Shop Manual

KOMATSU

PC270LC-6LE

HYDRAULIC EXCAVATOR

MACHINE MODEL	SERIAL NUMBERS
PC270LC-6LE	A83001 and up

CONTENTS

The affected pages are indicated by using the following marks. It is requested that necessary actions be taken to these pages according to the table below.

Mark	Indication	Action
"	New page to be added	Add
!	Page to be replaced	Replace
( )	Page to be deleted	Discard

Pages without marks were previous additions or revised pages.

LIST OF ORIGINAL, NEW AND REVISED PAGES

MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV
	00-1			10-3			10-33			10-63	
	00-4			10-4			10-34			10-64	
	00-5			10-5			10-35			10-65	
	00-6			10-6			10-36			10-66	
	00-7			10-7			10-37			10-67	
	00-8			10-8			10-38			10-68	
	00-9			10-9			10-39			10-69	
	00-10			10-10			10-40			10-70	
	00-11			10-11			10-41			10-71	
	00-12			10-12			10-42			10-72	
	00-13			10-13			10-43			10-73	
	00-14			10-14			10-44			10-74	
	00-15			10-15			10-45			10-75	
	00-16			10-16			10-46			10-76	
	00-17			10-17			10-47			10-77	
	00-18			10-18			10-48			10-78	
	01-1			10-19			10-49			10-79	
	01-2			10-20			10-50			10-80	
	01-3			10-21			10-51			10-81	
	01-4			10-22			10-52			10-82	
	01-5			10-23			10-53			10-83	
	01-6			10-24			10-54			10-84	
	01-7			10-25			10-55			10-85	
	01-8			10-26			10-56			10-86	
	01-9			10-27			10-57			10-87	
	01-10			10-28			10-58			10-88	
	01-11			10-29			10-59			10-89	
	01-12			10-30			10-60			10-90	
	10-1			10-31			10-61			10-91	
	10-2			10-32			10-62			10-92	

LIST OF ORIGINAL, NEW AND REVISED PAGES

MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV
	10-93			10-130			10-167		"	20-8	Î
	10-94			10-131			10-168		"	20-9	Î
	10-95			10-132			10-169		"	20-10	Î
	10-96			10-133			10-170		"	20-11	Î
	10-97			10-134			10-171		"	20-12	Î
	10-98			10-135			10-172		"	20-13	Î
	10-99			10-136			10-173		"	20-14	Î
	10-100			10-137			10-174		"	20-15	Î
	10-101			10-138			10-175		"	20-16	Î
	10-102			10-139			10-176		"	20-17	Î
	10-103			10-140			10-177		"	20-18	Î
	10-104			10-141			10-178		"	20-19	Î
	10-105			10-142			10-179		"	20-20	Î
	10-106			10-143			10-180		"	20-21	Î
	10-107			10-144			10-181		"	20-22	Î
	10-108			10-145			10-182		"	20-23	Î
	10-109			10-146			10-183		"	20-24	Î
	10-110			10-147			10-184		"	20-25	Î
	10-111			10-148			10-185		"	20-26	Î
	10-112			10-149			10-186		"	20-27	Î
	10-113			10-150			10-187		"	20-28	Î
	10-114			10-151			10-188		"	20-29	Î
	10-115			10-152			10-189		"	20-30	Î
	10-116			10-153			10-190		"	20-31	Î
	10-117			10-154			10-191		"	20-32	Î
	10-118			10-155			10-192		"	20-33	Î
	10-119			10-156			10-193		"	20-34	Î
	10-120			10-157			10-194		"	20-35	Î
	10-121			10-158			10-195		"	20-36	Î
	10-122			10-159			10-196		"	20-37	Î
	10-123			10-160		"	20-1	Î	"	20-38	Î
	10-124			10-161		"	20-2	Î	"	20-39	Î
	10-125			10-162		"	20-3	Î	"	20-40	Î
	10-126			10-163		"	20-4	Î	"	20-41	Î
	10-127			10-164		"	20-5	Î	"	20-42	Î
	10-128			10-165		"	20-6	Î	"	20-43	Î
	10-129			10-166		"	20-7	Î	"	20-44	Î

LIST OF ORIGINAL, NEW AND REVISED PAGES

MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV
"	20-45	Î	"	20-82	Î	"	20-119	Î	"	20-156	Î
"	20-46	Î	"	20-83	Î	"	20-120	Î	"	20-157	Î
"	20-47	Î	"	20-84	Î	"	20-121	Î	"	20-158	Î
"	20-48	Î	"	20-85	Î	"	20-122	Î	"	20-159	Î
"	20-49	Î	"	20-86	Î	"	20-123	Î	"	20-160	Î
"	20-50	Î	"	20-87	Î	"	20-124	Î	"	20-161	Î
"	20-51	Î	"	20-88	Î	"	20-125	Î	"	20-162	Î
"	20-52	Î	"	20-89	Î	"	20-126	Î	"	20-163	Î
"	20-53	Î	"	20-90	Î	"	20-127	Î	"	20-164	Î
"	20-54	Î	"	20-91	Î	"	20-128	Î	"	20-165	Î
"	20-55	Î	"	20-92	Î	"	20-129	Î	"	20-166	Î
"	20-56	Î	"	20-93	Î	"	20-130	Î	"	20-167	Î
"	20-57	Î	"	20-94	Î	"	20-131	Î	"	20-168	Î
"	20-58	Î	"	20-95	Î	"	20-132	Î	"	20-169	Î
"	20-59	Î	"	20-96	Î	"	20-133	Î	"	20-170	Î
"	20-60	Î	"	20-97	Î	"	20-134	Î	"	20-171	Î
"	20-61	Î	"	20-98	Î	"	20-135	Î	"	20-172	Î
"	20-62	Î	"	20-99	Î	"	20-136	Î	"	20-173	Î
"	20-63	Î	"	20-100	Î	"	20-137	Î	"	20-174	Î
"	20-64	Î	"	20-101	Î	"	20-138	Î	"	20-175	Î
"	20-65	Î	"	20-102	Î	"	20-139	Î	"	20-176	Î
"	20-66	Î	"	20-103	Î	"	20-140	Î	"	20-177	Î
"	20-67	Î	"	20-104	Î	"	20-141	Î	"	20-178	Î
"	20-68	Î	"	20-105	Î	"	20-142	Î	"	20-179	Î
"	20-69	Î	"	20-106	Î	"	20-143	Î	"	20-180	Î
"	20-70	Î	"	20-107	Î	"	20-144	Î	"	20-181	Î
"	20-71	Î	"	20-108	Î	"	20-145	Î	"	20-182	Î
"	20-72	Î	"	20-109	Î	"	20-146	Î	"	20-183	Î
"	20-73	Î	"	20-110	Î	"	20-147	Î	"	20-184	Î
"	20-74	Î	"	20-111	Î	"	20-148	Î	"	20-185	Î
"	20-75	Î	"	20-112	Î	"	20-149	Î	"	20-186	Î
"	20-76	Î	"	20-113	Î	"	20-150	Î	"	20-187	Î
"	20-77	Î	"	20-114	Î	"	20-151	Î	"	20-188	Î
"	20-78	Î	"	20-115	Î	"	20-152	Î	"	20-189	Î
"	20-79	Î	"	20-116	Î	"	20-153	Î	"	20-190	Î
"	20-80	Î	"	20-117	Î	"	20-154	Î	"	20-191	Î
"	20-81	Î	"	20-118	Î	"	20-155	Î	"	20-192	Î

LIST OF ORIGINAL, NEW AND REVISED PAGES

MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV
"	20-193	Î	"	20-230	Î	"	20-267	Î	"	20-304	Î
"	20-194	Î	"	20-231	Î	"	20-268	Î	"	30-1	Î
"	20-195	Î	"	20-232	Î	"	20-269	Î	"	30-2	Î
"	20-196	Î	"	20-233	Î	"	20-270	Î	"	30-3	Î
"	20-197	Î	"	20-234	Î	"	20-271	Î	"	30-4	Î
"	20-198	Î	"	20-235	Î	"	20-272	Î	"	30-5	Î
"	20-199	Î	"	20-236	Î	"	20-273	Î	"	30-6	Î
"	20-200	Î	"	20-237	Î	"	20-274	Î	"	30-7	Î
"	20-201	Î	"	20-238	Î	"	20-275	Î	"	30-8	Î
"	20-202	Î	"	20-239	Î	"	20-276	Î	"	30-9	Î
"	20-203	Î	"	20-240	Î	"	20-277	Î	"	30-10	Î
"	20-204	Î	"	20-241	Î	"	20-278	Î	"	30-11	Î
"	20-205	Î	"	20-242	Î	"	20-279	Î	"	30-12	Î
"	20-206	Î	"	20-243	Î	"	20-280	Î	"	30-13	Î
"	20-207	Î	"	20-244	Î	"	20-281	Î	"	30-14	Î
"	20-208	Î	"	20-245	Î	"	20-282	Î	"	30-15	Î
"	20-209	Î	"	20-246	Î	"	20-283	Î	"	30-16	Î
"	20-210	Î	"	20-247	Î	"	20-284	Î	"	30-17	Î
"	20-211	Î	"	20-248	Î	"	20-285	Î	"	30-18	Î
"	20-212	Î	"	20-249	Î	"	20-286	Î	"	30-19	Î
"	20-213	Î	"	20-250	Î	"	20-287	Î	"	30-20	Î
"	20-214	Î	"	20-251	Î	"	20-288	Î	"	30-21	Î
"	20-215	Î	"	20-252	Î	"	20-289	Î	"	30-22	Î
"	20-216	Î	"	20-253	Î	"	20-290	Î	"	30-23	Î
"	20-217	Î	"	20-254	Î	"	20-291	Î	"	30-24	Î
"	20-218	Î	"	20-255	Î	"	20-292	Î	"	30-25	Î
"	20-219	Î	"	20-256	Î	"	20-293	Î	"	30-26	Î
"	20-220	Î	"	20-257	Î	"	20-294	Î	"	30-27	Î
"	20-221	Î	"	20-258	Î	"	20-295	Î	"	30-28	Î
"	20-222	Î	"	20-259	Î	"	20-296	Î	"	30-29	Î
"	20-223	Î	"	20-260	Î	"	20-297	Î	"	30-30	Î
"	20-224	Î	"	20-261	Î	"	20-298	Î	"	30-31	Î
"	20-225	Î	"	20-262	Î	"	20-299	Î	"	30-32	Î
"	20-226	Î	"	20-263	Î	"	20-300	Î	"	30-33	Î
"	20-227	Î	"	20-264	Î	"	20-301	Î	"	30-34	Î
"	20-228	Î	"	20-265	Î	"	20-302	Î	"	30-35	Î
"	20-229	Î	"	20-266	Î	"	20-303	Î	"	30-36	Î

LIST OF ORIGINAL, NEW AND REVISED PAGES

MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV
"	30-37	Î	"	30-74	Î	"	30-111	Î	"	30-148	Î
"	30-38	Î	"	30-75	Î	"	30-112	Î		40-1	
"	30-39	Î	"	30-76	Î	"	30-113	Î		40-2	
"	30-40	Î	"	30-77	Î	"	30-114	Î		40-3	
"	30-41	Î	"	30-78	Î	"	30-115	Î		40-4	
"	30-42	Î	"	30-79	Î	"	30-116	Î		40-5	
"	30-43	Î	"	30-80	Î	"	30-117	Î		40-6	
"	30-44	Î	"	30-81	Î	"	30-118	Î		40-7	
"	30-45	Î	"	30-82	Î	"	30-119	Î		40-8	
"	30-46	Î	"	30-83	Î	"	30-120	Î		40-9	
"	30-47	Î	"	30-84	Î	"	30-121	Î		40-10	
"	30-48	Î	"	30-85	Î	"	30-122	Î		40-11	
"	30-49	Î	"	30-86	Î	"	30-123	Î		40-12	
"	30-50	Î	"	30-87	Î	"	30-124	Î		40-13	
"	30-51	Î	"	30-88	Î	"	30-125	Î		40-14	
"	30-52	Î	"	30-89	Î	"	30-126	Î		40-15	
"	30-53	Î	"	30-90	Î	"	30-127	Î		40-16	
"	30-54	Î	"	30-91	Î	"	30-128	Î		40-17	
"	30-55	Î	"	30-92	Î	"	30-129	Î		40-18	
"	30-56	Î	"	30-93	Î	"	30-130	Î		40-19	
"	30-57	Î	"	30-94	Î	"	30-131	Î		40-20	
"	30-58	Î	"	30-95	Î	"	30-132	Î		40-21	
"	30-59	Î	"	30-96	Î	"	30-133	Î		40-22	
"	30-60	Î	"	30-97	Î	"	30-134	Î		40-23	
"	30-61	Î	"	30-98	Î	"	30-135	Î		40-24	
"	30-62	Î	"	30-99	Î	"	30-136	Î		40-25	
"	30-63	Î	"	30-100	Î	"	30-137	Î		40-26	
"	30-64	Î	"	30-101	Î	"	30-138	Î		40-27	
"	30-65	Î	"	30-102	Î	"	30-139	Î		40-28	
"	30-66	Î	"	30-103	Î	"	30-140	Î		40-29	
"	30-67	Î	"	30-104	Î	"	30-141	Î		40-30	
"	30-68	Î	"	30-105	Î	"	30-142	Î		40-31	
"	30-69	Î	"	30-106	Î	"	30-143	Î		40-32	
"	30-70	Î	"	30-107	Î	"	30-144	Î		40-33	
"	30-71	Î	"	30-108	Î	"	30-145	Î		40-34	
"	30-72	Î	"	30-109	Î	"	30-146	Î		40-35	
"	30-73	Î	"	30-110	Î	"	30-147	Î		40-36	

LIST OF ORIGINAL, NEW AND REVISED PAGES

MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV	MARK	PAGE	REV
	40-37										
	40-38										
	40-39										
	40-40										
	40-41										
	40-42										
	40-43										
	40-44										

00 FOREWORD

PRODUCT PUBLICATIONS INFORMATION

PC270LC-6

VARIOUS PRODUCT PARTS & SERVICE PUBLICATIONS ARE AVAILABLE TO ALL **KOMATSU** CONSTRUCTION EQUIPMENT OWNERS, INCLUDING OPERATION & MAINTENANCE MANUALS, PARTS BOOKS AND SHOP MANUALS.

SPECIAL PUBLICATIONS SUCH AS SERVICE TOOL, AIR CONDITIONING, AND TURBOCHARGER SHOP MANUALS ARE ALSO AVAILABLE AS WELL AS SELECTED OPERATION & MAINTENANCE AND SHOP MANUALS IN FOREIGN LANGUAGES.

THE PUBLICATIONS LISTED BELOW ARE AVAILABLE FOR THIS PARTICULAR MACHINE(S).

DESCRIPTION	FORM NUMBER
PARTS BOOK - PAPER:	
Engine and Chassis	BEPB005300
PARTS BOOK - MICROFICHE:	
Engine and Chassis	BEPM005300
OPERATION & MAINTENANCE MANUAL:	
Engine and Chassis	CEAM003400
SHOP MANUAL:	
Chassis	CEBM003000
SAFETY MANUAL	HE92-2
STANDARD MAN-HOUR GUIDE	

PARTS AND SERVICE PUBLICATIONS CAN *ONLY* BE ACQUIRED BY AUTHORIZED KOMATSU DISTRIBUTORS, USING THE KOMATSU AMERICA INTERNATIONAL COMPANY PARTS INFORMATION PROCESSING SYSTEM (PIPS).

IF THE PIPS SYSTEM IS NOT AVAILABLE AT THE DISTRIBUTOR LOCATION, THEN THE FOLLOWING REQUISITION FOR TECHNICAL SERVICE PUBLICATIONS AND SERVICE FORMS CAN BE USED. FORM KDC91D IS SHOWN ON THE REVERSE SIDE OF THIS PAGE.

REQUISITION FOR TECHNICAL SERVICE PUBLICATIONS AND SERVICE FORMS

COMPLETE FORM AND RETURN TO

Komatsu America International Company
440 North Fairway Drive
Vernon Hills, IL 60061-8112 U.S.A.
Attn: Technical Publications
Fax No. (847) 970-4186
Tel No. (847) 970-5887

SHIP TO

TYPE or PRINT ONLY

COMPANY NAME	PURCHASE ORDER NO.
ATTN.	ORDER DATE
STREET ADDRESS	
CITY, STATE, ZIP CODE	
COUNTRY	

PHONE NO.	FAX NO.	SHIPPING METHOD	DISTR/BRANCH CODE

IMPORTANT - TO ASSURE SHIPMENT OF THE CORRECT PUBLICATION(S), THE MODEL NUMBER AND MACHINE SERIAL NUMBER MUST BE SHOWN.

QTY.	PUBLICATION FORM NO.	PARTS BOOK ⬇ P-Paper M-Microfiche		PUBLICATION DESCRIPTION	MODEL NUMBER	SERIAL NUMBER

KDC91D 081696

CURRENT PRICES WILL BE CHARGED

SAFETY

SAFETY NOTICE

IMPORTANT SAFETY NOTICE

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

To prevent injury to workers, the symbols ⚠ and ⚠ are used to mark safety precautions in this manual. The cautions accompanying these symbols should always be followed carefully. If any dangerous situation arises or may possibly arise, first consider safety, and take the necessary actions to deal with the situation.

GENERAL PRECAUTIONS

Mistakes in operation are extremely dangerous. Read the Operation and Maintenance Manual carefully BEFORE operating the machine.

1. Before carrying out any greasing or repairs, read all the precautions given on the decals which are fixed to the machine.

2. When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.

   Always wear safety glasses when hitting parts with a hammer.

   Always wear safety glasses when grinding parts with a grinder, etc.

3. If welding repairs are needed, always have a trained, experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, glasses, cap and other clothes suited for welding work.

4. When carrying out any operation with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR signs on the controls in the operator's compartment.

5. Keep all tools in good condition and learn the correct way to use them.

6. Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt or oil on the floor. Smoke only in the areas provided for smoking. Never smoke while working.

PREPARATIONS FOR WORK

7. Before adding oil or making repairs, park the machine on hard, level ground, and block the wheels or tracks to prevent the machine from moving.

8. Before starting work, lower blade, ripper, bucket or any other work equipment to the ground. If this is not possible, insert the safety pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning signs on them.

9. When disassembling or assembling, support the machine with blocks, jacks or stands before starting work.

10. Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine. Never jump on or off the machine. If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

PRECAUTIONS DURING WORK

11. When removing the oil filler cap, drain plug or hydraulic pressure measuring plugs, loosen them slowly to prevent the oil from spurting out. Before disconnecting or removing components of the oil, water or air circuits, first remove the pressure completely from the circuit.

12. The water and oil in the circuits are hot when the engine is stopped, so be careful not to get burned. Wait for the oil and water to cool before carrying out any work on the oil or water circuits.

13. Before starting work, remove the leads from the battery. ALWAYS remove the lead from the negative (-) terminal first.

14. When raising heavy components, use a hoist or crane. Check that the wire rope, chains and hooks are free from damage. Always use lifting equipment which has ample capacity. Install the lifting equipment at the correct places. Use a hoist or crane and operate slowly to prevent the component from hitting any other part. Do not work with any part still raised by the hoist or crane.

15. When removing covers which are under internal pressure or under pressure from a spring, always leave two bolts in position on opposite sides. Slowly release the pressure, then slowly loosen the bolts to remove.

16. When removing components, be careful not to break or damage the wiring. Damaged wiring may cause electrical fires.

17. When removing piping, stop the fuel or oil from spilling out. Fuel or oil on the floor is flammable and slippery, a health and safety hazard. Clean up any spilled fuel or oil immediately.

18. As a general rule, do not use gasoline to wash parts. In particular, use only the minimum of flammable liquids when cleaning electrical parts.

19. Be sure to assemble all parts again in their original places. Replace any damaged part with new parts.

    When installing hoses and wires, be sure that they will not be damaged by contact with other parts when the machine is being operated.

20. When installing high pressure hoses, make sure that they are not twisted. Damaged tubes are dangerous, so be extremely careful when installing tubes for high pressure circuits. Also check that connecting parts are correctly installed.

21. When assembling or installing parts, always use the specified tightening torques. When installing protective parts such as guards, or parts which vibrate violently or rotate at high speed, be particularly careful to check that they are installed correctly.

22. When aligning two holes, never insert your fingers or hand. Be careful not to get your fingers caught in a hole.

23. When measuring hydraulic pressure, check that the measuring tool is correctly assembled before taking any measurements.

24. Take care when removing or installing the tracks of track-type machines. When removing the track, the track separates suddenly, so never let anyone stand at either end of the track.

GENERAL

This shop manual has been prepared as an aid to improve the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every opportunity.

This shop manual mainly contains the necessary technical information for operations performed in a service workshop. For ease of understanding, the manual is divided into the following sections. These sections are further divided into each main group of components.

GENERAL

This section lists the general machine dimensions, performance specifications, component weights, and fuel, coolant and lubricant specification charts.

STRUCTURE AND FUNCTION

This section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting.

TESTING AND ADJUSTING

This section explains checks to be made before and after performing repairs, as well as adjustments to be made at completion of the checks and repairs. Troubleshooting charts correlating "Problems" to "Causes" are also included in this section.

DISASSEMBLY AND ASSEMBLY

This section explains the order to be followed when removing, installing, disassembling or assembling each component, as well as precautions to be taken for these operations.

MAINTENANCE STANDARD

This section gives the judgement standards when inspecting disassembled parts.

NOTICE

The specifications contained in this shop manual are subject to change at any time and without any advance notice. Contact your distributor for the latest information.

HOW TO READ THE SHOP MANUAL

VOLUMES

Shop manuals are issued as a guide to carrying out repairs. They are divided as follows:
Chassis volume: Issued for every machine model
Engine volume: Issued for each engine series
Electrical volume: Each issued as one to cover all models
Attachment volume: Each issued as one to cover all models

These various volumes are designed to avoid duplication of information. Therefore to deal with all repairs for any model, it is necessary that chassis, engine electrical and attachment be available.

DISTRIBUTION AND UPDATING

Any additions, amendments or other changes will be sent to your distributors. Get the most up-to-date information before you start any work.

FILING METHOD

1. See the page number on the bottom of the page. File the pages in correct order.
2. Following examples show how to read the page number:
   Example 1 (Chassis volume):

   10 - 3
   - 10: Item number (10. Structure and Function)
   - 3: Consecutive page number for each item

   Example 2 (Engine volume):
   Refer to the pertinent engine manual.

3. Additional pages: Additional pages are indicated by a hyphen (-) and numbered after the page number. File as in the example.
   Example:
   10-4
   10-4-1
   10-4-2 Added pages
   10-5

REVISED EDITION MARK

When a manual is revised, an edition mark (....) is recorded on the bottom outside corner of the pages.

REVISIONS

Revised pages are shown at the LIST OF REVISED PAGES between the title page and SAFETY page.

SYMBOLS

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

Symbol	Item	Remarks
	Safety	Special safety precautions are necessary when performing the work.
	Caution	Special technical precautions or other precautions for preserving standards are necessary when performing the work.
	Weight	Weight of parts or systems. Caution necessary when selecting hoisting wire or when working posture is important, etc.
	Tightening torque	Places that require special attention for tightening torque during assembly.
	Coat	Places to be coated with adhesives and lubricants etc.
	Oil, water	Places where oil, water or fuel must be added, and the capacity.
	Drain	Places where oil or water must be drained, and quantity to be drained.

HOISTING INSTRUCTIONS

HOISTING

Heavy parts (25 kg or more) must be lifted with a hoist etc. In the **DISASSEMBLY AND ASSEMBLY** section, every part weighing 25 kg or more is indicated clearly with the symbol

If a part cannot be smoothly removed from the machine by hoisting, the following checks should be made:

1) Check for removal of all bolts fastening the part to the relative parts.
2) Check for existence of another part causing interface with the part to be removed.

WIRE ROPES

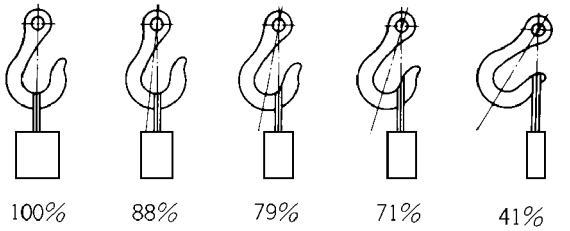
1) Use adequate ropes depending on the weight of parts to be hoisted, referring to the table below:

Wire ropes
(Standard "Z" or "S" twist ropes without galvanizing

Rope diameter (mm)	Allowable load (tons)
10.0	1.0
11.2	1.4
12.5	1.6
14.0	2.2
16.0	2.8
18.0	3.6
20.0	4.4
22.4	5.6
30.0	10.0
40.0	18.0
50.0	28.0
60.0	40.0

★ The allowable load value is estimated to be 1/6 or 1/7 of the breaking strength of the rope used.

2) Sling wire ropes from the middle portion of the hook. Slinging near the edge of the hook may cause the rope to slip off the hook during hoisting, and a serious accident can result. Hooks have maximum strength at the middle portion.



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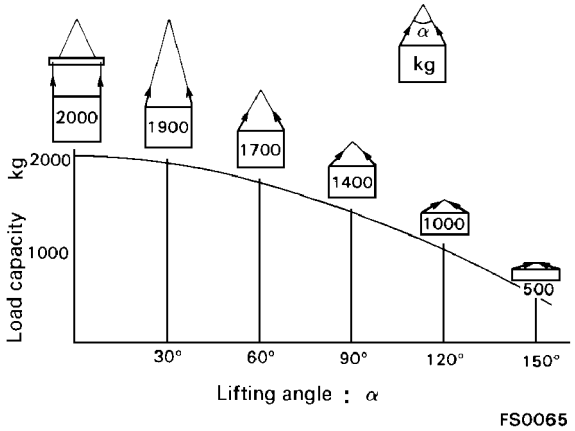
3) Do not sling a heavy load with one rope alone, but sling with two or more ropes symmetrically wound on to the load.

Slinging with one rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original winding position on the load, which can result in a dangerous accident.

4) Do not sling a heavy load with ropes forming a wide hanging angle from the hook. When hoisting a load with two or more ropes, the force subjected to each rope will increase with the hanging angles. The table below shows the variation of allowable load (kg) when hoisting is made with two ropes, each of which is allowed to sling up to 1000 kg vertically, at various hanging angles. When two ropes sling a load vertically, up to 2000 kg of total weight can be suspended. This weight becomes 1000 kg when two ropes make a 120 e other hand, two ropes are subject to an excessive force as large as 4000 kg if they sling a 2000 kg load at a lifting angle of 150



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COATING MATERIALS

The recommended coating materials prescribed in the shop manuals are listed below.

Category	Code	Part No.	Qty	Container	Main applications, features
Adhesive	LT-1A	790-129-9030	150 g	Tube	Used to prevent rubber gaskets, rubber cushions and cork plugs from coming out
	LT-1B	790-129-9050	20 g (x2)	Plastic container	Used in places requiring an immediately effective, strong adhesive. Used for plastics (except polyethylene, polypropylene, tetrafluoroethylene, and vinyl chloride), rubber, metal and non-metal.
	LT-2	09940-00030	50 g	Plastic container	Features: Resistance to heat, chemicals Used for anti-loosening and sealant purposes for bolts and plugs.
	LT-3	790-129-9060 Set of adhesive and hardening agent	Adh 1 kg Hard agt 500 kg	Can	Used as adhesive or sealant for metal, glass or plastic.
	LT-4	790-129-9040	250 g	Plastic container	Used as sealant for machined holes.
	Loctite 648-50	79A-129-9110	50 cc	---	Features: Resistance to heat, chemicals Used at joint portions subject to high temperature.
Gasket sealant	LG-1	790-129-9010	200 g	Tube	Used as adhesive or sealant for gaskets and packing of power train case, etc.
	LG-3	790-129-9070	1 kg	Can	Features: Resistance to heat Used as sealant for flange surfaces and bolts at high temperature locations; used to prevent seizure. Used as sealant for heat resistant gasket for at high temperature locations such as engine pre-combustion chamber, exhaust pipe.
	LG-4	790-129-9020	200 g	Tube	Features: Resistance to water, oil Used as sealant for flange surface, thread. Also possible to use as sealant for flanges with large clearance. Used as sealant for mating surfaces of final drive case, transmission case.
	LG-5	790-129-9080	1 kg	Plastic container	Used as sealant for various threads, pipe joints, flanges. Used as sealant for tapered plugs, elbows, nipples of hydraulic piping.
	LG-6	09940-00011	250 g	Tube	Features: Silicon based, resistant to heat, cold. Used as sealant for flange surface, thread. Used as sealant for oil pan, final drive case, etc.
	LG-7	09920-00150	150 g	Tube	Features: Silicon based, quick hardening type. Used as sealant for flywheel housing, intake manifold, oil pan, thermostat housing, etc.
Rust prevention lubricant	---	09940-00051	60 g	Can	Used as lubricant for sliding parts (to prevent squeaking).
Molybdenum disulfide lubricant	---	09940-00040	200 g	Tube	Used to prevent seizure or scuffing of the thread when press fitting or shrink fitting. Used as lubricant for linkage, bearings, etc.
Lithium grease	G2-L1	SYG-350LI SYG-400LI SYG-400LI-A SYG-160LI SYGA-160CNLI	Various	Various	General purpose type
Calcium grease	G2-CA	SSG2-400CA SYG2-350CA SYG2-400CA-A SYG2-160CA SYGA-16CNCA	Various	Various	Used for normal temperature, light load bearing at places in contact with water or steam.
Molybdenum disulfide grease	---	SYG2-400M	400 g (10/case)	Bellows type	Used for places with heavy load.

STANDARD TIGHTENING TORQUE

STANDARD TIGHTENING TORQUE OF BOLTS AND NUTS

The following charts give the standard tightening torques of bolts and nuts. Exceptions are given in sections of **DISASSEMBLY AND ASSEMBLY**.

1 kgm = 9.806 Nm

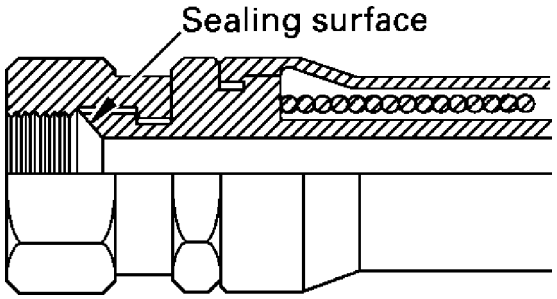
Thread diameter of bolt	Width across flat		
mm	mm	kgm	Nm
6	10	1.35 ±0.15	13.2 ±1.4
8	13	3.20 ±0.3	31.4 ±2.9
10	17	6.70 ±0.7	65.7 ±6.8
12	19	11.5 ±1.0	112 ±9.8
14	22	18 ±2.0	177 ±19
16	24	28.5 ±3	279 ±29
18	27	39 ±4	383 ±39
20	30	56 ±6	549 ±58
22	32	76 ±8	745 ±78
24	36	94.5 ±10	927 ±98
27	41	135 ±15	1320 ±140
30	46	175 ±20	1720 ±190
33	50	225 ±25	2210 ±240
36	55	280 ±30	2750 ±290
39	60	335 ±35	3280 ±340

This torque table does not apply to the bolts with which nylon packing or other non-ferrous metal washers are to be used, or which require tightening to otherwise specified torque.

TIGHTENING TORQUE OF SPLIT FLANGE BOLTS

Use these torques for split flange bolts.

Thread diameter of bolt	Width across flat	Tightening torque	
mm	mm	kgm	Nm
10	14	6.70 ±0.7	65.7 ±6.8
12	17	11.5 ±1.0	112 ±9.8
16	22	28.5 ±3	279 ±29



TIGHTENING TORQUE FOR FLARED NUTS

Use these torques for flared part of nut.

Thread diameter of bolt	Width across flat	Tightening torque	
mm	mm	kgm	Nm
14	19	2.5 ±0.5	24.5 ±4.9
18	24	5 ±2	49 ±19.6
22	27	8 ±2	78.5 ±19.6
24	32	14 ±3	137.3 ±29.4
30	36	18 ±3	176.5 ±29.4
33	41	20 ±5	196.1 ±49
36	46	25 ±5	245.2 ±49
42	55	30 ±5	294.2 ±49

ELECTRIC WIRE CODE

In the wiring diagrams, various colors and symbols are employed to indicate the thickness of wires. This wire code table will help you understand WIRING DIAGRAMS.
Example: 05WB indicates a cable having a nominal number 05 and white coating with black stripe.

CLASSIFICATION BY THICKNESS

Nominal number	Copper wire			Cable O.D. (mm)	Current rating (A)	Applicable circuit
	Number of strands	Dia. Of strand (mm)	Cross section (mm^2)			
0.85	11	0.32	0.88	2.4	12	Starting, lighting, signal etc.
2	26	0.32	2.09	3.1	20	Lighting, signal etc.
5	65	0.32	5.23	4.6	37	Charging and signal
15	84	0.45	13.36	7.0	59	Starting (Glow plug)
40	85	0.80	42.73	11.4	135	Starting
60	127	0.80	63.84	13.6	178	Starting
100	217	0.80	109.1	17.6	230	Starting

CLASSIFICATION BY COLOR AND CODE

Priority	Classification	Circuits	Charging	Ground	Starting	Lighting	Instruments	Signal	Other
1	Primary	Code	W	B	B	R	Y	G	L
		Color	White	Black	Black	Red	Yellow	Green	Blue
2	Auxiliary	Code	WR	---	BW	RW	YR	GW	LW
		Color	White/Red	---	Black/White	Red/White	Yellow/Red	Green/White	Blue/White
3		Code	WB	---	BY	RB	YB	GR	LR
		Color	White/Black	---	Black/Yellow	Red/Black	Yellow/Black	Green/Red	Blue/Red
4		Code	WL	---	BR	RY	YG	GY	LY
		Color	White/Blue	---	Black/Red	Red/Yellow	Yellow/Green	Green/Yellow	Blue/Yellow
5		Code	WG	---	---	RG	YL	GB	LB
		Color	White/Green	---	---	Red/Green	Yellow/Blue	Green/Black	Blue/Black
6		Code	---	---	---	RL	YW	GL	---
		Color	---	---	---	Red/Blue	Yellow/White	Green/Blue	---