1. How to use this manual (857S-0005-1E)

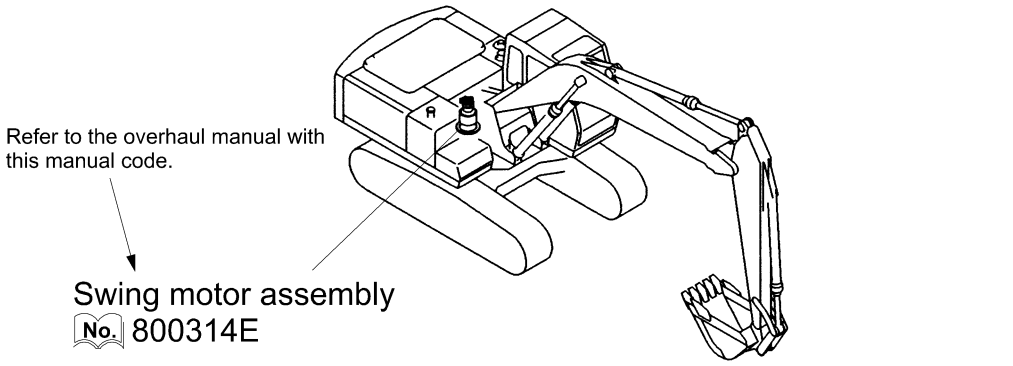
(1) Carry out preoperational checks before starting operation.
(2) Check each test item according to the testing schedule of monthly and yearly tests.

If a problem occurs

Refer to each equipment chapter and investigate the location of the problem.

C: Layout and circuit diagram of equipment
D: Engine unit
E: Hydraulic pump equipment
F: Control equipment
G: Front attachment
H: Superstructure
I: Lower structure
J: Electrical equipment
APC100: Refer to the separate manual.

- If disassembly of hydraulic units and other devices is required, refer to the "disassembly and assembly of equipment" section of each equipment chapter.
- The manual code of the "overhaul manual" of hydraulic units and other devices required for disassembly and assembly is printed, so refer to that procedure manual.

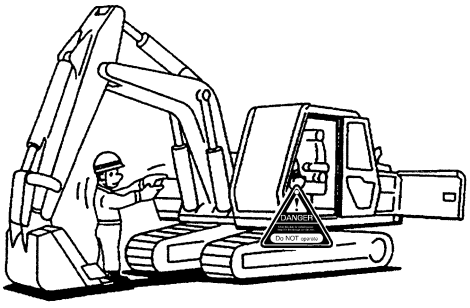


When you have repaired any malfunctioning parts, carry out the specified inspections and check that there is enough oil.
When replacing parts, always check them with reference to the relevant parts list.

Carry out preoperational checks and test-run the equipment unloaded to confirm its safety.

Start work.

(4) Park the machine on level ground for inspection and servicing
- Choose a work site which is firm, level and free of hazards.
- Always lower the bucket to rest on the ground.
- Stop the engine and remove the key.
- Put the warning tag.
- Place chocks to immobilize the track shoes.



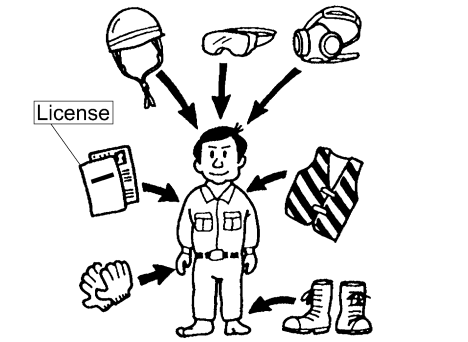
0097-00680E

(5) Each piece of equipment is rigorously tested and tuned before shipping. Tuning outside your authorised KATO dealer is forbidden.

(6) Repairs to the boom and arm require special techniques.
Contact your authorised KATO dealer.

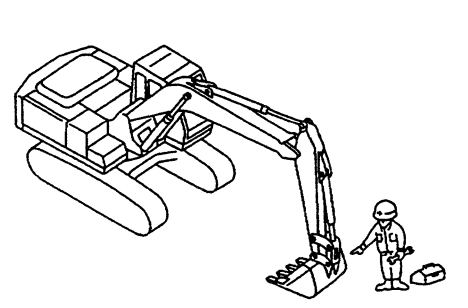
0097-00690E

(7) Wear protective clothing and equipment
- Wear a helmet, protective goggles, safety boots, gloves etc. when inspecting and servicing the machine.
- Metal splinters can fly off when you are using a hammer or grinder, so always wear proper protective clothing and equipment when using these tools.



7070-00050E

(8) Supporting attachments
- Always rest the attachment on the ground during inspection and servicing.
- It is dangerous to replace or repair hydraulic hoses, joints or other hydraulic equipment while the attachment is raised in the air.
It must be lowered to the ground.


0097-00700

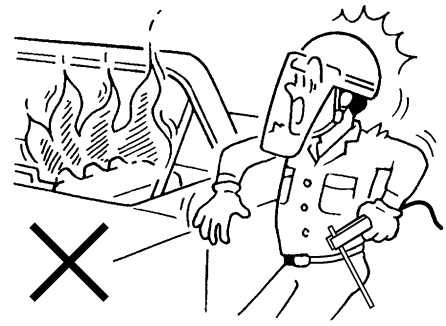
(21) Servicing with the engine running is a job for two people

- Avoid servicing the machine while it is working if at all possible.
- If it is unavoidable, work with at least two people. One of you must be in the operator's seat to be able to stop the engine at any time and all those involved must be in constant contact.
- If you work near rotating parts, take care not to be trapped or dragged in.

7070-03430

(22) Precautions when welding

- There is a risk of fire when welding due to possible damage to electrical equipment or generation of gas from hot paint.
- Employ a qualified welder for the job and carry it out in a properly equipped place.


7070-03442

The following are basic precautions before welding.

- Turn the starter switch to OFF.
- Disconnect the negative side of the battery cable from the terminal.
- Cut away the paint from the area to be welded so that it cannot produce gas.
- Attach an earth connection within one meter of the weld point with no O-rings or bearings between the weld and earth points.
- Always wear protective equipment and make sure the ventilation is adequate.
- Remove flammable materials and place a fire extinguisher nearby.

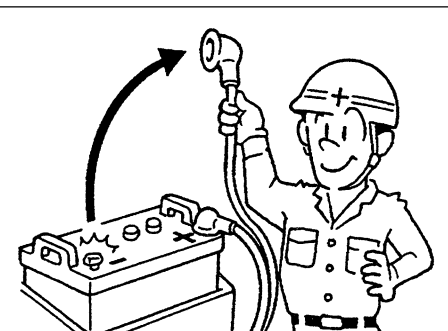
(8570-0081-1E)

⚠ CAUTION

If you don't turn the starter switch to OFF and disconnect the negative side of the battery cable from the terminal before welding, the electrical or electronic equipment could malfunction or the batteries could explode dangerously.

(23) Detach the battery cable

- When servicing any part of the electrical system or when welding, there is the risk that a short circuit could occur and place load on the batteries. The batteries generate flammable gas causing the risk of an explosion. The battery electrolyte is dilute sulfuric acid which will burn skin on contact.
- Damage to the batteries is extremely dangerous, so always remove either of the battery cables before servicing any part of the electrical system or welding. (Always disconnect the battery cable from the negative terminal.)


0097-01110

6-2 Recommended lubricants table (817E-0022-2E)

To insure proper operation of this machine, all points which require lubrication must be serviced with the correct lubricants, at proper time interval. All points which require lubrication are shown in the "Greasing chart" and "Oiling chart".

Type \ Maker / Ambient Temp.			Shell	Esso	Mobil	BP	Caltex	NIPPON OIL
Hydraulic Oil (ISO No.)	32 –20°C — 20°C	HO	Tellus ST32	Nuto H32	D.T.E. 24	Energol HLP 32	Rando Oil HD 32	HYRANDO WIDE KV32
	46 –10°C — 30°C		Tellus ST46	Nuto H46	D.T.E. 25	Energol HLP 46	Rando Oil HD 46	HYRANDO WIDE KV46
	68 0°C — 40°C		Tellus ST68	Nuto H68	D.T.E. 26	Energol HLP 68	Rando Oil HD 68	HYRANDO WIDE KV68
	100 5°C — 50°C		Tellus 100	Nuto H100	D.T.E. 27	Energol HLP 100	Rando Oil HD 100	HYRANDO WIDE 100
Gear Oil GL-5 class (API No.)	–20°C — 30°C	GO	Spirax EP 75W-85	Gear Oil GX 80W-90	Mobilube HD 80W-90	Hypogear 80W-90	Multipurpose Thuban 80W-90	———
	0°C — 50°C		Spirax EP 140	Gear Oil GX 85W-140	Mobilube HD 85W-140	EPHypogear 85W-140	Multipurpose Thuban 85W-140	———
Grease	Extreme pressure bearing grease (NLG Ⅰ - Ⅱ)	EG	Alvania EP Grease 2	Beacon EP-2	Mobilux EP-2	EPEnegrease LS-EP2	Multifax EP2	———
	Chassis grease (NLG Ⅰ - Ⅰ)	SG	SAE Standard Grease					
Engine Oil CD, CE class (SAE No.)	–20°C — 20°C	EO	Rimura CT Oil 10W-30	Essolube XD-3 10W-30	Delvac Super 10W-30	Vanellus FE 10W-30	Delo 350 Multigrade 10W-30	Diesel CF/DH-1 10W-30
	–10°C — 40°C		Rimura CT Oil 15W-40	Essolube XD-3 15W-40	Delvac Super 15W-40	Vanellus C3 15W-40	Delo 600 Multigrade 15W-40	Diesel CF/DH-1 15W-40

(857E-0012-2E)

(827E-0039-0E)

⚠ CAUTION

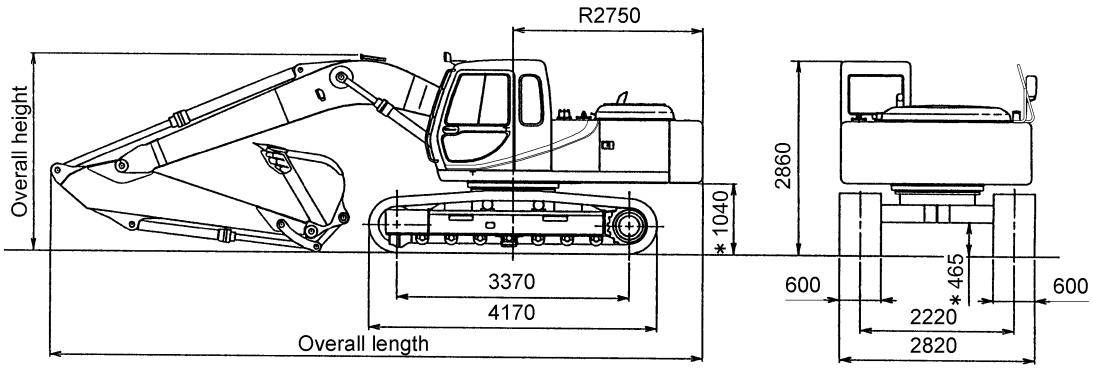
- For replacement with the hydraulic oil which differs in brand from the one in use now, all the oil confined in the hydraulic circuit including the oil reservoir should be replaced.
- The oils and greases recommended above are subject to change due to oil company circumstances. If there is any difference in the above table, consult your authorised KATO dealer or oil dealer.

Note The machine is shipped from the factory with the hydraulic oil conforming to the specification based on the contract filled. Its brand and ISO VG No. are shown on the nameplate attached to the top of the oil reservoir.

Note As can be seen from the above table, hydraulic oil is shown as classified by ISO viscosity grade.

1. External views (9370-0002-0E)

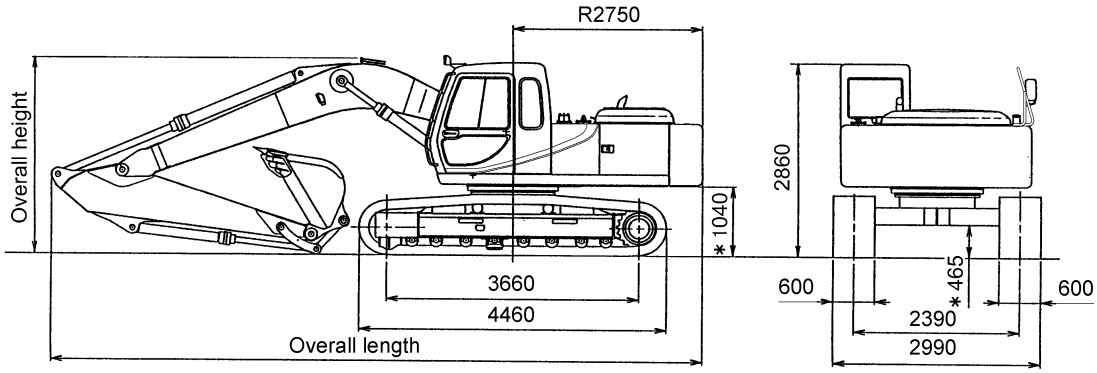
HD820Ⅲ



∗ These dimensions do not include the projection of shoe plates.

9370-00431E

HD820Ⅲ-LC



∗ These dimensions do not include the projection of shoe plates.

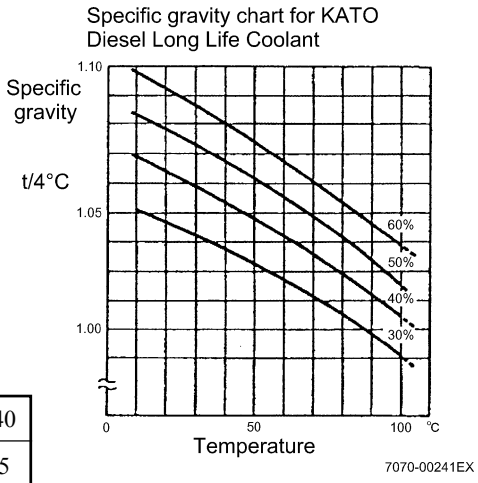
9370-00441E

	Short arm		Standard arm		Long arm	
	STD	LC	STD	LC	STD	LC
Overall height (mm)	2950	2950	2910	2910	3110	3110
Overall length (mm)	9510	9510	9500	9500	9530	9530

(8370-0059-0E)

(5) Addition of Long Life Coolant and calculation of its concentration

1) The freezing temperature of the coolant varies greatly with the concentration of the Long Life Coolant it contains. Set the coolant freezing temperature 5°C below the lowest recorded temperature in the operating region and use that temperature to determine the required concentration of the Long Life Coolant and therefore the Long Life Coolant volume to add.



Coolant freezing temperature against addition volume of the Long Life Coolant

Freezing temperature (°C)	–15	–20	–25	–30	–40
Long Life Coolant concentration (%)	30	35	40	45	55
Long Life Coolant addition volume (L)	6.9	8.1	9.2	10.4	12.7
Water volume (L)	16.1	14.9	13.8	12.6	10.3
Total coolant volume (L)	23				

(Using KATO Diesel Long Life Coolant)

(8270-0246-2E)

2) If it is possible that the temperature may be about to drop below the freezing temperature of the coolant currently in use, add the Long Life Coolant.

Once you have finished adjusting the Long Life Coolant concentration, start the engine and allow it to mix the coolant fully, then use a hydrometer or concentration gauge to check the actual concentration.

(8570-0083-0E)

⚠ CAUTION

- Use only genuine KATO Diesel Long Life Coolant. Other brands could cause corrosion of copper and aluminum components and reduce their lifespan. The freezing temperature might be different, leaving the risk of freezing and engine damage.
- Use the Long Life Coolant within the concentration range between 30—60%. If the concentration is below 30%, anti-corrosion effect is reduced. If it is 60% or more, the freezing temperature becomes higher.
- If you top up the coolant level with water or repair coolant leakage, always recheck the Long Life Coolant concentration. If you do not check and adjust the concentration as necessary, the reduced Long Life Coolant concentration could allow freezing of the coolant which would damage the engine.

(6) Precautions on handling Long Life Coolant

1) No fire near Long Life Coolant

Long Life Coolant is a hazardous substance and must not be handled near fire or other source of ignition.

(8270-0178-1E)

⚠ CAUTION

Long Life Coolant is flammable, so beware of fire.

2) Do not drink Long Life Coolant

Long Life Coolant is poisonous. Never allow it into your mouth even when diluted. If you drink it by accident, make yourself vomit immediately and consult a doctor.

2-4 Checking the status of the APC100 system (817S-0033-2E)

After you have completed the pre-power-up inspection, check the status of the APC100 system as described below.

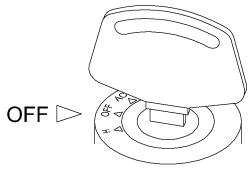
(847S-0022-1E)

⚠ CAUTION

You must confirm that the accelerator actuator is mounted correctly before you switch on the APC100 system. If you do not do this, the engine speed will be unable to match the position of the accelerator dial or the drive motor of the accelerator actuator could overrun and burn out.

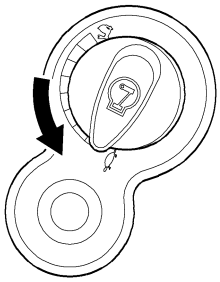
(1) Checking all switch and dial positions

1) Starter switch: "OFF" position



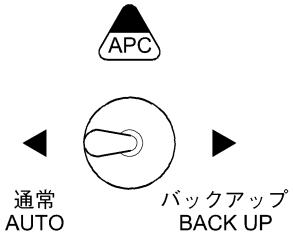
817S-00211

2) Accelerator dial: "Low idling (🐢)" position



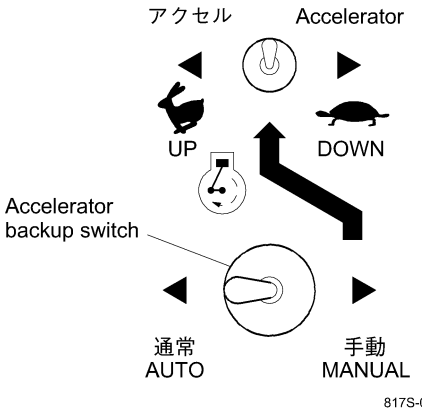
817S-00221

3) APC switch: "Normal (AUTO)" position



817S-00230

4) Accelerator backup switch: "Normal (AUTO)" position

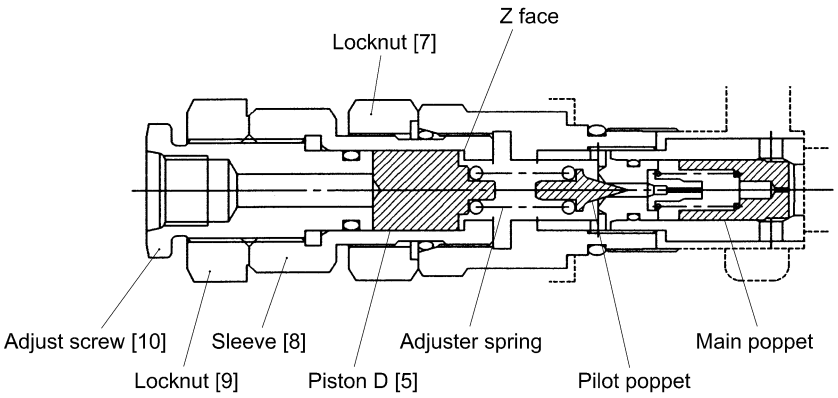


817S-00240E

3-1-2 Main relief valve adjustment method (847S-0030-2E)

If high pressure adjustment is necessary, adjust 1) and 2). If low pressure adjustment is necessary, adjust 2) only.

(1) Main relief valve



837S-00641E

Note When you turn sleeve [8] and adjust screw [10], turn them reversely and so on to avoid applying excessive force on the adapter and hose attached to adjust screw [10].

1) High-pressure adjustment

・ Unscrew locknut [7] and tighten adjust screw [10] until piston D [5] comes into contact with the Z face.

・ Adjust sleeve [8] to adjust the high-pressure side pressure. After that, lock the position by tightening locknut [7].

2) Low-pressure adjustment

・ Unscrew locknut [9] and loosen adjust screw [10] after high pressure adjustment to adjust the low-pressure side pressure. After that, lock the position by tightening locknut [9].

One quarter turn of the adjust screw ≒ 10MPa (102kgf/cm^2)

3) After adjustment, return the adapter and hose attached to adjust screw [10] to their original positions.

Classification	Device	Compatibility HD820Ⅲ←→HD820Ⅱ	Notes (Requirements for compatibility)
Front	Boom	←○→	
	Arm	←○→	
	Bucket	←○→	
	Side link	←○→	
	Tipping link	←○→	
Element	Return filter	←○→	
	Drain filter	←○→	
	Fuel filter	←○→	
	Suction strainer	←○→	
	Pilot line filter	←○→	
	Engine oil filter	←○→	

＜Abbreviations＞ ←○→ : Mutually compatible ←×→ : Mutually incompatible (937S-0087-1E)

←△→ : Conditionally compatible ×←→○ : Compatible in one direction

5-2 Hydraulic pump (937S-0126-0E)

Part No.		609-79900012
Main pump	Rated pressure	32.8MPa (335kgf/cm^2)
	Delivery	115cm^3/rev × 2
	Maximum flow	255L/min × 2
	Direction of rotation	Clockwise (as viewed from shaft end)
Gear pump	Rated pressure	3.6MPa (37kgf/cm^2)
	Delivery	10cm^3/rev
	Maximum flow	20.5L/min
	Direction of rotation	Clockwise (as viewed from shaft end)
Mass		126kg

(937S-0127-1E)

5-3 Check valve (937S-0128-0E)

	Back pressure	Bypass
Part No.	669-53800001	669-50700001
Cracking pressure	0.20 ± 0.03MPa (2.0 $^{\pm 0.3}$kgf/cm^2)	0.49 ± 0.05MPa (5.0 $^{\pm 0.5}$kgf/cm^2)
Mass	Approx. 0.16kg	Approx. 0.16kg

(937S-0129-2E)

(8270-0143-4E)

⚠ CAUTION

- Take care not to get grit or mud on the extracted pins.
- Thoroughly wipe the grease, grit and mud off the extracted O-rings. If any O-ring is damaged, deformed or hardened, replace it.
- The arm tip and tipping link have dust seals fitted on both ends, so take care not to damage them.

2-1-3 Mounting (9370-0012-3E)

(1) Ready the bucket for mounting

(2) Clean and grease all pins and holes.

(3) Start the engine and leave it at idling speed.

(4) Fit the pin seal O-rings onto the inside of the bosses of bucket holes ⓑ, and insert the steel bushes into the holes. Line the arm tip holes up with the bucket holes ⓑ which have the steel bushes inside and insert bucket pin Ⓑ. (Fig. ①)

Note The fit is good enough to ensure that the pin can be inserted as long as the centers of the holes are aligned, so do not hit the pin or otherwise apply excessive force.

Note Line the pin up with the rotation stopper hole and check the pin's orientation before you insert it.

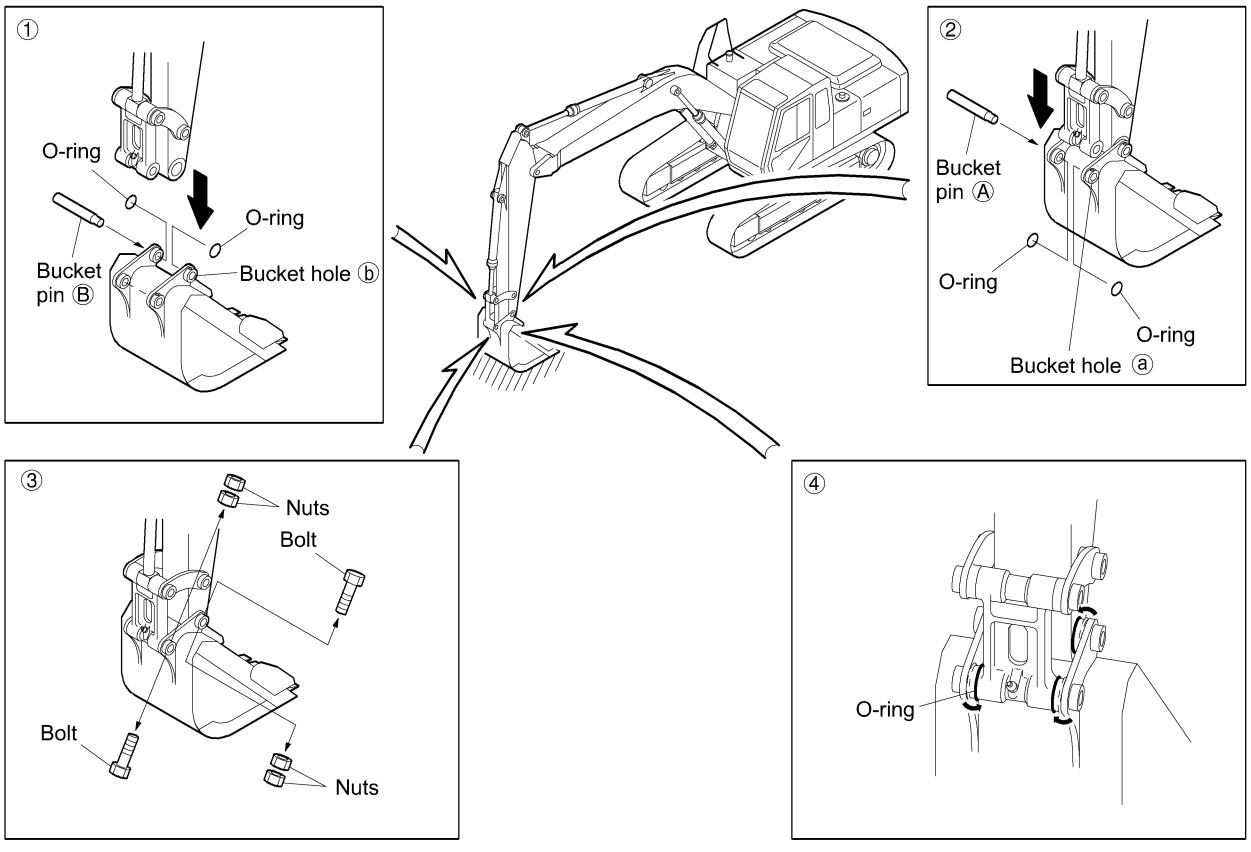
(5) Fit the pin seal O-rings onto the inside of the bosses of bucket holes ⓐ, and raise the boom or the arm to lift the bucket. Then adjust the cylinders so that bucket pin Ⓐ can be easily inserted into the bucket holes ⓐ. (Fig. ②)

(6) After inserting each pin, line them up with their rotation stopper holes and fasten the bolts in place. (Fig. ③)

(7) Set the pin seal O-rings in the "V" grooves. (Fig. ④)

(8) Adjust the play on the bucket.

(9) Grease each pin and stop the engine. Bucket attachment is complete.



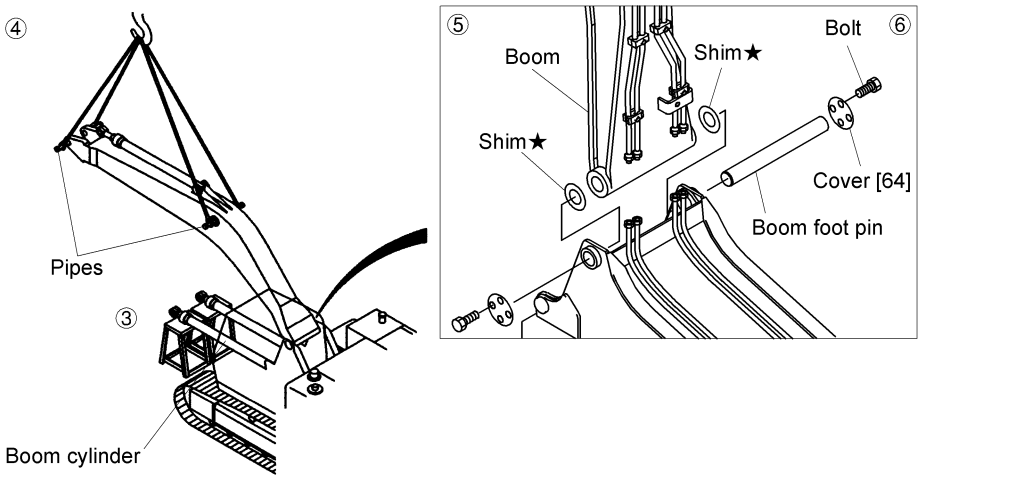
9370-00071E

(6) Remove covers [64] and extract the boom foot pin. (Fig. ⑥)

(767S-0311-1E)

⚠ CAUTION

Be sure to mark the shims (detached when removing the pin) left and right to avoid mistakes in reassembly.



937S-00631E

2-3-2 Inspection and repair (857S-0120-1E)

After disassembly, inspect the following points and make repairs as necessary.

(1) Check for cracks, damage, deformation, corrosion etc. in each part of the boom and repair cracks and damage by welding where necessary. Remove corrosion with a wire brush and repaint the affected areas.

(2) Use calipers to measure wear to the inner diameters of pin holes and bushes, bending, damage and wear to pins etc. and replace any which exceeds wear limits. (Refer to "Service standards".)

(3) Inspect all pipes and hoses for damage, cracks, dents, bending, crumbling, deformation and wear of the screw threads. Replace any worn or defective parts.

(4) Replace all O-rings and seals with new ones.

2-3-3 Mounting (937S-0107-1E)

(1) Pass iron bars etc. of adequate strength through the boom cylinder attachment hole and the arm attachment holes. Attach the sling wire ropes to the iron bars and support the boom with a crane. Align the centers of the attachment holes and insert the boom foot pin to join the boom foot to the slewing table. After inserting the pin, attach covers [64]. (Fig. ①)

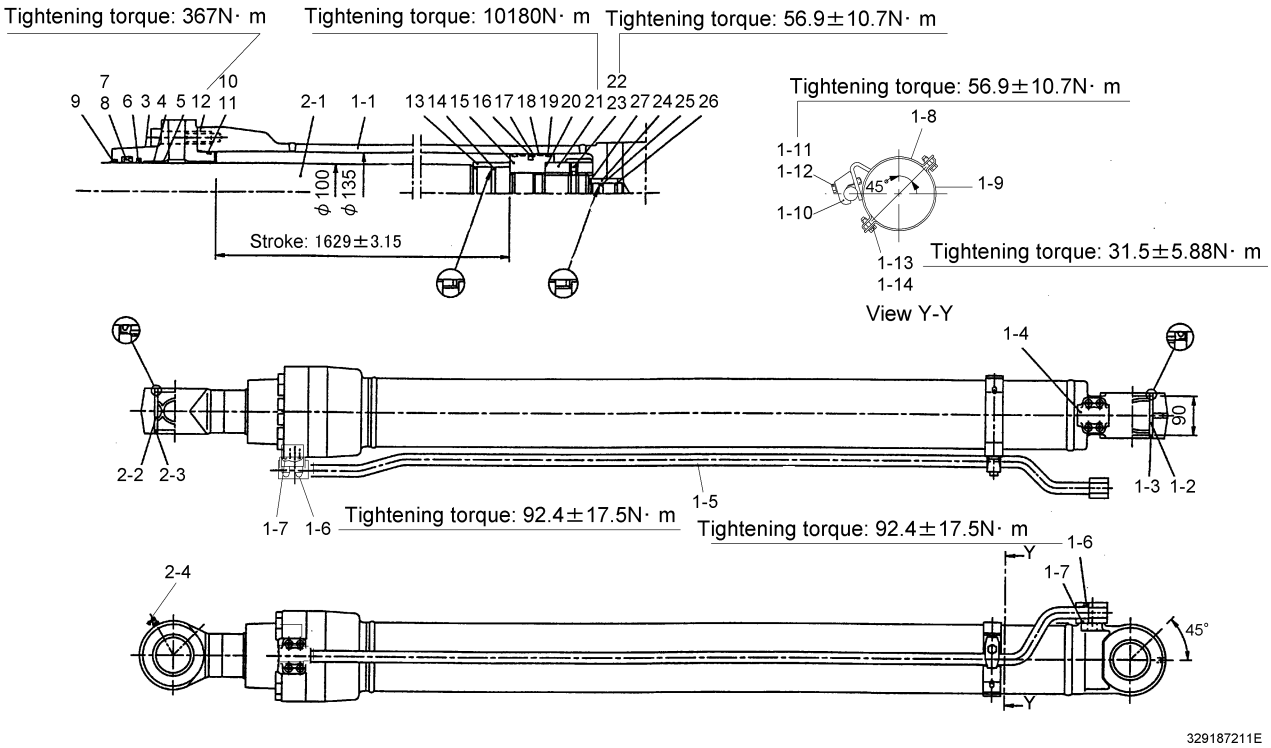
(777S-0091-1E)

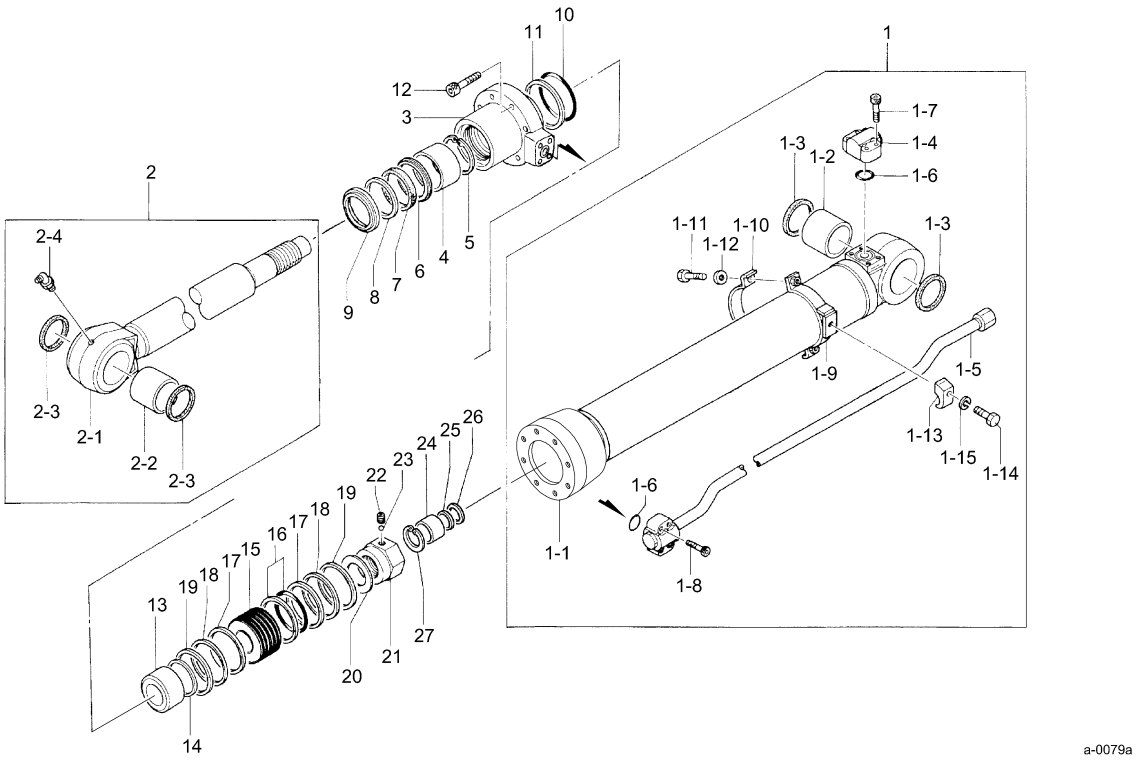
⚠ CAUTION

- Be sure to attach the shims (detached when removing the pin) left and right correctly in reassembly.
- Insert an appropriate thickness of shims (those marked ★ in the diagram) to reduce the lateral clearance in the boom boss to 2.0mm. Place the shims carefully, locating them so as to avoid applying excessive force to the cylinders etc.
- The boom foot section has dust seals fitted on both ends, so take care not to damage them when inserting the pin.

(3) Arm cylinder

329-18700021





3-1-2 Inspection and repair (767S-0297-1E)

Replace the internal gear if it shows signs of damage or deterioration. Measure the displacement over a given number of the internal gear teeth and replace it if the limit of use is exceeded. (Refer to "Service standards".)

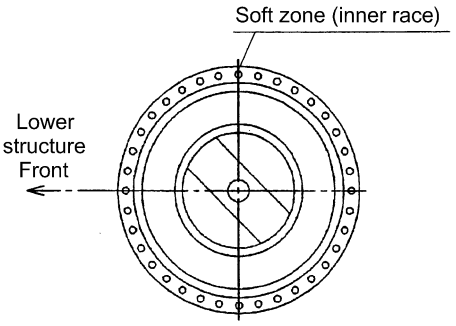
3-1-3 Mounting (937S-0046-0E)

(1) After cleaning the swing gear bearing, degrease and wash the screw threads of all the bolts and dry it with compressed air.

(2) Arrange the wire rope slings to the swing gear, lift it with a crane and lower it into position for remounting on the lower structure.

⚠ CAUTION (847S-0054-0E)

- When remounting the swing gear onto the lower structure, position it so that the soft zone (marked "S") on the inner race of the swing gear bearing is positioned as shown in the diagram relative to the lower structure.
- If the surface, the swing gear is to be bolted onto, is rough or scarred, you must grind it smooth before mounting the swing gear.

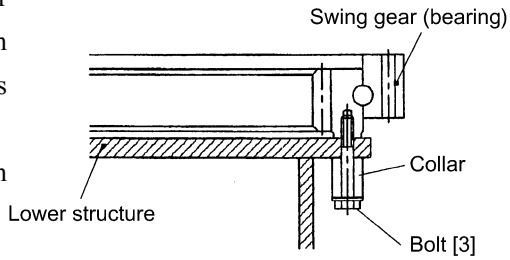


707S-00722E

(3) First provisionally bolt the swing gear bearing to the lower structure with four bolts [3] at diagonally opposite positions. Then fasten all the bolts provisionally on diagonally-opposite pairs before finally tightening them evenly to the correct torque.

Note 1. Bolts must be degreased, washed, dried and coated with screw-lock compound.

2. Tightening torque for bolts [3]: 533N・m (54.4kgf・m)

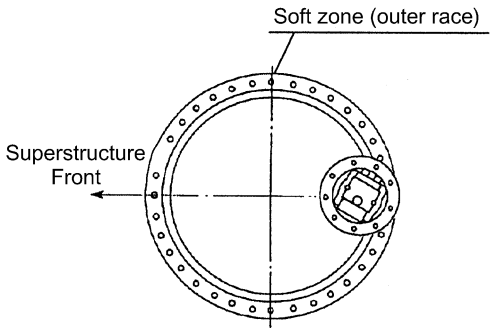


707S-00733EB

(4) Arrange the sling wire ropes to the superstructure and use a crane to lift and support it in the correct position for mounting on the lower structure.

⚠ CAUTION (767S-0321-0E)

When remounting the superstructure onto the swing gear, position it so that the soft zone (marked "S") on the outer race of the swing gear bearing is positioned as shown in the diagram relative to the superstructure.



707S-00743E

Note At this stage if you insert two metal bars into bolt attachment holes on the swing gear bearing, it will be easier to position the superstructure correctly.

2-3 Track roller (767S-0166-0E)

2-3-1 Removal and disassembly (937S-0056-1E)

(1) Retract the adjuster cylinder to allow more slack in the track shoe then use the boom to raise the body on the side from which the track roller is to be removed.

Note If this operation is difficult, remove the track shoe altogether.

(2) Remove bolts [2] and remove the track roller from the traveling frame. (Fig. ①)

(3) If it is necessary to disassemble the track roller, follow the procedure below. (Fig. ②)

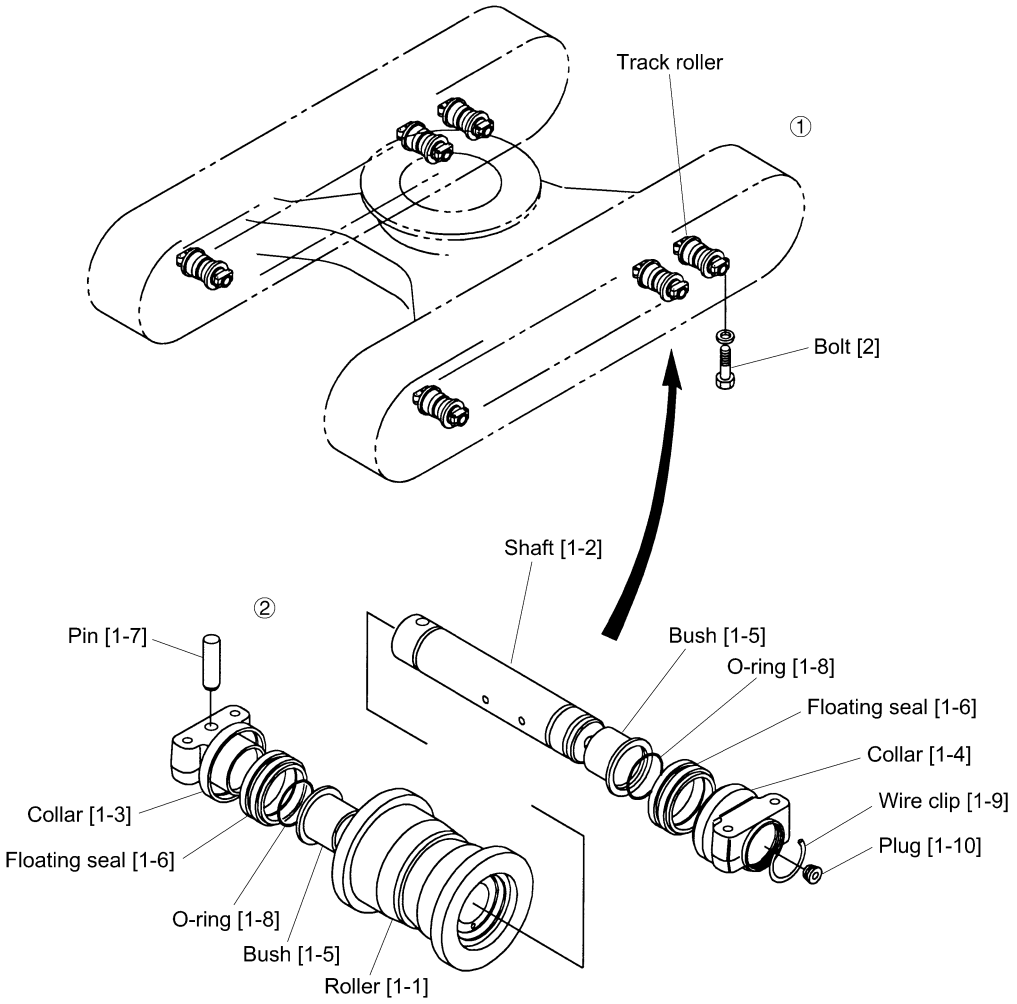
1) Remove wire clip [1-9] from the outside of the shaft and pin [1-7] from the inside to remove collars [1-3] and [1-4] from the both sides of shaft [1-2].

Note Remove plug [1-10] and drain oil out before doing this work.

2) Remove floating seals [1-6] from the collars and roller.

3) Remove O-rings [1-8] from the shaft.

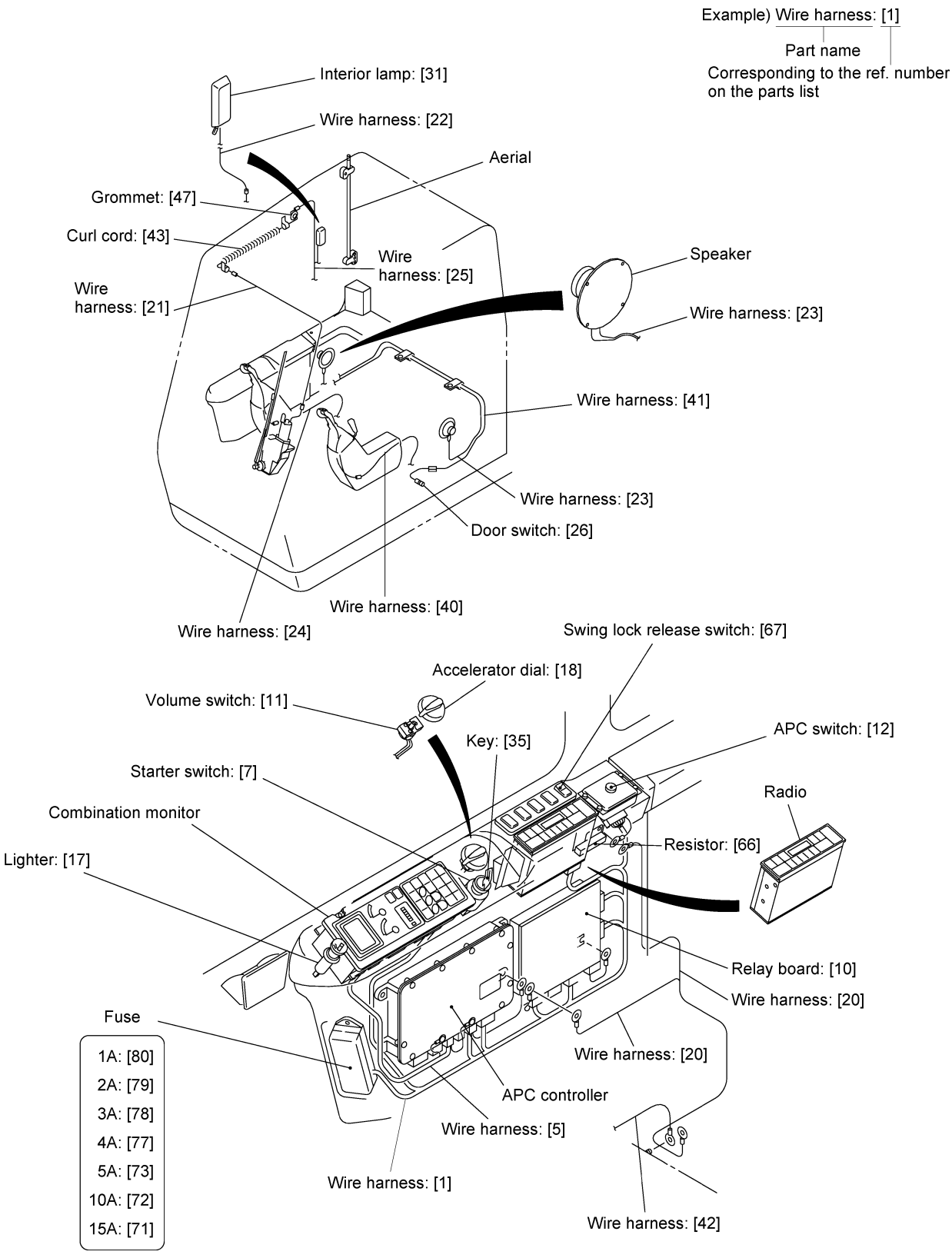
4) Remove roller [1-1] with bushes [1-5] from the shaft.



817S-00993E

1. Layout of electrical equipment (817S-0089-0E)

1-1 Inside the cab (817S-0090-0E)



777S-00982E