CEBM009500

Shop Manual

avance

PC300LL-6

LOGGING EXCAVATOR

SERIAL NUMBERS **PC300LL-6** **A84001** and UP

January 2002

CONTENTS

IF A TOPIC IS NOT DIRECTLY ADDRESSED IN THE ADDENDUM FOR THE PC300LL, PLEASE USE THE TOPIC CONTAINED IN THE STANDARD *SHOP MANUAL* UNDER THE HEADING OF PC300LC OR PC300HD.

PRODUCT PUBLICATIONS INFORMATION

Various product Parts and Service Publications are available to all **KOMATSU** construction equipment owners, including operation and 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 & Service Manuals in foreign languages.

The Publications listed below are available for this particular machine(s).

DESCRIPTION	FORM NUMBER
PARTS BOOK	
Chassis and Engine - PC300LL-6	BEPB020400
OPERATION AND MAINTENANCE MANUAL	
Chassis and Engine	CEAM008500
SHOP MANUAL	
Chassis	CEBM002901
Engine	CEBM000601
SAFETY MANUAL	
Excavator	HE92-2

Parts and Service Publications can only be acquired by authorized KOMATSU distributors using the Komatsu America International Company Parts Inventory 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 KDC91E is shown on the reverse side of this page.

REQUISITION FOR TECHNICAL SERVICE PUBLICATIONS AND SERVICE FORMS

COMPLETE FORM AND RETURN TO ——ö

DataKom Publishing Corporation
440 North Fairway Drive
Vernon Hills, IL 60061-8112 U.S.A.
Attn: Service Publications
Fax No. (847) 970-4186
Tel No. (847) 970-5887

SHIP TO ——ö

TYPE or PRINT ONLY ——ö

COMPANY NAME
ATTN.
STREET ADDRESS
CITY, STATE, ZIP CODE
COUNTRY

PURCHASE ORDER NO.

ORDER DATE

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

KDC91E 072199

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 & 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

1. 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.

2. 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.

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

4. 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

1. 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.

2. 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.

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

4. 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.

5. 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.

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

7. When removing piping, stop the fuel or oil from spilling out. If any fuel or oil drips on to the floor, wipe it up immediately. Fuel or oil on the floor can cause you to slip, or can even start fires.

8. As a general rule, do not use gasoline to wash parts. In particular, use only the minimum of gasoline when washing electrical parts.

9. 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.

10. 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.

11. 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.

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

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

14. 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, ADJUSTING AND TROUBLESHOOTING

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

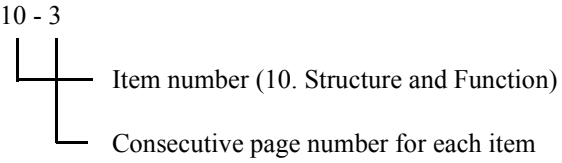
These various volumes are designed to avoid duplication of information. Therefore to deal with all repairs for any model, it is necessary that chassis, engine, electrical and attachment be available.

DISTRIBUTION AND UPDATING

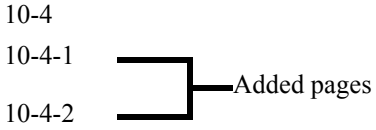
Any additions, amendments or other changes will be sent to your distributors. Get the most up-to-date information before you start any work.

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:



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



REVISED EDITION MARK

When a manual is revised, an edition mark (①②③…) 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

WARNING! 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

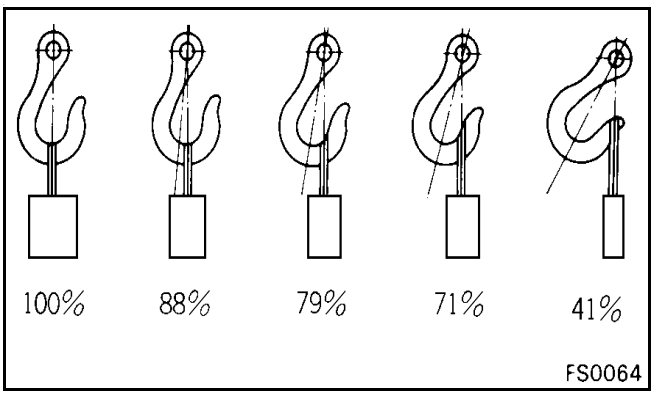
1. Use adequate ropes depending on the weight of parts to be hoisted, referring to the table below:

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

Rope diameter	Allowable load	
mm	kN	tons
10	9.8	1.0
11.2	13.7	1.4
12.5	15.7	1.6
14	21.6	2.2
16	27.5	2.8
18	35.3	3.6
20	43.1	4.4
22.4	54.9	5.6
30	98.1	10.0
40	176.5	18.0
50	274.6	28.0
60	392.2	40.0

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

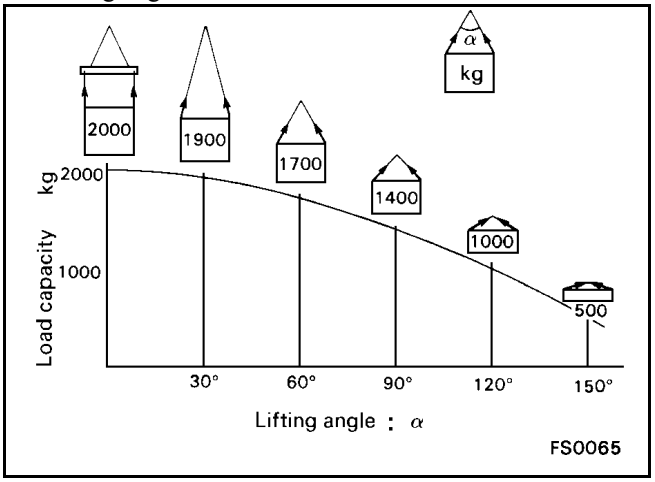
2. Sling wire ropes from the middle portion of the hook. Slinging near the edge of the hook may cause the rope to slip off the hook during hoisting, and a serious accident can result. Hooks have maximum strength at the middle portion.



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

WARNING! 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° hanging angle. On the 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°



COATING MATERIALS

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

Category	Code	Part No.	Quantity	Container	Main applications, features
Adhesives	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 (2 pes.)	Polyethylene 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	Polyethylene 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)	Adhesive: 1 kg Hardening agent: 500 g	Can	● Used as adhesive or sealant for metal, glass or plastic.
	LT-4	790-129-9040	250 g	Polyethylene container	● Used as sealant for machined holes.
	Holtz MH 705	790-126-9120	75 g	Tube	● Used as heat-resisting sealant for repairing engine.
	Three bond 1735	179-129-9140	2 g	Polyethylene container	● Quick hardening type adhesive. ● Cure time: within 5 sec. to 3 min. ● Used mainly for adhesion of metals, rubbers, plastics and woods.
	Aron-alpha 201	790-129-9130	50 g	Polyethylene container	● Quick hardening type adhesive. ● Quick cure type (max. strength after 30 minutes). ● Used mainly for adhesion of rubbers, plastics and metals.
	Loctite 648-50	79A-129-9110	50 cc	Polyethylene container	● 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.

Category	Code	Part No.	Quantity	Container	Main applications, features
Gasket sealant	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	Polyethylene 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.
	Three bond 1211	790-129-9090	100 g	Tube	● Used as heat-resisting sealant for repairing engines.
Molybdenum disulphide lubricant	LM-G	09940-00051	60 g	Can	● Used as lubricant for sliding parts (to prevent squeaking).
	LM-P	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.
Grease	G2-LI	SYG2-400LI SYG2-350LI SYG2-400LI-A SYG2-160LI SYGA160CNLI	Various	Various	● General purpose type
	G2-CA	SYG2-400CA SYG2-350CA SYG2-400CA-A SYG2-160CA SYG2-160CNCA	Various	Various	● Used for normal temperature, light load bearing at places in contact with water or steam.
	Molybdenum disulphide lubricant	SYG2-400M	400 g (10 per case)	Belows 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 DISASSEMBLY AND ASSEMBLY.

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

Thread diameter of bolt	Width across flats	
mm	mm	Nm	kgm
6	10	7.85 ± 1.95	0.8 ± 0.2
8	13	18.6 ± 4.9	1.9 ± 0.5
10	14	40.2 ± 5.9	4.1 ± 0.6
12	27	82.35 ± 7.85	8.4 ± 0.8

TIGHTENING TORQUE OF HOSE NUTS

Use these torques for hose nuts.

Nominal No.	Thread diameter	Width across flat	Tightening torque	
	mm	mm	Nm	kgm
02	14	19	24.5 ± 4.9	2.5 ± 0.5
03	18	24	49 ± 19.6	5 ± 2
04	22	27	78.5 ± 19.6	8 ± 2
05	24	32	137.3 ± 29.4	14 ± 3
06	30	36	176.5 ± 29.4	18 ± 3
10	33	41	196.1 ± 49	20 ± 5
12	36	46	245.2 ± 49	25 ± 5
14	42	55	294.2 ± 49	30 ± 5

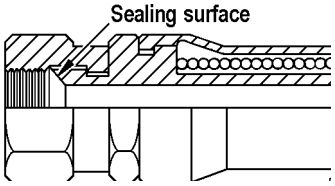
TIGHTENING TORQUE OF SPLIT FLANGE BOLTS

Use these torques for split flange bolts.

Thread diameter	Width across flat	Tightening torque	
mm	mm	Nm	kgm
10	14	65.7 ± 6.8	6.7 ± 0.7
12	17	112 ± 9.8	11.5 ± 1
16	22	279 ± 29	28.5 ± 3

TIGHTENING TORQUE FOR FLARED NUTS

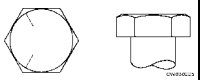
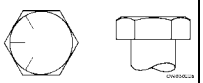
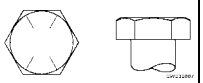
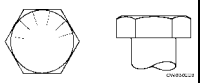
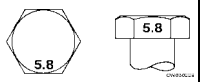
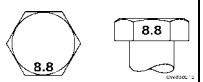
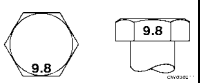
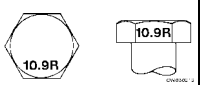
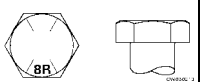
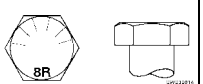
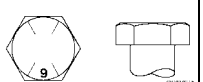
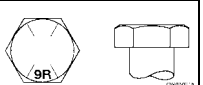
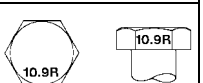
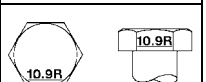
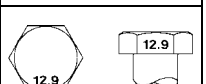
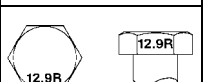
Use these torques for flared part of nut.



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

ALTERNATIVE FASTENERS

BOLT IDENTIFICATION CHART

TYPE/CLASS	DESCRIPTION	HEAD MARK
Type 5 Inch Thread	Three radial lines on top and none on side of head. Medium carbon steel quenched and tempered.	
Type 5.2 Inch Thread	Three radial lines on top and none on side of head. Low carbon boron steel quenched and tempered.	
Type 8 Inch Thread	Six radial lines on top and none on side of head. Medium carbon or carbon alloy steel quenched and tempered.	
Type 8.2 Inch Thread	Six radial lines on top and none on side of head. Low carbon boron steel quenched and tempered.	
Class 5.8 Metric Thread	Marked on top or side of head. Low or medium carbon steel.	
Class 8.8 Metric Thread	Marked on top or side of head. Medium carbon or carbon alloy or low carbon boron steel quenched and tempered.	
Class 9.8 Metric Thread	Marked on top or side of head. Medium carbon or carbon alloy or low carbon boron steel quenched and tempered.	
Class 10.9 Metric Thread	Marked on top or side of head. Medium carbon or carbon alloy or low carbon boron steel quenched and tempered.	
Type 8R Inch Thread	Six radial lines on head with type designation, none on sides. Medium carbon or medium carbon alloy steel quenched and tempered.	
Type 8R Inch Thread	Six radial lines on head with type designation, none on sides. Low carbon boron steel quenched and tempered.	
Type 9 Inch Thread	Six radial lines on head with type designation, none on sides. Medium carbon alloy steel quenched and tempered.	
Type 9R Inch Thread	Six radial lines on head with type designation, none on sides. Medium carbon alloy steel quenched and tempered.	
Class 10.9R Metric Thread	Marked on top or side of head. Medium carbon or carbon alloy steel quenched and tempered.	
Class <u>10.9R</u> Metric Thread	Marked on top or side of head and underlined. Low carbon boron steel quenched and tempered.	
Class 12.9 Metric Thread	Marked on top or side of head. Medium carbon alloy steel quenched and tempered.	
Class 12.9R Metric Thread	Marked on top or side of head. Medium carbon alloy steel quenched and tempered.	

GRADE 5 AND 8 NON-PHOSPHATE COATED HARDWARE

Recommended torque for all standard application nuts and bolts, provided; all thread surfaces are clean and lubricated with SAE-30 engine oil or joints are rigid, that is, no gaskets or compressible materials are used. When reusing nuts or bolts, use minimum torque values.

THREAD	GRADE 5	
	N•m	lbf ft
1/4NC	8	6
1/4NF	9	7
5/16NC	18	13
5/16NF	20	15
3/8NC	33	24
3/8NF	37	27
7/16NC	52	38
7/16NF	57	42
1/2NC	79	58
1/2NF	88	65
9/16NC	114	84
9/16NF	126	93
5/8NC	156	115
5/8NF	175	130
3/4NC	278	205
3/4NF	312	240
7/8NC	414	305
7/8NF	454	334
1NC	617	455
1NF	691	510
1-1/8NC	827	610
1-1/8NF	929	685
1-1/4NC	1166	860
1-1/4NF	1295	955
1-3/8NC	1532	1130
1-3/8NF	1749	1290
1-1/2NC	2034	1400
1-1/2NF	2291	1690
1-3/4NC	3213	2370
2NC	4813	3550

THREAD	GRADE 8	
	N•m	lbf ft
1/4NC	12	9
1/4NF	15	11
5/16NC	24	18
5/16NF	28	21
3/8NC	46	34
3/8NF	52	38
7/16NC	73	54
7/16NF	81	60
1/2NC	111	82
1/2NF	122	90
9/16NC	163	120
9/16NF	179	132
5/8NC	224	165
5/8NF	251	185
3/4NC	393	290
3/4NF	434	320
7/8NC	617	455
7/8NF	698	515
1NC	942	695
1NF	1064	785
1-1/8NC	1342	990
1-1/8NF	1505	1110
1-1/4NC	1898	1400
1-1/4NF	2102	1550
1-3/8NC	2481	1830
1-3/8NF	2827	2085
1-1/2NC	3295	2430
1-1/2NF	3701	2730
1-3/4NC	5166	3810
2NC	7810	5760

Multiply the standard torque by 0.65 when finished jam nuts are used, 0.7 when molykote, white lead or similar mixture are used as lubricants, 0.75 when parkerized bolts or nuts are used, 0.85 when cadmium plated bolts or nuts and zinc bolts with waxed zinc nuts are used or 0.9 when hardened surfaces are used under the nut or bolt head. The general torque must be used in all cases where special torques are not given. Values listed in this manual are lubricated (wet) threads; values should be increased 1/3 for non lubricated (dry) threads.

GRADE 8 PHOSPHATE COATED HARDWARE

NOMINAL THREAD	STANDARD TORQUE ± 10%	
	N•m	lbf ft
1/4	10	8
5/16	21	16
3/8	38	28
7/16	60	45
1/2	92	70
9/16	130	100
5/8	180	140
3/4	325	240
7/8	520	590
1	780	580
1-1/8	1110	820
1-1/4	1565	1160
1-3/8	2050	1520
1-1/2	2720	2020
1-3/4	3380	2510
2	5080	3780

This chart provides tightening torque for general purpose applications using original equipment standard hardware as listed in the Parts Books for the machine involved.

DO NOT SUBSTITUTE.

Original equipment standard hardware is defined as Grade 8, coarse thread bolts and nuts and thru hardened flat washers (Rockwell C 38-45), all phosphate coated and assembled without supplemental lubrication (as received) condition.

The torques shown also apply to the following;

Phosphate coated bolts used in tapped holes in steel or gray iron. Phosphate coated bolts used with phosphate coated prevailing torque nuts (nuts with distorted threads or plastic inserts). Phosphate coated bolts used with copper plated weld nuts.

Markings on bolt heads or nuts indicate material grade only and are not to be used to determine required torque.

STANDARD METRIC FASTENERS

NOMINAL THREAD	STANDARD TORQUE ± 10%	
	N•m	lbf ft
6	10	7
7	16	12
8	23	17
10	46	34
12	80	60
14	125	90
16	200	150
18	275	200
20	385	290
22	530	390
24	670	500
27	980	730
30	1330	990
33	1790	1330
36	2325	1730
39	3010	2240

This chart provides tightening torque for general purpose applications using original standard hardware as listed in the Parts Book for the machine involved.

DO NOT SUBSTITUTE.

Original standard hardware is defined as metric class 10.9 bolts and class 10.0 nuts and thru flat washers (Rockwell C 38-45), all phosphate coated and assembled without supplemental lubrication.

The torques shown also apply to the following;

Phosphate bolts used in tapped holes in steel or gray iron, with phosphate coated prevailing torque nuts or with copper plated weld nuts.

Markings on bolt heads or nuts indicate material class only and are not to be used to determine required torque.

HYDRAULIC TUBES AND FITTINGS

The torque figures are recommended for plain, cadmium or zinc plated fittings, dry or wet installations. Swivel nuts either swaged or brazed. Figures are for tube nuts used with 37° flared fittings and JIC - 37° seat o-ring boss plugs and swivel nuts.

Tube Nuts			O-ring Boss Plugs And Swivel Nuts	
For 37° Flared Fitting			JIC 37° Seat	
Size	Tubing OD	Thread	N•m	lbf ft
4	1/4	7/16-20	12 to 16	9 to 12
5	5/16	1/2-20	16 to 20	12 to 15
6	3/8	9/16-18	33 to 21	21 to 24
8	1/2	3/4-16	47 to 54	35 to 40
10	5/8	7/8-14	72 to 79	53 to 58
12	3/4	1-1/16-12	104 to 111	77 to 82
14	7/8	1-3/16-12	122 to 136	90 to 100
16	1	1-5/16-12	149 to 163	110 to 120
20	1-1/4	1-5/8-12	190 to 204	140 to 150
24	1-1/2	2-1/2-12	217 to 237	162 to 175
32	2	2-1/2-12	305 to 325	225 to 240

HOSE CLAMPS

This chart provides the tightening torques for hose clamps used in all rubber applications (radiator, air cleaner, operating lever boots, hydraulic system, fuel systems etc.).

Clamp Type and Size	Torque ± 0.6 N•m (5 lbf in)			
	Hydraulic System		All Others	
	N•m	lbf in	N•m	lbf in
T Bolt	---	---	6.2 to 7.3	55 to 65
Worm drive under 1-3/4 in open diameter	4.5 to 5.6	40 to 50	2.2 to 3.3	20 to 30
Worm drive over 1-3/4 in open diameter	---	---	4.5 to 5.6	40 to 50
Worm drive all Ultra-Tite	4.5 to 5.6	40 to 50	10.7 to 11.8	95 to 105

SPLIT FLANGE CONNECTIONS

The following chart provides the tightening torques for split flange connections used in hydraulic systems. Flanges and fitting shoulders should fit squarely. Install all bolts, finger tight, then torque evenly. Over torquing bolts will damage the flanges and/or bolts, which may cause leakage.

Flange Size	Bolt Size	Bolt Torque	
		N•m	lbf ft
1/2	5/16	20 to 24	15 to 18
3/4	3/8	30 to 37	22 to 27
1	3/8	37 to 47	27 to 35
1-1/4	7/16	47 to 61	35 to 45
1-1/2	1/2	62 to 79	46 to 58
2	1/2	75 to 88	55 to 65
2-1/2	1/2	107 to 123	79 to 91
3	5/8	187 to 203	138 to 150
3-1/2	5/8	159 to 180	117 to 133

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)			
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	Circuits Classification		Charging	Ground	Starting	Lighting	Instrument	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	—

CONVERSION TABLES

METHOD OF USING THE CONVERSION TABLE

The Conversion Table in this section is provided to enable simple conversion of figures. For details of the method of using the Conversion Table, see the example given below.

EXAMPLE

- Method of using the Conversion Table to convert from millimeters to inches.

1. Convert 55 mm into inches.
   A. Locate the number 50 in the vertical column at the left side, take this as ①, then draw a horizontal line from ①.

   B. Locate the number 5 in the row across the top, take this as ②, then draw a perpendicular line down from ②.

   C. Take the point where the two lines cross as ③. This point ③ gives the value when converting from millimeters to inches. Therefore, 55 millimeters = 2.165 inches.

2. Convert 550 mm into inches.
   A. The number 550 does not appear in the table, so divide by 10 (move the decimal one place to the left) to convert it to 55 mm.

   B. Carry out the same procedure as above to convert 55 mm to 2.165 inches.

   C. The original value (550 mm) was divided by 10, so multiply 2.165 inches by 10 (move the decimal one place to the right) to return to the original value. This gives 550 mm = 21.65 inches.

Millimeters to inches — 1 mm = 0.03937 in

	0	1	2	3	4	5 ②	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
						③				
50 ①	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Millimeters to Inches **1 mm = 0.03937 in**

	0	1	2	3	4	5	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
50	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Kilogram to Pound **1 kg = 2.2046 lb**

	0	1	2	3	4	5	6	7	8	9
0	0	2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	51.91	55.12	57.32	59.53	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	112.44	114.64	116.85	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.10	143.30	145.51	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.76	171.96	174.17
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.01	196.21
90	198.42	200.62	202.83	205.03	207.24	209.44	211.64	213.85	216.05	218.26

Liter to U.S. Gallon **1 L = 0.2642 U.S. Gal**

	0	1	2	3	4	5	6	7	8	9
0	0	0.264	0.528	0.793	1.057	1.321	1.585	1.849	2.113	2.378
10	2.642	2.906	3.170	3.434	3.698	3.963	4.227	4.491	4.755	5.019
20	5.283	5.548	5.812	6.076	6.340	6.604	6.869	7.133	7.397	7.661
30	7.925	8.189	8.454	8.718	8.982	9.246	9.510	9.774	10.039	10.303
40	10.567	10.831	11.095	11.359	11.624	11.888	12.152	12.416	12.680	12.944
50	13.209	13.473	13.737	14.001	14.265	14.529	14.795	15.058	15.322	15.586
60	15.850	16.115	16.379	16.643	16.907	17.171	17.435	17.700	17.964	18.228
70	18.492	18.756	19.020	19.285	19.549	19.813	20.077	20.341	20.605	20.870
80	21.134	21.398	21.662	21.926	22.190	22.455	22.719	22.983	23.247	23.511
90	23.775	24.040	24.304	24.568	24.832	25.096	25.361	25.625	25.889	26.153

Liter to U.K. Gallon **1 L = 0.21997 U.K. Gal**

	0	1	2	3	4	5	6	7	8	9
0	0	0.220	0.440	0.660	0.880	1.100	1.320	1.540	1.760	1.980
10	2.200	2.420	2.640	2.860	3.080	3.300	3.520	3.740	3.950	4.179
20	4.399	4.619	4.839	5.059	5.279	5.499	5.719	5.939	6.159	6.379
30	6.599	6.819	7.039	7.259	7.479	7.699	7.919	8.139	8.359	8.579
40	8.799	9.019	9.239	9.459	9.679	9.899	10.119	10.339	10.559	10.778
50	10.998	11.281	11.438	11.658	11.878	12.098	12.318	12.528	12.758	12.978
60	13.198	13.418	13.638	13.858	14.078	14.298	14.518	14.738	14.958	15.178
70	15.398	15.618	15.838	16.058	16.278	16.498	16.718	16.938	17.158	17.378
80	17.598	17.818	18.037	18.257	18.477	18.697	18.917	19.137	19.357	19.577
90	19.797	20.017	20.237	20.457	20.677	20.897	21.117	21.337	21.557	21.777

kgm to ft. lb. **1 kgm = 7.233 ft. lb.**

	0	1	2	3	4	5	6	7	8	9
0	0	7.2	14.5	21.7	28.9	36.2	43.4	50.6	57.9	65.1
10	72.3	79.6	86.8	94.0	101.3	108.5	115.7	123.0	130.2	137.4
20	144.7	151.9	159.1	166.4	173.6	180.8	188.1	195.3	202.5	209.8
30	217.0	224.2	231.5	238.7	245.9	253.2	260.4	267.6	274.9	282.1
40	289.3	296.6	303.8	311.0	318.3	325.5	332.7	340.0	347.2	354.4
50	361.7	368.9	376.1	383.4	390.6	397.8	405.1	412.3	419.5	426.8
60	434.0	441.2	448.5	455.7	462.9	470.2	477.4	484.6	491.8	499.1
70	506.3	513.5	520.8	528.0	535.2	542.5	549.7	556.9	564.2	571.4
80	578.6	585.9	593.1	600.3	607.6	614.8	622.0	629.3	636.5	643.7
90	651.0	658.2	665.4	672.7	679.9	687.1	694.4	701.6	708.8	716.1
100	723.3	730.5	737.8	745.0	752.2	759.5	766.7	773.9	781.2	788.4
110	795.6	802.9	810.1	817.3	824.6	831.8	839.0	846.3	853.5	860.7
120	868.0	875.2	882.4	889.7	896.9	904.1	911.4	918.6	925.8	933.1
130	940.3	947.5	954.8	962.0	969.2	976.5	983.7	990.9	998.2	1005.4
140	1012.6	1019.9	1027.1	1034.3	1041.5	1048.8	1056.0	1063.2	1070.5	1077.7
150	1084.9	1092.2	1099.4	1106.6	1113.9	1121.1	1128.3	1135.6	1142.8	1150.0
160	1157.3	1164.5	1171.7	1179.0	1186.2	1193.4	1200.7	1207.9	1215.1	1222.4
170	1129.6	1236.8	1244.1	1251.3	1258.5	1265.8	1273.0	1280.1	1287.5	1294.7
180	1301.9	1309.2	1316.4	1323.6	1330.9	1338.1	1345.3	1352.63	1359.8	1367.0
190	1374.3	1381.5	1388.7	1396.0	1403.2	1410.4	1417.7	1424.9	1432.1	1439.4

kg/cm^2 to lb/in^2 **1 kg/cm^2 = 14.2233lb/in^2**

	0	1	2	3	4	5	6	7	8	9
0	0	14.2	28.4	42.7	56.9	71.1	85.3	99.6	113.8	128.0
10	142.2	156.5	170.7	184.9	199.1	213.4	227.6	241.8	256.0	270.2
20	284.5	298.7	312.9	327.1	341.4	355.6	369.8	384.0	398.3	412.5
30	426.7	440.9	455.1	469.4	483.6	497.8	512.0	526.3	540.5	554.7
40	568.9	583.2	597.4	611.6	625.8	640.1	654.3	668.5	682.7	696.9
50	711.2	725.4	739.6	753.8	768.1	782.3	796.5	810.7	825.0	839.2
60	853.4	867.6	881.8	896.1	910.3	924.5	938.7	953.0	967.2	981.4
70	995.6	1010	1024	1038	1053	1067	1081	1095	1109	1124
80	1138	1152	1166	1181	1195	1209	1223	1237	1252	1266
90	1280	1294	1309	1323	1337	1351	1365	1380	1394	1408
100	1422	1437	1451	1465	1479	1493	1508	1522	1536	1550
110	1565	1579	1593	1607	1621	1636	1650	1664	1678	1693
120	1707	1721	1735	1749	1764	1778	1792	1806	1821	1835
130	1849	1863	1877	1892	1906	1920	19324	1949	1963	1977
140	1991	2005	2034	2048	2062	2077	2091	2105	2119	
150	2134	2148	2162	2176	2190	2205	2219	2233	2247	2262
160	2276	2290	2304	2318	2333	2347	2361	2375	2389	2404
170	2418	2432	2446	2460	2475	2489	2503	2518	2532	2546
180	2560	2574	2589	2603	2617	2631	2646	2660	2674	2688
190	2702	2717	2731	2745	2759	2773	2788	2802	2816	2830
200	2845	2859	2873	2887	2901	2916	2930	2944	2958	2973
210	2987	3001	3015	3030	3044	3058	3072	3086	3101	3115
220	3129	3143	3158	3172	3186	3200	3214	3229	3243	3257
230	3271	3286	3300	3314	3328	3343	3357	3371	3385	3399
240	3414	3428	3442	3456	3470	3485	3499	3513	3527	3542

Temperature

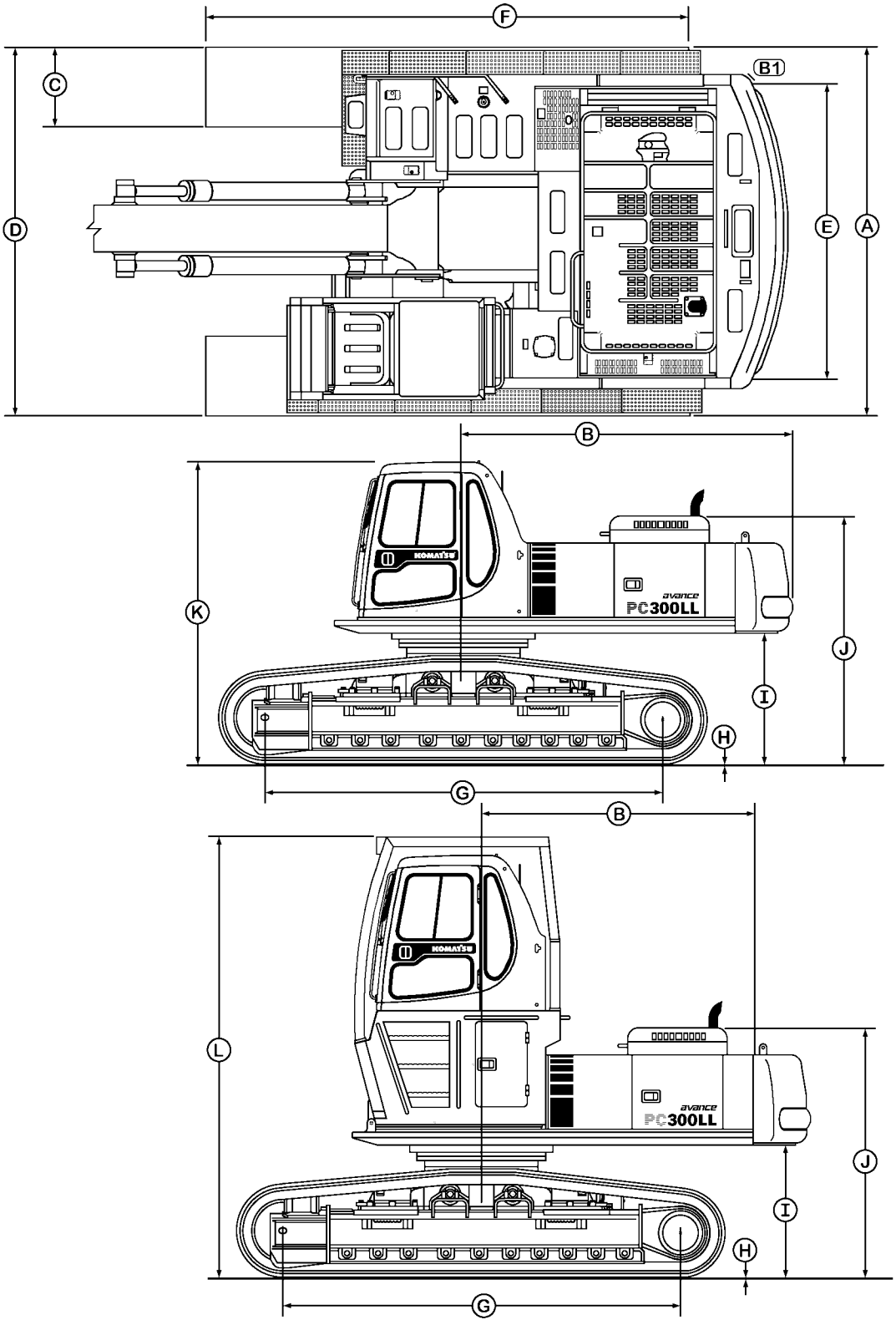
Fahrenheit Centigrade Conversion; a simple way to convert a Fahrenheit temperature reading into a Centigrade temperature reading or vise versa is to enter the accompanying table in the center or boldface column of figures. These figures refer to the temperature in either Fahrenheit or Centigrade degrees. If it is desired to convert from Fahrenheit to Centigrade degrees, consider the center column as a table of Fahrenheit temperatures and read the corresponding Centigrade temperature in the column at the left. If it is desired to convert from Centigrade to Fahrenheit degrees, consider the center column as a table of Centigrade values, and read the corresponding Fahrenheit temperature on the right.

°C		°F	°C		°F	°C		°F	°C		°F
-40.4	-40	-40.0	-11.7	11	51.8	7.8	46	114.8	27.2	81	117.8
-37.2	.35	-31.0	-11.1	12	53.6	8.3	47	116.6	27.8	82	179.6
-34.4	-30	-22.0	-10.6	13	55.4	8.9	48	118.4	28.3	83	181.4
-31.7	-25	-13.0	-10.0	14	57.2	9.4	49	120.2	28.9	84	183.2
-28.9	-20	-4.0	-9.4	15	59.0	10.0	50	122.0	29.4	85	185.0
-28.3	-19	-2.2	-8.9	16	60.8	10.6	51	123.8	30.0	86	186.8
-27.8	-18	-0.4	-8.3	17	62.6	11.1	52	125.6	30.6	87	188.6
-27.2	-17	1.4	-7.8	18	64.4	11.7	53	127.4	31.1	88	190.4
-26.7	-16	3.2	-7.2	19	66.2	12.2	54	129.2	31.7	89	192.2
-26.1	-15	5.0	-6.7	20	68.0	12.8	55	131.0	32.2	90	194.0
-25.6	-14	6.8	-6.1	21	69.8	13.3	56	132.8	32.8	91	195.8
-25.0	-13	8.6	-5.6	22	71.6	13.9	57	134.6	33.3	92	197.6
-24.4	-12	10.4	-5.0	23	73.4	14.4	58	136.4	33.9	93	199.4
-23.9	-11	12.2	-4.4	24	75.2	15.0	59	138.2	34.4	94	201.2
-23.3	-10	14.0	-3.9	25	77.0	15.6	60	140.0	35.0	95	203.0
-22.8	-9	15.8	-3.3	26	78.8	16.1	61	141.8	35.6	96	204.8
-22.2	-8	17.6	-2.8	27	80.6	16.7	62	143.6	36.1	97	206.6
-21.7	-7	19.4	-2.2	28	82.4	17.2	63	145.4	36.7	98	208.4
-21.1	-6	21.2	-1.7	29	84.2	17.8	64	147.2	37.2	99	210.2
-20.6	-5	23.0	-1.1	30	86.0	18.3	65	149.0	37.8	100	212.0
-20.0	-4	24.8	-0.6	31	87.8	18.9	66	150.8	40.6	105	221.0
-19.4	-3	26.6	0	32	89.6	19.4	67	152.6	43.3	110	230.0
-18.9	-2	28.4	0.6	33	91.4	20.0	68	154.4	46.1	115	239.0
-18.3	-1	30.2	1.1	34	93.2	20.6	69	156.2	48.9	120	248.0
-17.8	0	32.0	1.7	35	95.0	21.1	70	158.0	51.7	125	257.0
-17.2	1	33.8	2.2	36	96.8	21.7	71	159.8	54.4	130	266.0
-16.7	2	35.6	2.8	37	98.6	22.2	72	161.6	57.2	135	275.0
-16.1	3	37.4	3.3	38	100.4	22.8	73	163.4	60.0	140	284.0
-15.6	4	39.2	3.9	39	102.2	23.3	74	165.2	62.7	145	293.0
-15.0	5	41.0	4.4	40	104.0	23.9	75	167.0	65.6	150	302.0
-14.4	6	42.8	5.0	41	105.8	24.4	76	168.8	68.3	155	311.0
-13.9	7	44.6	5.6	42	107.6	25.0	77	170.6	71.1	160	320.0
-13.3	8	46.4	6.1	43	109.4	25.6	78	172.4	73.9	165	329.0
-12.8	9	48.2	6.7	44	111.2	26.1	79	174.2	76.7	170	338.0
-12.2	10	50.0	7.2	45	113.0	26.7	80	176.0	79.4	175	347.0

01 GENERAL

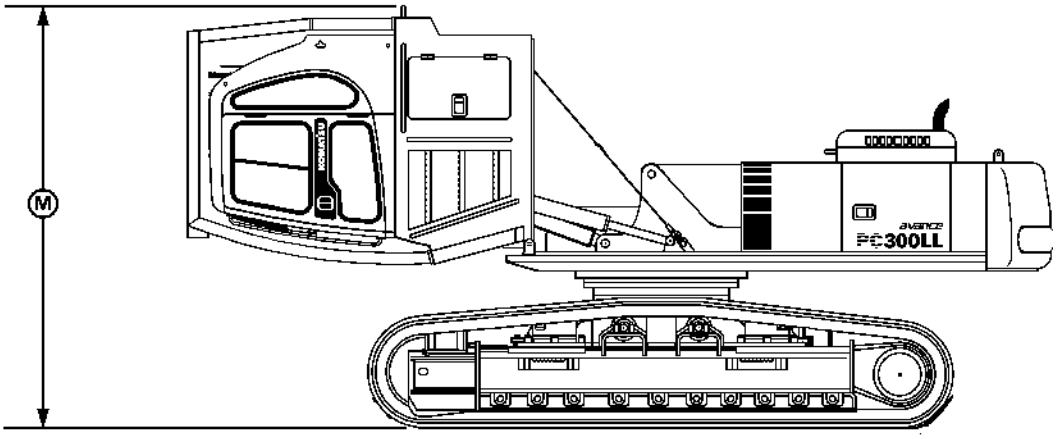
GENERAL ASSEMBLY DRAWING

PC300LL-6



VESM0181

Item	Description		Dimension
A	Overall width		3570 mm
B	Swing center to rear end distance		3285 mm
B1	Tail swing radius		3300 mm
C	Track shoe width		700 mm
D	Width of crawler		3570 mm
E	Track gauge		2870 mm
F	Track length		5355 mm
G	Length of track on ground		4020 mm
H	Grouser height		36 mm
I	Ground clearance, counterweight		1452 mm
J	Engine compartment height		2856 mm
K	Overall height (for transport)	w/o riser or guard	3392 mm
L		with riser and guard	4809 mm
M		with riser tilted	3943 mm



VESM0182

SPECIFICATIONS
PC300LL-6

Machine Model			PC300LL-6
Serial numbers			A85001 and up
Bucket Capacity			1.2 (m^3)
Operating Weight (W/O work equipment)		(kg)	30,350
Performance	Swing speed	(rpm)	9.1
	Swing maximum slope angle (w/std work equipment)	(°.)	21.0
	Travel speed	(km/h)	Lo: 2.5 Mi: 3.5 Hi: 4.4
	Gradeability	(°)	35
	Ground pressure (shoe width: 700 mm)	(kg/cm^2)	0.54
Dimensions	Overall length (for transport)	(mm)	No KA work equipment
	Overall width	(mm)	3570
	Overall width of track	(mm)	3570
	Overall height (for transport)	(mm)	3392 (w/o riser) 3943 (w/riser tilted)
	Overall height to top of cab	(mm)	3392 (w/o riser) 4809 (w/riser & cab guard)
	Ground clearance of counterweight	(mm)	1452
	Minimum ground clearance	(mm)	706
	Tail swing radius	(mm)	3300
	Minimum swing radius of work equipment	(mm)	No KA work equipment
	Height of work equipment at minimum swing radius	(mm)	No KA work equipment
	Length of track on ground	(mm)	4020
	Track gauge	(mm)	2870
	Height of engine hood	(mm)	2856

WEIGHT TABLE

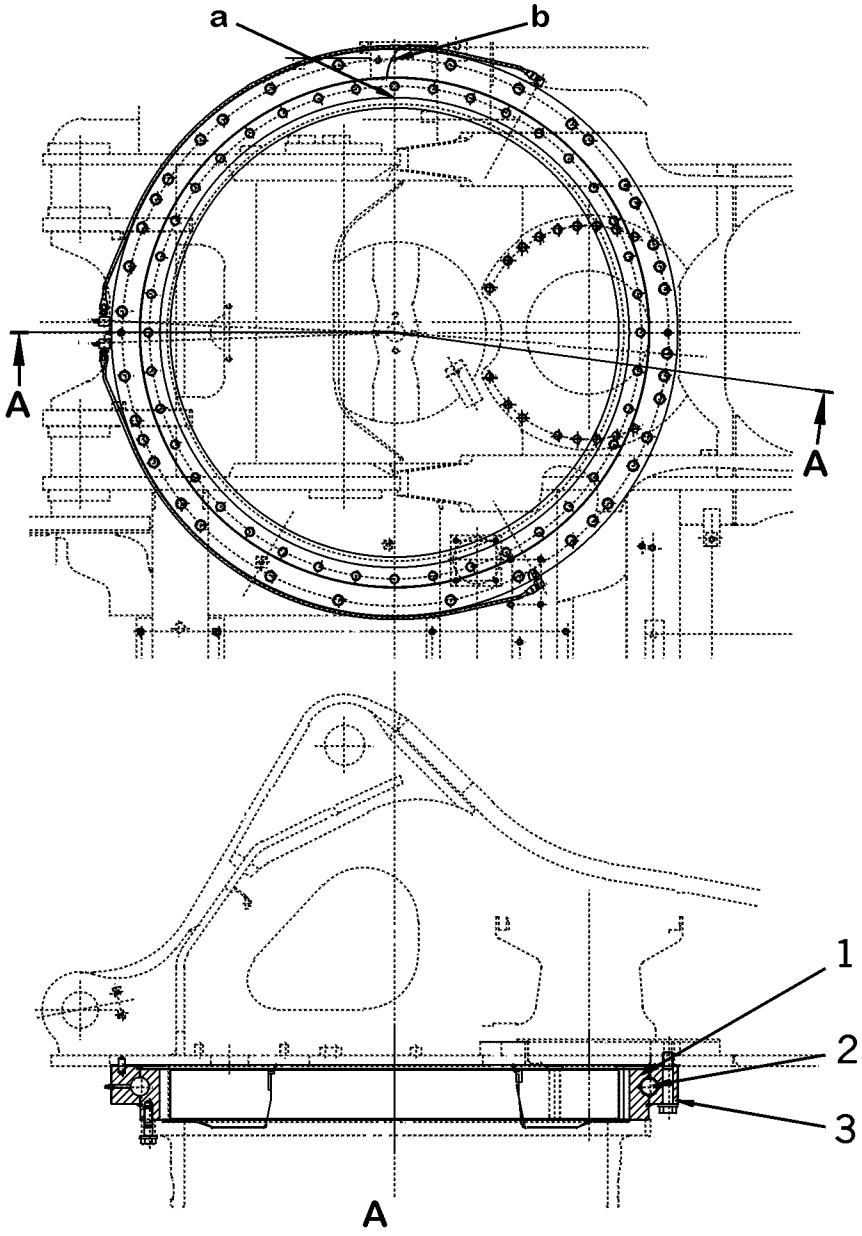
WARNING! This weight table is a guide for use when transporting or handling components.

Unit: kg

Machine model	PC300LL-6
Serial Number	A85001 and up
Engine assembly	1000
• Engine	675
• Damper	14.7
• Hydraulic pump	200
Radiator, oil cooler assembly	165
Hydraulic tank, filter assembly (excl. oil)	226
Fuel tank (excl. fuel)	218
Revolving frame	3434
Operators cab	287
Operators seat	29
Counterweight	6320
Swing machinery	491
Control valve	256
Travel motor	173 x 2
Center swivel joint	37
Track frame assembly	11,175
• Track frame	7,885
• Swing circle	605
• Idler	272 x 2
• Idler cushion	367 x 2
• Carrier roller	85 x 4
• Track roller	74 x 14
• Final drive (includes travel motor)	788 x 2
Track shoe assembly	
• Standard triple grouser shoe (600 mm)	4,430
• Standard triple grouser shoe (700 mm)	4,850
• Wide triple grouser shoe (800 mm)	5,290
• Standard double grouser shoe (700 mm)	5,450
• Standard triple grouser HD shoe (700 mm)	5,220

10 STRUCTURE AND FUNCTION

SWING CIRCLE



SAP00144

1. Swing circle inner race. . . . . 90 tooth
2. Ball
3. Swing circle outer race

a. Inner race soft zone “S” position

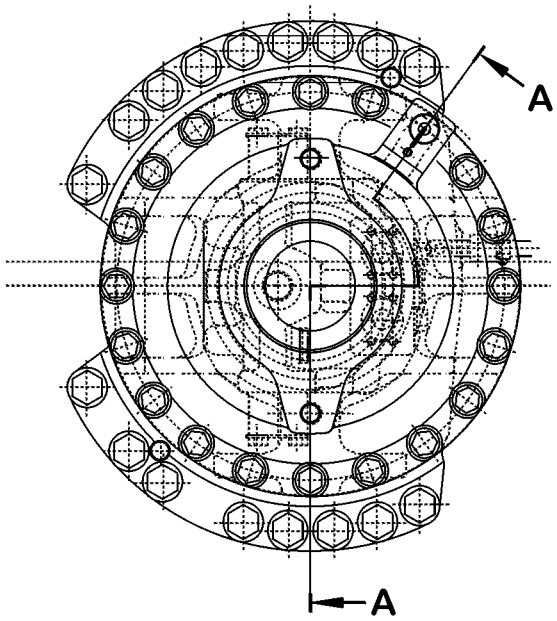
b. Outer race soft zone “S” position

Specifications:

Reduction ratio: . . . . . $-\frac{84}{13} = -6.462$

Amount of grease 33L (G2-L1)

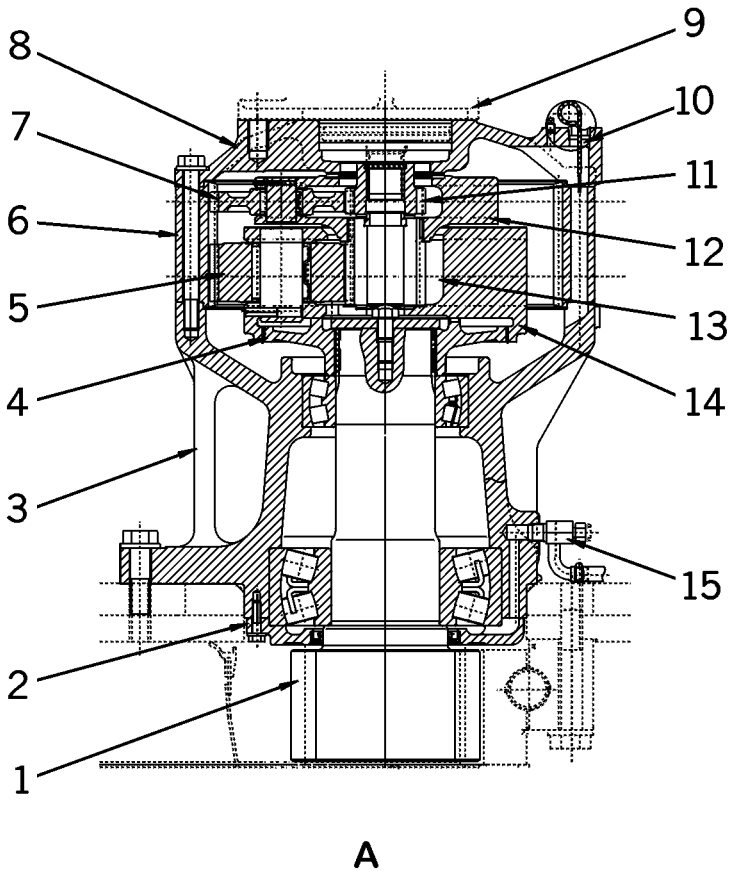
SWING MACHINERY



1. Swing pinion. . . . . 13 tooth
2. Cover
3. Case
4. Coupling
5. No. 2 planetary gear . . . . . 38 tooth
6. Ring gear. . . . . 97 tooth
7. No. 1 planetary gear . . . . . 38 tooth
8. Cover
9. Swing motor
10. Oil level gauge
11. No.1 sun gear. . . . . 20 tooth
12. No.1 planetary carrier
13. No.2 sun gear. . . . . 19 tooth
14. No. 2 planetary carrier
15. Drain plug

Specifications:

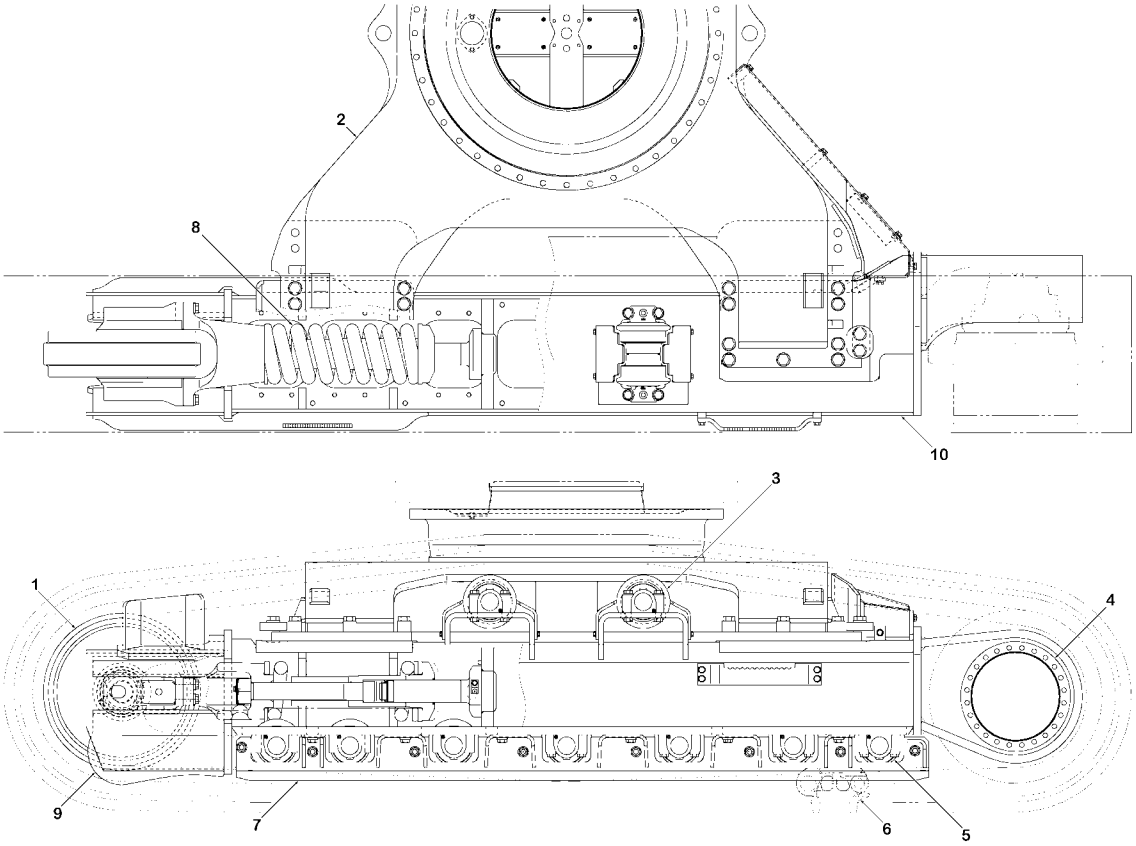
Reduction ratio: . . . . . $\frac{20+97}{20} \times \frac{19+97}{19} = 35.716$



SAP00146

TRACK FRAME • RECOIL SPRING

★ The diagram shows the PC300LL-6



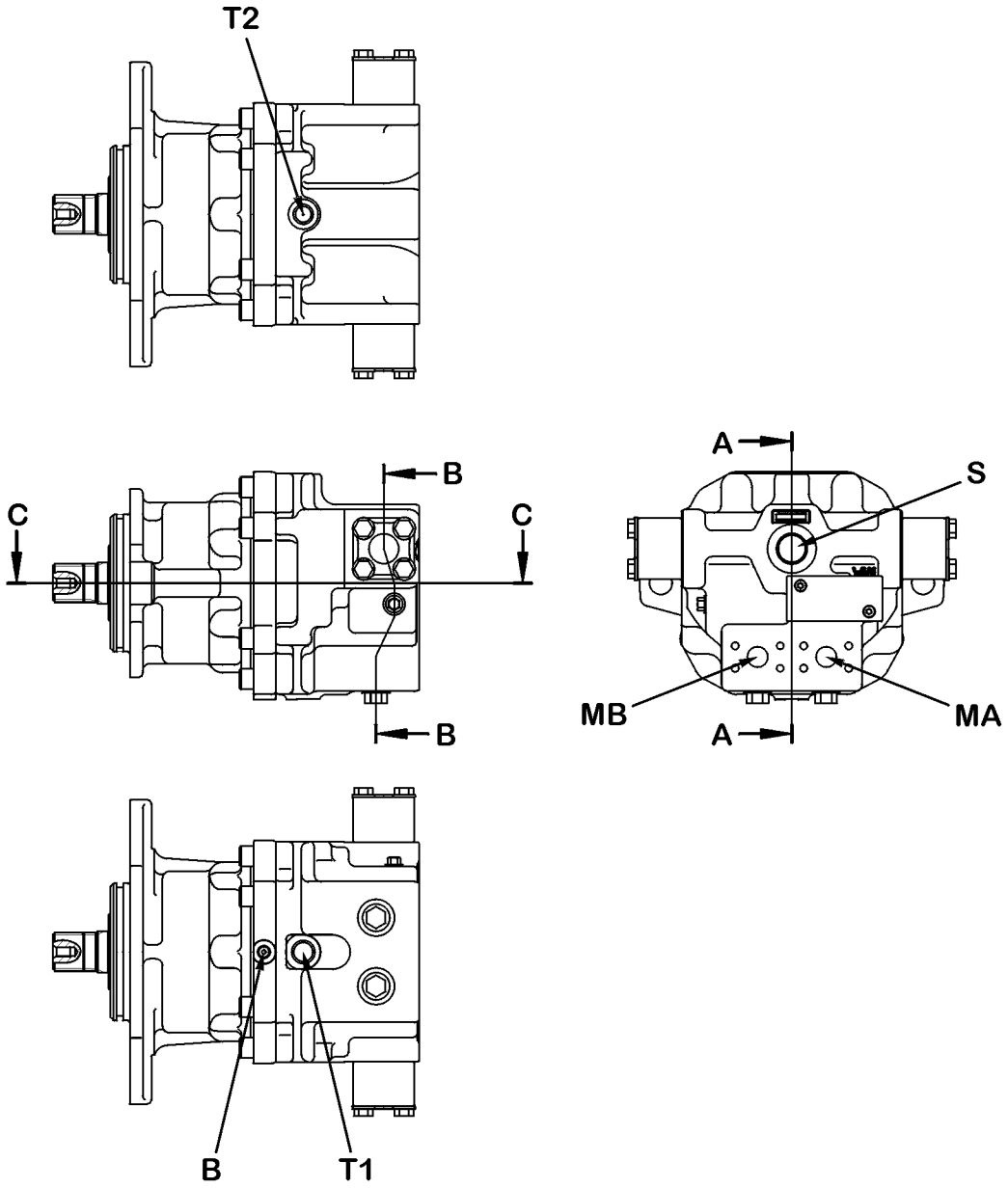
VESM0184

1. Idler
2. Track frame
3. Carrier roller
4. Final drive
5. Track roller
6. Track shoe
7. Full roller guard
8. Recoil spring
9. Front guard
10. Crawler frame

● No. of rollers

Model	No. of rollers (each side)
PC300LL	7

SWING MOTOR
KMF160ABE-3

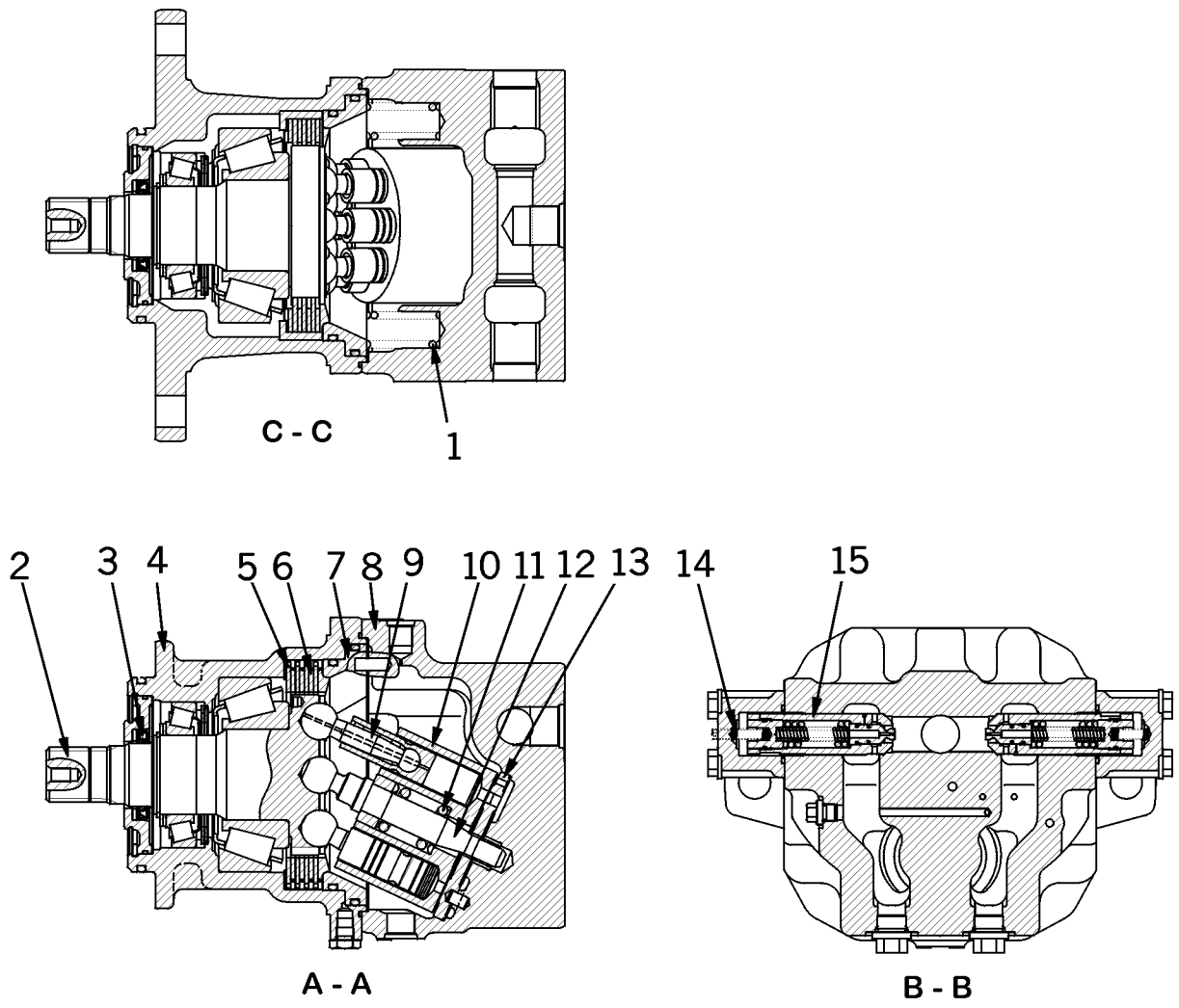


SWP14753

B : From swing brake solenoid valve
S : From lift check valve
MA : From control valve
MB : From control valve
T1 : To tank
T2 : To port **S**

Specifications

Model	KMF160ABE-3
Theoretical delivery	160.7 cc/rev
Safety valve set pressure	293 kg/cm²
Rated speed	1680 RPM
Brake releasing pressure	18.4 ±4 kg/cm²



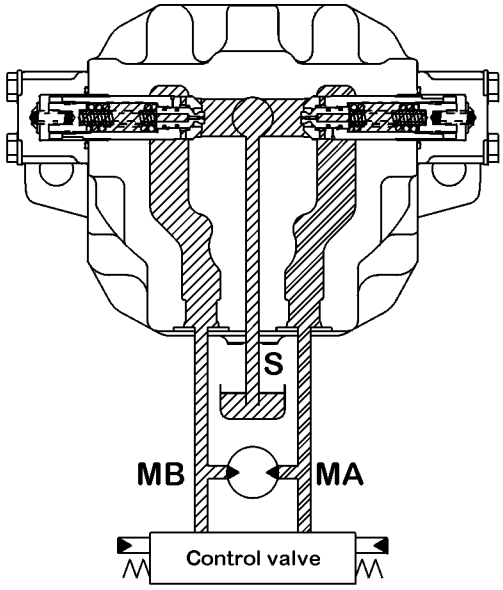
SWP14754

1. Spring
2. Output shaft
3. Oil seal
4. Case
5. Plate
6. Disc
7. Brake piston
8. Housing
9. Piston assembly
10. Cylinder block
11. Spring
12. Center shaft
13. Valve plate
14. Suction valve spring
15. Suction-safety valve

SUCTION-SAFETY VALVE

FUNCTION

- When the swing is stopped, the outlet port circuit of the motor is closed by the control valve, but the motor continues to be turned by the inertia of the swing. As a result, the pressure at the outlet port of the motor becomes abnormally high and there is danger that the motor will be damaged.
- The safety valve is installed to prevent this problem. It acts to release the abnormally high pressure oil from the outlet port of the motor to port **S**, and also functions as a swing brake.
- The suction valve supplies an amount of oil equivalent to the amount of oil released by the safety valve. It sends this oil from port **S** to the inlet port of the motor to prevent any cavitation.



SAP00245

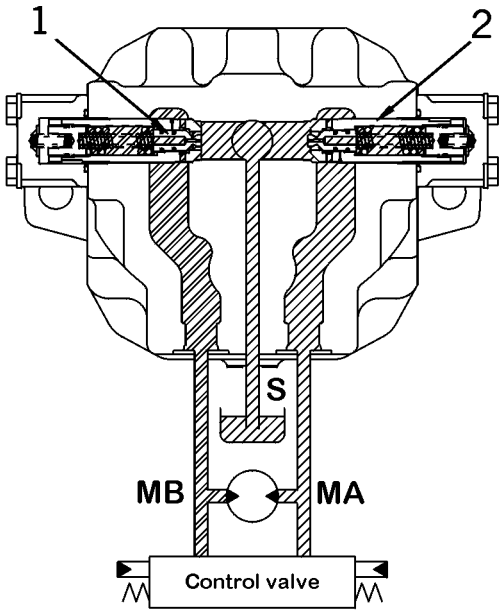
OPERATION

1. When Starting Swing

- If the swing control lever is operated to swing to the right, the pressurized oil from the pump passes through the control valve and is supplied to port **MA**.
- When this happens, the pressure at port **MA** rises and the starting force is generated in the motor, so the motor starts to turn. The oil from the outlet port of the motor flows from port **MB** through the control valve and returns to the tank.

2. When Stopping Swing

- When the swing control lever is returned to the neutral position, no more pressurized oil is supplied from the pump to port **MA**. At the same time, the oil from the outlet port of the motor returns from the control valve to the tank, and the circuit is closed.
- The pressure at port **MB** rises, and rotating resistance to the motor is generated, so the brake starts to take effect. If the pressure at port **MB** rises to the set pressure of safety valve (1), safety valve (1) opens and releases the pressurized oil at port **MB** to port **S**.
- No pressurized oil is supplied at port **MA**, but the swing continues and negative force is generated. When this negative pressure drops to the set pressure of suction valve (2), suction valve (2) opens and oil is supplied from port **S** to prevent cavitation.



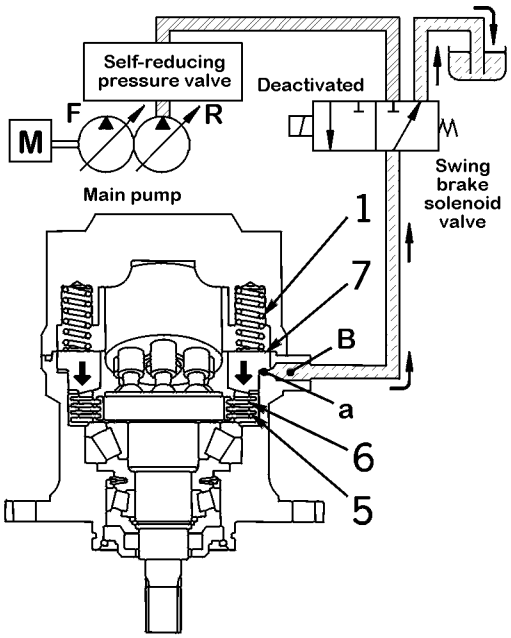
SAP00246

SWING BRAKE

OPERATION

1) Swing Brake Solenoid Valve De-energized

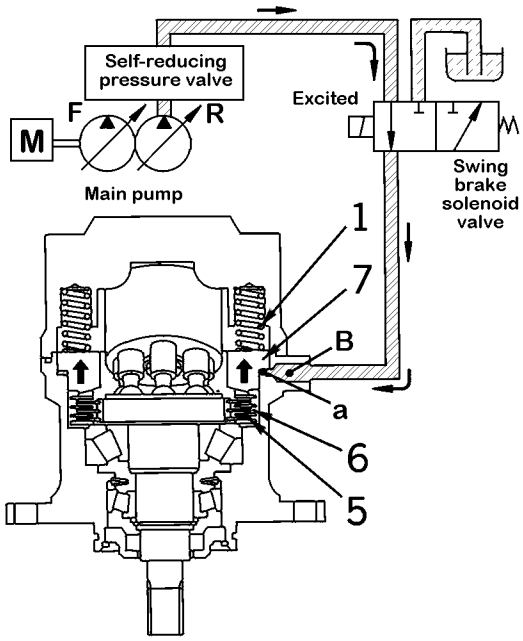
- If the swing brake solenoid valve is de-energized, the flow of pressurized oil from the main pump is shut off, and port **B** is connected to the tank circuit.
- As a result, brake piston (7) is pushed down by brake spring (1), pushes disc (6) and plate (5) together, and the brake is applied.



SWP05100

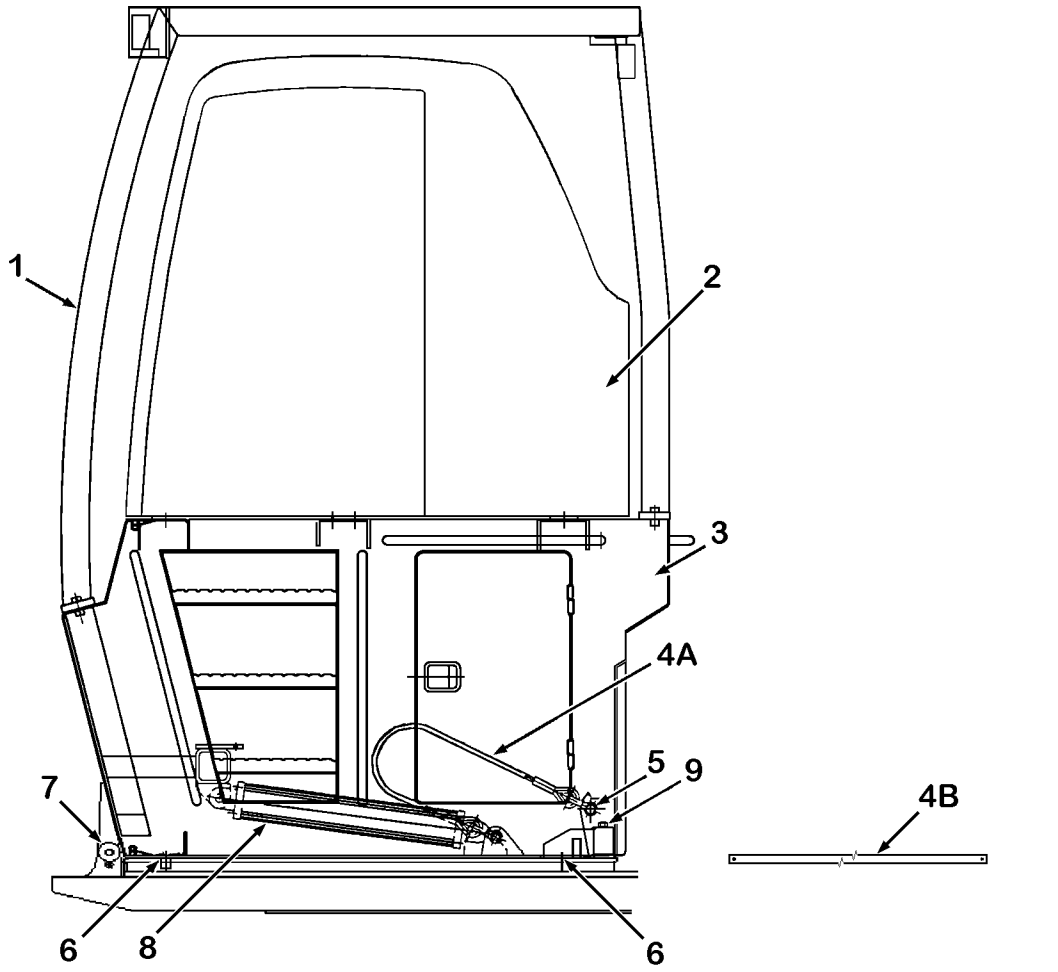
2) Swing Brake Solenoid Valve Energized

- When the swing brake solenoid valve is energized, the valve is switched, and pressurized oil from the main pump enters port **B** and flows to brake chamber **a**.
- The pressurized oil entering chamber **a** overcomes brake spring (1) and pushes brake piston (7) up. As a result, disc (6) and plate (5) are separated and the brake is released.



SWP05101

CAB RISER AND RELATED PARTS



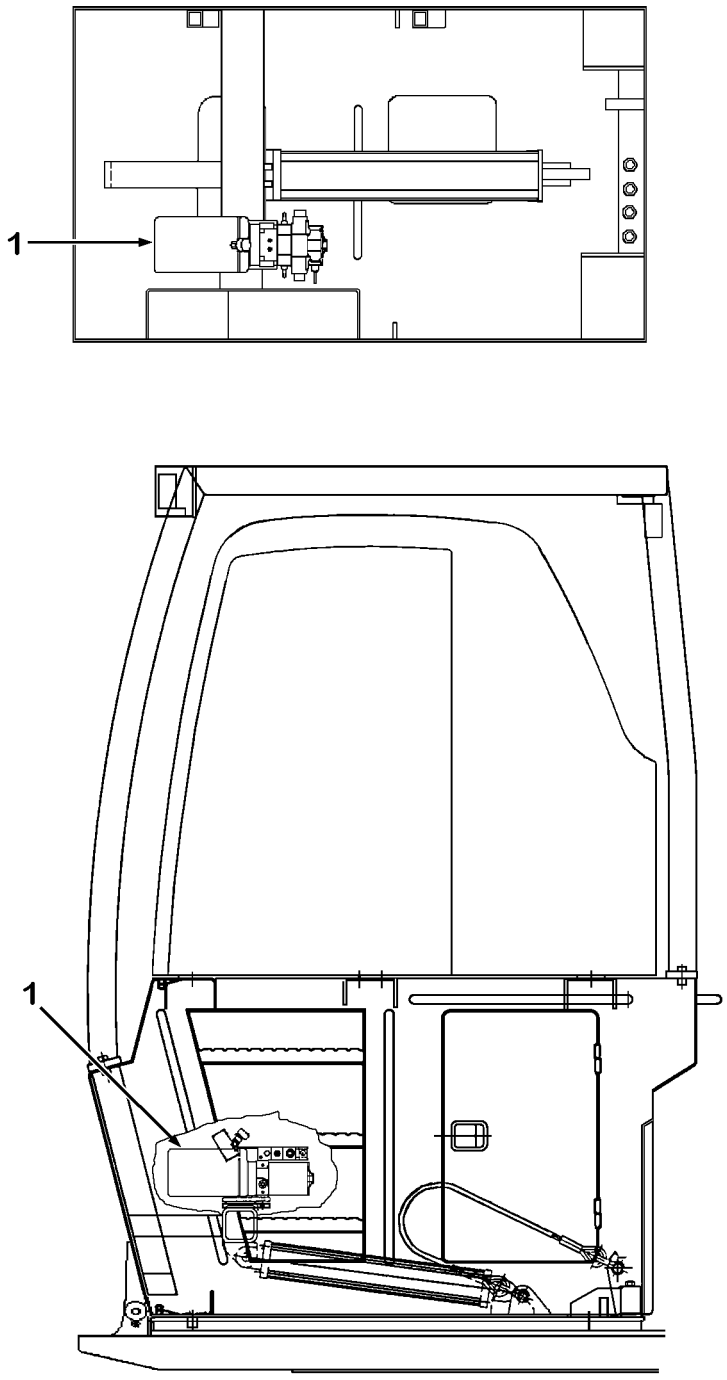
1. Over Cab Guard
2. Cover
3. Riser

4A. Safety Cable

4B. Shipping Bar (Use when shipping machine per Operation and Maintenance Manual Specs. Replace Safety Cable w/shipping bar)

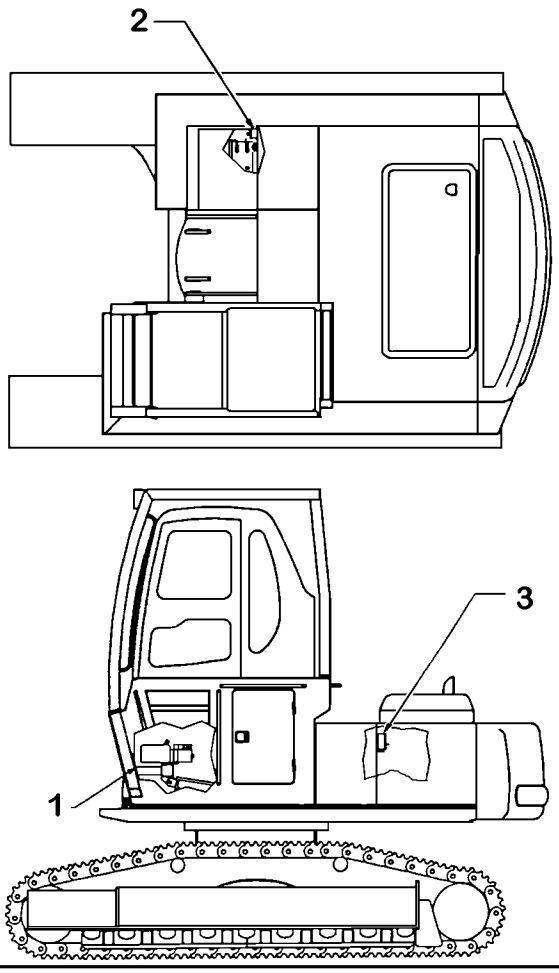
5. Shackle
6. Mounting bolt locations
7. Riser Pivot Pins
8. Cylinder
9. Bolt Storage Nuts

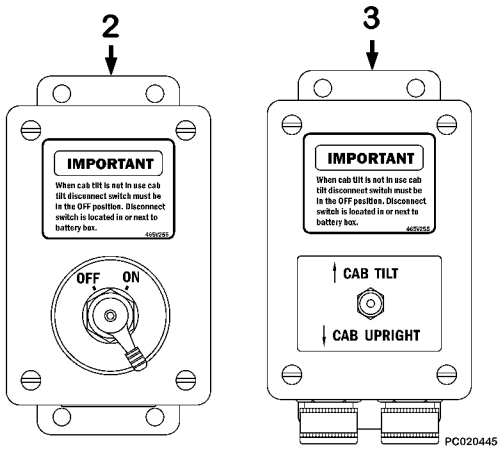
NOTE: Items 4A, 5, 6, and 8 are located inside riser

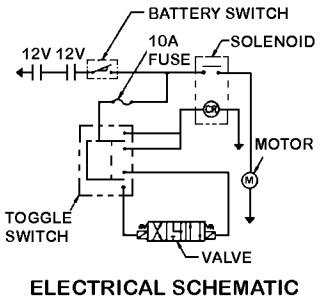


VESM0176

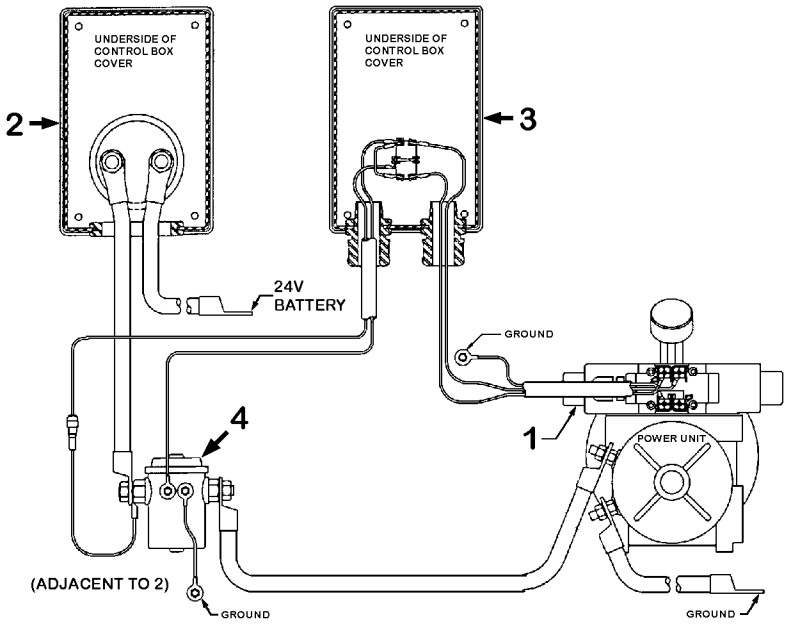
1. Power unit







ELECTRICAL SCHEMATIC



VESM0183

1. Power unit
2. Battery switch box
3. Tilt Switch box
4. Solenoid

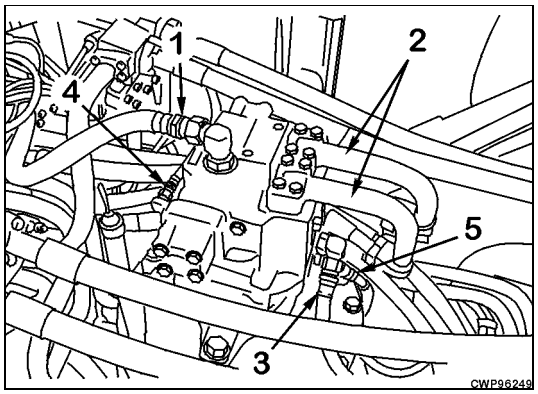
30 DISASSEMBLY AND ASSEMBLY

SWING MOTOR

REMOVAL

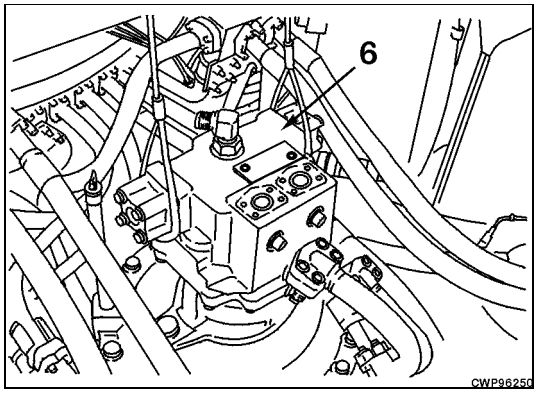
WARNING! Release the remaining pressure in the hydraulic circuit. For details, see TESTING AND ADJUSTING.

WARNING! Loosen the oil filler cap slowly to release the pressure inside the hydraulic tank.



★ Fit blind plugs in the disconnected hoses and tubes.

1. Disconnect suction hose (1).
2. Disconnect swing hoses (2).
3. Disconnect drain hoses (3) and (4).
4. Disconnect swing holding brake hose (5).
5. Remove mounting bolts, and lift off swing motor (6).



kg Swing motor ..... 110 kg

INSTALLATION

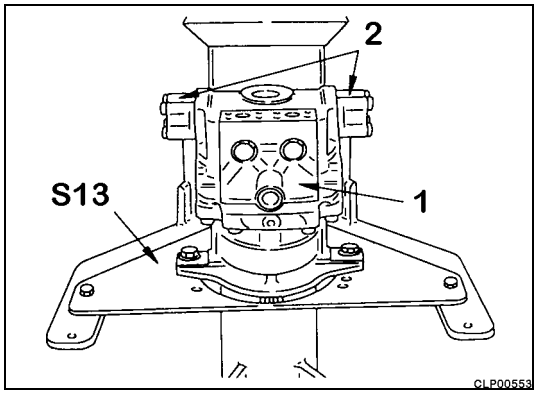
- Carry out installation in the reverse order of removal.

★ Refill with oil [hydraulic tank] through the oil filler to the specified level. Run the engine to circulate the oil through the system. Then check the oil level again.

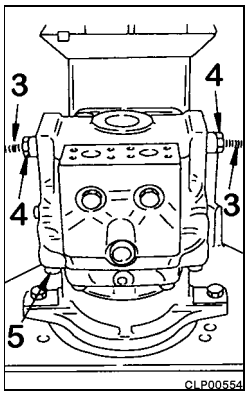
★ Bleed the air from the swing motor. For details, see TESTING AND ADJUSTING.

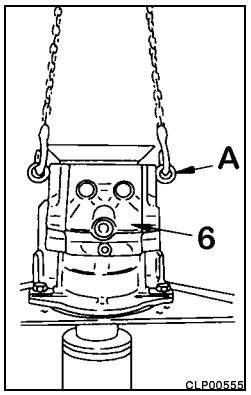
DISASSEMBLY

1. Set swing motor (1) to tool **S13**.



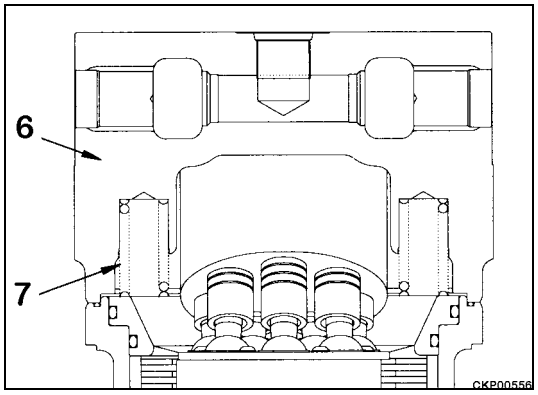
2. Remove covers (2), then remove springs (3) and sleeves (4). Remove housing mounting bolts (5).
3. Using eye bolts **A**, lift off housing (6).



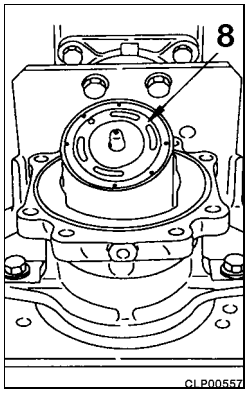


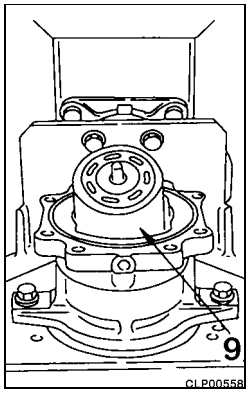
★ Springs (7) may fall out during the removal operation, so be careful not to loose them.

4. Remove six springs (7) from valve case (6).

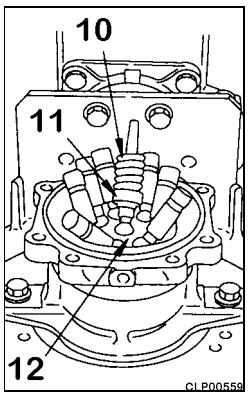


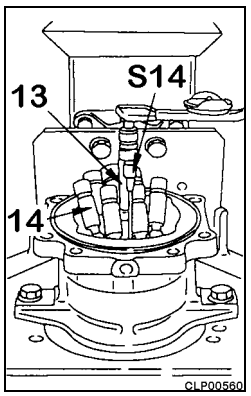
5. Remove valve plate (8).
6. Remove cylinder block (9).





7. Remove spring (10) and center ring (11).
8. Using tool **S14**, remove seven mounting screws, then remove retainer (12).
9. Remove center shaft (13) and seven pistons (14).



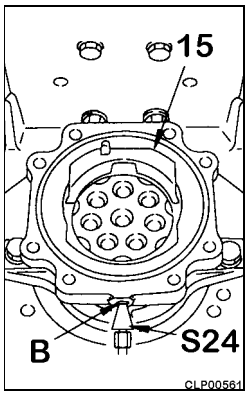


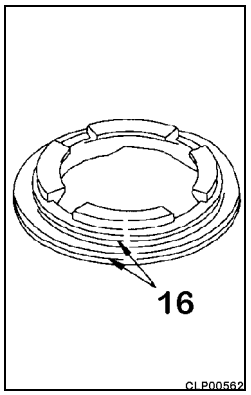
10. Using tool **S24**, pump in air through port B and remove brake piston (15).

Air pressure ..... 2 kgm/cm²

★ Be careful that the air pressure is not too high or the brake piston will fly out.

11. Remove o-ring (16) from piston.



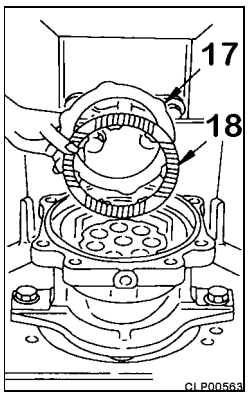


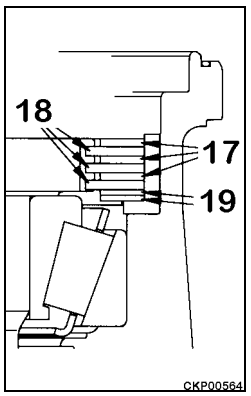
12. Remove plates (17) and discs (18).
13. Remove plates (19).

★ Plates (17) 3

★ Plates (19) 2

★ Discs (18) 3

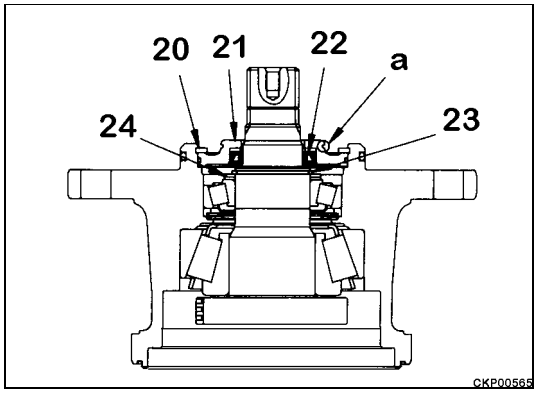




14. Remove case from tool **S13** and turn over. Remove snap ring (20), then remove cover (21).

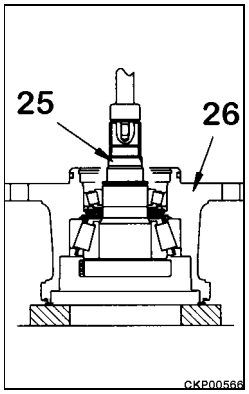
★ Put a screwdriver in contact with portion **a** and remove cover.

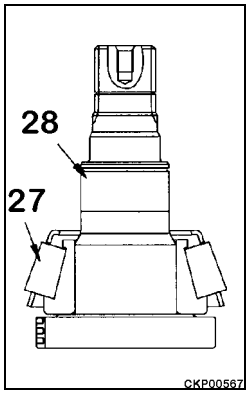
15. Remove oil seal (22) from cover (21).
16. Remove snap ring (23), then remove two spacers (24).



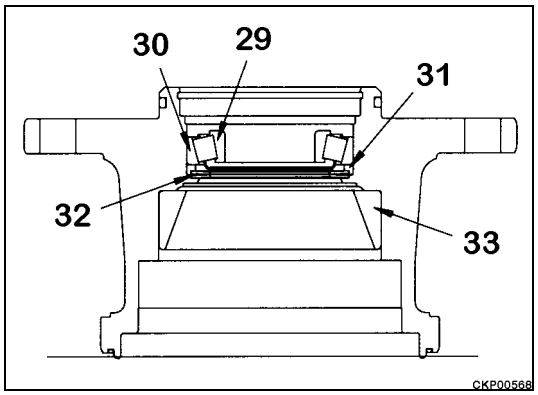
17. Set case to press and remove shaft (25) from case (26).

18. Remove bearing (27) from shaft (28).





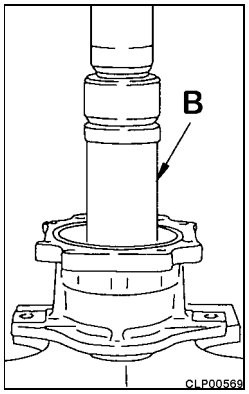
19. Remove bearing inner race (29) from case. Remove bearing outer race (30). Remove seat (31) and belleville spring (32). Remove main bearing outer race (33).

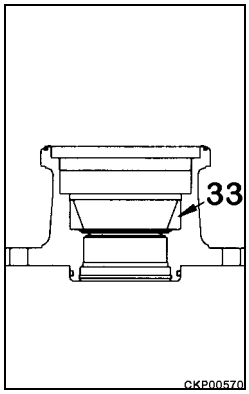


ASSEMBLY

- Using chromium oxide, remove all the lapping powder from the places that have been lapped. Clean all parts, remove all burrs and check for dirt or damage. Coat the rotating parts and sliding surfaces of all parts with engine oil before installing.

1. Using push tool **B**, press outer race (33) into case.



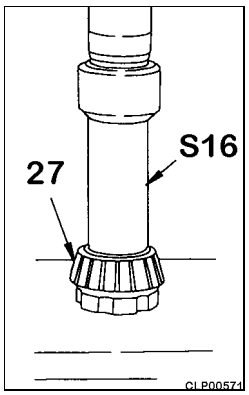


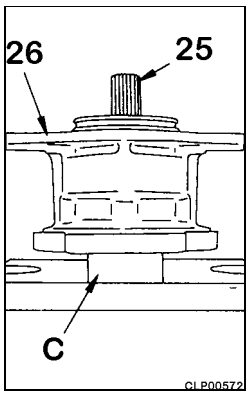
2. Using tool **S16**, press bearing (27) onto shaft.

★ Press until the end face of the inner race is in tight contact with the shaft.

★ Press load ..... 8 to 39 kN

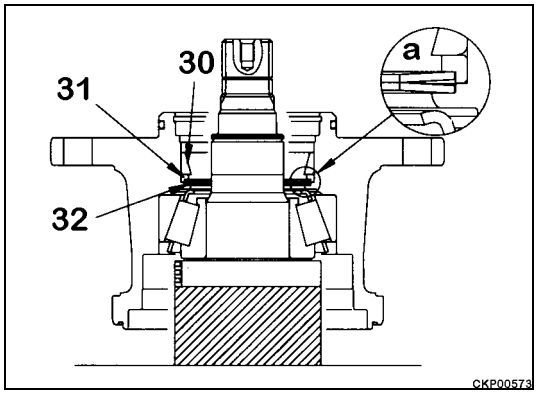
3. Set shaft (25) to block **C**, then set case (26) in position.



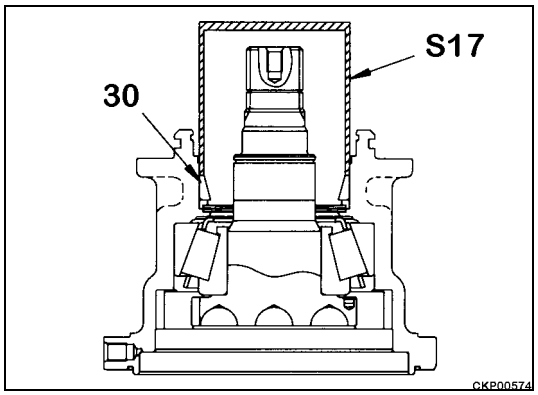


4. Install belleville spring (32) and seat (31).

★ Install belleville spring in the direction shown in (**a**).

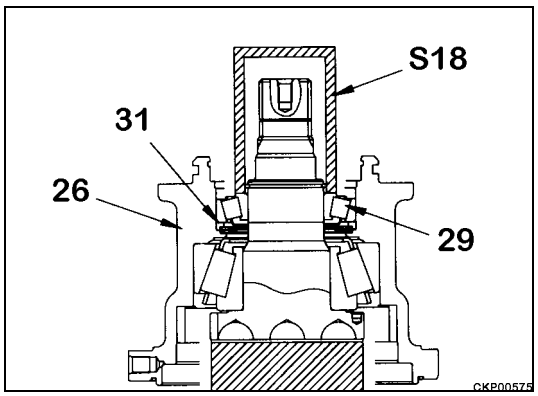


5. Using tool **S17**, install outer race (30).



6. Using tool **S18**, press bearing (29). During the press operation, rotate case (26) and check that the bearing rotates smoothly. Press until seat (31) is in tight contact with case (26).

★ Bearing press load.....4 to 20 kN

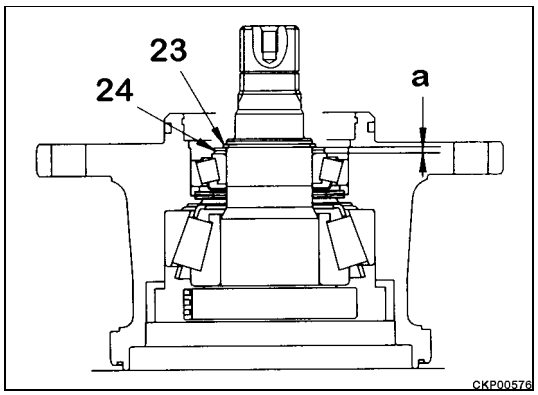


7. Measure clearance **a** between bottom face of snap ring (23) and top face of bearing inner race, then select two spacers (24) equivalent to clearance **a** from table below.

Unit: **mm**

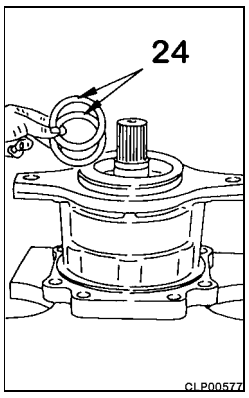
Spacer (24) Part No.	Thickness
706-77-42440	2.3
706-77 42450	2.5
706-77-42460	2.7

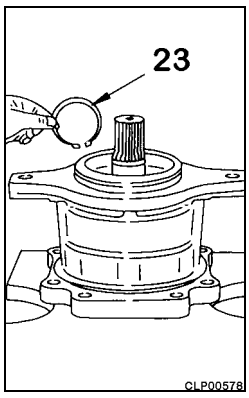
Standard assembled thickness of spacers .....5.1 mm



8. After assembling spacers (24), install snap ring (23).

★ Check that the snap ring is fitted securely in the snap ring groove.

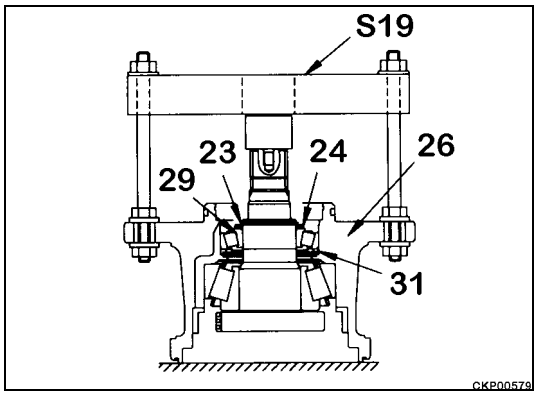




9. Assemble tool **S19** to case (26), then push out drive shaft under load given below until end face of bearing inner race (29) is in tight contact with spacer (24) and snap ring (23).

★ Pushing out load ..... 4 to 16 kN

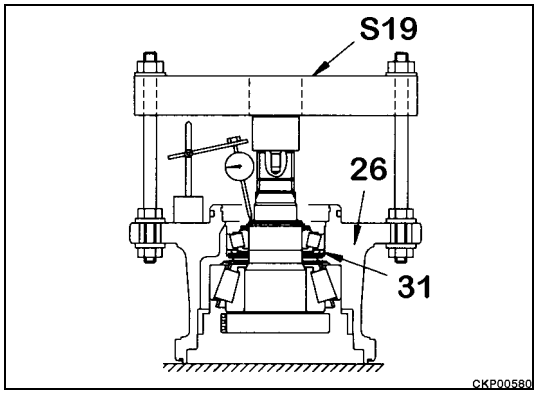
10. After bringing bearing into tight contact, apply a load of **22 kN** and check that spacer (24) cannot be rotated by hand and that spacer is in tight contact.



11. Check clearance between case (26) and seat (31) as follows:

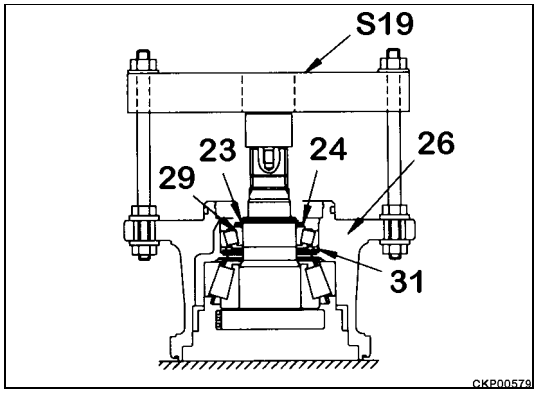
A. Using tool **S19**, apply a load of **5 to 22 kN** to tip of drive shaft, measure movement of drive shaft and check that it is within specified value.

Drive shaft movement ..... 0.1 to 0.4 mm

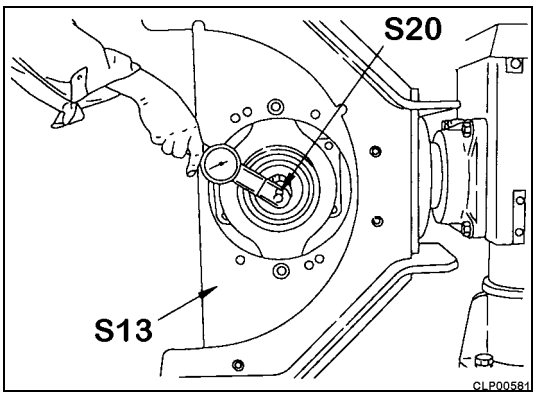


B. If movement of drive shaft is not within specified value, adjust spacer as follows:

- If clearance is less than 0.1 mm: replace spacer with 706-77-42440 and install snap ring.
- If clearance is more than 0.4 mm: replace spacer with 706-77-42460 and install snap ring.
- Repeat steps to measure movement of drive shaft and check that clearance is within range of 0.1 to 0.4 mm.



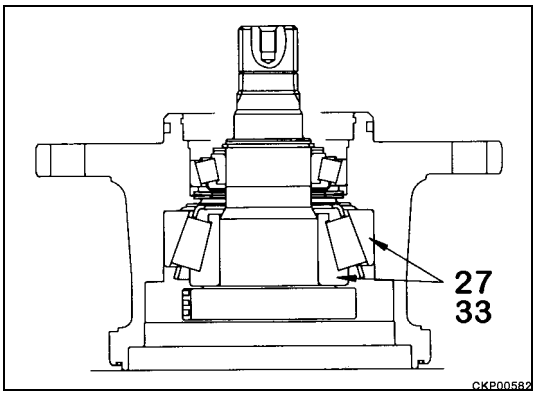
C. Aassemble motor case on tool **S13**, then use tool **S20** to measure rotating torque of drive shaft.



N•m Drive shaft rotating torque .....2 to 5 N•m

★ Before measuring, freely lubricate the bearing with oil. Rotate the drive shaft at a speed of one revolution every five seconds when measuring the rotating torque.

★ If the rotating torque is not within the range of 2 to 5 N•m, replace bearings (27 and 33) with new parts and adjust again.

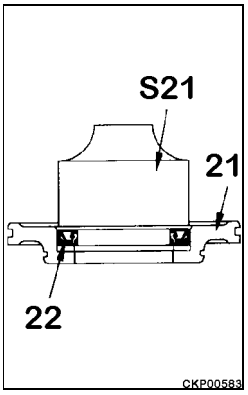


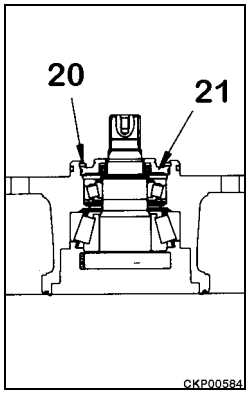
12. Using tool S21, press oil seal (22) until it is in tight contact with cover (21).

13. Assemble cover (21) and install snap ring (20).

★ Be careful not to damage the lip of the oil seal when installing the cover.

Seal lip .....Grease [G2-LI-S]



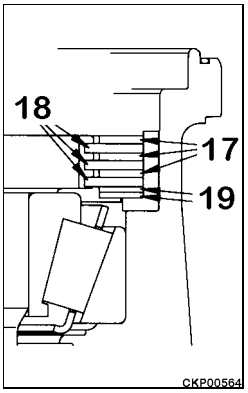


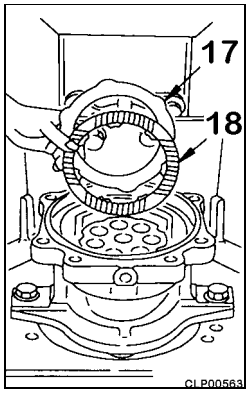
14. Assemble plates (19) qty. two, then alternate disc (18) qty. three and plate (17) qty. three to case, ending with plate (17).

★ Before assembling the discs, coat the surface with lubricating oil.

Disc surfaces.....Lubricating oil

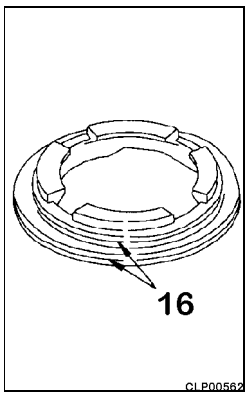
★ Do not wash the discs in trichlene or drizol or blow strongly with air.

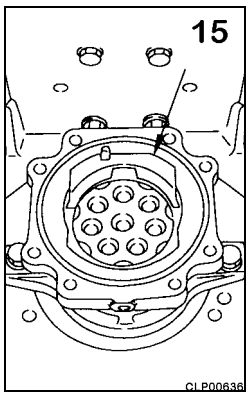




15. Install o-ring (16) to piston.

16. Install brake piston (15).





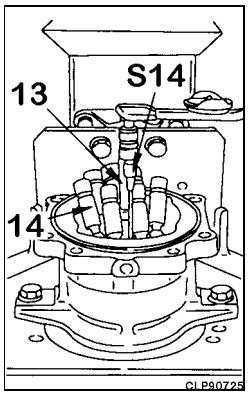
17. Set seven pistons (14) and center shaft in position. Using tool **S14**, tighten 7 retainer mounting screws.

★ Replace the mounting screws with new parts.

Retainer screw .....Thread tightener [LT-2]

N•m

1st step [tighten temporarily] .....Max 0.98 N•m
2nd step .....3.9 to 5.9 N•m
3rd step .....13.2 ± 1.5 N•m



★ Remove all oil and grease from the threads [male and female] and dry completely.

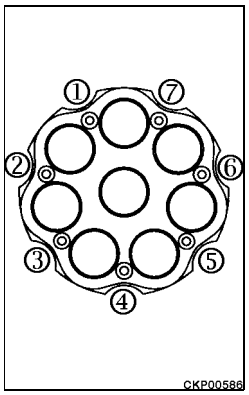
★ Order for tightening; ①-④-⑦-③-⑥-②-⑤.

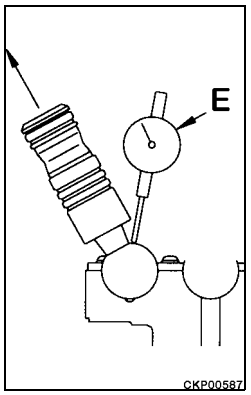
★ After tightening, wipe off any adhesive that has been squeezed out.

★ Check that the large ball of piston (14) and center shaft (13) move smoothly.

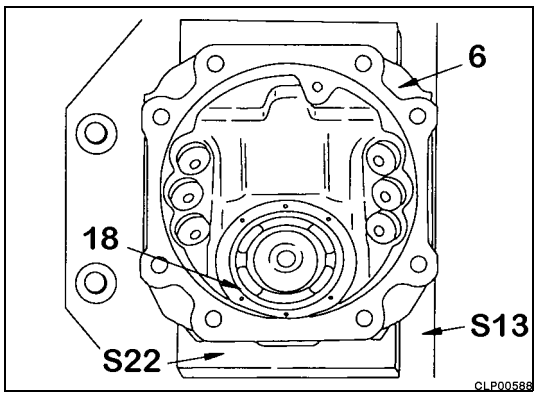
18. Using dial gauge **E**, measure play of piston (14) in axial direction.

Play of piston **.....** Max 0.25 mm



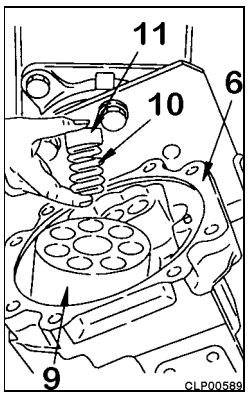


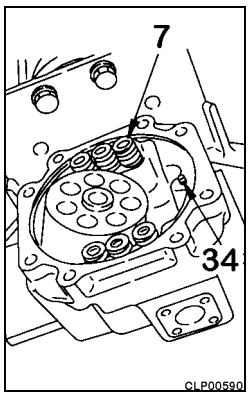
19. Position housing (6) on tool **S13** together with tool **S22**, then adjust angle so that valve plate mounting surface is horizontal. Install valve plate (18).



20. Assemble cylinder block (9) to housing (6). Assemble spring (10) and center ring (11) to cylinder block.

21. Install six springs (7) to housing. Position dowel pin (34) to hole.

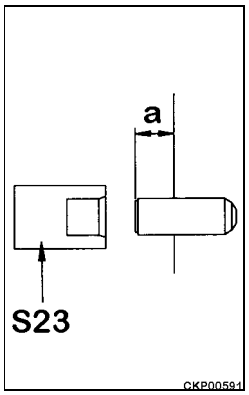


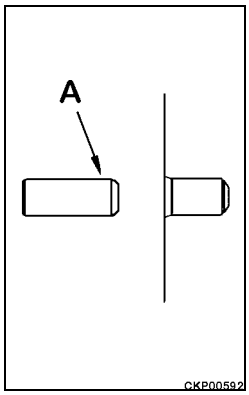


22. Using tool **S23**, knock in the dowel pin so that the dimension **a** is the standard value.

Standard value **a** ..... 8 to 10 mm

23. Assemble tapered end **A** to the hole in the housing. Be careful not to damage the dowel pin and the brake piston.



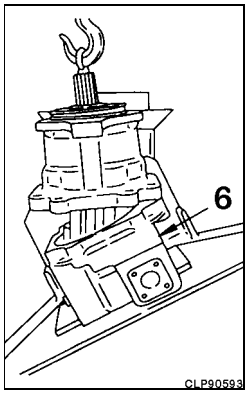


24. Raise motor case, align with housing and lower slowly, align seven center shaft pistons with holes in cylinder block, then install housing (6).

Case surface..... Gasket sealant [LG5 or LG7]

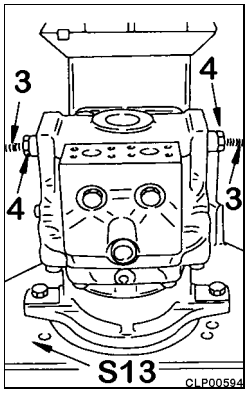
★ Align the dowel pins with the holes in the motor case exactly when installing.

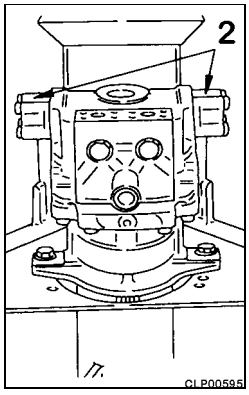
N•m Cover mounting bolt.....277 ± 32 N•m



25. Position swing motor onto tool **S13**. Install sleeves (4), springs (3) and covers (2).

N•m Cover mounting bolt.....110 ± 2 N•m

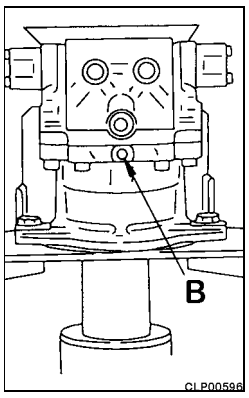


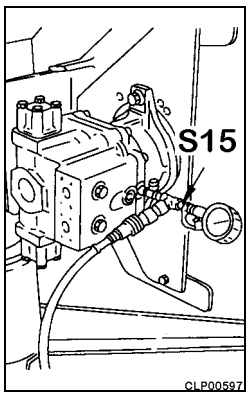


26. Check drive shaft rotation torque as follows:

A. Using tool **S15**, apply pressure through port **B** to release brake.

Brake release pressure ..... at least 20 kg/cm²





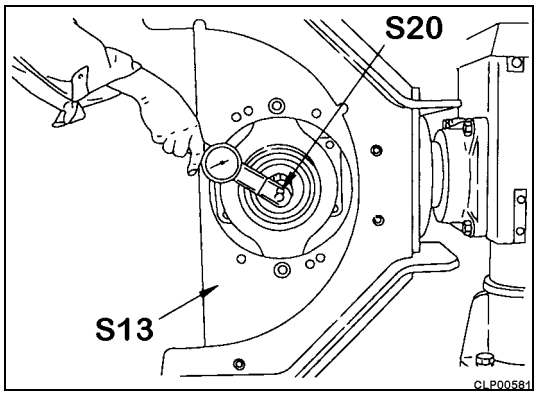
B. Set tool **S20** in position and check rotating torque.

★ When checking the rotating torque, check that the shaft rotates smoothly without any hesitation or rough spots.

N•m

Variation .....Max 1.5 N•m
Rotating torque .....5.9 to 15.2 N•m

★ If it is not within the specified value, adjust again.



SWING MACHINERY

REMOVAL

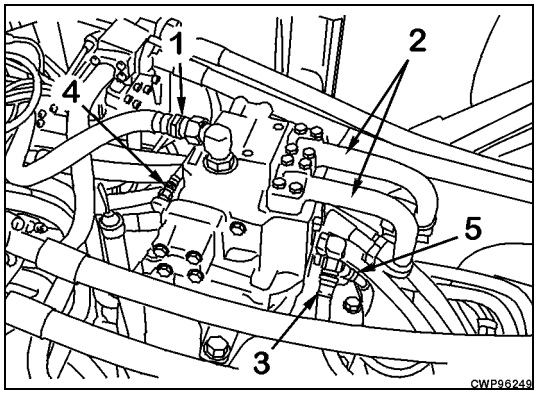
WARNING! Release the remaining pressure in the hydraulic circuit. For details, see TESTING AND ADJUSTING

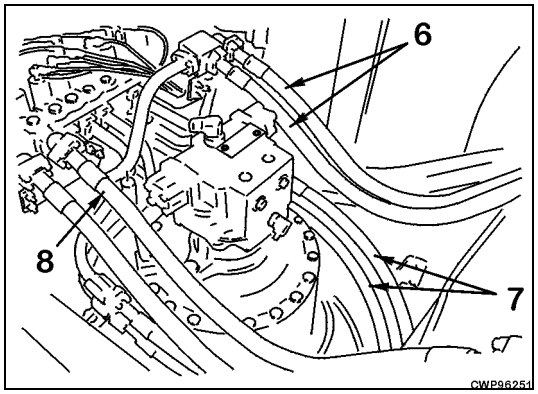
WARNING! Loosen the oil filler cap slowly to release the pressure inside the hydraulic tank.

★ Fit blind plugs in the disconnected hoses and tubes to prevent oil from flowing out.

1. Remove step on top of control valve.
2. Disconnect suction hose (1), swing hose (2), drain hoses (3) and (4), and swing holding brake hose (5) connected to swing motor.
3. Disconnect arm hose (6) and let it hang down.
4. Disconnect left travel hose (7) at control valve end and move towards boom.

★ Secure it to the boom with rope.





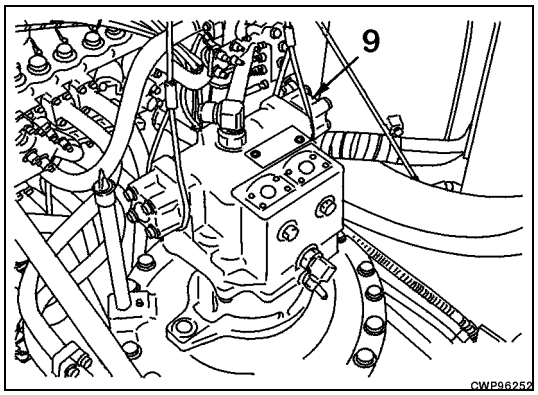
5. Disconnect bucket cylinder hose (8) at control valve end.
6. Lift off swing motor (9).

kg Swing motor ..... 110 kg

7. Lift off swing machinery (10). ※ 1

kg Swing machinery ..... 550 kg

★ After removing the right travel hose clamp mounting bracket, remove the swing machinery.

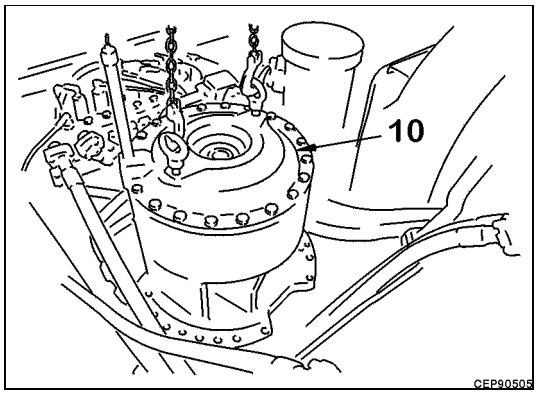


INSTALLATION

● Carry out installation in the reverse order of removal.

※ 1

N•m Swing machinery case bolt ..... 927 ± 103 N•m

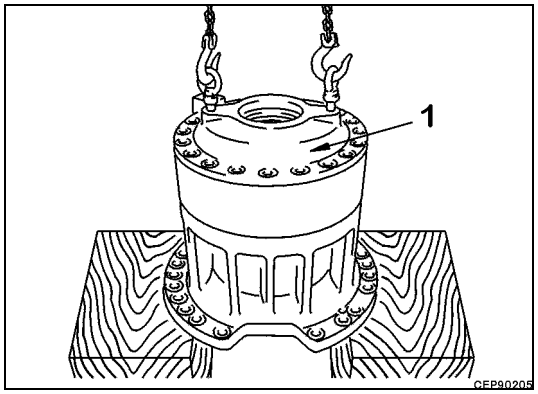


DISASSEMBLY

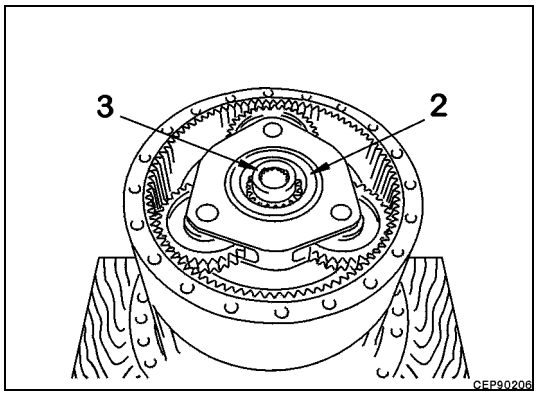
1. Loosen drain plug and drain oil from swing machinery.

Swing machinery case .....≈ 21.5 L

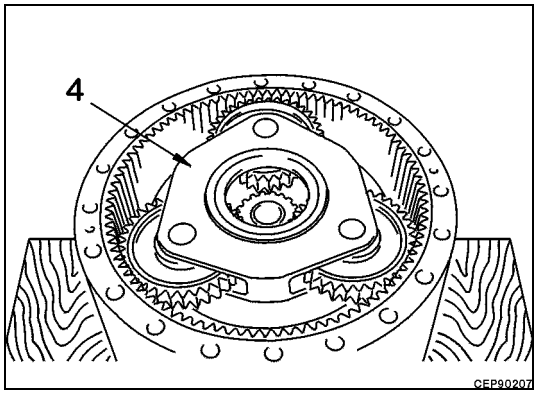
2. Remove mounting bolts, then lift off cover (1).



3. Remove thrust washer (2), then remove #1 sun gear (3).



4. Remove #1 carrier (4).

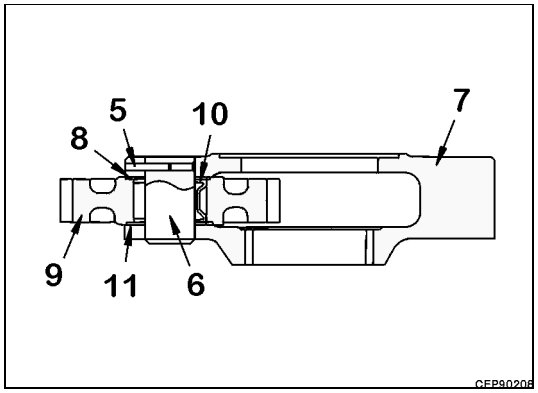


5. Disassemble #1 carrier as follows:

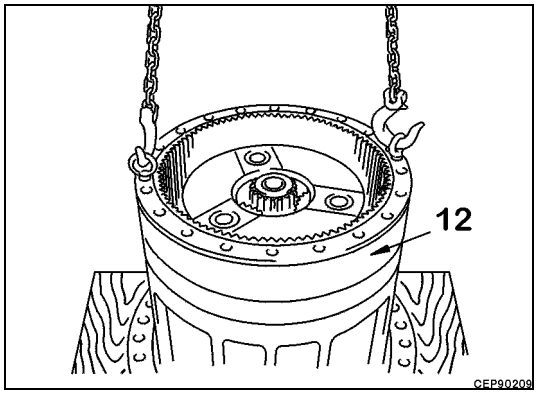
   A. Push in pin (5), and knock out shaft (6) from carrier (7).

★ After removing the shaft, remove pin (5).

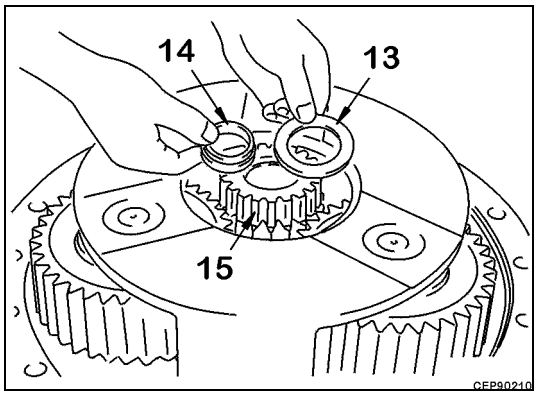
   B. Remove thrust washer (8), gear (9), bearing (10), and thrust washer (11).



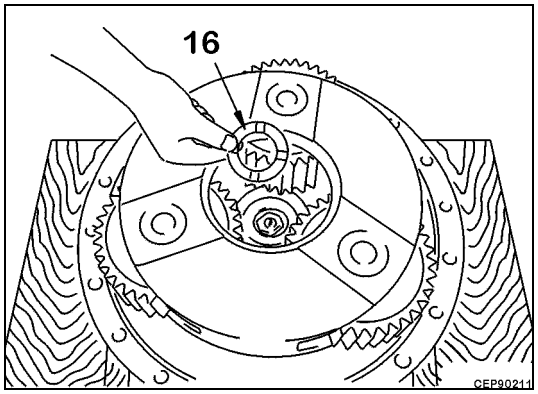
6. Lift off ring gear (12).



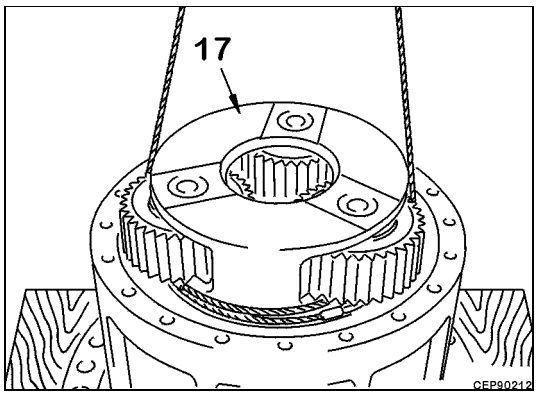
7. Remove thrust washer (13) and collar (14), then remove #1 sun gear (15).



8. Remove thrust washer (16).



9. Lift off #2 carrier (17).

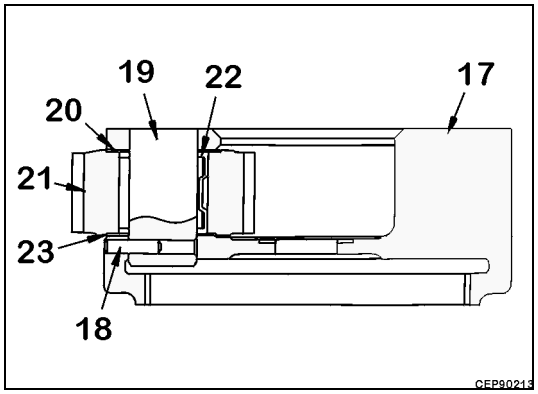


10. Disassemble # 2 carrier as follows:

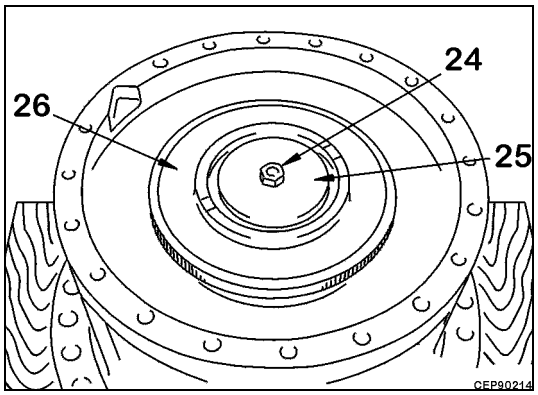
    A. Push in pin (18), and knock out shaft (19) from carrier (17).

★ After removing the shaft, remove pin (18).

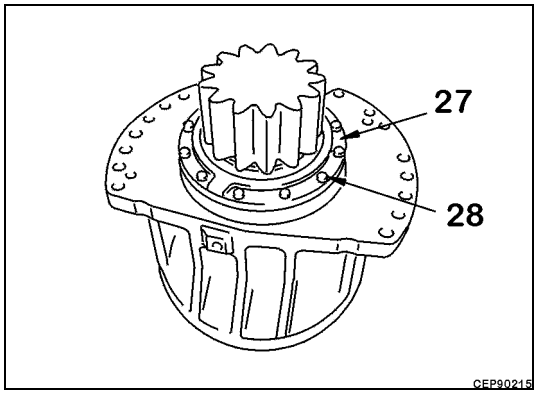
    B. Remove thrust washer (20), gear (21), bearing (22), and thrust washer (23).



11. Remove bolt (24), then remove holder (25). Remove gear (26).

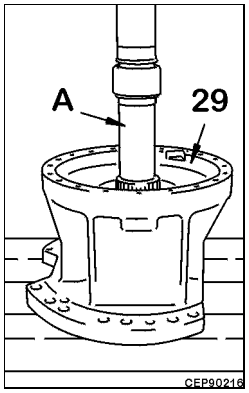


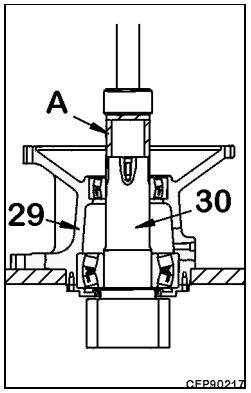
12. Turn over case and pinion, then remove mounting bolts (28) from cover (27).



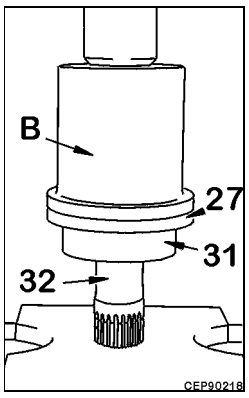
13. Turn over case and pinion (29), and set on press stand. Then, using push tool **A**, remove pinion shaft (30) with press.

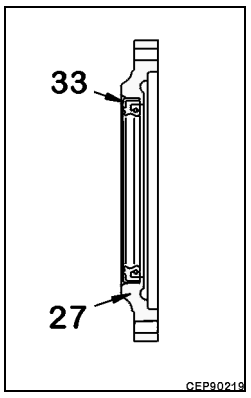
★ Set a wooden block under the press and be careful not to damage the pinion shaft when removing it.



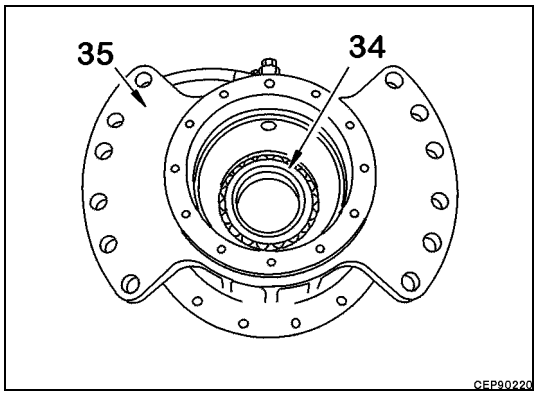


14. Using push tool **B**, remove cover (27) and bearing (31) from shaft (32). Remove oil seal (33) from cover (27).





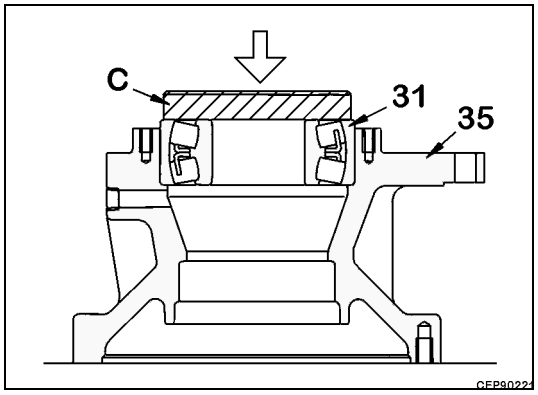
15. Using push tool, remove bearing (34) from case (35).



ASSEMBLY

- Clean all parts, and check for dirt or damage. Coat the sliding surfaces of all parts with engine oil before installing.

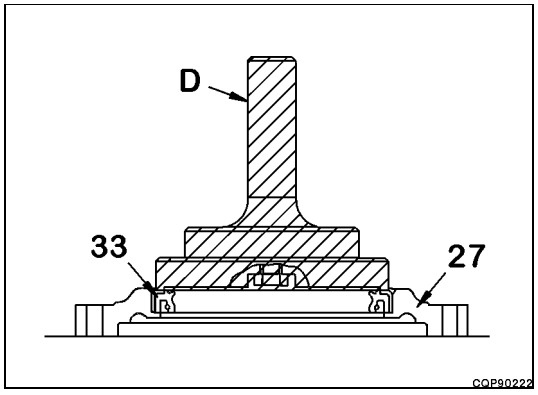
1. Using push tool **C**, press fit bearing (31) to case (35).



2. Using push tool **D**, press fit oil seal (33) to cover (27).

Outside girth of oil seal.....Gasket sealant [LG-6]

★ Be carecareful not to let the gasket sealant [LG-6] get on the oil seal lip when press fitting.



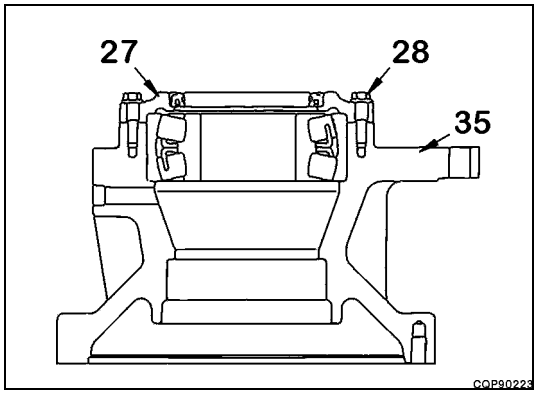
3. Fit cover (27) to case (35), and tighten mounting bolts (28).

★ Be careful not to let the gasket sealant [LG-6] get on the oil seal lip when press fitting.

Cover mounting surface.....Gasket sealant [LG-6]

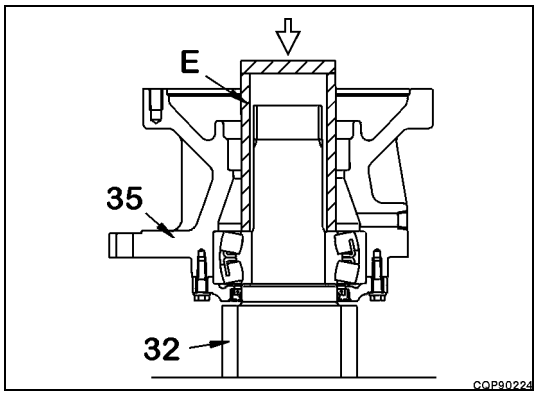
N•m Mounting bolt.....66 ± 7 N•m

Lip of oil seal.....Grease [G2-L1]



4. Set case (35) to shaft (32), then using push tool **E**, press fit bearing inner race portion.

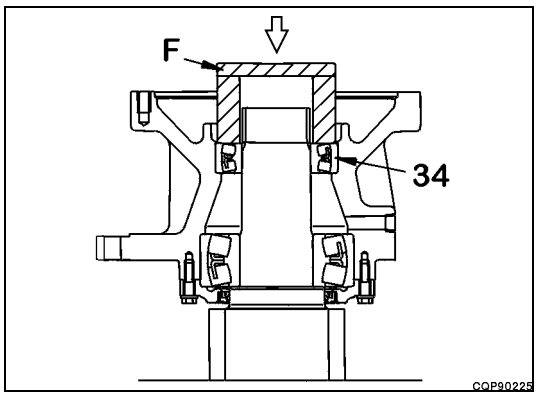
★ When setting the case to the shaft, be extremely careful not to damage the oil seal.



5. Using tool **F**, press fit bearing (34).

★ Press the bearing inner race and outer race at the same time when press fitting. Do not press only the inner race when press fitting.

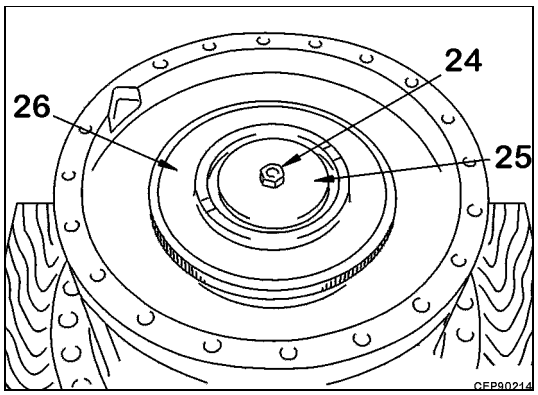
★ After press fitting bearing, check that the case rotates smoothly.



6. Assemble gear (26), then fit holder (25) and tighten bolt (24).

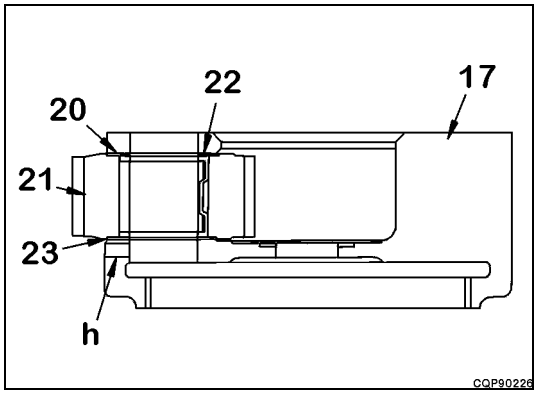
Mounting bolt.....Thread tightener [LT-2]

N•m Mounting bolt.....380 ± 47N•m



★ There are the remains of the staking when the pin is inserted at the end face of hole **h** at the side of the carrier, so remove the staked metal from the inside diameter of the hole before starting to assemble.

7. Assemble bearing (22) to gear (21), fit top and bottom thrust washers (23) and (20) and set gear to carrier (17).



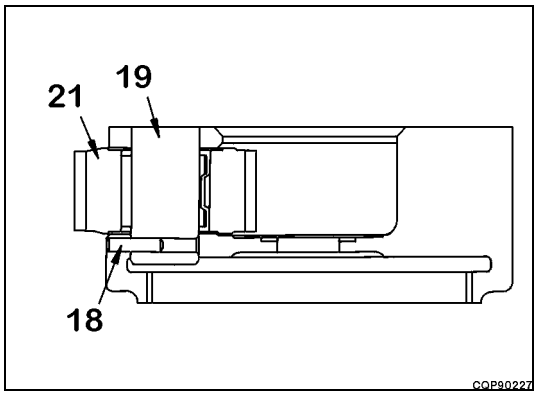
8. Align with position of pin holes of shaft and carrier, then tap with a plastic hammer to install shaft (19).

★ When installing the shaft, rotate the planetary gear, and be careful not to damage the thrust washer.

9. Insert pin (18).

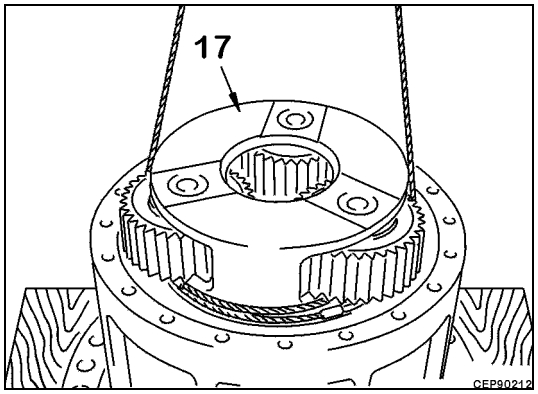
★ After inserting the pin, stake the pin portion of the carrier.

★ After assembling the carrier, check that gear (21) rotates smoothly.

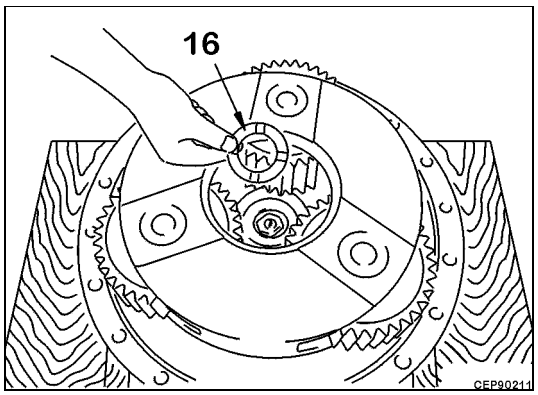


10. Raise #2 carrier (17) and install.

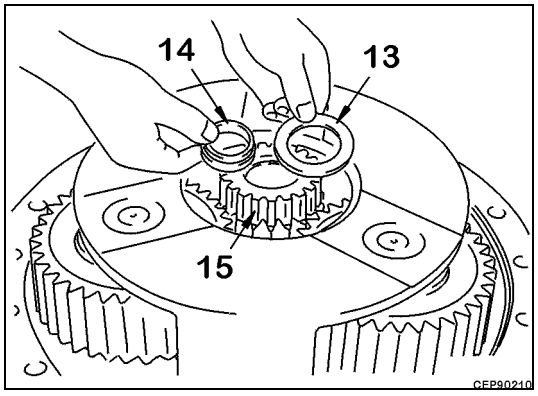
★ Align the position so that the tip of the gear shaft enters at four places, then install.



11. Assemble thrust washer (16).



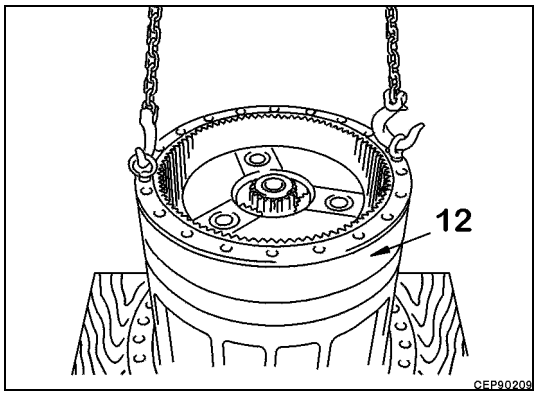
12. Install #2 sun gear (15) to #2 carrier, then install collar (14) and thrust washer (13).



13. Raise ring gear (12) and install.

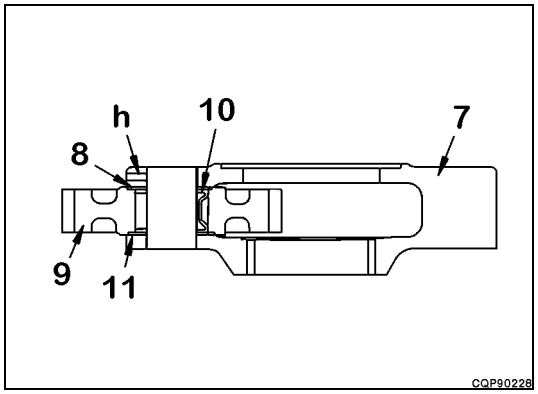
★ Align with the drain hole and assemble.

Ring gear and case surface.....Gasket sealant [LG-6]



★ There are the remains of the staking when the pin is inserted at the end face of hole **h** at the side of the carrier, so remove the staked metal from the inside diameter of the hole before starting to assemble.

14. Assemble bearing (10) to gear (9), fit top and bottom thrust washers (8) and (11) and set gear to carrier (7).



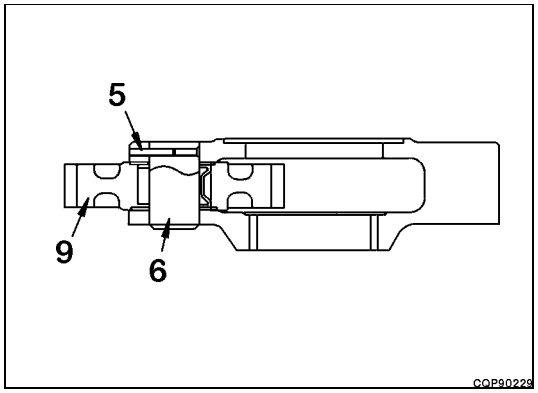
15. Align position of pin holes of shaft and carrier, then tap with a plastic hammer to install shaft (6).

★ When installing the shaft, rotate the planetary gear, and be careful not to damage the thrust washer.

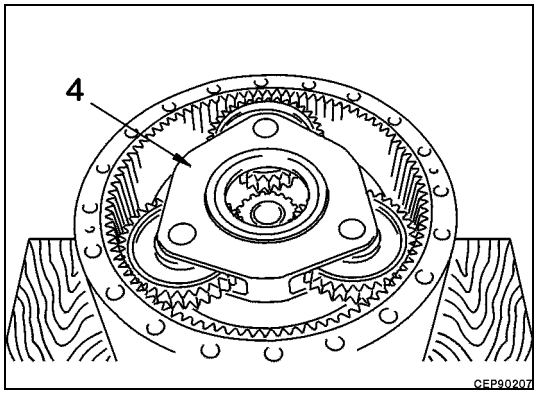
16. Insert pin (5).

★ After inserting the pin, stake the pin portion of the carrier.

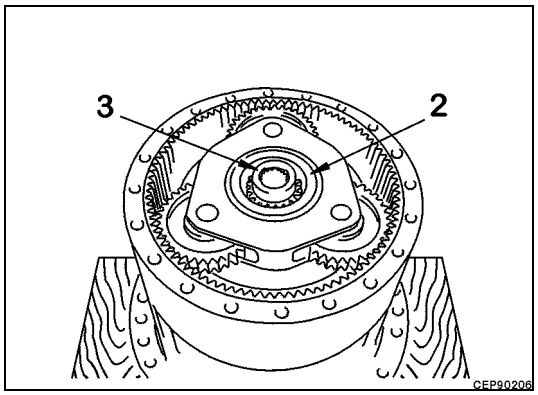
★ After assembling carrier, check that gear (9) rotates smoothly.



17. Install #1 carrier (4).



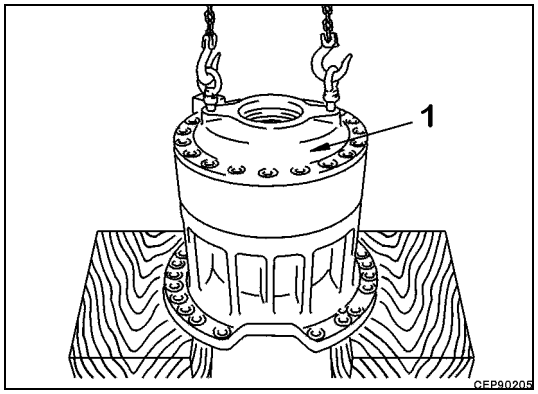
18. Assemble #1 sun gear (3) to carrier. Install thrust washer (2).



19. Install cover (1).

Cover mounting surface.....Gasket sealant [LG-6]

N•m Mounting bolt, 1st pass.....98 N•m
Mounting bolt, 2nd pass.....80 to 90°



20. Tighten drain plug and add engine oil through oil filler.

Swing machinery case.....≈ 21.5 L

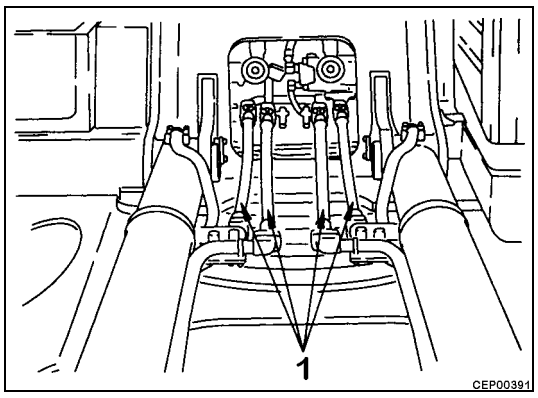
REVOLVING FRAME

REMOVAL

1. Remove work equipment. For details, see WORK EQUIPMENT.

WARNING! When disconnecting the hydraulic hoses, release the remaining pressure in the hydraulic circuit. For details, see TESTING AND ADJUSTING.

2. Disconnect boom cylinder hoses (1).

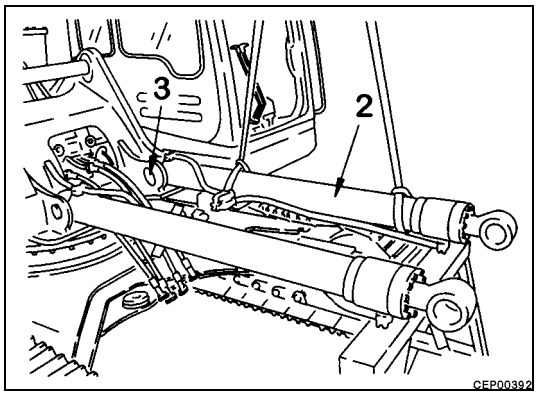


★ Fit blind plugs in the hoses and make it possible to swing the upper structure.

3. Raise boom cylinder (2), then pull out foot pin (3) and lift off. Remove the remaining cylinder in the same way.

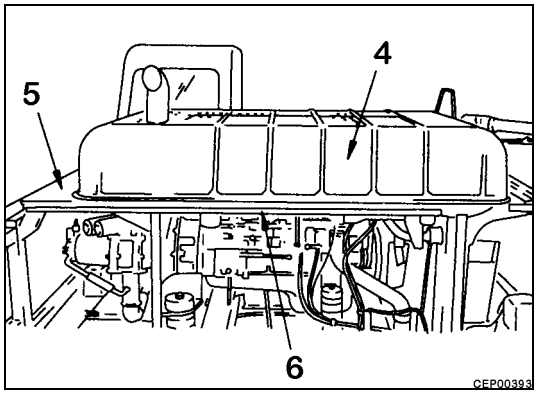
kg Boom cylinder..... 410 kg

4. Remove counterweight. For details, see COUNTERWEIGHT.



5. Remove engine hood (4), cover (5), and frame (6).
   ★ For details of the method of removing the engine hood, see HYDRAULIC COOLER.

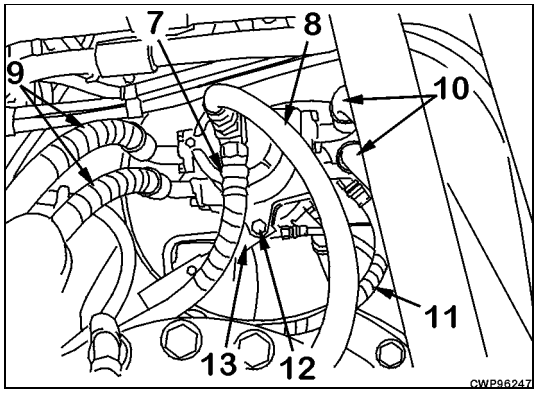
6. Leave three mounting bolts each at front and rear of revolving frame, and remove other mounting bolts.
   ★ Swing the upper structure and set to a position where it is easy to remove the mounting bolts.



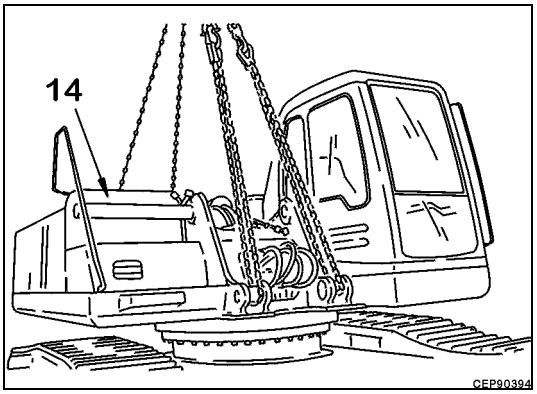
7. Disconnect drain hoses (7) and (8).
   ★ Install blind plugs in the drain hoses.

8. Disconnect travel hoses (9) and (10), and speed selector hose (11).

9. Pull out pin (12), and disconnect plate (13) from swivel joint.



10. Sling revolving frame (14), then remove mounting bolts, and lift off revolving frame. ※ 1
    - ★ Use two lever blocks.
    - ★ Loosen the mounting bolts remaining at the front and rear and adjust the center of gravity with the lever block while lifting off.



kg Revolving frame..... 10000 kg

INSTALLATION

- Carry out installation in the reverse order of removal.

※ 1

Circle mating surface .....Gasket sealant [LG-4]

Frame mounting bolt .....Thread tightener [LT-2]

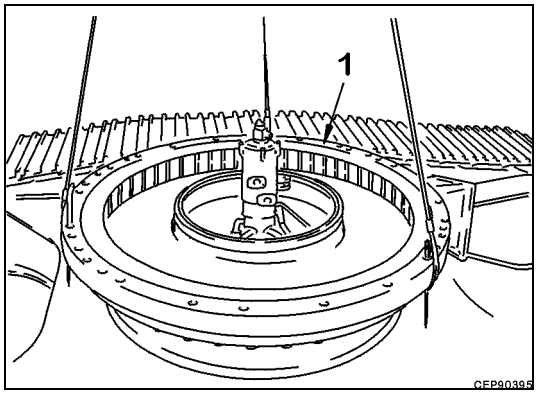
N•m Frame mounting bolt . . . . . 927 ± 103 N•m

SWING CIRCLE

REMOVAL

1. Remove the revolving frame. For details, see REVOLVING FRAME.
2. Sling swing circle (1) at three points, remove mounting bolts, and lift off swing circle. ※ 1

kg Swing circle . . . . . 600 kg



INSTALLATION

- Carry out installation in the reverse order of removal.

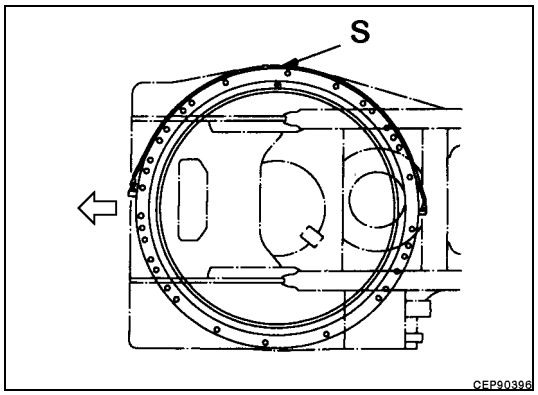
※ 1

Circle mounting bolt ..... Thread tightener [LT-2]

N•m Circle mounting bolt .....927 ± 103 N•m

★ Set the soft zone **S** mark on the inside ring of the inner race facing the right side of the machine as shown in the diagram, then install to the track frame.

Swing circle .....Grease [G2-LI] 35 L

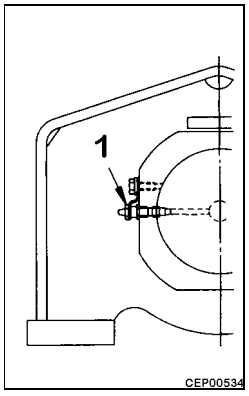


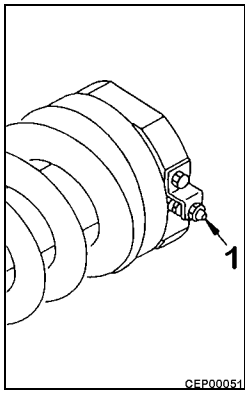
IDLER AND RECOIL SPRING

REMOVAL

1. Remove track shoe and chain. For details, see TRACK SHOE.

★ Remove lubricator (1).

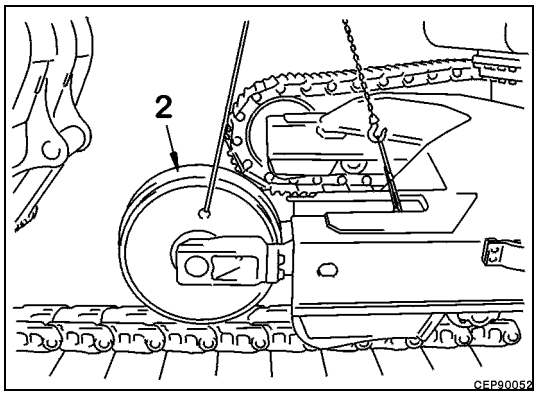




2. Sling the idler and recoil spring (2) and pull out to the front to remove. ※ 1

★ Fit wire to the idler and spring of the idler and recoil spring assembly, and adjust the balance when removing.

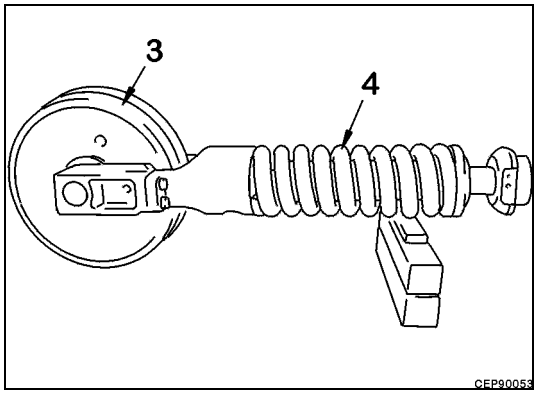
kg Idler and recoil spring ..... 610 kg



3. Disconnect recoil spring (4) from idler

kg Idler ..... 240 kg

kg Recoil spring ..... 370 kg



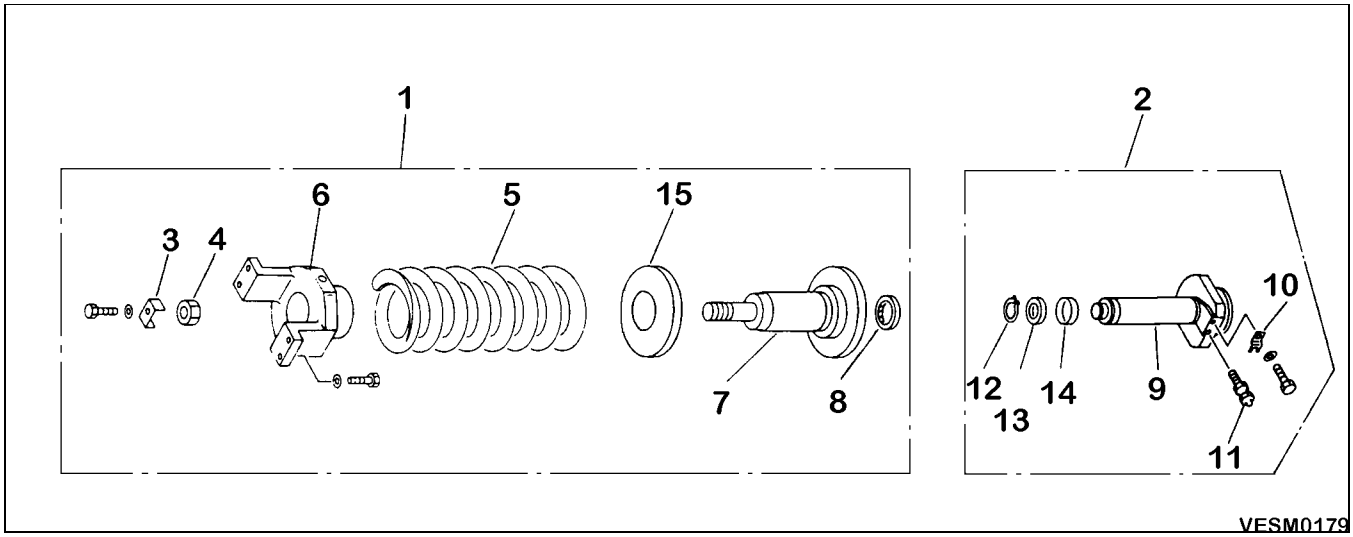
INSTALLATION

● Carry out installation in the reverse order of removal.
※ 1

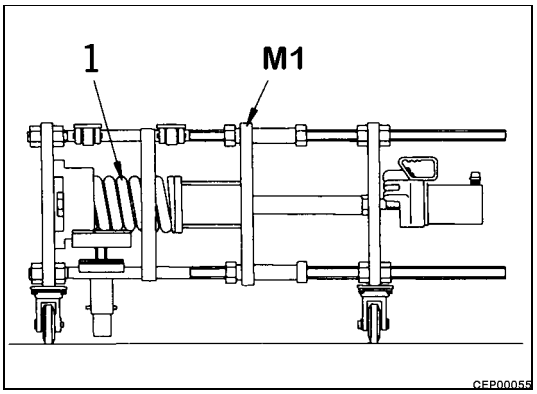
★ When installing the idler and recoil spring, assemble so that the position of the greasing plug on the idler is on the outside for the right side of the machine and on the inside for the left side of the machine.

RECOIL SPRING

DISASSEMBLY



1. Remove piston assembly (2) from recoil spring assembly (1).
2. Disassembly of recoil spring assembly
   A. Set recoil spring assembly (1) to tool **M1**.



WARNING! The recoil spring is under large installed load, so be sure to set the tool properly. Failure to do this is dangerous.

★ Installed load of spring:
PC300LL:.....269.3 kN

   B. Apply hydraulic pressure slowly to compress spring, and remove lock plate (3), then remove nut (4).

★ Compress the spring to a point where the nut becomes loose.

★ Release the hydraulic pressure slowly and release the tension of the spring.

★ Free length of spring:
PC300LL:.....857 mm

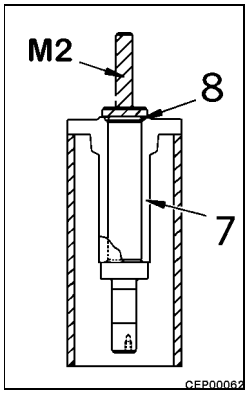
   C. Remove yoke (6), plate (15), cylinder (7), and dust seal (8) from spring (5).

3. Disassembly of piston assembly
   A. Remove lock plate (10) from piston (9), then remove valve (11).
   B. Remove snap ring (12), then remove U-packing (13) and ring (14).

ASSEMBLY

1. Assembly of piston assembly
   A. Assemble ring (14) and U-packing (13) to piston (9), and secure with snap ring (12).
   B. Tighten valve (11) temporarily, and secure with lock plate (10).
2. Assembly of recoil spring assembly
   A. Using tool **M2**, install dust seal (8) to cylinder (7).
   B. Assemble cylinder (7), plate (15), and yoke (6) to spring (5), and set in tool **M1**.

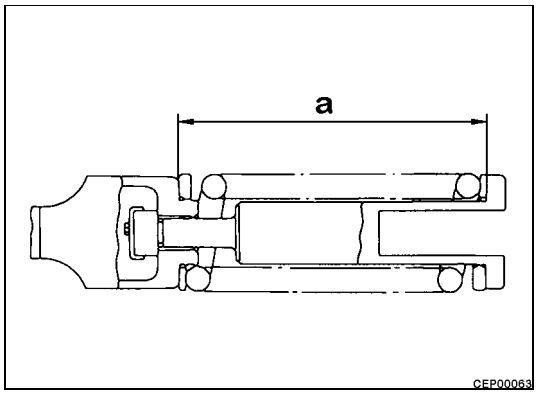
Sliding portion of cylinder: .....Grease (G2-L1)



   C. Apply hydraulic pressure slowly to compress spring, and tighten nut (4) so that installed length of spring is dimension "**a**", then secure with lock plate (3).

★ Installed length "**a**" of spring:

PC300LL:..... 688 mm



   D. Remove recoil spring assembly (1) from tool **M1**.

3. Assemble piston assembly (2) to recoil spring assembly (1).

Sliding portion of piston, wear ring: .....Grease (G2-L1)

★ Assemble the cylinder assembly so that the mounting position of the valve is 90° to the side.

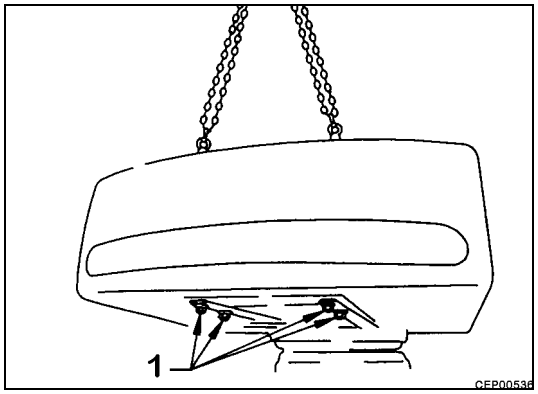
★ Fill the inside of the cylinder with approx. 200 cc of grease (G2-L1), then bleed the air, and check that grease comes out of the grease hole.

COUNTERWEIGHT

REMOVAL

1. Set lifting chain hooks to lifting eyes of counterweight and remove slack.
2. Remove mounting bolts (1).
   ★ Check the location of the shims.
3. Lift off counterweight (2). ※ 1

kg Counterweight: PC300LL ..... 8,182 kg



INSTALLATION

- Carry out installation in the reverse order of removal.

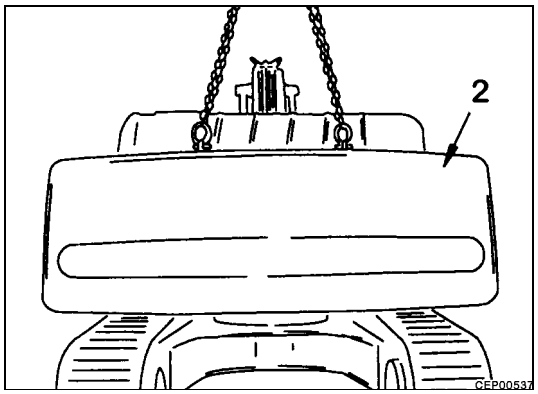
※ 1

★ Adjust the stepped difference [top and bottom clearance] from the bodywork with shims.

★ Install so that the clearance between the door and counterweight and the clearance between the revolving frame and the counterweight are a uniform 10 ± 5 mm.

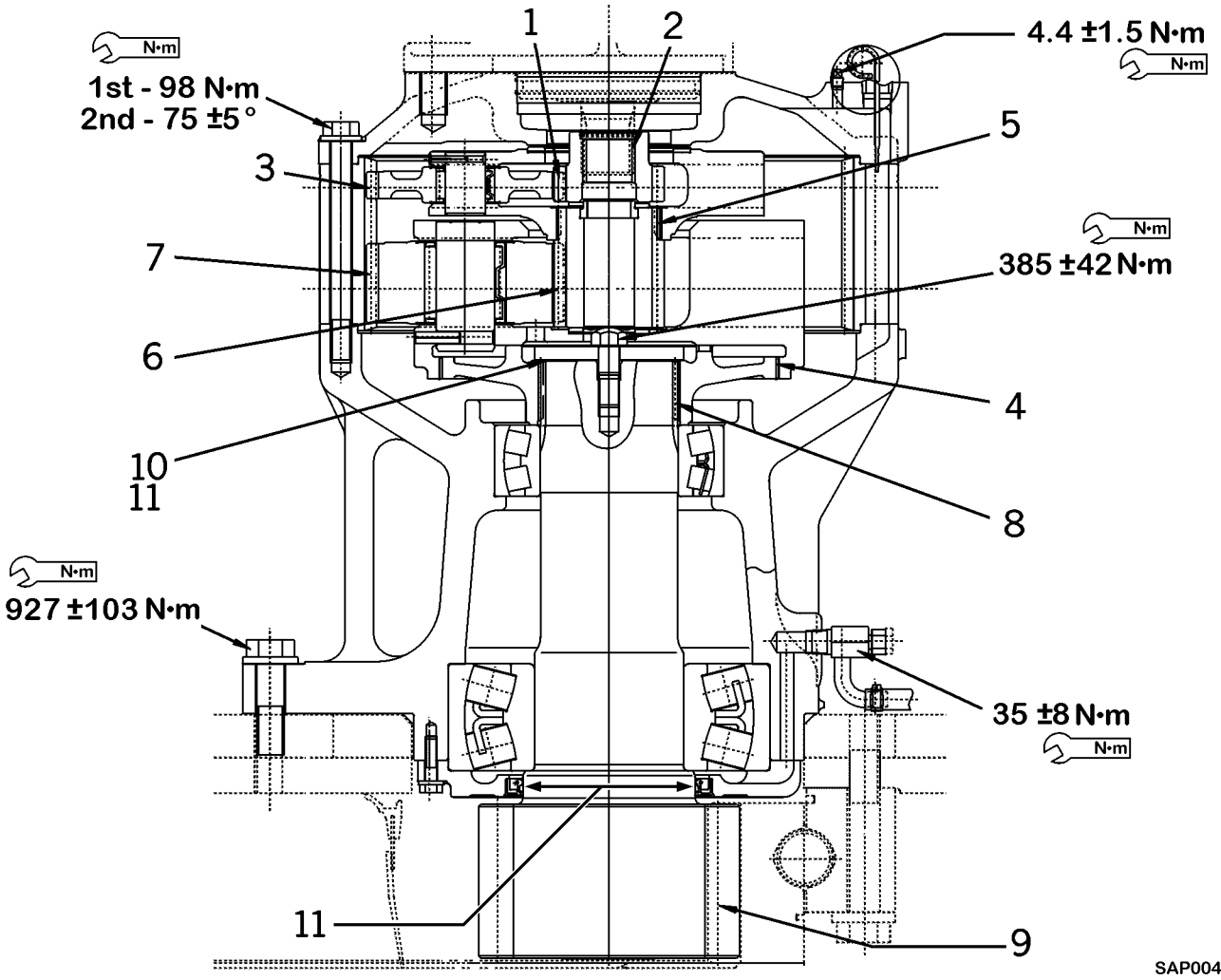
Thread of mounting bolt: .....Thread tightener (LT-2)

kg Mounting bolt: ..... 1,814 ± 98.1 Nm



40 MAINTENANCE STANDARD

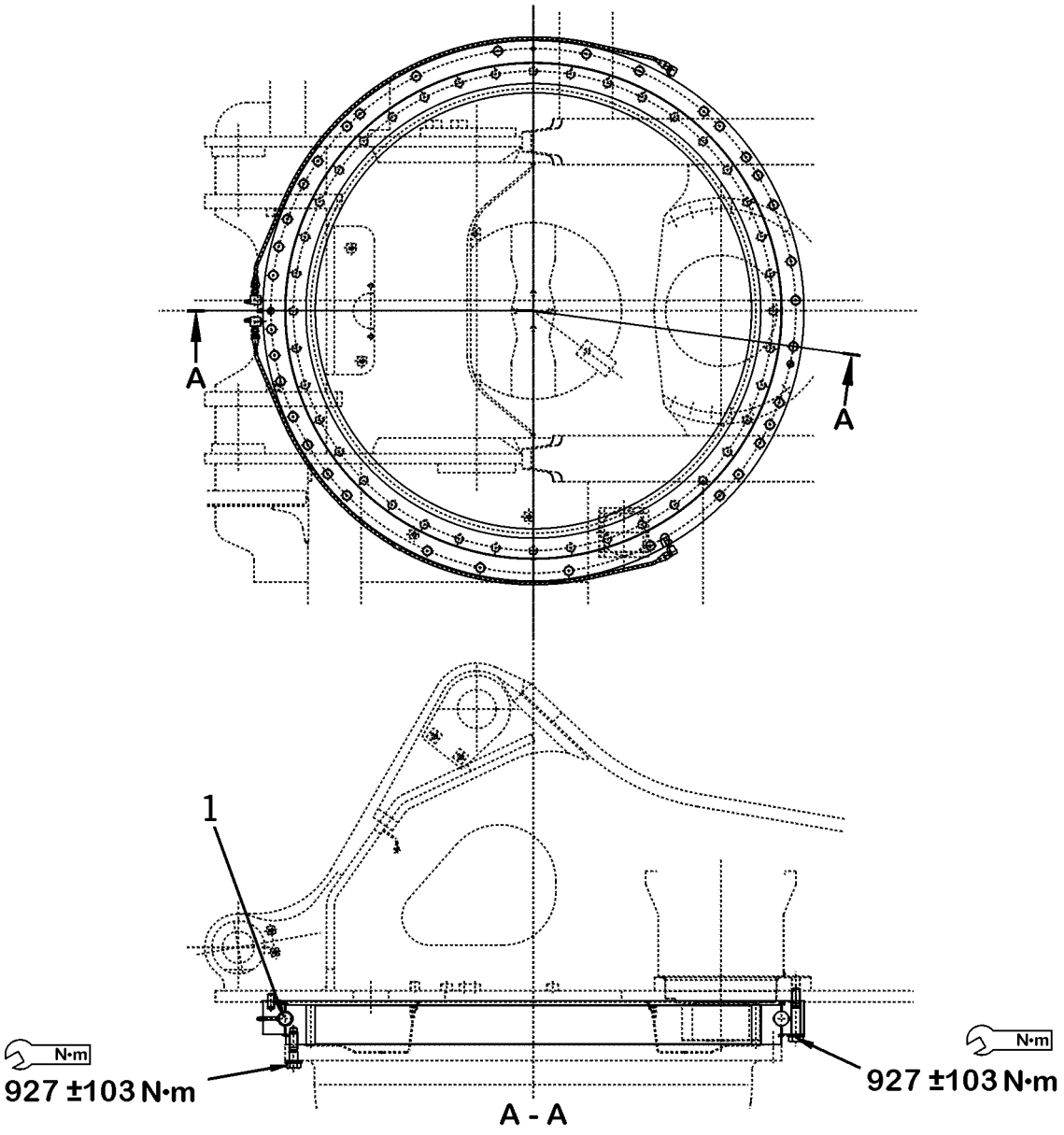
SWING MACHINERY



Unit: mm

No.	Check item	Criteria		Remedy
		Standard clearance	Clearance limit	
1	Backlash between swing motor shaft and #1 sun gear	0.19 to 0.29	---	Replace
2	Backlash between #1 sun gear and #1 planet gear	0.19 to 0.56	0.90	
3	Backlash between #1 planet gear and ring gear	0.24 to 0.70	0.90	
4	Backlash between #2 planet carrier and coupling	0.06 to 0.24	---	
5	Backlash between #1 planet carrier and #2 sun gear	0.40 to 0.71	1.10	
6	Backlash between #2 sun gear and #2 planet gear	0.19 to 0.56	1.00	
7	Backlash between #2 planet gear and ring gear	0.24 to 0.70	1.10	
8	Backlash between coupling and swing pinion	0.08 to 0.25	---	
9	Backlash between swing pinion and swing circle	0 to 1.21	2.00	
10	Clearance between plate and coupling	0.06 to 0.86	---	
11	Wear of swing pinion oil seal contact surface	Standard size	Repair Limit	Repair hard chrome plating or replace
		150 =+0 - 0.1	---	

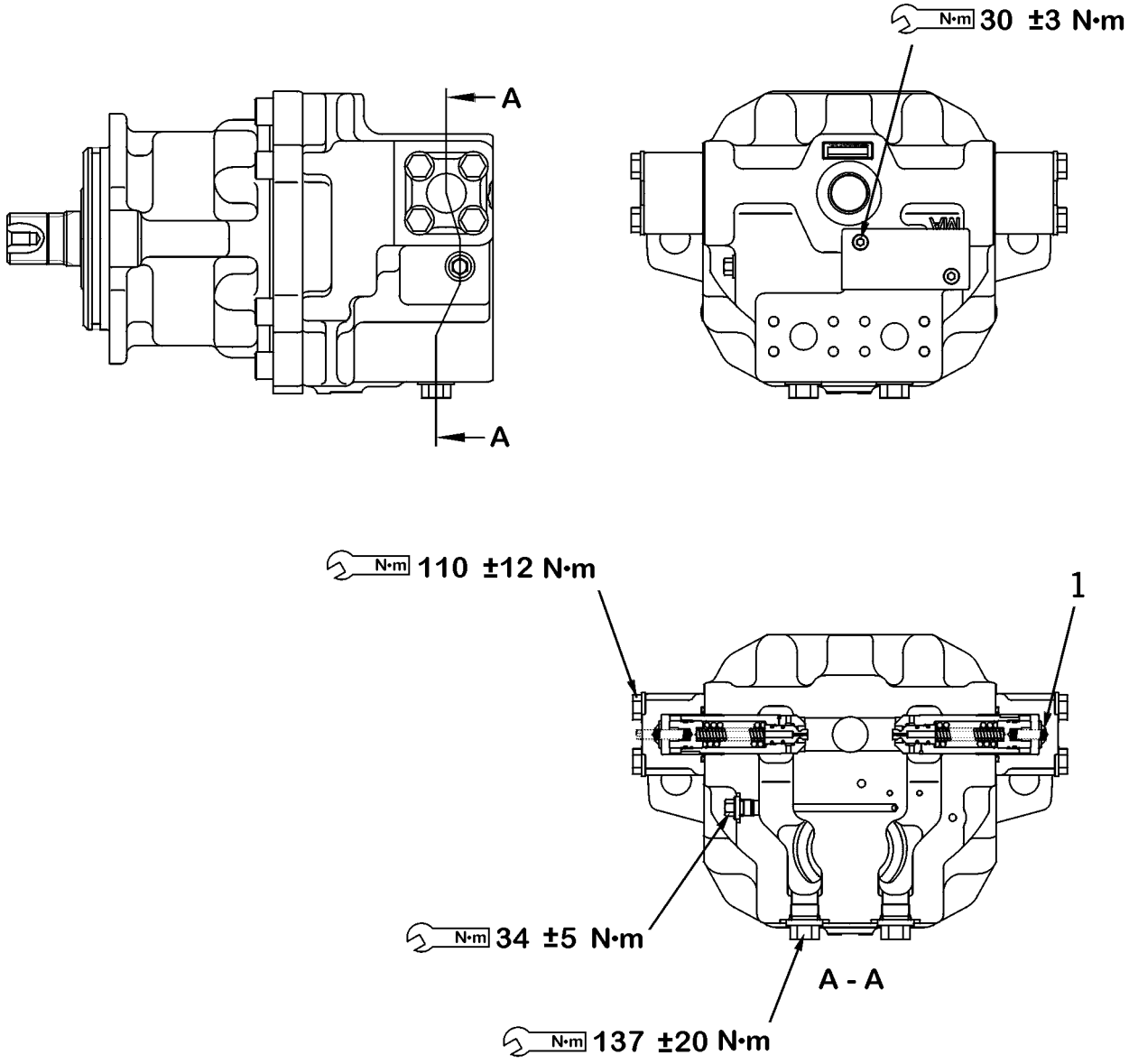
SWING CIRCLE



Unit - mm

No.	Check item	Criteria		Remedy
		Standard clearance	Clearance limit	
1	Clearance of bearing in axial direction - when mounted on machine	0.5 to 1.6	3.2	Replace

SWING MOTOR
KMF160ABE 3



SWP14817

Unit - mm

No.	Check item	Criteria					Remedy
		Standard size			Repair limit		Replace spring if there is damage or deformation
		Free length x OD	Installed length	Installed load	Free length	Installed load	
1	Check valve spring	46.9 x 9.2	31	1.6 kg	---	1.28 kg	

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