

# SHOP

# MANUAL

## KOMATSU

# D60A,E,P,PL-7

# D65A,E,P-7

MACHINE MODEL	SERIAL NO.
D60A-7	40001 and up
D60E-7	40001 and up
D60P-7	40001 and up
D60PL-7	40001 and up
D65A-7	40001 and up
D65E-7	40001 and up
D65P-7	40001 and up

The affected pages are indicated by the use of the following marks. It is requested that necessary actions must be taken to these pages according to the list below.

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## IMPORTANT SAFETY NOTICE

Proper service and repair is extremely important for the safe operation of machine. The service and repair techniques recommended by Komatsu and described in this manual are both effective and safe methods of operation. Some of these operations require the use of tools specially designed by Komatsu for the purpose.

To prevent injury to workers, the symbols  and  are used to mark safety precautions in this manual. The cautions accompanying these symbols should 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.

## FOREWORD

This shop manual has been prepared as an aid in improving the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him 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 available opportunity.

### Organization

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 chapters for each main group of components; these chapters are further divided into the following sections.

#### 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 "Diagnoses" 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 standards

This section gives the judgement standards when inspecting disassembled parts.

## USING THE SHOP MANUAL

### Volumes

Shop manuals are issued for carrying out repairs.

They are divided as follows:

- **Chassis volume:** issued for every machine model
- Engine volume: issued for each engine series
- Electrical volume : } each issued as one volume to cover all models
- Fuel system volume : }
- Attachments volume: }

In addition, the following volumes are issued for high level rebuilding techniques to cover all models.

- Engine volume
- Undercarriage volume

The following volumes are issued for inspection and tests after repairs:

- Guidance for reusable parts volume
- Bench test methods volume

These various volumes are designed to avoid duplicating the same information. Therefore to deal with all repairs for any model, it is necessary to have the shop manual for that model as well as the relevant engine volume, the fuel system volume and the electrical volume.

This shop manual is **chassis volume**.

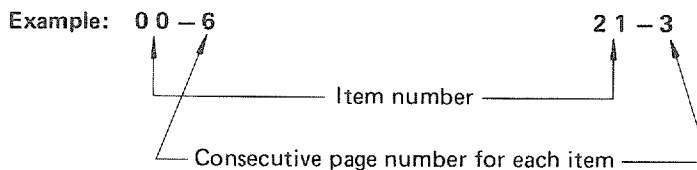
### Distribution and Updating

Recipients of shop manuals are recorded at the Komatsu Head Office. Any additions, amendments or other changes will be sent to all recipients without fail, so someone should be appointed to be in charge of manuals. In this way, pages can be added or removed immediately and the manuals kept up to date and easy to use.

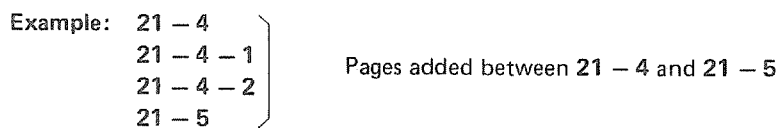


**Filing Method**

- 1) File under the manual title file printed on the bottom of the page.
- 2) Method of taking out the pages for filing is as follows: First order each item number starting with the lowest, and next order according to the consecutive page number for each item.



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



Besides this, when necessary, information will be written in the filing ring hole's margin. Look when filing.

**Revised Edition Mark**






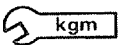



When a manual is revised, a revision number is placed within a circle and printed on the bottom inside corner of the pages to distinguish it from the old manual. Therefore, higher circled numbers supersede lower ones.

**Revisions**

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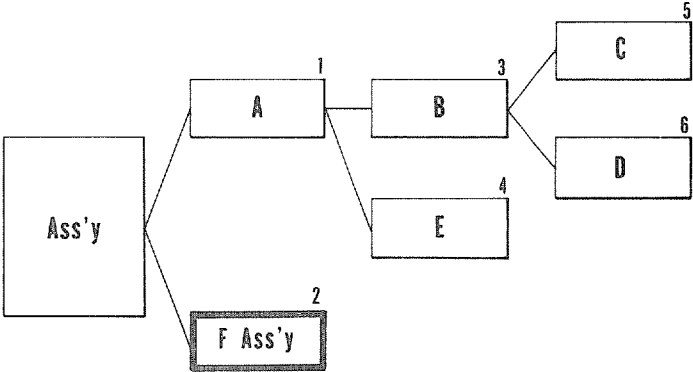
Symbols

So that the shop manual can be of sufficient practical use, we have marked important places for safety and quality with the following symbols.

SYMBOL	ITEM	REMARKS
	Security	This indicates work that requires special precautions for the security of the machine when assembling.
	Safety	Special safety precautions are necessary when performing the work.
		Extra special safety precautions are necessary when performing the work because it is under internal pressure.
	Caution	Special technical precautions or other precautions for preserving standards are necessary when performing the work.
	Weight	Weight of parts or systems. Caution necessary when selecting hoisting wire, or when working posture is important, etc.
	Tightening torque	Places that require special care with the tightening torque when assembling.
	Coat	Places to be coated with adhesives, etc. when assembling.
	Oil, water	Places for filling with oil, etc. Oil capacity.
	Drain	Places for draining oil, etc. Quantity to be drained.

**Network Diagrams**

The standard procedures for disassembly and assembly are described and shown in photographs for each part of the machine. The sequence or steps employed in disassembly and assembly are shown in network diagrams as depicted below.



The sequence of the procedural steps is given in arabic numbers on the top right of each block. For example, when it is necessary to remove part D from the assembly, the steps for removal should be A → B → D. Or, to remove part E the step is A → E. **F Ass'y** is an assembly for which the disassembling procedure is described separately. For assembly, the sequence is presented under each section, in the same manner as for disassembly.

**Troubleshooting Chart**

As shown below, the symptoms relating to a particular trouble are described in the line designated "Diagnoses". The cause of the trouble is then correlated under the "Causes" column and is shown marked.

Problem No. 1 Reduced tractive power or slow travel speed.

Diagnoses	Causes		
	Oil leaks in torque converter	Air suction in the hydraulic pump	
Torque converter oil pressure gauge shows lower than normal pressure (normal 3 ~ 4.8 kg/cm <sup>2</sup> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transmission oil pressure gauge shows lower than normal pressure (normal 20 ~ 23 kg/cm <sup>2</sup> )		<input type="radio"/>	
	<input type="radio"/>		

DEFINITION

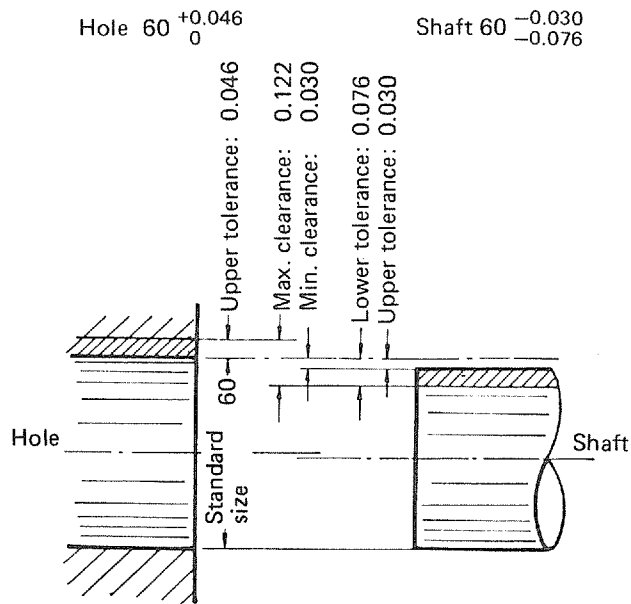
Standard Size,  
Tolerance

The dimensions of finished parts each differ a little. Therefore, when determining the finished dimensions of parts, a dimension that will be standard is determined provisionally, and then the difference allowed from it is indicated. The former is called the **standard size**, and the latter the **tolerance**.

The way to show this is by a plus or a minus sign with the tolerance in smaller numerals to the right the standard size.

**Example:**  $120 \begin{smallmatrix} -0.022 \\ -0.126 \end{smallmatrix}$  (The same meaning as 119.874 – 119.978)

Moreover, when expressing the dimensions of a hole and the shaft that goes inside it, for the sake of convenience, the standard size for the hole and the shaft usually taken as the same, and the tolerances changed to indicate the tightness of the fit. For example, the fit of revolving shaft is indicated as follows, and is shown in the drawing.



**Standard Size** This is the standard value at the time of design, the finished dimension of new parts.

**Repair Limit** This is the limit in dimension up to which the part can be used. (The size of parts changes due to wear or distortion during use). When parts exceed the repair limit, they must be repaired or replaced as specified.

**Standard Clearance** This is the clearance between two new parts after assembly, shown as a range between minimum clearance and maximum clearance. In general, parts are adjusted to this clearance after repair.

**Clearance Limit** This is the maximum clearance allowed between parts. (The clearance increases due to wear, etc. during use.)  
When the clearance exceeds the clearance limit, the parts must be repaired or replaced as specified.

**Maintenance Standard** This is the number given to items in diagrams of individual components. The same number is given in the left-hand column for ease of identification.

Unit: mm

No.	Check item	Criteria			Remedy
		Serial No.	Standard size	Repair limit	
1					


Unit: mm

No.	Check item	Criteria					Remedy	
		Serial No.	Standard size	Tolerance		Standard clearance		Clearance limit
				Shaft	Hole			
10								

## KOMATSU SEALANT

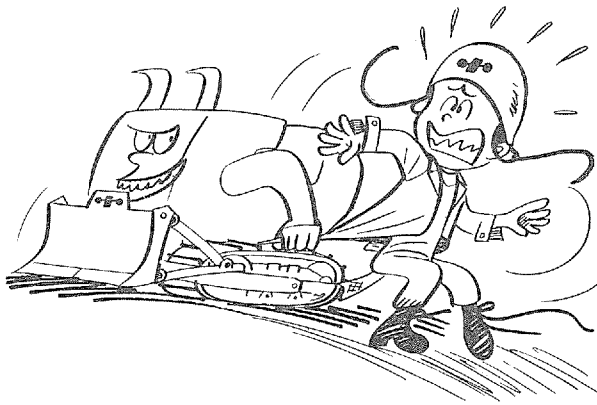
Komatsu Sealant	Komatsu Code	Purpose and Application	How to Use	Precautions
GASKET SEALANT (Liquid gasket)	LG-1	Prevents leakage of gas from valves, plugs, threads, gaskets, joint seats and oil seats of the cylinder head and oil pan housing.	(1) Before applying sealant, thoroughly remove water, oil and grease from surfaces to be coated. (2) The sealing effect will increase considerably when sealant is applied to both the mating surfaces. (3) Dry the applied sealant for 4 to 6 minutes before joining the mating surfaces.	(1) Keep sealant away from flames. (2) Keep sealant in a closed vessel and store in a cool and dark place.
METAL SEALANT	LG-4	Use when installing the final drive case and transmission case, etc. Surface coated with this sealant will not require a gasket.	(1) Before applying sealant, thoroughly remove water, oil and grease from surface to be coated. (2) The sealing effect will increase considerably when sealant is applied to both the mating surfaces. (3) Dry the applied sealant for 4 to 6 minutes before joining the mating surfaces.	(1) Keep sealant away from flames. (2) Keep sealant in a closed vessel and store in a cool and dark place.
THREAD TIGHTENER (Adhesives)	LT-2 (-50° to +120°C)	Used for fixing bolts, plugs and screws.	(1) Before applying tightener, thoroughly remove water, oil and grease from surface to be coated. (2) Apply 2 or 3 drops of tightener to the threads. (3) Immediately tighten the bolt, and its threads will soon stick.	(1) Some persons may be allergic to this agent. Be sure to wash your hands immediately after using the agent.
MOLY LUBRICANT (Molybdenum) disphide	LM-P (MoS <sub>2</sub> ) (-20° to +400°C)	(1) Prevents sticking and seizing during assembly and break-in. (2) Facilitates disassembly. Typical application: Press-fitted bearings, keys and pins.	(1) Wipe clean the surface to be coated with lubricant. (2) On repairing the machine, apply a thin, even coat of lubricant to the fitting parts using a brush or spatula.	(1) Keep lubricant in a closed vessel.
RUST PROOF SPRAY		Usable for wide application such as rustproofing, lubrication, and moisture proofing, as well as for loosening rusted screws.	(1) Spray the part:	(1) Do not aim the spray at the human body. (2) This spray is HIGHLY INFLAMMABLE. Never bring it in the vicinity of an open fire. (3) Do not use a large quantity of spray in a room with making fire. (4) Do not store at 40°C or above. (5) Never put an empty spray can into a fire.
SEALING TAPE		Prevents oil leakage from plugs and flanges in hydraulic circuits.	(1) Wind sealing tape on the threaded part of a plug or flange. (2) Screw in the plug or flange with the sealing tape left wound.	(1) Be careful not to confuse the proper winding direction of sealing tape. Sealing tape should not slacken when tightening the screw.

## SAFETY

This safety flag  will be seen on some pages of this manual. It indicates the need to pay special attention to safety in handling of parts or treatment of working procedures.

### 1. Working clothes

Wear a cap, coverall and safety shoes. Do not roll the sleeves up. (Absolutely avoid attempting to work wearing only under clothes.) Wearing of gloves is recommended for removing the exhaust manifold, holding parts with unfinished surfaces, welding operations, and handling of heavy parts. However, it is not recommended for drilling machine operation or disassembly and reassembly of the engine's inner parts.



O2F001

### 2. Putting the working area in good order

Putting the working area in good order is essential to safe performance of work.

- 1) Arrange tools, disassembled parts, replacement parts and products in good order. All parts should be properly placed in the designated positions.
- 2) Do not clog the aisles. Parts and products temporarily placed in an aisle should be removed as soon as possible.
- 3) Each worker is required to personally keep his surrounding area clean. Time and labor spent for cleaning should not be considered wasted.

### 3. Cooperation

Two or more workers who fail to cooperate may cause an accident. At the start of joint work, each person should be assigned his part of the work.

### 4. Fire prevention

The following instructions should be strictly observed to protect the work shop against fire:

- 1) Smoking is permitted only in certain specified areas provided with ash trays. Do not confuse an ash tray with an ash can. Walking with a cigarette between one's lips is to be avoided.
- 2) Workers should be familiar with the location of fire extinguishers and their use.
- 3) Objects should not be placed near a fire extinguisher or fireplug, as easy access to fire-fighting equipment is essential.
- 4) Store oil and grease cans in a prescribed place and rags soaked with oil in a safe, non-inflammable container.
- 5) Carefully store gasoline, diesel fuel, lubricating oil, lacquer, thinner, acetylene, propane gas and oxygen all of which are inflammable, volatile and explosive in the prescribed sheds. Do not attempt to bring more of those materials into the shop than is absolutely necessary.

### 5. Welding operations

- 1) When performing gas welding, be careful not to hook up the oxygen hose to the acetylene (or vice versa) by mistake.
- 2) If gas leakage is suspected, check welding devices by means of the soap bubble detection method.
- 3) When lighting a burner, keep the burner free from inflammables and direct the opening of the burner downward. Do not leave the burner lit unnecessarily. Do not drag or wave about hoses with the burner left lit.
- 4) Protect gas cylinders against sunshine or any other heat source which may increase gas temperature rapidly.
- 5) Keep gas cylinders far away from fire and inflammables.

- 6) Keep the valve and gauge of each cylinder free from oil and grease.
- 7) Be sure to wear safety goggles for arc welding to protect the eyes against harmful light.
- 8) Do not wear wet clothes or gloves that could cause electric shocks.
- 9) Check the welder and cords frequently for loose terminals and other faulty conditions. Do not attempt to use any faulty equipment even if it is possible to carry on the welding operation.

**6. Disassembly and reassembly operations**

- 1) Use only the tools prescribed for use for each work. Check that the tools are in proper condition before using them. If any faults are found repair completely. Especially avoid use of the special tools for unspecified purposes.
- 2) Check hammers for handle tightness. Do not attempt to use a hammer which lacks a wedge, whose handle is likely to break or whose driving surface is rough with burrs.
- 3) Do not wear gloves when using a hammer.
- 4) Be sure to wear safety goggles when using a shipping hammer. Also, be careful of the direction in which chips fly, in order to avoid injuring other persons.
- 5) Check the clamps of a vice so that objects can be held steadily.
- 6) Be sure to block heavy parts before removing their mounting bolts. Take care not to cause an

accident because of the shifting of the center of gravity when heavy parts are hoisted.

- 7) Be careful not to carelessly allow your finger to be caught when adjusting the alignment between two holes.
- 8) Do not attempt to work with a part while hoisting it. Perform work only after safely supporting the part on blocks.
- 9) To protect your face from accidental spurting of hot grease when loosening the track tension adjusting lubricator, do not directly face the lubricator.
- 10) When adjusting tire pressure, do not charge or discharge air with your face in front of the tire valve.

**7. Washing**

- 1) When performing washing of a part with the high-pressure steam cleaner, pay special attention so that hot steam does not injure other persons.
- 2) Do not use gasoline as a detergent for general parts. If the use of gasoline is required to wash special parts (such as some electrical devices), limit the quantity of gasoline to as little as possible to prevent fire.
- 3) Protect your skin against organic solvents such as trichlene. If splashed with this kind of solvent, wash the skin with soapy water as soon as possible.



# SHOP MANUAL

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## **D60·65A,E,P-7**

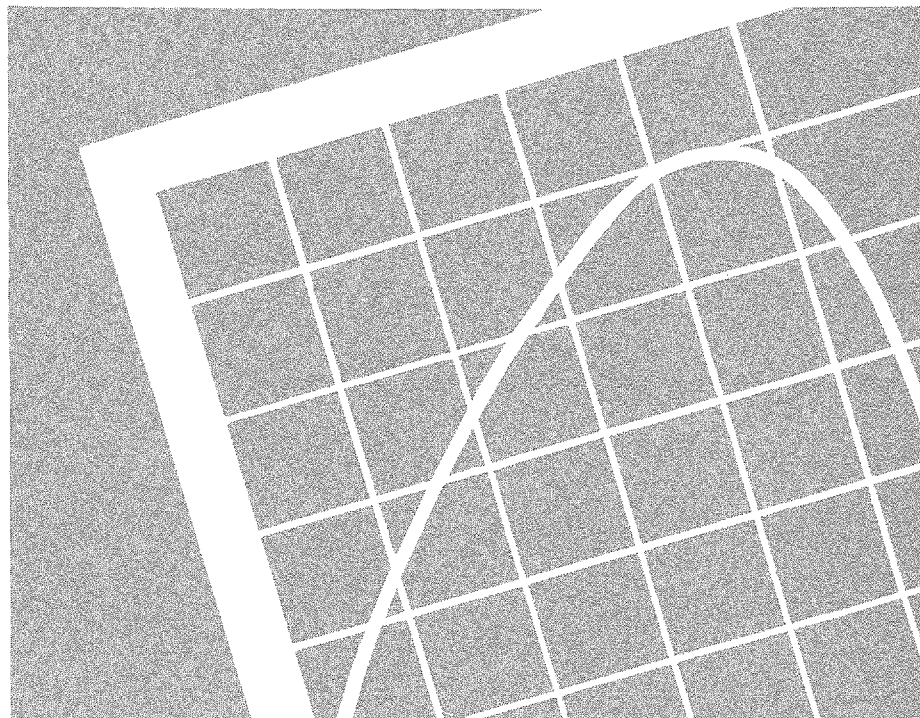
SERIAL NO. D60A,E,P-7 40001 and up

SERIAL NO. D65A,E,P-7 40001 and up

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## **01 GENERAL**

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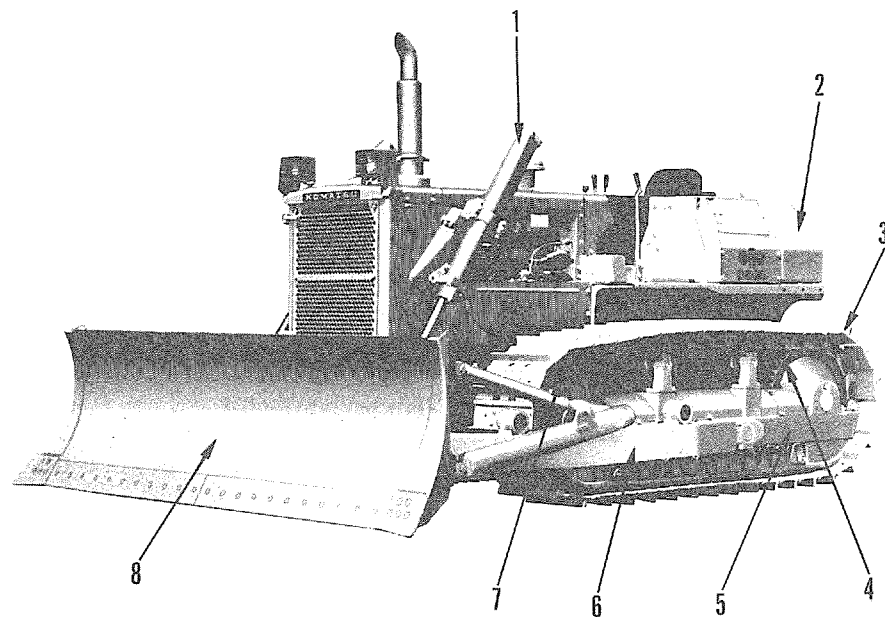
# GENERAL

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## GENERAL VIEWS

● **D60A-7 with angledozer**

S/N 40001 and up

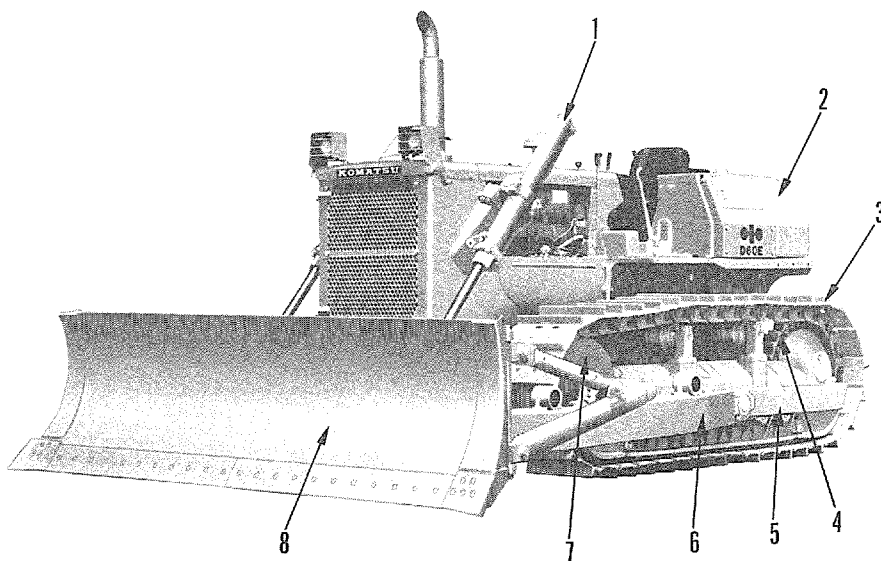


- 1. Blade lift cylinder
- 2. Fuel tank
- 3. Track
- 4. Sprocket
- 5. Track frame
- 6. Blade frame
- 7. Idler
- 8. Blade

PI44C001

● **D60E-7 with angledozer**

S/N 40001 and up



- 1. Blade lift cylinder
- 2. Fuel tank
- 3. Track
- 4. Sprocket
- 5. Track frame
- 6. Blade frame
- 7. Idler
- 8. Blade

PI44C002