

Operation & Maintenance Manual

GALEO

PC16R-2

HYDRAULIC EXCAVATOR

SERIAL NUMBER

PC16R-2 F00003 and up



WARNING

Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read this manual before operating or maintaining this machine.

This manual should be kept inside the cab for reference and periodically reviewed by all personnel who will come into contact with the machine.

KOMATSU
Utility

1.1 FOREWORD

- This manual has been compiled by Komatsu Utility S.p.A. in order to supply customers with all the necessary information on the machine and on safety regulations, as well as the use and maintenance instructions that enable the operator to exploit the capacity of the machine with optimal results and to keep the machine efficient over time.
- The operation manual, together with the spare parts catalogue, is an integral part of the machine and must accompany it, even when it is resold, until its final disposal.
- The manual must be handled with the greatest care and always kept on board the machine, so that it can be consulted at any moment; it must be placed in the appropriate compartment inside the seat support, where the registration documents and the logbook are usually kept.
- This manual must be given to the staff who have to use the machine and carry out the routine maintenance operations; they must read the contents carefully more than once, in such a way as to clearly understand what are the correct operating conditions and the dangerous conditions that must be avoided.
In case of loss or damage, request a new copy to Komatsu or your Komatsu Dealer.
- The illustrations contained in this manual may represent machine configurations available on request.
Komatsu machines are constantly improved in order to increase their efficiency and reliability; this manual sums up all the information regarding the most recent technology applied at the moment in which the machine is launched.
For any further and/or updated information, contact your Komatsu Dealer.
- Punctual periodic annotations regarding the maintenance operations that have been carried out are important, since they provide a clear report on the situation and say exactly what has been done and what has to be done after the next maintenance interval. Therefore, it is advisable to consult both the hour meter and the maintenance plan frequently.
- Over the years Komatsu Dealers have gathered considerable experience in customer service.
If more information is needed, do not hesitate to contact your Komatsu Dealer: he always knows how to get the best performance from the machine, he can recommend the equipment that is most suitable for specific needs and can provide the technical assistance necessary for any change that may be required to conform the machine to the safety standards and traffic rules.
Furthermore, Komatsu Dealers also offer assistance for the supply of Komatsu genuine spare parts, which guarantee safety and interchangeability.
- The table included in this manual must be filled in with the machine data, which are also the data that must be communicated to the Dealer when requiring assistance and ordering spare parts.

CAUTION

- **The incorrect use of the machine and inappropriate maintenance operations may cause serious injury and even death.**
 - **Operators and maintenance personnel must carefully read this manual before using the machine or performing maintenance operations.**
 - **Any serious accident that may occur during the use of the machine or during maintenance operations is due to failure to comply with the instructions given herein.**
 - **The application of the procedures and precautions described in this manual will ensure safety only provided that the machine is used correctly.**
If the machine is used for any purpose or in any way other than those described herein, the operator shall be responsible for his own safety and for the safety of any other person involved.
-

1.2 INFORMATION ON SAFETY

Many accidents are caused by insufficient knowledge of and failure to comply with the safety regulations prescribed for the maintenance operations that must be performed on the machine.

In order to avoid accidents, before starting work and before carrying out any maintenance operation, carefully read and be sure to understand all the information and warnings contained in this manual and given on the plates applied onto the machine. To enable the operator to use this machine safely, safety precautions are explained in this manual and labels and warning plates are affixed to the machine to highlight situations involving potential hazards and suggest how to avoid them.

Terminology used in the signs

The following words are used in the signs to inform the user that there is a potential hazard that may lead to personal injury or damage to property.

In this manual, on the labels and on the plates, the following words are used to express the potential level of the hazard.

DANGER

- Indicates a situation of imminent danger that, if not avoided, may cause serious injury and even death. The use of this term must be limited to situations of extreme danger.
-

WARNING

- Indicates a situation of potential danger that, if not avoided, may cause serious injury and even death.
-

CAUTION

- Indicates a situation of potential danger that, if not avoided, may cause moderate injury. This term can also be used as a warning against dangerous interventions.
-

Other terms used in the signs

In addition to those indicated above, the following warning terms are used to recommend the precautions to be taken to protect the machine or to supply useful information.

IMPORTANT

- This term is used to indicate precautions that must be taken in order to avoid actions that may shorten the life of the machine.

NOTE

- This word is used to indicate a useful piece of information.

Komatsu cannot reasonably predict every circumstance that might involve a potential hazard during the operation or maintenance of the machine; for this reason, the safety warnings included in this manual and applied onto the machine may not include all possible safety precautions.

If all the instructions given in relation to this machine are kept to, the operators and anyone in the vicinity can work in total safety, and do not run the risk of damaging the machine. In case of doubt regarding the safety measures necessary for some procedures, contact Komatsu or your local Komatsu Dealer.

 DANGER

- Before starting any maintenance operation, position the machine on a firm and level surface, lower the equipment to the ground, engage the safety locks of the equipment and the controls, and stop the engine.
-

 DANGER

- To make the information clearer, some illustrations in this manual represent the machine without safety guards. Do not use the machine without guards and do not start the engine when the hood is open, unless this is expressly prescribed for certain maintenance operations.
-

 WARNING

- It is strictly forbidden to modify the setting of the hydraulic system safety valves; Komatsu cannot be held liable for any damage to persons, property or the machine, if this has been tampered with by modifying the standard settings of the hydraulic system.
-

 WARNING

- Before carrying out any electric welding, disconnect the battery and the alternator. (See "2.8.13 PRECAUTIONS TO BE TAKEN WHEN HANDLING THE BATTERY AND THE ALTERNATOR").
-

 WARNING

- Install only authorized optional equipment (see "6.1 AUTHORIZED OPTIONAL EQUIPMENT").
-

 DANGER

- It is absolutely forbidden to operate the machine while standing on the ground.
Every single manoeuvre must be carried out by the operator, correctly seated in driving position.
-

1.3 INTRODUCTION

1.3.1 INTENDED USE OF THE MACHINE

The Komatsu machines described in this manual have been designed and constructed to be used mainly for EXCAVATION and EARTH-MOVING OPERATIONS.

If provided with suitable safety devices, they can be used with authorized optional equipment having the characteristics illustrated in paragraph "6.1 AUTHORIZED OPTIONAL EQUIPMENT".

1.3.2 IMPROPER OR UNAUTHORIZED USES

CAUTION

- This paragraph describes some of the improper or unauthorized uses of the machine; since it is impossible to predict all the possible improper uses, if it is necessary to use the machine for particular applications, contact your Komatsu Dealer before carrying out the work.

IMPORTANT

- The instructions regarding the authorized optional equipment are given in the relevant operation and maintenance manuals; if the equipment is supplied by Komatsu, these publications are enclosed to this manual.
- The instructions regarding the assembly of the authorized equipment, the controls requiring special arrangements on the machine and the hydraulic couplings necessary for the operation of such equipment are grouped in the final section of this manual.

Komatsu machines are constructed exclusively for the handling, excavation and treatment of inert materials; therefore, the following uses are absolutely forbidden:

- USE OF THE MACHINE BY MINORS OR INEXPERIENCED PERSONS.
- USE OF THE MACHINE FOR LIFTING PERSONS OR OBJECTS.
- TRANSPORT OF CONTAINERS WITH FLAMMABLE OR DANGEROUS FLUIDS.
- USE OF THE BUCKET FOR DRIVING OR EXTRACTING PILES.
- USE OF THE MACHINE FOR TOWING DAMAGED VEHICLES.

1.3.3 MAIN CHARACTERISTICS

- Simple and easy operation.
- Hydrostatic transmission obtained through two axial piston motors that operate epicyclic reduction gears.
- Rotation of the turret achieved by means of an axial piston hydraulic motor acting on an epicyclic reduction gear.
- Main equipment controlled through servo levers ensuring also combined movements that can be modulated proportionally and continually.
- Boom swing and optional equipment operated through foot pedal controls.
- Travel and blade operated through levers.
- Travel speed selection push button.
- Hydraulic track gauge adjustment (optional).
- Complete series of instruments visible from the operating position.
- Lever accelerator.
- Easy maintenance with simplified intervals.

1.3.4 RUNNING-IN

Every machine is scrupulously adjusted and tested before delivery.

A new machine, however, must be used carefully for the first 100 hours, in order to ensure proper running-in of the various components.

If the machine is subjected to excessive work load at the beginning of operation, its potential productivity and its functionality will be shortly and untimely reduced.

Every new machine must be used carefully, paying special attention to the following instructions:

- After the start, let the engine idle for 5 minutes, in such a way as to warm it up gradually before actual operation.
- Avoid operating the machine with the limit loads allowed or at high speed.
- Avoid abrupt starts or accelerations, useless sudden decelerations and abrupt reversals.

SYNTHETIC BIODEGRADABLE OIL TYPE HEES

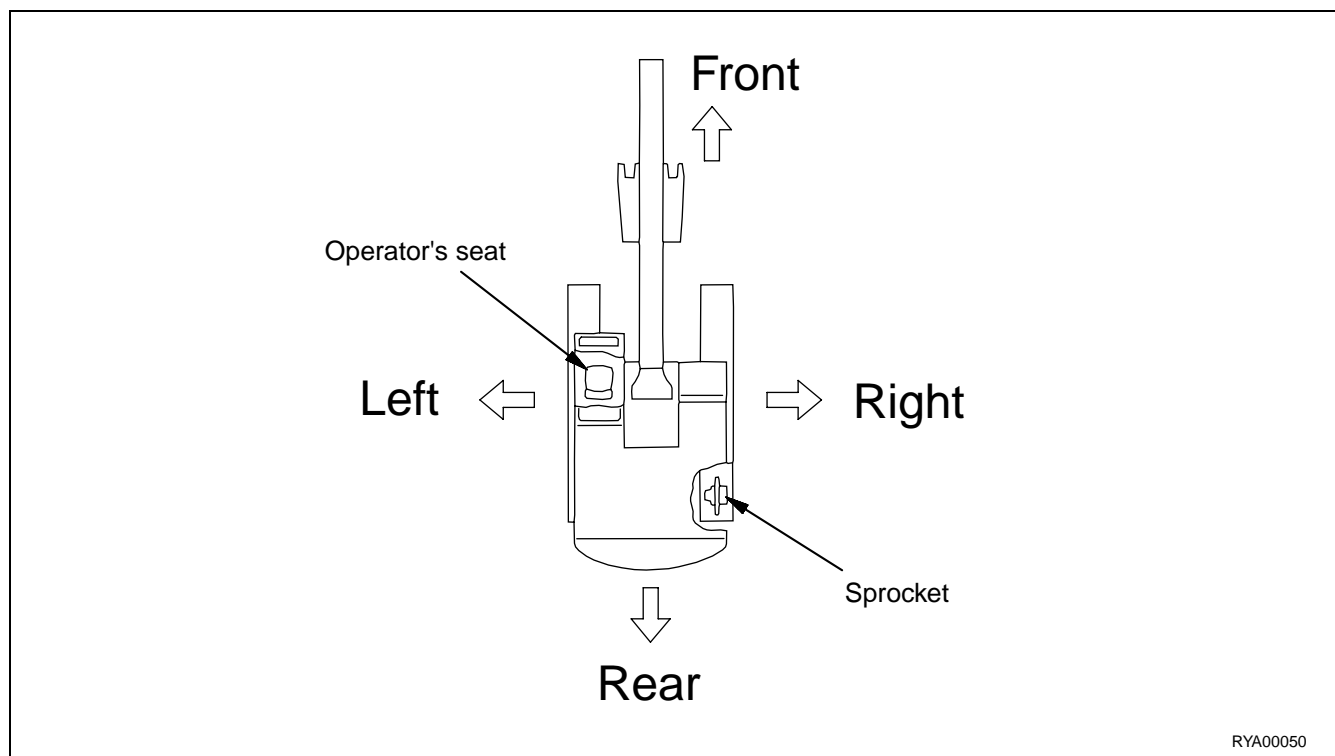
For machines in which synthetic biodegradable oil type HEES is used, perform the following operations in addition to the standard maintenance operations:

- After the first 50 hours of operation, change the hydraulic circuit drain filter.
- After the first 500 hours of operation, change the hydraulic circuit oil.

IMPORTANT

- **When changing the oil filters (cartridges), check their inner part to make sure that there are no deposits. If considerable deposits are observed, find out what may have caused them before starting the machine.**
- **The number of operating hours is indicated by the hour meter.**

1.3.5 POSITIONS AND DIRECTIONS OF THE MACHINE



In this manual, the terms front/forward, rear/backward, left, and right refer to the travel direction as seen from the operator seat when it is facing the front and the sprocket is at the rear of the machine.

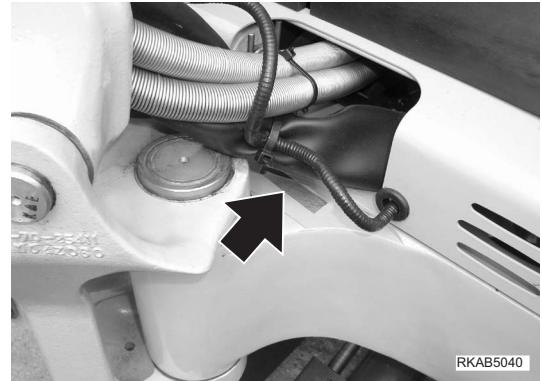
1.4 PRODUCT IDENTIFICATION

The Komatsu excavator and its main components are identified by serial numbers stamped on the identification plates.

The serial number and the identification numbers of the components are the only numbers that must be communicated to the Dealer when requiring assistance and ordering spare parts.

1.4.1 MACHINE SERIAL NUMBER

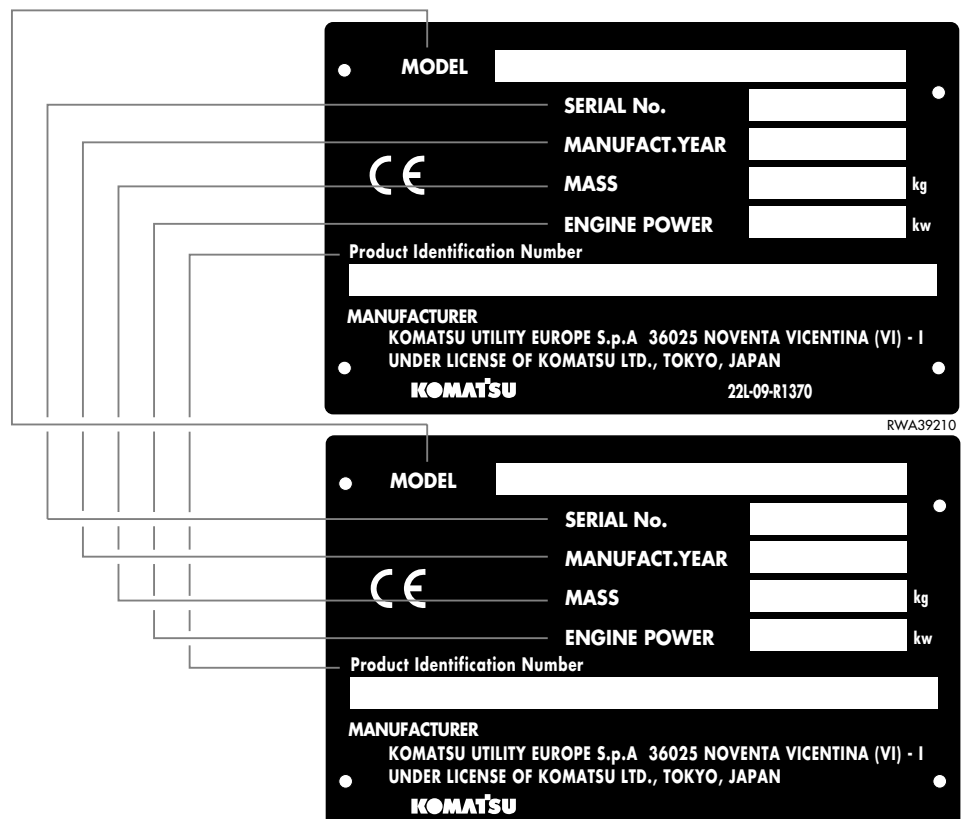
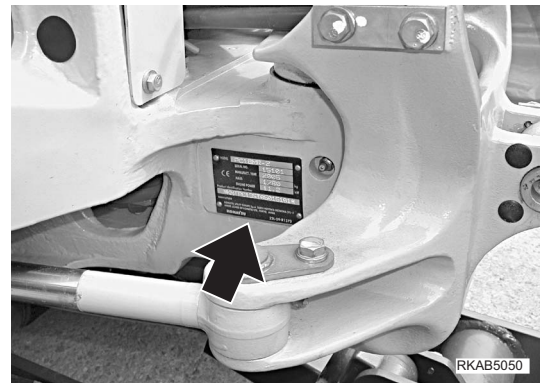
The machine serial number is stamped on the front upper part of the main frame, on the left side.



1.4.2 MACHINE IDENTIFICATION PLATE AND PRODUCT IDENTIFICATION NUMBER (PIN)

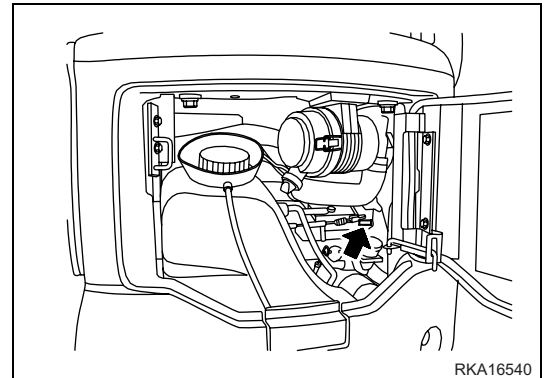
The Komatsu excavators described in this manual are CE marked, in fact they are in compliance with the EU harmonised standards.

The plate with the CE marking is applied to the front wall of the main frame, on the right side.

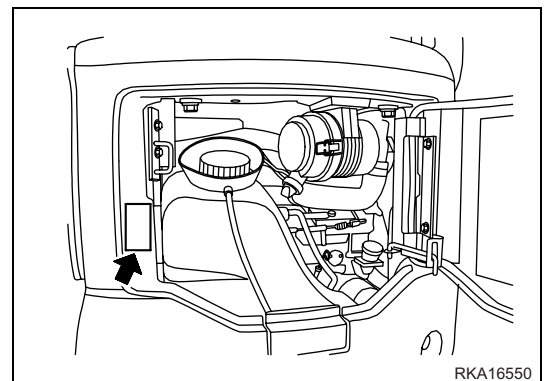


1.4.3 ENGINE SERIAL NUMBER AND EXHAUST GAS EMISSION PLATE

The engine serial number is stamped on the plate positioned on the engine itself.

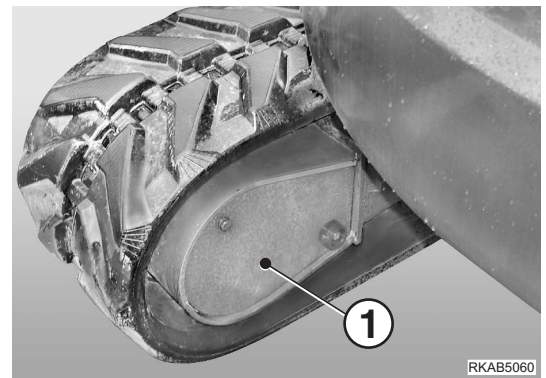


The exhaust gas emission plate is applied to the counterweight.



1.4.4 TRAVEL REDUCTION GEAR SERIAL NUMBER

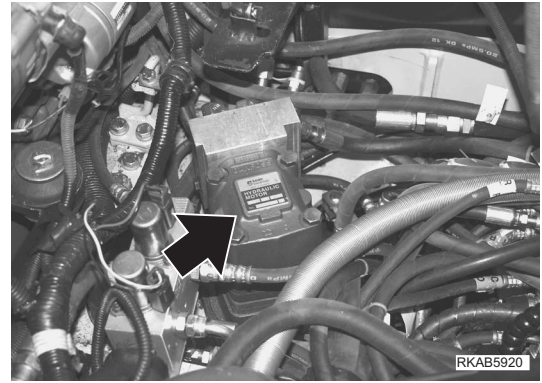
The serial number is stamped on the plate positioned inside the travel reduction gear and can be seen after removing the cover (1).



PRODUCT IDENTIFICATION

1.4.5 SWING REDUCTION GEAR SERIAL NUMBER

The serial number is stamped on the plate positioned on the upper side of the swing motor.



1.4.6 SERIAL NUMBERS AND DEALER'S ADDRESS

Machine no.° _____ Model _____

Product identification number (PIN) _____

Engine no.° _____

Travel reduction gear no.° _____

Swing reduction gear no.° _____

Dealer:

Address: _____

_____ Tel. _____

Contact person: _____

NOTES: _____

TABLE OF CONTENTS

FOREWORD

1.1 FOREWORD	1
1.2 INFORMATION ON SAFETY	2
1.3 INTRODUCTION	4
1.3.1 INTENDED USE OF THE MACHINE	4
1.3.2 IMPROPER OR UNAUTHORIZED USES	4
1.3.3 MAIN CHARACTERISTICS.....	4
1.3.4 RUNNING-IN	5
1.3.5 POSITIONS AND DIRECTIONS OF THE MACHINE.....	5
1.4 PRODUCT IDENTIFICATION	6
1.4.1 MACHINE SERIAL NUMBER	6
1.4.2 MACHINE IDENTIFICATION PLATE AND PRODUCT IDENTIFICATION NUMBER (PIN) ...	6
1.4.3 ENGINE SERIAL NUMBER AND EXHAUST GAS EMISSION PLATE	7
1.4.4 TRAVEL REDUCTION GEAR SERIAL NUMBER	7
1.4.5 SWING REDUCTION GEAR SERIAL NUMBER	8
1.4.6 SERIAL NUMBERS AND DEALER'S ADDRESS	9

SAFETY AND ACCIDENT PREVENTION

2.1 SAFETY, NOISE AND VIBRATION PLATES	18
2.1.1 POSITION OF THE SAFETY PLATES.....	18
2.1.2 PICTOGRAMS AND RELEVANT MEANINGS	19
2.1.3 POSITION OF THE NOISE PLATES	24
2.1.4 VIBRATIONS TO WHICH THE OPERATOR IS SUBJECTED.....	24
2.2 GENERAL PRECAUTIONS	25
2.2.1 GENERAL SAFETY RULES.....	25
2.2.2 SAFETY DEVICES AND GUARDS	25
2.2.3 CLOTHING AND PERSONAL PROTECTION ITEMS	25
2.2.4 UNAUTHORIZED MODIFICATIONS.....	26
2.2.5 LEAVING THE OPERATOR SEAT	26
2.2.6 GETTING ON AND OFF THE MACHINE.....	27
2.2.7 PREVENTING FIRES DUE TO FUEL AND OIL	28
2.2.8 PREVENTING BURNS	28
2.2.9 PREVENTING DAMAGE DUE TO ASBESTOS POWDER	29
2.2.10 PREVENTING DAMAGE CAUSED BY THE WORK EQUIPMENT	29
2.2.11 FIRE EXTINGUISHERS AND FIRST AID KIT	30
2.2.12 PRECAUTIONS CONCERNING THE ROPS STRUCTURE.....	30
2.2.13 PRECAUTIONS CONCERNING THE EQUIPMENT.....	30
2.3 PRECAUTIONS TO BE TAKEN BEFORE STARTING THE ENGINE	31
2.3.1 SAFETY AT THE WORK SITE.....	31
2.3.2 FIRE PREVENTION	31
2.3.3 PRECAUTIONS CONCERNING THE OPERATOR SEAT	31
2.3.4 ROOM VENTILATION	32
2.3.5 PRECAUTIONS TO BE TAKEN FOR THE LIGHTS	32
2.4 PRECAUTIONS TO BE TAKEN WHEN WORKING	33
2.4.1 STARTING THE ENGINE	33
2.4.2 CHECK THE DIRECTION BEFORE STARTING THE MACHINE	33

2.4.3	HAND SIGNALS	34
2.4.4	CHECKS FOR TRAVELLING IN REVERSE	39
2.4.5	MOVING THE MACHINE	39
2.4.6	MOVING ON SLOPES	40
2.4.7	WORKING ON SLOPES	41
2.4.8	UNAUTHORIZED OPERATIONS	41
2.4.9	PREVENTING ELECTROCUTION	43
2.4.10	VISIBILITY	43
2.4.11	WORKING ON ICY OR SNOW-COVERED SURFACES	43
2.4.12	PREVENTING DAMAGE CAUSED BY THE WORK EQUIPMENT	44
2.4.13	WORKING ON LOOSE GROUND	44
2.4.14	PARKING THE MACHINE.....	44
2.5	TRANSPORTING THE MACHINE ON MOTOR VEHICLES	45
2.5.1	LOADING AND UNLOADING THE MACHINE	45
2.5.2	TRANSPORTING THE MACHINE	45
2.6	BATTERY	46
2.6.1	PREVENTING RISKS THAT MAY BE DUE TO THE BATTERY	46
2.6.2	STARTING WITH BOOSTER CABLES	46
2.7	PRECAUTIONS FOR THE REMOVAL OF THE MACHINE	47
2.8	PRECAUTIONS FOR MAINTENANCE.....	48
2.8.1	WARNING PLATES	48
2.8.2	TOOLS	48
2.8.3	MAINTENANCE STAFF	48
2.8.4	EQUIPMENT	49
2.8.5	WORKING UNDER THE MACHINE	49
2.8.6	CLEANING THE MACHINE	49
2.8.7	USE OF THE ENGINE DURING MAINTENANCE.....	50
2.8.8	PERIODICAL CHANGE OF THE PARTS THAT ARE CRITICAL FOR SAFETY.....	50
2.8.9	STOP THE ENGINE BEFORE CARRYING OUT ANY MAINTENANCE OPERATION OR INSPECTION	50
2.8.10	RULES TO BE FOLLOWED WHEN REFUELLING OR ADDING OIL.....	51
2.8.11	CHECKING THE COOLANT LEVEL IN THE RADIATOR	51
2.8.12	USING LAMPS	51
2.8.13	PRECAUTIONS TO BE TAKEN WHEN HANDLING THE BATTERY AND THE ALTERNATOR.....	52
2.8.14	PRECAUTIONS CONCERNING THE STARTER.....	52
2.8.15	HANDLING HIGH-PRESSURE HOSES	52
2.8.16	PRECAUTIONS TO BE TAKEN WHEN HANDLING HIGH-PRESSURE OIL	53
2.8.17	PRECAUTIONS FOR MAINTENANCE OPERATIONS AT HIGH TEMPERATURES AND HIGH PRESSURE.....	53
2.8.18	PRECAUTIONS TO BE TAKEN WHEN USING HIGH-PRESSURE GREASE TO ADJUST THE TRACK TENSION	54
2.8.19	DO NOT REMOVE THE SHOCK ABSORBING SPRING FROM THE SHOCK ABSORBER UNIT	54
2.8.20	HYDRAULIC ACCUMULATOR	54
2.8.21	COOLING FAN AND BELT	55
2.8.22	WASTE MATERIALS	55
2.8.23	COMPRESSED AIR.....	55
2.8.24	PRECAUTIONS TO BE TAKEN WHEN HANDLING TECHNOLOGICAL AND ELASTOMERS	56
2.8.25	PRECAUTIONS TO BE TAKEN WHEN USING SYNTHETIC BIODEGRADABLE OIL TYPE HEES.....	56

THE MACHINE AND ITS OPERATIONS

3.1	MACHINE ILLUSTRATIONS	58
3.1.1	OVERALL VIEW OF THE MACHINE	58
3.1.2	CONTROLS AND GAUGES	59
3.2	INSTRUMENTS AND CONTROLS	60
3.2.1	WARNING LIGHTS AND GAUGES	60
3.2.1.1	EMERGENCY WARNING LIGHTS	61
3.2.1.2	GAUGES	62
3.2.1.3	WARNING LIGHTS	63
3.2.2	SWITCHES AND PUSH BUTTONS	65
3.2.3	CONTROL LEVERS AND PEDALS	68
3.2.4	COVERSWITH LOCK.....	75
3.2.5	ENGINE HOOD	76
3.2.6	RADIATOR COVER	77
3.2.7	BATTERY COVER	78
3.2.8	TILTING THE CAB FLOOR	79
3.2.9	FUSES	82
3.2.10	MAIN FUSE	83
3.2.11	TECHNICAL DOCUMENTATION COMPARTMENT	83
3.2.12	TOOL BOX	83
3.3	USE OF THE MACHINE AND RELATED CONTROLS.....	84
3.3.1	BEFORE STARTING THE ENGINE	84
3.3.1.1	VISUAL CHECKS.....	84
3.3.1.2	CHECKS TO BE CARRIED OUT BEFORE STARTING THE ENGINE	85
3.3.1.3	ADJUSTMENTS.....	92
3.3.1.4	OPERATIONS TO BE CARRIED OUT BEFORE STARTING THE ENGINE	94
3.3.2	STARTING THE ENGINE.....	96
3.3.2.1	STARTING WITH WARM ENGINE OR IN WARM CLIMATES.....	96
3.3.2.2	STARTING WITH COLD ENGINE OR IN COLD CLIMATES	98
3.3.3	AFTER STARTING THE ENGINE.....	100
3.3.3.1	RUNNING IN A NEW MACHINE.....	100
3.3.3.2	WARMING-UP OPERATIONS.....	101
3.3.4	STOPPING THE ENGINE	103
3.3.5	HOW TO MOVE THE MACHINE.....	104
3.3.5.1	PRELIMINARY OPERATIONS TO BE CARRIED OUT BEFORE MOVING THE MACHINE	104
3.3.5.2	MOVING THE MACHINE FORWARD	104
3.3.5.3	MOVING THE MACHINE IN REVERSE	106
3.3.5.4	STOPPING THE MACHINE	107
3.3.6	STEERING THE MACHINE.....	108
3.3.6.1	STEERING (CHANGING DIRECTION)	108
3.3.7	SWINGING THE TURRET	110
3.3.8	WORK EQUIPMENT CONTROLS AND FUNCTIONS.....	111
3.3.9	UNAUTHORIZED OPERATIONS.....	114
3.3.10	PRECAUTIONS FOR USE.....	116
3.3.11	PRECAUTIONS TO BE TAKEN WHEN TRAVELLING ON SLOPES.....	118
3.3.12	GETTING THE MACHINE OUT OF MUD	120
3.3.13	OPERATIONS THAT CAN BE PERFORMED WITH THE HYDRAULIC EXCAVATOR	121
3.3.14	CHANGING THE BUCKET.....	123
3.3.15	PARKING THE MACHINE.....	124
3.3.16	CHECKING THE MACHINE EVERY DAY AFTER WORK	126
3.3.16.1	BEFORE STOPPING THE ENGINE	126
3.3.16.2	AFTER STOPPING THE ENGINE	126

3.3.17	LOCKING THE MACHINE.....	126
3.3.18	RUBBER TRACKS (Machines equipped with rubber tracks only)	127
3.3.18.1	OPTIMAL USE OF THE RUBBER TRACKS	127
3.3.18.2	WARRANTY ON RUBBER TRACKS.....	127
3.3.18.3	USE OF THE RUBBER TRACKS.....	128
3.3.18.4	HOW TO PRESERVE THE RUBBER TRACKS OVER TIME	128
3.4	TRANSPORTING THE MACHINE	132
3.4.1	TRANSPORT PROCEDURE	132
3.4.2	LOADING AND UNLOADING THE MACHINE.....	132
3.4.3	LIFTING THE MACHINE	138
3.5	USING THE MACHINE IN THE COLD SEASON	140
3.5.1	PRECAUTIONS TO BE TAKEN WHEN USING THE MACHINE IN THE COLD SEASON	140
3.5.1.1	FUEL AND LUBRICANTS.....	140
3.5.1.2	COOLANT	140
3.5.1.3	BATTERY.....	141
3.5.2	PRECAUTIONS TO BE TAKEN EVERY DAY AT THE END OF WORK.....	142
3.5.3	HOW TO PROCEED AT THE END OF THE COLD SEASON	142
3.6	LONG PERIODS OF INACTIVITY	143
3.6.1	BEFORE A PERIOD OF INACTIVITY	143
3.6.2	DURING A PERIOD OF INACTIVITY	143
3.6.3	AFTER A PERIOD OF INACTIVITY	143
3.7	TROUBLESHOOTING	144
3.7.1	IF FUEL RUNS OUT COMPLETELY	144
3.7.2	OCCURRENCES THAT ARE NOT FAILURES	144
3.7.3	REMOVING THE MACHINE	144
3.7.4	PRECAUTIONS TO BE TAKEN WHEN WORKING IN PARTICULAR CONDITIONS	145
3.7.5	IF THE BATTERY IS DOWN.....	145
3.7.5.1	REMOVING AND INSTALLING THE BATTERY	146
3.7.5.2	CHARGING THE BATTERY	146
3.7.5.3	STARTING WITH BOOSTER CABLES	147
3.7.6	OTHER TROUBLES.....	149
3.7.6.1	ELECTRICAL CIRCUIT.....	149
3.7.6.2	FRAME.....	150
3.7.6.3	ENGINE	150
 MAINTENANCE		
4.1	GUIDE TO MAINTENANCE	154
4.2	MAINTENANCE NOTES	156
4.2.1	OIL, FUEL AND COOLANT.....	156
4.2.1.1	OIL	156
4.2.1.2	FUEL	157
4.2.1.3	COOLANT	157
4.2.1.4	KOWA (KOMATSU OIL WEAR ANALYSIS).....	158
4.2.1.5	STORING OIL AND FUEL	159
4.2.1.6	FILTERS	159
4.2.2	NOTES ON THE MAINTENANCE OF THE ELECTRICAL SYSTEM	160
4.2.3	NOTES ON THE MAINTENANCE OF THE HYDRAULIC SYSTEM.....	160
4.2.4	MAINTENANCE NOTES REGARDING LUBRICATION	160
4.3	PARTS SUBJECT TO WEAR	161
4.3.1	LIST OF THE PARTS SUBJECT TO WEAR.....	161

TABLE OF CONTENTS

4.4	FUEL, COOLANT AND LUBRICANTS	162
4.4.1	APPROVED SYNTHETIC BIODEGRADABLE LUBRICANTS TYPE HEES.....	164
4.5	TIGHTENING TORQUES	165
4.5.1	STANDARD TIGHTENING TORQUES FOR SCREWS AND NUTS.....	165
4.5.2	STANDARD TIGHTENING TORQUES FOR HOSES WITH ORFS.....	166
4.6	LUBRICATION	167
4.6.1	LUBRICATION DIAGRAM.....	167
4.7	PERIODICAL CHANGE OF SAFETY-RELATED COMPONENTS	168
4.7.1	SAFETY-RELATED PARTS.....	169
4.8	MAINTENANCE PLAN	170
4.8.1	MAINTENANCE PLAN.....	170
4.8.2	MAINTENANCE INTERVALS IN CASE OF USE OF THE HYDRAULIC BREAKER.....	171
4.8.2.a	CHANGING THE HYDRAULIC OIL FILTER.....	171
4.8.2.b	CHANGING THE HYDRAULIC OIL.....	171
4.9	MAINTENANCE PROCEDURES	172
4.9.1	WHEN REQUIRED.....	172
4.9.1.a	CHECKING, CLEANING OR CHANGING THE AIR FILTER CARTRIDGE.....	172
4.9.1.b	CHECKING THE BATTERY CHARGE LEVEL.....	174
4.9.1.c	CLEANING THE WATER SEPARATOR FILTER.....	175
4.9.1.d	DRAINING THE FUEL TANK.....	176
4.9.1.e	CHECKING AND ADJUSTING THE STEEL TRACK TENSION.....	176
4.9.1.f	CHECKING THE RUBBER TRACKS.....	178
4.9.1.g	CHECKING AND ADJUSTING THE RUBBER TRACK TENSION.....	180
4.9.1.h	CHANGING THE RUBBER TRACKS.....	182
4.9.1.i	BLEEDING THE HYDRAULIC SYSTEM.....	185
4.9.2	CHECKS TO BE CARRIED OUT BEFORE STARTING THE ENGINE.....	186
4.9.3	MAINTENANCE AFTER THE FIRST 50 HOURS OF OPERATION (Only for machines in which synthetic biodegradable oil type HEES is used).....	186
4.9.4	MAINTENANCE AFTER THE FIRST 500 HOURS OF OPERATION (Only for machines in which synthetic biodegradable oil type HEES is used).....	186
4.9.5	MAINTENANCE EVERY 500 HOURS OF OPERATION.....	187
4.9.5.a	LUBRICATION.....	187
4.9.5.b	CHANGING THE ENGINE OIL AND THE ENGINE OIL FILTER CARTRIDGE.....	189
4.9.5.c	CHANGING THE FUEL FILTER CARTRIDGE.....	190
4.9.5.d	CHECKING THE OIL LEVEL IN THE FINAL REDUCTION GEARS.....	191
4.9.5.e	CHECKING AND CLEANING THE FINS OF THE RADIATOR AND OF THE EXCHANGER.....	191
4.9.5.f	CHECKING AND ADJUSTING THE FAN BELT TENSION.....	192
4.9.5.g	DRAINING THE HYDRAULIC OIL TANK (Only for machines in which synthetic biodegradable oil type HEES is used).....	193
4.9.6	MAINTENANCE EVERY 1000 HOURS OF OPERATION.....	194
4.9.6.a	CHANGING THE HYDRAULIC OIL FILTER.....	194
4.9.6.b	CHANGING THE OIL IN THE FINAL REDUCTION GEARS.....	196
4.9.6.c	CHECKING AND ADJUSTING THE ENGINE VALVE CLEARANCE.....	196
4.9.7	MAINTENANCE EVERY 2000 HOURS OF OPERATION.....	197
4.9.7.a	CHANGING THE OIL IN THE HYDRAULIC TANK AND CLEANING THE FILTER.....	197
4.9.7.b	CHANGING THE COOLANT.....	199
4.9.7.c	CHECKING THE ALTERNATOR AND THE STARTER.....	200

TECHNICAL SPECIFICATIONS

5.1	TECHNICAL DATA	202
5.2	LIFTING CAPACITIES	204
5.2.1	LIFTING CAPACITIES	204

AUTHORIZED OPTIONAL EQUIPMENT

6.1	AUTHORIZED OPTIONAL EQUIPMENT	208
6.1.1	PRECAUTIONS REGARDING SAFETY	208
6.1.2	PRECAUTIONS REGARDING THE INSTALLATION OF EQUIPMENT	209
6.1.3	CHARACTERISTICS OF THE OPTIONAL EQUIPMENT	210
6.1.3.1	CHARACTERISTICS OF THE OPTIONAL EQUIPMENT	210
6.2	MACHINE CONFIGURATION FOR THE INSTALLATION OF ATTACHMENTS	211
6.2.1	POSITION OF THE DEVICES	211
6.2.2	HYDRAULIC CIRCUIT	213
6.2.2.1	INSTALLING AND CONNECTING THE EQUIPMENT	213
6.2.2.2	MAINTENANCE	213
6.2.2.3	BLEEDING	214
6.3	OPERATING THE EQUIPMENT	215
6.3.1	LONG PERIODS OF INACTIVITY	216
6.4	PRECAUTIONS TO BE TAKEN WHEN USING OPTIONAL EQUIPMENT	217
6.4.1	HYDRAULIC BREAKER.....	217

PAGE INTENTIONALLY LEFT BLANK

SAFETY AND ACCIDENT PREVENTION

2.1 SAFETY, NOISE AND VIBRATION PLATES

2.1.1 POSITION OF THE SAFETY PLATES

- The safety plates must always be legible and in good conditions; for this reason, if they are dirty with dust, oil or grease, it is necessary to clean them with a solution made of water and detergent. Do not use fuel, petrol or solvents.
- If the plates are damaged, ask for new ones to Komatsu or to your Komatsu Dealer.
- In case of replacement of a component provided with a safety plate, make sure that such a plate is applied also to the new part.
- The machine can be provided with other plates in addition to those indicated below; keep also to the instructions given in the additional plates, in any case.

