Operation & Maintenance Manual

HYDRAULIC
MINING
EXCAVATOR

PC5500-11

SERIAL NUMBER 15185

Unsafe use of this excavator may cause serious injury or death. Operators and maintenance personnel must read this manual before operating or maintaining this excavator. This manual should be kept near the excavator for reference and must be periodically reviewed by all personnel who will come into contact with it.

Komatsu has Operation and Maintenance Manuals written in other languages. If a foreign language manual is required, contact your local distributor for availability.

KOMATSU

1.6 SPECIFICATION AND SERIAL PLATE

Fig. 1-4

The specification and serial plate is located on the outside of the driver's cab near the door.

1.6.1 PRODUCT IDENTIFICATION NUMBER

The product Identification Number Code (PIN-Code) is printed in the space provided on the specification and serial plate. (Fig. 1-4)

2.4.3.6 PROVIDE FIRE EXTINGUISHER AND FIRST AID KIT

Always follow the precautions below to prepare for action if any injury or fire should occur, refer to Fig. 2-8.

– Be sure that fire extinguishers have been provided and read the labels to ensure that you know how to use them in emergencies.
– Carry out periodic inspection and maintenance to ensure that the fire extinguisher can always be used.
– Provide a first aid kit. Carry out periodic checks and add to the contents if necessary.

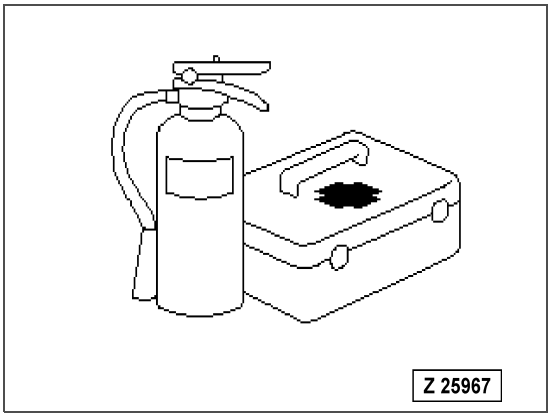

Fig. 2-8

2.4.3.7 IF A PROBLEM IS FOUND

If you find any problems in the excavator during operation and maintenance (noise, vibration, smell, incorrect gauges, smoke, oil, leakage, etc., or any abnormal display on the warning devices or monitor), report to the person in charge and have the necessary action taken. Do not operate the excavator until the problem has been corrected.

2.4.4 FIRE PREVENTION

2.4.4.1 PRECAUTIONS TO PREVENT FIRE

Fire caused by fuel, oil, antifreeze, or window washer fluid.

Do not bring any flame or fire close to flammable substances such as fuel, oil, antifreeze, or window washer fluid. There is a danger they may catch fire. To prevent fire, always observe the following:

Refer to Fig. 2-9:

– Do not smoke or use any flame near fuel or other flammable substances.
– Stop the motors before adding fuel.
– Do not leave the excavator while adding fuel or oil.
– Tighten all fuel and oil caps securely.
– Be careful not to spill fuel on overheated surfaces or on parts of the electrical system.
– After adding fuel or oil, wipe up any spillage.
– Put greasy rags and other flammable materials into a safe container to maintain safety in the workplace.
– When washing parts with oil, use a non-flammable oil. Do not use diesel oil or gasoline. There is a danger that they may catch fire.
– Do not weld or use a cutting torch to cut any pipe or tubes that contain flammable liquids.
– Determine well ventilated areas for storing oil and fuel. Keep the oil and fuel in the determined place and do not allow unauthorized persons to enter.

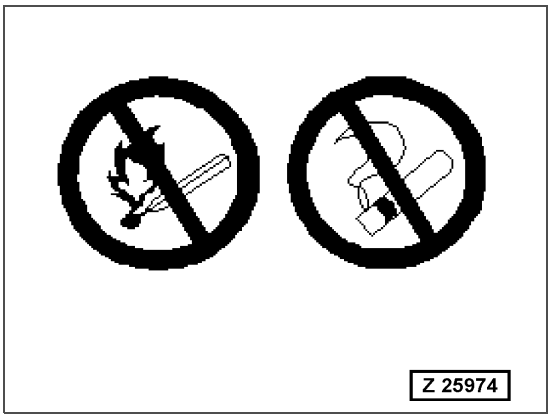

Fig. 2-9

On job sites where the excavator may go close to electric cables, always do as follows.

– Before starting work near electric cables, inform the local power company of the work to be performed, and ask them to take the necessary action.
– Always maintain a safe distance (see the table on the right) between the excavator and the electric cable. Check with the local power company about safe operating procedure before starting operations.
– To prepare for any possible emergencies, wear rubber shoes and gloves. Lay a rubber sheet on top of the seat, and be careful not to touch the chassis with any exposed part of your body.
– Use a signalman to give warning if the excavator approaches too close to the electric cables.
– When carrying out operations near high voltage cables, do not let anyone near the excavator.
– If the excavator should come too close or touch the electric cable, to prevent electric shock, the operator should not leave the operator's compartment until it has been confirmed that the electricity has been shut off. Also, do not let anyone near the excavator.

Voltage of Cables	Safety Distance
100 V - 200 V	Over 2 m (7 ft)
6,600 V	Over 2 m (7 ft)
22,000 V	Over 3 m (10 ft)
66,000 V	Over 4 m (14 ft)
154,000 V	Over 5 m (17 ft)
187,000 V	Over 6 m (20 ft)
275,000 V	Over 7 m (23 ft)
500,000 V	Over 11 m (36 ft)

2.4.11.7 LIGHTNING STRIKES

The excavator is vulnerable to strikes by lightning, A maximum of two people are allowed in the cabin and they must be sitting in appropriate seats. Stop working when the storm is close, lower the attachment to the ground and wait for the storm to pass.Stop working when the storm is close, lower the attachment to the ground and wait for the storm to pass. A possible lightning strike may damage the mechanical bearings and the electrical systems. Check the excavator after a lightning strike for possible damages and repair if necessary.

2.4.11.8 WORKING ON LOOSE GROUND

– Avoid traveling or operating your excavator too close to the edge of cliffs, overhangs, and deep ditches. The ground may be weak in such areas. If the ground should collapse under the weight or vibration of the excavator, there is a hazard that the excavator may fall or tip over. Remember that the soil after heavy rain or blasting or after earthquakes is weak in these areas.
– When working on embankments or near excavated ditches, there is a hazard that the weight and vibration of the excavator will cause the soil to collapse. Before starting operations, take steps to ensure that the ground is safe and to prevent the excavator from rolling over or falling.

2.5 PRECAUTION FOR MAINTENANCE

2.5.1 GENERAL PRECAUTIONS

- Observe the adjusting, maintenance and inspection activities and intervals set out in the Operation,- Lubrication and Maintenance Manual, including information on the replacement of parts and equipment. These activities may be executed by skilled personnel only.
- Brief operating personnel before beginning special operations and maintenance work, and appoint a person to supervise the activities.
- In any work concerning the operation, conversion or adjustment of the excavator and its safety-oriented devices or any work related to maintenance, inspection and repair, always observe the start-up and shut-down procedures set out in the Operation,- Lubrication and Maintenance Manual and the information on maintenance work.
- Ensure that the maintenance area is adequately secured.
- If the excavator is completely shut down for maintenance and repair work, it must be secured against inadvertent starting by:
  - locking the principal control elements and removing the ignition key and/or
  - attaching a warning tag to the main switch or control levers.
  - setting the maintenance safety switch to the 0 position and securing it with a padlock
- Carry out maintenance and repair work only if the excavator is positioned on stable and level ground and has been secured against inadvertent movement and buckling.
- To avoid the risk of accidents, individual parts and large assemblies being moved for replacement purposes should be carefully attached to lifting tackle and secured. Use only suitable and technically perfect lifting gear and suspension systems with adequate lifting capacity. Never work or stand under suspended loads.
- The fastening of loads and the instructing of crane operators should be entrusted to experienced persons only. The marshaller giving the instructions must be within sight or sound of the operator.
- For carrying out overhead assembly work always use specially designed or otherwise safety-oriented ladders and working platforms. Never use excavator parts as a climbing aid. Wear a safety harness when carrying out maintenance work at greater heights.
  Keep all handles, steps, handrails, platforms, landings, stairways and ladders free from dirt, snow and ice.
- Always tighten any screwed connections that have been loosened during maintenance and repair.
- Any safety devices removed for set-up, maintenance or repair purposes must be refitted and checked immediately upon completion of the maintenance and repair work.
- Ensure that all consumables and replaced parts are disposed of safely and with minimum environmental impact.
- Before starting any lubrication or maintenance work read the Fundamental Safety Instructions on page 2-1.
- Park the excavator at a safe place on level ground. Proceed according to the instructions ”Parking the excavator”. Lower the attachment flat onto the ground. Move all control levers to neutral position.
- Stop the motors and move all control levers through their shift positions to relieve the pressure in the hydraulic system. Refer to ”Stopping the motors” for detailed description of the stopping procedure. Also see the chapter ’Relieving The Pressure In The Hydraulic System’ in the ’Operation’ part of this manual.
- Before any maintenance work is started, set the maintenance safety switch to 0 position.
  Find to the location of the maintenance safety switch refer to section 2.5.1.3 on page 2-29. In the 0 position the motors can not be started. Secure this position by inserting a padlock into the holes of the switch. Up to ten padlocks can be attached to the holes provided.
- A warning plate ”Caution excavator Maintenance” must be fixed in the Operator’s cab before any lubrication or maintenance work is started.
- Block the excavator to prevent excavator movement

2.5.3.2 HANDLING HIGH PRESSURES HOSES OR PIPES

– If oil or fuel leaks from high-pressure hoses, it may cause fire or defective operation, which may lead to serious injury or death. If any loose bolts are found, stop work and tighten to the specified torque. If any damaged hoses are found, stop operations immediately and contact your Komatsu distributor.

Replace the hose if any of the following problems are found.

– Damaged or leaking hydraulic fitting.
– Frayed or cut covering or exposed reinforcement wire layer.
– Covering swollen in places.
– Twisted or crushed movable portion.
– Foreign material embedded in covering.

2.5.3.3 REPLACEMENT OF HOSE LINES

Hydraulic hoses are subjected to natural aging. Hence, their usable lifetime is limited to maximum 6 years.

NOTICE

HYDRAULIC HOSE STORAGE!

The hydraulic hose lifetime can become porous.
The maximum permissible storage time of hydraulic hoses must be observed.

– This storage period is part of the usable lifetime and must be considered when installing a new hose line. If, for example, a hose line with a one year storage time is to be installed, the remaining service life of the hose line must be considered. All hose lines are marked with the date of production.
– Hose lines considered as Safety Critical Parts have to be replaced earlier. Refer to the chapter "Lubrication and Maintenance Schedule" in the MAINTENANCE section of the Operation and Maintenance Manual for further information.

All hydraulic hoses of the excavator have to be replaced when their service life has expired, even if there is no visible damage. Refer to the chapter "Lubrication and Maintenance Schedule" in the MAINTENANCE section of the Operation and Maintenance Manual for further information.

NOTICE

GENUINE PARTS!

Genuine parts are guaranteed.
Repairs on hydraulic hoses are not allowed. Use ONLY GENUINE Komatsu Germany replacement hose lines.

2.5.3.4 INSPECTION OF HOSE LINES

⚠ WARNING

FLUID UNDER HIGH PRESSURE!

The hydraulic system is always under internal pressure and can lead to serious injury when leaking.
When inspecting or replacing piping or hoses, always check that the pressure in the hydraulic circuit has been released.

Inspect all hoses, hose lines and fittings carefully during the course of the daily walk-around inspection. Check for leaks and damages. Beware of pinhole leakages. Replace damaged parts without delay.

2.8 SAFETY WARNING SIGNS

The warning signs and safety labels described in this section are used on this excavator.

– Be sure you fully understand the correct position and content of these safety labels.
– To ensure that the labels and signs can be read properly, be sure that they are situated in the correct location and that they are clean. When cleaning them, use soap and water. Do not use organic solvents or gasoline. These may damage the labels and cause them to peel off.
– There are also other labels in addition to the safety labels. Handle these labels in the same way.

NOTICE

If the labels are damaged, lost, or cannot be read properly, replace them with new ones. For details of the part numbers for the labels, see this manual or the actual label, and place an order with your Komatsu distributor.

Emergency escape route from right side walkway
Fig. 2-68
Part number **519 756 98** (Instructions for operating the emergency escape ladder)

1. Turn pin handle CW (clockwise)
2. Remove pin handle
3. Kick against bar to disengauge lever mechanism
4. Kick against bar to assist in lowering the ladder
5. Kick against angled section to push ladder downwards
6. Turn pin on latch on hand railing gateway CCW (counter-clockwise)
7. Remove pin
8. Raise hand raining gateway

Part number **520-135-98** (emergency escape ladder to the left)

For further information, refer to the chapter “Emergency Escape Ladders in the “Operation” section of the Operation and Maintenance Manual.

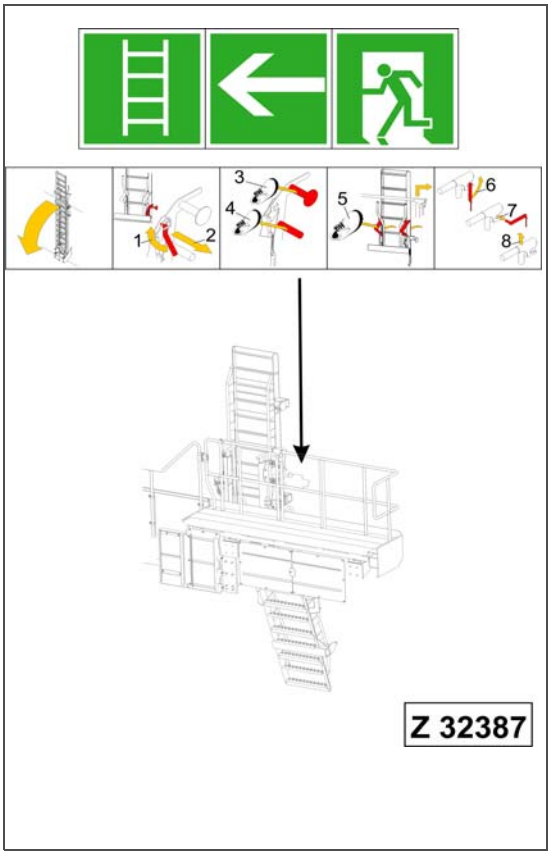

Fig. 2-68

Ensure a safe distance from working area
Fig. 2-81
Part number **09134A3281**
Position on the stick of the attachment to warn of keeping clear of the moving range of the working equipment.

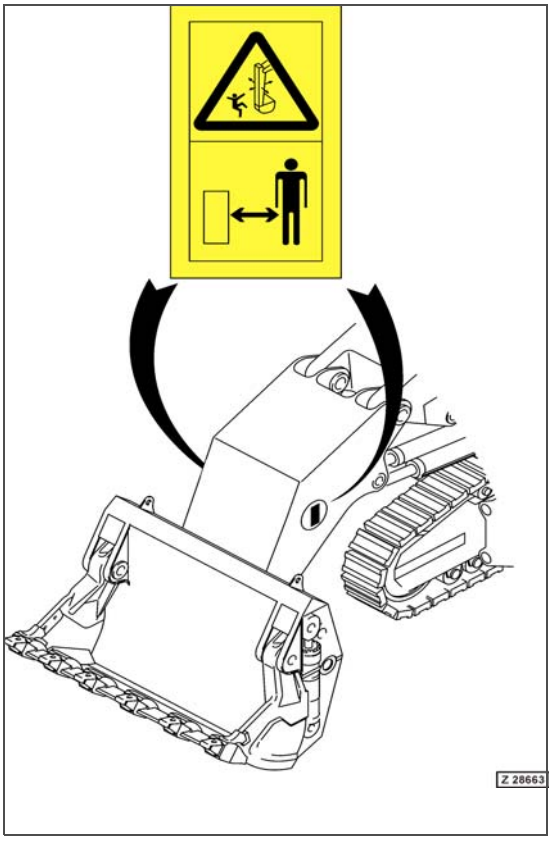

Fig. 2-81

Care when handling batteries
Fig. 2-82
Part number **518 658 98**
Care is to be taken when handling the batteries or the battery cables. Refer to "BATTERY HANDLING" on page 2-40.
This sign is located under the access grip to the battery compartment under the walkway.

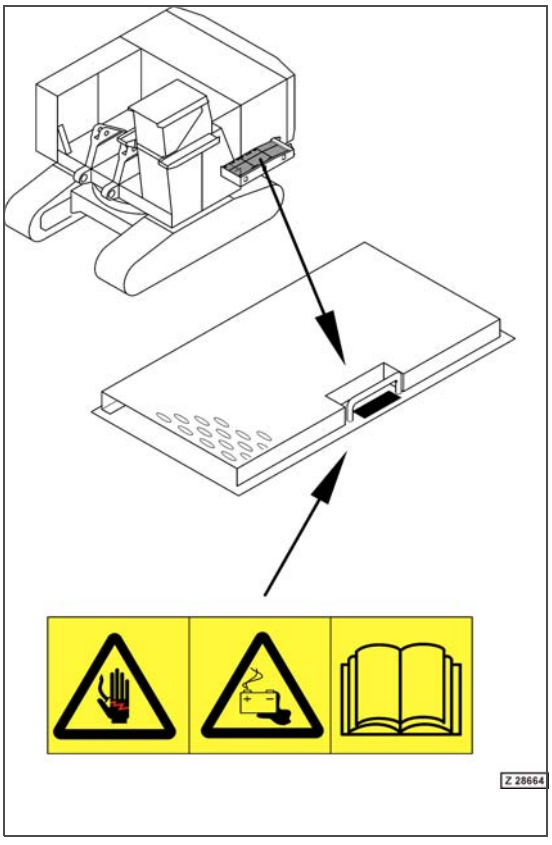

Fig. 2-82

3 OPERATION

Legend for Fig. 3-93

(1) Access/egress stairway in lowered position

(2) (70S084 and 70S084b) Access/egress stairway control switch for lifting and lowering the stairway

(3) Pull chain for lowering of the access/egress stairway and gaining access to the excavator from the ground

⚠ CAUTION

EMERGENCY USE ONLY!

Use this chain only in emergencies when the operator does not respond to other communication signals.

(4) (70B122) Monitor and control sensor, located on ladder pivot bracket.
This sensor is open when the ladder is lowered and closed when the ladder is raised

(5) (70B091) Monitor and control sensor, located on ladder pivot bracket.
This sensor is open when the ladder is raised and closed when the ladder is lowered.

(6) (70B114) Safety sensor, located on ladder pivot bracket.
This sensor detects when the ladder is in the raised position.

(7) Pull chain for lowering the access/egress stairway when escaping the excavator

⚠ CAUTION

EMERGENCY USE ONLY!

Use this chain only in emergencies when the Operator needs to escape the excavator.

(8) Emergency stop switch for main drive motor and position of manual actuator for fire suppression system (if so equipped)

(9) Lever on magnet valve to activate lowering of ladder in emergency.

(10) View showing underside of platform with position of ladder hydraulic cylinder

(11) (70S155) Actuation switch for lowering and raising of hydraulic service arm

(12) (70S018) Light switch for area of access to the excavator

Operating the Hydraulic Access/egress Stairway

⚠ WARNING

OPERATING THE ACCESS/EGRESS STAIRWAY IMPROPERLY IS HAZARDOUS!

Operating the ladder improperly can result in serious injury or death.
Wait until the ladder has lowered completely before climbing. Do not lift people or objects (tools) with the ladder. Make sure the moving range of the ladder is clear of people when raising or lowering.

– If there are any obstacles within the moving range of the ladder, stop the ladder by setting the control switch to -0- position.

Legend for Fig. 3-98

(1) Ladder rungs on boom

(2) Handrails on boom

(3) Safety chains on handrail of cab walkway

(4) Walkway around operator’s cab

(5) Boom access ladder

Accessing the boom

The walkway (4) on the inner side of the cab leads to the access ladder (5). The safety chains (3) on the handrail of the walkway are to be unhooked in order to gain access to the boom.

⚠ WARNING

RISK OF FALLING!

Falling off the boom can result in serious injury or death.
When working on the boom, a safety harness and fall absorber are to be worn at all times. Refer to chapter "SAFETY" on page 2-1 for further details.

Be sure to attach safety chains (3) after leaving the boom.

3.2.7.2 OPERATOR'S SEAT ADJUSTMENT

Before operating the excavator, adjust the seat and mirrors for operator's maximum comfort, visibility, and complete control of the excavator.

Legend for Fig. 3-103

(1) Weight adjustment

(2) Height adjustment

(3) Absorber (cushioning)

(4) Fore and aft adjustment

(5) Control carrier

(6) Seat depth adjustment

(7) Seat pan angle adjustment

(8) Armrests

(9) Armrest adjustment

(10) Headrest

(11) Storage box

(12) Seat heater

(13) Lumbar support

(14) Backrest adjustment

(15) Fore and aft isolator

REMARKS: For more detailed information on the operator's seat refer to the document filed in the volume 2 binder.
More Information on the seat belt, ison page 3-109.

3.3.1.1 HYDRAULIC CONTROL SYSTEM

See Fig. 3-109

NOTICE

UNEXPECTED CONTROL OF THE EXCAVATOR!

An incorrect control pattern will result in the excavator reacting unexpectedly.
The control pattern shown is set as standard ex-works (Euro). Variations may exist. Please check and confirm if the control pattern is implemented on your excavator.

REMARKS: For more information → "WORKING WITH THE ATTACHMENT" on page 3-237.

⚠ WARNING

OPERATE SAFELY!

Wrong or incorrect operation of the controls can lead to serious injury or death.
Always be aware of potential hazards before and during activation of the control levers.
Before starting the engine, make sure you know the location and function of each control.
Always sit in the Operator's seat when operating this excavator.
Observe the Safety Instructions on on page 2-1.

3.3.1.2 SAFETY CIRCUIT FOR CONTROLS

(Pilot control system cut-out and actuation of hydraulic slew parking brake)

This system is controlled through the operator's seat, the hydraulic access/egress stairway and the service arm of the central refilling system, if so equipped. It prevents movements of the excavator and its attachment as long as the operator is not sitting in his seat and/or the access/egress stairway is in the lowered position or when the service arm is in its lowered position.

NOTICE

CHECK THE CONTROL PATTERN!

An incorrect control pattern will result in the excavator reacting unexpectedly.
If the excavator responds in an unexpected manner, release all control levers and pedals and strike the emergency shut-off button

3.3.3.1 CONTROL PANEL

Legend for Fig. 3-114

(1) Key operated main switch

REMARKS: After switching OFF main switch (1), wait before the green lamp near to the battery main switches goes out before switching OFF the battery main switches. Komtrax Plus needs this period for saving data. The system operation lamp of the battery main switches lights green during this saving period. If batteries are switched OFF before this time period is over, data will be lost. Switch the battery main switches only OFF when the system operation lamp is OFF.

(2) High level alarm: **Automatic engine shutdown**.
The high level alarm (2) will sound approximately 10 seconds before an automatic engine shutdown occurs and will continue to sound during the 10 second period. At the same time a blinking message *SHUTDOWN* will be displayed on the Komtrax Plus monitor.

REMARKS: Use the time period to move the excavator to a safe place and lower the attachment to the ground. Inform service about the shutdown condition.

(3) Strike button, emergency shut down of both engines and pilot control system cut out.

REMARKS: In case of emergency push in this button to stop both engines and to cut out the pilot control circuit.
DO NOT use for normal stopping procedure.

For releasing the switch, turn and pull-up the strike button.

(4) WARNING lamp (Yellow) of rear engine 1. This lamp is used to monitor engine out-of-range condition, in case the Komtrax Plus Monitor fails to function. When this lamp illuminates, the engine can still be operated until end of shift, but it can lose some system features which sometimes results in power loss (derate condition). Inform Service about the engine problem.

(5) STOP lamp (Red) of rear engine 1. This lamp is used to monitor engine out-of-range condition, in case the Komtrax Plus Monitor fails to function. When this lamp illuminates, stop the engine operation in a safe manner immediately. The engine monitoring system CENSE or the electronic control module ECM will initiate automatic engine shutdown due to serious engine problem. Inform Service about the engine failure.

(6) Rotary switch REAR Engine 1 START

(7) Rotary switch REAR Engine 1 STOP

(8) WARNING lamp (Yellow) of front engine 2. This lamp is used to monitor engine out-of-range condition, in case the Komtrax Plus Monitor fails to function. When this lamp illuminates, the engine can still be operated until end of shift, but it can lose some system features which sometimes results in power loss (derate condition). Inform Service about the engine problem.

(9) STOP lamp (Red) of front engine 2. This lamp is used to monitor engine out-of-range condition, in case the Komtrax Plus Monitor fails to function. When this lamp illuminates, stop the engine operation in a safe manner immediately. The engine monitoring system CENSE or the electronic control module ECM will initiate automatic engine shutdown due to serious engine problem. Inform Service about the engine failure.

(10) Rotary switch FRONT Engine 2 START

(11) Rotary switch FRONT Engine 2 STOP

(12) Switch for warning beacon on cab roof

(13) Switch for interior illumination

3.4.3.1 MAIN GAUGE SCREEN 1

Symbol explanation, Fig. 3-120

°C	Celsius, ambient temperature
1/min	Revolutions Per Minute (RPM), engine speed
	Time
	Truck Counter 1
	Truck Counter 2
1 	Engine 1 Coolant Temperature
2 	Engine 2 Coolant Temperature
	Hydraulic Oil Temperature
	Fuel Level

Function of Keys F1 to F6

F1	This button is used to scroll through the four main gauge screens (1, 2, 3 and 4). With other screens selected the function of this key changes accordingly, see examples on the following pages.
F2	This button switches to fuel consumption screen, for details there is more information on page 3-143
F3	This button switches to failure message history screen for the operator. The color of the icon above this switch changes to yellow when a current message is available in the Failure Message history. The button remains yellow as long as the cause for the message exists, even if the message was canceled. For details see Failure Message screen on page 3-143.
F4	This button switches to the Main Screen for changing the display from Time to Service Meter Reading or to Date and vice versa, details are on page 3-144.
F5	This button switches to the Maintenance Monitor. The color of the icon above this switch changes to yellow or red when Maintenance is due, for details see Maintenance Monitor on page 3-144.
F6	This button switches to the User Menu Settings for Operator, more detailson page 3-145.

Screen adjustment Day and Night, Fig. 3-130

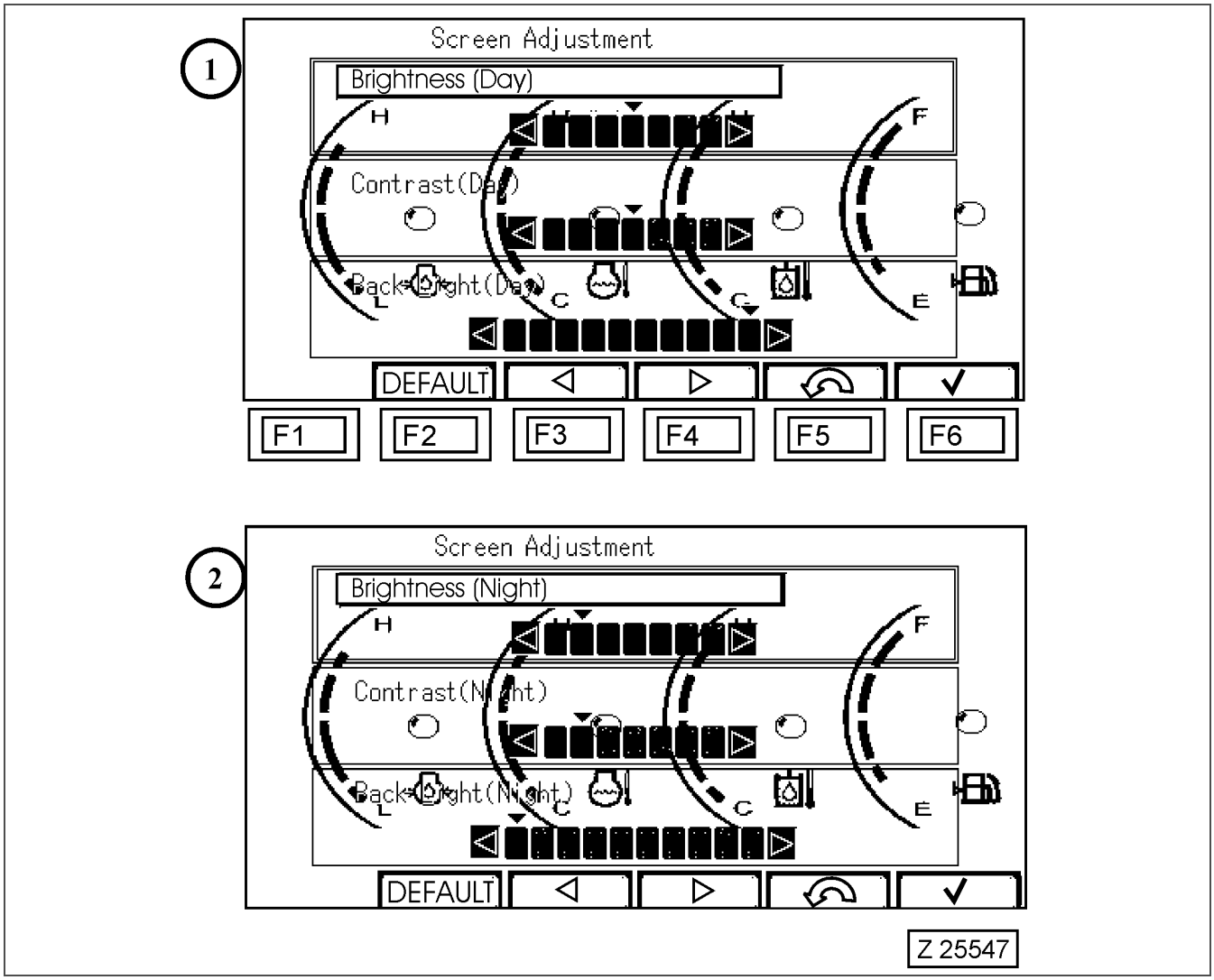

Fig. 3-130

Screen adjustment Day and Night

The Day Screen (1) will be displayed during the day with the main working lights off.
The screen changes automatically to Night when the main working lights are on, see screen (2).
Adjustment of both screens is done in the same way.

Legend for Fig. 3-138

(1) Display on the unit

(2) Fan blower is automatic

(3) Air conditioning function is active

(4) Dehumidifying (de-misting) function is active

(5) Circulation in the cab is active

(6) Shows the actual temperature or the failure number.

(7) Heating function is active

(8) Number of failures

(9) Service is performed

(10) No function

(11) Fan blower is manual

(12) Gauge to show the status level of the manual fan blower

4. TINT SETTING

– Press the MENU button (5) less than 2 seconds.
– Select menu item TINT with buttons UP/DN (3) and acknowledge the selection with the MENU button (5).
– Adjust the desired tint by using the buttons +/- (2).
– Press button MENU (5) to finish the set-up.

REMARKS: For more information refer to the separate manual 7'' Digital TFT LCD Color All Round Vision Monitor filed in volume 2 binder.

3.7.3 CONTROL AND FILTER PANEL OF REAR- AND FRONT POWER UNIT

Legend for Fig. 3-155

(Rr.1) Control and filter panel of rear power unit, engine 1

(Fr.2) Control and filter panel of front power unit, engine 2

(1) Change over valve for operation mode of pump control system for rear power unit, engine 1.

(2) Change over valve for operation mode of pump control system for front power unit, engine 2.

(3) Pressure oil filter for fan drive hydraulic motor of coolant radiator for rear engine "1". Filter restriction monitored by differential pressure switch 57B021-1.

(4) Pressure oil filter for pump distributor gear PTO "1" lubricating oil. Filter restriction monitored by differential pressure switch 57B027-1.

(5) Pressure oil filter for fan drive motor of hydraulic oil cooler "1". Filter restriction monitored by differential pressure switch 57B028-1.

(6) Pressure oil filter for pilot- and pump control oil circuit. Filter restriction monitored by differential pressure switch 57B022.

(7) Pressure oil filter for fan drive hydraulic motor of coolant radiator for front engine "2". Filter restriction monitored by differential pressure switch 57B021-2.

(8) Pressure oil filter for pump distributor gear PTO "2" lubricating oil. Filter restriction monitored by differential pressure switch 57B027-2.

(9) Pressure oil filter for fan drive motor of hydraulic oil cooler "2". Filter restriction monitored by differential pressure switch 57B028-2.

3.7.3.1 OPERATION MODES OF PUMP REGULATION SYSTEM

The standard operation mode of the pump control system is the Electronic Operation Mode.
For testing purposes the pump control system can be changed to the hydraulic operation mode. In case of a failure in the electronic control system the hydraulic operation mode can be used to continue operation.

The lever positions for electronic and hydraulic operation mode are marked with corresponding symbols at levers (1) and (2).

Master Turbo Controller MTC - LED Indications (continued)

Legend for Fig. 3-160

(8) SYS field
PWR (Power) LED.

- OFF: No voltage applied
- OFF and red flashing (short flashing in 5 - 10 seconds interval): Voltage applied and key switch on dashboard OFF
- Green light: Voltage applied and key switch on dashboard ON, Controller active.
- Red and Green: Reset condition. Inform Service.

DIAG (Diagnostic) LED.

- OFF: User program not loaded or stopped
- Red: RAM memory fault, user program not started. Inform Service.
- Green: User program loaded and started.
- Green flashing: User program loaded and started. Data communication with on-line connection.

(9) CAN-Node 2 (11K302) Type ICND

(10) CAN-Node 3 (11K303) Type ICNV

(11) CAN-Node 4 (11K304) Type ICNV

(12) CAN-Node 5 (11K305) Type ICNV

3.8.6 COMPONENTS OF ELECTRICAL PREHEATING SYSTEM IN CAB BASE (WHEN EQUIPPED)

⚠ DANGER

HIGH VOLTAGE!

The cab base may contain high voltage electrical appliances which cause serious injury and death.
Access to the cab base for authorized service staff only.
Do not touch cables, their terminals and connected components.
Grounding procedures by electricians, having the authorization for working on high voltage systems must be carried out before entering the high voltage areas.

General

The preheating system is a special equipment and can be installed in the factory or locally at site. Power supply to the preheating system is provided by an external power source.

The following systems are equipped with heaters:

- Engine cooling system
- Engine lubricating system
- Hydraulic system (main and suction oil reservoir)
- PTOs (pump distributor gears)
- Storage batteries

REMARKS: The auxiliary heater unit in the cab base (5), Fig. 3-163 and the battery charger (3) are also connected to the external power supply.

Legend for Fig. 3-163

(1) Main switch board (1X1) for the preheating systems, located in the cab base

(2) Main switch (1Q1) for all system heaters

(3) Battery charger (E55)

(4) Fuse box with circuit breaker 1F76 - 125A for battery charger

(5) Heater unit (1H1) for cab base

(6) Control box for hydraulic oil heating

(7) Switch, hydraulic oil heating ON / OFF

(8) Indicator light green, hydraulic oil heating ON.

(9) Warning light red, heating system failure.

(10) Main switch board (X2)

⚠ WARNING

STARTING THE ENGINE IS HAZARDOUS!

People on or about the excavator may be unaware it is starting, and could be seriously injured as a result. Before starting the engine, make sure that no one will be endangered.

CHECK THE FOLLOWING ITEMS

Legend Fig. 3-168

(1) Engine oil pan dipstick oil level gauge

(2) Oil filler tube for engine oil pan

(3) Coolant expansion tank of front and rear engine radiators

(4) Coolant level sight gauge on front and rear coolant expansion tanks

Walk-around Inspection

Make a ”Walk-around” inspection of the excavator, refer to section 4.10 on page 4-358 in the maintenance Section for the daily inspection items.

Engine oil level of Front and Rear Engine

Check oil level with excavator standing on level ground. Check oil level in engine oil pan with the dipstick oil gauge (1). For accurate readings, the oil level should not be checked until the oil has settled into the oil pan after the engine has been shut down (about 5 minutes).

REMARKS: The oil level in the engine oil pan can vary between the MIN and MAX marking on gauge (1) depending on the operating condition of the reserve system when the engine was stopped.
With sufficient oil in the reserve tank and with the reserve system in proper working order, there is no need to fill the engine oil pan even with the oil level at the MIN mark on gauge (1). If the oil level is below the MIN marking on the gauge, corrective action must be taken. Fill the reserve tank and check the reserve system. The function of each reserve system is monitored by an indicator light located on the "X2" switch board in the cab base. See section "LOW VOLTAGE SWITCH BOARD IN CAB BASE" for more information.

Check the oil level in both engine oil reserve tanks, more information on page 4-323.

Be sure to fill the corresponding reserve tank of rear engine -1- or the reserve tank of front engine -2- when the information message **"Engine oil reserve tank 1 (or 2) empty"** is being displayed on the Komtrax Plus monitor in the operator’s cab.

3.11.1.1 COLD WEATHER STARTING AT AMBIENT TEMPERATURES BELOW –25°C AND TO –40°C

NOTICE

NOTE THE STARTING PROCEDURE IN COLD AREAS!

The reliability of the excavator and equipment will be seriously impaired if the following procedure is not properly carried out. When starting the engine at such extremely low temperatures, it is vital to proceed according to the following start-up procedure. The hydraulic system should be filled with one of the specified hydraulic oils listed on page 4-306, "LUBRICANTS FOR OPERATION IN COLD AND ARCTIC CLIMATES"

1. Record the Outside Ambient Temperature. If it is colder than –40°C, then **DO NOT start the excavator and keep the electrical preheating systems activated.**

2. If the Outside Ambient Temperature is between –40°C and –25°C, then check that the preheating systems are duly energized and that all the Heaters are functioning properly.

3. Let the preheating systems warm the hydraulic oil and the engine coolant up to a temperature of –25°C or warmer. These temperatures are indicated on the health monitor (3). (With Heaters properly functioning, these temperatures should never fall below –25°C).

3.1. If the preheating systems were not energized during the Standstill Period, the warm-up phase may last several hours, depending on the actual ambient temperature the excavator was exposed to, and the length of time the excavator stood still, until the minimum starting temperature of –25°C for the hydraulic oil and engine coolant is reached.

3.2. If the outside ambient temperature is below –40°C, warm up the entire excavator, using any safe means of heat generation such as hot air blower in connection with air-borne parachute, and/or any other appropriate means, before start-up, especially when the excavator has been shutdown for a long period, moreover when the preheating systems were not energized during the standstill period.

4. When the hydraulic oil, for example Shell Tellus S4 VX 32, and the engine coolant have been warmed-up to the minimum starting temperature of –25°C, switch off the engine coolant pre-heating systems. All other heating systems remain active.

REMARKS: If a different hydraulic oil with a different viscosity is in the system, the minimum starting temperature may change. Refer to the "Hydraulic Oil Viscosity and Temperature Chart" on on page 3-223 for the permissible starting temperatures.

5. Start cranking the Engine, up to three times.

6. Once the Engine is started, keep it at low idle speed for five minutes, then shift Engine to high idle speed in order to warm-up the Engine.for a long period, moreover when the preheating systems were not energized during the standstill period

NOTE! If the excavator is equipped with a Two Speed Range travel drive, always use the low speed range when traveling on a slope.
Never go downhill with fast speed range engaged.
The low travel speed range must also be used during cornering.

PARKING BRAKE

The excavator is equipped with spring loaded disk type parking brakes. These brakes engaging and releasing automatically. They are arranged between the hydraulic motors and travel gears. When the motor/engine is running the parking brakes are automatically released by pilot oil pressure. With the motor/engine at standstill the parking brakes are engaged.

3.12.1.1 TRAVEL ALARM / BACK-UP ALARM

(Special equipment)

The excavator can be equipped with one of the above alarm systems. The back-up alarm will sound at reverse travel. The travel alarm will sound at forward and reverse travel.

3.12.2 TRAVELING INSTRUCTIONS

- Never travel the excavator without first making certain that no one will be endangered.
- Be sure to sound the signal horn before starting to drive to make your intention clear.
- Before traveling long distances slew the superstructure parallel to the undercarriage and apply the slew brake.
- When traveling over inclines and gradients raise the working attachment only to such a height, that the bucket has sufficient ground clearance.
- Do not travel crossways to slope.
- Whenever possible operate the excavator with the sprockets to the rear in the direction of travel.
- On steep terrain make sure that the final drives are at the rear in relation to travel direction.
- Before traveling over a bridge find out whether its bearing capacity is sufficient for the operating weight of the excavator.
- Check for sufficient clearance and use a spotter.
- Pay attention to high voltage lines. On rough terrain observe movement of the boom.
- Travel speed must conform to local conditions so that the excavator can be stopped at any time.
- Change traveling direction only after the excavator is stopped.
- In order to avoid damage to track rollers and links, never turn the undercarriage over ditches and troughs.
- When working attachment is removed, the reduced stability of the excavator has to be considered during traveling or slewing and when basic boom is operated. The stability can be improved, when the final drives are positioned opposite to counterweight.
- Observe permissible tilt angle of the Diesel engine when traveling uphill or downhill (superstructure must be in line with the undercarriage). Refer to Engine Operation Manual for the respective data.

3.14 WORKING WITH THE ATTACHMENT

⚠ WARNING

INTERFERENCE TO THE ELECTRONIC CONTROL SYSTEM!

The interference of electromagnetic radiation can cause the excavator to respond in an unexpected manner which could lead to serious injury or death.
In the event of unexpected movement, release all control levers and pedals and strike the emergency shut-down button.

NOTICE

UNEXPECTED CONTROL OF THE EXCAVATOR!

An incorrect control pattern will result in the excavator reacting unexpectedly.
The control pattern shown is set as standard ex-works (Euro). Variations may exist. Please check and confirm if the control pattern is implemented on your excavator.

Backhoe

LH control lever

- A - Extending stick
- B - Retracting stick

RH control lever

- C - Filling bucket (roll back)
- D - Emptying bucket (roll forward)
- E - Lifting boom
- F - Lowering boom

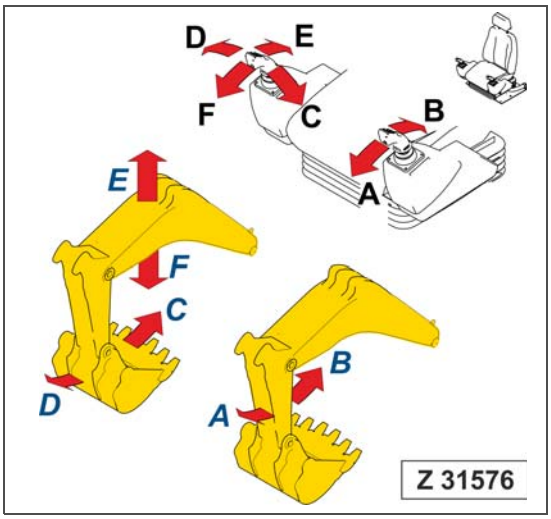

Fig. 3-187

Front shovel

LH control lever

- A - Extending stick
- B - Retracting stick

RH control lever

- C - Emptying bucket (roll back)
- D - Filling bucket (roll forward)
- E - Lifting boom
- F - Lowering boom

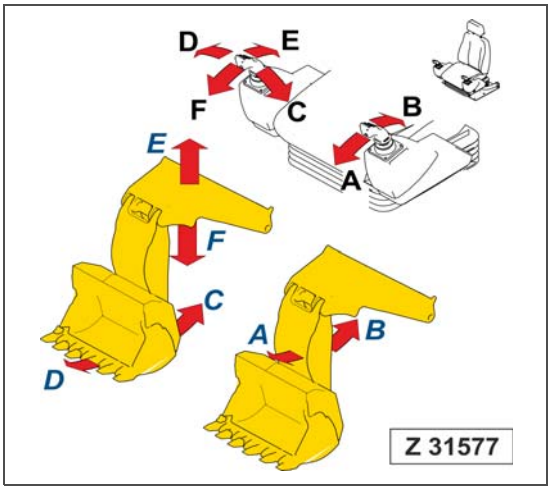

Fig. 3-188

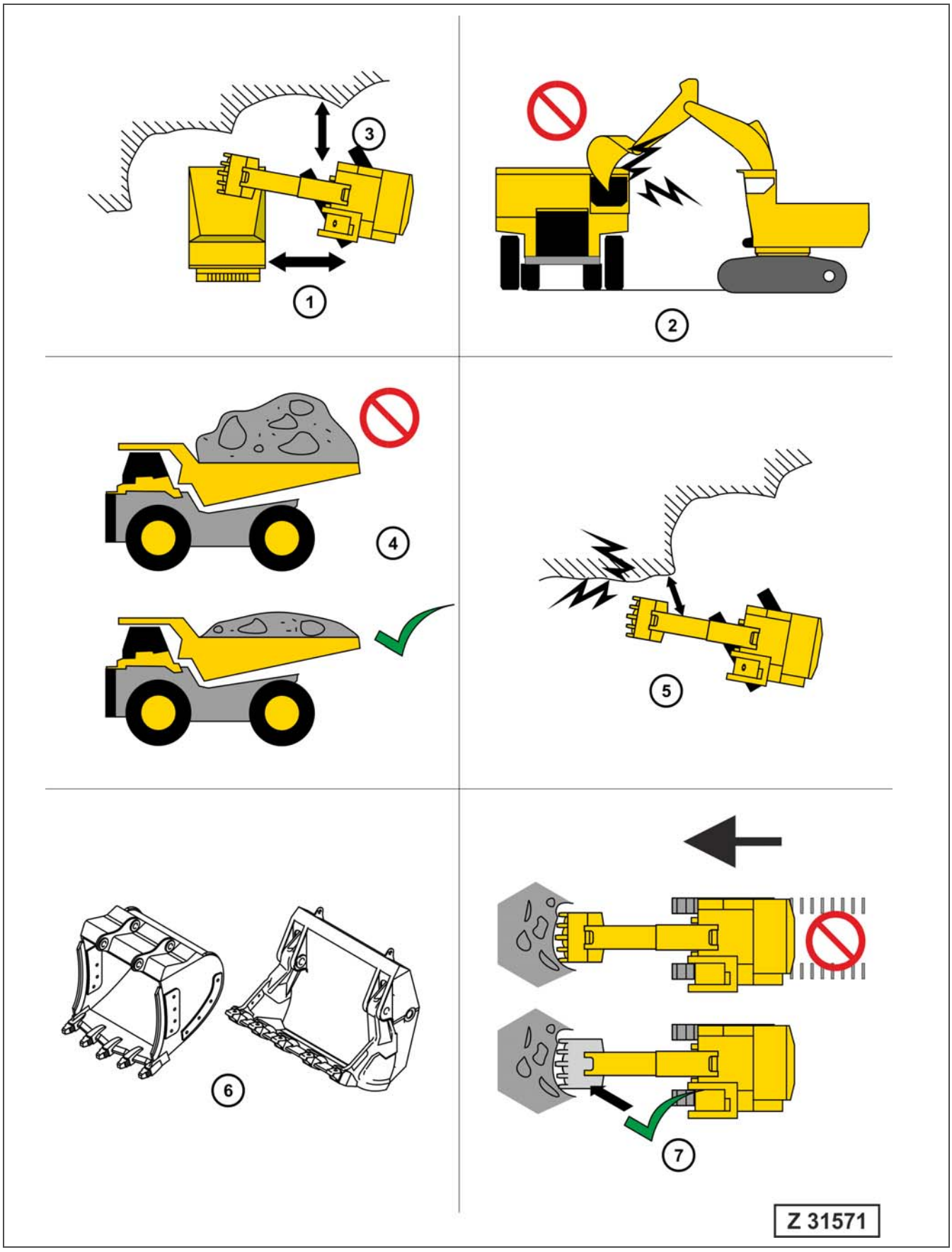

Fig. 3-205

3.18.2.2 SLEW CIRCLE LUBRICATION SYSTEM ”SLS”

Repairs on the slew circle lubrication system with the Engine running or with the Engine OFF and Main Switch Key in ON position

If repairs under the above conditions have been carried out it is necessary to reset the control circuit of the lubrication system by actuating the rotary switch (2), Fig. 3-213 for a full lube cycle.

If this manually actuated lube cycle is not being carried out, the fault message ”LUBE SYSTEM FAILURE” will remain on the health monitor (3).

Resetting of the lube system control circuit can also be done by shutting down the engine and switching OFF the main switch key.

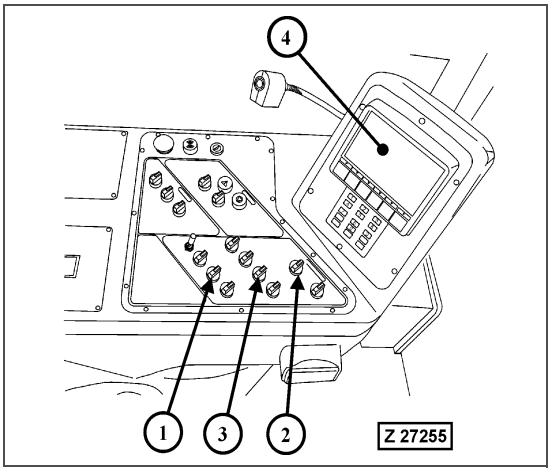

Fig. 3-213

REMARKS: For more information regarding inspection, trouble shooting and maintenance of the lubrication system, refer to the separate manual LUBRICATION SYSTEMS in volume 2 binder.

3.18.2.3 ADJUSTMENTS OF THE SLEW CIRCLELUBRICATION SYSTEM

The following adjustments can be made in the service menu of the Komtrax Plus system, under menu point 4.8.1:

Level 4: Service Menu / Settings 4.8.1

– *PAUSE TIME
– *LUBE CYCLE COUNTER

REMARKS: Refer to Service Manual Komtrax Plus system for description of adjustment procedure.

3.18.2.4 DEFINING THE LUBRICATION SYSTEM GREASING AREAS

.**CLS 1** - Slew bearing, lower bearing of slew gearbox, Lower bearing of boom cylinder

CLS 2 - Attachments pins and bushings.

SLS - Open gear toothing of slew ring.

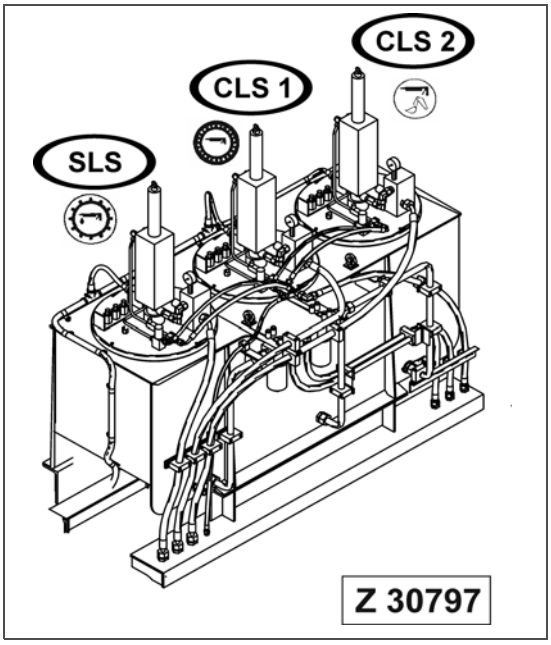

Fig. 3-214

3.19.3 LOCATION OF THE EXTINGUISHING AGENT TANK ASSEMBLIES AND EXPELLANT GAS CARTRIDGES ON POWER HOUSE ROOF

Legend for Fig. 3-219

- A - Components of the dry chemical fire suppression system LT-A-101
- B - Components of the liquid agent fire suppression system LVS
- (1) Extinguishing agent tank assembly of the dry chemical suppression system LT-A-101
- (2) Name plate
- (3) Fill cap
- (4) Extinguishing agent tank assembly of the liquid agent fire suppression system LVS
- (5) Relief valve
- (6) Manual actuator switch at the radiator door
- (7) Manual actuator switch at the rear power house entrance
- (8) From automatic detection system
- (9) Extinguishing agent outlet to nozzle
- (10) Pressure switch for engine shutdown
- (12) Mounting clamp
- (15) Expellant gas Nitrogen cartridge
- (20) Pneumatic actuation line

REMARKS: Check Extinguishing agent tank assemblies (1 and 4) and expellant gas cartridges (15) for good condition and proper mounting.
Check filling level of Extinguishing agent tank assembly (1) of the dry chemical suppression system LT-A-101 according to the instructions in the separate Inspection and Maintenance manual LT-A-101 VEHICLE FIRE SUPPRESSION SYSTEM.
When checking the filling level, make sure the extinguishing powder is not compacted. Stir up the extinguishing powder with a suitable stick until it is in a free flowing condition.

3.21.2 OPERATING THE HYDRAULIC SERVICE ARM

A - Diesel Engines OFF

The Service Arm can only be lowered.

Proceed as follows:

1. Turn main key switch to ON position.
2. Turn enabling switch (1), Fig. 3-224 to ON position ”1”.
3. For lowering the Service Arm (3) pull down chain (2).
4. Release chain (2) when arm (3) is in fully lowered position.

REMARKS: To stop lowering movement of the Service Arm in any position release chain (2).

5. Before leaving the excavator turn enabling switch (1) to OFF position ”0” and remove the main switch key.

B - Diesel Engines running

Control the Service Arm as follows:

1. Turn enabling switch (1 Fig. 3-224) to ON position ”1”.
2. To lower the service arm (3) pull chain (2) and hold until the service arm is in fully lowered position. For reversing moving direction of service arm release the chain (2) to stop service arm movement and then pull chain (2) again.

NOTICE

ENSURE THE UNDERCARRIAGE IS POSITIONED CORRECTLY!
Do not lower the service arm when the superstructure is rotated through 90°.
When lowering the service arm, the superstructure must always be aligned parallel to the tracks.

3. To lift the service arm pull chain (2) and hold until the service arm is completely lifted into its home position.

REMARKS: Be sure the Service Arm is completely lifted to its home position otherwise the proximity sensor in the guide frame of the service arm will not release the pilot control system.

3.22.1 OPERATING THE CRANE

REMARKS: Before operating the crane, check condition and fastening of the crane structure and base.

Read the separate Instruction Manual ”CRANE TYPE HMK 60 Ta1” before operating the Crane. The Crane Instruction Manual is filed in volume 2 Binder.

DO NOT exceed maximum payload of 1000 kg.

DO NOT lift the hook block to the stop.

Carry out inspection and maintenance according to the separate Crane Instruction Manuals.
Check security and tightening torque of all mounting bolts after the first 100 operating hours and thereafter every 1000 operating hours. Refer to the maintenance section for the tightening torque specifications.

Legend for Fig. 3-229:

1 Control panel.

2 Electric – hydraulic power unit

3 Rotating boom

4 Lift boom

5 Hydraulic rope winch

6 Lift boom extensions

7 Load hook

8 Support for lift boom (4) in home position

9 Securing eye for load hook (7) in home position

10 Emergency stop switch for all hydraulic operations of the crane

11 Warning light, if this light comes on the crane has reached 90% of its maximum permissible lifting capacity. This light is used as a pre-warning to indicate a possible overload condition.

12 Indicator light automatic cut-off of the hydraulic winch. Use button (12A) to reactivate winch.

12A Push button. This button is used to override an automatic cut-off of the hydraulic winch. If a minimum of three windings of rope are left on the winch drum, the winch rope cut-off device automatically stops the winch. To reactivate the winch push in the button while simultaneously rewinding the winch rope.

13 Control lever for lift boom extensions EXTEND - RETRACT

14 Control lever for lift boom RAISE - LOWER

15 Control lever for rotating boom SLEW LEFT - SLEW RIGHT

16 Control lever for winch rope UP - DOWN

Excessive oil foaming	– Air in hydraulic system – Poor quality oil – Excessive by-passing of oil over relief valves – Pressure hoses badly twisted or kinked – Restricted oil flow due to foreign matter – Breather on the reservoir clogged. – Relief valve improperly adjusted

3.27.4 FINAL DRIVES AND SLEW GEAR

Noisy operation	– Incorrect lubricant or oil level too low – Bearings scored or damaged. – Sun gear teeth excessively worn or damaged – Bearings of planetary pinions worn

3.27.5 CRAWLER TRACKS

Excessive track wear	– Wrong track tension – Track roller loose or out of alignment – Track shoes loose – Track links stuck – Worn drive sprocket
Excessive wear on drive sprocket	– Wrong track tension – Track links (pins/bores) Excessively worn – Sprocket, rollers and guide wheel out of aligment

4.3 FILLING CAPACITIES

Unit or System	*Liter (approx.)*
Engines	
– Cooling system	
– Front engine	360.0
– Rear engine	360.0
– Engine oil	
– Front engine oil pan	190.0
– Front Engine reserve tank (refill)	580.0 (425.0)
– Rear engine oil pan	190.0
– Rear engine reserve tank (refill)	580.0 (425.0)
– Fuel tank	10800.0
Hydraulics	
– Hydraulic oil reservoir	3600.0
– Total hydraulic system	6600.0
– Main hydraulic pumps, drive shaft housing	1.5
Power take-off	
– Pump distributor gearbox, **type 2063**	95.00
– Pump distributor gearbox, **type 631650**	80.00
– Flexible drive couplings between engine and pump distributor gear, each:	1.45
Swing	
– Swing gears **type 2063**	42
– Motor adapter housing	0.6
– Swing gears **type 632770**	60.0
– Motor adapter housing	0.3 ***1**
– Brake housing	0.3
Travel	
– Travel gearbox, **type 2063**	150.0
– Motor adapter housings	2.0
– Travel gearbox, **type 631053**	120.0
– Motor adapter housings	0.5

4.5.4.7 EVERY 1000 OPERATING HOURS OR 6 MONTHLY

Service Point	Service	See
Critical bolt connections for cabin mounting, for counter-weight and for swing gears (7)	Check for correct tightening torque and security	on page 4-435
Hydraulic system	- Replace return and leakage oil filter elements - Clean or replace pressure filter elements - Clean or replace high pressure filter elements - Replace breather filter elements - Drain sediments	on page 4-447
PTO's (Pump distributor gears) Swing gears and Travel gears	Oil sample analysis	on page 4-461
Hydraulic track tensioning system	Check pressure accumulators	on page 4-463
Engine shutdown switches	Functionality test	on page 4-441
Engine shutdown pull chains (if equipped)	Functionality test	on page 4-443
Electrical equipment	Maintenance	on page 4-445
Cab air cleaner	replace primary filter	on page 4-465
Air cleaners	Inspect and lubricate hinges	on page 4-467
Hydraulic oil cooler doors and machinery house doors	Inspect and lubricate door hinges	on page 4-469
Other hinged areas	Inspect and lubricate	on page 4-471
Engine	Maintenance	(2)
Fire suppression system	Maintenance	(1)
Air conditioning	Inspect the complete system	(3)

4.5.4.8 EVERY 2000 OPEARTING HOURS OR YEARLY

Service Point	Service	See
Hydraulic system	- Change oil **(4)** - Replace suction strainers **(4)** - Replace pulsation damper	on page 4-475
Emergency escape ladder	Inspect for functionality	on page 4-487
Stairway emergency lowering chains	Inspect for functionality	on page 4-489
Hydraulic hoses, attachment	Check	on page 4-491
Preventative Maintenance (PM) Test	Perform test	on page 4-493
Emergency escape from cabin	Check functionality	on page 4-495
Fire detection and actuation system	Maintenance	(1)

4.7.0.2 EXTENDED SERVICE INTERVALS FOR ENGINES WITH ENGINE OIL MANAGEMENT SYSTEM

The reference numbers for Fig. 4-237 are the same as in Fig. 4-236 on the previous pages.

Legend for Fig. 4-237

(4)	Oil filters for the engine oil reserve system
(5)	Connector for suction line from oil filters to pumping unit
(6)	Pumping unit, located at the power frame (13).
(6A)	Radial groove indicates connection point for oil feed back line (9) to reserve tank. (Orientation help when connecting the oil lines after repairs)
(7)	Supply line from pumping unit to crankcase
(8)	Connector for withdrawal oil line from engine oil pan to pump
(9)	Oil feed-back line to reserve tank
(13)	Power frame
(15)	Eliminator filter

4.7.1 MAINTENANCE OF THE ENGINES

All maintenance has to be carried out in accordance with the separate Engine Operation and Maintenance Manual.

4.7.1.1 CLEANING PRACTICES WHEN WORKING ON THE FUEL SYSTEM

NOTICE

CLEANING THE FUEL SYSTEMS!

When servicing any fuel system components which can be exposed to potential contaminants, prior to disassembly, clean the fittings, mounting hardware and the area around the component to be removed. If the surrounding areas are not cleaned, dirt or contaminants can enter the fuel system.

- Electrical contact cleaner can be used if steam cleaner tools are not available. Use electrical contact cleaner rather than compressed air to wash dirt and debris away from fuel system fittings. Diesel fuel on exposed fuel system parts attract airborne contaminants.
- Choose lint-free towels for fuel system work.
- Cap and plug fuel lines, fittings and ports whenever the fuel system is opened. Rust, dirt and paint can enter the fuel system whenever a fuel line or other component is loosened or removed.
- The tools used for fuel system troubleshooting and repair are to be cleaned regularly to avoid contamination. Like fuel system parts, tools that are coated with oil or fuel attract airborne contaminants. Renumber the following points regarding the fuel system tools.
  - Tools are to be kept as clean as possible.
  - Clean and dry the tools before returning them to the tool box.
  - If possible, store the fuel system tools in sealed containers

6. Ensure the tools are clean before use

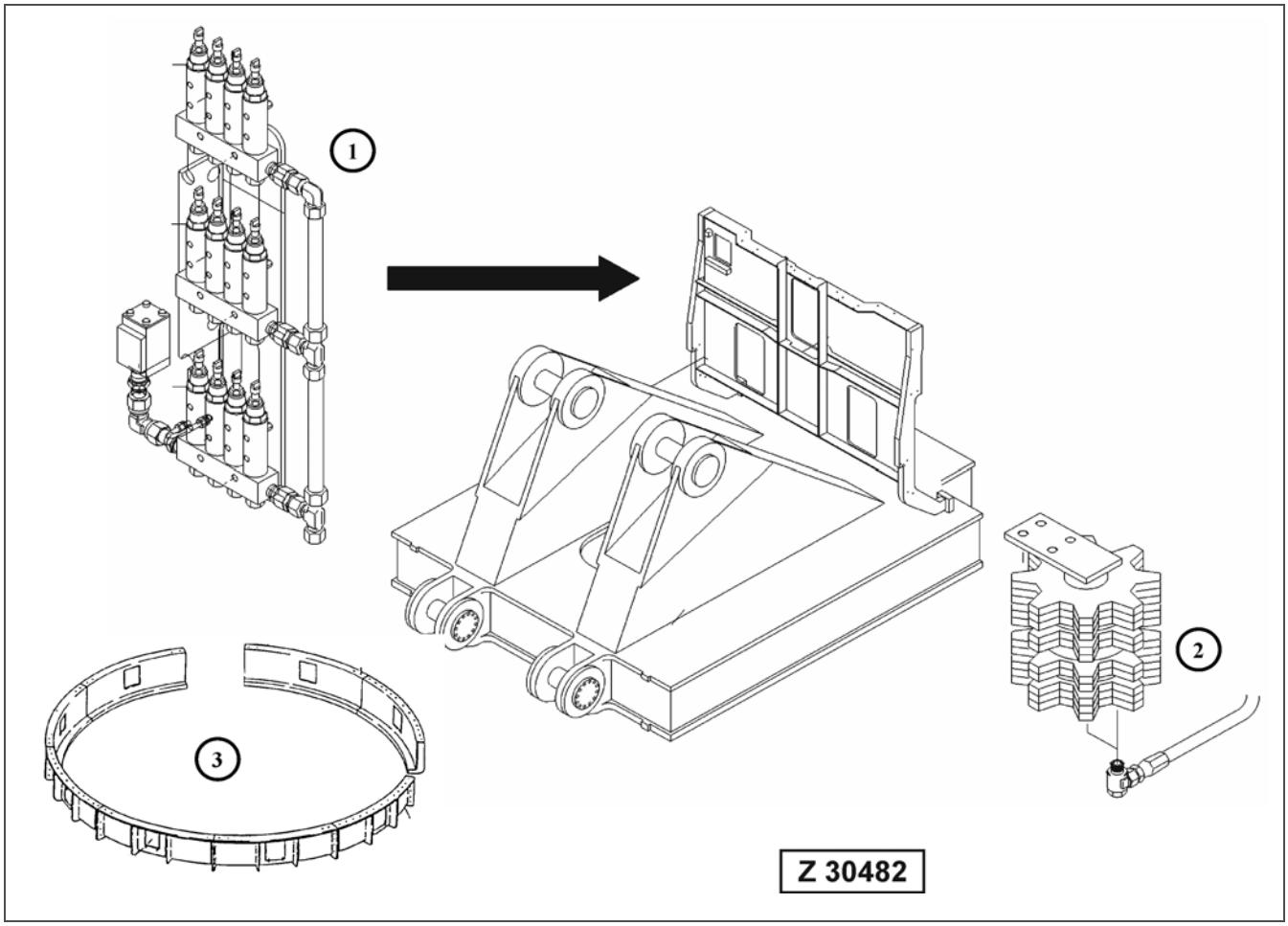

Fig. 4-243

4.8.4 SWING CIRCLE PINION - CHECK GREASE INJECTORS AND GREASE CONNECTIONS

Legend for Fig. 4-243

(1) Mounting plate of grease injectors

(2) Pinion for slew ring

(3) Slew ring guard (if so equipped)

If the excavator is equipped with gear ring guard (3) for the slew ring (see Fig. 4-243), remove covers for gear ring inspection.

More information to inspecting and maintaining the grease injectors is found on page 4-414

4.9.2 FILLING THE HYDRAULIC SYSTEM

Legend for Fig. 4-250

(1) Main hydraulic oil reservoir

(2) Hydraulic oil level sight gauge

(3) Oil level plate

(4) Oil filler plug

1. Make sure main shut-off valve is in open position and all connections are securely tightened.

Select hydraulic oil viscosity grade according to ambient temperatures.
If the new hydraulic oil has a different viscosity grade compared with the drained oil it is necessary to enter the new viscosity grade into the appropriate **"Excavator Components"** group of the Komtrax Plus Menu Control.

2. On excavators equipped with Central Refilling System fill main hydraulic oil reservoir according to section "Central Refilling System" on page 3-274.
   On excavator without central refilling system fill main oil reservoir through opening (4), Fig. 4-250. Depending on type of attachment and the present oil temperature, select the applying oil level range on plate (3). Be sure to use the correct marking on oil level plate (3).

3. Bleed the hydraulic system according to the instructions below.

4.9.2.1 BLEEDING THE HYDRAULIC OIL TANK

Description of hydraulic oil tank bleeding instruction

NOTE! Make sure, that all main pumps and auxiliary pumps are statically bled before carrying out hydraulic oil tank bleeding.

Step 1

1. Start engine and run it on high idle (operating temperature TH3 is reached).
2. Lock lever in lock position.
3. Connect a plastic hose to the return oil chamber breather nipple and lead it to a suitable oil tab.
4. Open the bleeder cock valve
5. Open return oil chamber breather nipple and bleed the system until bubble-free oil is coming out.
6. Close return oil chamber breather nipple and remove plastic hose.

Step 2

1. Start engine and run it on high idle (operating temperature TH3 is reached).
2. Lock lever in lock position.
3. Connect a plastic hose to the return oil filter breather nipple and lead it to a suitable oil tab.
4. Open return oil filter breather nipple and bleed all four return oil filters until bubble-free oil is coming out.
5. Close return oil filter breather nipple and remove plastic hose.
6. Step 3

4.9.6 COLD STARTING AID, REPLACE FLUID CYLINDER

Legend for Fig. 4-255

(1) Air cleaner for rear engine 1

(2) Air cleaner for front engine 2

(3) Cold starting aid mounted on the air cleaner carrier

(4) Electrically operated valve

(5) Mounting clamp

(6) Cold start fluid cylinder

⚠ WARNING

HAZARDOUS FLUID!

Starting fluid is poisonous and flammable and if misused could result in serious injury or death

Do not store replacement cylinders in living areas

Do not smoke while changing cylinders

Use only in well ventilated areas

Use with care to avoid fires

Avoid breathing of vapors or repeated contact with skin

Do not puncture or burn cylinders

Discard cylinders in a safe place

Keep fluid container away from heat, sparks, open flame, or open sunlight. It may explode

Observe instructions on the container

Do not store or use at temperatures above 93° C (200° F)

Air Cleaner Maintenance (continued)

Fig. 4-260

REMARKS: If the fault message "Air cleaner element restricted" is displayed on the Komtrax Plus screen after installation of a new main filter element the safety-filter element has also to be replaced.

If faulty service or a defect has been detected while servicing the main filter element also the safety filter element has to be replaced.

After having the main filter element cleaned three-times or replaced also the safety filter element has to be replaced.

Replacing the safety filter element (7):

1. Remove element in sequence of ref. no. (1 to 7).
2. Cover air intake opening.
3. Install new safety filter element (7).

REMARKS: The safety filter element may not be cleaned and re-used.

4. Remove cover from air intake opening.
5. Install safety and main filter element, take care service indicator (6) is correctly secured by cotter pin (5).

4.10.3.2 GENERAL SERVICE TIPS

The air cleaners should be inspected periodically to maintain maximum engine protection and maximum service life. These inspections should include the following points.

1. Inspect the air transfer duct between the air cleaner and the engine to be sure all clamps are tight, all flange joints are tight, and there are no cracks in the ducting.
2. Air cleaner mounting bolts and clamps must be tight to hold the air cleaner securely.
3. Check the dust cup to make sure it is sealing 360° around the air cleaner body.
4. Automatic dust unloader valve (if so equipped) must be in place, not inverted or damaged, and free from obstruction.

4.11.1 SWING GEARS AND MOTOR ADAPTER HOUSINGS - CHECK OIL LEVELS

REMARKS: The excavator is equipped with the gearbox type 632770 (illustrated) but the gearbox type of 2063 may be used as a replacement. Please check the nameplate and the list for filling capacities on page 4-307

4.11.1.1 SWING GEAR, TYPE 2063

I Front Swing gear

II Rear Swing gear

Legend for Fig. 4-265

Swing gears

(A) Position of oil level gauge for checking the oil levels

(1) Oil level gauge

(2) Oil filler plug

(3) Breather filter

(10) Drain coupling or evacuation nozzles for Wiggins system

Motor Adapter Housing

(4) Oil level gauge and filler opening. This opening can also be used for connecting a suction pump when changing the oil.

(5) Breather filter

(6) Oil drain plug

CHECK SWING GEAR OIL LEVEL

Remove oil level gauge (1), Fig. 4-265 and wipe it clean. Insert the gauge but DO NOT screw in, see detail ”A”. Remove the gauge. The oil level should be at the upper mark of gauge (1). If necessary add the specified gear oil through filler opening (2).
Remove breather filter (3). Blow out with compressed air from inside to outside and reinstall.

CHECK MOTOR ADAPTER HOUSING OIL LEVEL

Remove oil level gauge (4) and wipe it clean. Insert the gauge but DO NOT screw in, see detail ”A”. Remove the gauge. The oil level should be at the upper mark of gauge (4). If necessary add the specified oil through filler opening (4).
Remove breather filter (5). Blow out with compressed air from inside to outside and reinstall.

4.11.3 PTOS (PUMP DISTRIBUTOR GEARS) AND OIL RESERVOIR - CHECK OIL LEVEL

REMARKS: The excavator is equipped with the gearbox type 631650 (illustrated) but the gearbox type of 2063 may be used as a replacement. Please check the nameplate and the list for filling capacities on page 4-307

Legend for Fig. 4-270

(1) Oil level gauge

(2) Oil filler plug

(3) Breather filter

(4) Oil drain plug

(5) Adapter housings for main hydraulic pumps

(6) Breather filter for main hydraulic pumps

(7) Oil level plug for main hydraulic pumps

(8) Oil drain plugs for main hydraulic pumps

(9) Breather filter for fan pumps

(10) Oil level plug for fan pumps

(11) Oil drain plug for fan pumps

4.11.3.1 PUMP DISTRIBUTOR GEARS, CHECK OIL LEVEL:

NOTICE

DIPSTICK!

Checking of the oil level in both PTO gears must be carried out at the scheduled intervals, also on excavators equipped with an oil loss sensor. This sensor does not monitor the oil level but shuts down the excavator. Extract the level gauge (1) and wipe it clean.

1. Remove level gauge (1), wipe it clean and reinsert. Remove again and read the oil level. The oil level should be between the “MIN” and “MAX” mark. If necessary, add oil through filler opening (2) up to the “MAX” mark on gauge (1).

REMARKS: If the oil level is above the “MAX” mark, drain the oil down until the oil level is at the “MAX” mark. Too much oil in the pump distributor gear will cause aeration of the oil.

2. Insert gauge (1). Remove breather filter (3) to inspect, clean or replace.

4.12.2 SIGNAL HORN COMPRESSOR - LUBRICATE

The compressor (1, Fig. 4-275) is located in the cab base.
Fill several drops of thin oil into the lubricator (2).
The oil must be free from resin and acid and must have the lowest solidifying-point possible (below - 40° C).

If the fins of the collector are very strongly blackened or coated with verdigris, clean them with emery cloth.

REMARKS: If the excavator is equipped with a second signal horn there is also a second compressor which has to be lubricated in the same way as the first one.

4.12.3 HYDRAULIC OIL COOLER FAN BEARINGS - CHECK FOR LEAKAGE AND CLEAN BREATHER FILTER

This bearing is maintenance free, however the fan motor (3 on Fig. 4-275) should be checked for leakage.

4.12.4 RADIATOR FAN BEARINGS - CHECK FOR LEAKAGE AND CLEAN BREATHER FILTER

Check housing (4 on Fig. 4-275) for leakage. If leakage is found, check the oil level in the bearing housing. Remove oil level plug (5). The oil level should be at lower edge of the opening. If necessary add oil through the breather filter adapter pipe. Clean breather filter (6) with compressed air from inside to outside and install plug (5) and breather filter (6). Oil loss of the bearing housing indicates worn or damaged seal rings. To prevent damage to the fan bearings, install new seal rings.

4.12.9 CABIN HEATER FILTER - INSPECT

NOTICE

FIRE RISK!

Blocking the heater louvers may result in fire.
Do not place any garments, pieces of fabric, etc, in front of the intake or outtake of the heating system or of heated air.

The illustration shows the outlet to the cab heater which is located underneath the operator's seat.

Legend for Fig. 4-280

(1) Rear of operator's seat

(2) Location of cabin heater filter

(3) Cover

(4) Bolts

1. Unscrew the 4 bolts (3) and remove cover (4).
2. Remove and inspect filter element (2).
3. If any rupture, holes or excess dirt are discovered, replace the element.

REMARKS: The filter must be changed after 3000 operating hours, regardless of condition.

4. If the element is usable, clean with compressed air from inside to outside and re-install.
5. Re-install cover (4).

4.13.3 CYLINDER ROD PROTECTION (IF EQUIPPED), INSPECT

Legend for Fig. 4-287

(1) Gap between stop plate and U-profile

(2) U-profile

(3) Stop plate

(4) Sliding stones

(5) Position of contracted cylinder rod

(6) Sliding block retaining screws

(7) Stop plate retaining screw

(8) Bolt

(9) Split pin

If the gap (1) between the U-profile (2) and the stop plate (3) is smaller than 1mm, the sliding blocks (4) have too much wear and must be exchanged.The wear that is shown by looking at the gap (1) can depend on which cylinder, and therefore in which position the cylinder rod protection is (bucket cylinder on back hoe excavators for example, or boom cylinders on front shovel excavators).

See “CYLINDER ROD PROTECTION (IF EQUIPPED), CHANGE SLIDING BLOCKS” on page 351 for full information.

4.13.6 GROUND CABLES OF ENGINE AND ALTERNATOR - CHECK FOR CORRECT CONNECTION

Legend for Fig. 4-292

(A) Alternator seen from below

(B) RH member of engine carrier frame

(1) Ground strap from engine to the ground terminal of alternator (A)

(2) Ground cable from alternator (A) to RH member of engine carrier frame (B)

(3) Identification plate (GND) for ground cables

Check ground cables

1. Remove both battery main switch keys.
2. Check ground strap (1) and ground cable (2) on both engines for good condition and secure fastening.

⚠ WARNING

DAMAGED CABLES ARE HAZARDOUS!

Loose or missing ground cables can cause fire, resulting in serious injury or death.
Be sure to replace a worn or damaged cable or fastening part without delay.

Critical Bolt Connections (continued)

4.14.1.2 CHECK TIGHTENING TORQUE OF THE COUNTERWEIGHT MOUNTING BOLTS,

Fig. 4-297

Reference No.:	*Bolt size mm*	*Grade*	*SW * mm*	*Tightening torque Nm*	*Qty.*
(3) Mounting bolts	M48	10.9	75	7500	20

* SW = Wrench size

Re-tighten mounting bolts to their correct torque and replace missing or damaged bolts.

Guideline for transportation and lifting of the counterweight Fig. 4-297

(1) A1 and A2 fastening points for vertical transport and for raising up of the counterweight with two symmetrical ropes

(2) A1, A2 and A3 fastening points for horizontal transport and for loading of the counterweight with three symmetrical ropes

⚠ WARNING

RISK OF EXPLOSION!

The chambers of the counterweight are filled with a mixture of concrete, granulated ore and steel pellets. This mixture can create explosive gases which will accumulate in the chambers of the counterweight. Before any welding, flame-cutting, grinding or drilling procedures are carried out on the counterweight it is vital to expel these gases from the counterweight chambers. Failure to properly expel the gases from the counterweight chambers can result in an explosion with serious personal injury or death.

4.14.5 HYDRAULIC SYSTEM - FILTER SERVICE

Legend for Fig. 4-302

R	Return oil filter location
L	Leakage oil filter location
(1)	Mounting bolt
(2)	Filter cover retainer
(3)	Filter cover assy
(4)	Return- and leakage filter unit
(5)	Oil filler plug
(6)	Back-pressure valve
(7)	Breather filter
(8)	Cover
(9)	Gasket

REMARKS: The description of the hydraulic filters appears in the following sequence:

- Return- and Leakage oil filters, more information on page 4-449
- Breather filter, more information on page 4-451
- High pressure filters, more information on page 4-453
- Pressure filters on central control and filter frame, more information on page 4-457

FILTER SERVICE (continued)

Clean or replace filter elements of the hydraulic oil pressure filters

NOTICE

INSPECT FILTERS!

When a fault message "Pressure Filter restricted" is displayed, stop work and clean or replace element of the corresponding pressure filter.

Legend for Fig. 4-307

(Rr.1)	Control and filter panel of rear power unit, engine 1
(Fr.2)	Control and filter panel of front power unit, engine 2
(1)	Change over valve for operation mode of pump control system for rear power unit, engine 1.
(2)	Change over valve for operation mode of pump control system for front power unit, engine 2.
(3)	Pressure oil filter for fan drive hydraulic motor of coolant radiator for rear engine "1". Filter restriction monitored by differential pressure switch 57B021-1.
(4)	Pressure oil filter for pump distributor gear PTO "1" lubricating oil. Filter restriction monitored by differential pressure switch 57B027-1.
(5)	Pressure oil filter for fan drive motor of hydraulic oil cooler "1". Filter restriction monitored by differential pressure switch 57B028-1.
(6)	Pressure oil filter for pilot- and pump control oil circuit. Filter restriction monitored by differential pressure switch 57B022.
(7)	Pressure oil filter for fan drive hydraulic motor of coolant radiator for front engine "2". Filter restriction monitored by differential pressure switch 57B021-2.
(8)	Pressure oil filter for pump distributor gear PTO "2" lubricating oil. Filter restriction monitored by differential pressure switch 57B027-2.
(9)	Pressure oil filter for fan drive motor of hydraulic oil cooler "2". Filter restriction monitored by differential pressure switch 57B028-2.

REMARKS: The pressure filters (4 and 8) for PTO gear lubrication can not be cleaned. These elements must be replaced.

4.14.9 ENGINE AIR CLEANERS- INSPECT AND LUBRICATE HINGES

Legend for Fig. 4-312

(1) Air cleaner on roof

(2) Flaps to remove dirt/dust from the air cleaners

(3) Hinges (with greasing nipple)

– Ensure there is safe access to the hydraulic air cleaners (1) on roof.

– Check all hinges (3) for good condition and proper fastening to their flaps (2). If cracks or distortion at the weld area of the hinges (3) are found corrective action must be taken. DO NOT try to open the flaps (2) before the damage has been repaired.

– Lubricate all flaps (2) by attaching a grease gun to the grease fittings on the hinges (3). Grease will be pumped through the grease nipples into the hinges (3).

– Check to make sure that the hinges (3) are properly secured.

4.15.1.1 HYDRAULIC SYSTEM - CHANGE PULSATION DAMPER (continued)

Legend for Fig. 4-317

(1) Return oil collector manifold

(2) Drain coupling

(3) Pulsation damper

(4) Return oil collector pipe

(5) Main control valves

(6) Swing control valve

REMARKS: Remove pulsation damper (3) and install new pulsation damper with new O-ring.

4.15.3 EMERGENCY ESCAPE LADDERS - INSPECTION

Legend for Fig. 4-322

(1) LH side window, serves for emergency exit from operator's cab.
Use the emergency escape hammer located next to the window inside the cab for breaking the window glass. More information on page 3-129 for location of the emergency escape hammer.

⚠ CAUTION

BEWARE OF GLASS!
Broken glass can cause injuries.
When escaping, remove the broken pieces of the glass from the sash so that you will not cut yourself with them. Take care not to slip on the broken and scattered pieces.

REMARKS: If the operator's cab is equipped with external metal sun visors, disengage the four catches and push out the sun visor panel.

(2) Emergency escape from operator's cab

(3) Emergency escape from roof area on the machinery house

If any damage or bad condition is found replace the parts concerned without delay, including the ladder dampening system.

4.16.1 SWING GEARS AND MOTOR ADAPTER HOUSING - CHANGE OIL

REMARKS: The excavator is equipped with the gearbox type 632770 (illustrated) but the gearbox type of 2063 may be used as a replacement. Please check the nameplate and the list for filling capacities on page 4-307

4.16.1.1 SWING GEAR, TYPE 2063

Legend for Fig. 4-327

Swing gears

(A) Position of oil level gauge for checking the oil levels

(1) Oil level gauge

(2) Oil filler plug

(3) Breather filter

(10) Drain couplings or evacuation nozzles for refuelling system

Motor Adapter Housing

(4) Oil level gauge and filler opening. This opening can also be used for connecting a suction pump when changing the oil.

(5) Breather filter

(6) Oil drain plug

Swing Gears, change oil:

1. Use adequate working platform for draining the oil. Place receptacles of sufficient capacity (approx. 100 liter) below drain couplings (10). Attach drain hose (part of tool set) to drain coupling (10). Remove parts (1, 2 and 3) to speed up draining. On swing gears with evacuation nozzle (10), use the Wiggins system for changing the oil.
2. Clean breather filter (3) with compressed air from inside to outside and re-install.
3. After the oil is completely drained, flush the gear with the regular gear oil.
4. Remove drain hose from coupling (10) and attach the protection cap onto the drain coupling.
5. Fill gear housing through filler opening (2) up to the "MAX" mark on level gauge (1) with fresh oil and re-install plug (2).

REMARKS: For checking the oil level insert the level gauge (1) but DO NOT screw in, see detail (A).

6. After short operating period check oil level and housings for leaks.

TRAVEL GEARS - CHANGE OIL

Fig. 4-332

REMARKS: The breather filters for the travel gears are mounted inside the center frame and connected with extension hoses.

1. Remove drain plugs (4), filler plug (3) and oil level gauge (2A) or (2B). Check breather filter, mounted inside center frame, and clean as necessary.
2. After the oil is completely drained, flush the gear with the regular gear oil and reinstall drain plugs (4).
3. Fill the gear with fresh oil through filler opening (3) up to the "MAX" mark on oil level gauge (2A) or (2B).
4. Install filler plug (3) and gauge (2A) or (2B) and tighten securely.
5. After short operating period check gears for leakage.

MOTOR ADAPTER HOUSINGS - CHANGE OIL

1. Remove parts (8, 9 and 10) and drain the oil completely.
2. Check breather filter, mounted inside center frame, and clean as necessary.
3. Install drain plug (10) and fill-up oil to level opening (8). Reconnect breather filter hose line to filler opening (9).

FINAL DRIVE HOUSINGS - CHANGE OIL

1. Remove drain plug (15), filler plug (14) and oil level gauge (13) and drain the lubricating oil.
2. Check breather filter mounted inside center frame, and clean as necessary.
3. After the oil is completely drained, install the cleaned drain plug (15) and tighten securely.
4. Fill in new oil up to the “MAX” marking on oil level gage (13).
5. Clean filler plug (14) and reinstall.
6. Insert oil level gauge (13) and tighten securely.
7. After short operating period check oil level and gear for leakage.

Critical Bolt Connections (continued)

Check fastening and condition of railings (A, B, C, D and E), Fig. 4-336

Reference No.:	***Bolt size mm***	***Grade***	***SW * mm***	***Tightening torque Nm***
(1)	M12	8.8	19	74
(2)	M12	8.8	19	74
(3)	M10	8.8	17	43

* SW = Wrench size

REMARKS: Detail (C) shows the bracket for attaching the emergency escape ladder (storage position).

Re-tighten mounting bolts to their correct torque and replace missing or damaged bolts.

Critical Bolt Connections (continued)

Check fastening of power house frame (01) to superstructure main frame, Fig. 4-341

Reference No.:	***Bolt size mm***	***Grade***	***SW * mm***	***Tightening torque Nm***	***Qty.***
(02)	M30	10.9	46	1770	28
(03)				Washer	28

* SW = Wrench size

Re-tighten mounting bolts to their correct torque and replace missing or damaged bolts.

Critical Bolt Connections (continued)

Check mounting and security of each diesel engine and pump distributor gear, Fig. 4-346

– Check all flexible bearings (1) for engine and pump distributor gear.
  – Check the flexible bearings for damage and signs of fatigue. Make sure that there is no contact between the upper and lower metal brackets of the flexible bearings (1). Replace the bearings if necessary.
  After new flexible bearings have been installed, check distance (A) on both torque supports.

REMARKS: All flexible bearings (1) and all rubber-bounded metal bars (4) should be replaced during engine overhaul.

– Check distance (A) between torque support and stop bolt (5).
  – With setting of the flexible engine bearings (1) the distance (A) increases and must be adjusted. To do this, loosen lock nut (7) and tighten stop bolt (5) until the correct distance (A) is obtained. Tighten lock nut (7) and recheck distance (A).
  If new flexible engine bearings (1) have been installed, replace also cup springs (6) and adjust distance (A) to 29 mm.
– Check tie bolts (2) on front and rear carrier units for looseness.
  – Check to make sure that the self locking retainer nuts (3) are tight and that there is no gap between nut and rubber-bounded metal bar (4).
  If necessary re-tighten retainer nuts (3) snugly.
  Check rubber-bounded metal bars (4) for signs of fatigue and damage.
  Replace as necessary.
– Check all bolt connections for correct tightening torque.

Check condition of engine carrier and brackets. If any damages, failures or wrong condition are found, corrective action must be taken.

Critical Bolt Connections (continued)

Crawler Carrier (and sliders for cold regions if they are fitted as an option)

Check condition and fastening of guide wheels (01), stop plates (03) and rollers (06 and 09), Fig. 4-351.

This interval also applies to sliders for cold regions if they are fitted as an option instead of the carrier rollers (06).

Legend for Fig. 4-351:

(01)	Guide wheel
(02)	Hydraulic track tensioning cylinders
(03)	Stop plates for guide wheel sliding blocks
(06)	Support rollers
(09)	Bottom rollers

4.17.3 CHECKING THE STEEL STRUCTURES

Legend for Fig. 4-356

1	Superstructure
2	Boom
7	Sick
8	Car body
9	Bucket

All the steel structures on the excavator are to be checked for signs of metal fatigue and cracks.

REMARKS: Contact your local Komatsu distributor for further information.