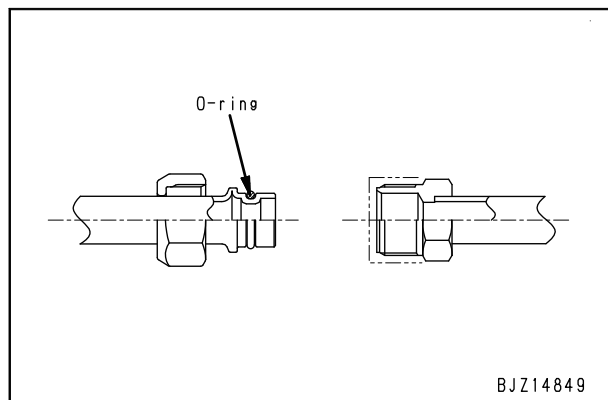
| Manufacturer | Part name |
|-----------------------|--------------------------------|
| DENSO | ND-OIL8 |
| VALEO THERMAL SYSTEMS | ZXL100PG (equivalent to PAG46) |
| SANDEN | SP-10 |

- When tightening nuts of the air conditioner hoses and tubes, be sure to use two wrenches. Use one wrench to fix and tighten the nut with

the other wrench to the specified torque (Use a torque wrench for tightening).

★ Example of fitting of O-ring

- An O-ring is fitted to every joint of hoses and tubes in the air conditioner circuit.



- ★ For tightening torques, see "Others", "Precautions for disconnection and connection of air conditioner piping".