GEN00097-03

Field Assembly Instruction

BULLDOZER

D375A-6

SERIAL NUMBERS 60001 and up

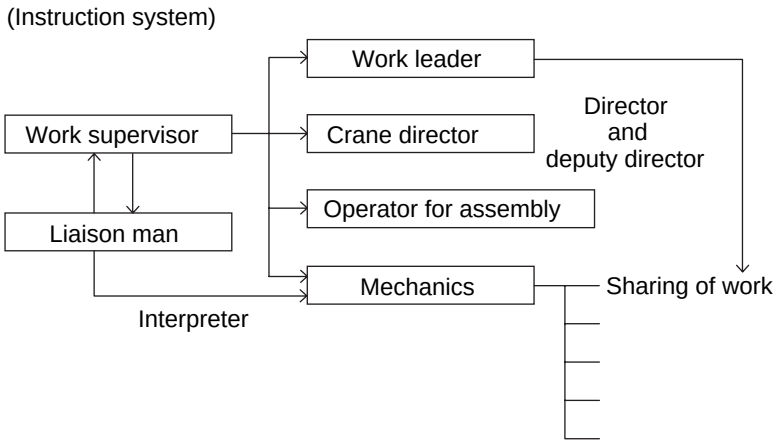
ecot3

KOMATSU

Preface

Since this machine is large in size, it is divided into some units to meet the transportation conditions and regulations applied to the transportation route when shipped from our factory.
This manual describes how to assemble the units into the complete machine in the field. We hope that this machine will display its quality and you will use it safely according to the operation manual.

Many units are large in size and heavy in weight and may be handled in a dangerous place or posture and many workers may have to work together to sling them with cranes.
Accordingly, before starting the assembly work, the work supervisor is required to hold a safety meeting to oblige the workers to put on protective gear and appoint a work leader and a crane work signal man and allot roles to all the workers for safe work.
In particular, the above meeting is more important when worker of different languages and customs work together.
The following is a reference supervision system diagram.



When the work equipment is installed, the engine must be operated.
Accordingly, before installing the work equipment, inspect and maintain the machine thoroughly.

Note that this manual does not describe the whole specification of the machine but describes only the basic specification.

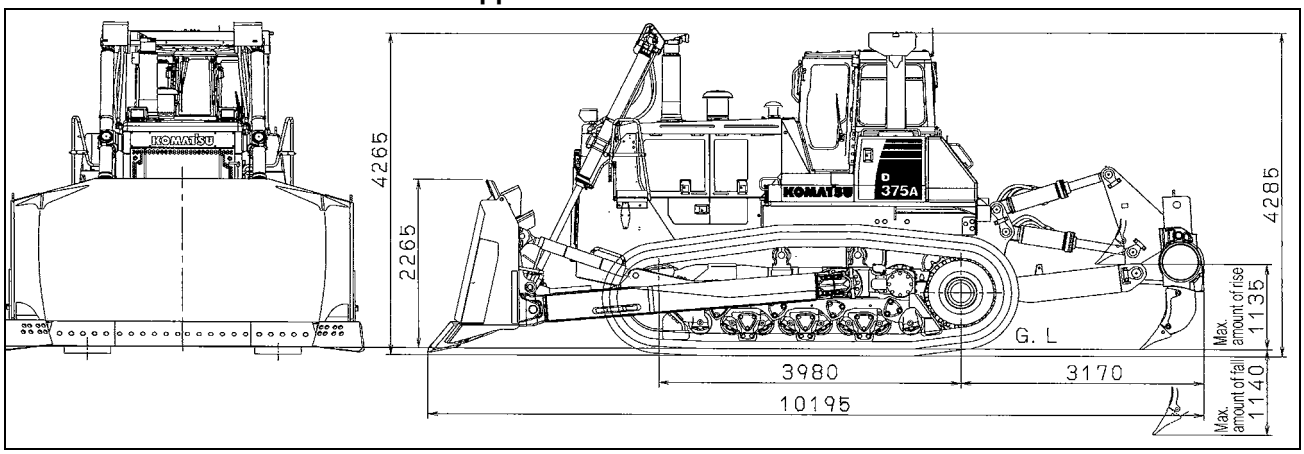
CONTENTS

Specifications

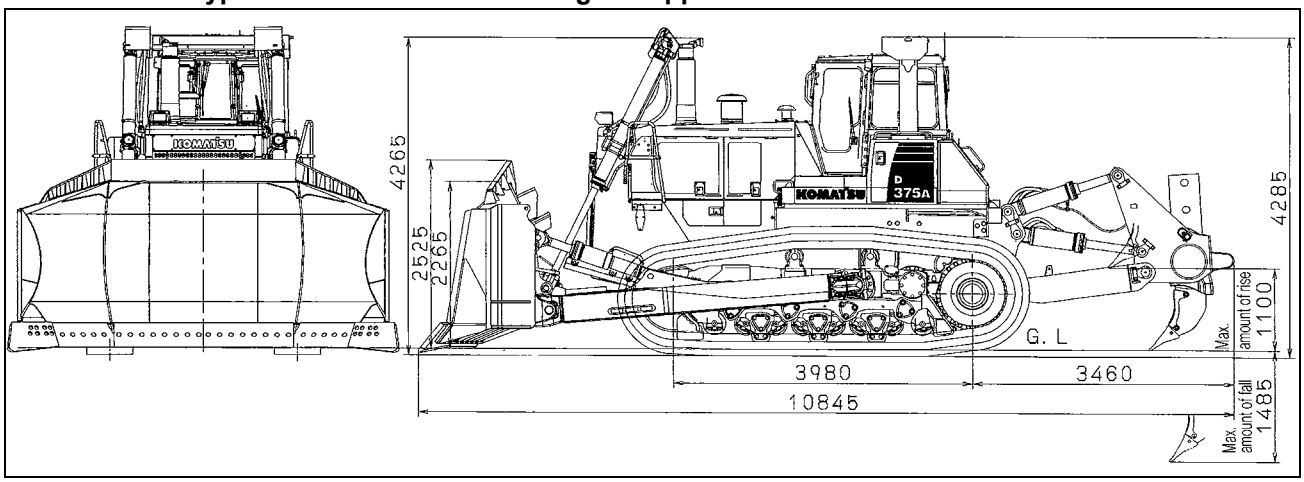
Item		Unit	Semi U-tiltdozer + Giant ripper	Reinforced type full U-tiltdozer + Giant ripper	Semi U-tiltdozer + Multi-ripper	Reinforced type full U-tiltdozer + Multi-ripper
Operating weight (excluding operator's weight)		kg	*1 71,555	*2 73,735	*1 72,155	*2 74,335
Blade weight (including cylinders and oil)		kg	10,965	12,465	10,965	12,465
Ripper weight (including cylinders and oil)		kg	6,200		6,800	
Engine name		—	Komatsu SAA6D170E-5 diesel engine			
Rated engine output		kW/rpm {HP/rpm}	433/1,800 {588/1,800}			
Overall length		mm	10,485	10,845	10,195	10,555
Overall height (with ROPS)		mm	4,285 (4,265)			
Overall width		mm	4,775	5,215	4,775	5,215
Travel speed (1st/2nd/3rd(Lo)/3rd)	Forward	km/h	3.5/6.8/8.0/11.8			
	Reverse	km/h	4.6/8.9/9.7/15.8			

*1: 610 mm (24 in) shoe, ROPS cab, air conditioner
*2: 710 mm (28 in) shoe, ROPS cab, air conditioner

- **Semi U-tiltdozer + variable multi ripper**



- **Reinforced type full U-tiltdozer + variable giant ripper**



Precautions for field assembly

1. Selection of work place

1) When selecting a work place, consider the following.
   - Is the work place sufficiently wide for loading and unloading the machine? (See the kit layout drawing.)
   - Is the ground sufficiently hard? (The machine and crane truck must not sink into the ground.)
   - Is the ground flat? (The ground surface must not be uneven or sloping.)
   - Is the road to inlet/outlet of the work place sufficient for turning the trailer and crane truck?
2) Take care extremely that dirt or water will not enter the hydraulic circuit while it is assembled.
3) Avoid working outdoors while strong wind is blowing or it is raining.
4) Take measures to protect the machine from sand, dirt and rainwater while the work is stopped.

2. How to do work

The work supervisor or the work leader should not do the work while reading this manual but should read and understand this manual thoroughly and then start the work.
In particular, write the "Precautions" for each work process in a sheet to explain or stick that sheet to the work place so that all the workers will observe the precautions.

3. Preparation and check of protective gear, slings and tools

The work supervisor or the work leader must perform the following checks about protective gear, slings and tools.

1) Are all the workers wearing helmets and other protective gear which they are obliged to wear?
   If special protective gear is necessary, check that it is prepared and can be used without problem.
2) Are all the slings and tools prepared? Check in advance that they are ready to be used without problem. In particular, check wooden blocks for internal decay and cracking.

4. ⚠ Check during actual work

The work supervisor or the work leader must check the following items constantly and make all the workers observe them.

1) Are the parking brakes of the trailer and crane truck applied securely and are their wheels locked with chocks during work? Are outriggers, if installed, used securely?
2) Are the temperature and pressure of the engine, hydraulic oil, coolant, etc. lowered sufficiently during work?
3) Is horn or another signal is made to warn around when the engine is started? In addition, is it checked that work equipment control lever and other control levers are in neutral and the fuel control dial (or fuel control lever) is in the low idle position?
4) Is the balance of the slung item checked extremely during sling work with the crane?
5) Is entry prohibition for outsiders to the work place observed?

5. The work supervisor or the work leader is required to hold a meeting with all the workers at the beginning of every morning and explain the work plan of the day to them and give them instructions to observe the safe work.

6. Precautions for starting engine

When the engine is started for the first time after assembled in the field, its inside must be lubricated with engine oil. Lubricate according to “M-4 No-injection cranking of engine” in this manual.

7. This edition describes the maximum disassembly range.
Accordingly, since notes are given to each work step, follow them.

Disposal of removed parts

As described in "Preface", when this machine is transported, it is divided into some units such as the body, undercarriage, cab, work equipment, etc. according to the transportation measure, regulations, etc.
Accordingly, the hydraulic pipings and hydraulic hoses to connect the units, oil inlets and outlets of the hydraulic devices, and parts which must not be damaged are plugged or covered to prevent oil leakage, entry of dirt and dust, and damage during transportation.
In addition, fixing jigs are used to prevent a trouble caused by a fall or a shake during transportation and to facilitate loading, unloading and crane work.

The above plugs, jigs, etc. are removed when the machine is assembled and become unnecessary after completion of the machine. Since they are useful when the machine needs to be transported in future, however, we recommend you to keep them as long as possible.

Assembly procedure, necessary equipment, and schedule

- The F/D assembly and pivot shaft are assumed to be installed to the body beforehand.
- Any change of the schedule caused by weather is not included.
- Special field work shall be arranged separately.

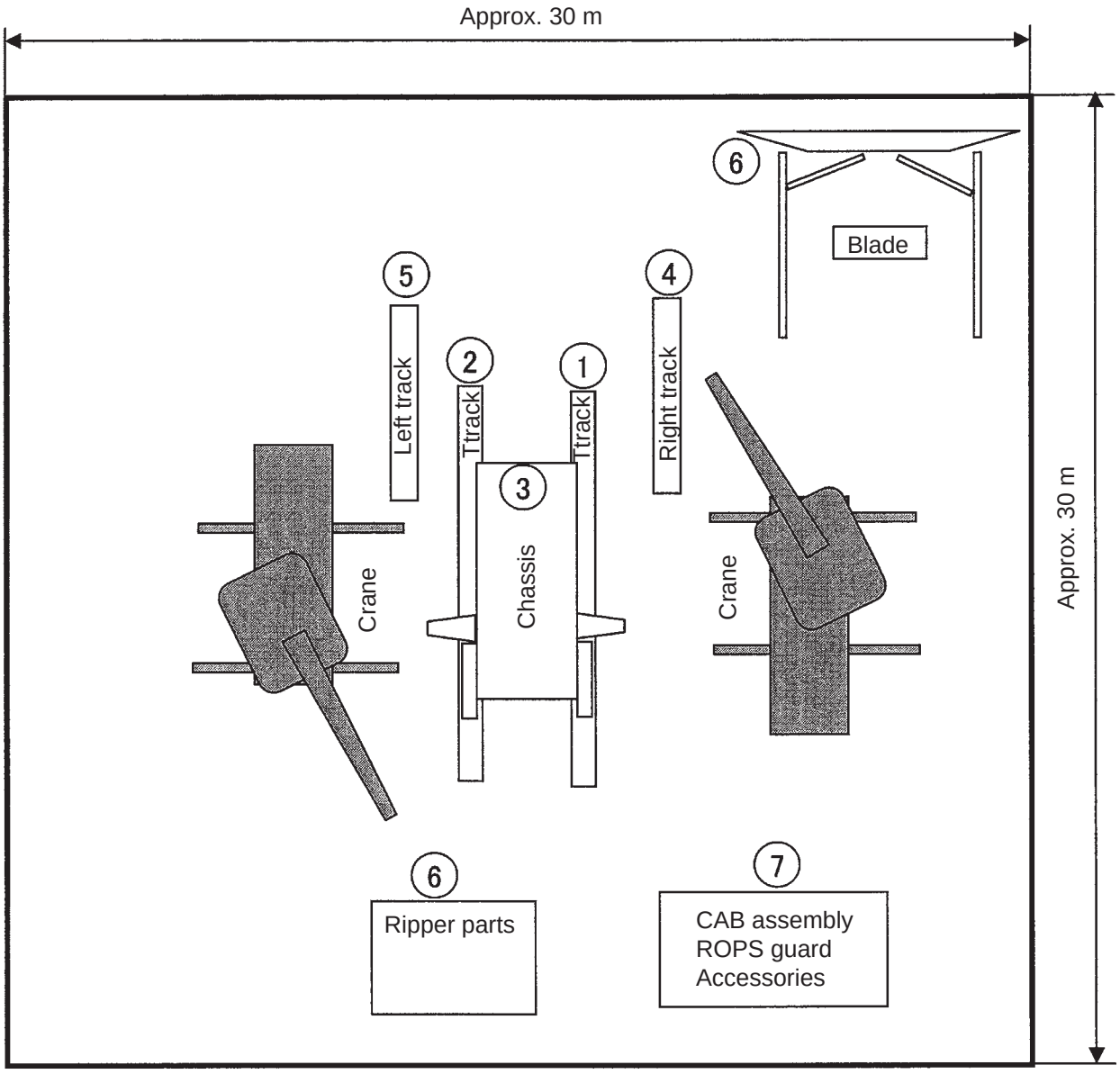
Schedule

	1st day	2nd day	3rd day	4th day
	8:00 10:00 12:00 14:00 16:00 18:00	8:00 10:00 12:00 14:00 16:00 18:00	8:00 10:00 12:00 14:00 16:00 18:00	8:00 10:00 12:00 14:00 16:00 18:00
Trailer must arrive at field before 8:00.	Unloading trailer → Installing pivot shaft and blade lift cylinder → Installing under cover → Assembling blade sub-assembly →	Installing T/F → Adding and checking oil → Installing ripper sub-assembly →	Installing tracks → Installing blade Connecting hoses → Installing cab → Installing ROPS guard → Test operation and adjustment → Washing, touching up, painting →	
Wrecker	50-ton wrecker × 2 units	50-ton wrecker × 2 units	25-ton wrecker × 1 unit	Unnecessary
Working hours	8H	8H	8H	8H
Number of workers	4 workers	4 workers	3 workers	3 workers
Total man-hours	32H	32H	24H	24H

Grand total
112H

Layout of kit

- When selection the work site, see "Before field assembly", too.
- The delivered kits (components) should be arranged as shown in the layout below after unloaded from the trailer and truck.
- However, since the layout below is a reference image of a work site about 30 m by 30 m, decide the actual layout according to the area and land form of the work site, considering the transportation packaging of each kit (component) explained later.

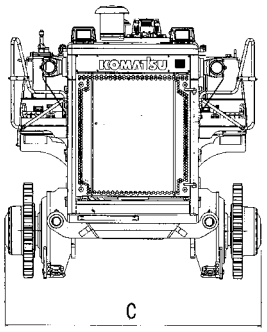


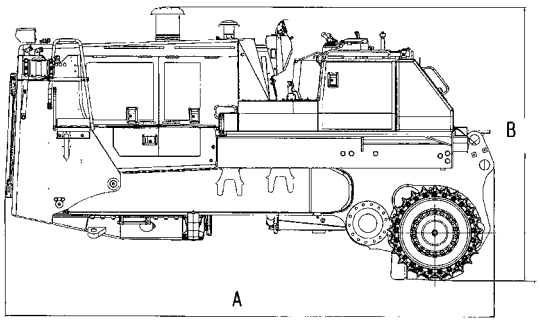
Style for transportation

Since the machine can be divided for transportation, ask us or our service shop before transportation.

■ **Style of each KIT.**

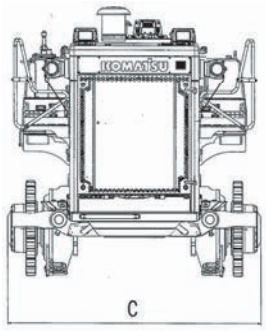
- **Tractor (Body)**

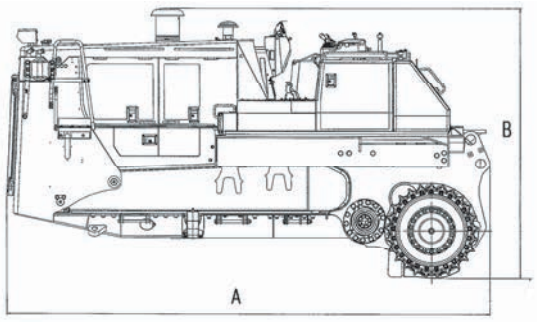




A	Overall length (mm)	5,848
B	Overall height (mm)	3,250
C	Overall width (mm)	3,060
Weight (kg)		27,000

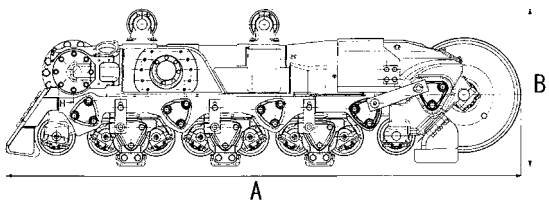
- **Tractor (Body) (At 32t resolution transportation)**

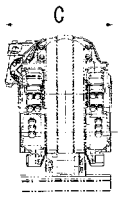




A	Overall length (mm)	5,848
B	Overall height (mm)	3,250
C	Overall width (mm)	3,060
Weight (kg)		28,000

- **Track frame**

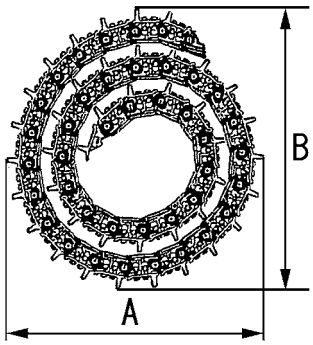




		STD	With full roller guard
A	Overall length (mm)	4,194	4,200
B	Overall height (mm)	1,280	1,280
C	Overall width (mm)	840	840
Weight (kg)		7,940	8,690

2 sets of the shoes are prepared for each machine.

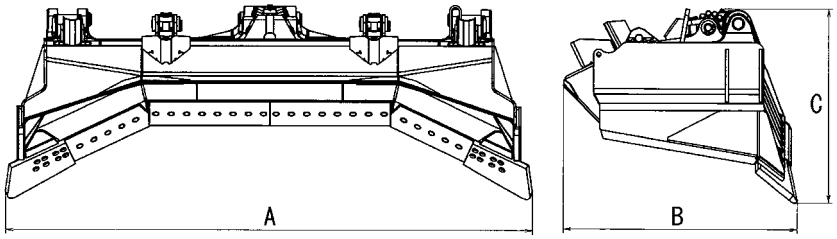
- **Track shoe**



Shoe wide	610	710
Number of shoes	41	
A (mm)	2,500	
B (mm)	2,500	
Weight (kg)	4,300	4,650

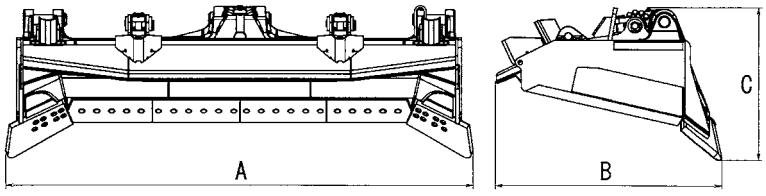
2 sets of the shoes are prepared for each machine.

- **Work equipment Blade**
  (1) Reinforced U-blade



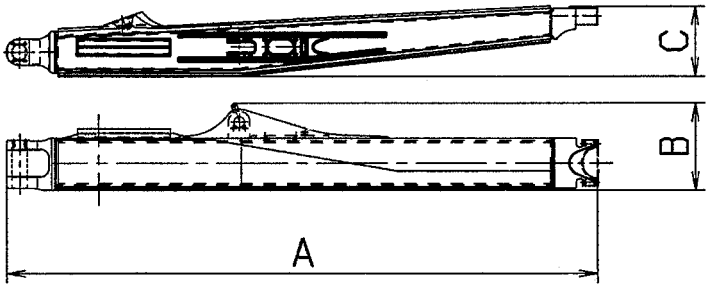
A	Overall length (mm)	5,125
B	Overall height (mm)	2,290
C	Overall width (mm)	1,890
Weight (kg)		8,250

- **Semi-U blade**



A	Overall length (mm)	4,775	
B	Overall height (mm)	2,290	
C	Overall width (mm)	1,532	
Weight (kg)		Stan-dard	Rein-forced
		6,750	7,220

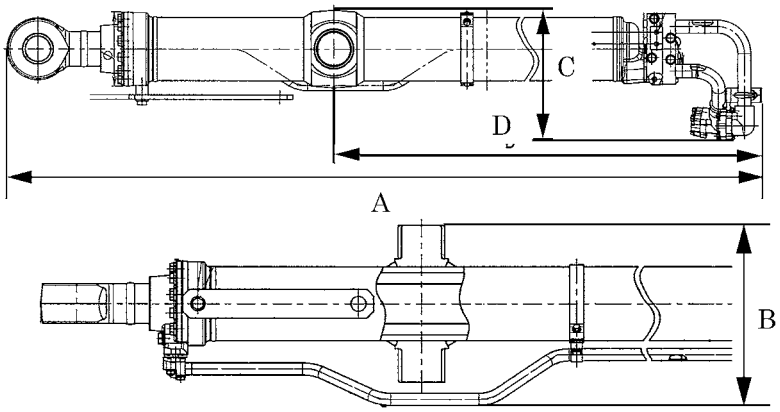
- **Work equipment Straight frame**



A	Overall length (mm)	4,300
B	Overall height (mm)	640
C	Overall width (mm)	490
Weight (kg)		1,350

2 sets of the shoes are prepared for each machine.

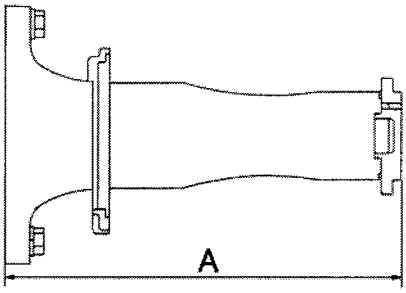
- **Work equipment Blade lift cylinder**

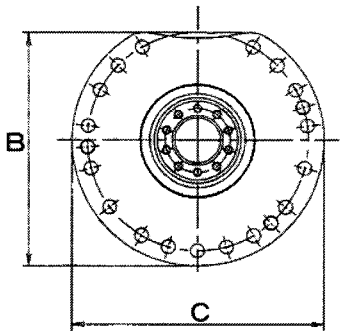


A	Overall length (mm)	2,575
B	Overall height (mm)	405
C	Overall width (mm)	372
D	Overall width (mm)	1,174.3
Weight (kg)		286.5

2 sets of the shoes are prepared for each machine.

- **Pivot shaft (At 32t resolution transportation)**





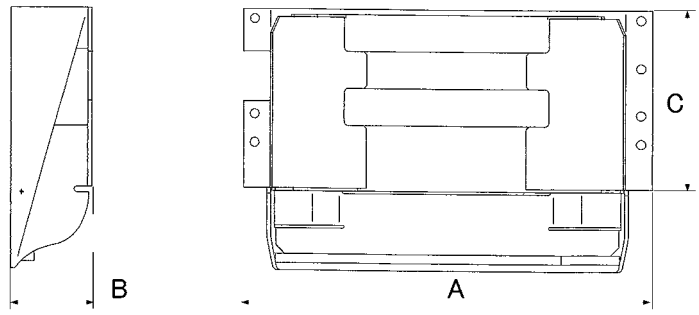
A	Overall length (mm)	770
B	Overall height (mm)	495
C	Overall width (mm)	515
Weight (kg)		210

2 sets of the shoes are prepared for each machine.

★ This part may be delivered installed to the machine.

- **Under cover**

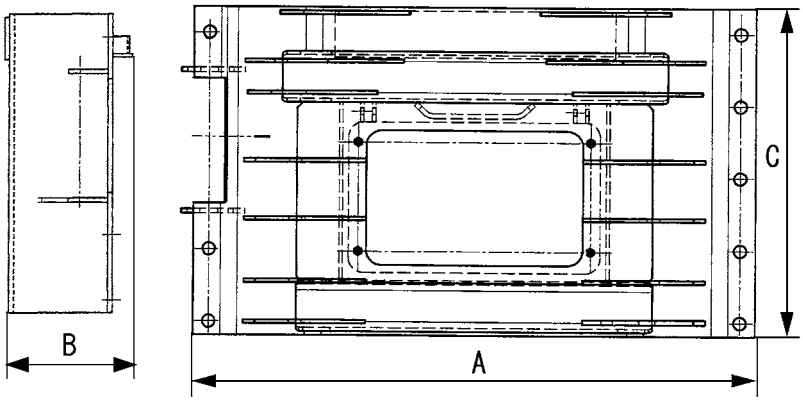
(1) Rear (At 32t resolution transportation)



A	Overall length (mm)	1,450
B	Overall height (mm)	290
C	Overall width (mm)	915
Weight (kg)		320

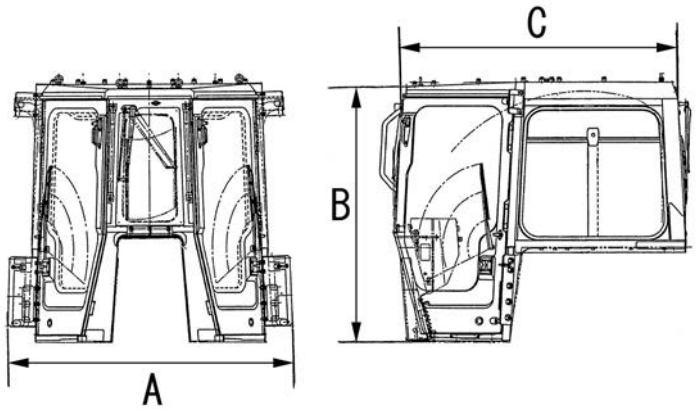
★ This part may be delivered installed to the machine.

(2) Side (At 32t resolution transportation)



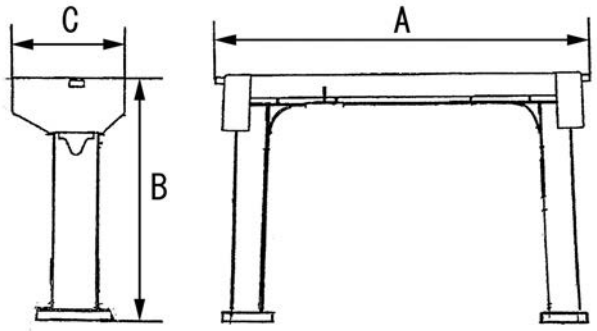
A	Overall length (mm)	1,450
B	Overall height (mm)	355
C	Overall width (mm)	840
Weight (kg)		220

- **Cab**



A	Overall length (mm)	1,787
B	Overall height (mm)	1,676
C	Overall width (mm)	1,740
Weight (kg)		500

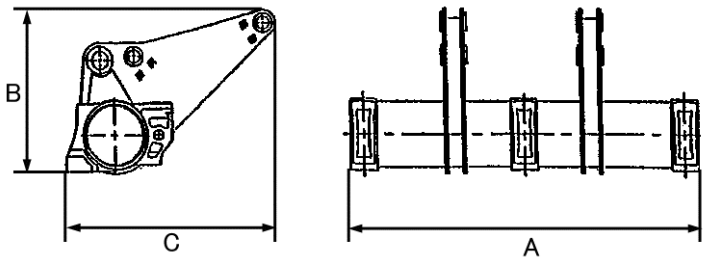
- **ROPS**



A	Overall length (mm)	2,055
B	Overall height (mm)	1,373
C	Overall width (mm)	612
	Weight (kg)	703

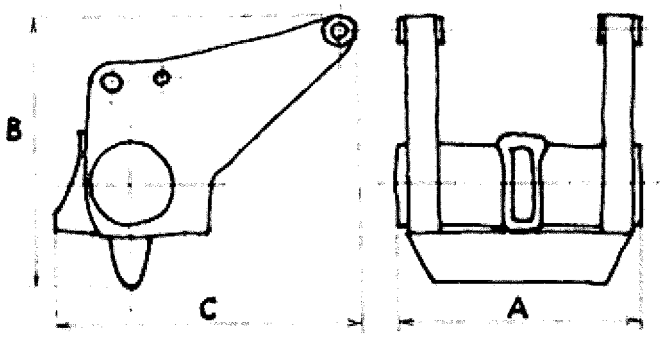
* ROPS is an abbreviation for Rollover Protective Structure.

- **Mulit-ripper beam**



A	Overall length (mm)	2,880
B	Overall height (mm)	1,256
C	Overall width (mm)	1,710
	Weight (kg)	2,500

- **Giant-ripper beam**



A	Overall length (mm)	1,397
B	Overall height (mm)	1,573
C	Overall width (mm)	2,175
	Weight (kg)	1,710

Table of tools for field assembly

No.	Tool name	Specification	Q'ty	Remarks
1	Air compressor	Min. 0.69 MPa – 15 m³/min	1	
2	Pneumatic hose and coupler (for pneumatic tools)	Hose length: 30 m Coupler must fit impact wrench and oil feed pump.	1 set	For air compressor
3	Crane truck	Lifting load: 50 ton : 25 ton	2 1	
4	Welder		2	For welding blade spill guard (If equipped)
5	Chain lever hoist (Chain block)	Rated load 1.5 ton	1	JIS B8819 or equivalent
		Rated load 3.2 ton	1	
		Rated load 6.3 ton	1	
6	Wire rope sling	ø 36 × 6 m	4	Specification: JIS B8817 or equivalent
		ø 20 × 5 m	2	
		ø 12 × 2 m	4	
7	Belt sling (made of synthetic fibers)	25 mm wide × 3 m	2	Specification: JIS B8818 or equivalent
		50 mm wide × 3 m	1	
8	Hydraulic wrench	Min 5,890 Nm {600 kgm}	1	Mainly for master link bolt
9	Hydraulic wrench socket	Width across flats: 46	1 unit each	For master link bolt
10	Extension bar	□ 38.1 × L300	1	
11	Air impact wrench	See No. 41		
12	Socket for impact wrench	Width across flats: 19, 22, 24, 27, 30, 32, 36, 41, 46, 50	1 unit each	Must fit impact wrench No. 41.
13	Torque wrench	Tightening capacity 588 Nm {60 kgm}	1	Impact wrench socket may be used if it fits.
		Tightening capacity 1,370 Nm {140 kgm}	1	
		Tightening capacity 2,060 Nm {210 kgm}	1	
14	Soket for torque wrench	Width across flats: 32, 36, 41, 46	1 unit each	
15	Eyebolt	M12, Using load: 220 kg	4	
		M16, Using load: 450 kg	2	For blade center link
16	Shackle	SD22	4	Specification symbols are quoted from JIS B2801
		BC36	2	
		SB44(T)	2	
17	Sledge hammer	Double-headed: 4.5 kg (10 lbs)	1	
18	Pinch bar (Lever)	ø 25 × 900 mm	1	JCMAS P018 or equivalent, Note 1)
19	Thread repair tap	M33 × Pitch 2	1	For master link
		M30 × Pitch 3	1	
		M24 × Pitch 3	1	
20	Jack	Screw type, Using load: 15 ton	2	For assembling track frame
21	Single ended wrench	Nominal width across flats (mm) 17, 19, 22, 24, 27, 30, 32, 36, 41, 46, 50	2 units each	For tightening hydraulic hose mouthpiece nut
22	Lubricating oil and grease	See assembly procedures A-3 and A-18.	—	
23	Anti-seize compound	Molybdenum disulphide grease (LM-P)	200 g	See coating material list.
24	Cleaning oil	For removing preservative	40 ℓ	
25	Paint remover	For removing phthalate resin coating	5 ℓ	
26	Paint for repair	See coating material list	3 units each	

No.	Tool name	Specification	Q'ty	Remarks
27	Glass cleaner	Cleaning liquid (commercially available)	1	For cleaning operator cab windshield glass
28	Cloth	Bunch	1 kg	
29	Adhesive cloth tape	Width × Length × Color 50 mm × 25 mm × Not specified	1 roll	
30	Plastic tube (Vinyl tube)	8 mm inside diameter × 1 mm thick × 3 m long, soft, transparent	1	For checking airtightness (internal pressure) of operator cab
31	Oil feed pump	Manual or pneumatic	1	
32	Oil mug	Capacity: Approx. 5 ℓ	1	
33	Drain oil receiver (made of steel sheet)	1,000 × 700 × 150 (mm) 700 × 400 × 150 300 × 300 × 100	2 units each	
34	Stand for high lift work	2 m high, with stair and handrail	2	
35	Safety belt	Waist belt type	Same as number of workers	
36	Safety glasses		Same as number of workers	
37	Stand (for setting machine)	For attached tool drawing	1	Front
		For attached tool drawing	1	Rear
38	Steel plate liner (for installing support stand No. 37)	1,000 × 500 (mm) 16 mm thick	4	With lifting hook
39	Sling for track fame	For attached tool drawing	1	
40	Wood block	□ 350 mm × 750 mm high	4	
		□ 350 mm × 400 mm high	4	
		□ 100 mm × 750 mm lengh	4	
41	Pneumatic impact wrench Tightening capacity Unit: Nm {kgm}	Objective bolt thread diameter	1	Note 2)
	– 200 {20.4}	M10 – M14	1	Socket No. 12 must fit this impact wrench.
	– 600 {61.2}	M16 – M20	1	
	– 1,000 {102}	M22 – M24	1	
	– 3.000 {306}	M27 – M38	1	
	– 6,500 {663}	Min. M39	1	
42	Common tools			Note 3)

Note 1) Pinch bar (Lever) No. 18 is P018-1978 (Pinch bar) of JCMAS (Japan Construction Mechanization Association) or equivalent.
You can read the information about JCMAS on the website.

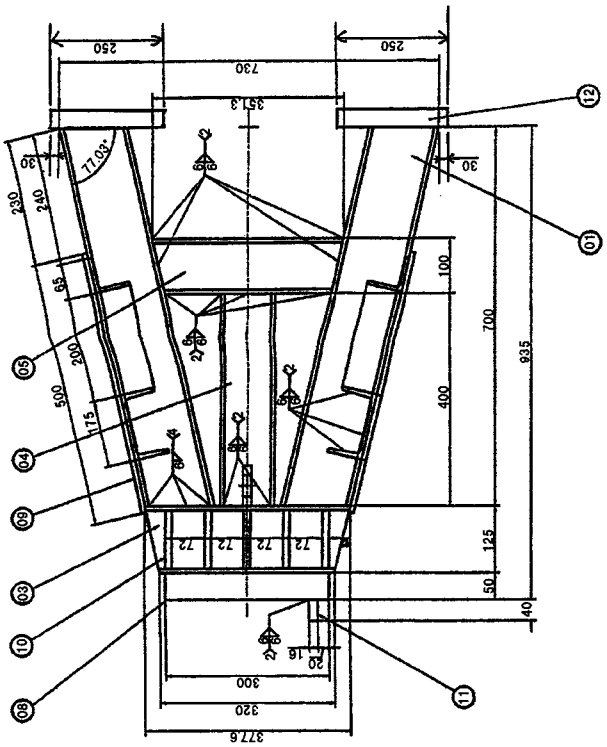
Note 2) Hydraulic wrench No. 8 may be used instead of pneumatic impact wrench No. 41 having tightening capacity of 1,000 – 6,500 Nm {102 – 663 kgm} (suitable for tightening M27 bolt or larger), as long as the sockets are adaptable.

Note 3) This list does not contain general hand tools (box wrenches, screwdrivers, pliers, etc.) Prepare them separately as required.

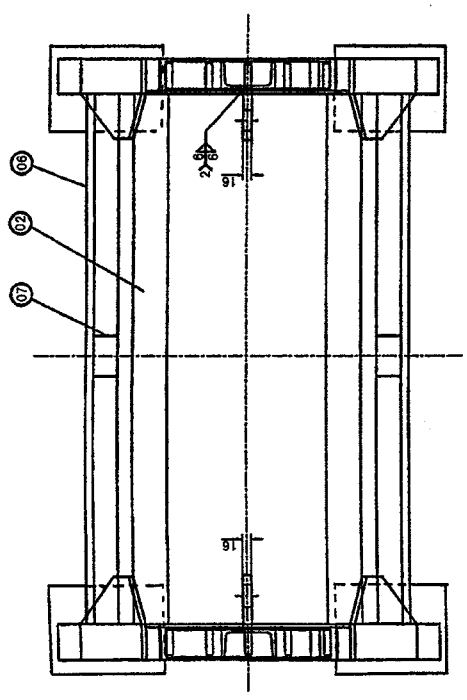
Sketch of jigs

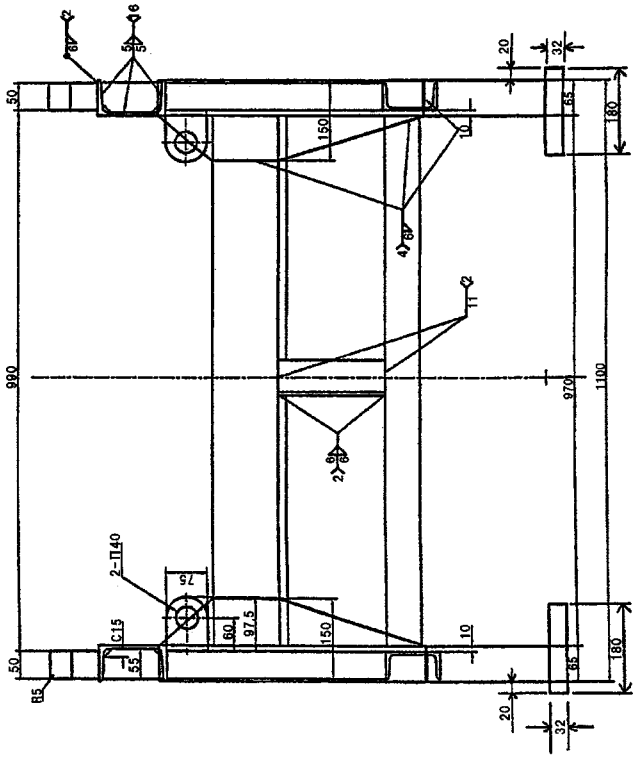
Note 1) We are not liable for any result of use of jigs manufactured according to these drawings.
Note 2) Necessary for disassembly to 32-t parts for transportation.

Stand (Front side)

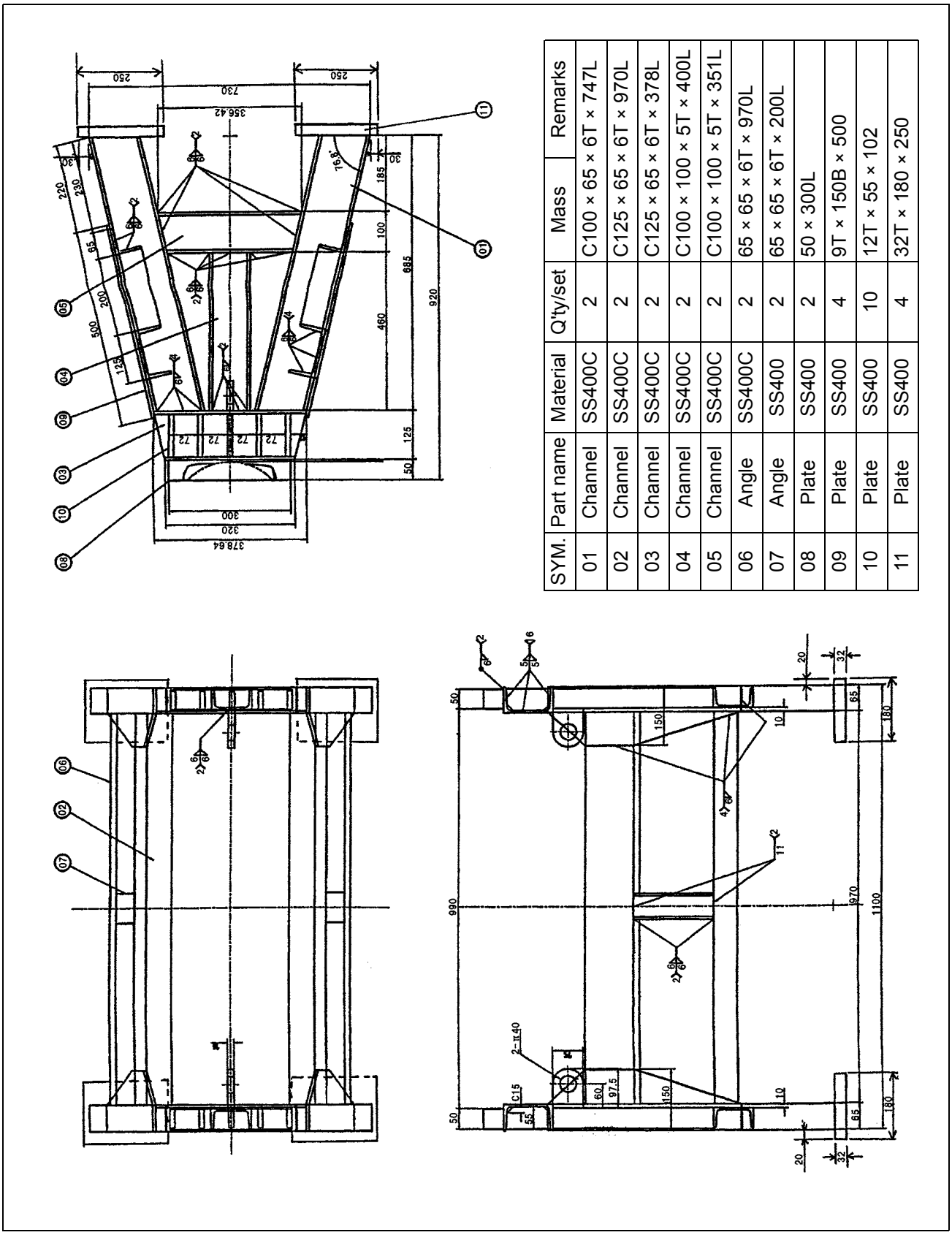


SYM.	Part name	Material	Q'ty/set	Mass	Remarks
01	Channel	SS400C	2	C100 × 65 × 6T × 747L	
02	Channel	SS400C	2	C125 × 65 × 6T × 970L	
03	Channel	SS400C	2	C125 × 65 × 6T × 378L	
04	Channel	SS400C	2	C100 × 100 × 5T × 400L	
05	Channel	SS400C	2	C100 × 100 × 5T × 351L	
06	Angle	SS400C	2	65 × 65 × 6T × 970L	
07	Angle	SS400	2	65 × 65 × 6T × 200L	
08	Plate	SS400	2	50 × 300L	
09	Plate	SS400	4	9T × 150B × 500	
10	Plate	SS400	10	12T × 55 × 102	
11	Plate	SS400	2	9T × 50 × 40	
12	Plate	SS400	4	32T × 180 × 250	



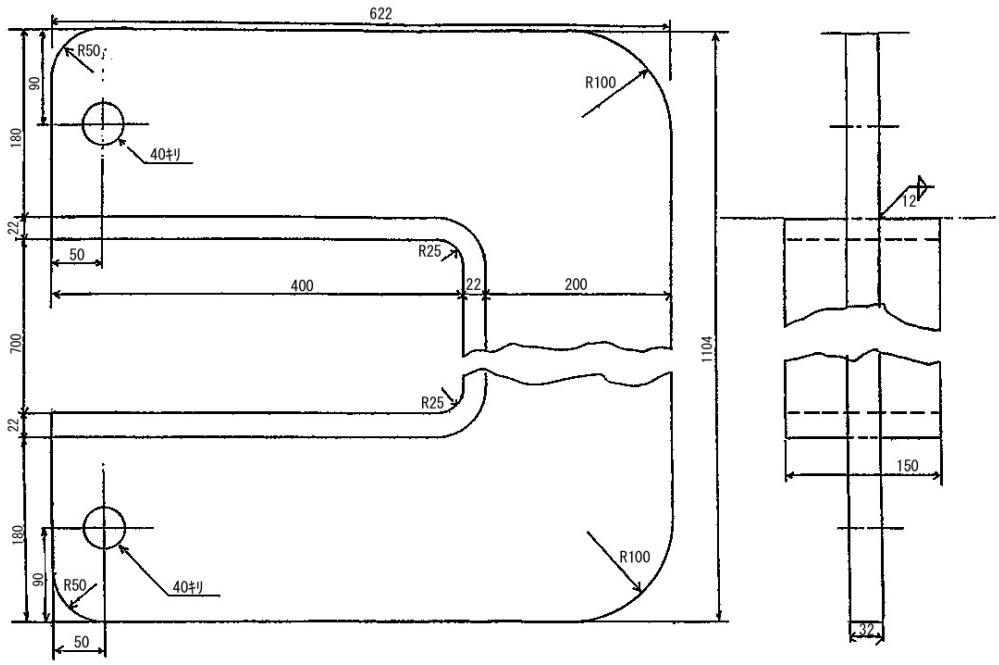


Stand (Rear side)

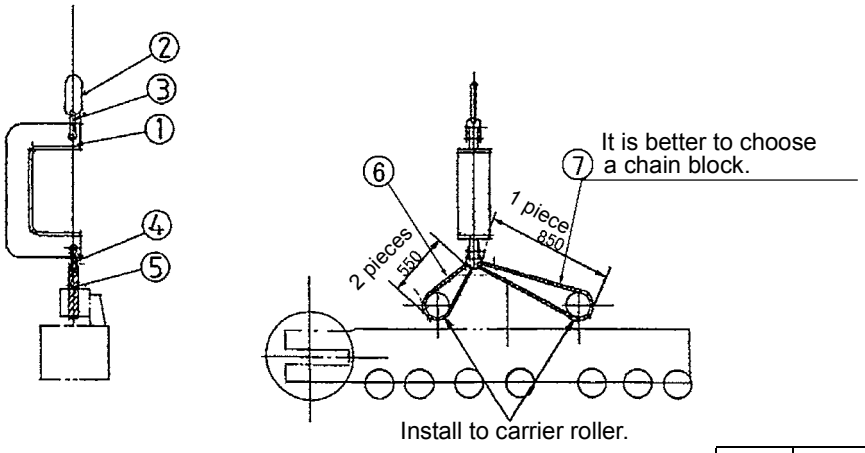


SYM.	Part name	Material	Q'ty/set	Mass	Remarks
01	Channel	SS400C	2	C100 × 65 × 6T × 747L	
02	Channel	SS400C	2	C125 × 65 × 6T × 970L	
03	Channel	SS400C	2	C125 × 65 × 6T × 378L	
04	Channel	SS400C	2	C100 × 100 × 5T × 400L	
05	Channel	SS400C	2	C100 × 100 × 5T × 351L	
06	Angle	SS400C	2	65 × 65 × 6T × 970L	
07	Angle	SS400	2	65 × 65 × 6T × 200L	
08	Plate	SS400	2	50 × 300L	
09	Plate	SS400	4	9T × 150B × 500	
10	Plate	SS400	10	12T × 55 × 102	
11	Plate	SS400	4	32T × 180 × 250	

Sling (Track frame assembly) Note) Necessary for disassembly to 32-t parts for transportation.



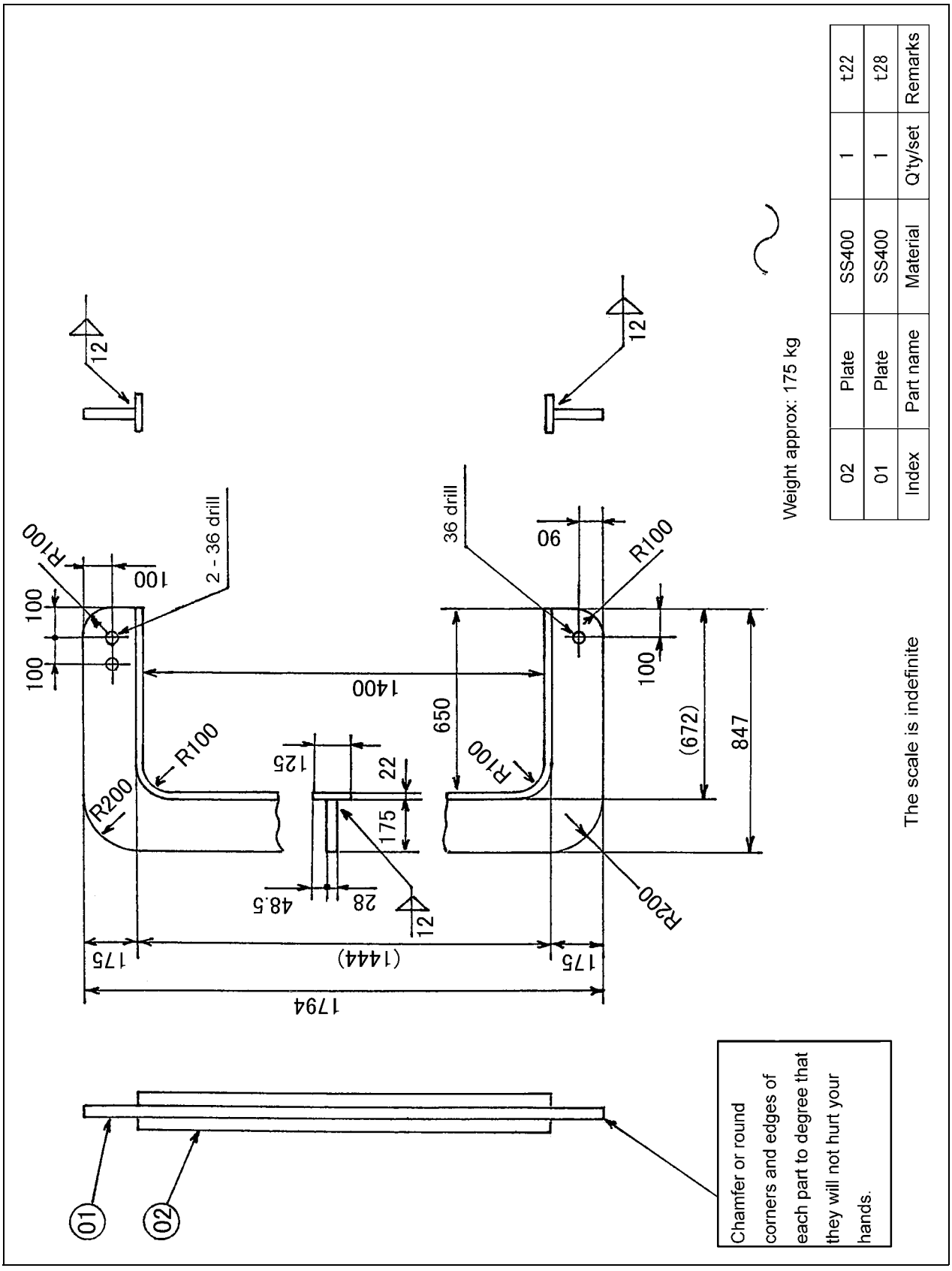
Sling (Track frame assembly)



SYM.	Part name	Q'ty/set	Remarks
1	Frame	1	
2	Master link	1	HM125
3	Shackle	1	RS10
4	Shackle	1	RB10
5	Spring	R3	
6	Wire rope	2	For 5 ton
7	Wire rope	1	For 3 ton

Sling (Pivot shaft)

Note) Necessary for disassembly to 32-t parts for transportation.



Index	Part name	Material	Q'ty/set	Remarks
02	Plate	SS400	1	t22
01	Plate	SS400	1	t28

Tightening torque

1. Tightening torque for bolts
   Tightening torque for bolts is indicated in the text as shown below. Tighten each bolt to the specified torque.

Part No. of bolt	□□□□□-□□□□□
Part No. of washer	△△△△△-△△△△△
Bolt specification	Thread size (Diameter, pitch, length)
Tool (Socket)	Applicable socket size
Tightening torque	＊＊＊ Nm {○○○ kgm}

If tightening torque for a bolt is not specified in the text, tighten it according to Table 1.

Remarks

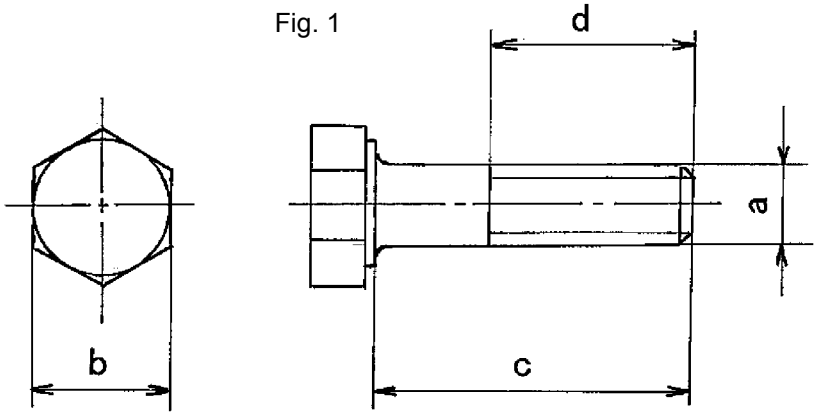
1. The thread diameter is the nominal diameter. For example, 16 mm is expressed as M16 and 26 mm is expressed as M20.
   The pitch in Table 1 is the distance that the bolt advances every turn in the axial direction (Unit: mm).

2. The bolt length is dimension c in Fig. 1.

3. The applicable socket size is expressed as 24 mm, 30 mm, etc. Since 24 mm, 30 mm, etc. correspond to dimension b in Fig. 1, an applicable socket can be selected from Table 1, too.

4. Tightening torque is expressed as ○○○ – ◎◎◎ or ○○○ ± ▽▽. If the target tightening torque is set, expression of ○○○ ± ▽▽ is applied.

Fig. 1



a : Bolt thread diameter (Nominal diameter)
b : Width across flats of bolt head
c : Bolt length
d : Threaded part of bolt

Table 1 Tightening torque for bolts not specified in text

Unit: Nm {kgm}

Nominal size of thread × pitch a (mm)	Width across flats (= Socket size) b (mm)	Tightening torque	
		Target	Range
M6 × 1	10	12 {1.2}	8.8 – 14.7 {0.9 – 1.5}
M8 × 1.25	13	25 {2.5}	14.7 – 34 {1.5 – 3.5}
M10 × 1.5	17	54 {5.5}	34 – 74 {3.5 – 7.5}
M12 × 1.75	19	89 {9}	54 – 123 {5.5 – 12.5}
M14 × 2	22	137 {14}	84 – 196 {8.5 – 20}
M16 × 2	24	230 {23.5}	147 – 309 {15 – 31.5}
M18 × 2.5	27	315 {32}	201 – 427 {20.5 – 43.5}
M20 × 2.5	30	460 {47}	319 – 608 {32.5 – 62}
M22 × 2.5	32	650 {66.5}	471 – 829 {48 – 84.5}
M24 × 3	36	810 {82.5}	588 – 1030 {60 – 105}
M27 × 3	41	1180 {120}	883 – 1470 {90 – 150}
M30 × 3	46	1520 {155}	1130 – 1910 {115 – 195}
M33 × 3	50	1960 {200}	1470 – 2450 {150 – 250}
M36 × 3	55	2450 {250}	1860 – 3040 {190 – 310}
M39 × 3	60	2940 {300}	2260 – 3630 {230 – 370}

★ For symbols “a” and “b” in the table, see Fig. 1.

2. Tightening torque for pipe threads

Proper tightening torque for pipe threads depends on combination of the materials of the male screw and female screw. In this manual, however, select tightening torque from Table 2 and Table 3 on the basis of the material of the male screw. If tightening torque is specified specially in explanation, however, apply that tightening torque.

2.1 If the male screw is made of mild steel or cast iron, apply Table 2.

Table 2

Unit: Nm {kgm}

Material of female thread / Nominal size	Steel	Cast iron	Light alloy
1/8	3.9 – 6.9 {0.4 – 0.7}	2.9 – 5.9 {0.3 – 0.6}	2.0 – 3.9 {0.2 – 0.4}
1/4	5.9 – 11.8 {0.6 – 1.2}	4.9 – 9.8 {0.5 – 1.0}	3.9 – 7.8 {0.4 – 0.8}
3/8	16.7 – 26.5 {1.7 – 2.7}	13.7 – 21.6 {1.4 – 2.2}	9.8 – 16.7 {1.0 – 1.7}
1/2	32.3 – 52.9 {3.3 – 5.4}	26.5 – 43.1 {2.7 – 4.4}	19.6 – 32.3 {2.0 – 3.3}
3/4	51.0 – 85.3 {5.2 – 8.7}	42.1 – 70.6 {4.3 – 7.2}	31.4 – 52.9 {3.2 – 5.4}
1	86.2 – 173.5 {8.8 – 17.7}	72.5 – 146.0 {7.4 – 14.9}	54.9 – 111.7 {5.6 – 11.4}

2.2 If the male screw is made of refined steel (heat-treated hard steel), apply Table 3.

Table 3

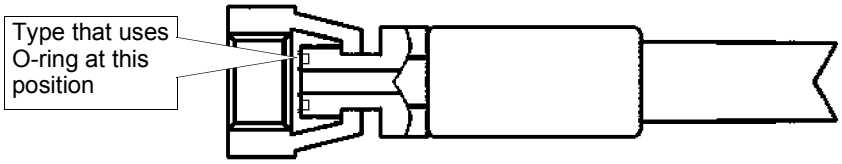
Unit: Nm {kgm}

Material of female thread / Nominal size	Steel	Cast iron	Light alloy
1/8	16.7 – 29.4 {1.7 – 3.0}	9.8 – 19.6 {1.0 – 2.0}	6.9 – 14.7 {0.7 – 1.5}
1/4	19.6 – 44.1 {2.0 – 4.5}	16.7 – 37.2 {1.7 – 3.8}	12.7 – 28.4 {1.3 – 2.9}
3/8	44.1 – 93.1 {4.5 – 9.5}	37.2 – 77.4 {3.8 – 7.9}	27.4 – 58.8 {2.8 – 6.0}
1/2	98.0 – 188.2 {10.0 – 19.2}	83.3 – 157.8 {8.5 – 16.1}	60.8 – 115.6 {6.2 – 11.8}
3/4	170.5 – 316.5 {17.4 – 32.3}	141.1 – 247.0 {14.4 – 25.2}	105.8 – 186.2 {10.8 – 19.0}
1	367.5 – 612.5 {37.5 – 62.5}	309.7 – 514.5 {31.6 – 52.5}	235.2 – 392.0 {24.0 – 40.0}

3. Tightening torque for hydraulic hose connecting nut

For the connecting nuts installed to the hydraulic hose adapters in relatively low pressure systems, apply tightening torque in Table 4.1 and 4.2.

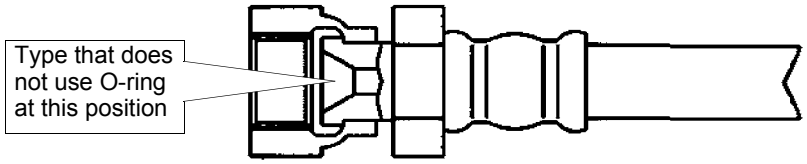
Table 4.1 Hydraulic hose of face seal type



Unit: Nm {kgm}

Outside diameter of hose (mm)	Width across flats (mm)	Tightening torque (Nm {kgm})	
		Range	Target
Approx. 6	19	34 – 54 {3.5 – 5.5}	44 {4.5}
Approx. 10	22	54 – 93 {5.5 – 9.5}	74 {7.5}
Approx. 13	27	84 – 132 {8.5 – 13.5}	103 {10.5}
Approx. 16	32	128 – 186 {13.0 – 19.0}	157 {16.0}
Approx. 20	36	177 – 245 {18.0 – 25.0}	216 {22.0}

Table 4.2 Hydraulic hose of taper seal type



Unit: Nm {kgm}

Outside diameter of hose (mm)	Width across flats (mm)	Tightening torque (Nm {kgm})	
		Range	Target
Approx. 6	19	34 - 63 {3.5 – 6.5}	44 {4.5}
Approx. 10	24	59 - 98 {6.0 – 10.0}	78 {8.0}
Approx. 13	27	84 - 132 {8.5 – 13.5}	103 {10.5}
Approx. 16	32	128 - 186 {13.0 – 19.0}	157 {16.0}
Approx. 20	36	177 - 245 {18.0 – 25.0}	216 {22.0}

Note: When connecting hose, take care not to twist them.

4. Proper socket sizes for bolts of M39 and larger (Reference)

For the proper sizes of sockets or spanners (= width across flats) for tightening hexagon bolts of M39 and larger, see Table 5.

Table 5

Unit: mm

Thread diameter	Proper sizes of sockets or spanners
M42	65
M45	70
M48	75
M52	80
M56	85
M60	90
M64	95

Coating materials list

(Rev. 2009.08)

★ The recommended coating materials such as adhesives, liquid gaskets, and greases used for disassembly and assembly are listed below.
★ For coating materials not listed below, use the equivalent of products shown in this manual.

Category	Komatsu code	Part No.	Capacity	Container	Main features and applications
Adhesive	LT-1A	790-129-9030	150 g	Tube	• Use to prevent rubber gaskets, rubber cushions, and cork plugs from coming out.
	LT-1B	790-129-9050	20 g (2 pcs.)	Polyethylene container	• Use for plastic (except polyethylene, polypropylene, tetrafluoroethylene and vinyl chloride), rubber, metal, and non-metal parts which require immediate and strong adhesion.
	LT-2	790-129-9040	50 g	Polyethylene container	• Features: Resistance to heat and chemicals. • Use to fix and seal bolts and plugs.
	LT-3	790-129-9060 (Set of adhesive and hardener)	Adhesive: 1 kg Hardener: 500 g	Can	• Use to bond and seal metal, glass and plastics.
	LT-4	790-129-9040	250 g	Polyethylene container	• Use to seal plugs for blank holes
	Holtz MH 705	790-129-9120	75 g	Tube	• Heat-resistant seal used to repair engines.
	ThreeBond 1735	790-129-9140	50 g	Polyethylene container	• Instantaneous adhesive. • Curing time: From 5 sec. to 3 min. • Use mainly to bond metals, rubbers, plastics, and woods.
	Aron-alpha 201	790-129-9130	2 g	Polyethylene container	• Instantaneous adhesive. • Quick-curing type (max. strength is obtained after 30 minutes) • Use mainly to bond rubbers, plastics, and metals.
	Loctite 648-50	79A-129-9110	50 cc	Polyethylene container	• Features: Resistance to heat and chemicals. • Use for fitted portions subjected to high temperature.
Liquid gasket	LG-5	790-129-9080	1 kg	Polyethylene container	• Use to seal various threaded portions, pipe joints, and flanges. • Use to seal taper plugs, elbows, and nipples for hydraulic piping.
	LG-6	790-129-9160	200 g	Tube	• Features: Silicon-based heat and cold-resistant sealant. • Use to seal flange surfaces and threaded portions. • Use to seal oil pan, final drive case, etc.
	LG-7	790-129-9170	1 kg	Tube	• Features: Silicon-based quick-curing sealant. • Use to seal flywheel housing, intake manifold, oil pan, thermostat housing, etc.
	LG-8 ThreeBond 1207B	419-15-18131	100 g	Tube	• Features: Silicon-based, heat and cold-resistant, vibration-resistant, impact-resistant sealant. • Use to seal transfer case, etc.
	LG-9 ThreeBond 1206D	790-129-9310	200 g	Tube	• Use for rough surfaces such as the circle gear top seal which is not clamped by bolts, gaps in the weld which must be caulked, etc. • Can be coated with paint.

Category	Komatsu code	Part No.	Capacity	Container	Main features and applications
Liquid gasket	LG-10 ThreeBond 1206E	790-129-9320	200 g	Tube	• Use as lubricant/sealant when installing the radiator hoses to the water tubes. • Can be coated with paint.
	LG-11 ThreeBond 1121	790-129-9330	200 g	Tube	• Feature: Can be used together with solid gaskets. • Use for covers of the transmission case and steering case etc.
	ThreeBond 1211	790-129-9090	100 g	Tube	• Liquid gasket used to repair engine.
Molybdenum disulfide lubricant	LM-P	09940-00040	200 g	Tube	• Use to prevent galling and seizure of press-fitted portions, shrinkage-fitted portions, and threaded portions. • Use to lubricate linkages, bearings, etc.
	—	09995-00250	190 g	Can	• Spray type • Thin molybdenum disulphide films are made on metal surfaces to prevent the metals from galling. • Use for the drive shaft splines, needle bearings, various link pins, bolts, etc.
Seizure prevention compound	LC-G NEVER-SEEZ	—	—	Can	• Feature: Seizure and galling prevention compound with metallic super-fine-grain, etc. • Use for the mounting bolt in the high temperature area of the exhaust manifold and the turbocharger, etc.
Grease	G2-LI G0-LI (*) *: For cold district	SYG2-400LI SYG2-350LI SYG2-400LI-A SYG2-160LI SYGA-160CNLI SYG0-400LI-A (*) SYG0-160CNLI (*)	Various	Various	• Feature: Lithium grease with extreme pressure lubrication performance, general purpose type.
	Molybdenum disulfide grease LM-G (G2-M)	SYG2-400M SYG2-400M-A SYGA-16CNM	400 g × 10 400 g × 20 16 kg	Bellows-type container Can	• Use for parts under heavy load. Caution: • Do not use this grease for rolling bearings like swing circle bearings, etc. and spline. • Use this grease for work equipment pins only when installing them, but do not use it afterward.
	Hyper White G2-T, G0-T (*) *: For cold district	SYG2-400T-A SYG0-400T-A (*) SYG2-16CNT SYG0-16CNT (*)	400 g 16 kg	Bellows-type container Can	• Seizure resistance, heat resistance and water resistance higher than molybdenum disulfide grease. • Not conspicuous on machine since color is white.
	Biogrease G2-B G2-BT (*) *: For use at high temperature and under high load	SYG2-400B SYG2-400BT (*) SYGA-16CNB SYGA-16CNBT (*)	400 g 16 kg	Bellows-type container Can	• Since this grease is biodegradable in short period, it has less impact on microorganisms, animals, and plants.
	G2-S ThreeBond 1855	—	200 g	Tube	• Feature: Silicone grease with wide usable temperature range, high resistance to thermal-oxidative degradation and performance to prevent deterioration of rubber and plastic parts. • Use for oil seals of the transmission, etc.

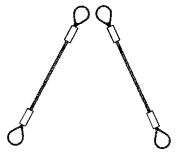
Category	Komatsu code	Part No.	Capacity	Container	Main features and applications	
Grease	G2-U-S ENS grease	427-12-11871	2 kg	Can	• Feature: Urea (organic system) grease with heat resistance and long life, can be packed into the confined space and left intact until next overhaul. • Use for rubber, bearing and oil seal in damper. • Caution: Do not mix with lithium grease.	
Primer	SUNSTAR PAINT PRIMER 580 SUPER	417-926-3910	20 mℓ	Glass container	For adhered window glass	• Use as primer for painted cab sheet metal surface. (Effective period: four months after date of manufacture)
	SUNSTAR GLASS PRIMER 580 SUPER		20 mℓ	Glass container		• Use as primer for glass. (Effective period: four months after date of manufacture)
	SUNSTAR PAINT PRIMER 435-95	22M-54-27230	20 mℓ	Glass container		• Use as primer for painted cab sheet metal surface. (Effective period: four months after date of manufacture)
	SUNSTAR GLASS PRIMER 435-41	22M-54-27240	150 mℓ	Can		• Use as primer for black ceramic-coated glass surface and for hard polycarbonate-coated surface. (Effective period: four months after date of manufacture)
	SUNSTAR SASH PRIMER GP-402	22M-54-27250	20 mℓ	Glass container		• Use as primer for sash (anodized aluminum surface). (Effective period: four months after date of manufacture)
Adhesive	SUNSTAR PENGUINE SEAL580 SUPER "S" or "W"	417-926-3910	320 mℓ	Polyethylene container	For adhered window glass	• Use "S" in high-temperature season and "W" in low-temperature season as adhesive for glass. (Effective period: four months after date of manufacture)
	Sika Japan, Sikaflex 256HV	20Y-54-39850	310 mℓ	Polyethylene container		• Use as adhesive for glass. (Effective period: six months after date of manufacture)
	SUNSTAR PENGUINE SUPER 560	22M-54-27210	320 mℓ	Ecocart (Special container)		• Use as adhesive for glass. (Effective period: six months after date of manufacture)
Caulking material	SUNSTAR PENGUINE SEAL No. 2505	417-926-3920	320 mℓ	Polyethylene container		• Use to seal glass-to-glass joints. (Effective period: four months after date of manufacture)
	SEKISUI SILICONE SEALANT	20Y-54-55130	333 mℓ	Polyethylene container		• Use to seal front window. (Effective period: six months after date of manufacture)
	GE TOSHIBA SILICONES TOSSEAL 381	22M-54-27220	333 mℓ	Cartridge		• Use to seal glass-to-glass joint. Translucent white seal. (Effective period: 12 months after date of manufacture)

Selection of wire ropes used for assembly

Select wire ropes to be used for assembly according to the following table.

Annex 2, Table 1 Using loads of 6 × 24 type rope slings.

Unit: kN {tf}

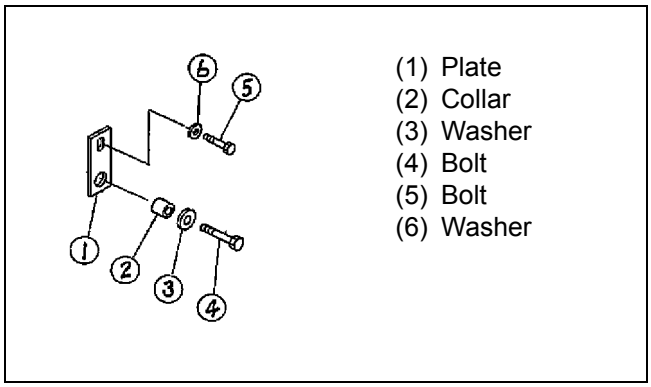
Number of wire ropes		1 pc.		2 pcs.			
							
Sling angle	α	$\alpha = 0°$		$\alpha \leqq 90°$		$90° < \alpha \leqq 120°$	
Angle to vertical line	β	$\beta = 0°$		$\beta \leqq 45°$		$45° < \beta \leqq 60°$	
Mode coefficient *M*		1		1.4		1	
Classification of wire rope / Outer diameter of wire rope (^{2})*d* (mm)		24G	24A	24G	24A	24G	24A
8		Max. 4.8 {0.49}	Max. 5.2 {0.53}	Max. 6.7 {0.68}	Max. 7.2 {0.74}	Max. 4.8 {0.49}	Max. 5.2 {0.53}
9		Max. 6.1 {0.63}	Max. 6.6 {0.67}	Max. 8.5 {0.88}	Max. 9.2 {0.93}	Max. 6.1 {0.63}	Max. 6.6 {0.67}
10		Max. 7.6 {0.77}	Max. 8.2 {0.83}	Max. 10 {1.0}	Max. 11 {1.1}	Max. 7.6 {0.77}	Max. 8.2 {0.83}
11.2		Max. 9.5 {0.97}	Max. 10 {1.0}	Max. 13 {1.3}	Max. 14 {1.4}	Max. 9.5 {0.97}	Max. 10 {1.1}
(12)		Max. 10 {1.1}	Max. 11 {1.2}	Max. 14 {1.5}	Max. 15 {1.6}	Max. 10 {1.1}	Max. 11 {1.2}
12.5		Max. 11 {1.2}	Max. 12 {1.3}	Max. 15 {1.6}	Max. 16 {1.8}	Max. 11 {1.2}	Max. 12 {1.3}
14		Max. 14 {1.5}	Max. 16 {1.6}	Max. 19 {2.1}	Max. 22 {2.2}	Max. 14 {1.5}	Max. 16 {1.6}
16		Max. 19 {1.9}	Max. 21 {2.1}	Max. 26 {2.6}	Max. 29 {2.9}	Max. 19 {1.9}	Max. 21 {2.1}
18		Max. 24 {2.5}	Max. 26 {2.7}	Max. 33 {3.5}	Max. 36 {3.7}	Max. 24 {2.5}	Max. 26 {2.7}
20		Max. 30 {3.1}	Max. 32 {3.3}	Max. 42 {4.3}	Max. 44 {4.6}	Max. 30 {3.1}	Max. 32 {3.3}
22.4		Max. 38 {3.9}	Max. 41 {4.2}	Max. 53 {5.4}	Max. 57 {5.8}	Max. 38 {3.9}	Max. 41 {4.2}
(24)		Max. 43 {4.4}	—	Max. 60 {6.1}	—	Max. 43 {4.4}	—
25		Max. 47 {4.8}	Max. 51 {5.2}	Max. 65 {6.7}	Max. 71 {7.2}	Max. 47 {4.8}	Max. 51 {5.2}
28		Max. 59 {6.1}	Max. 64 {6.5}	Max. 82 {8.5}	Max. 89 {9.1}	Max. 59 {6.1}	Max. 64 {6.5}
30		Max. 68 {7.0}	Max. 73 {7.5}	Max. 95 {9.8}	Max. 102 {10.5}	Max. 68 {7.0}	Max. 73 {7.5}
31.5		Max. 75 {7.7}	Max. 81 {8.3}	Max. 105 {10.7}	Max. 113 {11.6}	Max. 75 {7.7}	Max. 81 {8.3}
33.5		Max. 85 {8.7}	Max. 92 {9.4}	Max. 119 {12.1}	Max. 128 {13.1}	Max. 85 {8.7}	Max. 92 {9.4}
35.5		Max. 96 {9.8}	Max. 103 {10.5}	Max. 134 {13.7}	Max. 144 {14.7}	Max. 96 {9.8}	Max. 103 {10.5}
37.5		Max. 107 {10.9}	Max. 115 {11.7}	Max. 149 {15.2}	Max. 161 {16.3}	Max. 107 {10.9}	Max. 115 {11.7}
40		Max. 122 {12.4}	Max. 131 {13.4}	Max. 170 {17.3}	Max. 183 {18.7}	Max. 122 {12.4}	Max. 131 {13.4}
42.5		Max. 137 {14.0}	Max. 148 {15.1}	Max. 191 {19.6}	Max. 207 {21.1}	Max. 137 {14.0}	Max. 148 {15.1}

A. Assembly

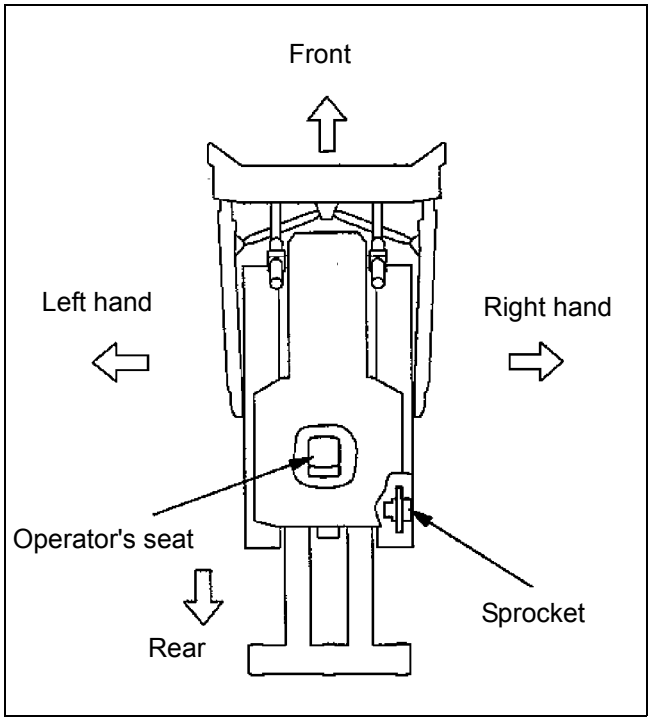
Remarks

1. In the "drawings" in this manual, parts and places are indicated by 1, 2, 3 ---, but indicated by (1), (2), (3) --- in the tables and texts.

Example:



2. In some places of this manual, the words of front, rear, right hand and left hand of machine are used. Those words indicate the directions seen from the operator's seat with the sprocket at the rear as shown below, unless otherwise specified.



Assembly process No.	Installation of chassis (1/3)
A-1	

1) Lay the 2 sets of track shoe assembly in parallel on the machine assembly place. (Fig. 1, Fig. 2)

   ★ Distance between track shoe assemblies: 2,500 mm (Fig. 2)

   ★ Set the directions and positions properly.
   Weight of each side (Shoe width: 610): 4,300 kg
   Number of shoes: 41 pieces/side
   Overall length: 11.5 m

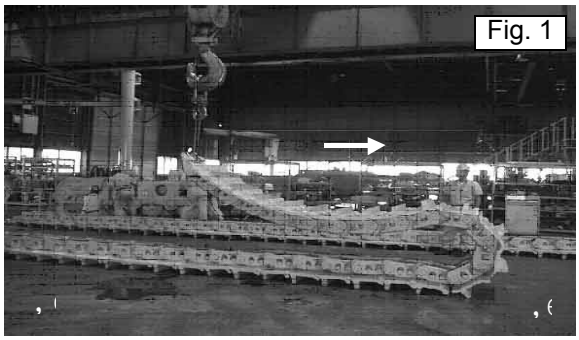


Fig. 1

2) Place the 2 stands to set (place) the machine between the right and left track shoe assemblies. (Fig. 3)
   For the stands, see "Field assembly jigs and tools list" in this manual.

   ★ One of the stands is for the front of the machine (967 mm high) and the other is for the rear of the machine (952 mm high).
   Set the upper stopper of the stand for the front of the machine forward.

   ★ Place the front stand at 6,700 mm from the front end of the track shoe assembly and place the rear stand further 2,900 mm backward. (L1 and L2 in Fig. 3)

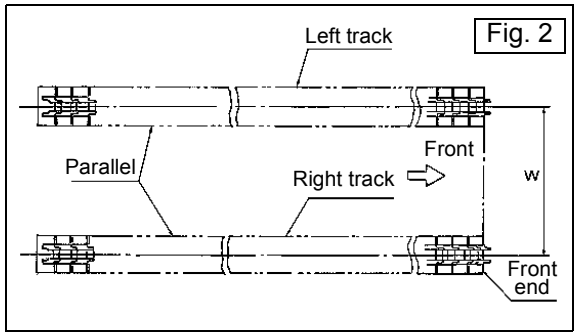


Fig. 2

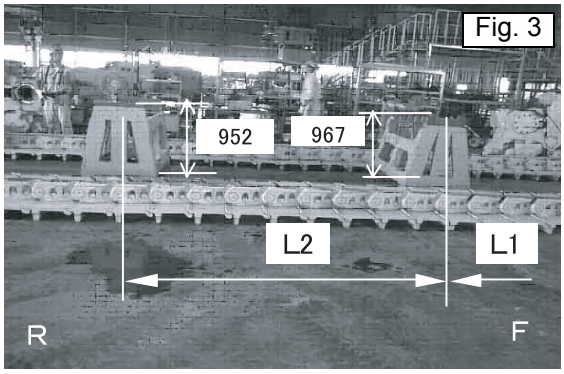


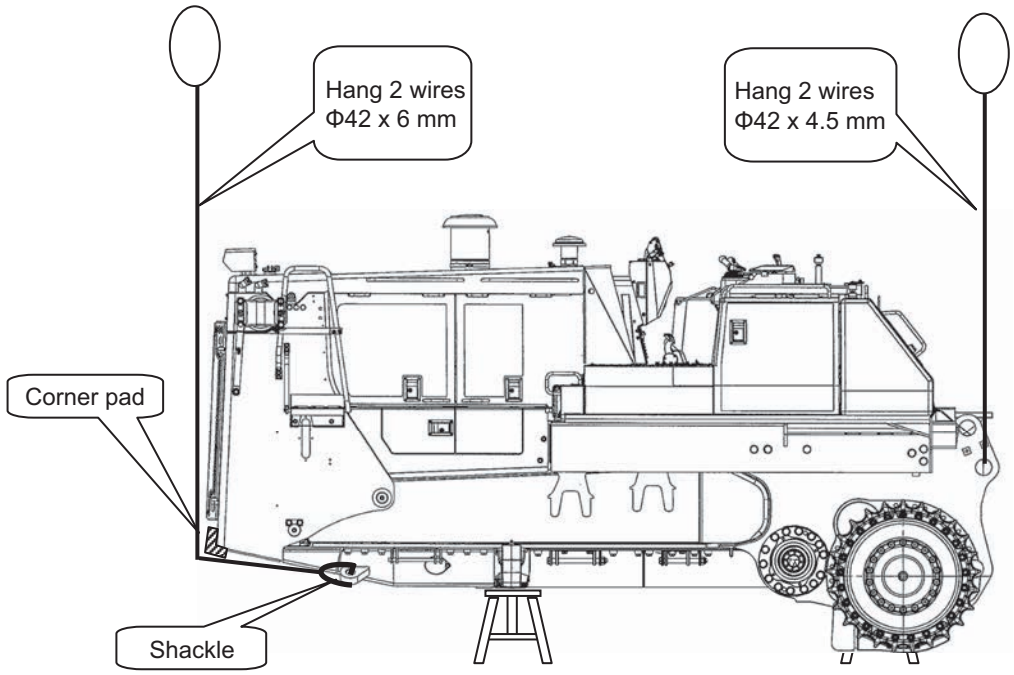
Fig. 3

Precautions	Necessary tools		Necessary equipment	
This work is required for disassembly to 32-t parts for transportation.	Name	Q'ty	Name	Q'ty
	ø20 × 2,000 mm	2	50-ton crane	1
	Wire rope sling			
			Support stand (front)	1
			Support stand (rear)	1
	Other remarks			

Assembly process No.	Installation of chassis (2/3)
A-1	

3) Sling the machine with 2 cranes having at least 50 ton capacity each to unload from the trailer and place it on the stands described above. (Fig. 4)
   ★ Match the direction of the machine to that of the track shoe assemblies.

Fig. 4



★ Machine weight: 27,000 kg
★ Lift points of machine
Front: Hang 2 wires (ø 42 mm) to the hook of the undercover by using 2 shackles and sling as shown in (Fig. 4).

Rear: Install wires (ø 42 mm) to the upper pins for installing the rear work equipment (ripper) (1 each on the right and left sides) and sling as shown in (Fig. 4).

Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	ø42 × 6,000 mm	2	50-ton crane	2
	ø42 × 4,500 mm	2		
	Wire rope sling			
	SB44(T) shackle	2		
	245kN(25t) Spec.			
	Corner pad	2		
	Other remarks			

Assembly process No.	Installation of chassis (3/3)
A-1	

Install 1 and 2 wire rope slings to the front and rear of the machine respectively as shown in (Fig. 4) and sling the machine with 2 truck cranes (Install the front slings to 1 truck crane and install the rear slings to another truck crane). Unload the machine from the trailer and place it on the chassis stand installed on the ground.

★ Install the front wire rope sling to the tow hook installed to the undercover of the machine through a proper shackle.
If the sling interferes with the machine at this time, put a rubber or felt pad between the sling and machine to protect the machine.

★ Install the rear wire rope slings to the ripper tilt cylinder mounts installed to the machine.
Install each sling to the pin installed to each of the right and left mounts.

★ Place the equalizer bar installed to the machine onto the front chassis stand and place the hull frame (main frame of the machine) onto the rear chassis stand.
At this time, check that the chassis stands are at the lateral center of the machine.

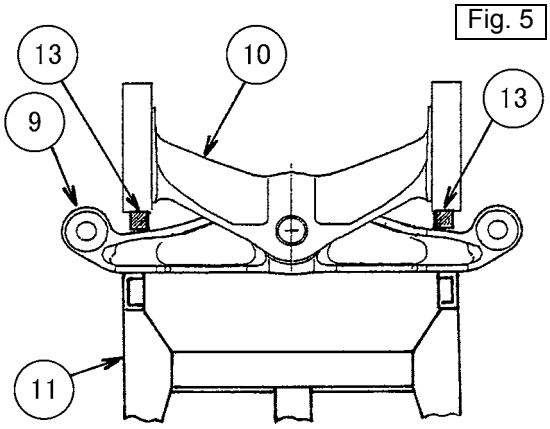
★ Before loosening the sling tension, put wooden block (13) between equalizer bar (9) and machine main frame (10) on each of the right and left sides as shown in (Fig. 5).

<Specifications of wooden block>

Section : 95 mm square
Length : 180 – 200 mm

★ Steel blocks of the same shape may be used instead of the wooden blocks.

Fig. 5



(9) Equalizer bar
(10) Machine main frame
(11) Front chassis stand
(13) Wooden block

Assembly process No.	Installation of undercover
A-2	

1) Install the 2 undercovers in the order shown in the (Fig. 1).

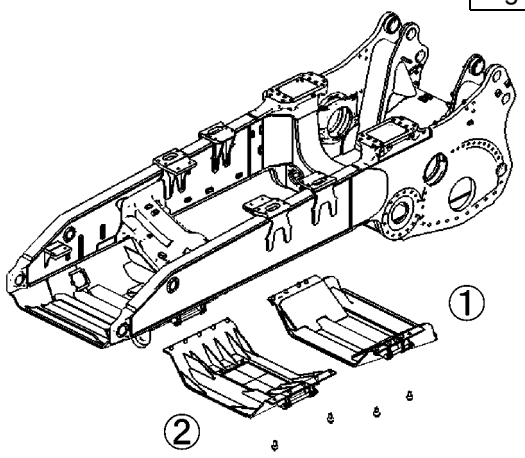
Undercovers 1

Part No. of bolt	01010-82470 (7 pieces)
Part No. of spacer	176-50-11170 (7 pieces)
Length of bolt	M24 × 70 mm
Part No. of bolt (Hinge area)	01010-82450 (2)
Part No. of washer (Hinge area)	01643-32460 (2)
Length of bolt (Hinge area)	M24 × 50 mm
Necessary socket	36 mm
Tightening torque	809 ± 221 Nm (82.5 ± 22.5 kgm)

Undercovers 2

Part No. of bolt	01010-82470 (8 pieces)
Part No. of spacer	176-50-11170 (8 pieces)
Length of bolt	M24 × 70 mm
Part No. of bolt (Hinge area)	01010-82450 (2)
Part No. of washer (Hinge area)	01643-32460 (2)
Length of bolt (Hinge area)	M24 × 50 mm
Necessary socket	36 mm
Tightening torque	809 ± 221 Nm (82.5 ± 22.5 kgm)

Fig. 1



Precautions	Necessary tools		Necessary equipment	
This work is required for disassembly to 32-t parts for transportation.	Name	Q'ty	Name	Q'ty
1) Apply adhesive (LT-2) to the bolts before tightening.	Impact wrench (– 1,000 Nm (– 102 kgm))	1		
2) Parts (1) and (2) may be installed before the machine is delivered.				
	Other remarks			

Assembly process No.	Installation of pivot shaft (1/2)
A-3	

Note) This work is required for disassembly to 32-t parts for transportation.

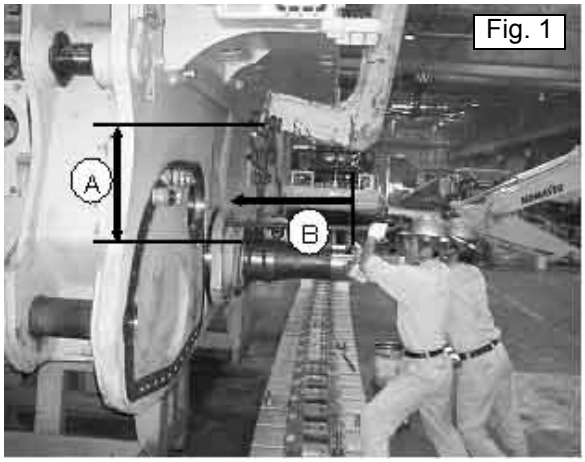


Fig. 1

1) Slinging pivot shaft
   - To sling the pivot shaft, install the sling as shown in (Fig. 1).
   - A proper length of the sling wire is about 600 mm. Dimension (A) in (Fig. 1)
   - Install the sling wire to about 500 mm from the pivot shaft end. Dimension (B) in (Fig. 1)

Part Nos. of pivot shafts

	Right shaft	Left shaft
Dual	195-50-42111	195-50-42111
Single	195-50-42111	195-50-42210

2) Setting position of pivot shaft
   * For details of installation, see the following page.
   - Set the pivot shaft to the machine with its flange directed as shown in (Fig. 2).

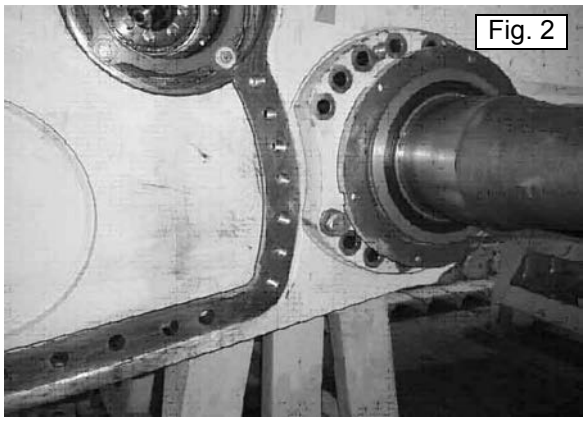


Fig. 2

3) Bolting to machine
   - When installing the pivot shaft, tighten the bolts lightly and evenly in the diagonal order to press fit the spigot joint portion until the flange face is seated.
   - Use an impact wrench (– 306 kgm) and a socket shown in the following table. (See [Fig. 3])
   - While turning the torsion seal cover properly, tighten the bolts.

   Note: After tightening, be sure to check the tightening torque.

Part No. of bolt	01010-83000 (14 pieces each on right and left)
Part No. of washer	01643-33080 (14 pieces each on right and left)
Bolt specification	M30 × 100 mm
Socket	46 mm
Tightening torque	1,720 ± 196 Nm (175 ± 20 kgm)

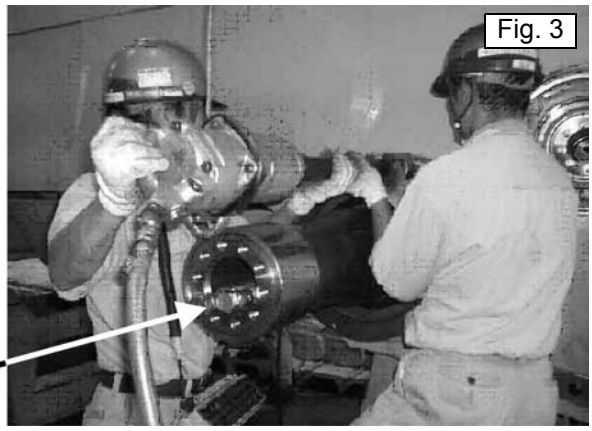


Fig. 3

4) Installation of cork plug
   After tightening the above bolts, drive the cork plugs into the screw bolt holes in which the bolts of the pivot shaft flange will not be installed.

Part name	Part No.	Q'ty
Plug	07049-03038	2 pieces each on right and left

Assembly process No.	Installation of pivot shaft (2/2)
A-3	

Remarks 1. Torsion seal (2) is press fitted to the large diameter end of pivot shaft (1) in advance. In addition, torsion seal retainer (3) is fitted in a free rotation state to bring the torsion seal in close contact with the track frame that will be described later. (Fig. 4)

2. There are 2 tilt hoses (4) and (5) for work equipment hydraulic system coming out of the pivot shaft mounting seat of the machine.
   Pass both of these tilt hoses through the center hole of the pivot shaft so that they will come out of the shaft end.
   At this time, do not twist the tilt hoses spirally inside the pivot shaft hole and set the one having identification color mark up. (Fig. 4)

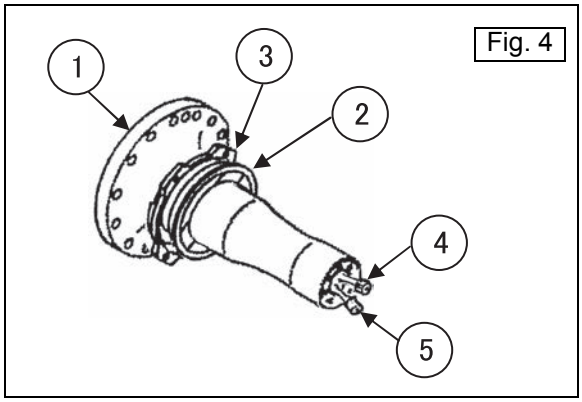


Fig. 4

(1) Pivot shaft
(2) Torsion seal
(3) Torsion seal retainer
(4) Tilt hose
Set one having identification color mark on neck up.
(5) Tilt hose
Set one having no identification color mark on neck down.

3. The pivot shaft may have been installed to the machine before delivery.

4. This assembly work shall be performed on the right and left sides of the machine. The tilt hose piping on both sides are different from each other as shown below.

Machine specification	Installing position in machine		Tilt hose type
Dual tiltdozer	Left	Upper	1 hose having identification blue mark
		Lower	1 hose having no identification color mark
	Right	Upper	1 hose having identification red mark
		Lower	1 hose having no identification color mark
Single tiltdozer	Left		Without tilt hose
	Right	Upper	1 hose having identification red mark
		Lower	1 hose having no identification color mark

Assembly process No.	Installation of undercarriage (1/27)
A-4	

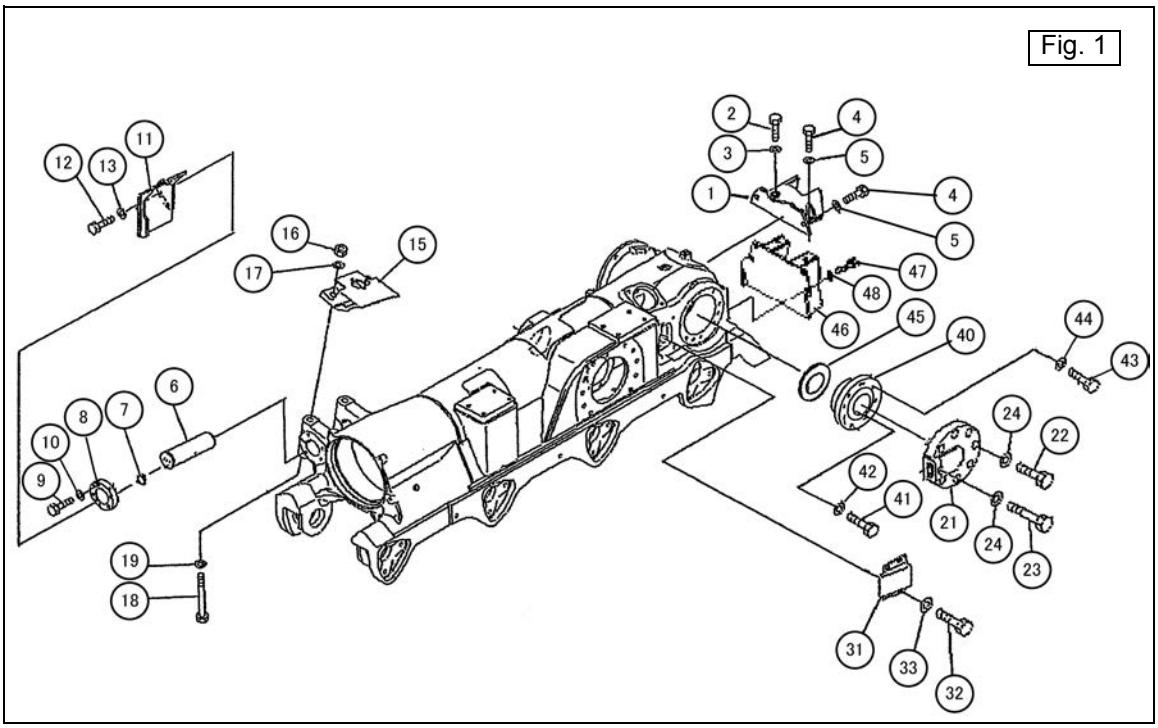
Note) This work is required for disassembly to 32-t parts for transportation.

1) Installation of track frame assembly to machine

1. 1) Before installing the track frame assembly, remove the following parts from it.
   - Rear upper cover parts of track frame assembly --- (1), (2), (3), (4), (5), (46), (47) and (48) in (Fig. 1)
   - Equalizer bar side pin and cover parts --- (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (17), (18) and (19) in (Fig. 1)
   - Pivot shaft end cover parts --- (21), (22), (23) and (24) in (Fig. 1)
   - Parts related to torsion seal assembly at pivot shaft end --- (40), (41), (42), (43), (44) and (45) in (Fig. 1)
   - Parts related to hydraulic hose hole cover of tiltdozer --- (31), (32) and (33) in (Fig. 1)

Note 1. This section describes assembly of right and left track frame assemblies of the dual tiltdozer specification and that of the right track frame assembly of the single tiltdozer specification. For the left track frame assembly of the single tiltdozer, see 1.2).
2. (Fig. 1) explains the left track frame assembly, and the right track frame assembly is similar to it.
The O-rings which must not be reused as a rule are not shown in the figure.
3. The removed parts will be installed again during or after assembly of the track frame assembly. Take care not to lose them.
4. The track frame assembly is shipped with the fixing jig installed so that the track roller area will not sag when the track frame assembly is slung. This fixing jig is unnecessary after completion of assembly, but do not remove it at this time. For the location of this jig and the time to remove it, see step 7) of this assembly procedure.

Fig. 1

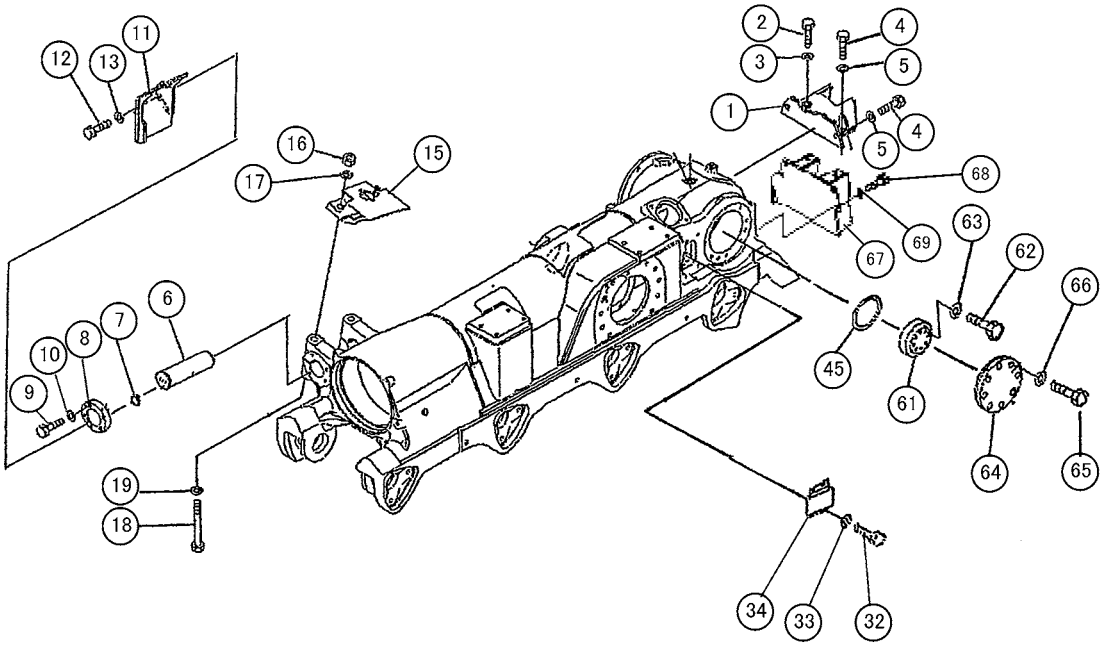


Assembly process No.	Installation of undercarriage (2/27)
A-4	

1.2) The parts to be removed from the left track frame assembly of the single tiltdozer are as follows.

- Rear cover parts of track frame assembly --- (1), (2), (3), (4), (5), (67), (68) and (69) in (Fig. 2)
- Equalizer bar side pin and cover parts --- (6), (7), (8), (9), (10), (11), (12), (13), (15), (16), (17), (18) and (19) in (Fig. 2)
- Pivot shaft end cover parts --- (64), (65) and (66) in (Fig. 2)
- Parts related to thrust washer of pivot shaft end --- (45), (61), (62) and (63) in (Fig. 2)
- Parts related to hydraulic hose hole cover of tiltdozer --- (32), (33) and (34) in (Fig. 2)

Fig. 2



Assembly process No.	Installation of undercarriage (3/27)
A-4	

1.3) Fit the O-ring to the O-ring (51) groove of the machine side (inside) of the pivot shaft insertion hole of the track frame assembly. (Fig. 3)

No.	Part No.	Q'ty
(51)	07000-15300	1 piece each on right and left

Note:1. Check that the O-ring contact face of the "torsion seal" press fitted to the pivot shaft installed in "Assembly procedure A-3" is free from foreign matter and harmful material. See (Fig. 9), too

2. The inside of the track frame assembly must be free from foreign matter.

3. Apply oil to bush and shaft.

1.4) Sling the track frame assembly with the sling jig, wire and crane.

★ For the position of the crane and slinging method, see (Fig. 4) and (Fig. 5).

Note 1. For the sling jig, see "Table of tools for field assembly".

2. Sling the track frame assembly horizontally.

3. (Fig. 4) and (Fig. 5) show the right track frame assembly.

Fig. 3

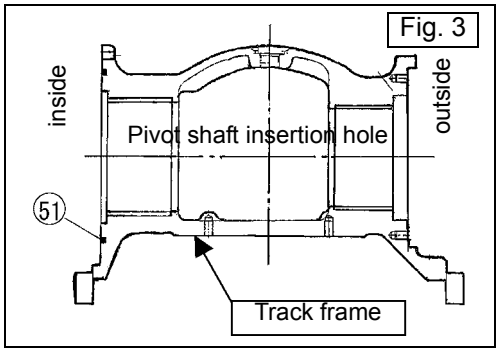
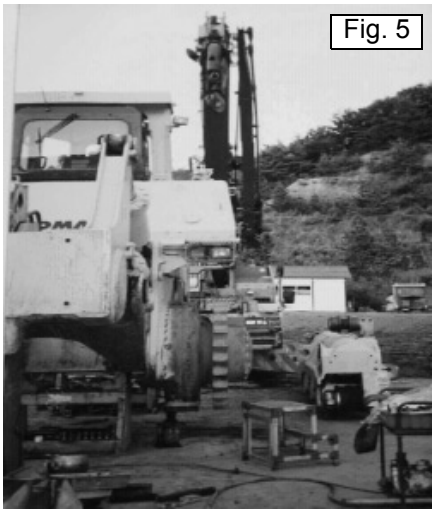


Fig. 4

Fig. 5



Assembly process No.	Installation of undercarriage (4/27)
A-4	

1.5) While aligning the pivot shaft insertion hole of the track frame assembly with the pivot shaft, pull the track frame assembly near the machine gradually.
See (Fig. 6)

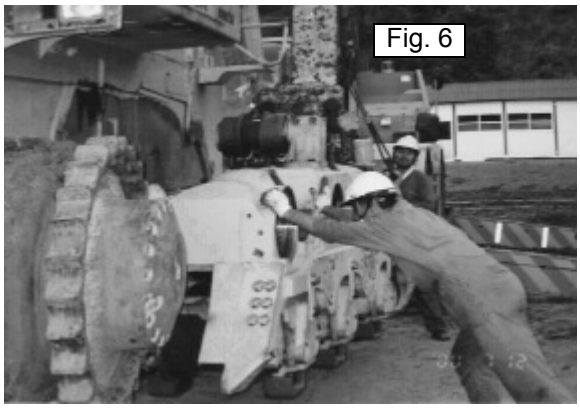


Fig. 6

1.6) Pull the track frame assembly until the O-ring in step 1.3) lightly touches the torsion seal press fitted to the pivot shaft (See (Fig. 9)) and until the side pin holes of the equalizer bar are aligned.
See (Fig. 7), (Fig. 8)

Note: Take care extremely that the O-ring (51) in step will not come off the groove or fall while the track frame assembly is pulled.

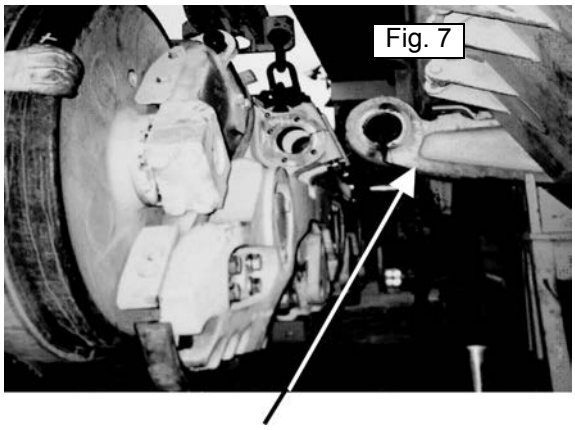


Fig. 7

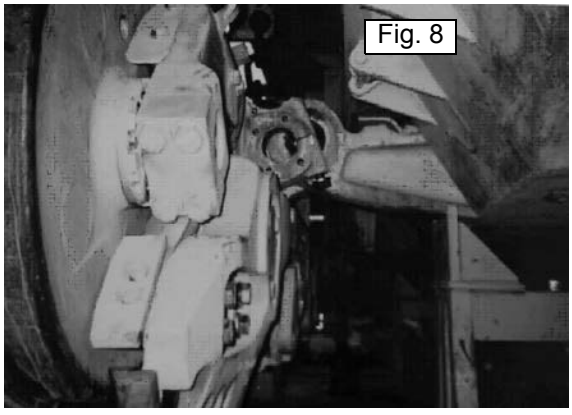


Fig. 8

(51) O-ring (See this procedure, 1.3)
(52) Torsion seal (See assembly procedure A-5)
(53) Torsion seal cover (See assembly procedure A-5)
(73) Pivot shaft (See assembly procedure A-5)
(74) Track frame assembly
(90) Machine body

Remarks The hydraulic hoses of the tiltdozer are not shown in the figure.

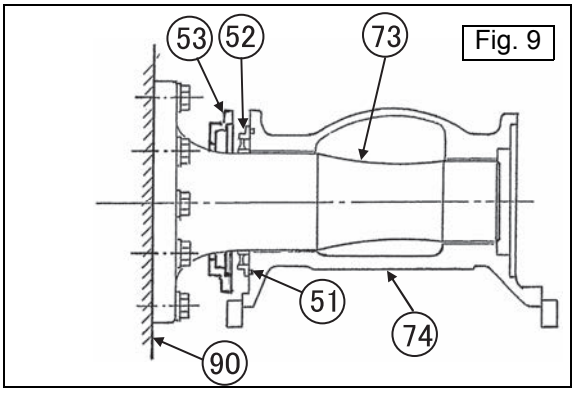
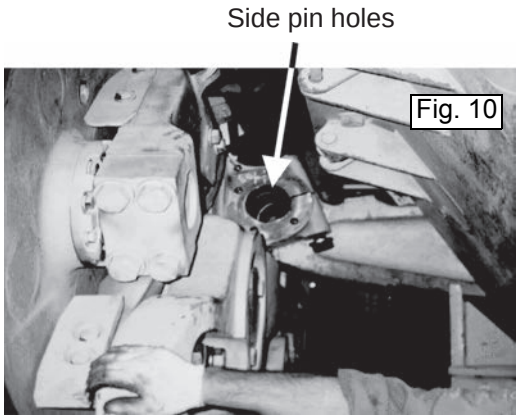


Fig. 9

Assembly process No.	Installation of undercarriage (5/27)
A-4	

1.7) Insertion of equalizer bar side pins

1.7.1) Align the equalizer bar side pin holes with each other. See (Fig. 10)

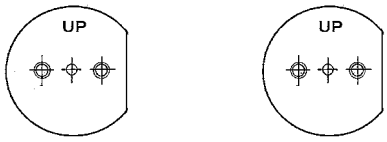


1.7.2) Insert each side pin. See (Fig. 11)

Removed pin (6) in 1.1), 1.2)	
(6) Part No.	195-50-51150 (1 each on right and lest sides)

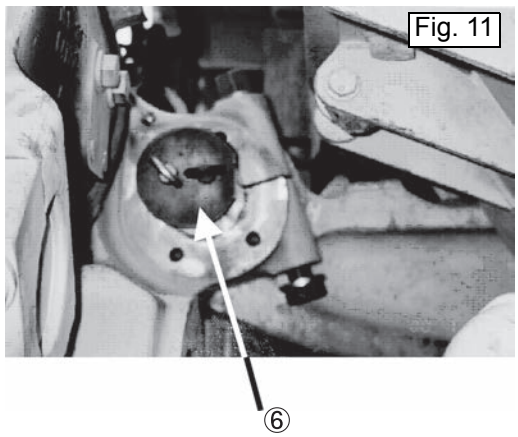
Note: Since each pin head face will be in contact with the O-ring, take care not to damage it when inserting the pin.

★ Insert from the front side of the machine.
★ Insert each pin with the stamp of "UP" on the pin head up.
★ The right and left pin heads seen from the front of the machine are as follows.

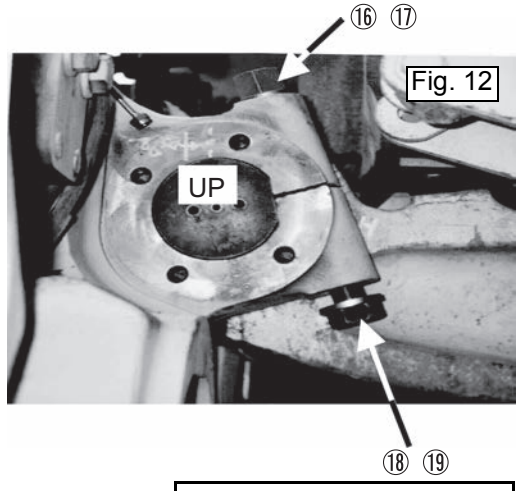


Right side of machine (Left when seen from front)

Left side of machine (Right when seen from front)



1.7.3) Tighten the side pin fixing bolts temporarily.
Insert bolts (18) and (19) from underside and install and tighten nuts (16) and (17) from above. See (Fig. 12)



Take care of bolt insertion direction (See Note 2)

(16), (17), (18) and (19) removed in 1.1), 1.2)	
(18) Part No. of bolt	195-50-51510 (2 pieces each on right and left)
(19) Part No. of washer	01643-33080 (2 pieces each on right and left)
(16) Part No. of nut	01803-03034 (2 pieces each on right and left)
(17) Part No. of washer	01643-33080 (2 pieces each on right and left)
Bolt s pecification	M30 × 305 mm
Socket	46 mm

Note 1. Take care not to damage the O-ring contact faces of the pin heads.
2. Bolts are inserted from above into the track frame assembly unit delivered to the field to protect their threads and for the reason of transportation.
When connecting the track frame assembly to the equalizer bar of the machine, remove those bolts and then insert them from below.
3. The mudguards (15) in (Fig. 1) and (Fig. 2) removed simultaneously in steps 1.1) and 1.2) will be install later in step 8). Accordingly, tighten their bolts and nuts temporarily at this time.

Assembly process No.	Installation of undercarriage (6/27)
A-4	

1.7.4) Place grease cover (8) on the equalizer bar side pin inserted in advance and fix it with mounting bolts (9) and (10) temporarily. (Fig. 13)

Note 1. Install "O-ring (7)" to the grease cover which will be in contact with the equalizer bar side pin head without fail.

2. Install the grease cover to the shape of the equalizer bar side pin head.

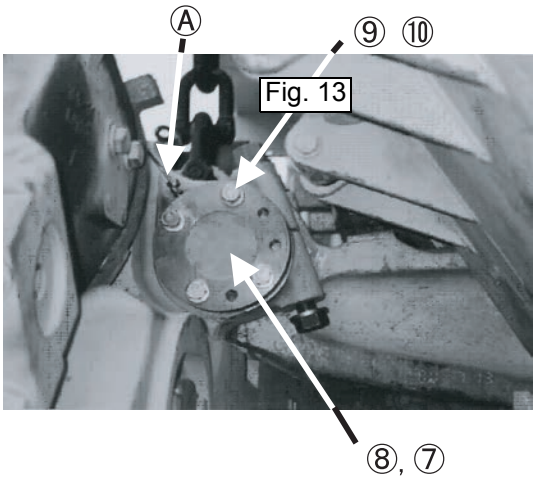


Fig. 13

Part No. of grease cover (8)		Left	195-50-52360 (1 piece)
		Right	195-50-52370 (1 piece)
Part No. of O-ring (7)		07000-12020 (1 piece each on right and left)	
Bolt (9)	Part No.	01010-81665 (4 pieces each on right and left)	
	Specification	M16 × 65 mm	
Part No. of washer (10)		01643-31645 (4 pieces each on right and left)	

} (7), (8), (9) and (10) removed in (Fig. 1) and (Fig. 2)

1.7.5) Connect the grease tube (A) coming from the equalizer bar to the grease cover.

Note: The tube joint has pipe threads. Take care not to tighten it too much. The reference tightening torque is shown below.

Tightening torque	14.7 – 34.3 Nm {1.5 – 3.5 kgm}

1.8) Place jacks or wooden blocks under the installed track frame assembly so that the assembly will not tip over when it is lowered from the crane. (Fig. 14)

Place the jacks or wooden blocks to at least 2 places so that the track frame assembly will be kept horizontally in each direction.

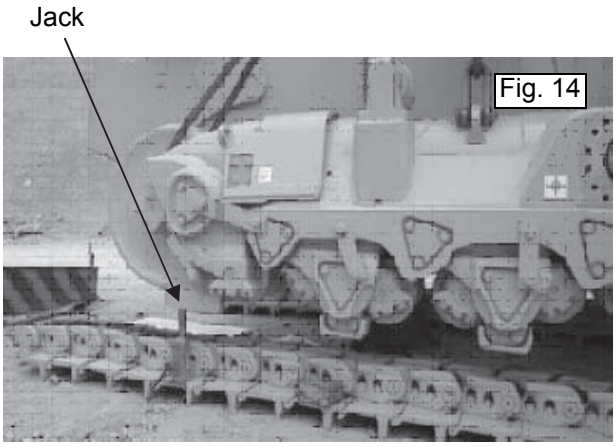


Fig. 14

1.9) Lower the track frame and start the installation work of the track frame assembly on the opposite side.

Assembly process No.	Installation of undercarriage (7/27)
A-4	

1.10) Install the track frame assembly on the opposite side according to steps 1.1) – 1.8).

(Fig. 15), (Fig. 16) and (Fig. 17)

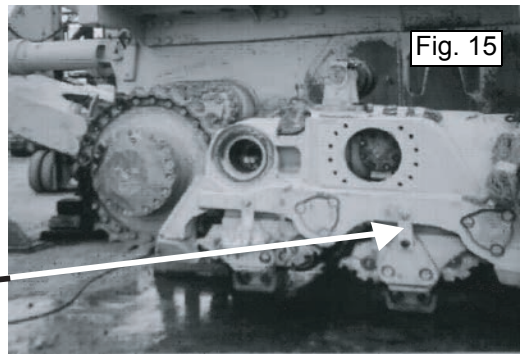


Fig. 15


Fig. 16


Fig. 17

Note: As described in 1.1), do not remove the bogie fixing jig for preventing the track rollers from drooping at this time.
Removal of this jig is described in 11) of this procedure. As a rule, however, remove it after removing the machine stand installed in "Assembly procedure A-1" and placing the whole machine, including the track frame assembly, onto the track shoe assembly spread on the ground.

Assembly process No.	Installation of undercarriage (8/27)
A-4	

2) Assembly of pivot shaft end

2.1) Right and left sides of dual tiltdozer and right side of single tiltdozer

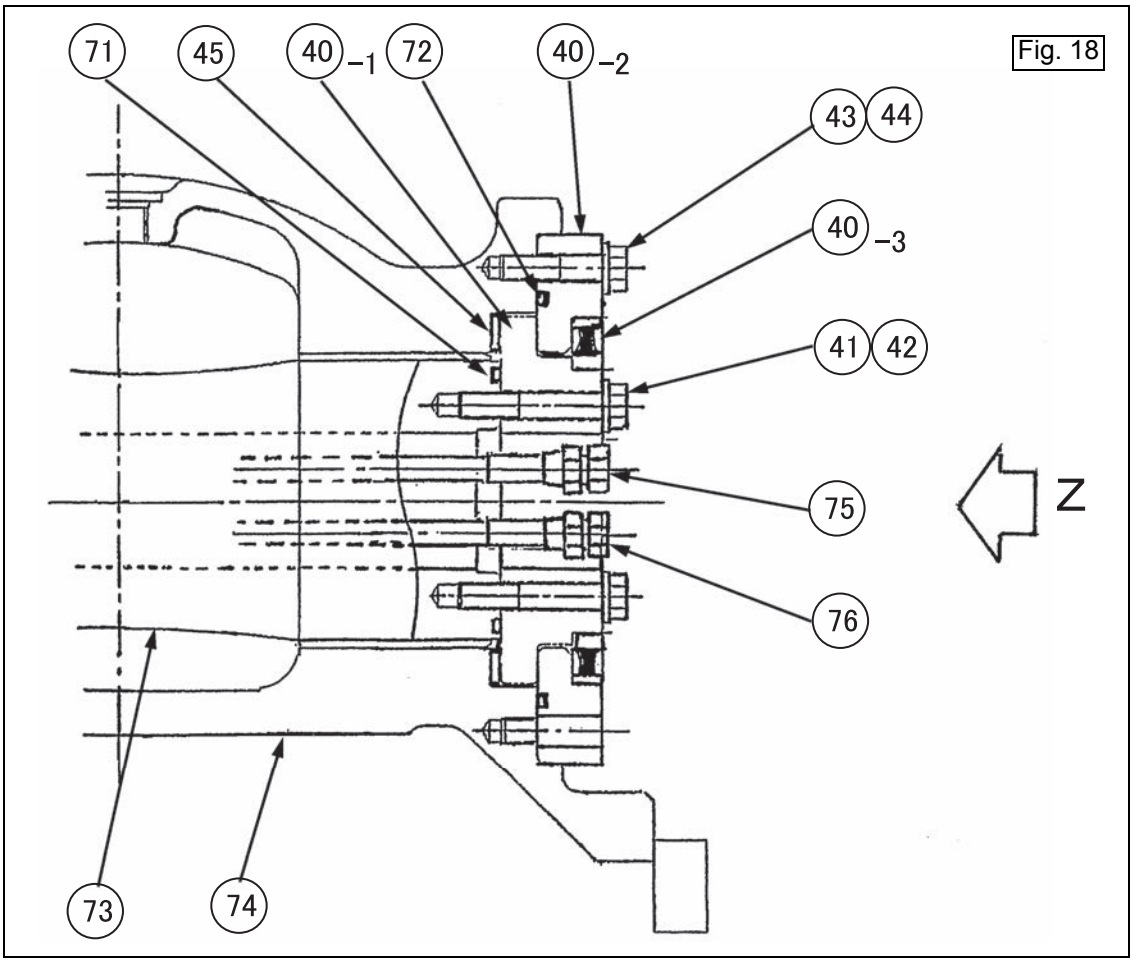


Fig. 18

No.	Part name	Part No.	Q'ty	Remarks
40-1	Inner washer	195-50-52120	1	Assembled already
40-2	Outer washer	195-50-52130	1	
40-3	Torsion seal	195-50-22181	1	
41	Bolt	01010-81690	8	
42	Washer	01643-51645	8	
43	Bolt	01010-81645	3	
44	Washer	01643-51645	3	
45	Spacer	195-50-22170	1	
71	O-ring	07000-15155	1	
72	O-ring	07000-15250	1	
73	Pivot shaft	–	–	
74	Track frame assembly	–	–	
75	Hydraulic hose	–	–	See Assembly procedure A-5
76	Hydraulic hose	–	–	

Assembly process No.	Installation of undercarriage (9/27)
A-4	

2.1.1) Fit the "O-ring" to the O-ring groove at the pivot shaft end. (71) in (Fig. 18)

2.1.2) Fit the spacer to the track frame assembly side of the pivot shaft end. (45) in (Fig. 18)
These parts are the parts remove in step 1.1).

2.1.3) Fit O-rings (5) to torsion seal assemblies (40-1), (40-2) and (40-3) in (Fig. 18) and install the torsion seal assemblies so that they will hold the O-rings in step 2.1.1) and spacers in step 2.1.2) and then tighten the bolts.

The torsion seal assemblies are the parts removed in step 1.1). See (Fig. 1), (40)

* Bolts to install inner washers of torsion seals. See (41) and (42) removed in (Fig. 18)	
Bolt specification	M16 × 90 mm
Tool (Socket)	24 mm
Tightening torque	See Table 1 “Tightening torque”

* Bolts to install outer washers of torsion seals. See (43) and (44) removed in (Fig. 18)	
Bolt specification	M16 × 45 mm
Tool (Socket)	24 mm
Tightening torque	See Table 1 “Tightening torque”

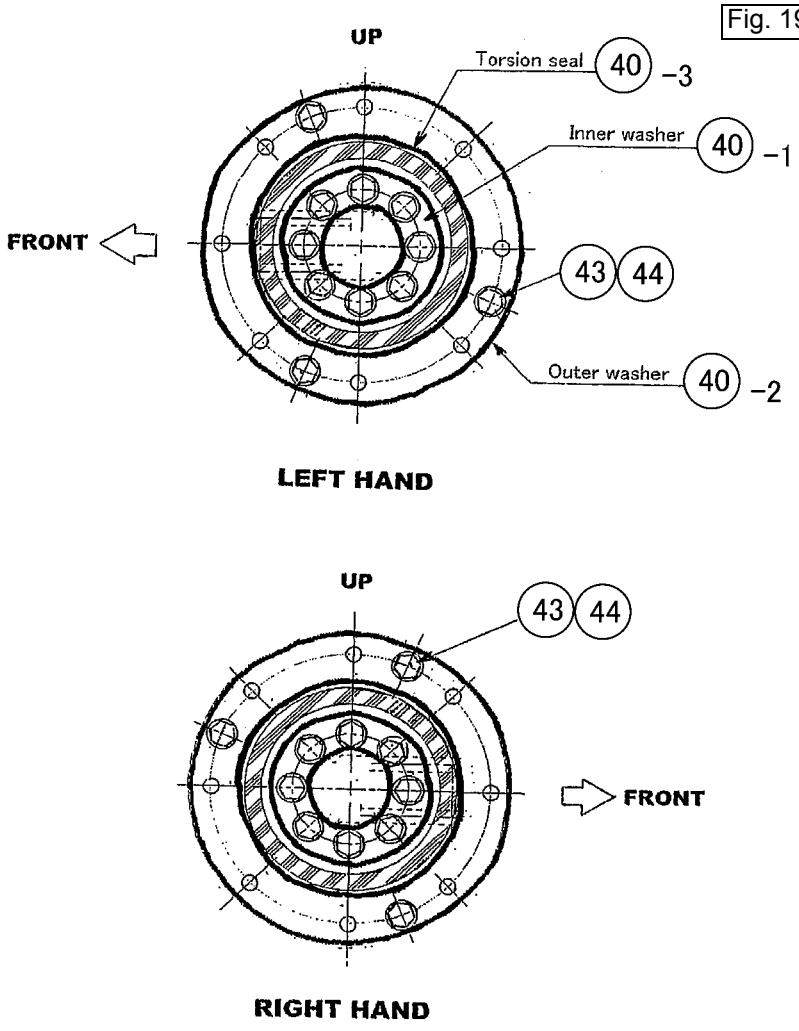
Note 1. Keep the track frame assemblies horizontally so that no torsion load will be applied to the torsion seals at the beginning of assembly.

2. Set the 3 bolts to install the outer washer of the torsion seal at irregular intervals as shown in 2.1.4).
If the bolts are not installed to correct positions, the pivot shaft end cover cannot be installed in step 4). Take care.

Assembly process No.	Installation of undercarriage (10/27)
A-4	

2.1.4) Outer washer mounting bolt positions of torsion seal assembly
Install outer washer mounting bolts (43) and washers (44) of the torsion seal assembly unequally spaced as shown in (Fig. 19), seeing from the direction of arrow Z in (Fig. 18).

Fig. 19



Note 1. The other equally spaced holes (8 places) to which (43) and (44) are not installed are for mounting bolts (22) and (23) of pivot shaft end cover (1) removed in (Fig. 1).
2. For the single tiltdozer, perform this work on the right side only. For the left side, see step 2.2).

Assembly process No.	Installation of undercarriage (11/27)
A-4	

2.2) Left side of single tiltdozer
Since there are not the torsion seals or hydraulic hoses on the left side of the single tiltdozer, assemble as shown below.

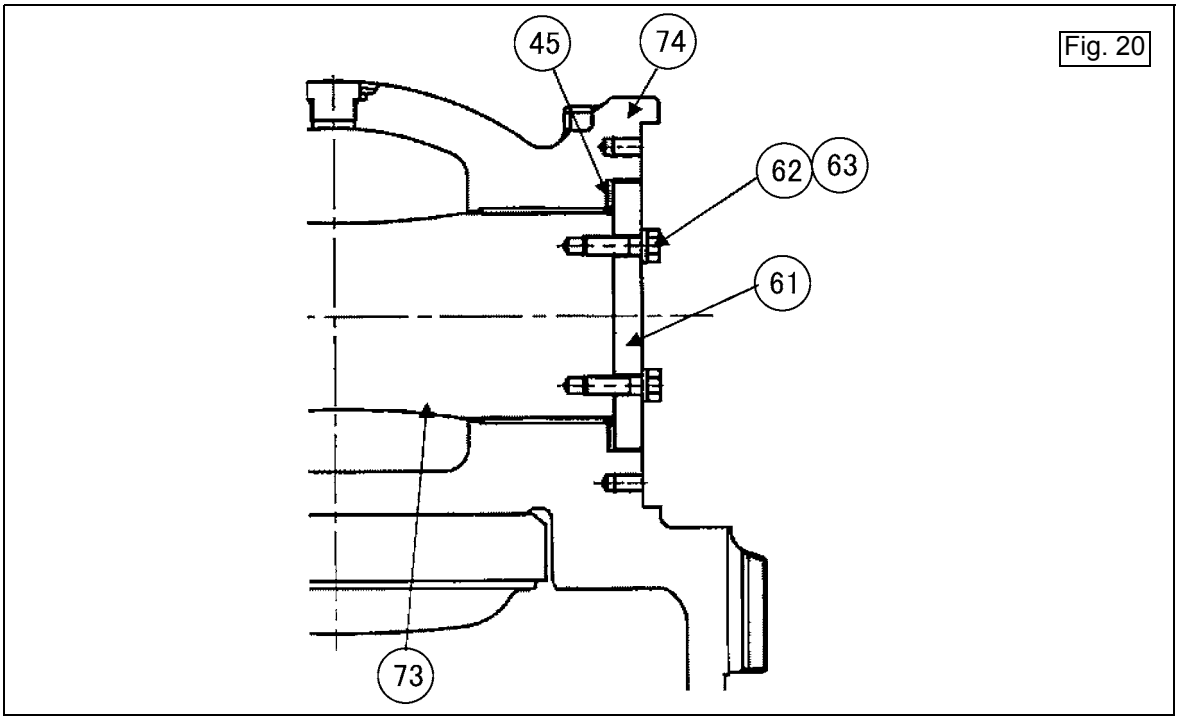


Fig. 20

No.	Part name	Part No.	Q'ty
45	Spacer	195-50-22170	1
61	Thrust washer	195-50-42260	1
62	Bolt	01010-81650	8
63	Washer	01643-31645	8
73	Pivot shaft	–	–
74	Track frame assembly	–	–

2.2.1) Fit spacer (45) to the track frame assembly side of the pivot shaft end.

2.2.2) Install thrust washer (61) with bolts (62) and washers (63).

* Thrust washer mounting bolt (62) and (63) in (Fig. 20)	
Bolt specification	M16 × 65 mm
Tool (Socket)	24 mm
Tightening torque	See Table 1 "Tightening torque"

Remark: (45), (61), (62), (63) are the parts removed in step 1.2).

Assembly process No.	Installation of undercarriage (12/27)
A-4	

3) Assembly of torsion seal retainer at pivot shaft base

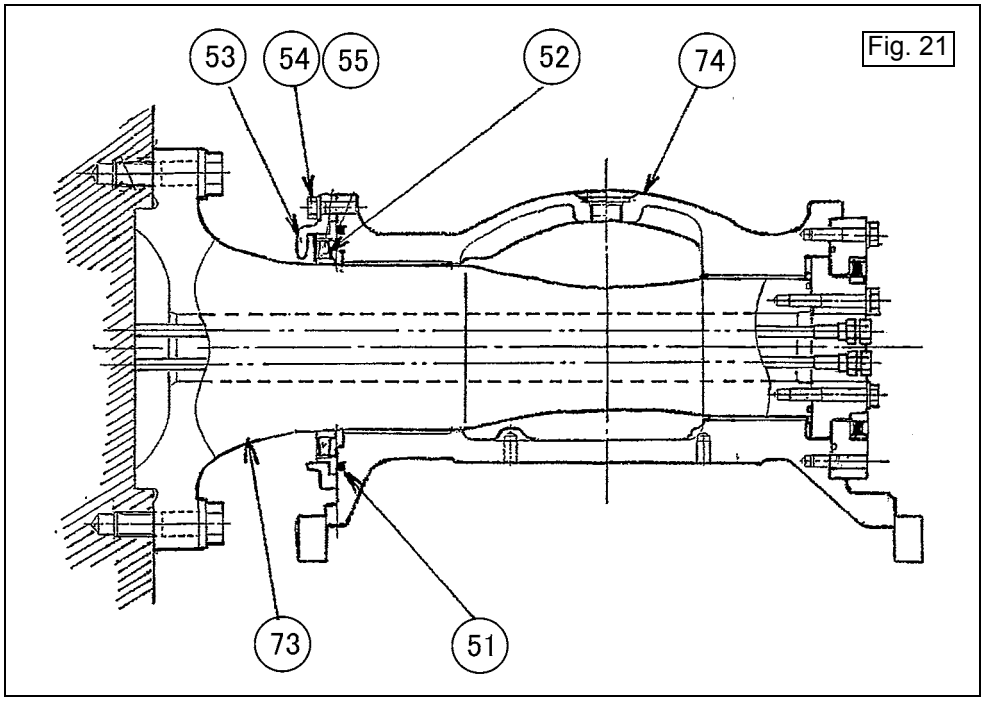


Fig. 21

No.	Part name	Part No.	Q'ty	Remarks
51	O-ring	07000-15300	–	See the procedure, 1.3.
52	Torsion seal	195-50-22151	–	See A-5
53	Torsion seal cover	195-50-22140	–	See A-5
54	Bolt	01010-81645	4	
55	Washer	01643-31645	4	
73	Pivot shaft	–	–	See A-5
74	Track frame assembly	–	–	

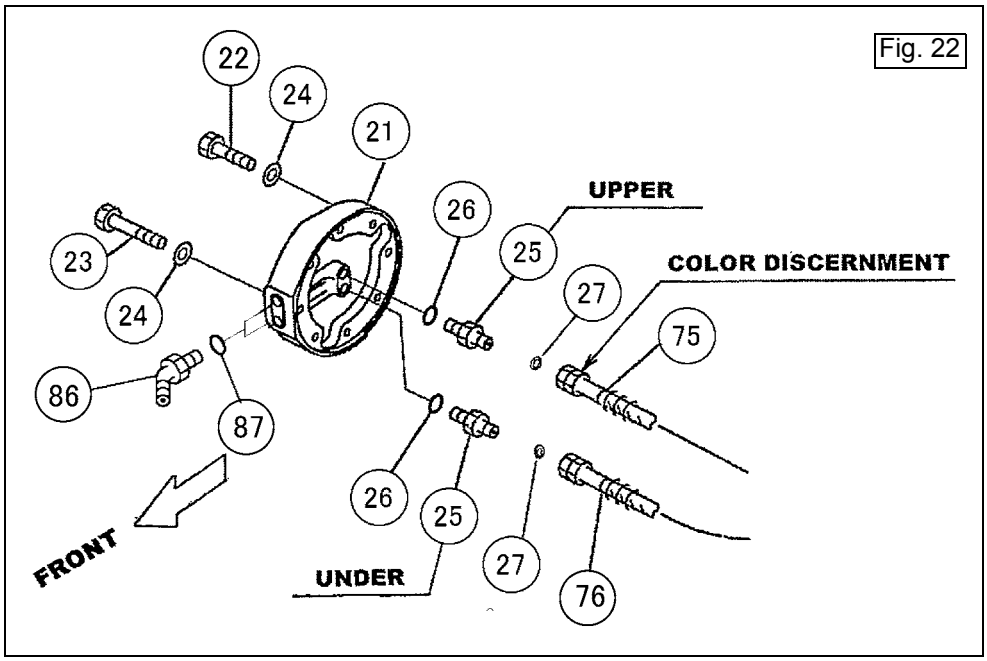
As explained in "assembly procedure A-5", Installation of pivot shaft, torsion seal retainer (53) is installed to the pivot shaft base in a free rotation state. Install this retainer to track frame assembly (74) with bolts (54) and washers (55), while holding seal (80) under it.

Bolt specification	M16 × 45 mm
Tool (Socket)	24 mm
Tightening torque	See Table 1 "Tightening torque"

Assembly process No.	Installation of undercarriage (13/27)
A-4	

4) Assembly of pivot shaft end cover

4.1) Right and left sides of dual tiltdozer and right side of single tiltdozer



No.	Part name	Part No.	Q'ty	Remarks
21	Cover	195-50-22132	1	Assembled already
25	Union	02781-00522	2	
26	O-ring	07002-12434	2	
86	Elbow	02783-10522	2	
87	O-ring	07002-12434	2	
22	Bolt	01010-81695	7	
23	Bolt	01010-81615	1	
24	Washer	01643-31645	8	
27	O-ring	02896-11015	2	
75	Hydraulic hose (Upper)	–	1	With identification color mark
76	Hydraulic hose (Lower)	–	1	Without identification color mark

Assembly process No.	Installation of undercarriage (14/27)
A-4	

4.1.1) Remove oil plugs (77) and (78) in (Fig. 23) installed to the ends of 2 hydraulic hoses (75) and (76) in (Fig. 18) coming out of the pivot shaft end.

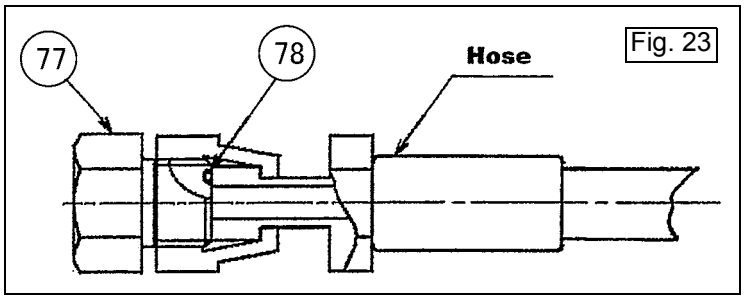


Fig. 23

No.	Part name	Part No.	Q'ty
77	Plug	07376-70522	2
78	O-ring	02896-11015	2

4.1.2) Connect the above hydraulic hoses to union (25) in (Fig. 22) installed to pivot shaft end cover (21) in (Fig. 22).

★ Take care not to forget to fit O-ring (27) in (Fig. 22).

Connect the hydraulic hoses according to the following table.

	Hose discernment	Selection of connecting elbow	
Left side of machine	Blue discernment at hose end	Connect to upper elbow.	
	No discernment on hose	Connect to lower elbow.	
Right side of machine	Red discernment at hose end	Connect to upper elbow.	Apply this assembly to right side of single tiltdozer, too.
	No discernment on hose	Connect to lower elbow.	

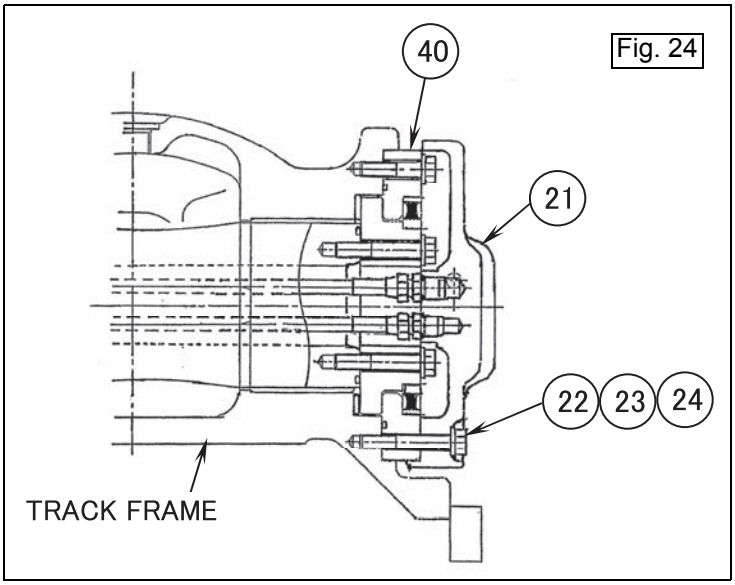
★ For the upper and lower unions, see (Fig. 22).

Assembly process No.	Installation of undercarriage (15/27)
A-4	

4.1.3) While pushing the hydraulic hoses into the pivot shaft hole, put pivot shaft end cover assembly connected to the tilt hoses in step 4.1.2) over torsion seal assembly (40) in (Fig. 18) and secure it to the track frame assembly with the bolts. See (Fig. 22) and (Fig. 24).

Bolt specification	M16 × 95 mm (7 pieces each)
	M16 × 115 mm (1 piece each)
Tool (Socket)	24 mm
Tightening torque	See Table 1 “Tightening torque”

Fig. 24



4.2) Left side of single tiltdozer
Install pivot shaft end cover having no hydraulic hose connection to the left side of the single tilt-dozer. See (Fig. 25) and (Fig. 26).

Fig. 25

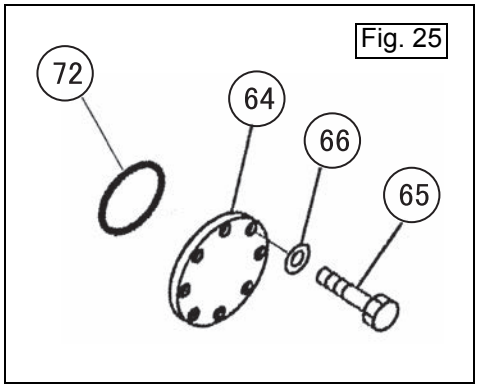
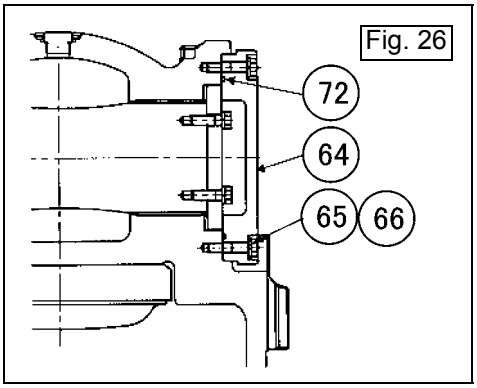


Fig. 26

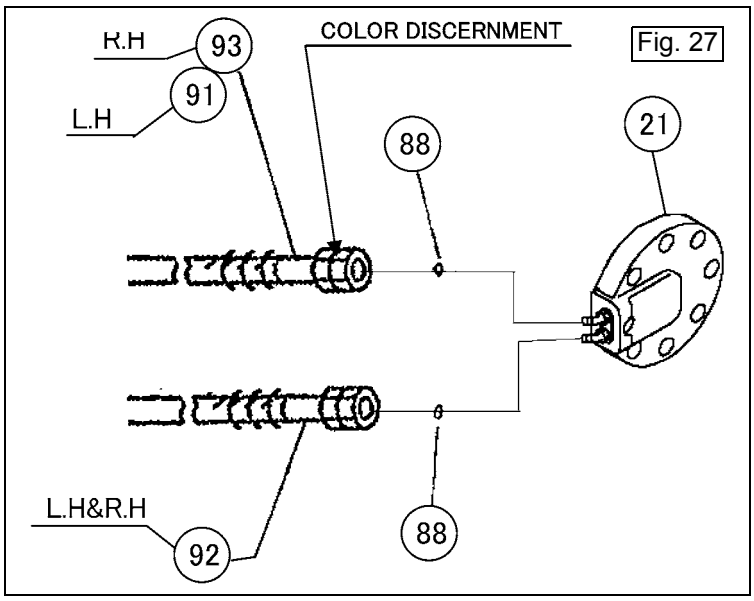


No.	Part name	Part No.	Q’ty
64	Cover	195-50-52140	1
65	Bolt	01010-81665	8
66	Washer	01643-31645	8
72	O-ring	07000-15250	1

Bolt specification	M16 × 65 mm
Tool (Socket)	24 mm
Tightening torque	See Table 1 “Tightening torque”

Assembly process No.	Installation of undercarriage (16/27)
A-4	

5) Assembly of tilt hoses from pivot shaft end cover to trunnion
Note: Perform the following before installing the trunnion.
This assembly is for the right and left sides of the dual tiltdozer and the right side of the single tiltdozer.



No.	Part name	Part No.	Q'ty	Remarks
88	O-ring	02896-11015	2	
91	Hydraulic hose	195-71-76691	1	With identification blue mark
92	Hydraulic hose	195-71-76671	2	With no identification color mark
93	Hydraulic hose	195-71-76631	1	With identification red mark

5.1) As a rule, direct the elbows toward the center of the machine. When connecting the hydraulic hoses described below, however, adjust the elbows so that the hydraulic hoses will not interfere with or strongly touch other parts.

5.2) Pass hydraulic hoses (91) and (92) on the left side and (92) and (93) on the right side through the track frame as shown in (Fig. 31) and connect them to the elbows installed in step 5.1).
At this time, take care not to forget to fit O-rings (88) to the elbows.
Connect the hydraulic hoses according to the following table.

	Hose discernment	Connect to pivot shaft cover
Left side of machine	Blue discernment at hose end	Connect to upper
	No discernment on hose	Connect to lower
Right side of machine	Red discernment at hose end	Connect to upper
	No discernment on hose	Connect to lower

Note : When passing the hydraulic hoses through the track frame, do not twist them spirally.

Assembly process No.	Installation of undercarriage (17/27)
A-4	

6) Assembly of trunnion
Install trunnions (81) necessary for connection of the blade assembly and machine described in "Assembly procedure A-12", Installation of blade assembly, to the both right and left track frames respectively. See (Fig. 28).

Note Before installing the trunnion, remove all the paint from face A of the track frame (mating face to the trunnion) and face B of the trunniong (mating face to the track frame) with sandpaper etc.

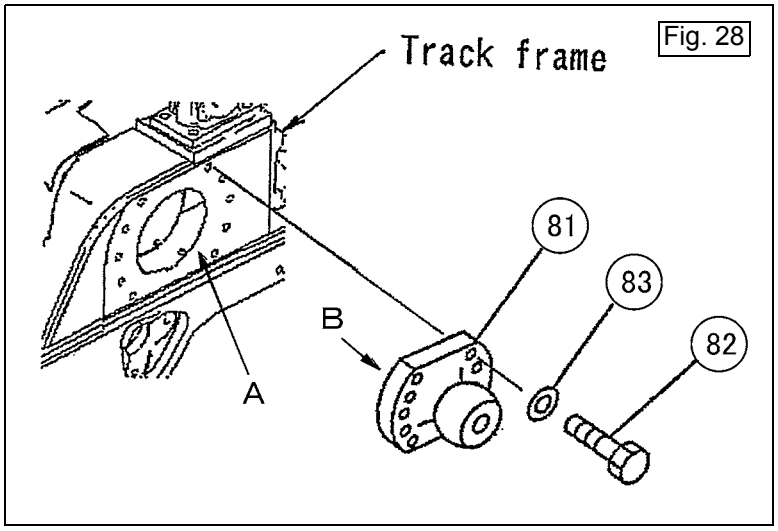


Fig. 28

No.	Part name	Part No.	Q'ty
81	Trunnion	195-71-511911	1 piece each on right and left
82	Bolt	01010-62475	10 pieces each on right and left
83	Washer	01643-32460	10 pieces each on right and left

Bolt specification	M24 × 75 mm
Tool (Socket)	36 mm
Tightening torque	See Table 1 "Tightening torque"

Note 1. This trunnion may be installed to the track frame before the machine is delivered.
2. This assembly may be performed before "Assembly procedure A-12", Installation of blade assembly, described later.

Assembly process No.	Installation of undercarriage (18/27)
A-4	

6.1) Pull out the opposite ends of the hydraulic hoses from the center hole of the trunnion as shown in (Fig. 29).
At this time, set the hydraulic hose having a identification color mark (A) in (Fig. 29) up.

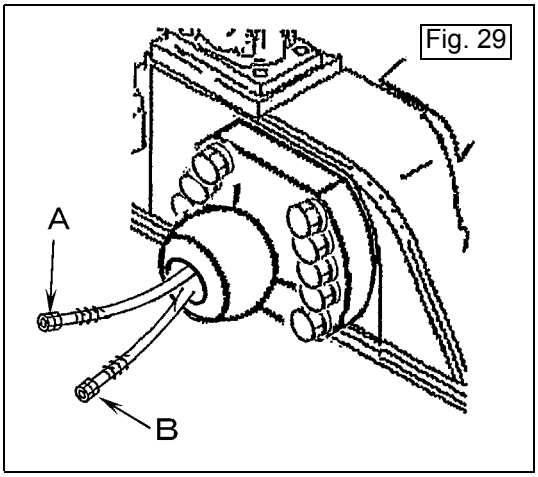


Fig. 29

A: Hydraulic hose with identification color mark
B: Hydraulic hose without identification color mark

6.2) Installation of plug at tilt hose end
Install plug (77) and O-ring (78) shown in (Fig. 29) to the end of each of tilt hoses (A) and (B). (Fig. 30)

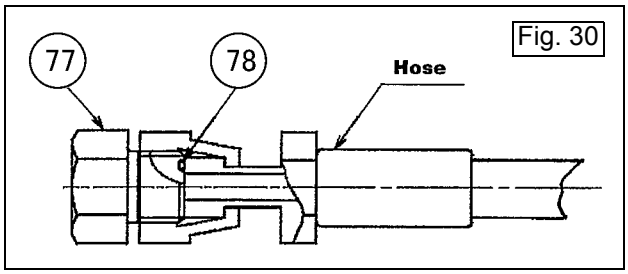


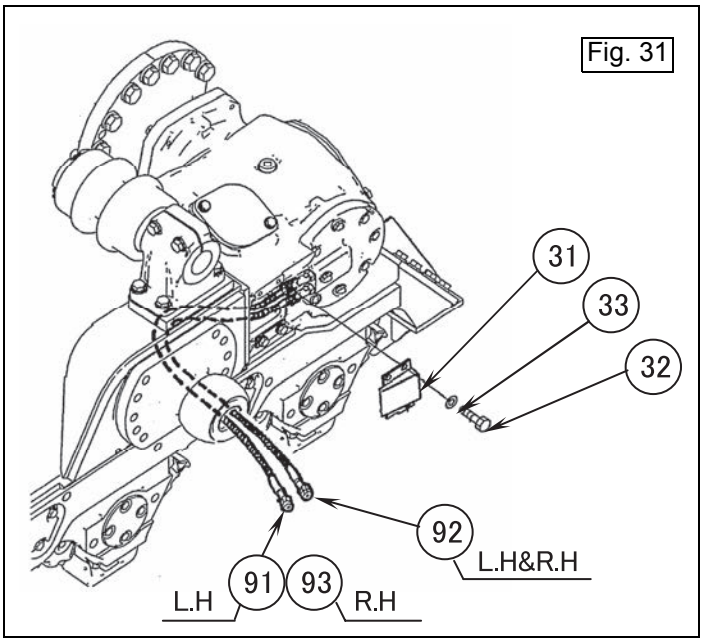
Fig. 30

No.	Part name	Part No.	Q'ty	
			For single tiltdozer	For double tiltdozer
77	Plug	07376-70522	2 pieces on only right	2 pieces each on right and left
78	O-ring	02896-11015	2 pieces on only right	2 pieces each on right and left

Note 1. Be sure to install these plugs in this step.
The rear work equipment (ripper) and front work equipment (blade assembly) may be operated in the installation procedure described later and these plugs stop oil from spouting out of hydraulic hoses A and B at that time.
2. Plugs (77) removed in step 4.1.1) may be reused.

Assembly process No.	Installation of undercarriage (19/27)
A-4	

6.3) Install cover (31) in (Fig. 31) to the track frame to protect the elbows described in step 5.2) and the hydraulic hoses from the elbows to inside described in step 5.1) from dirt and sand.



No.	Part name		Part No.	Q'ty	Remarks
31	Left side	Cover	195-30-69520	1	
	Right side	Cover	195-30-69530	1	
32	Bolt		01010-81635	3	
33	Washer		01643-31645	3	
91	Left side	Hydraulic hose	–	–	See step 5), 5.2)
92		Hydraulic hose	–	–	
92	Right side	Hydraulic hose	–	–	
93		Hydraulic hose	–	–	

Bolt specification	M16 × 35 mm
Tool (Socket)	24 mm
Tightening torque	See Table 1 "Tightening torque"

Assembly process No.	Installation of undercarriage (20/27)
A-4	

7) Assembly of front cover of pivot shaft end cover
Perform this assembly for the left track frame of the single tiltdozer specification.

7.1) Install dirt and sand prevention cover (34) with the bolts to the left track frame hole on the front side of the pivot shaft end cover (the hole for hydraulic hoses for dual tiltdozer specification). (Fig. 32)

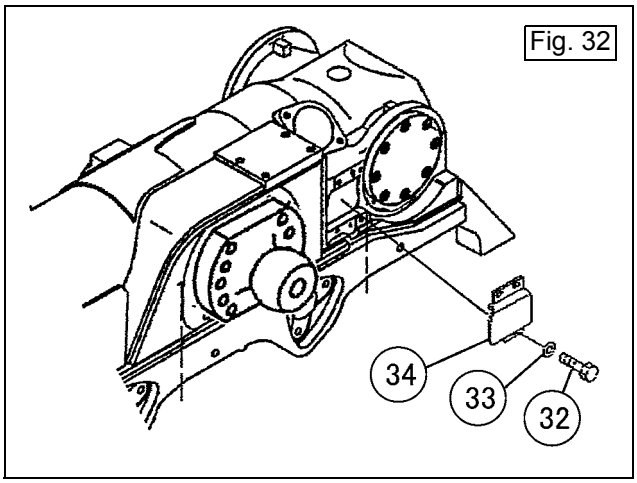


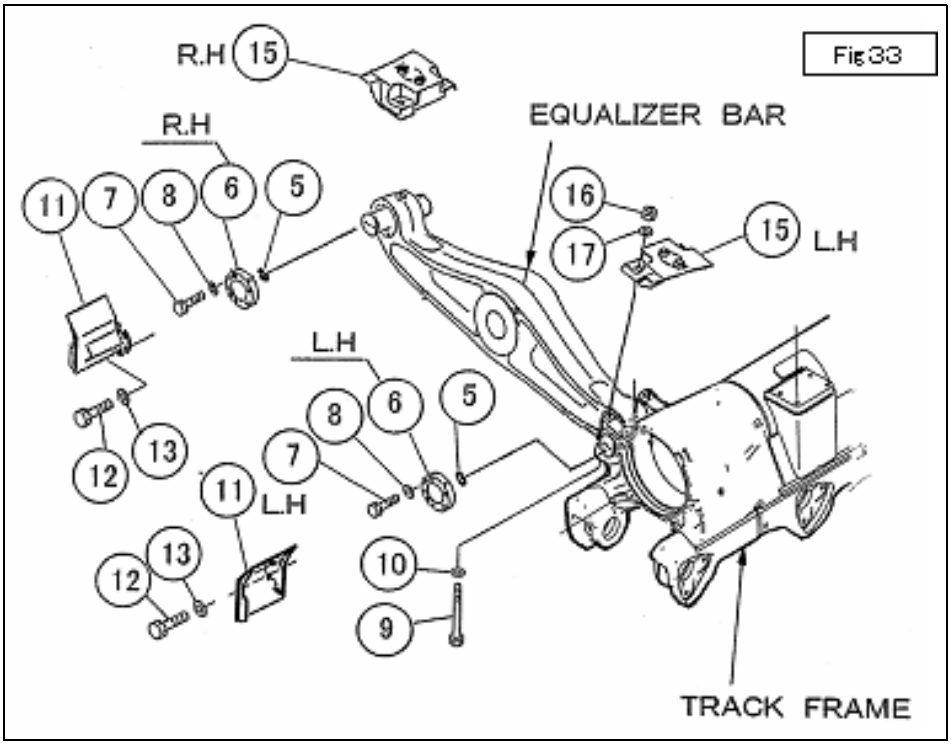
Fig. 32

No.	Part name	Part No.	Q'ty
32	Bolt	01010-81635	3
33	Washer	01643-31645	3
34	Cover	195-30-69511	1

Bolt specification	M16 × 35 mm
Tool (Socket)	24 mm
Tightening torque	See Table 1 "Tightening torque"

Assembly process No.	Installation of undercarriage (21/27)
A-4	

8) Assembly of parts around equalizer bar side pin
Assemble the parts around the equalizer bar side pin and permanently tighten the equalizer bar side pin mounting bolts and nuts which were assembled temporarily in step 1.7).



No.		Part name		Part No.	pcs./machine	Remarks
5		O-ring		07000-42020	2	Assembly already
6	L.H	1	Cover	195-50-52360	1	
		2	Connector	07213-50710	1	
	R.H	1	Cover	195-50-52370	1	
		2	Connector	07213-50710	1	
7		Bolt		01010-81665	8	
8		Washer		01643-31645	8	
9		Bolt		195-50-51510	4	
10		Washer		01643-33080	4	
11	L.H	Cover		195-30-68950	1	
	R.H	Cover		195-30-68960	1	
12		Bolt		01010-61650	6	
13		Washer		01643-31645	6	
15	L.H	1	Cover (Big)	195-50-52310	1	Assembly
		2	Cover (Small)	198-50-61350	1	
		3	Bolt	01010-81225	2	
		4	Washer	01643-31232	2	
	R.H	1	Cover (Big)	195-50-52320	1	Assembly
		2	Cover (Small)	198-50-61350	1	
		3	Bolt	01010-81225	2	
		4	Washer	01643-31232	2	
16		Nut		01803-03034	4	
17		Washer		01643-33080	4	

Assembly process No.	Installation of undercarriage (22/27)
A-4	

8.1) Remove the nuts (16) and washers (17) installed temporarily in step 1.7.3) and install the mud cover (15). (Fig. 33), (Fig. 34)

Note: Take care not drop the bolts.

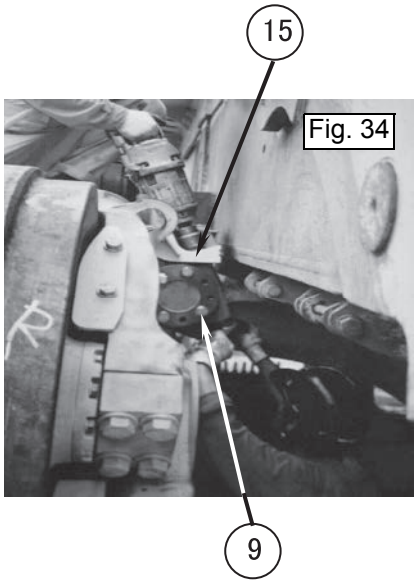


Fig. 34

8.2) Install and tighten nuts (16) and (17) again to secure the mudguards. (Fig. 33), (Fig. 34)

Bolt specification	M30
Tool (Socket)	46 mm
Tightening torque	1,960 – 2,450 Nm
	{200 – 250 kgm}

Note: Do not turn bolt (9) together with related parts

8.3) Tighten the grease cover mounting bolts (7) and washer (8) tightened temporarily in step 1.7.4). (Fig. 33), (Fig. 35)

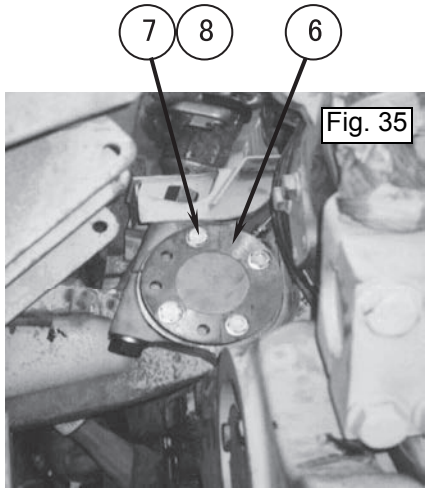


Fig. 35

Bolt specification	M16 × 65 mm
Tool (Socket)	24 mm
Tightening torque	See Table 1 “Tightening torque”

8.4) Install front mudguards (11) to grease feed covers (6) and secure it with bolts (12) and washers (13). (Fig. 33), (Fig. 36)

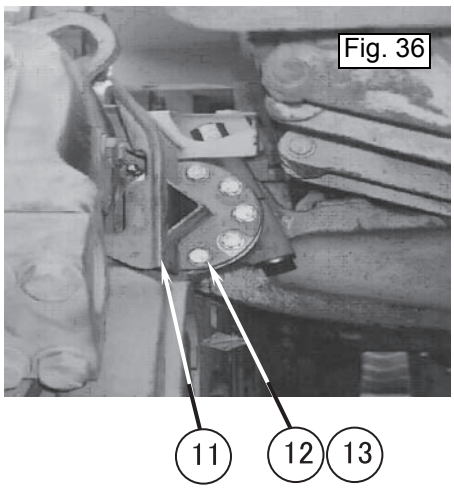


Fig. 36

Bolt specification	M16 × 50 mm
Tool (Socket)	24 mm
Tightening torque	See Table 1 “Tightening torque”

Assembly process No.	Installation of undercarriage (23/27)
A-4	

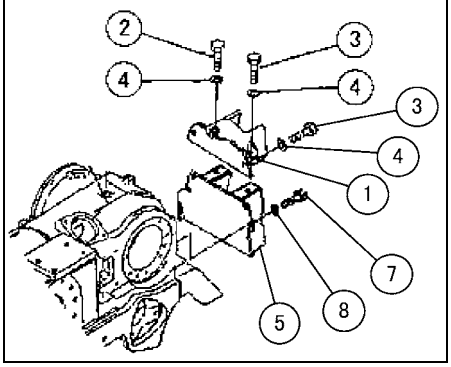
9) Assembly of mudguards at rear of track frame assembly

Install mudguards (1) at the rear of track frame assembly removed in steps 1.1) and 1.2) and secure them with bolts (2), (3) and washers (4). (Fig. 37), (Fig. 38)

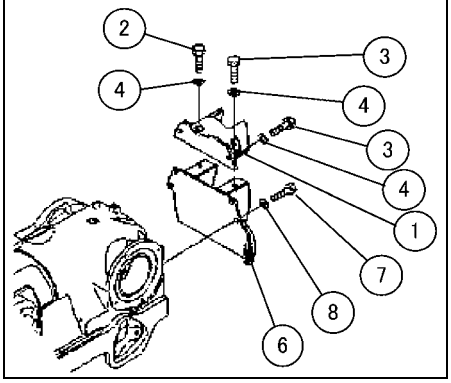
No.	Part name	Part No.	pcs./ machine	Remarks
1	Cover	195-30-69311	2	Common to right and left
2	Bolt	01010-62060	2	
3	Bolt	01010-62050	8	
4	Washer	01643-32060	10	
5	Cover	195-30-69331	1	Left
6	Cover	195-30-69341	1	Right
7	Bolt	01010-62050	8	
8	Washer	01643-32060	8	

Bolt specification	long	M20 × 60 mm
	short	M20 × 50 mm
Tool (Socket)	30 mm	
Tightening torque	See Table 1 “Tightening torque”	

Left Fig. 37



Right Fig. 38



10) Installation whole machine to track shoe assemblies

10.1) After installing the right and left track frame assemblies to the machine, sling the whole machine with 2 cranes having at least 50 ton capacity each. For the slinging procedure, see “Assembly procedure A-1” Installation of machine.

10.2) Remove the support stands and unnecessary stands such as the jacks, wooden blocks, etc. installed in “Assembly procedure A-1” Installation of machine.

10.3) Place the whole machine on the track shoe assemblies spread on the ground.

10.4) Set chocks to prevent the machine from rolling over.

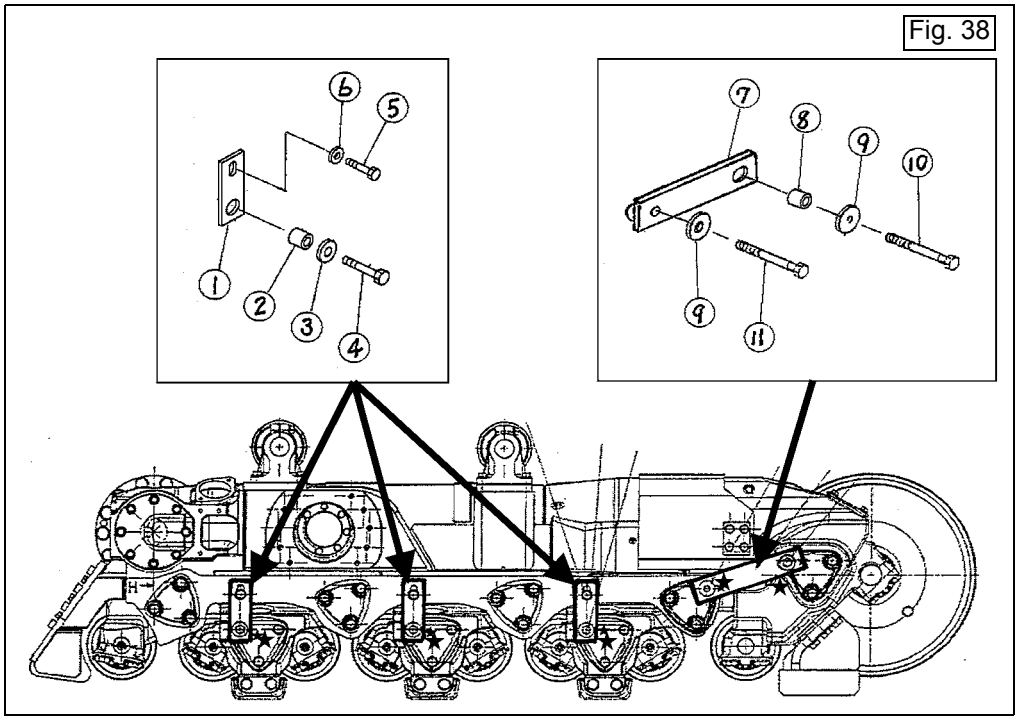
Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	ø42 mm × 6 m	2	50-ton crane	2
	ø42 mm × 4.5 m	2		
	Wire rope sling			
	SB44(T) shackle	2		
	Corner pad	2		
	Other remarks			

Assembly process No.	Installation of undercarriage (24/27)
A-4	

11) Removal of bogie fixing jig

Note: Perform the following work after placing the whole machine on the track shoe assemblies spread on the ground. If it is performed before placing the machine, the track rollers will sag more than necessity and the work following will become difficult.

Fig. 38



No.	Part name	Part No.	Q'ty	Remarks
1	Plate	195-30-68610	3 each on right and left	Parts to be removed
2	Collar	198-30-66190	3 each on right and left	
3	Washer	19M-54-11770	3 each on right and left	
4	Bolt	01011-62410	3 each on right and left	
5	Bolt	01010-62455	3 each on right and left	Parts to removed and installed to different places
6	Washer	01643-32460	3 each on right and left	
7	Plate	195-30-69540	1 each on right and left	Parts to be removed
8	Collar	195-30-69550	1 each on right and left	
9	Washer	19M-54-11770	2 each on right and left	
10	Bolt	01011-62410	1 each on right and left	
11	Bolt	01011-62420	1 each on right and left	

11.1) Remove parts (1) – (11) shown in (Fig. 38). (These parts are installed to 4 places each on the outside of the track frame assembly, thus they are installed to 8 places in total on the right and left track frame assemblies.)

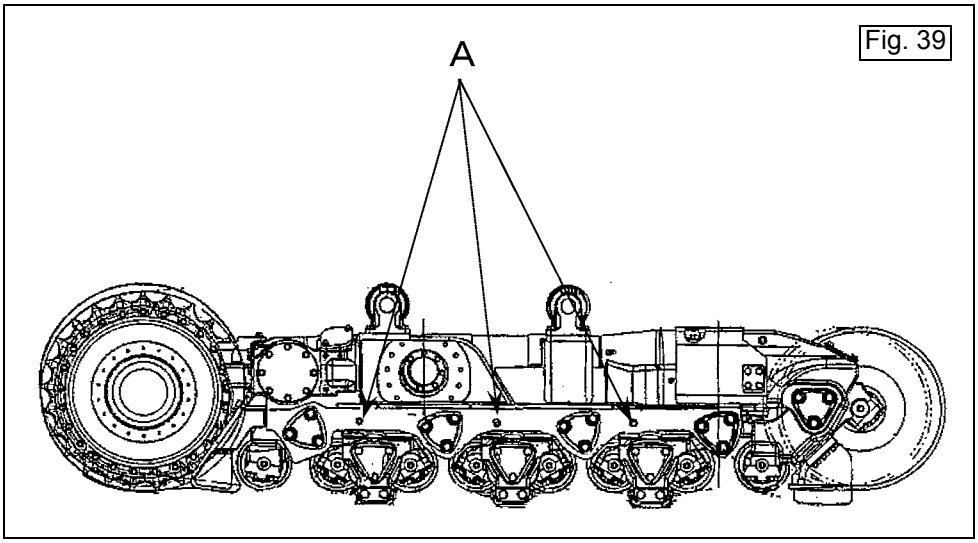
Assembly process No.	Installation of undercarriage (25/27)
A-4	

11.2) Tighten the specified bolts and washers into the bolt holes (marked with ★) which have been used to install the bogie fixing jig.

Bolt specification	01010-62455 (5 pieces each on right and left)	Use bolts (5) and washers (6) for 6 of total of 10 places.
Part No. of washer	01643-32460 (5 pieces each on right and left)	
Bolt specification	M24 × 55 mm	
Tool (Socket)	36 mm	
Tightening torque	See Table 1 "Tightening torque"	

11.3) Drive cork plugs into the tap holes part (A) in (Fig. 39) from which bolts (5) of fixing jig (1) were removed. (3 places on each side, 6 places in total)

Fig. 39

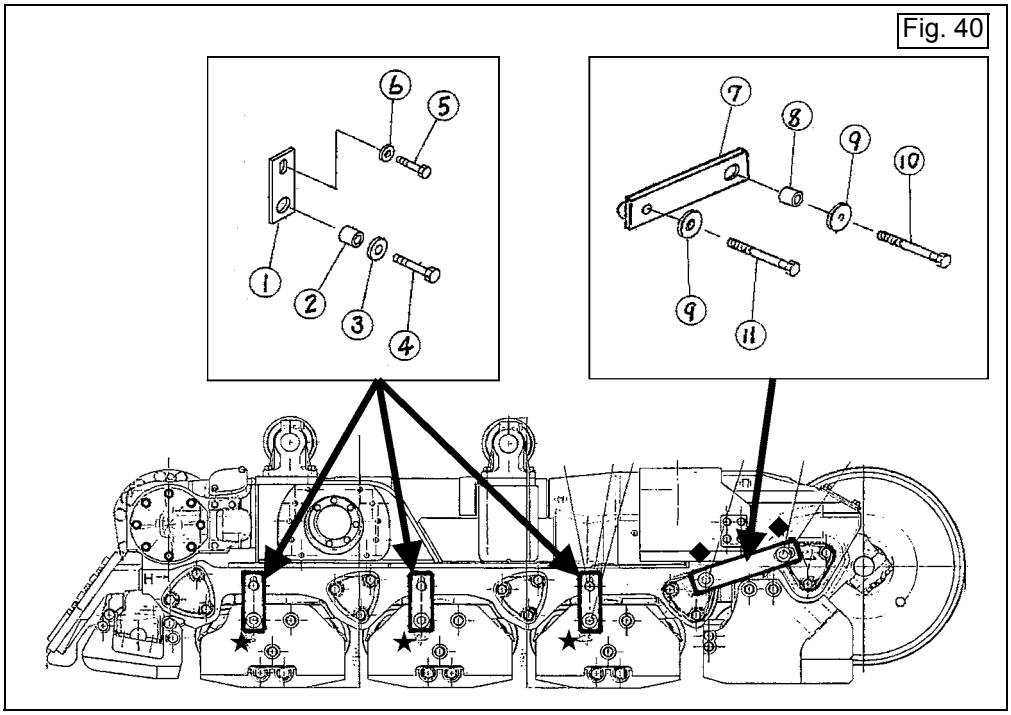


No.	Part name	Part No.	Q'ty	Remarks
Part A	Plug	07019-02430	3 each on right and left	Cork plug

Assembly process No.	Installation of undercarriage (26/27)
A-4	

12) Removal of bogie fixing jig of machine with full roller guard (optional)

Fig. 40



	No.	Part name	Part No.	Q'ty	Remarks
*	1	Plate	195-30-69860	3 each on right and left	Parts to be removed
	2	Collar	198-30-66190	3 each on right and left	
	3	Washer	19M-54-11770	3 each on right and left	
	4	Bolt	01011-62410	3 each on right and left	
*	5	Bolt	01010-62460	3 each on right and left	Parts to removed and installed to different places
	6	Washer	01643-32460	3 each on right and left	
	7	Plate	195-30-69540	1 each on right and left	Parts to be removed
	8	Collar	195-30-69550	1 each on right and left	
	9	Washer	19M-54-11770	2 each on right and left	
	10	Bolt	01011-62410	1 each on right and left	
	11	Bolt	01011-62420	1 each on right and left	

- Parts marked with * are different from those of track frame assembly of standard specification ([Fig. 38]).

12.1) Remove parts (1) – (11) shown in (Fig. 40). (These parts are installed to 4 places each on the outside of the track frame assembly, thus they are installed to 8 places in total on the right and left track frame assemblies.)

Assembly process No.	Installation of undercarriage (27/27)
A-4	

11.2) Tighten the specified bolts and washers into the bolt holes (marked with ★: 6 places in total and marked with ◆: 4 places in total) which have been used to install the bogie fixing jig.

Part No. of bolt	01010-62460 (3 pieces each on right and left)
Part No. of washer	01643-32460 (3 pieces each on right and left)
Part No. of bolt	01010-62455 (2 pieces each on right and left)
Part No. of washer	01643-32460 (2 pieces each on right and left)
Bolt specification	M24 × 60 mm or M24 × 55 mm
Tool (Socket)	36 mm
Tightening torque	See Table 1 "Tightening torque"

Use bolts (5) and washers (6) for 6 of total of 10 places.

12.3) Drive cork plugs into the tap holes part (A) in (Fig. 39) from which bolts (5) of fixing jig (1) were removed. (3 places on each side, 6 places in total)

- When it is standard specification, same as (Fig. 39).

No.	Part name	Part No.	Q'ty	Remarks
Part A	Plug	07019-02430	3 each on right and left	Cork plug

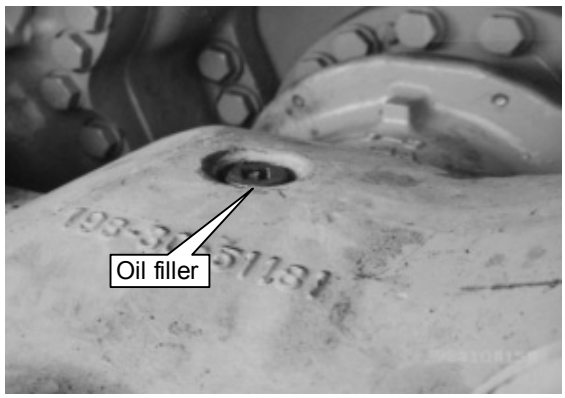
The track roller specification undercarriage is installed now.
(For installation of the track shoe, see "Assembly procedure A-10")

Assembly process No.	Adding oil to recoil chamber and pivot chamber
A-5	

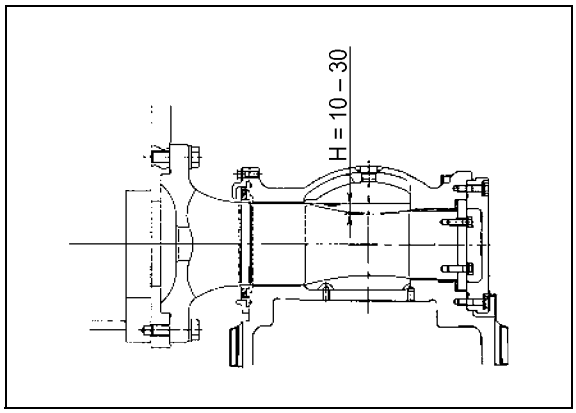
1. Adding oil to track frame pivot chamber

   1) Remove soil and gravel from around the oil filler, and then remove the plug and add oil, taking care that dirt will not enter the case.

Oil	: EO30
Quantity	: 18 ℓ/each side

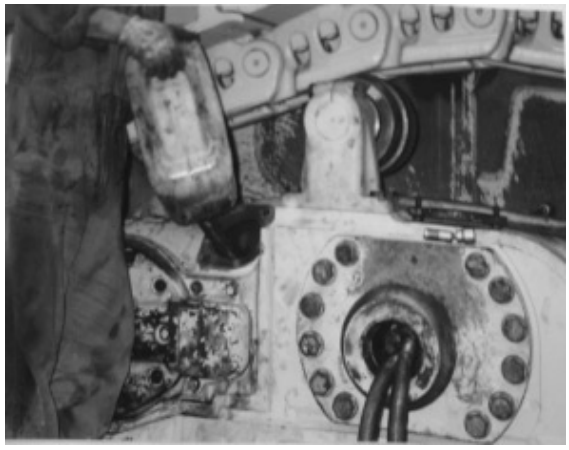


   2) Pivot case oil level H = 10 – 30 mm

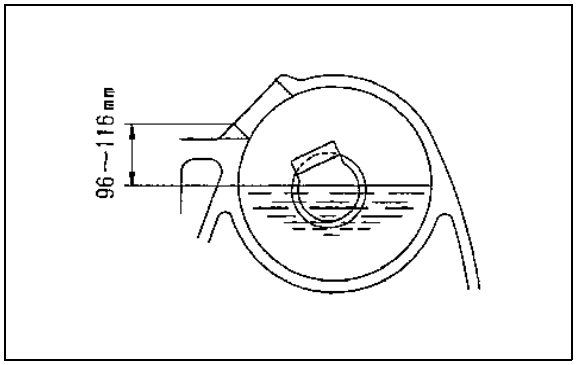


2. Adding oil to track frame recoil chamber

   1) After adjusting the track and positioning the idler, check the oil level and add new oil by the necessary quantity.



   2) Recoil chamber oil level H = 96 – 116 mm



Assembly process No.	Installation of engine air inlet hood
A-6.1	

1) Remove the dust/water seal stuck to the air inlet hood mounting opening of the engine hood shown in the figure. (Fig. 1)

2) Insert air inlet hood (1) in the air inlet mounting opening all the way. It may be installed in any direction.

3) Tighten the band bolt of air inlet hood (1) to fix.

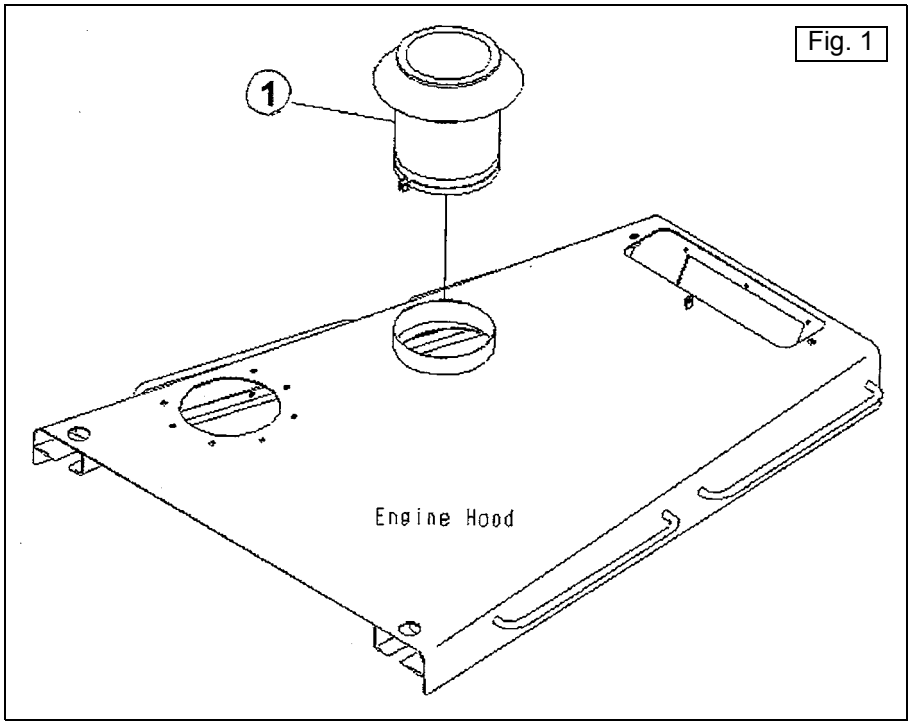


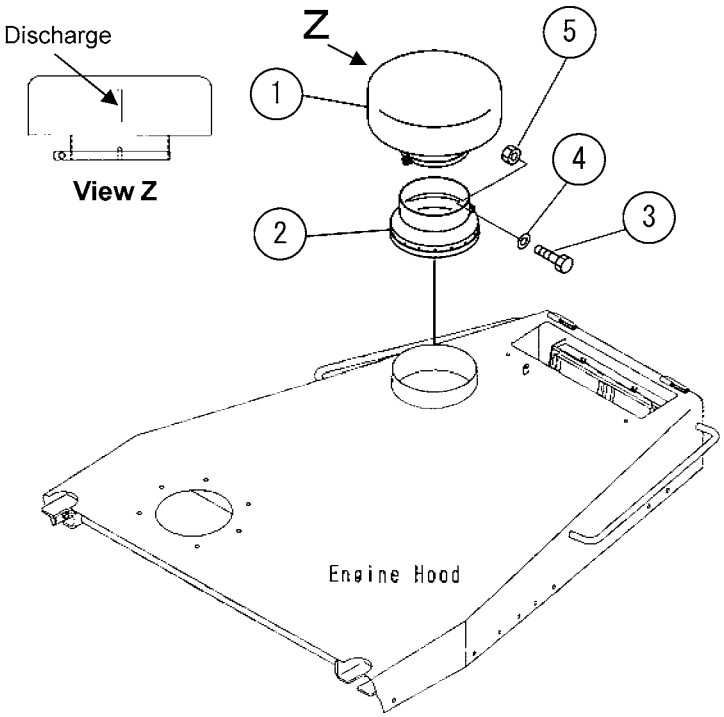
Fig. 1

No.	Part No.	Name	Q'ty
1	6128-11-5180	Hood	1

Assembly process No.	Installation of engine air pre-cleaner (if equipped)
A-6.2	

1) Remove the dust/water seal stuck to the air inlet hood mounting opening of the engine hood shown in the figure. (Fig. 2)
2) Insert duct (2) in the air discharge mounting opening all the way. It may be installed in any direction.
3) Tighten the duct band with bolt (3), washer (4) and nut (5).
4) Insert pre-cleaner (1) in duct (2) all the way. It may be installed in any direction.
5) Tighten the band bolt of pre-cleaner (1) to fix.

Fig. 2

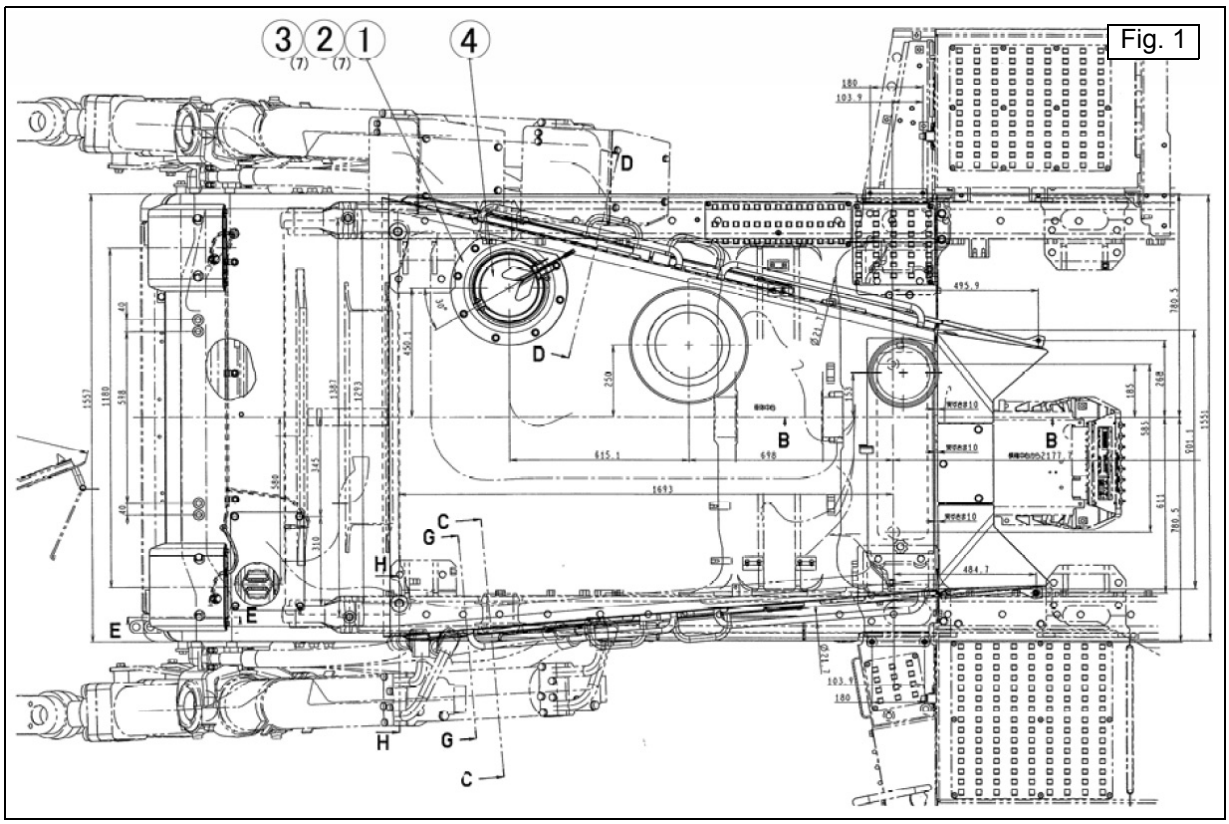


No.	Part No.	Name	Q'ty
1	195-01-35210	Precleaner	1
2	195-54-68880	Duct	1
3	01016-51045	Bolt	1
4	01643-31232	Washer	1
5	01580-11008	Nut	1

Assembly process No.	Installing direction of exhaust pipe
A-7	

1) Remove the temporarily exhaust pipe installed to the machine and then remove rain cap (4).
2) Install rain cap (4) to the exhaust pipe (1) at the angle shown in (Fig. 1) and install exhaust pipe assembly to the hood with bolts (2) and washers (3).

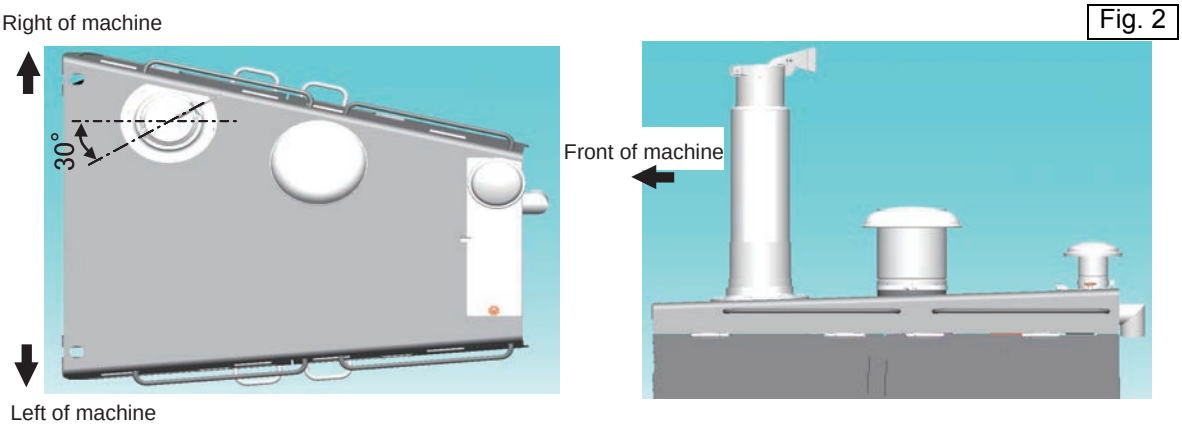
Fig. 1



4	6162-14-5640	1
3	01643-31232	7
2	195-54-43210	7
1	195-01-41112	1
No.	Part No.	Q'ty

Install the rain cap in the direction shown in (Fig. 2).

Fig. 2



Note) Direct the rain cap toward the inside of the machine so that the exhaust gas will not blow over the right blade lift cylinder.

Assembly process No.	Installation of blade lift cylinder (1/2)
A-8	

1. Remove the cap and bushing of the yoke.
   ★ When removing the cap, make a match mark on it for reinstallation. (The cap is a part of the yoke.)

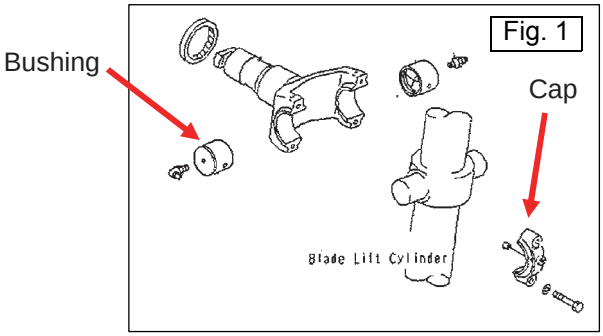


Fig. 1

2. Installation of cylinder
   Secure the cylinder with ropes for safety as shown in the photo.


Fig. 2

Part No. of bolt	01010-82000 (4 pieces on each side)
Part No. of washer	01643-32060 (4 pieces on each side)
Length of bolt	100 mm
Necessary socket	30 mm
Tightening torque	56 ± 6 kgm

   Fix the cylinder at the angle shown in the Fig. 3.
   • Cap mounting bolts
   Note: Do not install the yoke to the position shown in Fig. 4.
   (If it is installed to this position, it is pushed out by the grease pressure.)


Fig. 3

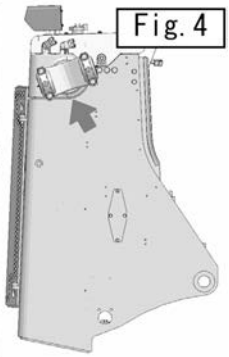


Fig. 4

3. Cylinder sling bracket
   Remove cylinder sling bracket than install the cylinder so that sling posture piston.

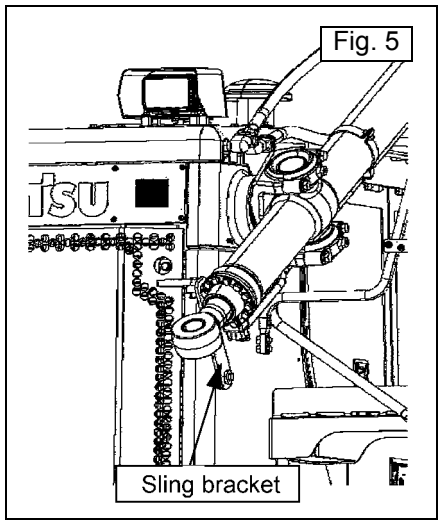


Fig. 5

Assembly process No.	Installation of blade lift cylinder (2/2)
A-8	

4. Installation of hoses
   Install the hoses as shown in the Fig. 6
   so that they will not interfere with each other.

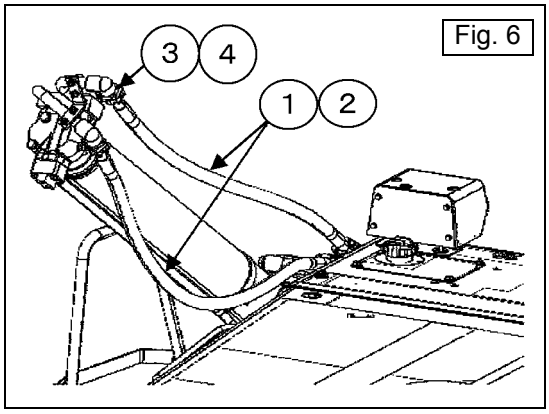


Fig. 6

No.	Part name	Part No.	Remarks
1	Hose	07099-01016 (2 pieces on each side)	
2	Split flange	07371-31049 (8 pieces on each side)	Reuse the installation parts.
3	Bolt	07375-21035 (16 pieces on each side)	Reuse the installation parts.
4	O-ring	07000-13032 (4 pieces on each side)	

5. Installation of right cylinder hose joint cover

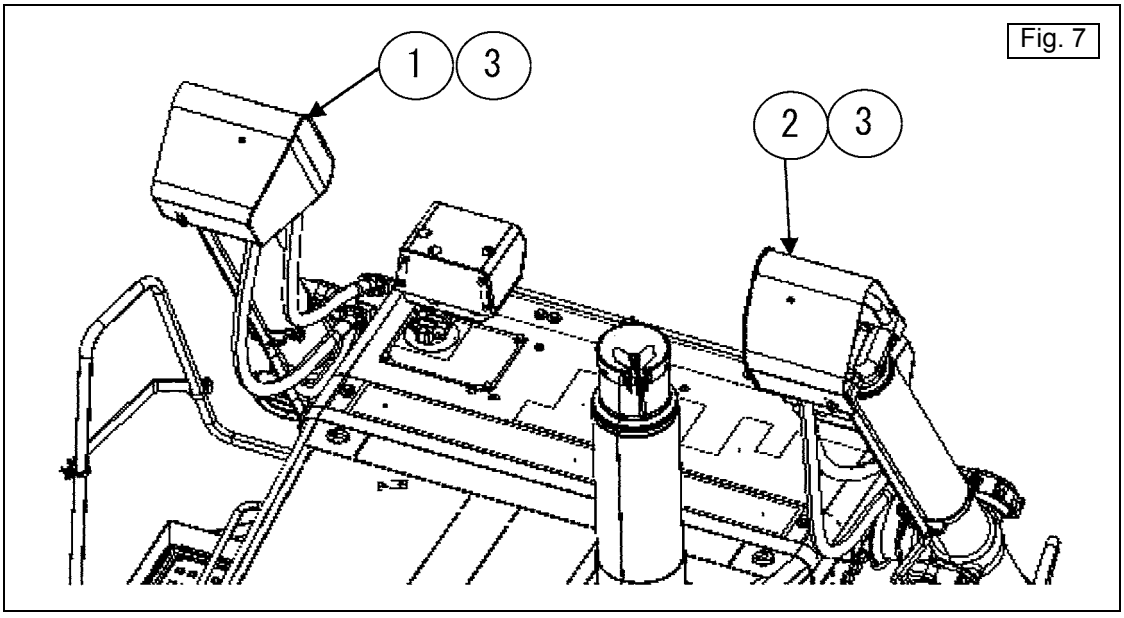


Fig. 7

No.	Part name	Part No.	Q'ty
1	Cover (left)	195-61-61871	1
2	Cover (right)	195-61-61891	1
3	Sems bolt	01024-81225	4

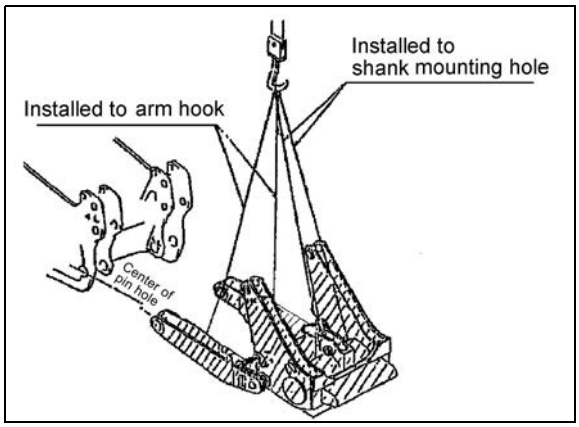
Assembly process No.	Installation of ripper (1/7)
A-9	

1. Installation of beam and arm assembly

★ The following is the installation procedure for the giant ripper. The installation procedure for the multi-shank ripper is basically the same as the following.

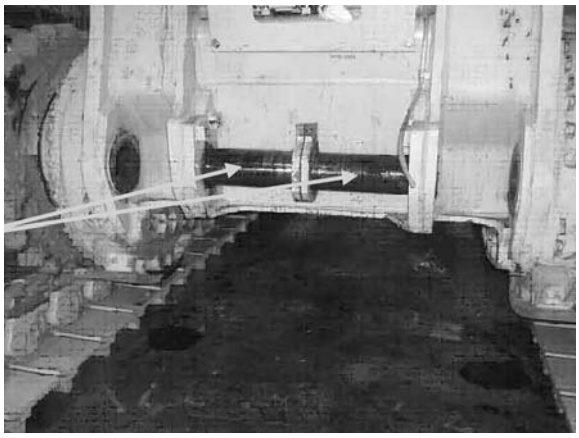
★ Remove all the rust-preventive oil from the ripper mounting pin and then coat the pin with new grease.

★ Before starting the following work, remove the lift cylinders and tilt cylinder which have been installed for transportation.
Lift cylinder ass'y (1 piece) : 270 kg
Tilt cylinder ass'y (1 piece) : 260 kg



1) Sling the front part with 2 chain blocks (2 t) so that slant to the right or left can be adjusted.

Weight of beam and arm : Approx. 4.2 t
(Multi-shank ripper specification)



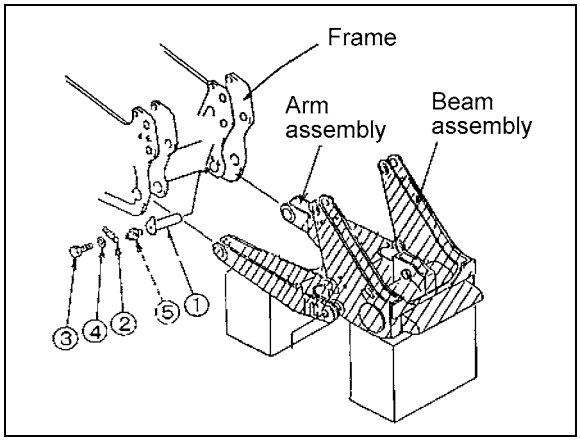
2) Since the pins at the mount are heavy, do not remove them from the mount but leave both of them inside when installing the arm.

★ Insert a bar between the pins and insert the pins halfway

Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	2-t chain block	2		
	ø20 mm × 2 m Wire rope sling	2		
	ø20 mm × 3 m Wire rope sling	1		
	Nylon sling for 2t	2		
	Other remarks			

Assembly process No.	Installation of ripper (2/7)
A-9	

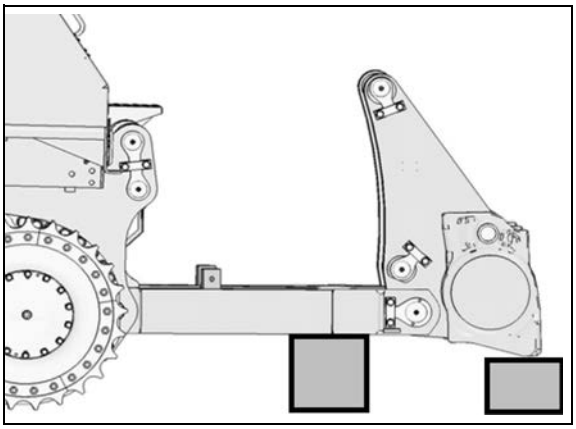
3) Insert either arm pin halfway and then set the pin hole on the opposite side. After both pins are inserted halfway, push them in to the end.



No.	Part name	Part No.	Q'ty
1	Pin	195-78-71190	2
2	Plate	195-78-21171	2
3	Bolt	01010-62040	4
4	Washer	01643-32060	4
5	Fitting	07020-00000	2

★ Installed to the machine body.

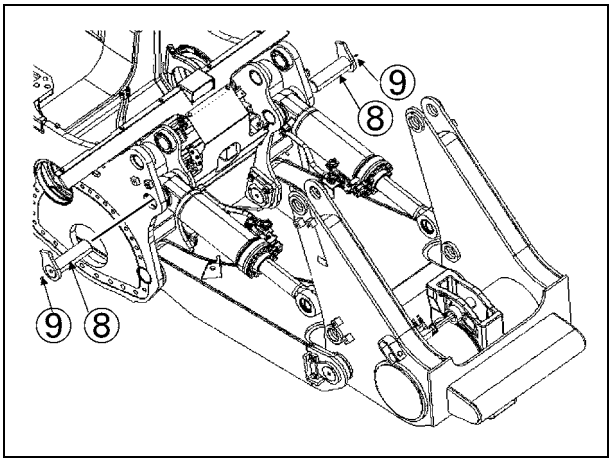
4) After inserting the pins, place wooden blocks under the center of the arm and under the beam shank holder.
Place the arm horizontally. Slant the beam a little toward the rear, considering the length of the cylinder.



Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	Wooden block □ 300 mm × 800 mm	1		
	Wooden block □ 300 mm × 600 mm	1		
	Other remarks			

Assembly process No.	Installation of ripper (3/7)
A-9	

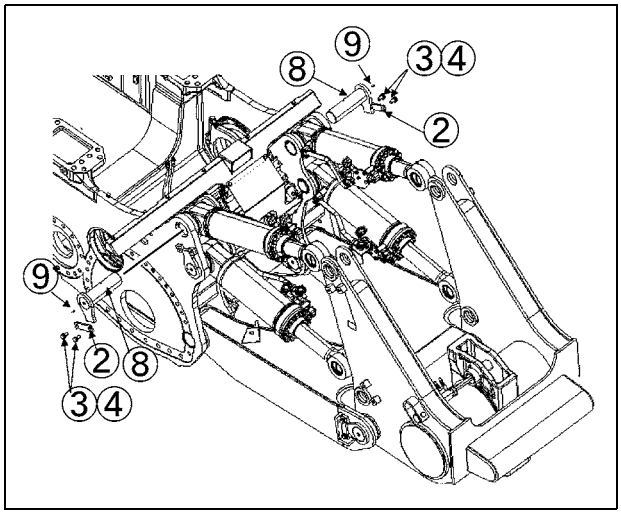
2. Installation of lift and tilt cylinders
   1) Installation of lift cylinder (machine side)
      Sling the removed lift cylinder with crane and insert the pin (8) into the frame.
      (2 places on the right and left sides)
      Do not install lock plates at this stage.
      ★ Take care not to mistake the right and left cylinders for each other. (The directions of their pipings are different.)



No.	Part name	Part No.	Q'ty
8	Pin	195-78-73170	2
9	Fitting	07020-00000	2

      ★ Beam side pin is to be installed after starting the engine and operating the cylinder, following all piping works (refer to item 4).

   2) IInstallation of tilt cylinder (machine side)
      Sling the tilt cylinder with the crane and install it to the frame with pin (8), lock plate (2), bolt (3) and washer (4) (on the right and left sides).
      ★ Take care not to mistake the right and left cylinders for each other. (The directions of their pipings are different.)
      ★ Beam side pin is to be installed after starting the engine and operating the cylinder, following all piping works (refer to item 4).



No.	Part name	Part No.	Q'ty
2	Plate	195-78-21171	2
3	Bolt	01010-62040	4
4	Washer	01643-32060	4
8	Pin	195-78-73170	2
9	Fitting	07070-00000	2

Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	Nylon sling for 2 t	2		
	Sledge hammer (5 lb)	1		
	Other remarks			

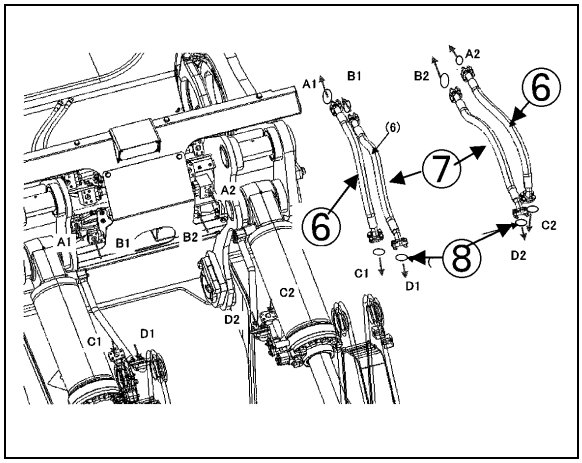
Assembly process No.	Installation of ripper (4/7)
A-9	

3. Installation of hydraulic piping

1) Install hose (6) and O-ring (7) of the lift cylinder.

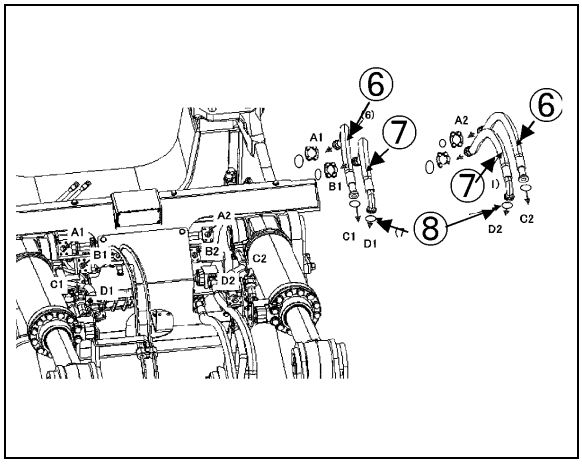
★ When mounting cylinder, Do assembling procedure “M-4 No-injection cranking of engine” before engine start.

No.	Part name	Part No.	Q'ty
6	Hose	07097-01009	2
7	Hose	07098-010A8	2
8	O-ring	07000-13032	8

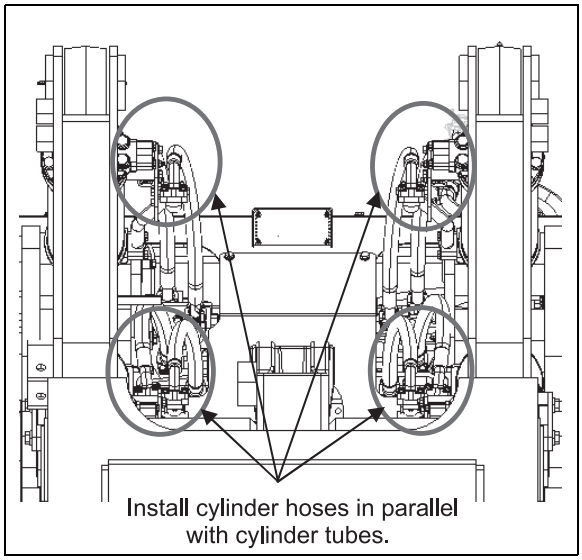


2) Install hose (6) and O-ring (7) of the tilt cylinder.

No.	Part name	Part No.	Q'ty
6	Hose	07099-010A9	2
7	Hose	07098-010A9	2
8	O-ring	07000-13032	8



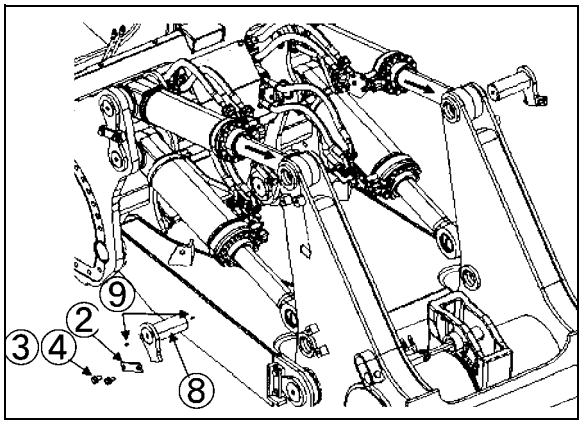
Installed angle of inside hoses of tilt cylinder



Assembly process No.	Installation of ripper (5/7)
A-9	

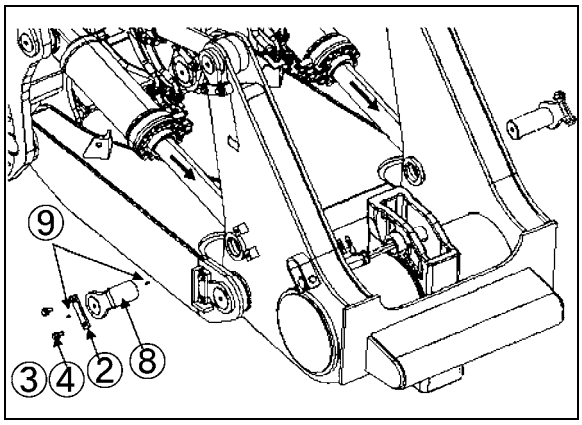
4. Bleeding air
   Bleed air from the hydraulic circuit according to the following procedure.
   1) Run the engine at low idle
   2) Extend and retract the cylinders to above 100 mm before each stroke end 4 – 5 times. (Do not relieve the pressure at each stroke end.)
   3) Extend and retract the cylinders to each stroke end 3 – 4 times.
   4) While the shank point is on the ground, check that the hydraulic oil level is normal. If the hydraulic oil level is lower than the specified level, add hydraulic oil according to the Operation and Maintenance Manual.
      ★ Lower the blade to the ground, too, at this time.
   5) When bleeding air, check that each cylinder hose moves freely and oil does not leak through any joint
      ★ If the hydraulic oil level is low, the work equipment pump may be damaged. Accordingly, bleed air carefully and check the hydraulic oil level, and then add hydraulic oil if necessary.

5. Connection of tilt cylinder (on beam side)
   1) Start the engine and operate the tilt cylinder as shown in the figure to adjust the cylinder length.
   2) Set the pin holes and connect the tilt cylinder to the beam by pin (8), lock plate (2), bolt (3) and washer (4). (2 places on the right and left sides)
      ★ Sling the right or left cylinder first and position it properly, and then sling and position the one on the opposite side.



No.	Part name	Part No.	Q'ty
2	Plate	195-78-21171	2
3	Bolt	01010-62040	4
4	Washer	01643-32060	4
8	Pin	195-78-73180	2
9	Fitting	07070-00000	4

6. Connection of lift cylinder (on beam side)
   1) Start the engine and operate the lift cylinder as shown in the figure to adjust the cylinder length.
   2) Set the pin holes and connect the lift cylinder to the beam by pin (8), lock plate (2), bolt (3) and washer (4). (2 places on the right and left sides)

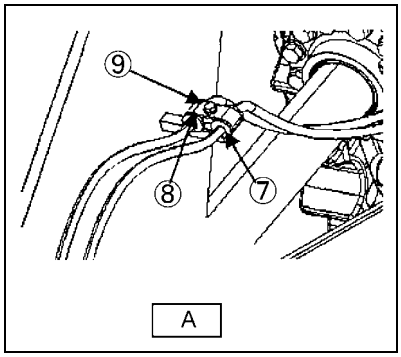


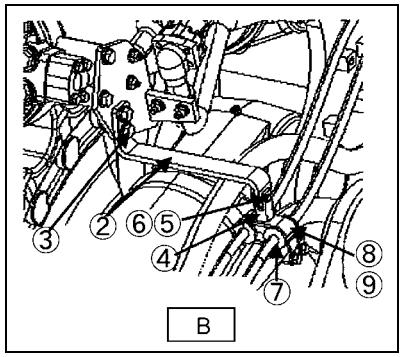
No.	Part name	Part No.	Q'ty
2	Plate	195-78-21171	2
3	Bolt	01010-62040	4
4	Washer	01643-32060	4
8	Pin	195-78-73180	2
9	Fitting	07070-00000	4

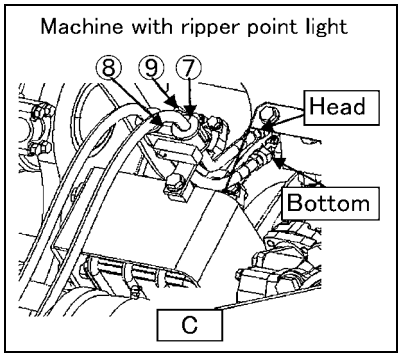
   ★ Sling the cylinder and position it properly.

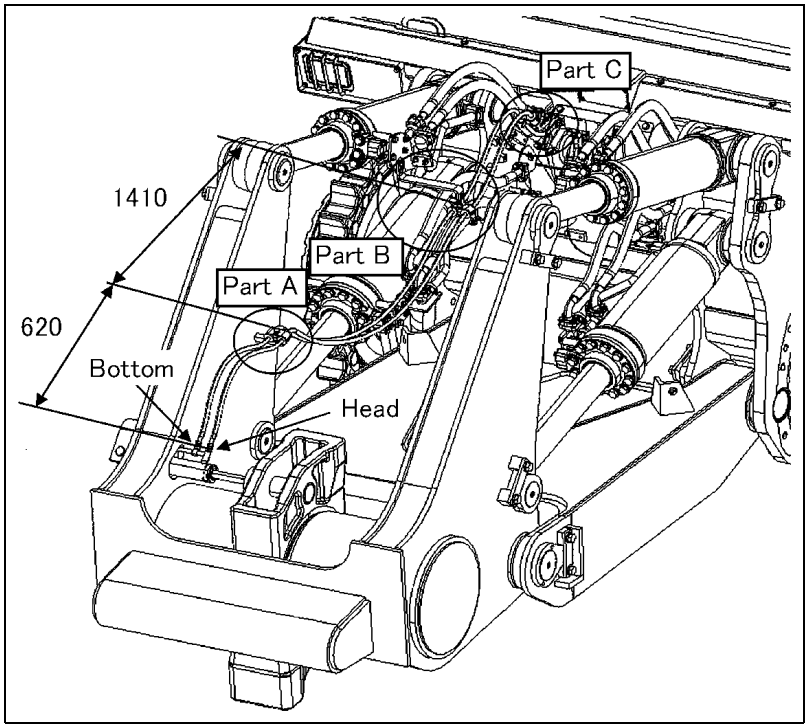
Assembly process No.	Installation of ripper (6/7)
A-9	

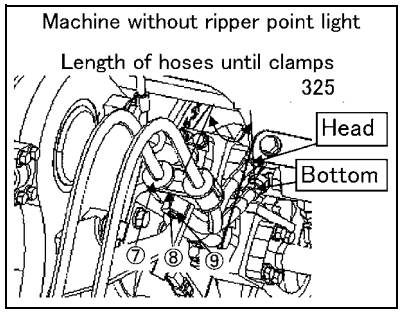
7. Piping of pin puller cylinder
   1) Connect the pin puller cylinder hoses as shown in figures.
   ★ For the hose clamps, see the detailed figures.
   ★ Run the engine, operate the ripper (lifting, tilting and retraction of pin puller) and check that each hose moves freely.
   • Hose: 49 ± 19.6 Nm {5 ± 2 kgm}











No.	Part name	Part No.	Q'ty	Remarks
1	Hose	02760-00326	2	
2	Plate	195-78-72571	1	
3	Sems bolt	01024-81240	2	
4	Yoke	144-947-2850	1	
5	Pin	04205-11028	1	
6	Pin	04050-13015	1	
7	Cushion	07095-00314	6	Machine without ripper point light uses only four.
8	Clamp	07094-30315	6	Machine without ripper point light uses only four.
9	Sems bolt	01024-81065	3	Machine without ripper point light uses only four.

Assembly process No.	Installation of ripper (7/7)
A-9	

8. Confirm whether the ripper cylinder hose and pin puller hose do not interfere other parts by operating the ripper to raise/lower, to tilt-in/tilt-back.
   If there is any interference, adjust the hose position by loosening the mouthpiece flange of hose. (cylinder hose)
   Adjust the clamp position so that pin puller hose does not interfere others or stretch too tight.

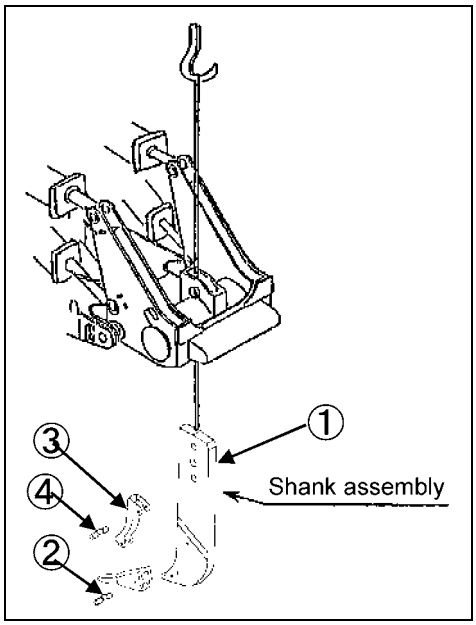
9. Installation of shank assembly (for giant ripper)

   ★ Perform this work after installing the tracks since the machine is required to ride over something in reverse.

   1) Install a wire to the hook at the top of the shank assembly, put it up through the holder, sling it with crane, and adjust the ripper to match the shank hole with the holder hole as shown in the right figure.

   2) Insert the pin in the shank by operating the pin puller cylinder.

   ★ Do not move the holder and shank simultaneously.

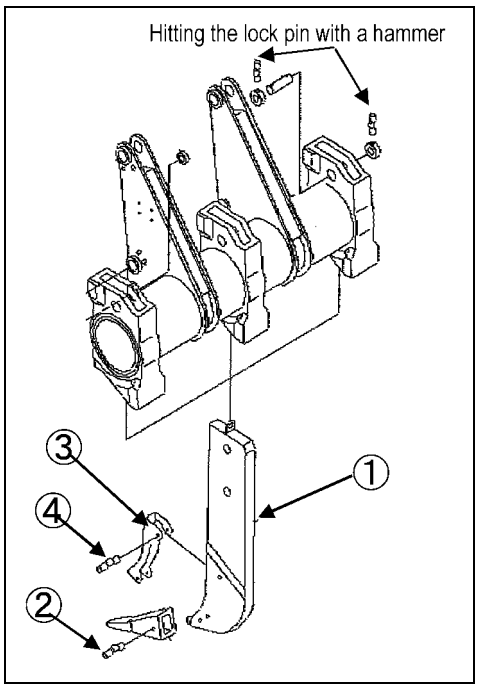


No.	Part name	Part No.	Q'ty
1	Shank	195-79-51150	1
2	Pin	195-78-71360	1
3	Protector	195-78-71111	1
4	Pin	195-78-71360	2

10. Installation of shank assembly (for multi-shank ripper)

   1) Install a wire to the hook at the top of the shank assembly, pass it up through the holder, pull it up with the crane and set the shank hole to the holder hole.

   2) Insert the shank fixing pin and lock it by hitting the lock pin with a hammer.



No.	Part name	Part No.	Q'ty
1	Shank	195-78-71310	3
2	Pin	195-78-71360	3
3	Protector	195-78-71111	3
4	Pin	195-78-71360	6

Assembly process No.	Installation of track (1/2)
A-10	

Note) This work is required for disassembly to 32-t parts for transportation.

1. Installation of track link

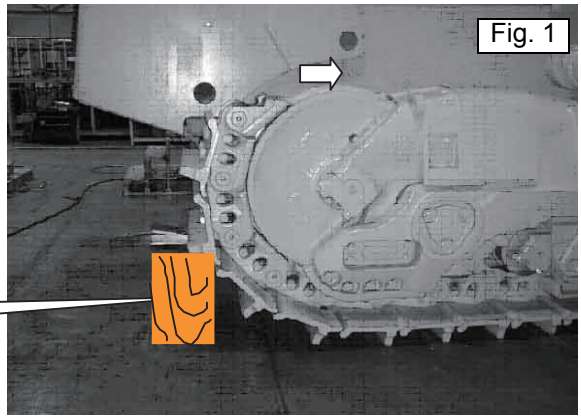
1-1) Wind the front end of each track up to the top of the idler. (Fig. 1)

1-2) While rotating the sprockets forward, discharge the grease from the cylinder and retract the cylinder to the stroke end.

★ Keep the grease plug open.

★ Clean the master link joint.

□ 300 mm × high 600 mm



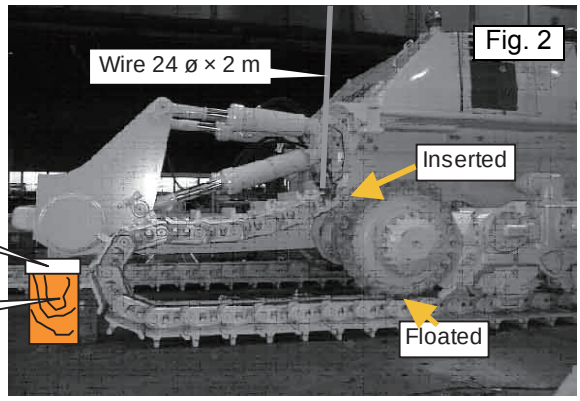
1-3) Push up the machine with the ripper and disengage the link from the sprocket so that the machine body will not run on the track. (Fig. 2)

★ Put a steel plate on the block to protect the block.

Steel plate 25 mm thick

□ 300 mm × high 600 mm

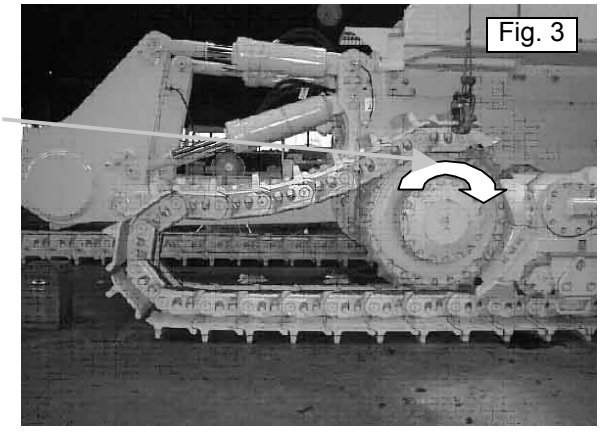
★ Carry out this work on a level place.



1-4) Sling the forward end of the track with a crane and wind the track link up to the top of the sprocket as shown in the photo. (Fig. 3)

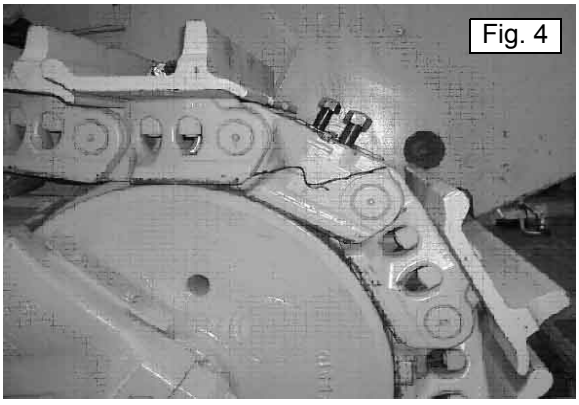
1-5) Wind the track onto the sprocket. While slinging the forward end of the track with the crane, rotate the sprocket to move only the upper part of the track forward.

★ The signal person must stand at a position where the bulldozer operator and crane operator can see him/her easily and must give signals. Before starting the work, confirm the signals.



1-6) Connect the master link just above the idler.

1-7) Fit the mating faces of the master link and check that you can screw in the bolts lightly. (Fig. 4)



Assembly process No.	Installation of track (2/2)
A-10	

2. Tightening of master bolts

2-1) Installation of shoe to master link
Tighten the master bolts with an impact wrench of 20 kgm to fit the link mating faces. (Fig. 5)

★ Apply anti-seizure agent LM-P to the threads of the bolts, threads of the link and hexagon seats.

★ If the bolts are tightened forcibly, their threads and master link's threads are damaged. Take care.

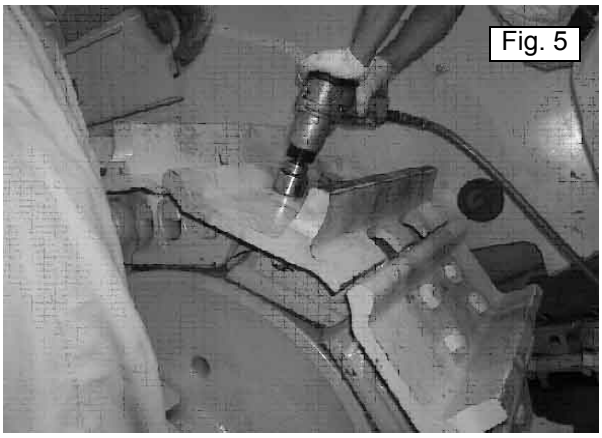


Fig. 5

2-2) Method of tightening master bolts

1st tightening
1) Tighten the bolts to initial torque of 686 ± 69 Nm (70 ± 7 kgm) with the torque wrench.
2) Make a match mark at the hexagonal part of the bolt (Initial position and 180-degree position when turn the bolt). (Fig. 6)

2nd tightening
3) Retighten with the hydraulic wrench (See "Field assembly tool list" in this manual). Fig. 6 (Tighten by 180 ± 10 °.)

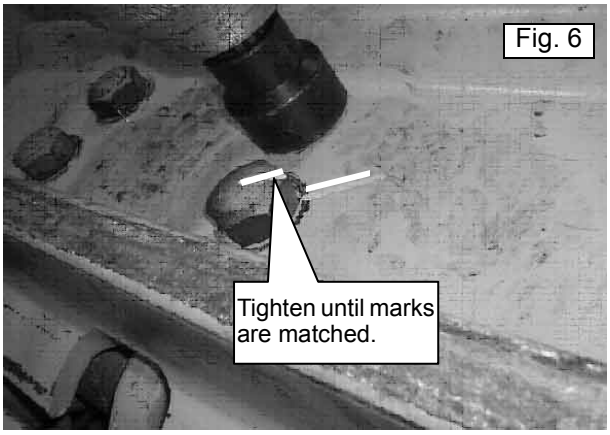


Fig. 6

★ Anti-seize compound

LM-P (MARUZEN MOLYMAX No. 2 or equivalent)

2-3) Tighten the bolts evenly in the order shown in the figure at right. (Fig. 7)

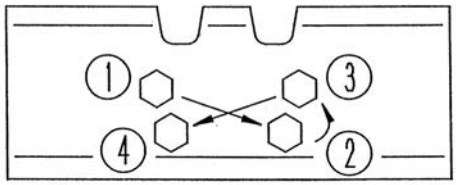


Fig. 7

★ Adjust the track tension when supplying grease at last.

★ Similarly install the track shoe on the opposite side.

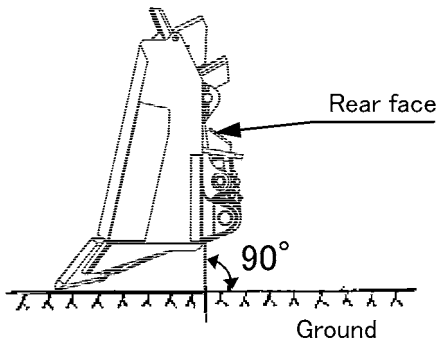
Assembly process No.	Assembly of blade (1/16)
A-11	

1. Installation of blade

Stand the delivered blade vertically on the assembly ground according to the following procedure.

★ Stand the blade means to set the back of the blade at 90 degrees to the ground as shown in (Fig. 1).

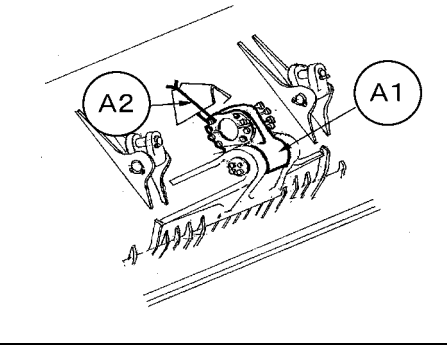
Fig. 1



[1] Fix center link (A1) which is at the center of the blade back with a wire (A2) as shown in (Fig. 2) by utilizing the bolt installed to the center link temporarily and the inverted V-shaped cover so that the center link will be also stood vertically when the blade is stood vertically on the ground.

Specifications of wire (A2)
Wire #10 (ø3.2 mm × approx. 2 m long)
(JIS G3532 annealed steel wire or equivalent)

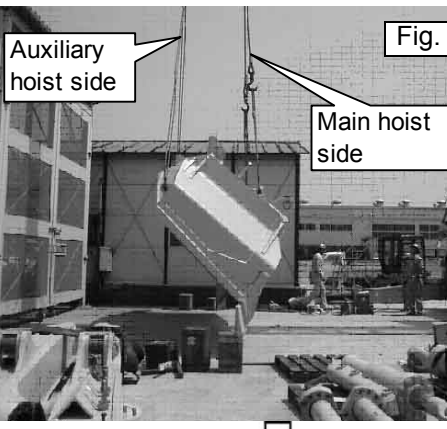
Fig. 2



[2] Sling the blade with the crane. While operating the main and auxiliary hoists, stand the blade gradually as shown in (Fig. 3) and (Fig. 4) until it stands vertically on the object position (ground).

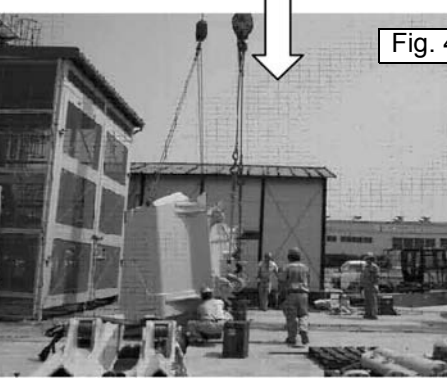
★ Install the rope slings of the main hoist to the blade lift hydraulic cylinder mounting pin.
★ Install the rope slings of the auxiliary hoist to the lifting holes at both ends of the blade top through shackles.

Fig. 3



Weight of semi U-blade	Standard	Reinforced
	6.4 t	6.8 t
Weight of full U-blade	6.5 t	
Rope sling	ø 24 mm × 5 m (4 pieces)	
Shackle	BC36, grade M (2 pieces)	
Truck crane	25 t (1 unit)	

Fig. 4



★ Use rope slings of JIS B8817 or equivalent having the lifting capacity of at least 4.8 ton.
★ Use shackles of JI B2801 or equivalent having the lifting capacity of at least 6 ton.

Assembly process No.	Assembly of blade (2/16)
A-11	

2. Measures to prevent blade from falling
(Set the blade so that it will stand vertically and stably even after the slings are loosened.)

[1] Set wooden blocks under the center link brackets. (Fig. 5)

★ Wooden block:
□300 mm × length 400 mm – 2 pieces

[2] Set wooden blocks under the straight frame brackets on both sides. (Fig. 6)

★ Wooden block:
□300 mm × length 400 mm – 2 pieces

[3] If it is difficult to stand the blade vertically with only the wooden blocks in steps [1] and [2], add plates to adjust finely.

[4] After confirming that the blade stands stably, loosen and remove the slings.

3. Connection of straight frames to right and left of blades

[1] Check that the joints at the ends of the straight frames are installed in the correct directions. (Fig. 7)

★ If the joint is installed in a wrong direction, rotate and install it again to the correct direction.

[2] Remove the connecting pins installed to the straight frame brackets on the blade. (Fig. 8)

No.	Part name	Part No.	Q'ty
1	Bolt	01011-62720	8
2	Washer	01643-32780	8
3	Shim (2 mm)	195-71-61450	2
4	Shim (1 mm)	195-71-61460	4
5	Shim (0.5 mm)	195-71-61470	4

Bolt specification	M20, Length : 45 mm
Tool (Socket)	30 mm

★ Do not remove plug (82) from pin (81).
★ The quantity is the number of parts necessary to 1 machine (1 blade).

Fig. 5

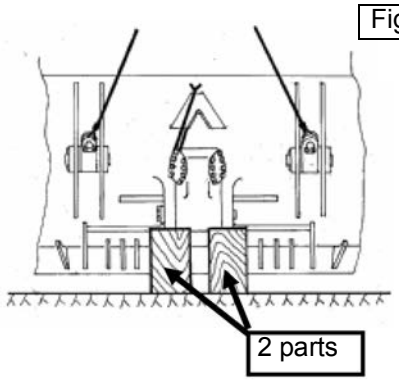


Fig. 6

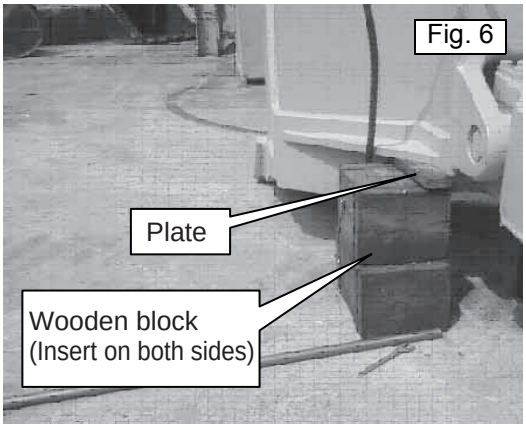


Fig. 7

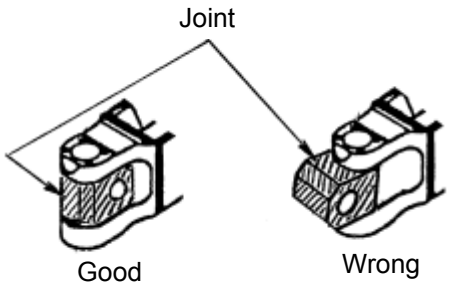
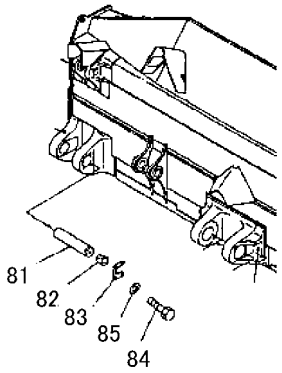


Fig. 8



Assembly process No.	Assembly of blade (3/16)
A-11	

[3] Sling the straight frame horizontally with belt slings. (Fig. 9)

- Lifting load: Approx. 1,400 kg/piece on each side
- Belt sling: 50 mm wide, 4 m long (2 pieces)

★ If the straight frame slants to the right or left, the joint described in [1] will not be inserted in the bracket yoke easily. Accordingly, keep the straight frames horizontally.

[4] While slinging the straight frame, insert the joint at its end in the bracket yoke on the blade and align the connecting pin holes. (Fig. 9)

[5] Insert pin (81) removed in step [2] and fix it to the bracket on the blade with lock (83), bolt (84) and washer (85). (Fig. 9)

[6] Set a wooden block under the rear end of the straight frame (on the opposite side to the joint) and adjust the height of the trunnion mounting portion (center) of the machine above the ground to 940 – 960 mm. (Fig. 10)

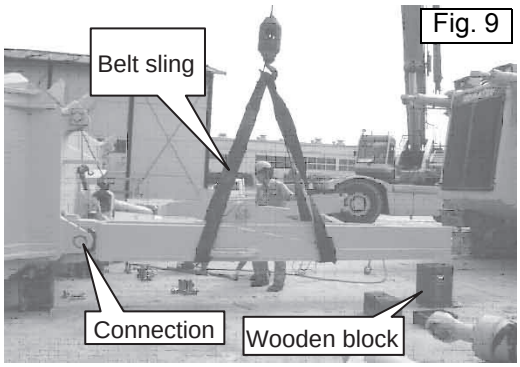
★ Wooden block:
□300 mm × length 700 mm – 1 piece

[7] Perform steps [1] – [6] on both right and left sides.

[8] Sling the straight frames again and set the right and left straight frames symmetrically about the blade and adjust the distance between both straight frames (dimension W) to approx. 3,700 mm. (Fig. 11)

★ Clean each connecting part.

Fig. 9



Reference: A belt sling means a belt made of synthetic fibers used to sling heavy things. It is used to prevent damage on the products and protect the paint during sling work.

Fig. 10

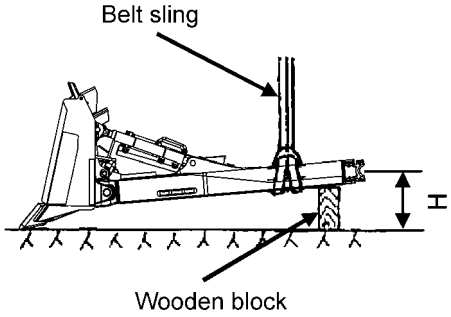
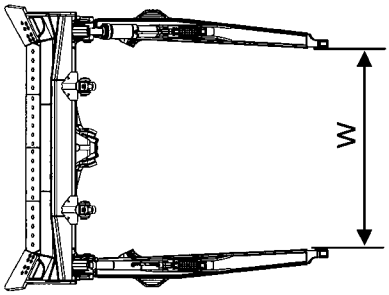


Fig. 11

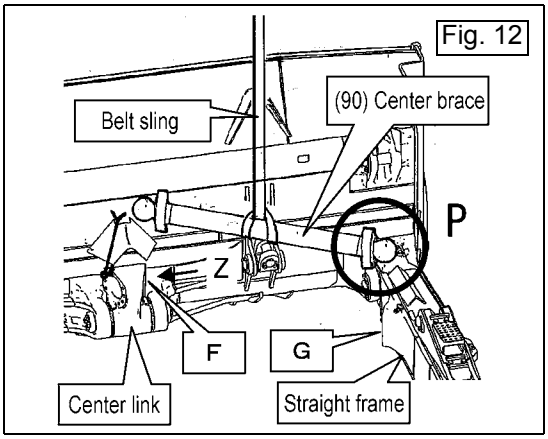


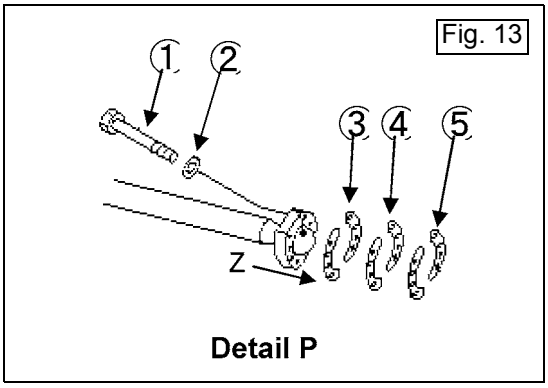
Assembly process No.	Assembly of blade (4/16)
A-11	

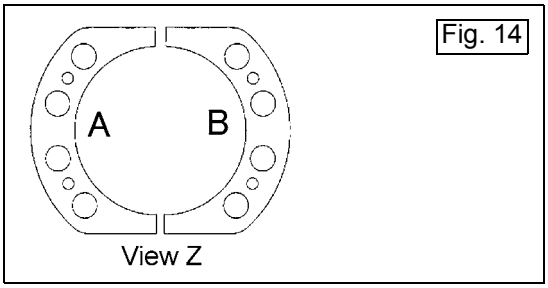
4. Installation of center brace
   4.1 Temporary installation
   [1] Remove the shims, bolts and washers installed temporarily in advance to part **F** (spherical seat) of the center link and part **G** (spherical seat) of the straight frame. (Fig. 12)

No.	Part name	Part No.	Q'ty
1	Bolt	01011-62720	8
2	Washer	01643-32780	8
3	Shim (2 mm)	195-71-61450	2
4	Shim (1 mm)	195-71-61460	4
5	Shim (0.5 mm)	195-71-61470	2

★ "Q'ty" in above table indicates the number for each spherical seat. Each machine has 2 parts **F** and 2 parts **G**, 4 parts in total.
★ For the "Part No." in above table, see (Fig. 13).
★ The kinds and numbers of the removed shims are so combined that the thickness at each place will be 4.5 mm. Accordingly, the shims removed from part **F** should not be mixed with those removed from part **G**.
★ When adjusting the thickness of 4.5 mm, keep each combination of **A** and **B**. (Fig. 14)







   [2] Install the belt sling to the center of center brace (90). While slinging the center brace with the crane, put the balls of the ball joints respectively to the spherical seat (part **F**) of the center link and that (part **G**) of the straight frame. (Fig. 12)

No.	Part name	Part No.	Q'ty
90	Center brace	195-71-71120	2

★ "Q'ty" in above table indicates the number for each machine.
★ Weight of center brace: Approx. 220 kg/piece

Assembly process No.	Assembly of blade (5/16)
A-11	

[3] Temporarily install the ball caps of center brace (90) to the spherical seats of the center link and straight frame (parts F and G in (Fig. 12)) with bolts (1) and washers (2) removed in step [1], while inserting shims (3), (4) and (5) removed in step [1] in parts A. (Fig. 15) and (Fig. 16)

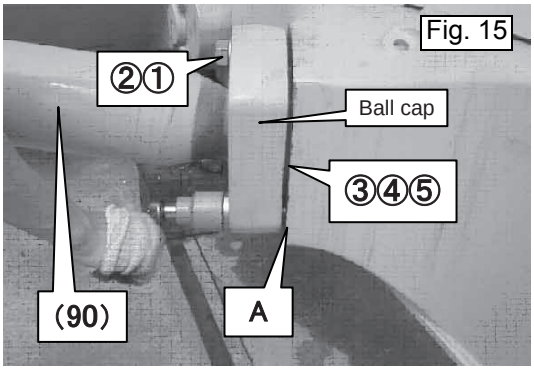
Bolt specification	M27, Length : 120 mm
Tool (Socket)	41 mm

★ Insert the shims so that their total thickness is clearance + 0.5 mm when the bolts are tightened lightly (4 bolts are tightened evenly).
Then, tighten the bolts to the specified torque and check that the blade moves smoothly.

★ Insert the sets of shims 4.5 mm thick in total (One 2-mm shim, Two 1-mm shims and One 0.5-mm shim) in the Two upper and lower places.
(Standard shim thickness: 4.5 mm)

★ Tighten the bolts until the spherical seat, shims and ball cap are fitted to each other, although they are being installed temporarily.

Fig. 15



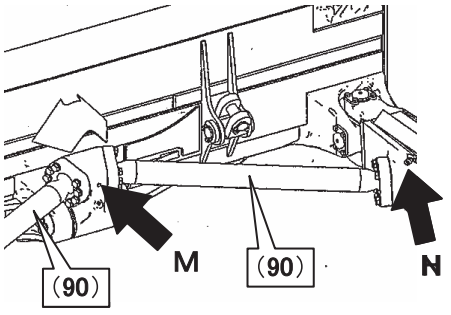
[4] Install the center brace on the opposite side similarly (according to steps [1] – [3]).

★ When working on the opposite side, remove the wire installed in step 1-[1].

[5] Supply a little amount grease through part **M** (1 place) and parts **N** (1 place each on the right and left sides). (Fig. 16)

★ Use grease G2-LI (See the coating material list).

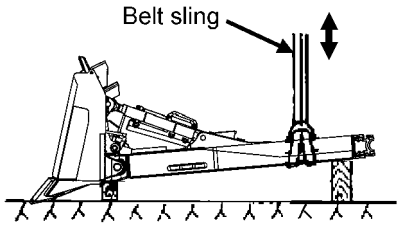
Fig. 16



[6] [Check of shim thickness]
Install the belt sling to either of the right and left straight frames and move the straight frame end up and down slowly with the crane as shown in (Fig. 17). (Stroke: 300 – 400 mm)
While moving up and down, check the ball joints of the center brace for abnormal sound and ensure that the ball joints move smoothly (check the balls for internal interference).
Perform this check on both right and left straight frames.

★ If not problem is detected, go to step 4.2. If any problem is detected, adjust the shims again (add new shims) according to step 4.3.

Fig. 17



Assembly process No.	Assembly of blade (6/16)
A-11	

4.2 Permanent installation

[1] If no problem is detected in step 4.1-[6], tighten the ball cap bolts at both ends of the center brace (1) in (Fig. 15) permanently.

Tool (Socket)	41 mm
Tightening torque	See Table 1 "Tightening torque"

★ Tighten all the bolts evenly in the diagonal order.

★ After tightening to the specified torque, check that the joint moves smoothly.

[2] After tightening permanently, go to step 4.4.

4.3 Shim adjustment (Addition of shims)

[1] If any problem is detected (interference of the ball is felt) in step 4.1-[6], remove bolts (1) and washers (2) which are fixing the ball caps temporarily at both ends of the center brace and add 0.5-mm thick shim (5) to the shim set in part **A**, and then install the ball caps temporarily with bolts (1) and washers (2) according to step 4.1-[3]. (Fig. 18)

No.	Part name	Part No.	Q'ty
5	Shim (0.5 mm)	195-71-61470	2

★ Numbers in above fig. show the quantity required for each spherical seat.

★ When adjusting the thickness of 4.5 mm, keep each combination of **A** and **B**. (Fig. 14)

4.4 Adjustment of distance between tilt cylinder mounting pin holes

[1] Sling the straight frame again with the belt sling as shown in (Fig. 19) and adjust the distance between the mounting pin holes of the tilt cylinder (or the brace assembly on the left side in step 6 for the single tilt dozer specification) (dimension **K**) to about 1,590 mm. Then, adjust the position of the wooden block under the straight frame so that the distance between the holes will be stabilized and then remove the sling.

★ Perform this adjustment on the right and left sides.

Fig. 18

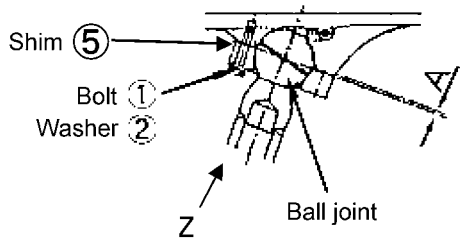
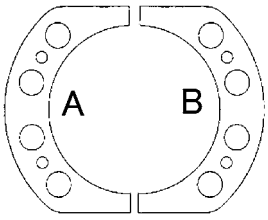
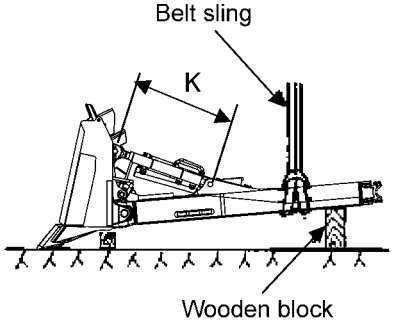


Fig. 14



View Z

Fig. 19



Assembly process No.	Assembly of blade (7/16)
A-11	

5. Installation of tilt hydraulic cylinders

5.1 In case of dual tiltdozer specification

[1] Install hydraulic hoses and hose protection covers to the right and left hydraulic cylinders. (Fig. 20)

	No.	Part name	Part No.	Q'ty
	6	Hydraulic cylinder	707-01-0ZT70	2
	7	Hydraulic hose (Overall length: 1,490 mm)	195-71-76650	2
	8	Hydraulic hose (Overall length: 1,060 mm)	195-71-75660	2
	9	O-ring	07000-13022	4
※	10	Flange	07371-30500	8
※	11	Bolt	01010-80830	16
※	12	Washer	01643-50823	16
	13	Cover	195-71-63651	2
	14	Bolt	01010-82050	12
	15	Washer	01643-32060	12

Bolt specification	Tool (Socket)
M8	13 mm
M20	30 mm
Tightening torque	See Table 1 "Tightening torque"

★ Flange (10), bolt (11) and washer (12) are installed to each hydraulic cylinder in advance. (Marked ※)
However, do not reuse the sleeve head (oil stop cover) installed to the hydraulic cylinder with (10), (11) and (12) when installing the hydraulic hoses.

★ Replace O-ring (9) with new one, as a rule.

Fig. 20

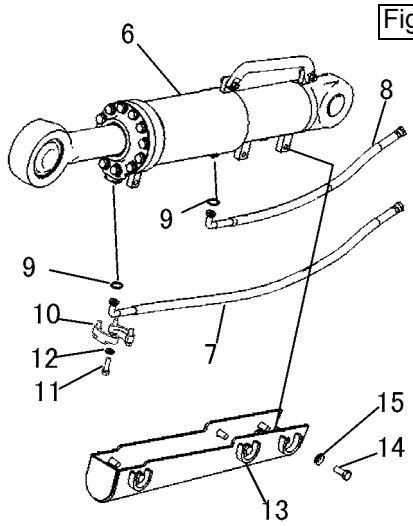
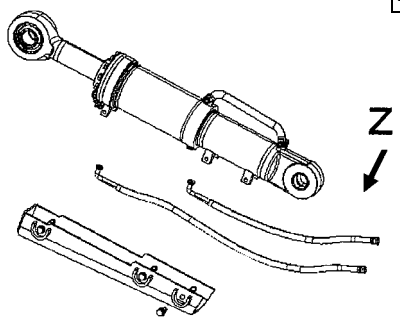
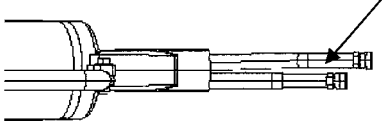


Fig. 35



When assembling, make sure that the shorter hose (bottom side) has been located on RH side of the cylinder (both RH and LH cylinders).



Z

Assembly process No.	Assembly of blade (8/16)
A-11	

[2] Remove the covers and hydraulic cylinder mounting pins installed to the hydraulic cylinder mounting sections of the right and left straight frames. (Fig. 21)

Bolt specification	Tool (Socket)
M12	19 mm
M20	30 mm

[3] While slinging hydraulic cylinder (6) with belt sling (20), with the cover side (hydraulic hose side) down, align the mounting pin hole on the bottom side (clevis side) with that of the straight frame.
Then, insert mounting pin (16) removed in step [2] and fix it to the straight frame with lock (17), bolt (18) and washer (19). (Fig. 21)

- Sling weight (Weight of hydraulic cylinder assembly)
  RH and LH sides, approx. 300kg each

Bolt specification	M20, Length : 50 mm
Tool (Socket)	30 mm
Tightening torque	See Table 1 "Tightening torque"

[4] Set a wooden block between hydraulic cylinder (hydraulic hose protection cover) and straight frame so that hydraulic cylinder (6) will be positioned as shown in (Fig. 22), and then loosen and remove the sling.

★ Do not connect the head side of hydraulic cylinder (6) part R in (Fig. 22) at this time.
Connect it after installing the blade assembly to the machine.
See “assembly procedure A-12”

Fig. 21

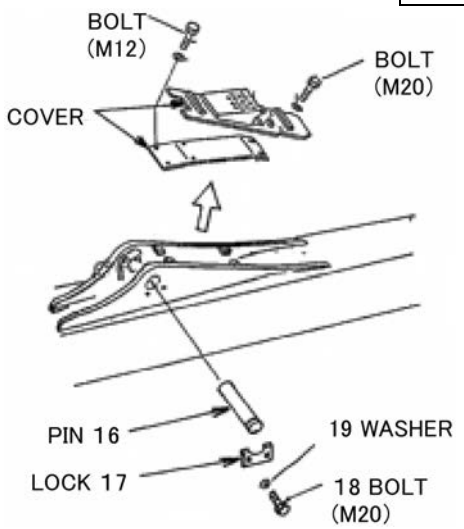
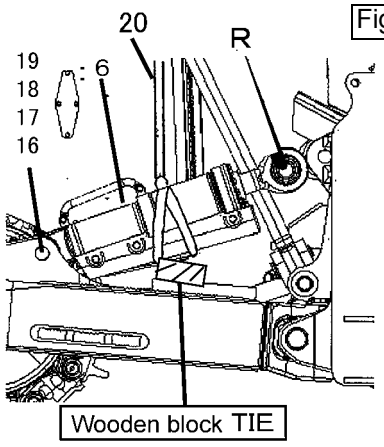


Fig. 22



Assembly process No.	Assembly of blade (9/16)
A-11	

[5] Connect the free ends of hydraulic hoses (7) and (8) installed to hydraulic cylinder (6) in step [1] to the elbows of flange (21) installed to the straight frame. (Fig. 23) Connect according to the letters stamped on the flange.

Stamp	Hose to be connected
H	Longer hydraulic hose (Head side)
B	Shorter hydraulic hose (Bottom side)

★ Take care not to forget to install O-rings (22).

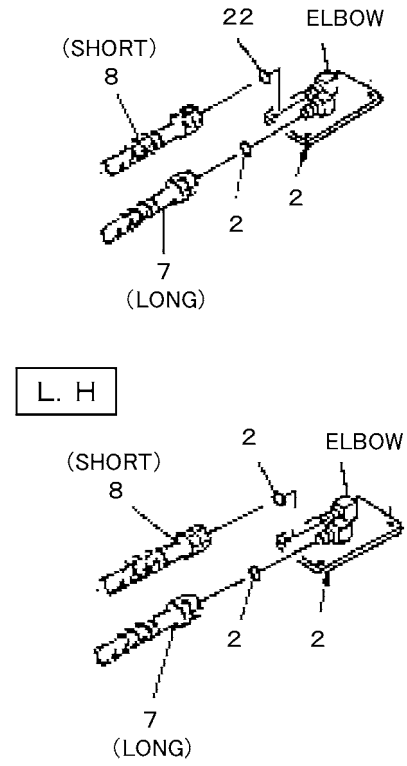
No.	Part name	Part No.	Q'ty
22	O-ring	02896-11015	4

★ When connecting the hydraulic hoses, remove the oil plugs (Part No.: 02789-00522) installed to the elbows of the flange in advance.

[6] Reinstall the covers removed in step [2].

Bolt specification	M12 Length : 25 mm	M20 Length : 50 mm
Tool (Socket)	19 mm	30 mm
Tightening torque	See Table 1 "Tightening torque"	

Fig. 23



Assembly process No.	Assembly of blade (10/16)
A-11	

5.2 In case of single tiltdozer specification

★ For the single tiltdozer specification, install the tilt hydraulic cylinder to only the right side.

[1] Install the hydraulic hoses and hose protection cover to the hydraulic cylinder. (Fig. 24)

	No.	Part name	Part No.	Q'ty
	31	Hydraulic cylinder	707-01-0ZT80	2
	32	Hydraulic hose (Overall length: 1,545 mm)	195-71-76731	2
	33	Hydraulic hose (Overall length: 1,060 mm)	195-71-76660	2
	34	O-ring	07000-13022	4
※	35	Frange	07371-30500	8
※	36	Bolt	01010-80830	16
※	37	Washer	01643-50823	16
	38	Cover	195-71-63661	2
	39	Bolt	01010-82050	12
	40	Washer	01643-32060	12

Bolt specification	Tool (Socket)
M8	13 mm
M20	30 mm
Tightening torque	See Table 1 "Tightening torque"

★ Flange (35), bolt (36) and washer (37) are installed to hydraulic cylinder (31) in advance. (Marked ※) However, do not reuse the sleeve head (oil stop cover) installed to the hydraulic cylinder with (35), (36) and (37) when installing the hydraulic hoses.

★ Replace O-ring (34) with new one, as a rule.

Fig. 24

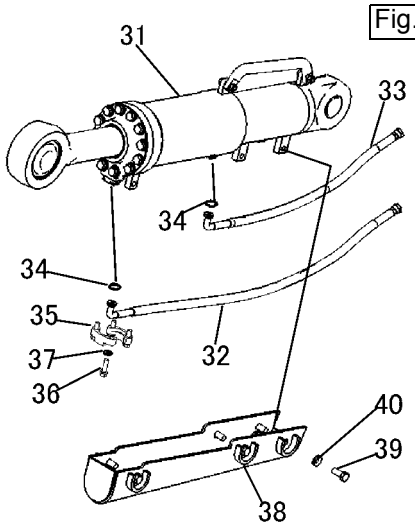
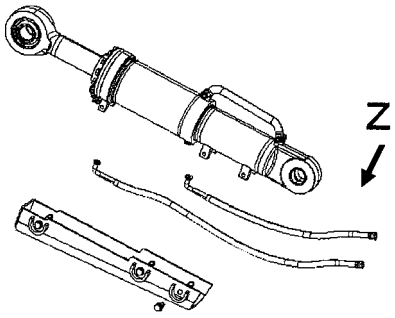
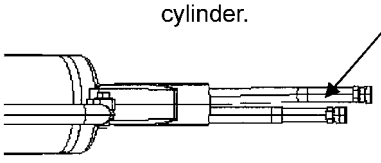


Fig. 36



When assembling, make sure that the shorter hose (bottom side) has been located on RH side of the cylinder.



Z

Assembly process No.	Assembly of blade (11/16)
A-11	

[2] Remove the covers and hydraulic cylinder mounting pin (41) installed to the tilt hydraulic cylinder mounting section of the right straight frame. (Fig. 25)

Bolt specification	Tool (Socket)
M12	19 mm
M20	30 mm

[3] While slinging tilt hydraulic cylinder (31) with belt sling (20), with the hydraulic hose cover side down, align the mounting pin hole on the bottom side (clevis side) with that of the straight frame.
Then, insert mounting pin (41) removed in step [2] and fix it to the straight frame with lock (42), bolt (43) and washer (44). (Fig. 25)

- Sling weight (Weight of hydraulic cylinder assembly)
  Approx. 300 kg

Bolt specification	M20, Length : 50 mm
Tool (Socket)	30 mm
Tightening torque	See Table 1 "Tightening torque"

[4] Set a wooden block between hydraulic cylinder (hydraulic hose protection cover) and straight frame so that the hydraulic cylinder (31) will be positioned as shown in (Fig. 26), and then loosen and remove the sling.

★ Do not connect the head side of the hydraulic cylinder (31) part R in (Fig. 26) at this time.
Connect it after installing the blade assembly to the machine.
See “assembly procedure A-12”

Fig. 25

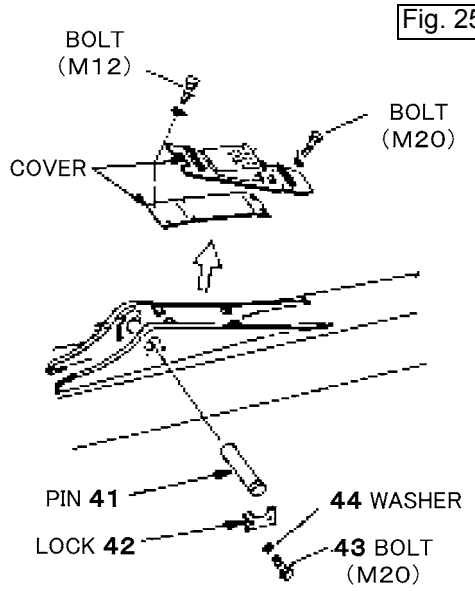
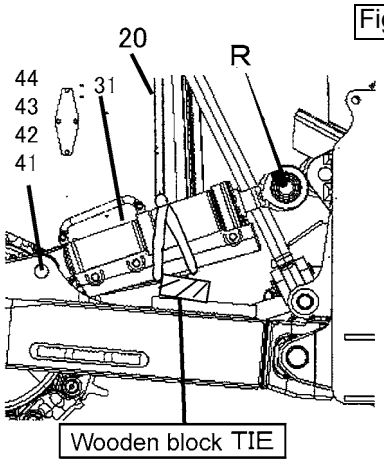


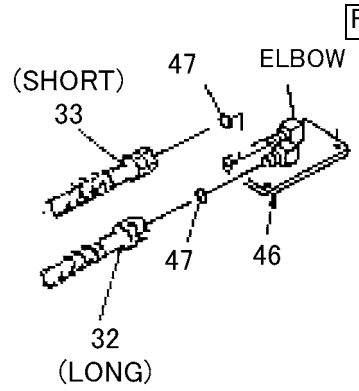
Fig. 26



Assembly process No.	Assembly of blade (12/16)
A-11	

[5] Connect the free ends of hydraulic hoses (32) and (33) installed to the hydraulic cylinder in step [1] to the elbows of flange (46) installed to the straight frame. (Fig. 27)
Connect according to the letters stamped on the flange.

Fig. 27



Stamp	Hose to be connected
H	Longer hydraulic hose (Head side)
B	Shorter hydraulic hose (Bottom side)

★ Take care not to forget to fit O-rings (47).

No.	Part name	Part No.	Q'ty
47	O-ring	02896-11015	4

★ When connecting the hydraulic hoses, remove the oil plugs (Part No.: 02789-00522) installed to the elbows of the flange in advance.

[6] Reinstall the covers removed in step [2].

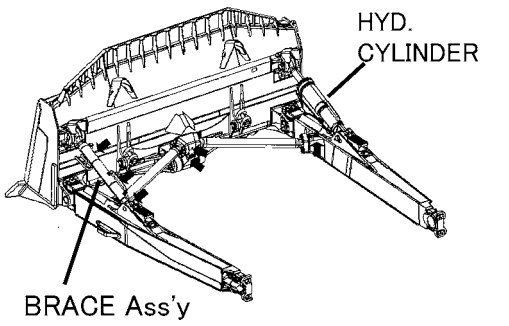
Bolt specification	M12 Length : 25 mm	M20 Length : 50 mm
Tool (Socket)	19 mm	30 mm
Tightening torque	See Table 1 "Tightening torque"	

Assembly process No.	Assembly of blade (13/16)
A-11	

6. Installation of brace assembly

★ The brace assembly is the portion shown in (Fig. 28) which is applied to the single tiltdozer specification.

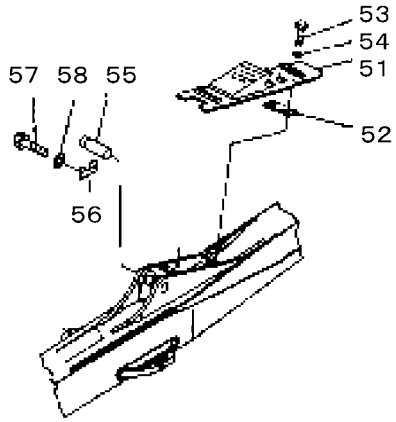
Fig. 28



[1] Remove covers (51 – 54) and brace assembly mounting pins (55 – 58) installed to the brace assembly mounting section of the left straight frame in advance. (Fig. 29)

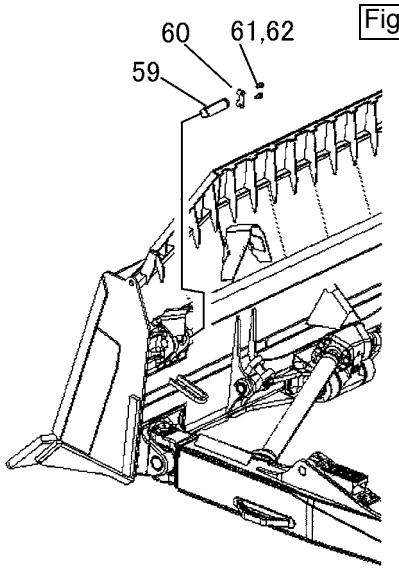
Bolt specification : 53, 57	M20
Tool (Socket)	30 mm

Fig. 29



[2] Remove brace assembly mounting pins (59 – 62) installed to the brace assembly mounting section of the blade in advance. (Fig. 30)

Fig. 30

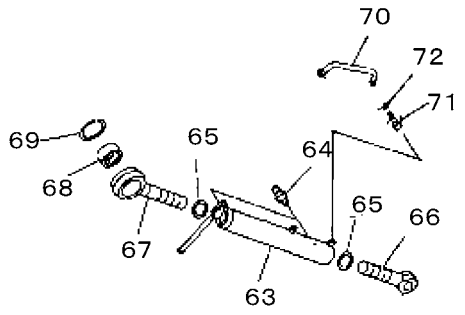


Assembly process No.	Assembly of blade (14/16)
A-11	

[3] The brace assembly consists of the following parts. (Fig. 31)

No.	Part name	Part No.	Q'ty
63	Brace	195-71-61561	1
64	Fitting	07020-00000	2
65	Seal	177-50-11170	2
66	Screw	195-71-61540	1
67	Screw	195-71-51152	1
68	Bushing	195-71-51263	1
69	Ring	04071-11160	1
70	Handle	195-71-62151	1
71	Bolt	01010-61660	2
72	Washer	01643-31645	2

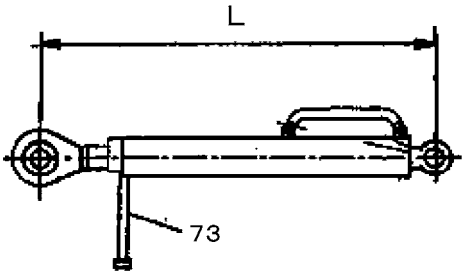
Fig. 31



[4] Supply grease (See step [9]) through fitting (64) installed to brace (63) and rotate brace (63) with attached lever (73) to adjust dimension L between the holes at both ends of brace assembly to approximately 1,590 mm. (Fig. 32)

Reference
If brace (63) is rotated with lever (73) while screws (66) and (67) at both ends are fixed, dimension L increases or decrease by 12.7 mm performance turn. Accordingly, if only one side screw in the both end screws is rotated by a half turn, dimension L can be adjusted by 3.175 mm.

Fig. 32



Assembly process No.	Assembly of blade (15/16)
A-11	

[5] While slinging brace assembly with the belt sling, with the handle (70) up, align the mounting pin hole of the brace assembly with that of the straight frame. Then, insert mounting pin (55) removed in step [1] and fix it to the straight frame with lock (56), bolt (57) and washer (58). (Fig. 33)

- Sling weight (Weight of brace assembly)
  Approx. 190 kg

Bolt specification	M20, Length : 50 mm
Tool (Socket)	30 mm
Tightening torque	See Table 1 "Tightening torque"

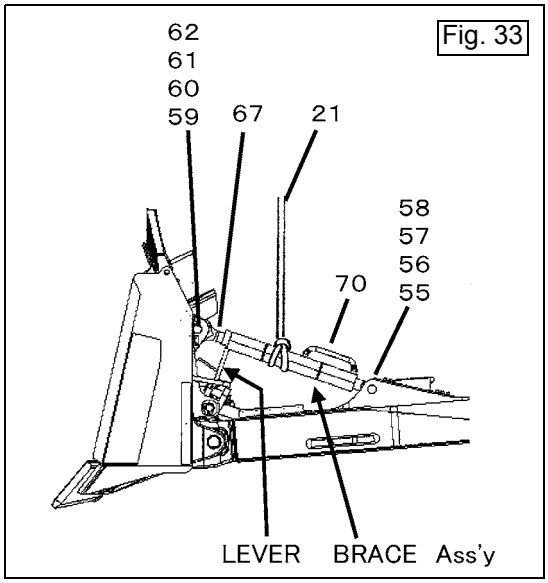


Fig. 33

[6] While still slinging the brace assembly with the belt sling (21), align the mounting pin hole on the opposite side of step [5] with the mounting pin hole of the blade.

★ At this time, if the mounting pin holes cannot be aligned because of dimension L adjusted in step [4], rotate screw (67) one half by one to adjust dimension L finely while locking brace (63).

If brace (63) is rotated with lever (73) to adjust dimension L, the direction of handle (70) changes. According, do not apply this method.

Then, insert mounting pin (59) removed in step [2] and fix it to the blade with lock (60), bolt (61) and washer (62). (Fig. 33)

Bolt specification	M20, Length : 50 mm
Tool (Socket)	30 mm
Tightening torque	See Table 1 "Tightening torque"

[7] Loosen and remove the sling.

Assembly process No.	Assembly of blade (16/16)
A-11	

[8] Reinstall covers (51) – (54) removed in step [1].

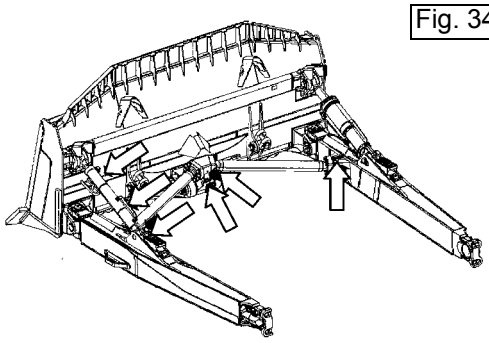
Bolt specification	M20, Length : 50 mm
Tool (Socket)	30 mm
Tightening torque	See Table 1 "Tightening torque"

[9] Greasing
After finishing installation, supply grease to the 5 places indicated with the arrows in (Fig. 34) until it comes out.

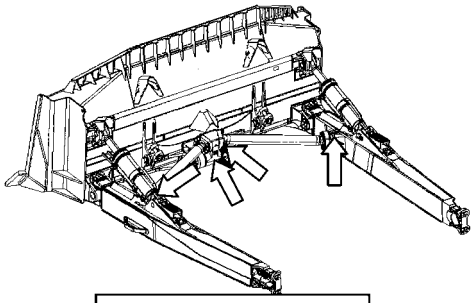
Single tiltdozer	6 places indicated by arrows
Dual tiltdozer	4 places indicated by arrows

★ G2-LI in "Coating material list" in this manual is recommended as grease for the above purpose.

Fig. 34



Single tiltdozer

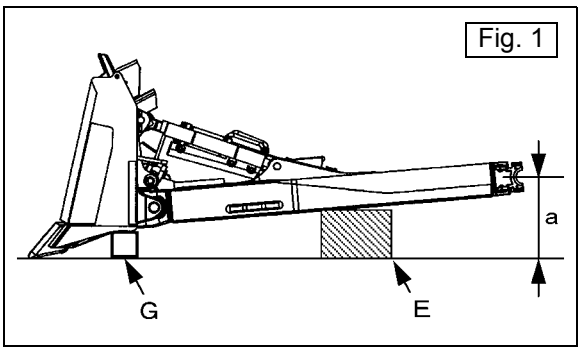


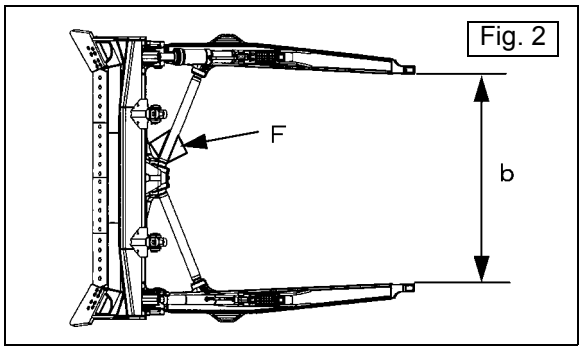
Dual tiltdozer

Assembly process No.	Installation of blade (1/9)
A-12	

Condition 1) Before starting the following work, complete "Assembly procedure A-11".
2) Before starting the following work, set the engine so that it can run to move the machine.

1) Posture of blade assembly before installation





Adjust the posture of the blade assembly before installation with wooden blocks (E) and (F) as shown in (Fig. 1) and (Fig. 2).

Dimension a	Dimension b (Disconnect between sphere centers)
About 995 mm	About 3,480 mm

★ Dimension a in the table is set on the assumption that the machine is used on a hard ground where the track shoe grousers will not sink. If the machine is used on a ground where the grousers sink, the trunnion height decreases by the sinking distance. Accordingly, dimension a must be lowered by the decrease of the trunnion height.

★ If the center link falls, dimension b increases. To prevent this, set wooden block (F) under the center link or arm.

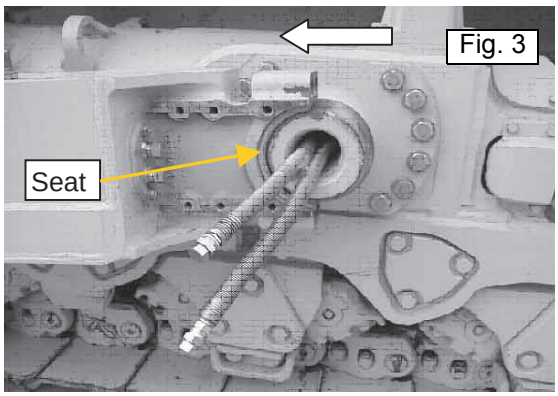
★ Leave wooden block (G) set to erect the blade vertically in “assembly procedure A-11" as it is.

2) Connection of blade assembly and machine

2.1) Peel off the paint from the spherical part of the trunnion and clean its surface.

★ Apply grease [G2-LI] to the spherical part of the trunnion.
G2-LI : See [Coating materials]

2.2) Set the machine within dimension "b" of the blade assembly and move it forward so that the right and left clearances will be the same.



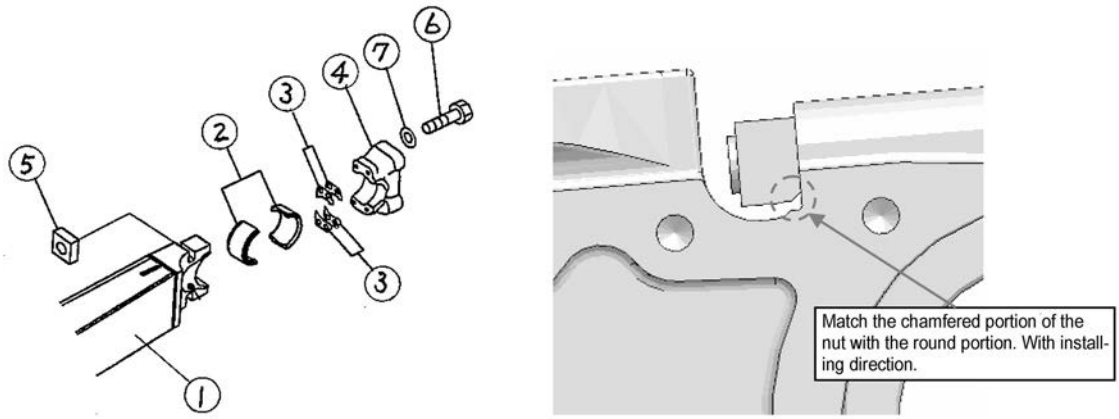
2.3) Move and press the machine forward until the trunnion is seated in the trunnion holder (bushing) of the blade assembly (straight frame). (Fig. 3)

Assembly process No.	Installation of blade (2/9)
A-12	

★ If the trunnion and trunnion holder are different in height, trunnion bushing (2) in (Fig. 4) may move when the trunnion is pressed.
If the trunnion and trunnion holder are different in height, sling the straight frame of the blade assembly with a crane etc. and adjust their heights.

2.4) Set the trunnion parts (Fig. 4) and tighten the bolts.
★ Match the chamfered portion of the nut with the round portion.

Fig. 4



No.	Part name	Part No.	Q'ty for each of right and left	Remarks
1	Blade assembly	-----	----	See “assembly procedure A-13”
2	Bushing	195-71-74250	2	
3	Plate	195-71-74260	4	
4	Cap	195-71-74231	1	
5	Nut	195-71-11512	4	With installing direction.
6	Bolt	207-46-12141	4	
7	Washer	01643-32780	4	

Bolt specification	M27, Length : 265 mm
Tool (Socket)	41 mm
Tightening torque	See Table 1 "Tightening torque"

2.5) Remove wooden block (E) set under the straight frame in step 1).

Assembly process No.	Installation of blade (3/9)
A-12	

3) Connection of tiltdozer hydraulic hoses

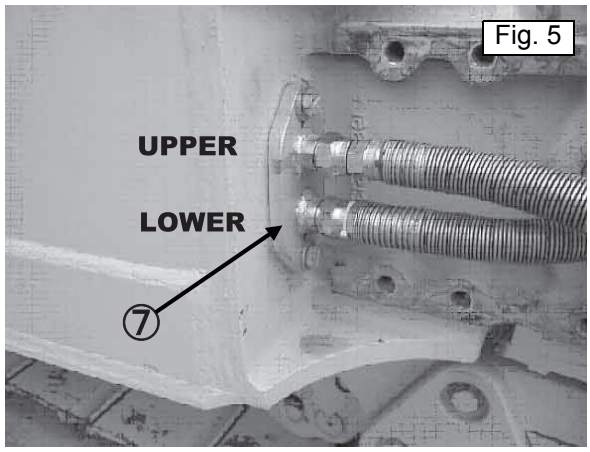


Fig. 5

3.1) Remove the plug at the tip of the hydraulic hose coming out from the center hole of trunnion (refer to item 6.4 of Assembling Procedures A-6).

★ Take care not to lose the "O-rings".

3.2) Remove the upper and lower locknuts from the nipples of the flange (7) in (Fig. 5) on the blade assembly side.

3.3) Connect the hydraulic hoses to the nipples of the above flange. (Fig. 5)

★ When connect, it certainly assembly O-ring (02896-11015) removed in step 3.1).

★ Connect the hydraulic hoses according to the following table.

Hose discernment	Selection of connecting nipple
Blue discernment at hose end	Connect to upper nipple.
No discernment on hose	Connect to lower nipple.

Left side is blue and right side is red.

★ The part Nos. of the plug and nut removed from the nipple of the flange in step 2) are shown below for reference.

Part name/Part No.		Dual tiltdozer	Single tiltdozer
		Q'ty	Q'ty
Nut	07221-20522	2 pieces each on right and left	2 pieces on only right
Plug	07376-50522	2 pieces each on right and left	2 pieces on only right

This part is not necessary any more after the blade assembly is installed to the machine. Keeping this part is recommended, however, since it is necessary again when the blade assembly is removed from the machine and stored.

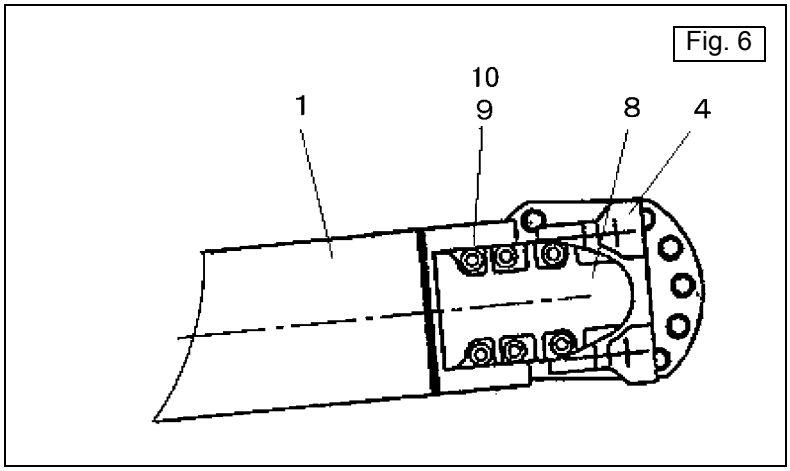
★ When the front work equipment is the single tiltdozer, perform this work only on the right side.

Assembly process No.	Installation of blade (4/9)
A-12	

4) Installation of tiltdozer hydraulic hose protection cover

Install tiltdozer hydraulic hose protection cover (8) (Fig. 6) connected in step 3).

Fig. 6



No.	Part name	Part No.	Q'ty	Remarks
1	Blade assembly	--------	--------	
4	Trunnion cap	--------	--------	See 2.4) of this procedure
8	Cover	195-71-74240	1 each on right and left	
9	Bolt	01010-62050	6 each on right and left	
10	Washer	01643-32060	6 each on right and left	

Bolt specification	M20, Length : 50 mm
Tool (Socket)	30 mm
Tightening torque	See Table 1 "Tightening torque"

★ Before installing the protection cover, check the operation of the tilt cylinder in the blade adjustment work described later and confirm that there is not oil leakage or another problem in the tilt hose connection.

Assembly process No.	Installation of blade (5/9)
A-12	

5) Connection of blade assembly and blade lift cylinders

5.1) Sling the hydraulic cylinder with the belt sling and remove the transportation sling bracket. (Fig. 7), (Fig. 8)

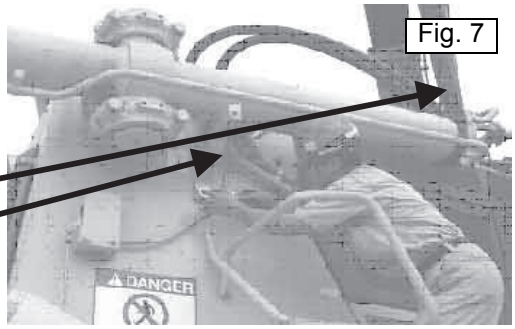


Fig. 7

★ Connect the hydraulic cylinders one by one.

5.2) Check the hydraulic oil level while the shank point is in contact with the ground, and add new hydraulic oil according to the Operation and Maintenance Manual if necessary. (If the hydraulic oil level is low, the work equipment pump may be damaged.)


Fig. 8

5.3) Start the engine and operate the blade control lever to extend/retract the hydraulic cylinder rod and align it with the connecting hole (joint link) of the blade assembly. Part (A) in (Fig. 9)

★ The work shall be performed by the machine operator, crane operator, and "signalman". The signalman must arrange the signaling method in advance and give proper directions to both operators.

5.4) Insert the connecting pin in part A. (Fig. 9)

5.5) Stop the engine.

5.6) Set the lock to the connecting pin head and bolt it to the joint link. (Fig. 9)

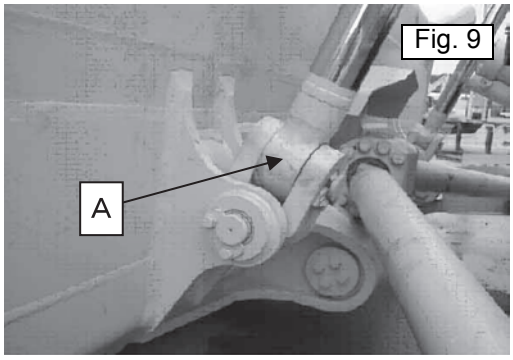


Fig. 9

Connecting pin part No.	198-71-61240 (1 piece each on right and left)
Part No. of lock	198-72-62170 (1 piece each on right and left)
Part No. of bolt	01010-81635 (2 pieces each on right and left)
Part No. of washer	01643-31645 (2 pieces each on right and left)
Bolt specification	M16 × 35 mm
Socket	24 mm
Tightening torque	See Table 1 "Tightening torque"

5.7) Install blade cylinder holdfast (11) on the upper side of the cylinder to fix the cylinder.

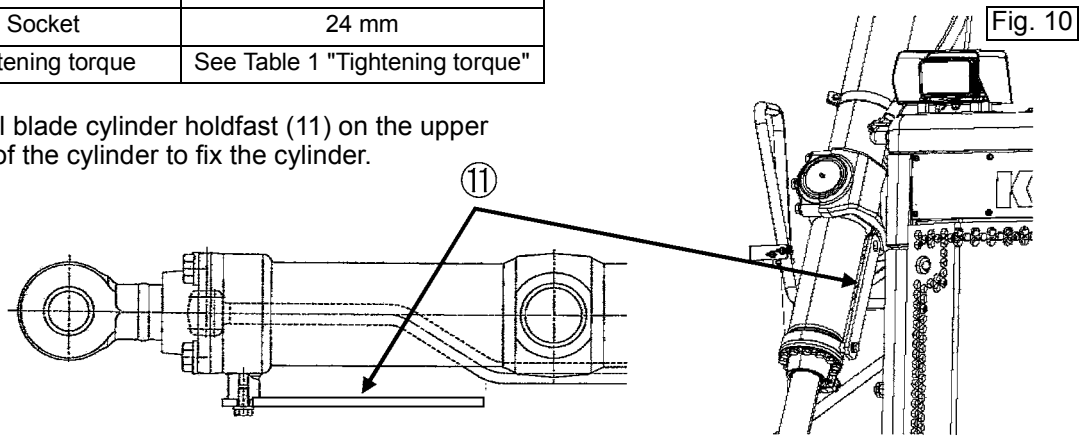


Fig. 10

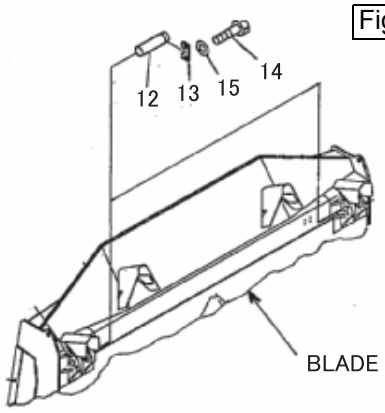
Assembly process No.	Installation of blade (6/9)
A-12	

6) Connection of blade assembly and blade tilt hydraulic cylinder

6.1) Remove the pins from the right and left of the cylinder connecting side (blade). (Fig. 11)

★ For the single tiltdozer, remove the pin from only the right side. For the left side, see “assembly procedure A-11” Installation of brace assembly.

Fig. 11



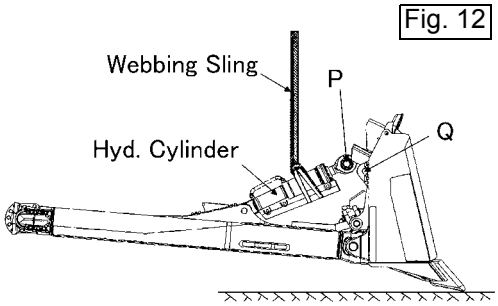
No.	Part name	Part No.	Q'ty
12	Pin	195-71-61590	1 peace each side
13	Lock	195-71-51450	1 peace each side
14	Bolt	01010-62050	2 peaces each side
15	Washer	01643-32060	2 peaces each side

Bolt specification	M20, Length : 50 mm
Tool (Socket)	30 mm

6.2) The bottom side (clevis side) of the hydraulic cylinder has been connected to the straight frame already. See “assembly procedure A-11" Raise one end of this hydraulic cylinder with the belt sling and remove the wooden block placed under it. (Fig. 12)

6.3) With the hydraulic cylinder raised, start the engine and operate the blade control lever to extend/retract the hydraulic cylinder rod and align its pin hole (P) with the pine hole (Q) of the blade. (Fig. 12)

Fig. 12



★ The work shall be performed by the machine operator, crane operator, and "signalman". The signalman must arrange the signaling method in advance and give proper directions to both operators.

Assembly process No.	Installation of blade (7/9)
A-12	

6.4) After aligning the pin holes, stop the engine and insert pin (12) removed in step 6.1) and fix it to the blade with lock (13), bolt (14) and washer (15). (Fig. 13)

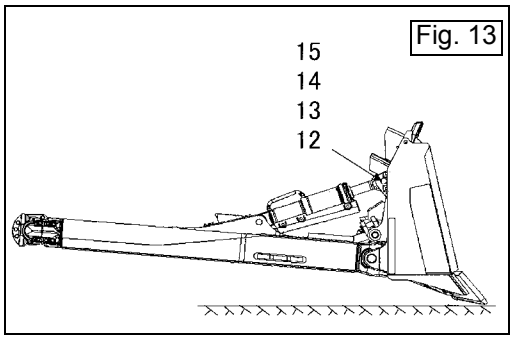


Fig. 13

★ Perform the work from step 6.2) to step 6.4) on the right and left sides.
However, perform on only the right side for the single tiltdozer.

★ For the tightening torque of bolt (14), see "Tightening torque", Table 1 in this manual.

6.5) Loosen and remove the slings of the hydraulic cylinder.

6.6) Start the engine again and operate the blade control lever to raise the whole blade assembly. Then, remove all the wooden blocks placed under the blade.

6.7) Lower the blade to the ground and stop the engine.

7) Confirmation of operation of blade assembly

7.1) Check of hydraulic oil level and supply of new oil

[1] Check the hydraulic oil level again and supply new oil, if necessary.

★ Confirm the oil level after lowering the ripper shank and blade to the ground and set the back of the blade perpendicular to the ground.

★ About the kind of used fluids refer to “Assembly procedure A-20” Check on the amount of lubricants and coolant.

★ If the hydraulic oil level is low, the work equipment pump may be damaged.

7.2) Check of each part for interference

[1] Move the blade slowly and check that each part does not make interference or abnormal sound. If abnormal sounds seem to come from the ball joints at both ends of the center brace, see step 7.5).

[2] Confirm that the blade does not interfere with the machine (radiator guard) when it is tilted to the maximum (or dual-tilted to the maximum for the dual tiltdozer) at the maximum lifting height.

[3] Confirm that there is sufficient clearances between the straight frames of the blade assembly and the tracks of the undercarriage when the blade is tilted to the maximum (or dual-tilted to the maximum for the dual tiltdozer).

Assembly process No.	Installation of blade (8/9)
A-12	

7.3) Confirmation of operation of single tiltdozer

[1] Confirm that the blade is "raised" and "lowered" according to the operation of the blade control lever. (Fig. 14)

[2] Confirm that the blade is "right-tilted" and "left-tilted" according to the operation of the blade control lever. (Fig. 15)

[3] Inspect according to the "Field assembly inspection check sheet" attached to the end of this manual.

★ If the lateral balance or the clearance between blade assembly and machine needs to be adjusted and the brace assembly length must be adjusted consequently as a result of the check, return to “assembly procedure A-11” Assembly of blade, 6. Installation of brace assembly, and readjust those items.

The above items can be adjusted with the adjustment handle attached to the brace, the direction of the handrail may change. Accordingly, do not apply this method.

If brace (63) is rotated with lever (73) to adjust dimension L, the direction of handle (70) changes. According, do not apply this method.

Fig. 14

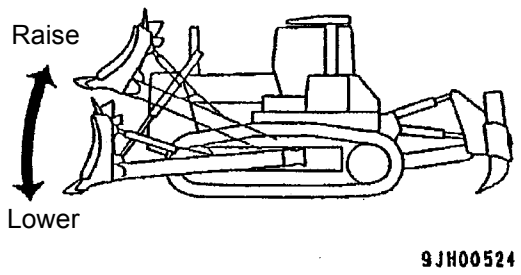
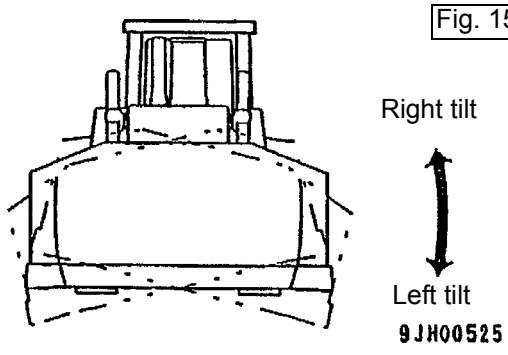


Fig. 15



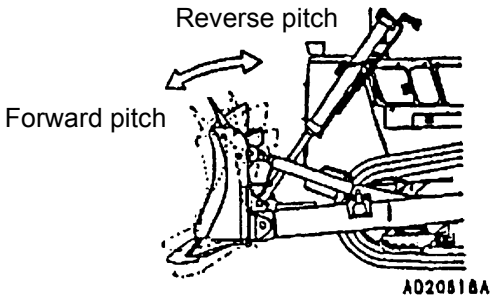
7.4) Confirmation of operation of dual tiltdozer

[1] In addition to [1] and [2] of the single tiltdozer specification, ensure that the blade is "pitched back" and "pitched forward" according to the operation of the blade control lever. (Fig. 16)

[2] Furthermore, confirm that the blade is "left-dual-tilted" and "right-dual-tilted" according to the operation of the blade control lever.

[3] Inspect according to the "Field assembly inspection check sheet" attached to the end of this manual.

Fig. 16



7.5) Readjustment of ball joint shims at both ends of center brace

When the blade is tilted to the right or left, if abnormal sound comes from either of the ball joints at both ends of the center brace, remove the ball cap of the ball joint which produces the abnormal sound and add the thinnest shim (0.5 mm) according to “assembly procedure A-11” Assembly of blade, step 4, and tilt the blade again to check.

Assembly process No.	Installation of blade (9/9)
A-12	

7.6) Bleeding air
Bleed air from the hydraulic circuit according to the following procedure.

1) Run the engine at low idle
2) Extend and retract the cylinders to above 100 mm before each stroke end 4 – 5 times. (Do not relieve the pressure at each stroke end.)
3) Extend and retract the cylinders to each stroke end 3 – 4 times.
4) While the shank point is on the ground, check that the hydraulic oil level is normal. If the hydraulic oil level is lower than the specified level, add hydraulic oil according to the Operation and Maintenance Manual.
   ★ Lower the blade to the ground, too, at this time.
5) When bleeding air, check that each cylinder hose moves freely and oil does not leak through any joint
   ★ If the hydraulic oil level is low, the work equipment pump may be damaged. Accordingly, bleed air carefully and check the hydraulic oil level, and then add hydraulic oil if necessary.

Assembly process No.	Installation of operator's cab (1/18)
A-13	

1) Installation of open lock striker
   Install right and left open lock striker mounting brackets (1) and (2) with sems bolts (3) as shown in (Fig. 1). (5 pieces on each side)
   ★ Strikers (4), nuts (5), washers (6), stopper rubbers (7), and nuts (8) are installed to the bracket when delivered.
   After mounting the operator's cab on the chassis, check the inspection items.

2) Installation of cab mounting bracket (L-shaped plate)
   Temporarily tighten the bracket (11) (L-shaped plate for outdoor use) to the position shown in [Fig. 2] by using sems bolts (12) (3 pieces on each side).
   Loosen the sems bolts (12) before installation the cab.

Fig. 1

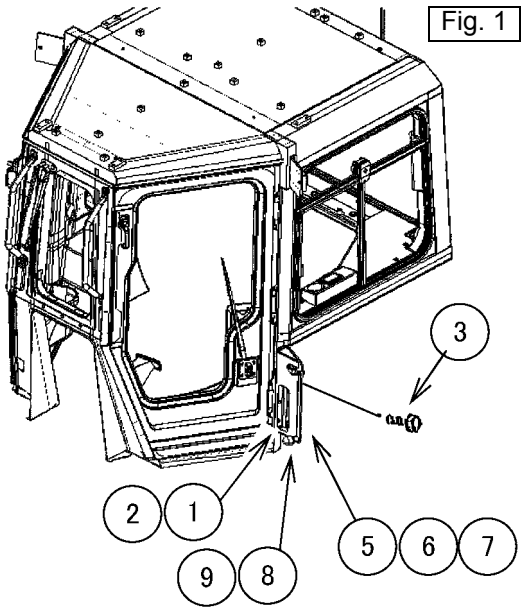
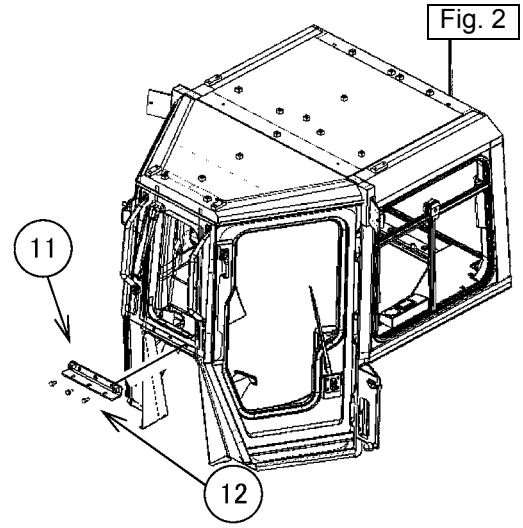


Fig. 2



No.	Part name	Part No.	Q'ty for each of right and left	Remarks
1	Bracket (L.H)	198-Z11-3341	1	Left
2	Bracket (R.H)	198-Z11-3351	1	Right
3	Sems bolt	01024-D1230	10	
5	Striker	14X-911-1921	2	
6	Nut	01580-11008	8	
7	Washer	01643-31032	8	
8	Stopper	09453-00002	2	
9	Nut	01580-01210	2	
11	Bracket	198-Z11-7980	1	
12	Sems bolt	01024-D1230	3	

Assembly process No.	Installation of operator's cab (2/18)
A-13	

3) Installation of rubber seals (13) to dashboard bracket

3.1) Apply paste seal (55) to the mating faces of the dashboard bracket and floor as shown in (Fig. 3).

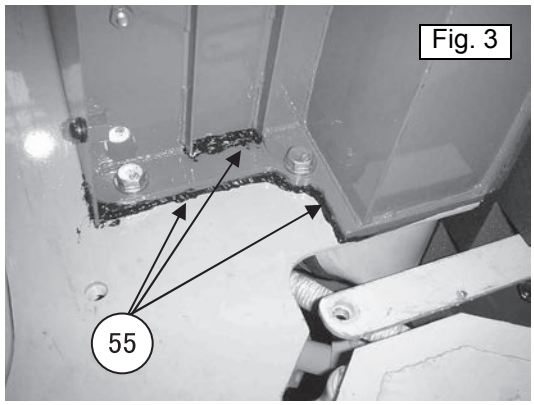


Fig. 3

3.2) Apply paste seal (55) to the guide plate of the dashboard bracket as shown in (Fig. 4).

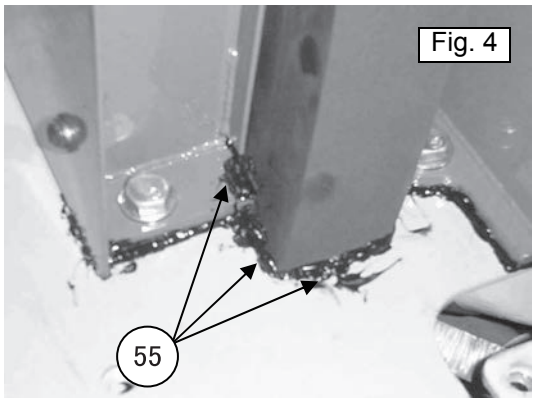


Fig. 4

3.3) Apply grease (G2-LI) to the outside of rubber seal (13) (joint face to the cap) as shown in (Fig. 5).

Remark 1: Apply grease so that the cab and rubber seal (13) will slip well against each other and rubber seal (13) will not be shifted or deformed when the cab is installed.

Remark 2: For the ease of assembly, remove both of right and left covers (A) before installing the cab and reinstall them after installing the cab.

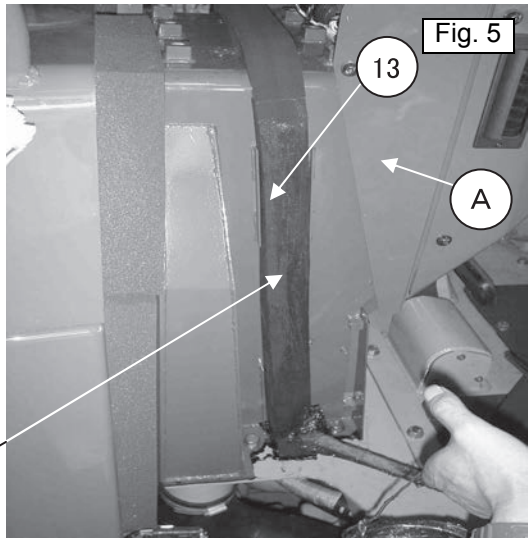


Fig. 5

No.	Part name	Part No.	Q'ty	Remarks
13	Rubber seal	198-Z11-3540	1	Sponge rubber
55	Paste seal	198-Z11-3960	1	

Assembly process No.	Installation of operator's cab (3/18)
A-13	

4) Installation of rubber seals to mating face of operator cab bottom

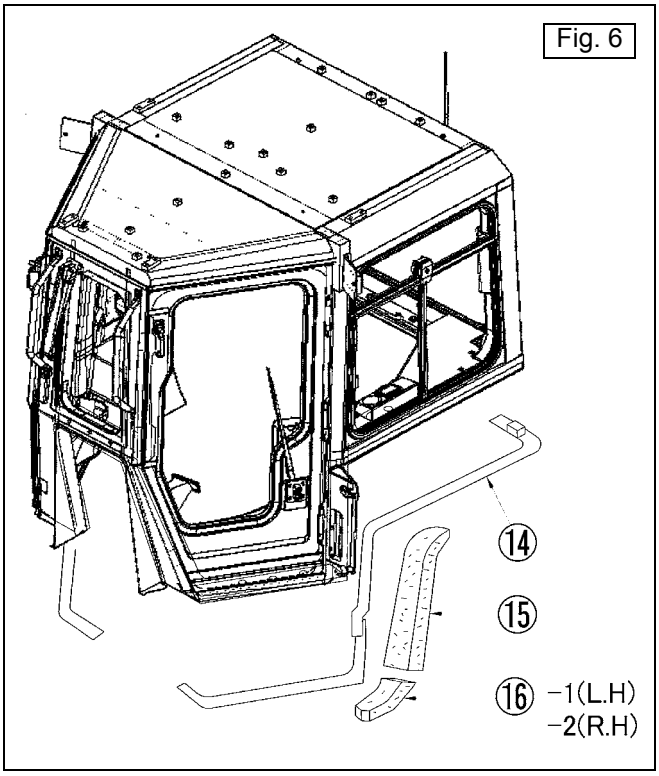
4.1) Weight of operator cab assembly: Approx. 500 kg

4.2) Remove dirt, oil and grease from the rubber seal sticking faces of operator cab bottom.

4.3) Peel off the release paper of rubber seals (14), (15) and (16) and stick those seals, referring to (Fig. 7) on the next page.

Remark : Since the rubber seals are made a little longer than required, cut them properly when sticking.

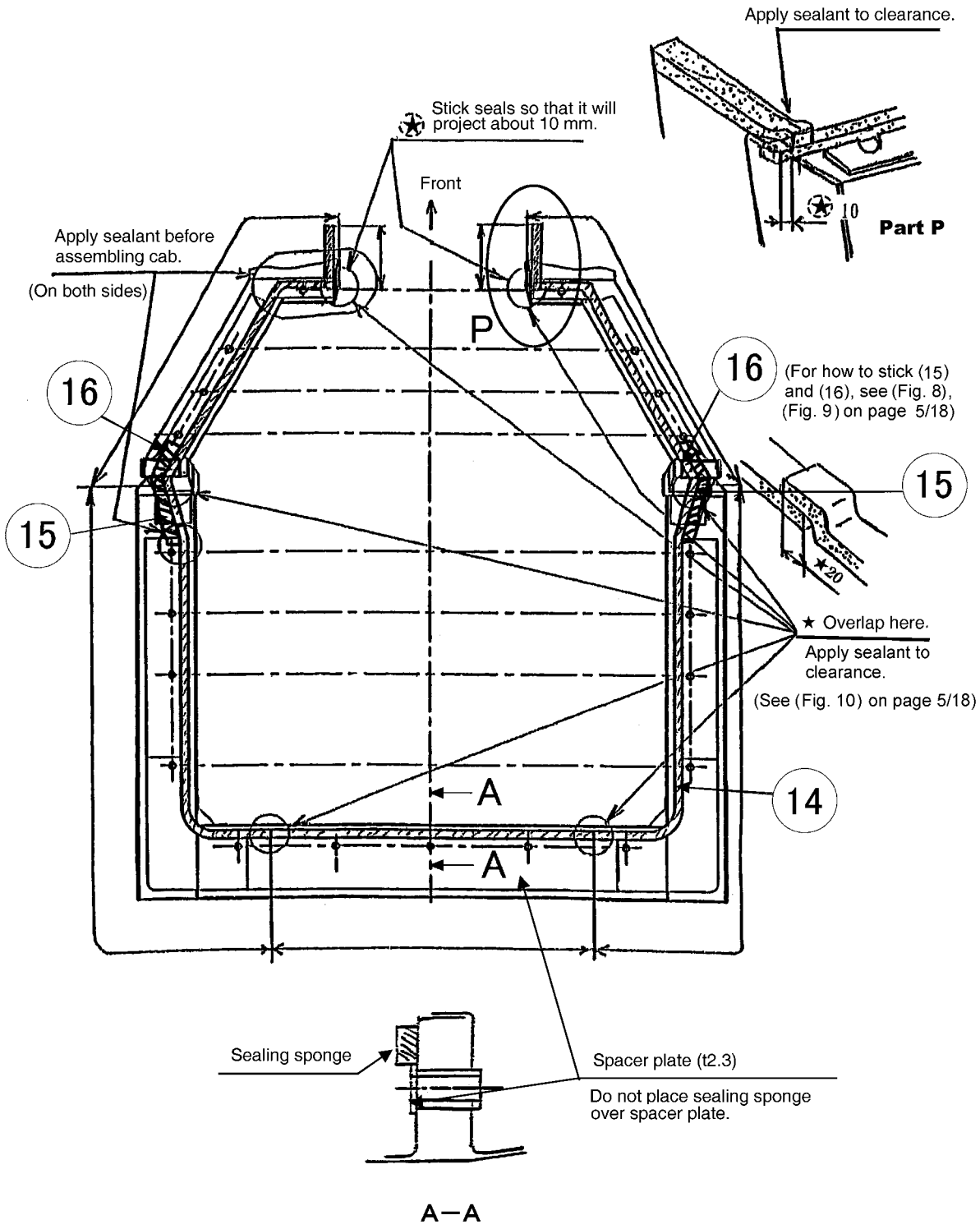
Fig. 6



No.	Part name	Part No.	Q'ty
14	Rubber seal	14X-911-5911	3
15	Rubber seal	198-Z11-7420	2
16-1	Rubber seal	198-Z11-7410	1
16-2	Rubber seal	198-Z11-7430	1

Assembly process No.	Installation of operator's cab (4/18)
A-13	

Fig. 7 How to stick seals (View from bottom of operator's cab)



Remark : For the base seal shown in the figure, see the next page.

Assembly process No.	Installation of operator's cab (5/18)
A-13	

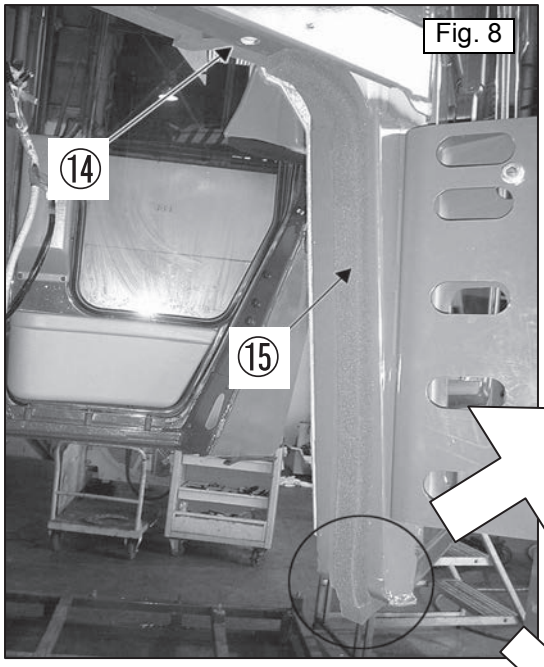


Fig. 8

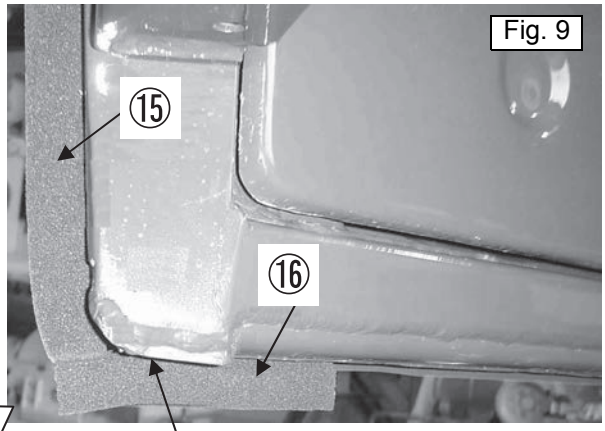


Fig. 9

Apply paste seal (55) to clearance

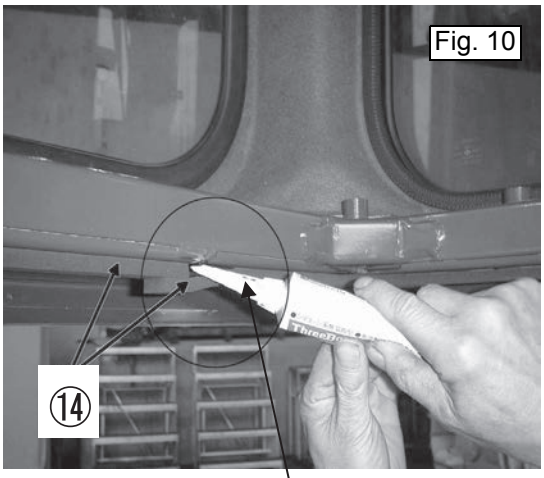


Fig. 10

Apply paste seal (55) to clearance

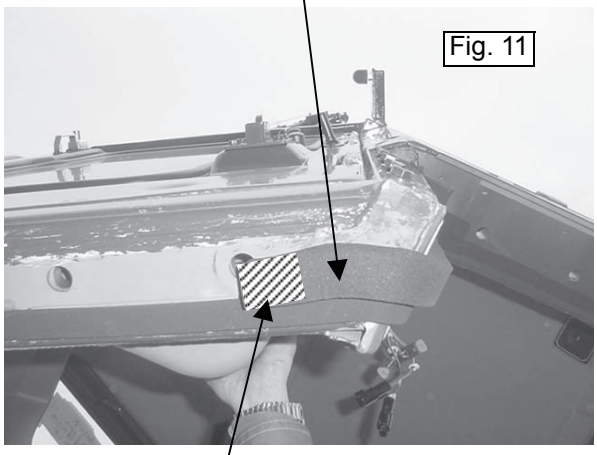


Fig. 11

The seal may cover on the mounting hole. In such case, cut it off accordingly.

No.	Part name	Part No.	Q'ty
55	Paste seal	198-Z11-3960	1

Assembly process No.	Installation of operator's cab (6/18)
A-13	

5) Installation of operator cab (hereinafter referred to as cab)

5.1) Lower the operator's cab assembly slowly onto the floor frame.

★ Since the clearance between the air conditioner duct on the cab side and the machine monitor (instrument panel) is narrow, lower the cab carefully, taking care not to hit it.

★ Since the rubber seal has high reaction force, take care that the cab will not swing or move laterally.

★ Take care that the rubber seal will not be moved or damaged.

★ Eliminate the clearance between the rubber seal of the air conditioner duct on the cab side and the air conditioner duct on the dashboard side.

Remark: For the machine monitor, see "assembly procedure M-2".

5.2) Tighten bolts (17) and (19) and washers (18) temporarily. See (Fig. 15)

★ The bolts at the cab door inlet have different length. Take care.

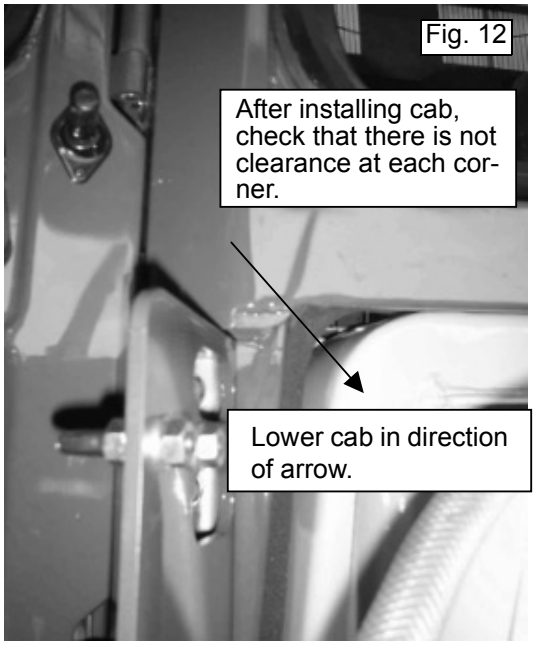


Fig. 12

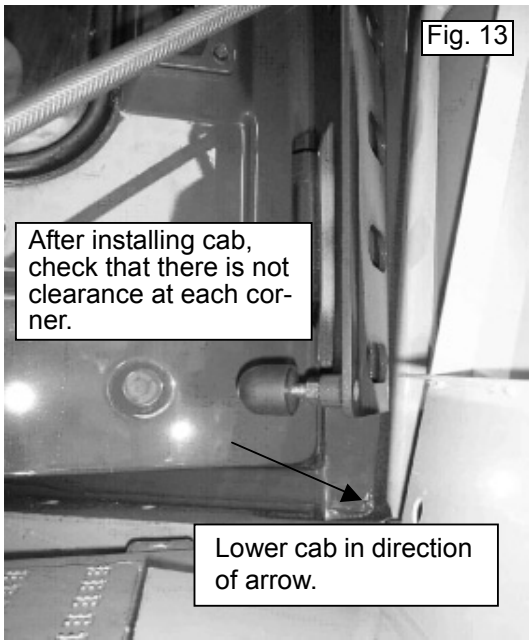


Fig. 13

5.3) Confirm if there is a clearance between the mating part (a) of the rubber seal and floor frame. (Fig. 14)

★ If there is a clearance as a result of the confirmation, sling the cab again and repeat the procedure from step 5.1).
If the clearance is very narrow, however, fill it with paste seal (55).

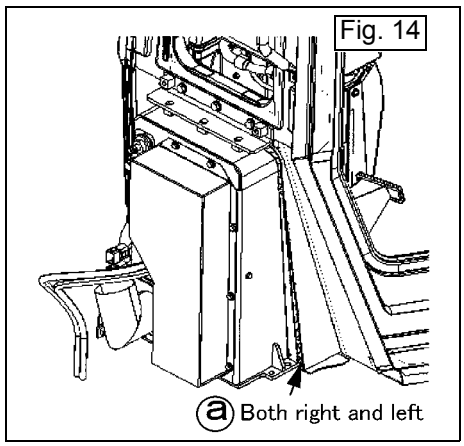
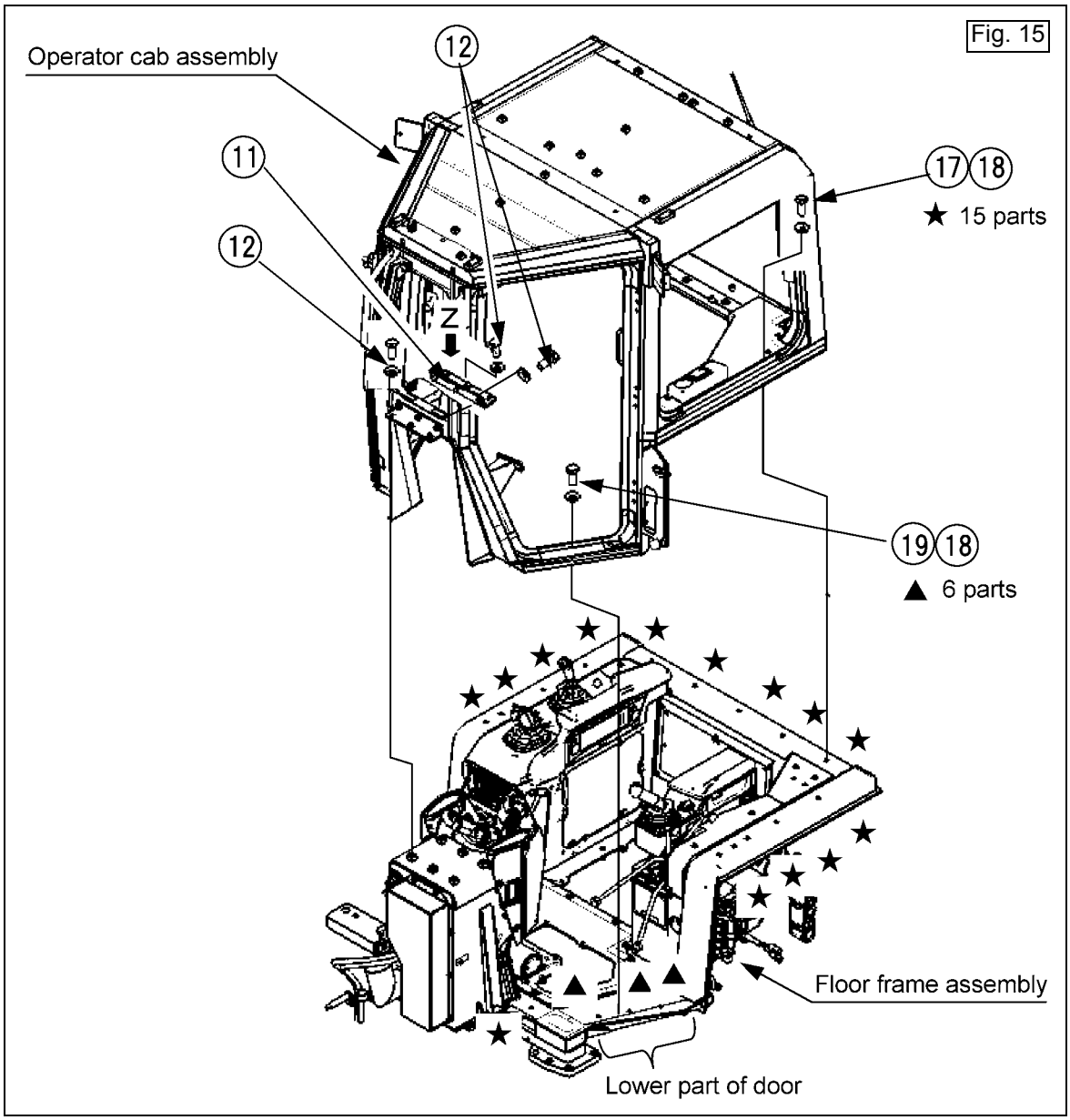


Fig. 14

Assembly process No.	Installation of operator's cab (7/18)
A-13	

5.4) After installing the cab on the floor, temporarily assemble the L-shaped plate for indoor use (11) by using sems bolts (12) (in order to prevent damage to the wiring on dashboard).



No.	Part name	Part No.	Q'ty
11	Bracket	198-Z11-3571	1
12	Sems bolt	01024-D1230	9
17	Bolt	01010-81275	15
18	Washer	124-54-26540	21
19	Bolt	01010-81245	6
55	Paste seal	198-Z11-3960	1

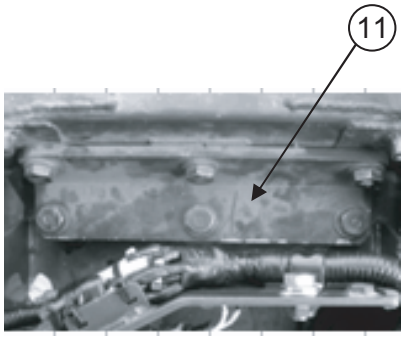
Assembly process No.	Installation of operator's cab (8/18)
A-13	

5.5) Check that the clearance between the air conditioner duct on the cab side and monitor is even on the right and left sides.
At the same time, check that the air conditioner duct seal on the cab side is fitted to faces C on the right and left sides of the air conditioner duct on the dashboard side and it is not moved to the right or left.

5.6) If the clearance between the air conditioner duct on the cab side and monitor is not even, loosen the air conditioner duct mounting screws on the cab side and move the air conditioner duct so that the clearance will be even.
If the duct on the cab side or air conditioner side is moved to the right or left, adjust it similarly.

5.7) Permanently tighten bolts (17) and (19) which were tightened temporarily in step 5.2) above .

5.8) Permanently tighten mounting bolts (12) of Lplates (11) which were installed temporarily in step 5.4 above.



View Z

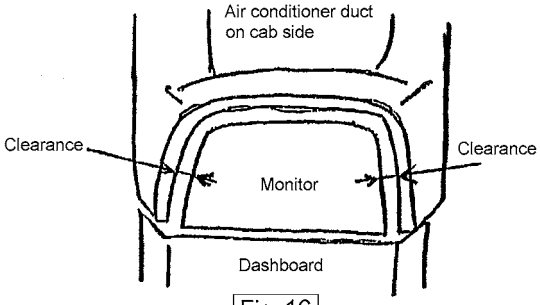


Fig. 16

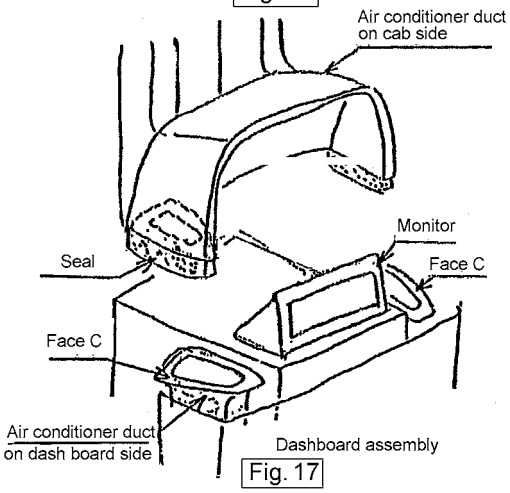


Fig. 17

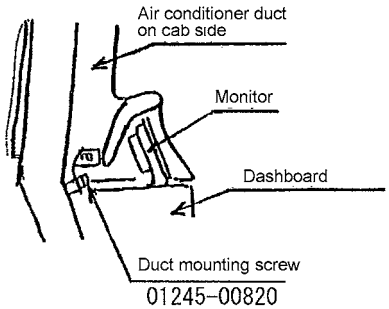


Fig. 18

* If the machine is equipped with the rear camera, the camera wiring must be connected to the multi-monitor.
See A-14 "Installation of rear monitor camera".

Assembly process No.	Installation of operator's cab (9/18)
A-13	

5.9) Install plates (20) with bolts (21) and washers (22). (2 pieces on each side)

5.10) Install right and left foot rests (23) and (24) with bolts (25) and washers (26).

5.11) Install pedal caps (27) to the foot rests.

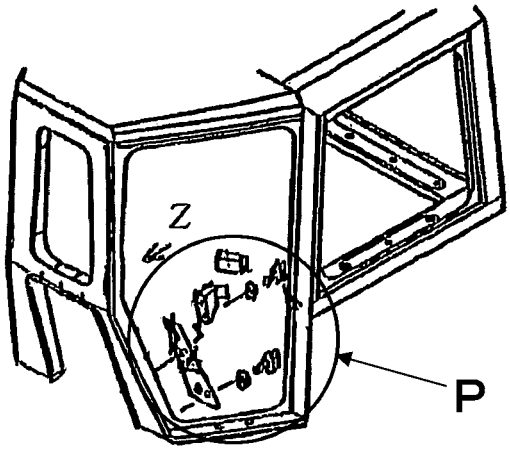
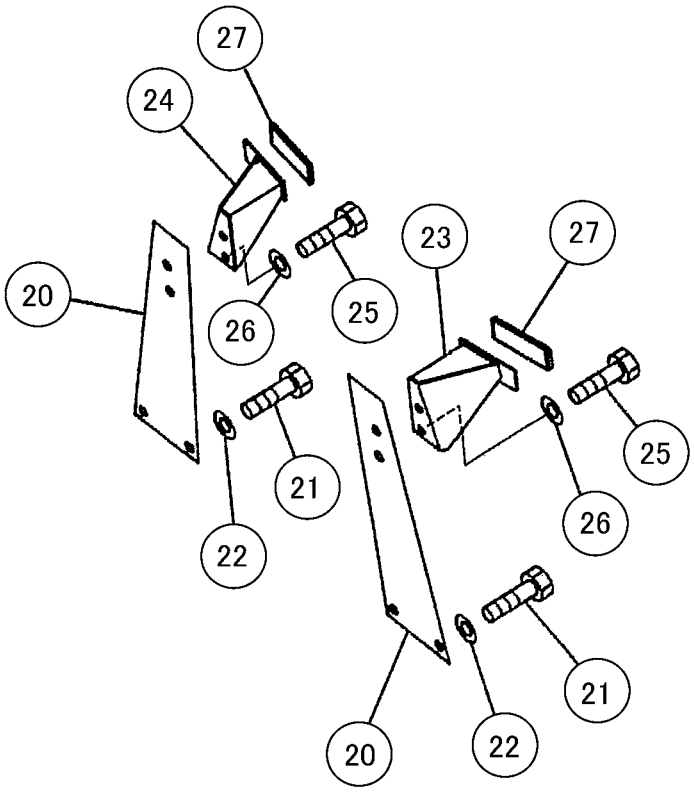


Fig. 19



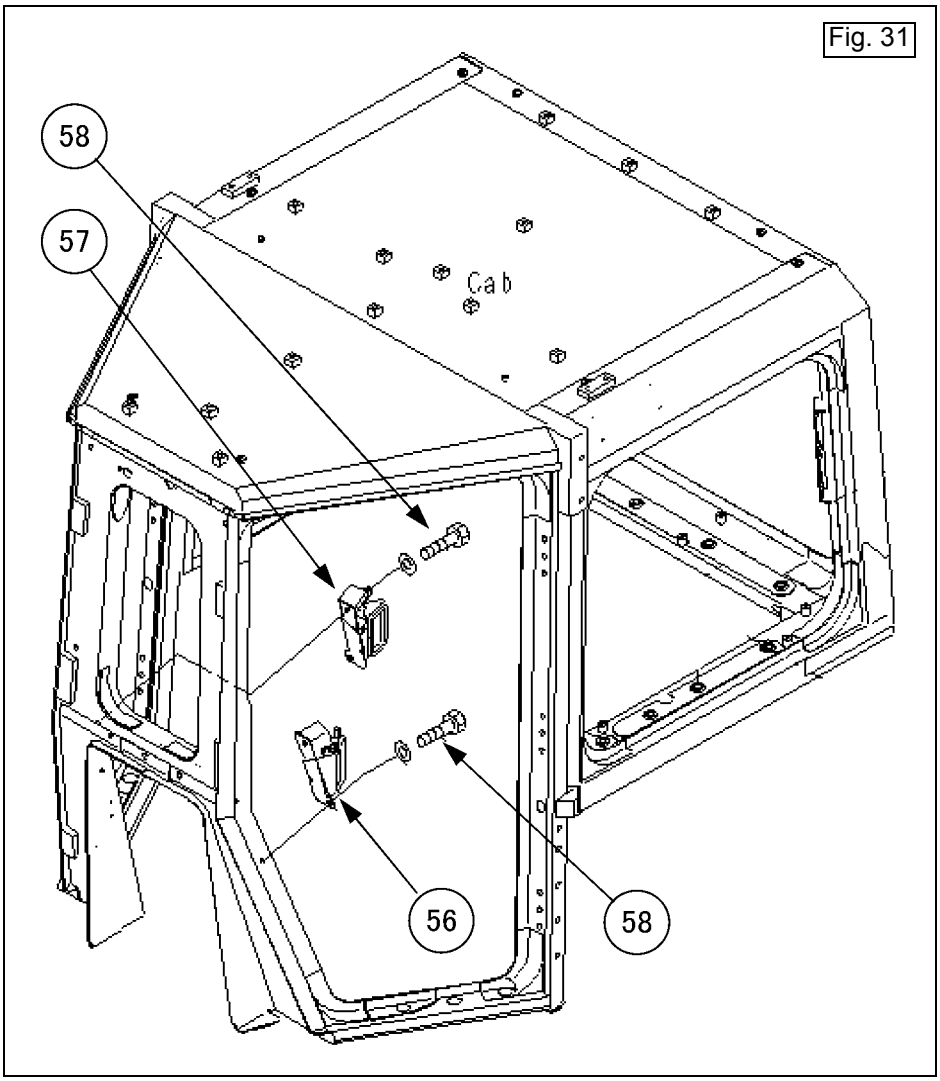
P part

No.	Part name	Part No.	Q'ty
20	Plate	198-Z11-2961	2
21	Sems bolt	01024-D1230	4
23	Foot rest (left)	14X-911-5711	1
24	Foot rest (right)	14X-911-5721	1
25	Sems bolt	01024-D1230	4
27	Pedal cap	203-43-56450	2

Assembly process No.	Installation of operator's cab (10/18)
A-13	

5.12) Installation of defroster ducts for right and left doors
Install left and right defroster ducts (56) and (57) with sems (58).

Fig. 31



No.	Part name	Part No.	Q'ty
56	Duct (L.H.)	198-911-9511	1
57	Duct (R.H.)	198-911-9521	1
58	Sems bolt	01024-D1230	4

Assembly process No.	Installation of operator's cab (11/18)
A-13	

5.13) The bundle of window washer tubes and the power supply wiring harness for cab (A) in (Fig. 20) come out of the bottom of the cab left side pillar (pillar at the left door hinge) into the cab. Take them out of the cab through the hole on the floor frame (B) in (Fig. 20).

5.14) Fit the grommet of the rubber boot protecting above bundle (A) to hole (B) and connect the boot to the cab and floor frame. (Fig. 21)

5.15) Connect bundle of the window washer tubes and power supply wiring harness for cab (A) pulled out in step 5.13) to the window washer tubes and power supply wiring harness for cab installed to the machine in advance at a place out of hole (B) indicated with X-> in (Fig. 20). (Fig. 22), (Fig. 23)

★ The window washer tubes and power supply wiring harness for cab have connector No. indicating rings at their ends as shown in (Fig. 22).
Connect the tubes having the same color marks and the connectors having the same Nos. together respectively.

Fig. 20

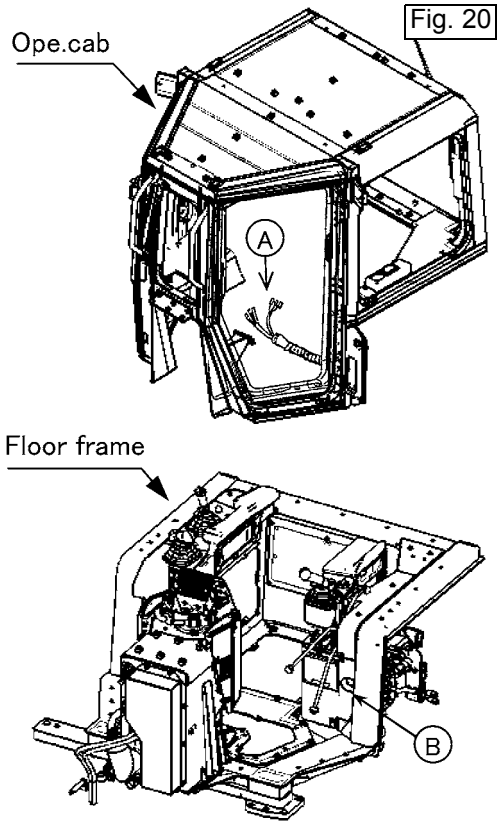
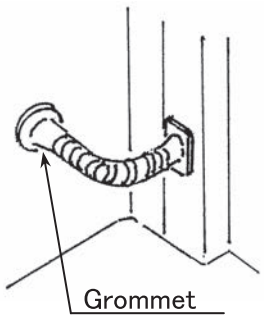
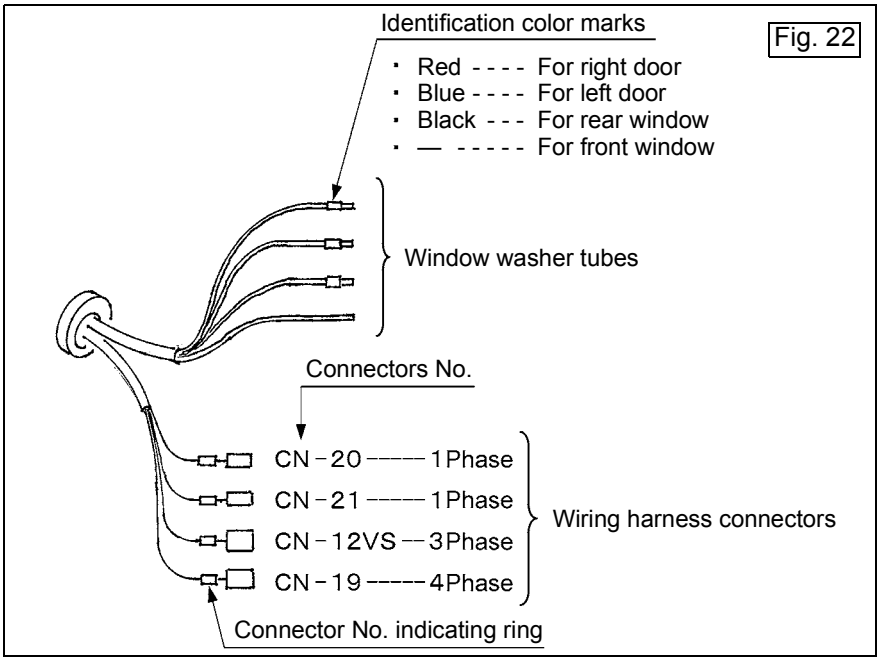
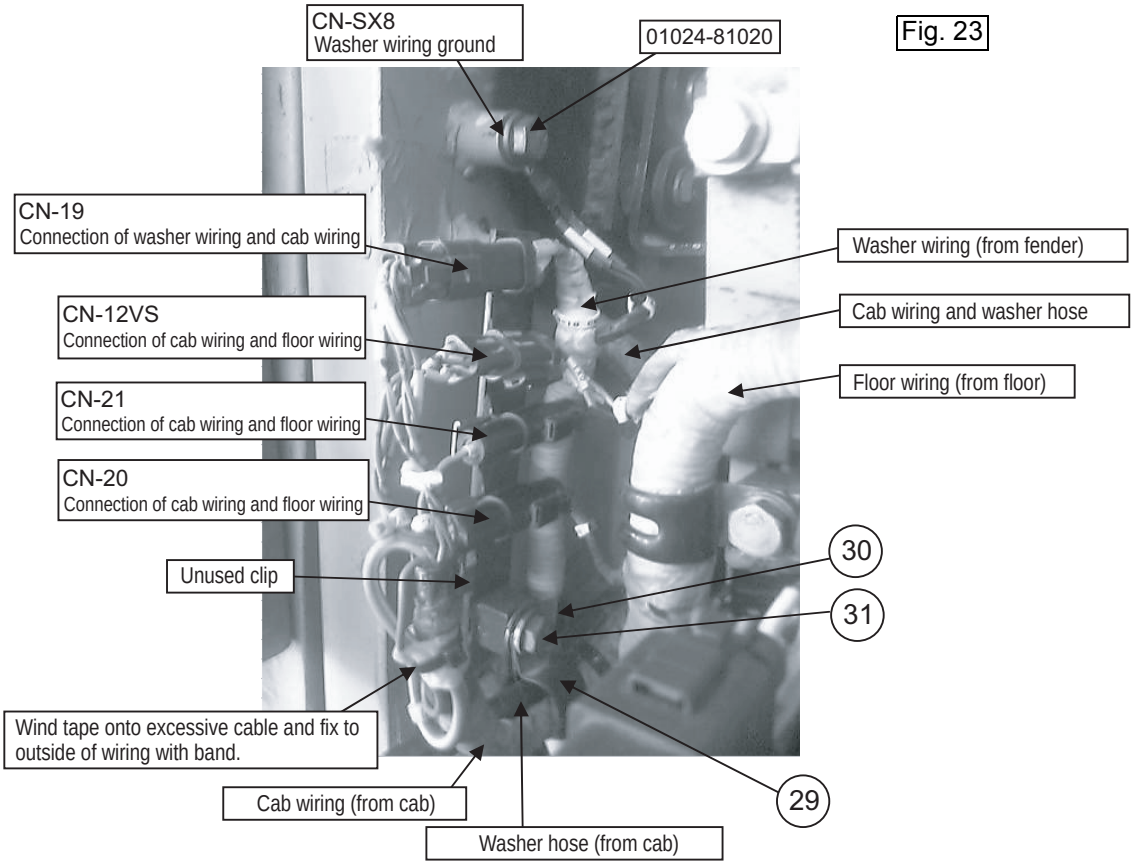


Fig. 21



Assembly process No.	Installation of operator's cab (12/18)
A-13	



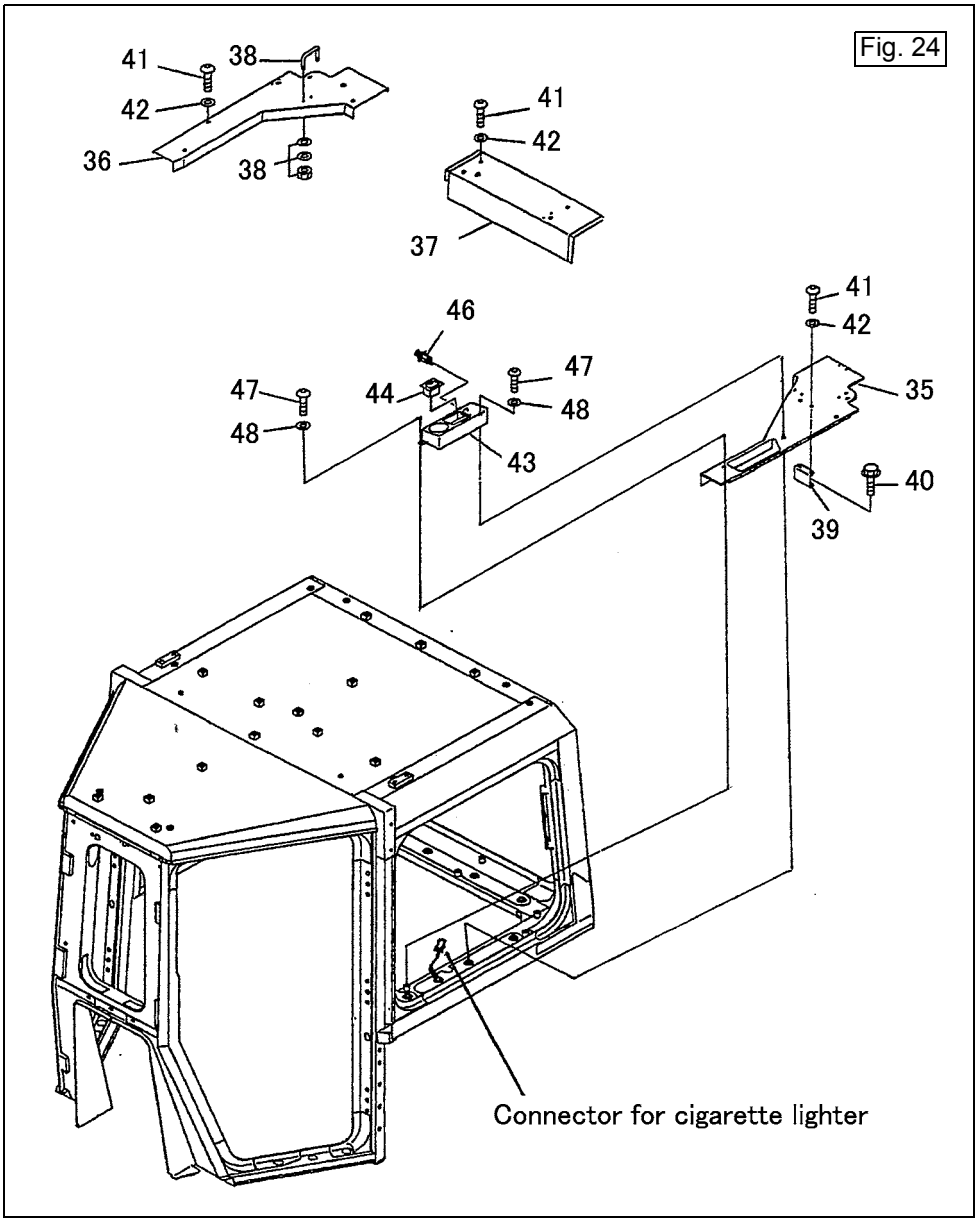


No.	Part name	Part No.	Q'ty	Remarks
29	Clip	04435-51910	1	Fix cab wiring and washer wiring simultaneously.
30	Clip	04434-51812	1	
31	Sems bolt	01024-81020	2	Tighten 04434-51910 and 04434-51812 together.

Assembly process No.	Installation of operator's cab (13/18)
A-13	

6) Installing the internal decorative parts and accessories

Fig. 24



No.	Part name	Part No.	Q'ty	Remarks
35	Cover (left)	198-Z11-2872	1	
36	Cover (right)	198-Z11-2882	1	
37	Cover	198-Z11-2892	1	
38	Handle	198-Z11-2850	6	
39	Bracket	198-Z11-3990	1	
40	Bolt	01435-30825	2	
41	Screw	01245-00820	13	
42	Washer	01643-70823	13	
43	Box	198-Z11-7490	1	
44	Tray	20G-54-13420	1	Ashtray
45	Lighter	20Y-06-23472	1	Cigarette lighter
46	Screw	01245-00820	2	
47	Washer	01643-70823	2	

Assembly process No.	Installation of operator's cab (14/18)
A-13	

6.1) Install handles (38) to covers (35), (36) and (37) around the floor frame (at the right, left and rear). (6 places)
6.2) Install the bracket (39) to the floor frame using bolts (40). (1 place)
6.3) Install the floor edge covers to each of which the handle was installed according to the above Paragraph (41) to their positions using the screws and washers (41) and (42). (Use a total of 13 units each.) (13 places)
6.4) Install box (43) having ashtray (44) and cigarette lighter (46) with screws (47) and washers (48).
★ When installing, connect the cigarette lighter connector coming out of the operator cab to that on box (43) side.
★ When the machine is delivered, ashtray (44) and cigarette lighter (46) are installed to box (43).

7) Installation of cover to rear side of front duct

Fig. 25

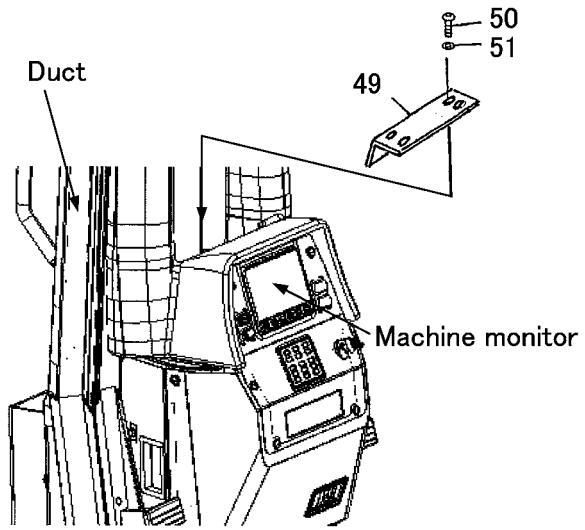
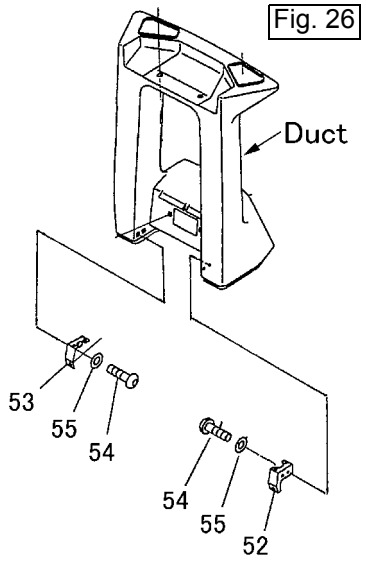


Fig. 26



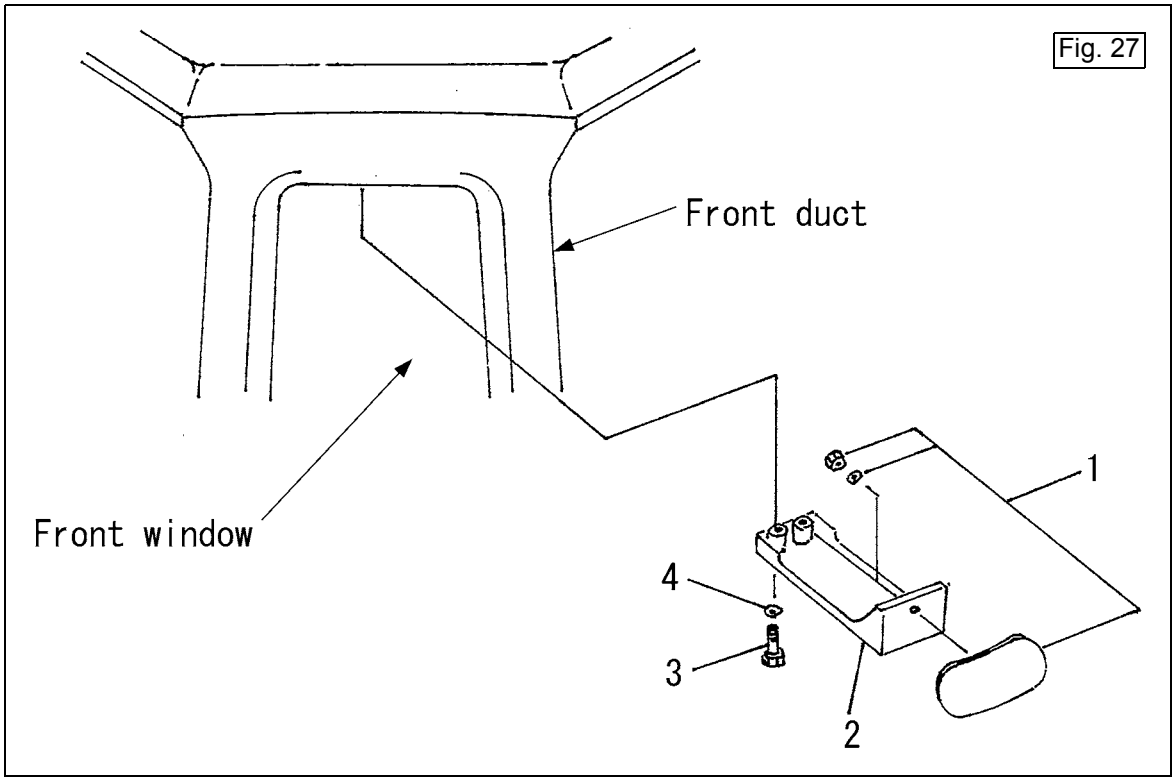
No.	Part name	Part No.	Q'ty	Remarks
49	Cover	195-54-68282	1	
50	Screw	01245-00616	4	
51	Washer	01643-70623	4	
52	Btracket (left)	198-Z11-3850	1	Installed already
53	Btracket (right)	198-Z11-3860	1	
54	Screw	01245-00616	2	
55	Washer	01643-70623	2	

7.1) Install cover (49) to the rear side of the box of the front duct containing the machine monitor (instrument panel) with screws (50) and washers (51).

★ Install the cover to the brackets (52) and (53) which are already installed to the bottom of the duct with screws (54) and washers (55). (Fig. 26)

Assembly process No.	Installation of operator's cab (15/18)
A-13	

8) Installation of rear view mirror (optional)



No.	Part name	Part No.	Q'ty	Remarks
1	Mirror	14X-911-6140	1	
2	Bracket	198-Z11-3670	1	
3	Sems bolt	01024-D0845	2	

8.1) Install rear view mirror (1) to bracket (2)

8.2) Install bracket (2) to the front duct top of the operator cab.

★ The rear view mirror is an optional part, which is not installed to the operator cab of the standard specification.

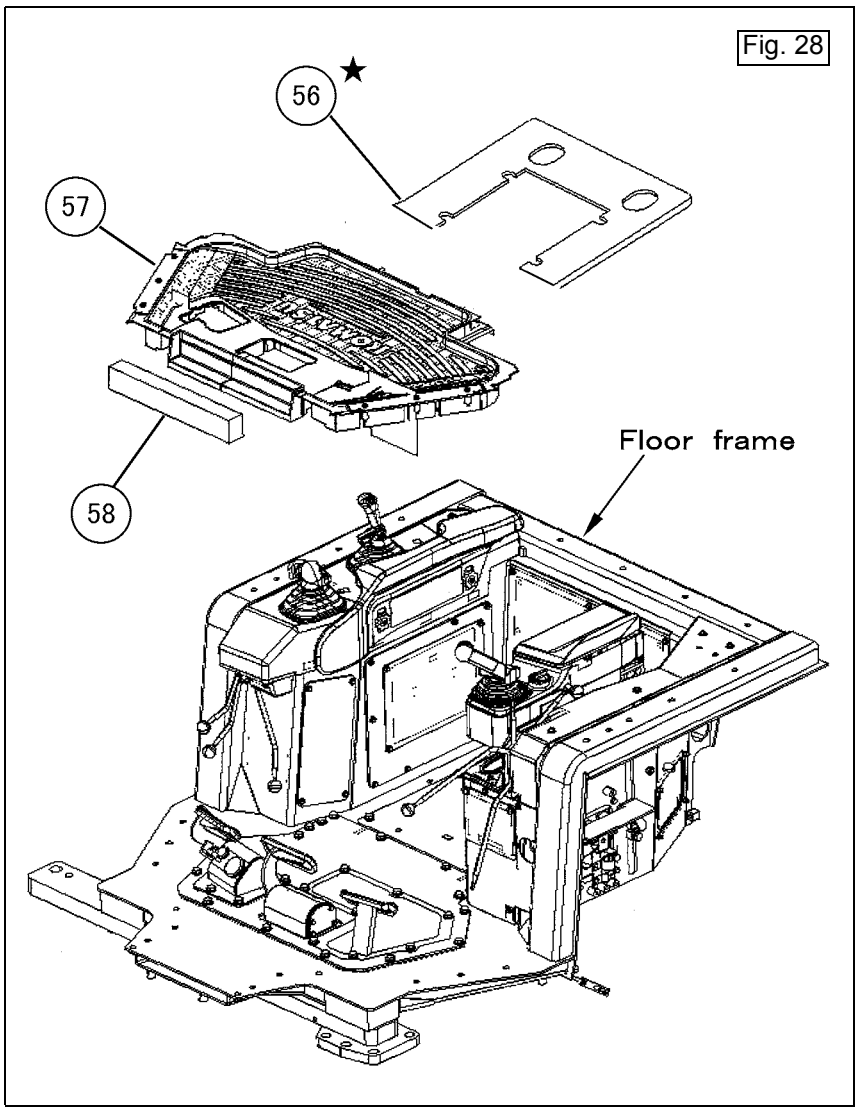
★ Each operator cab to be equipped with the rear view mirror is delivered with the rear view mirror installed, as a rule.

Accordingly, this work is required only when the rear view mirror is delivered uninstalled.

Assembly process No.	Installation of operator's cab (16/18)
A-13	

9) Installation of floor mats

9.1) Install the floor mats (57), (58).



★ Floor mat (56) is installed together with the operator seat to the floor frame when delivered.

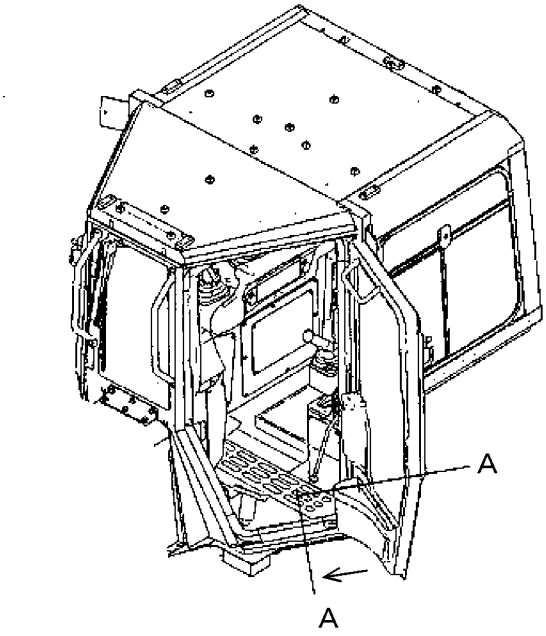
No.	Part name	Part No.	Q'ty	Remarks
56	Mat	195-54-68981	1	Installed already
57	Mat	195-54-68971	1	
58	Mat	195-54-68891	1	

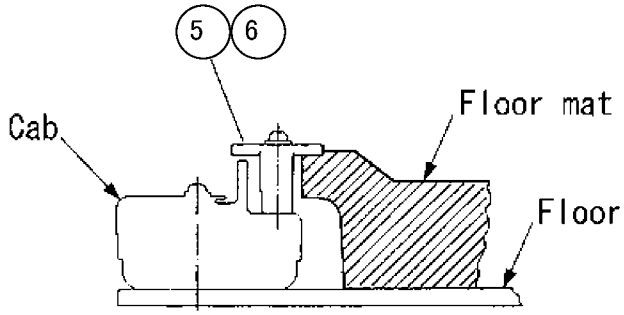
★ If the floor mats may be stained during the following work, floor mats (57) and (58) should be installed just before completion of the assembly of the machine.

Assembly process No.	Installation of operator's cab (17/18)
A-13	

9.2) Hold the right and left ends of floor mat (57) with plates (59) and (60) installed to the bottom of the operator cab doorway. See (Fig. 29)

Fig. 29



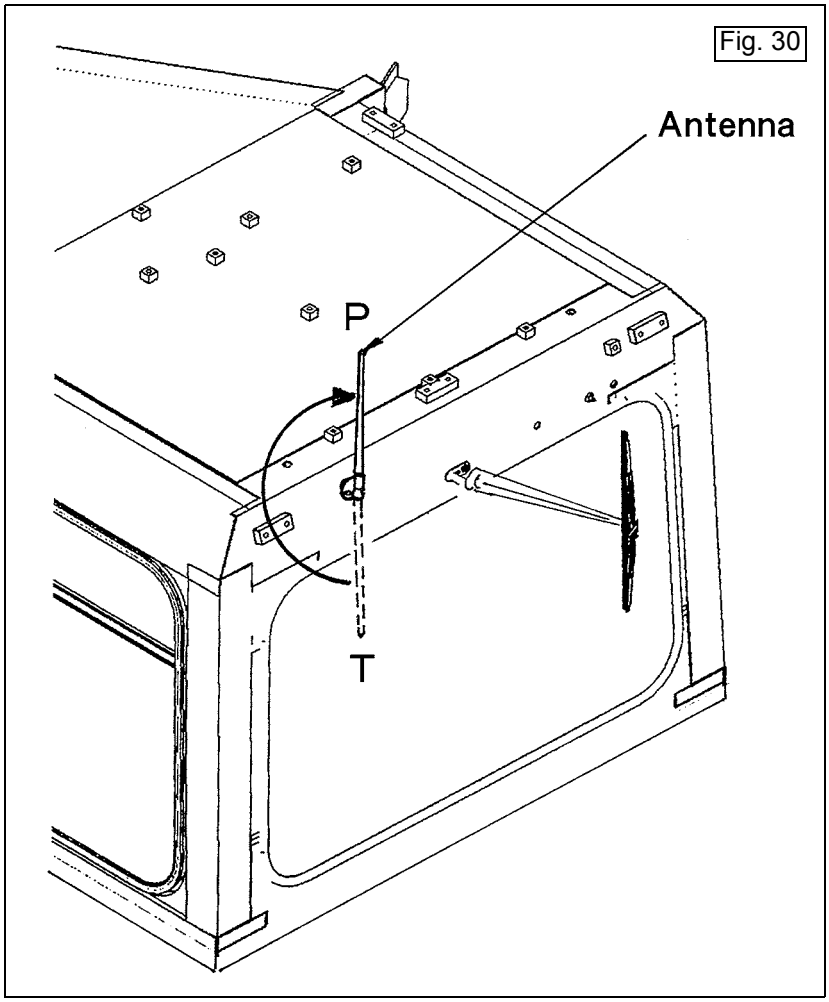


Detail of section A-A

No.	Part name	Part No.	Q'ty	Remarks
59	Plate	198-Z11-7590	2	
60	Bolt	01024-D0650	6	

Assembly process No.	Installation of operator's cab (18/18)
A-13	

10) Change of installed angle of radio antenna



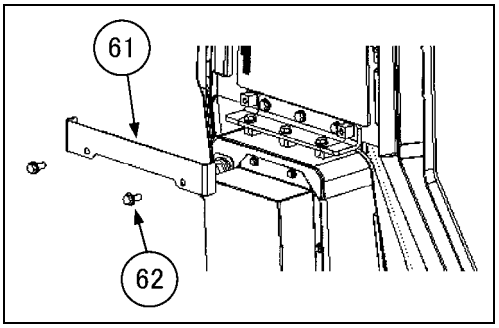
10.1) Loosen the wing bolt at the center of rotation of the radio antenna, rotate the antenna from position (T) indicate with the broken line to position (P) indicated with the solid line, and stand it vertically.
Tighten the wing bolt again to fix the antenna.

★ Loosen and tighten the wing bolt with the hand.

★ The radio antenna is set to position (T) indicated with the broken line for packing when the operator cab is transported from the factory to the field.

11) Installation of the guard for cab windshield glass
Install the cover (61) to the lower part of cab windshield glass by using sems bolts (62).

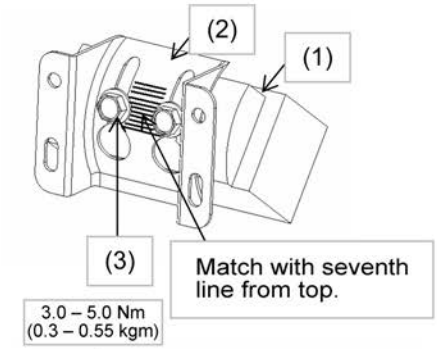
No.	Part name	Part No.	Q'ty
61	Cover	198-Z11-7991	1
62	Sems bolt	01024-D1230	2



Assembly process No.	Installation of rear monitor camera (if equipped) (1/4)
A-14	

1. Camera sub-assembly

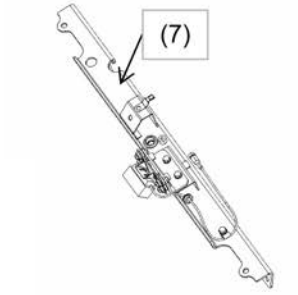
   (1) Install camera (1) to bracket (2) by using bolts (3).
   * Match the center of bolt (3) with the seventh line from the top in the scale stuck to bracket (2).

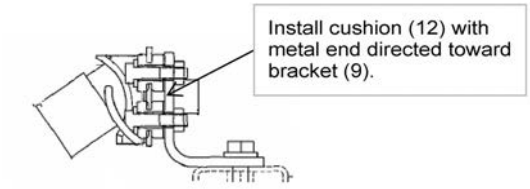


2. Camera bracket sub-assembly

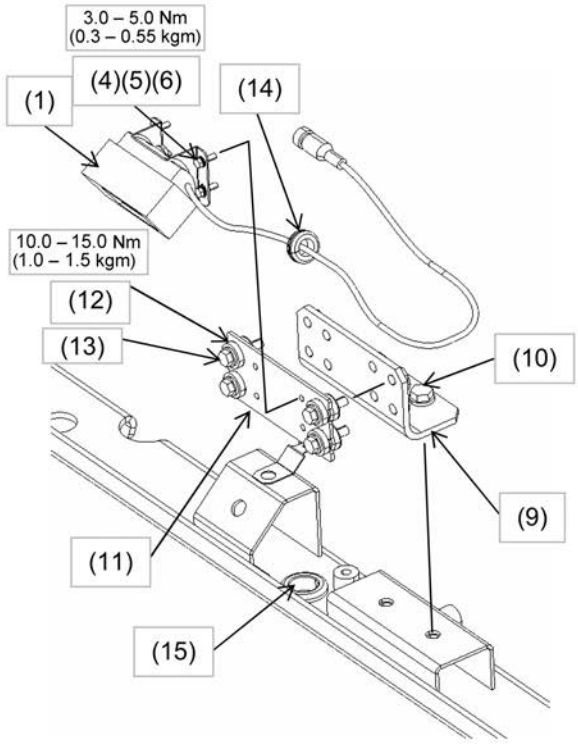
   (1) Install bracket (9) to camera bracket (7) by using bolts (10).

   (2) Insert cushion (12) into bracket (11) and install them to bracket (9) by using bolts (13).





   (3) Install camera (1) to plate (11) by using bolts (4), (5), and (6).



   (4) Put grommet (14) over the camera wiring.

   (5) Install grommet (15) to bracket (7).

* For details of each part, see (4/4).

Assembly process No.	Installation of rear monitor camera (if equipped) (2/4)
A-14	

3. Installation of camera sub-assembly

   (1) Install sub-assembled camera bracket (7) to the cab by using bolts (8).

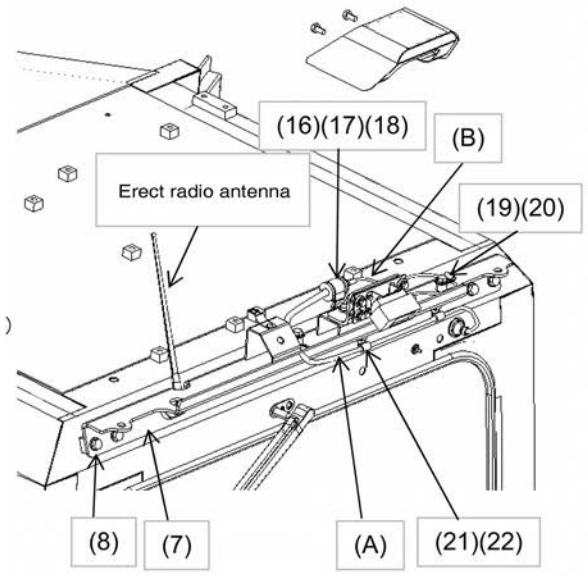
   * Keep the radio antenna erected.

   (2) Pass camera wiring (A) installed to the rear of the cab through grommet (15) fitted to camera bracket (7) and connect it to camera wiring (B).

   (3) Fix the connectors of camera wirings (A) and (B) by using cushion (16) and clamps (17) and (18).

   (4) Fix camera wiring (B) to camera bracket (7) by using clamps (19) and (20).

   (5) Fix camera wiring (A) to camera bracket (7) by using clamps (21) and (22).



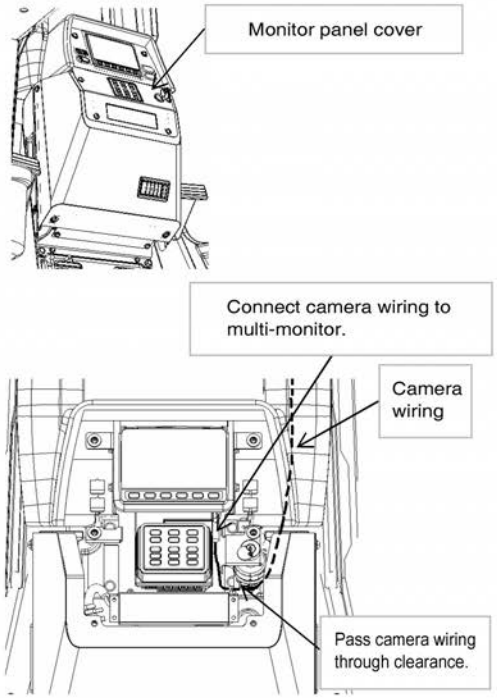
4. Connection of camera wiring to multi-monitor

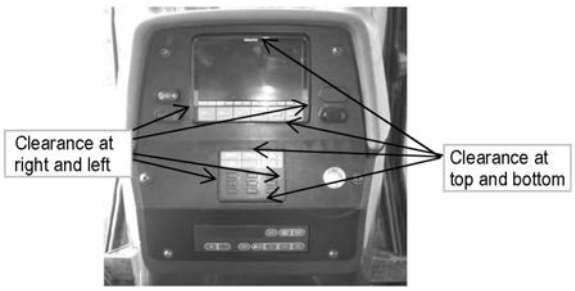
   (1) Remove monitor panel cover (C) before installing the cab.

   (2) After installing the cab, connect the camera wiring to the connector on the right side of the multi-monitor.

   (3) Install the monitor panel cover.

   * Install the monitor panel cover in order to make that the clearance between the monitor panel and the panel cover hole is even.





* For details of each part, see (4/4).

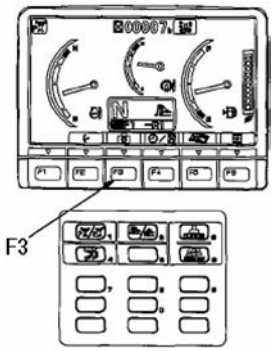
Assembly process No.	Installation of rear monitor camera (if equipped) (3/4)
A-14	

5. Check of camera direction

   (1) After assembling the machine, change the multi-monitor screen to the camera screen.

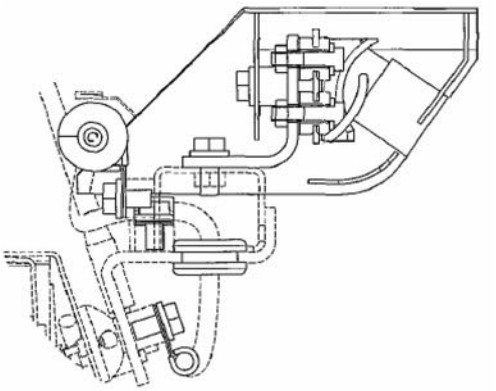
   (2) Ensure that a part of the rear cover is displayed at the bottom of the camera screen.
   When the screen is wrong, adjust the camera direction.

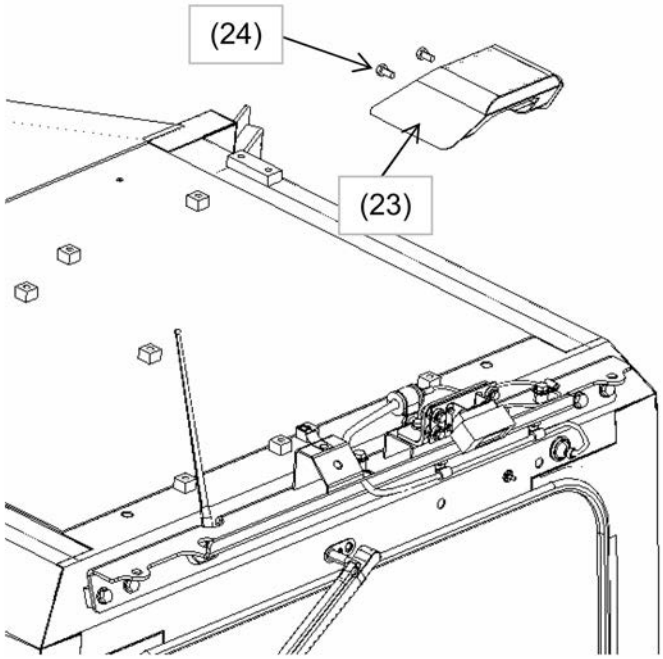
   * The above camera view range is a proper range. Adjust it according to the customer's request.



6. Installation of camera cover

   (1) Install cover (23) to bracket (9) by using bolts (24).





* For details of each part, see (4/4).

Assembly process No.	Installation of rear monitor camera (if equipped) (4/4)
A-14	

No.	Part name	Part No.	Q'ty	Remarks
1	Camera	7835-33-1100	1	Packed in 7835-33-1001
2	Bracket	7835-33-1201	1	Packed in 7835-33-1001
3	Bolt	7835-33-1310	2	Packed in 7835-33-1001
4	Bolt	7835-33-1320	4	Packed in 7835-33-1001
5	Washer	7835-33-1330	4	Packed in 7835-33-1001
6	Washer	7835-33-1340	4	
7	Bracket	195-06-55491	1	
8	Sems bolt	01024-D1225	4	
9	Bracket	20Y-06-41661	1	
10	Sems bolt	01024-D1025	2	
11	Bracket	20Y-06-41670	1	
12	Cushion	20Y-810-1240	4	
13	Sems bolt	01024-D0835	4	
14	Grommet	201-54-13210	1	
15	Grommet	205-977-7310	1	
16	Cushion	07095-00317	1	
17	Clamp	04434-53211	1	
18	Sems bolt	01024-D1020	1	
19	Clamp	04434-50610	1	
20	Sems bolt	01024-D1020	1	
21	Clamp	04434-51010	3	
22	Sems bolt	01024-D1020	3	
23	Cover	20Y-06-41681	1	
24	Sems bolt	01024-D1020	2	

Assembly process No.	Installation of additional cab lights (if equipped) (1/2)
A-15	

For machine without camera

1. Installation of additional lights to cab top

   (1) Install brackets (1), (2), (3), and (4) to the top and rear of the cab by using bolts (5).

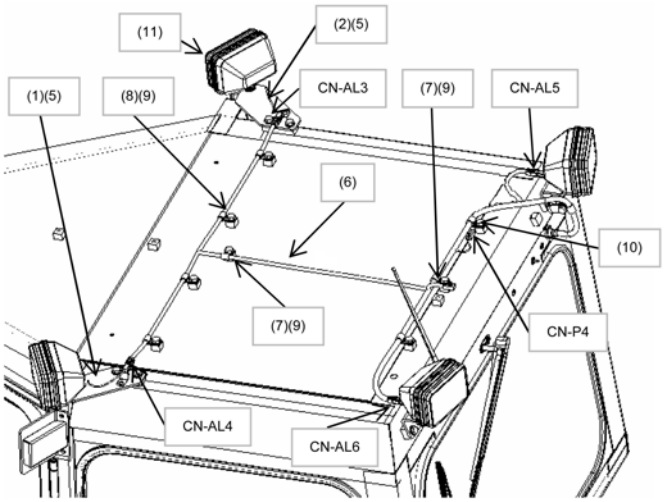
   (2) Install wiring (6) by using clamps (7), (8), and bolts (9).

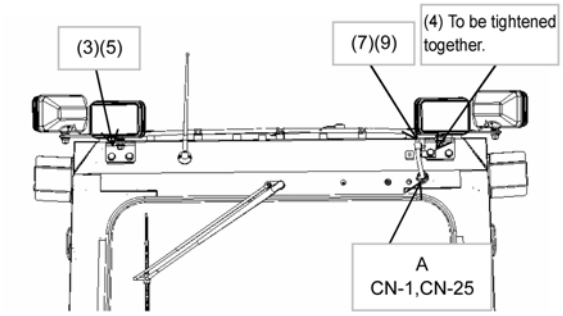
   (3) Remove the cap at the rear of the cab, take out the internal wiring connectors (No. CN-1, 25) through the hole, connect them, and return them into the cab.
   Put wiring grommet (A) to the hole.

   (4) Tighten clip (10) together with the clamp to fix the connector (CN-P4).

   (5) Install lamps (11) to the brackets and connect the connectors (CN-AL3, AL4, AL5 and AL6).

   * Adjust the light angles as necessary.





No.	Part name	Part No.	Q'ty	Remarks
1	Bracket	198-Z11-7830	1	For left
2	Bracket	198-Z11-7840	1	For right
3	Bracket	198-Z11-5490	2	For rear
4	Bracket	207-92-51270	1	For right rear
5	Sems bolt	01024-D1225	8	
6	Wiring harness	195-Z11-7350	1	
7	Clamp	04434-51412	7	
8	Clamp	04434-51012	4	
9	Sems bolt	01024-81220	9	
10	Clip	08193-21012	1	
11	Work lamp	17A-06-17931	4	Halogen
	Work lamp	21T-06-33980	4	HID

Assembly process No.	Installation of additional cab lights (if equipped) (2/2)
A-15	

For machine with camera

1. Installation of additional lights to cab top

   (1) Install brackets (1) and (2) to the top and rear of the cab by using bolts (5).

   (2) Tighten bracket (4) together with the camera bracket.

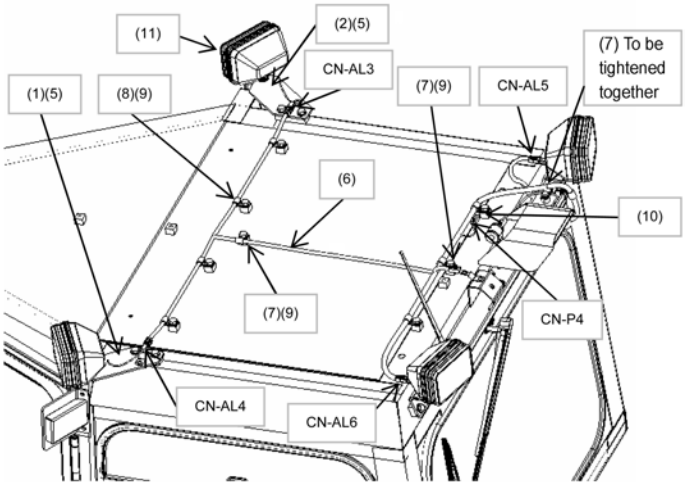
   (3) Install wiring (6) by using clamps (7), (8), and bolts (9).

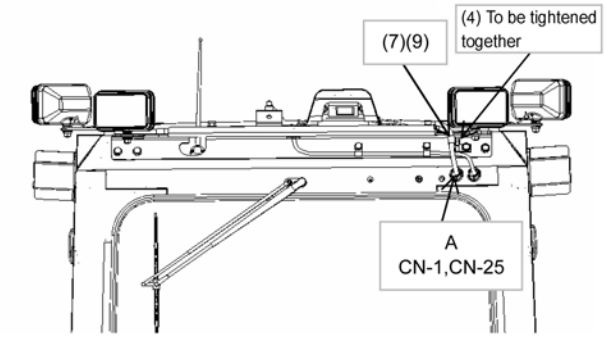
   (4) Remove the cap at the rear of the cab, take out the internal wiring connectors (No. CN-1, 25) through the hole, connect them, and return them into the cab.
   Put wiring grommet (A) to the hole.

   (5) Tighten clip (10) together with the clamp to fix the connector (CN-P4).

   (6) Install lamps (11) to the brackets and connect the connectors (CN-AL3, AL4, AL5 and AL6).

   * Adjust the light angles as necessary.





No.	Part name	Part No.	Q'ty	Remarks
1	Bracket	198-Z11-7830	1	For left
2	Bracket	198-Z11-7840	1	For right
4	Bracket	207-92-51270	1	For right rear
5	Sems bolt	01024-D1225	4	
6	Wiring harness	195-Z11-7350	1	
7	Clamp	04434-51412	6	
8	Clamp	04434-51012	4	
9	Sems bolt	01024-81220	9	
10	Clip	08193-21012	1	
11	Work lamp	17A-06-17931	4	Halogen
	Work lamp	21T-06-33980	4	HID

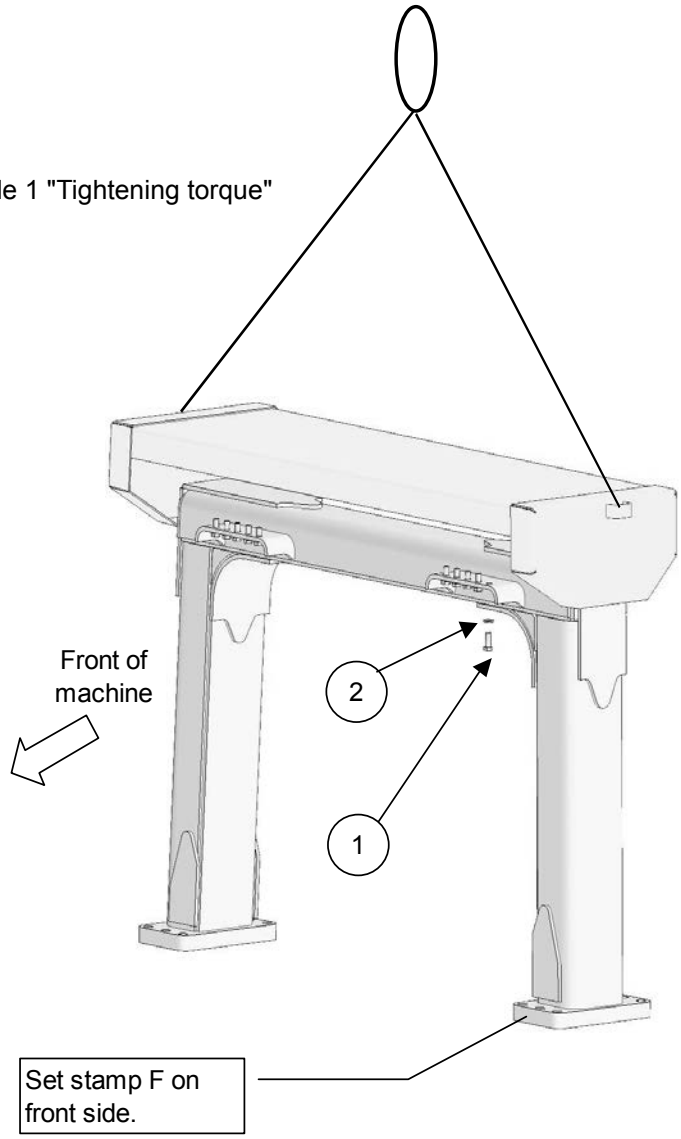
Assembly process No.	Installation of ROPS (1/2)
A-16	

1. Installation of roof to ROPS

   Roof: 80 kg

   ROPS: 600 kg

   Mounting bolt (1)
   Tightening torque: See Table 1 "Tightening torque"



No.	Part name	Part No.	Q'ty
1	Bolt	01010-81640	20
2	Washer	01643-31645	20

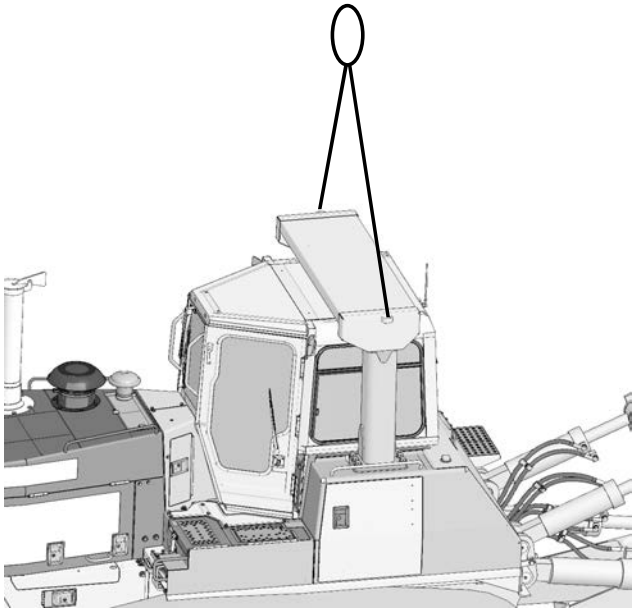
Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	Torque wrench (60 kgm)	1	25-ton crane	1
	M24 socket	1		
	ø12 mm × 2 m Wire rope sling	2		
	Other remarks			

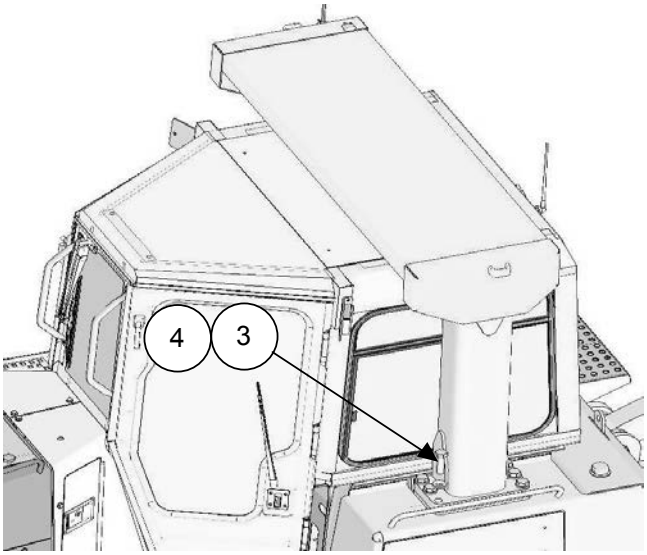
Assembly process No.	Installation of ROPS (2/2)
A-16	

2. Sling the ROPS with the crane and set it to the installing position.

   ROPS assembly: 700 kg

   Tightening torque: 1,520 – 1,910 Nm
   {155 – 195 kgm}



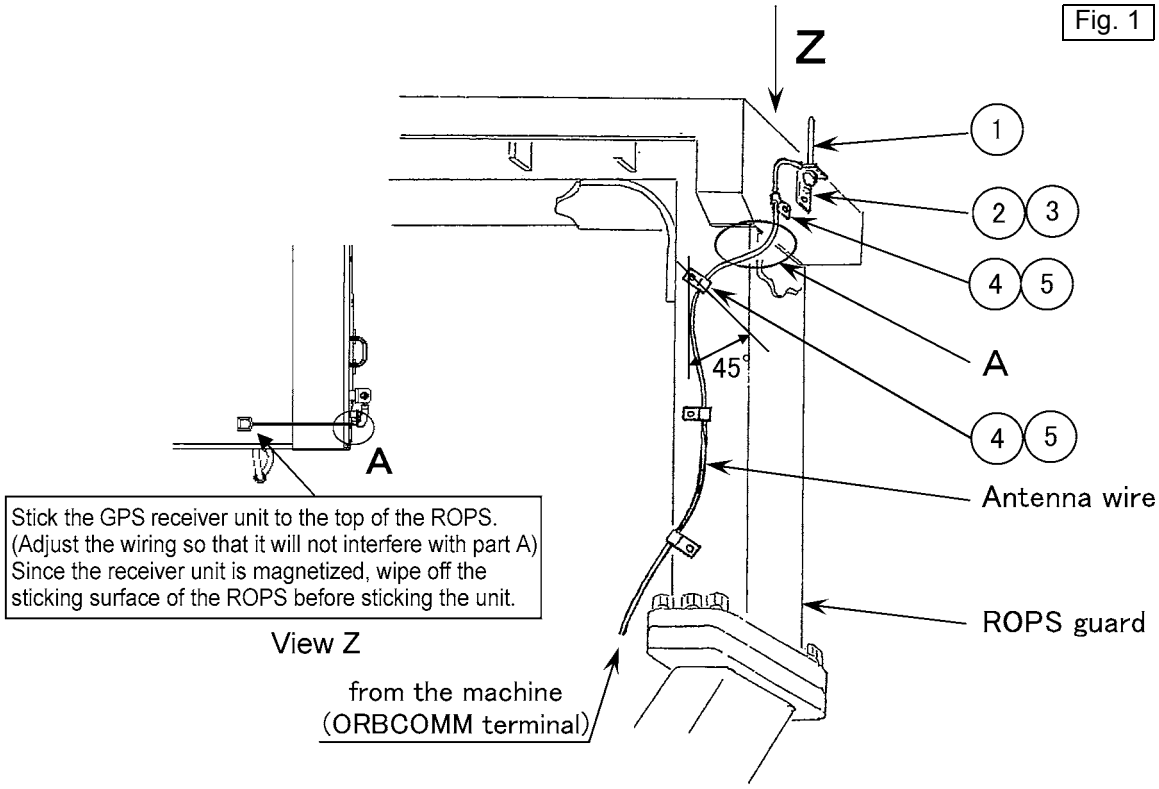


No.	Part name	Part No.	Q'ty
3	Bolt	01010-83010	12
4	Washer	01643-33080	12

Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
Enter the tightening torque (measured) of the mounting bolts in the Record column on page 8/8 of "Field assembly check sheet" at the end of this manual.	Torque wrench (210 kgm)	1		
	46-mm socket	1		
	ø12 mm × 2 m Wire rope sling	2		
	Other remarks			

Assembly process No.	Installation of VHMS, ORBCOMM antenna
A-17	

Fig. 1



No.	Part name	Part No.	Q'ty	Remarks
1	Antenna	8A13-10-2100	1	
2	Bracket	195-54-73450	1	
3	Bolt	01024-81016	2	
4	Clamp	04434-51408	4	
5	Bolt	01024-80816	4	

1) Install antenna installation bracket (2) to the hood of the ROPS guard.

2) Install the antenna cable from the ORBCOMM terminal installed to the machine to the ROPS guard with clamps (4) and then install its end to the antenna installation bracket (2).

★ When installing the antenna cable end to the antenna installation bracket, apply adhesive (LT-2) to the female threads of the nut and male threads of the cable end, and then tighten the nut. Do not stick the adhesive to the core or internal material of the antenna cable.

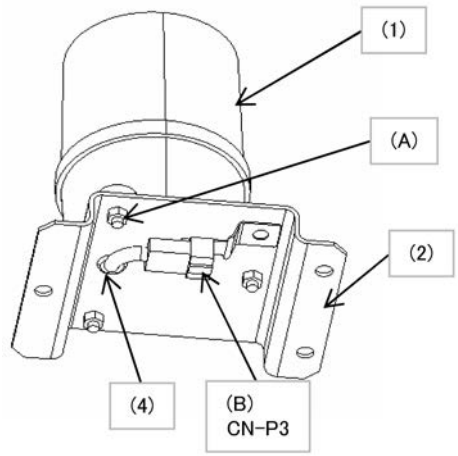
★ Adjust the route of the antenna cable so that the antenna cable will not interfere with the hood (particularly part A) or legs of the ROPS by changing the directions of the clamps (4) properly.

3) Install antenna (1) to the antenna cable end.

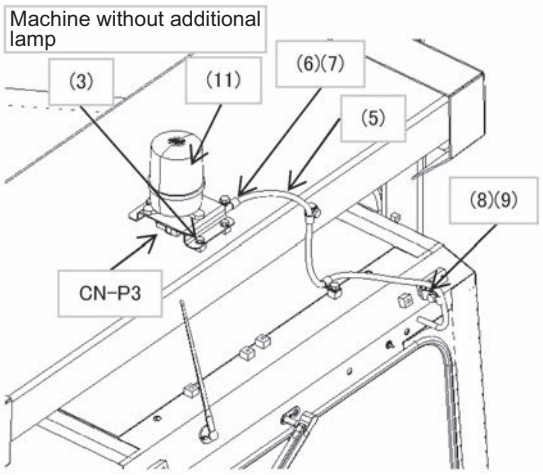
VHMS: Abbreviation for Vehicle Health Monitoring System

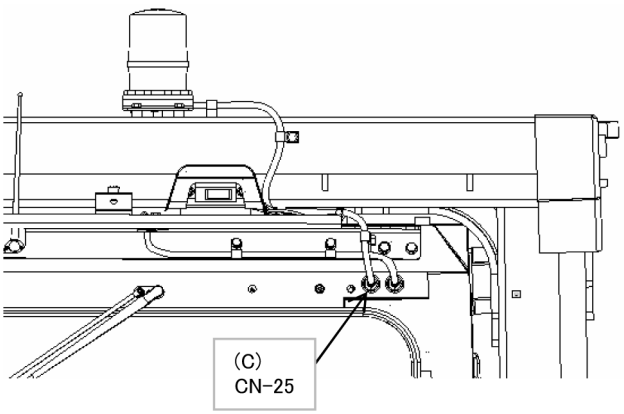
Assembly process No.	Installation of revolving warning lamp to top of ROPS (if equipped) (1/3)
A-18	

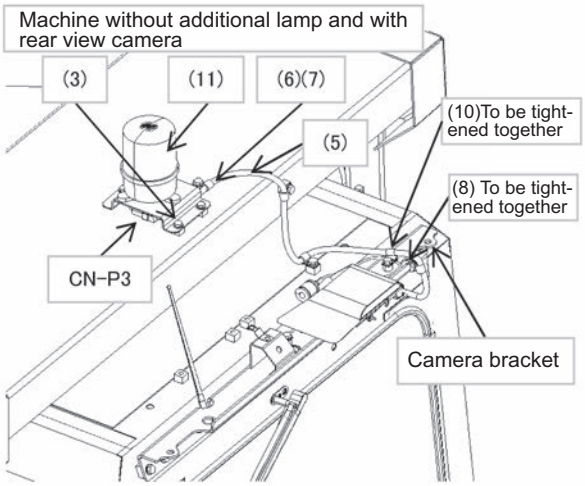
1. Revolving warning lamp sub-assembly
   (1) Remove connector (B) of lamp (1).
   (2) Install grommet (4) to bracket (2), pass the wiring of lamp (1) through the hole of grommet (4), and install lamp (1) with nuts (A) attached to lamp (1).
   (3) Reinstall connector (B) that was removed from lamp (1).
   (4) Fix connector (B) of lamp (1) to bracket (2) by using the clip.



2. Installation of revolving warning lamp to top of ROPS
   For machine without additional lamp
   (1) Connect connector (CN-P3) of wiring (5) to connector (B) of lamp (1).
   (2) Install lamp (1) to the top of the ROPS by using bolts (3).
   (3) Remove the cap at the rear of the cab, take out the internal wiring connector (CN-25) through the hole, connect it, and return it into the cab.
   Fit grommet (C) of wiring (5) to the hole.
   (4) Install bracket (8) to the rear of the cab by using bolt (9).
   For the machine with the rear view camera, tighten bracket (8) by using the mounting bolts of the camera bracket.
   (5) Install wiring (5) by using clamps (6), (10), and (7).
   For the machine with the rear view camera, tighten clamp (10) and the camera wiring clamp together.







※ For details of each part, see (3/3).

Assembly process No.	Installation of revolving warning lamp to top of ROPS (if equipped) (2/3)
A-18	

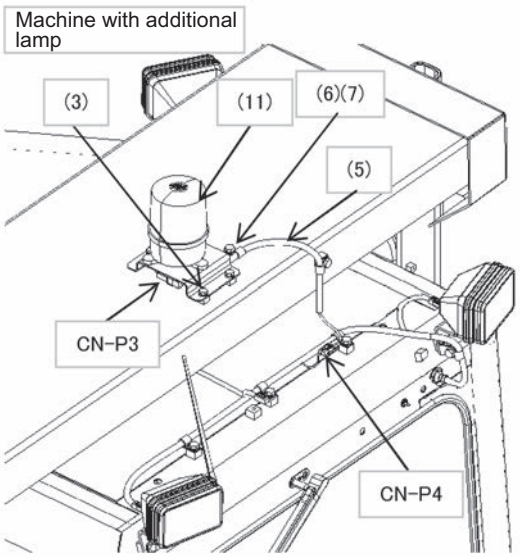
For machine with additional lamp

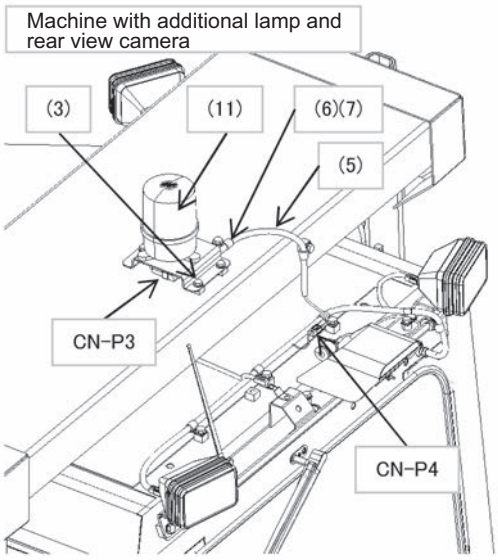
(1) Connect connector (CN-P3) of wiring (5) to connector (B) of lamp (1).

(2) Install lamp (1) to the top of the ROPS by using bolts (3).

(3) Connect connector (CN-P4) of wiring (5) to connector (CN-P4) of the additional lamp wiring on the top of the cab.

(4) Install wiring (5) by using clamps (6) and (7).





※ For details of each part, see (3/3).

Assembly process No.	Installation of revolving warning lamp to top of ROPS (if equipped) (3/3)
A-18	

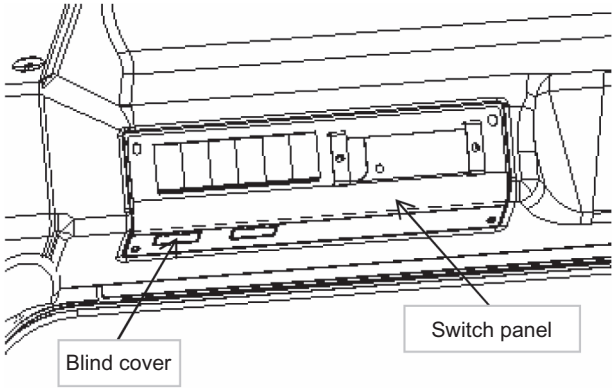
3. Installation of revolving warning lamp switch

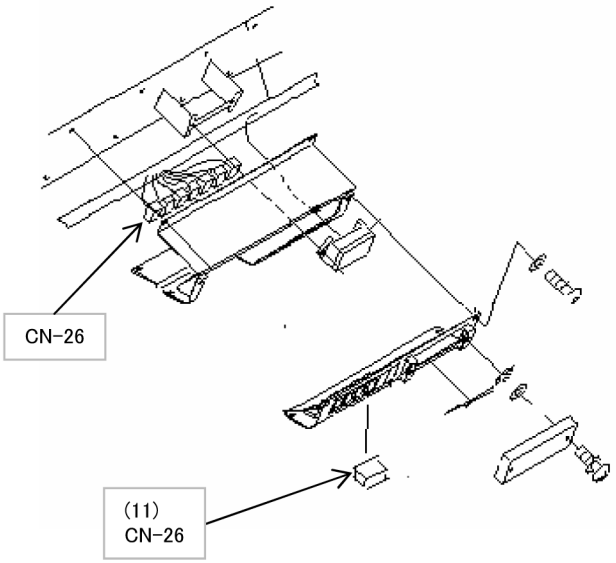
   (1) Remove the switch panel at the right top inside the cab.

   (2) Remove the blind cover of the switch panel and install switch (11).

   (3) Connect connector (CN-26) of switch (11) to wiring connector (CN-26) in the cab.

   (4) Install the switch panel.





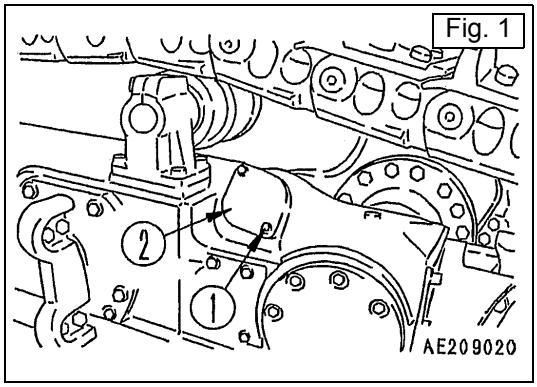
No.	Part name	Part No.	Q'ty	Remarks
1	Lamp	14X-890-1160	1	
2	Bracket	154-06-31310	1	
3	Sems bolt	01024-81020	3	
4	Grommet	08037-01008	1	For right rear
5	Wire harness	195-06-43490	1	Other than machine with additional lamp
		195-06-43480	1	For machine with additional lamp
6	Clamp	04434-51412	4	Use only 2 pieces for machine with additional lamp
7	Sems bolt	01024-81220	4	Use only 2 pieces for machine with additional lamp
8	Bracket	207-62-51270	1	Unnecessary to machine with additional lamp
9	Sems bolt	01024-81225	1	Unnecessary to machine with cameral and additional lamp
10	Clamp	04434-51412	1	Only machine with camera
11	Switch	22U-06-22310	1	

Assembly process No.	Check track tension (1/2)
A-19	

Adjusting

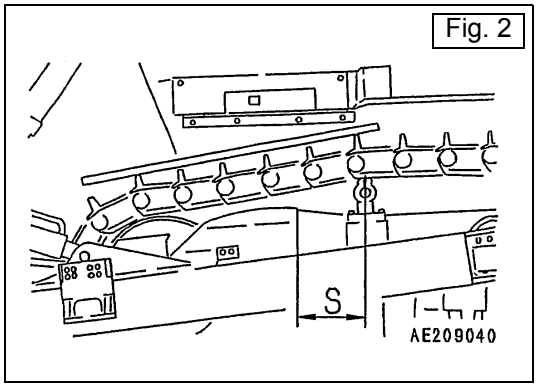
- When increasing tension
  1. First remove the bolts (1) and then remove the cover (2). (Fig. 1)
  2. Pump in grease through the grease fitting (3) with a grease pump. (Fig. 3)
  3. To check that the correct tension has been achieved, move the machine backwards and forwards.
  4. Check the track tension again, and if the tension is not correct, adjust it again.

Fig. 1



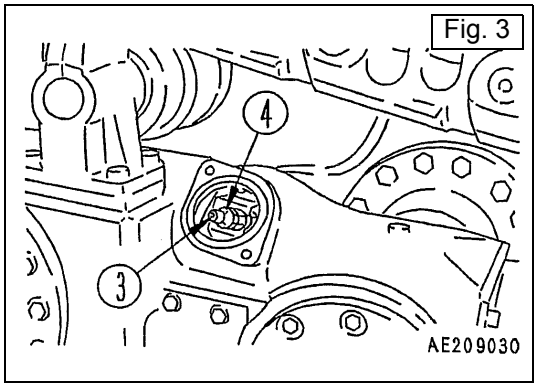
5. Continue to pump in grease until S becomes 720mm (28.4 in).
   If the tension is still loose, the pin and bushing are excessively worn, so they must be either turned or replaced. Please contact your Komatsu distributor. (Fig.2)

Fig. 2



- When loosening tension
  1. Remove both bolts (1), then remove cover (2). (Fig. 1)
  2. Loosen plug (4) gradually to release the grease. (Fig. 3)
  3. Turn plug (4) a maximum of one turn.
  4. If the grease does not come out smoothly, move the machine backwards and forwards a short distance.
  5. Tighten plug (4).
  6. To check that the correct tension has been achieved, move the machine backwards and forwards.
  7. Check the track tension again, and if the tension is not correct, adjust it again.

Fig. 3



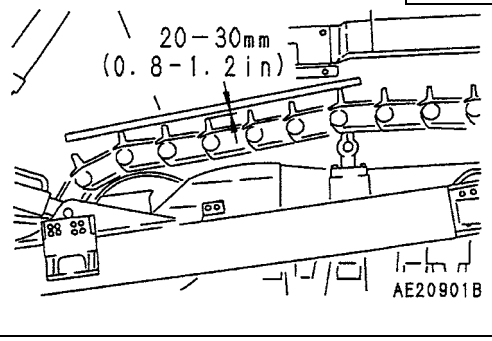
Precautions	Necessary tools		Necessary equipment	
• There is danger of plug (4) flying out under the high internal pressure of the grease. Never loosen plug (4) more than 1 turn. Never loosen any part other than plug (4). Never put your face in the mounting direction of plug (4). If the track tension cannot be loosened with the procedure given here, please contact your Komatsu distributor. • When removing cover (2), be careful not to let any dirt get inside. • There is a safety label stuck to the back of cover (2). Be careful not to damage the safety label.	Name	Q'ty	Name	Q'ty
	Other remarks			

Assembly process No.	Check track tension (2/2)
A-19	

Inspection

Stop the machine on level ground (stop with the transmission in FORWARD without applying the brake). Then place a straight bar on the track shoes between the carrier roller and the idler as shown in the figure, and measure the clearance between the bar and the grouser at the midpoint. If the clearance is 20 to 30 mm (0.79 to 1.18 in), the tension is standard. If the track tension is not at the standard value, adjust it in the following manner. (Fig. 4)

Fig. 4



Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	Other remarks			

Assembly process No.	Check fuel, coolant and lubricants (1/2)
A-20	

Check the amount of lubricant and coolant in every device.
When refill is required, perform it reference to [Fig.1] and [Table 1].

Fig. 1 Using temperature range of oil, grease, fuel and coolant

Reservoir	Fluid Type	Ambient Temperature, degrees Celsius -22 -4 14 32 50 68 86 104 122°F -30 -20 -10 0 10 20 30 40 50°C	Recommended Komatsu Fluids
Engine oil pan	Engine oil (Note.1)		Komatsu EOS0W30
			Komatsu EOS5W40
			Komatsu EO10W30-DH
			Komatsu EO15W40-DH
			Komatsu EO30-DH
Power train oil pan (incl. Transmission,torque converter and bevel gear case)	Powertrain oil (Note.2)		TO10
			TO30
Final drive case (each) Damper case	Powertrain oil		TO30
Hydraulic system	Powertrain oil		TO10
	Hydraulic oil		HO46-HM
	Engine oil		Komatsu EO10W30-DH
			Komatsu EO15W40-DH
Grease fitting	Hyper grease (Note.3)		G2-T,G2-TE
	Lithium EP grease		G2-LI
Cooling system	Supercoolant AF-NAC (Note.4)		AF-NAC
Fuel tank	Diesel fuel		ASTM Grade No.1-D S15 ASTM Grade No.1-D S500
			ASTM Grade No.2-D S15 ASTM Grade No.2-D S500

• ASTM : American Society of Testing and Material

Assembly process No.	Check fuel, coolant and lubricants (2/2)
A-20	

Table 1 Specified capacity and refill capacity of each part

		Engine oil pan	Damper case	Power train case	Final drive case (each)	Hydraulic system (With blade, without ripper)	Cooling system (including sub-tank)	Fuel tank
Specified capacity	Liters	87	2.1	275	61	280	120	1,200
	US gal	22.99	0.55	72.66	16.12	73.98	31.70	317.04
Refill capacity	Liters	86	2.1	150	61	130	–	–
	US gal	22.72	0.55	39.63	16.12	34.34	–	–

Oil and coolant addition condition

- Use Komatsu genuine oil and grease.
- When adding oil, do not mix oils of different types. When changing the type of oil, replace the oil of the specified capacity (all the oil). (The oil remaining in the piping etc. may be mixed with the new oil.)
- When the machine is delivered, the oil, fuel and coolant shown in (Table 2) are filled, unless otherwise specified.

Table 2

Item	Type
Engine oil pan	Engine oil 15W40DH-1 (Komatsu genuine)
Power train case Final drive case Damper case	Power train oil TO30 (Komatsu genuine)
Hydraulic tank	Power train oil TO10 (Komatsu genuine)
Fuel tank	JIS No. 1, JIS No. 2, JIS No. 3 in winter (Oct. – Mar.)
Radiator	Supercoolant AF-NAC (Concentration: Min. 30%) (Komatsu genuine)

Assembly process No.	Bleeding air from hydraulic cylinders
A-21	

★ After disassembling for transportation, changing the oil in the hydraulic tank, or removing the hydraulic cylinders or work equipment piping, bleed the air from the hydraulic circuit as follows.

1. Blade lift cylinder (with piston valve)
   1) Start the engine and run at low idling for approx. 5 minutes.

   2) With the engine at low idling, extend and retract the cylinder four or five times without operating it to the end of its stroke.

      ★ Operate the piston rod to approx. 100 mm form the end of the stroke; do not releive the circuit under any circumstances.

   3) Keeping the engine at low idling, retract the cylinder to a point approx. 100 mm before the end of the stroke, then use fine control (at least 10 seconds) to retract the cylinder to the end of its stroke. While operating the lever, hold the cylinder in this position for 3 minutes.

   4) With the engine at high idling, retract the cylinder to a point approx. 100 mm before the end of the stroke, then use fine control (at least 10 seconds) to retract the cylinder to the end of its stroke. While operating the lever, hold the cylinder in this position for 1 minute.

2. Blade tilt cylinder (without piston valve)
   1) Start the engine and run at low idling for approx. 5 minutes.

   2) With the engine at low idling, raise and lower the blade four or five times without operating the cylinder to the end of its stroke.

      ★ Operate the piston rod to approx. 100 mm form the end of the stroke; do not relieve the circuit under any circumstances.

   3) Repeat this operation with the engine at full throttle, then run the engine at low idling and operate the piston rod to the end of its stroke to relieve the circuit.

⚠ If from the beginning the engine is run at full throttle, or the cylinders are operated to the end of their stroke, the piston packing may be damaged, so never operate in this way.

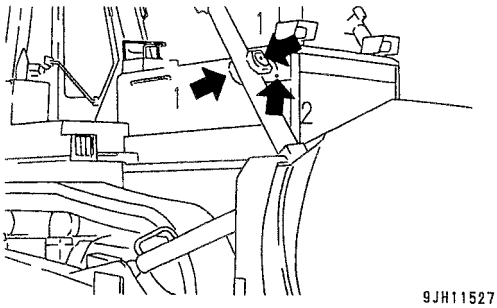
⚠ Check the oil level, and add oil to the specified level if necessary.

Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	Other remarks			

Assembly process No.	Lubricating (1/3)
A-22	

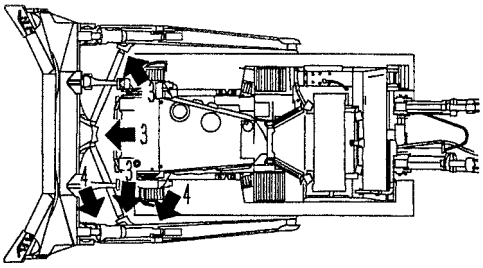
1. Blade lift cylinder support yoke (4 places) (Fig. 1)
2. Blade lift cylinder support shaft (2 places) (Fig. 1)

Fig. 1



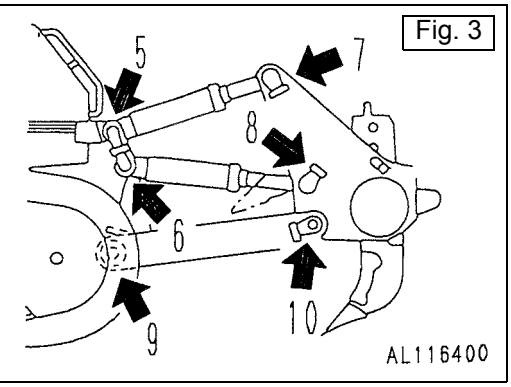
3. Blade arm ball joint (3 places) (Fig. 2)
4. Brace screw (2 places) (Fig. 2)

Fig. 2



5. Ripper tilt cylinder bottom pin (2 places) (Fig. 3)
6. Ripper lilt cylinder bottom pin (2 places) (Fig. 3)
7. Ripper tilt cylinder rod end pin (2 places) (Fig. 3)
8. Ripper lilt cylinder rod end pin (2 places) (Fig. 3)
9. Ripper arm pin (front) (2 places) (Fig. 3)
10. Ripper arm pin (rear) (2 places) (Fig. 3)

Fig. 3

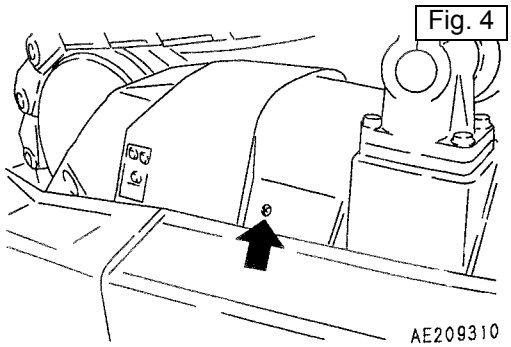


Precautions	Necessary tools		Necessary equipment	
About the kind of used fluids refer to “Assembly procedure A-20” Check on the amount of lubricants and coolant. For other related matters, confirm them by Operation Manual.	Name	Q'ty	Name	Q'ty
	Other remarks			

Assembly process No.	Lubricating (2/3)
A-22	

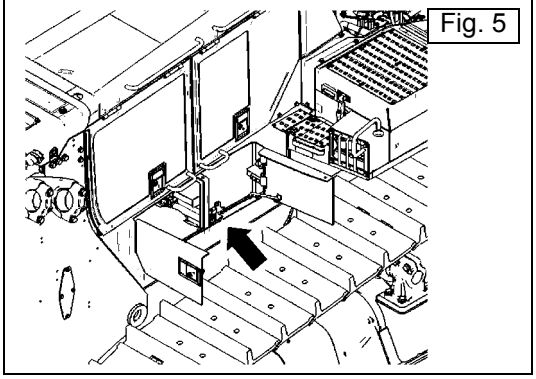
11. Equalizer bar side shaft (1 place) (Fig. 4)

Fig. 4



12. Suspension (Equalizer bar center shaft) (1 place) (Fig. 5)

Fig. 5



Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	Other remarks			

Assembly process No.	Lubricating (3/3)
A-22	

13. Universal joint (2 places) (Fig. 6)
    ★ Do not use molybdenum disulfide grease.
    Remove inspection cover (3) of the under-cover on the rear bottom of the chassis as follows.

    1) Remove 2 bolts (1) at the front of the machine. (Fig. 7)

    2) Support the cover with your elbow while gradually removing 2 bolts (2) at the rear of the machine. (Fig. 7), (Fig. 8)
    3) Lower the cover gradually to open it.

Fig. 6

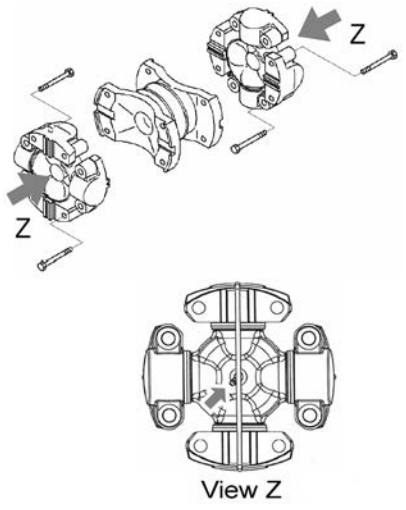
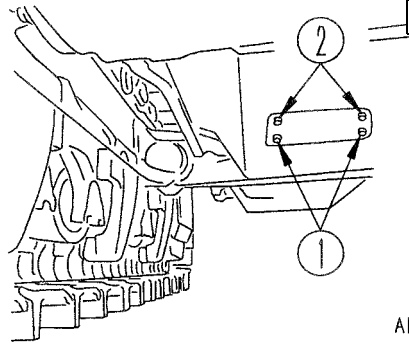
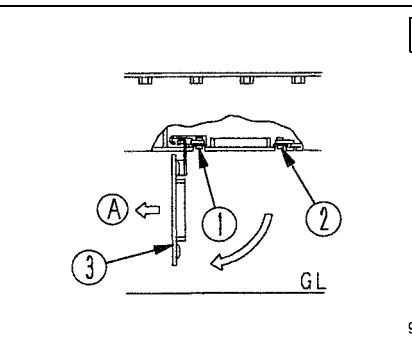


Fig. 7



14. Steering/directional/gear shift lever rotation link (4 places)

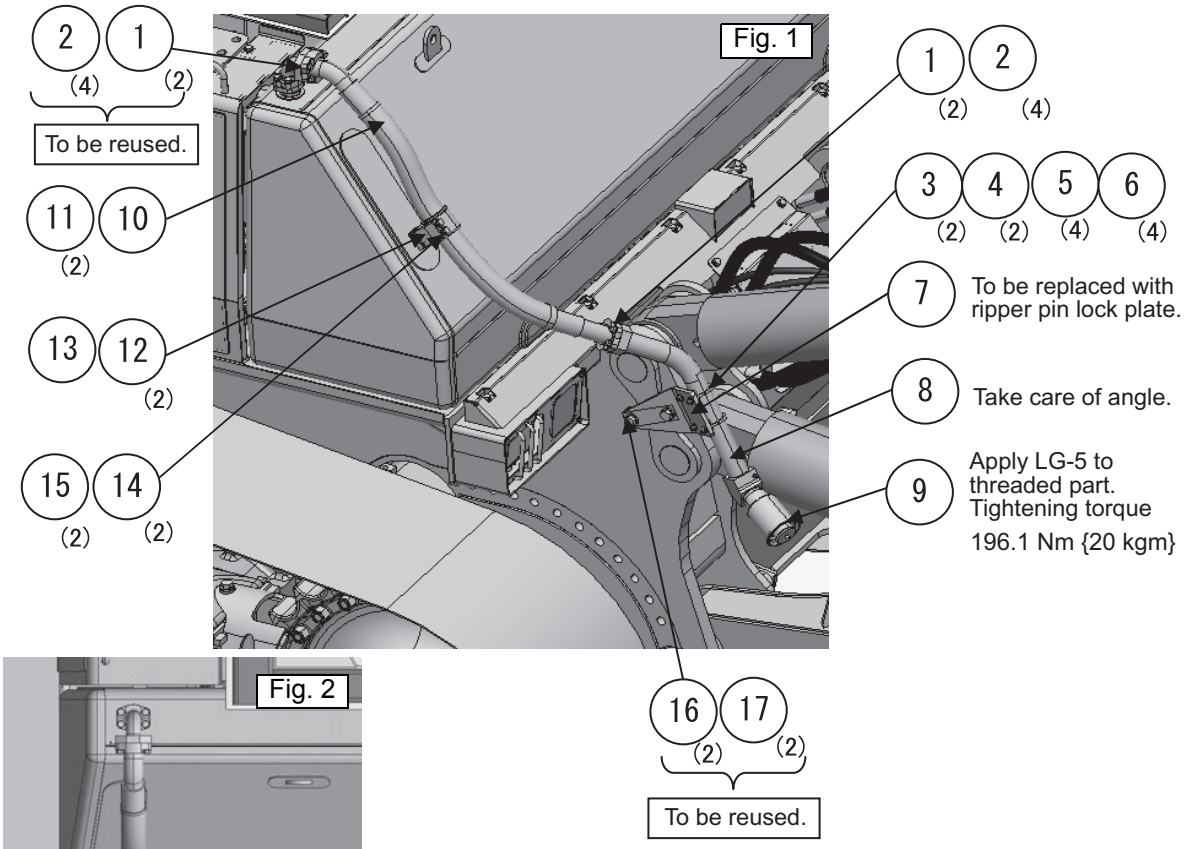
Fig. 8

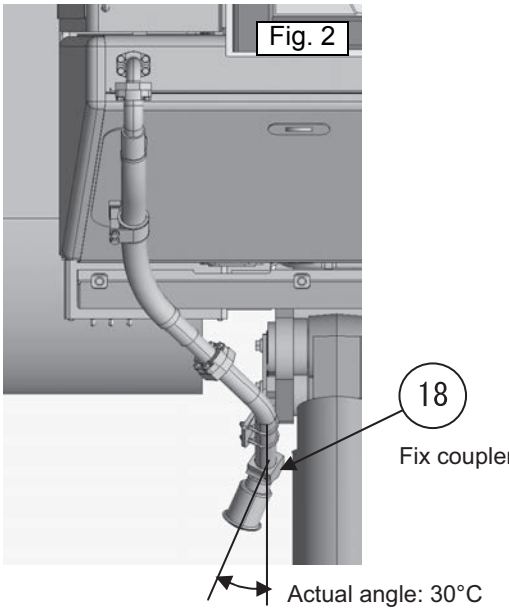


Precautions	Necessary tools		Necessary equipment	
The undercover is heavy (Approx. 50 kg). Never try to open or close the cover when directly beneath it. When removing bolts (2), carry out the work from the rear of the cover so that you can easily get out of the way. Take measures to prevent the engine from being started by mistake. (Pull out the key, etc.)	Name	Q'ty	Name	Q'ty
	Other remarks			

Assembly process No.	Installation of fuel quick charge piping (if equipped)
A-23	

(1) Remove the blind plug from the left top of the fuel tank and connect the hose. (Fig. 1)
(2) Remove the left ripper pin lock plate and install the brackets and tubes. (Fig. 1)
(3) Connect the hoses to the tubes. (Fig. 1)
(4) Fix the hoses to the fuel tank with the clamps. (Fig. 1)
(5) Tighten the U-bolts permanently so that the tubes will be set in the specified directions. (Fig. 2)





☆ (8), (9) is assembled already.

No.	Part name	Part No.	Q'ty
1	Flange	07371-32076	4
2	Sems bolt	07375-21240	8
3	Clip	07283-36163	2
4	Seat	07283-56170	2
5	Washer	01643-31032	4
6	Nut	01597-01009	4
7	Plate	195-04-42680	1
☆ 8	Tube	195-04-42670	1
☆ 9	Receiver	198-04-66170	1
10	Hose	195-04-42660	1
11	O-ring	07000-12060	2
12	Clamp	42C-16-11510	2
13	Cusion	07095-02062	1
14	Bolt	01011-81210	2
15	Washer	01643-31232	2
16	Bolt	01010-62040	2
17	Washer	01643-32060	2
18	Screw	01023-10610	1

M. Check and maintenance procedures after completion of assembly

Assembly process No.	Check and adjustment of operator's cab (1/7)
M-1	

1. Measuring pressure in cab

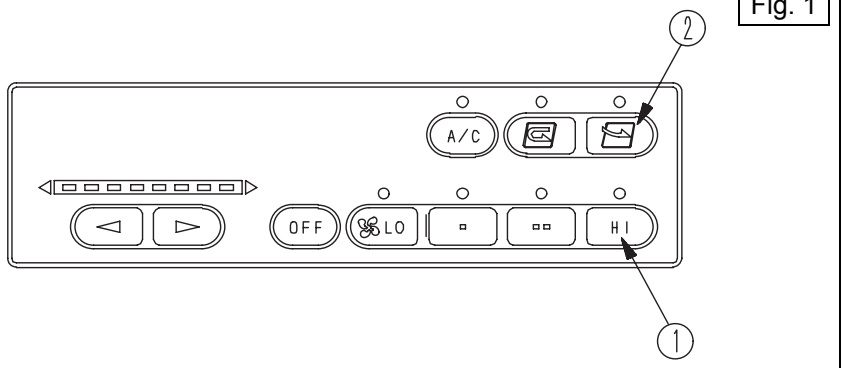
   (1) Measure the pressure in the cab.

   - Criterion : Measured value ≧ 78.5 Pa {8 mmH_2O}
   - Testing condition : Run the engine at full throttle and set the engine fan to 100%.
     : Max. cooling fan speed.
     : Set the blower to the high (Hi).

   ★ Set the maximum cooling fan speed with the mode adjustment function of the service menu of the machine monitor.
   For the setting procedure for the maximum cooling fan speed with the adjustment mode, see assembly procedure "M-5".

   ★ Operate the blower according to the following procedure.

Fig. 1



   1) Select the fresh air mode with the RECIRC/FRESH air selector switch (2). (Fig. 1)

   2) Depress fan switch (1) to set the blower to the high (Hi). (Fig. 1)

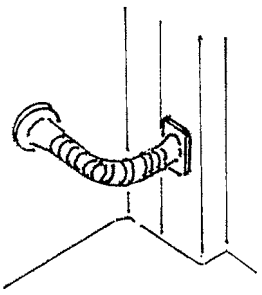
   ★ If the standard pressure is not obtained, check the seals around the dashboard and the seals of the fitting faces of the cab and floor for an opening. (Run water over outside to see if it enters the cab.) If there is an opening, fill it with liquid seal.

Assembly process No.	Check and adjustment of operator's cab (2/7)
M-1	

(2) Outlined below is a simplified method for the internal pressure measurement of the operator's cab:
   a) Prepare a transparent vinyl hose (of an outer diameter of 10 mm and 3,000 mm long).
   b) Pour water into the hose bore for about a half of the hose length.
   c) Remove the sliding windshield lock lever located on the side panel of the operator's cab to insert one end of the vinyl hose before fastening an adjacent part of the hose to the top end of the back seat using packing tape. (Fig. 5)
   d) Seal the gap occurring between the lock-lever hose and the outer periphery-of the hose.
   e) Match the water levels of the beginning part and the ending part of the water cloumn inside the transparent vinyl hose at the outside of the operator's cab.
   f) Start the engine and run it at full speed to read the difference between the two water levels. (Fig. 3)

★ Before measuring the internal pressure, ensure that the grommets shown in Fig. 4 are fitted securely.

Fig. 4



• Fig. 4 is the same as Fig. 21 in "Assembly procedure A-11".

Fig. 2

Fig. 3

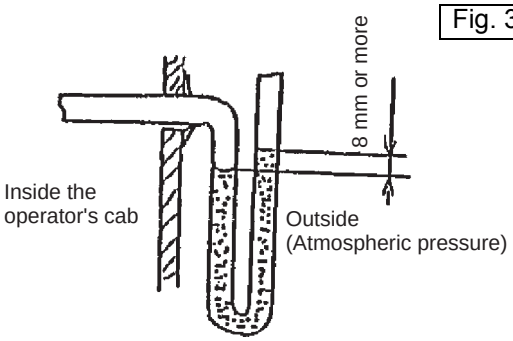


Fig. 5

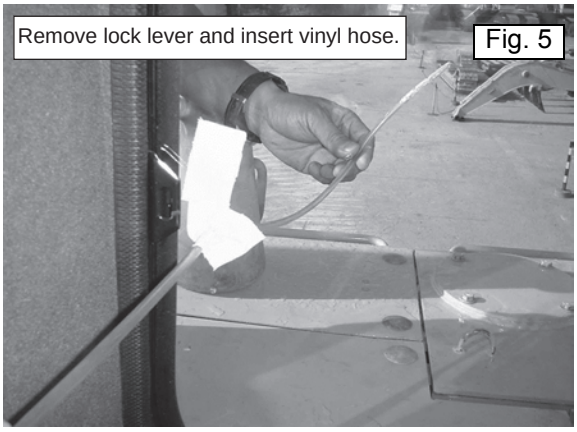
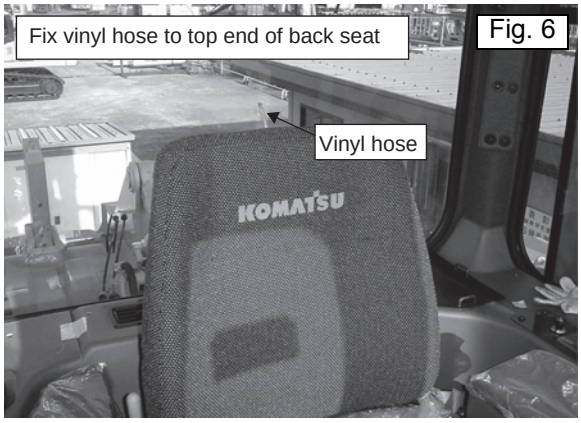


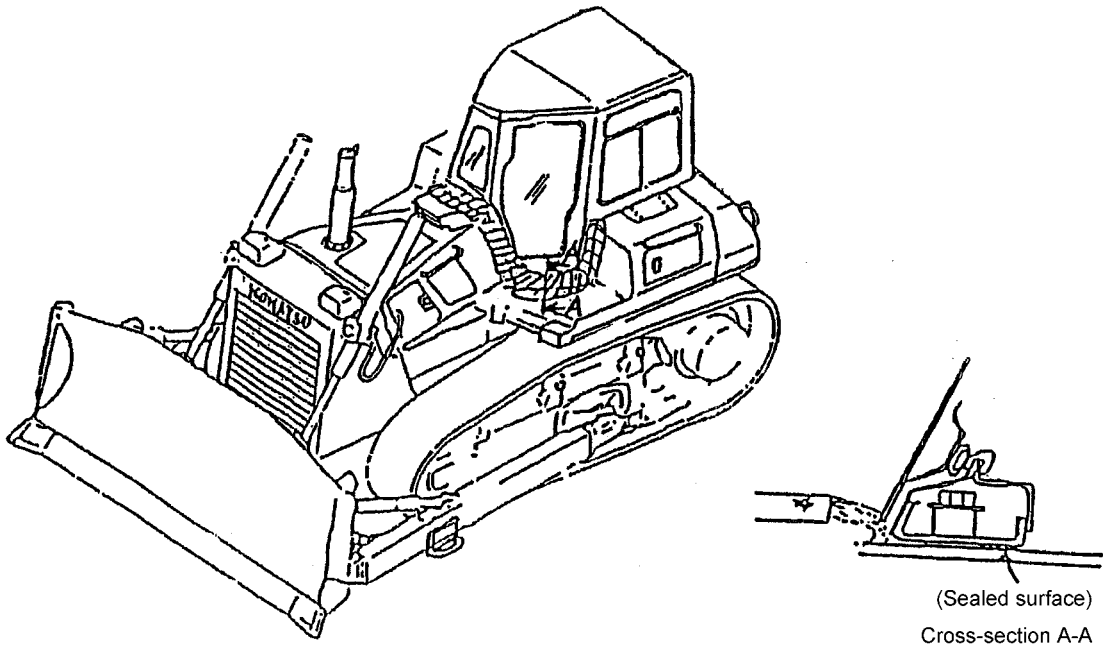
Fig. 6



Assembly process No.	Check and adjustment of operator's cab (3/7)
M-1	

2. Shower test for water-tightness
   (1) Close all the opening sections of the operator's cab.
   (2) Prepare to pour water of a flow of about 5 gal. (about 19 ℓ)/min. through a water hose.
   (3) Pour water to the area around the hatched section in Fig. 18 for about 10 minutes. When doing this, it is not necessary to use pressurized water.
   (4) Pour water horizontally to the sealed surface according to the "Cross-section A-A". (Fig. 7)
   (5) Carefully check the area around the dashboard, in particular.
   ★ When any water leakage is found, apply due caulking before re-checking the section if the water leakage still occurs.

Fig. 7



Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	Other remarks			

Assembly process No.	Check and adjustment of operator's cab (4/7)
M-1	

3. Checking the door lock
   Check the correlation between the operator's cab structure and the door when the door is opened and closed. When anything is found abnormal, make due adjustment to correct it.

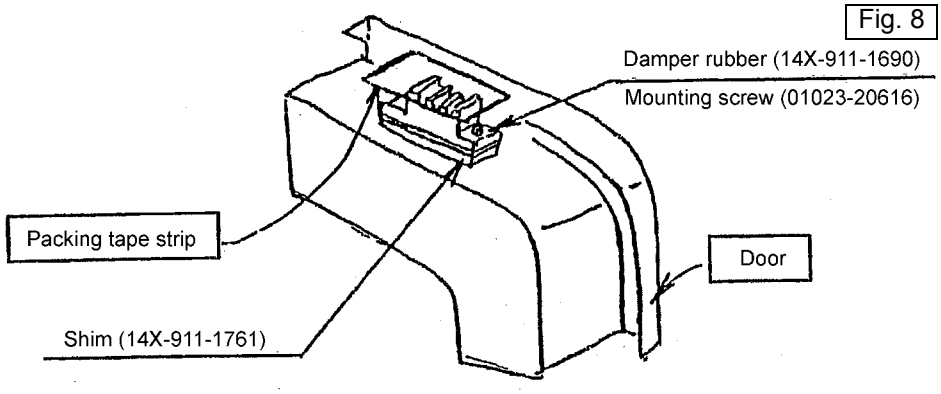
3-1 Checking the current statuses

(1) Check the mounted elevation of the damper rubber. (Located at 4 places per a side and check them on both L.H and R.H sides.)
Applying a packing tape strip over the contact surfaces of the damper rubber, open and close the door for 2 to 3 times. After finishing this opening and closing cycles of the door, check the contact surface of the packing tape with the operator's cab structure. (Fig. 8)

Normal: The back surface of the packing tape comes in light contact the operator's cab structure when the door is being closed.

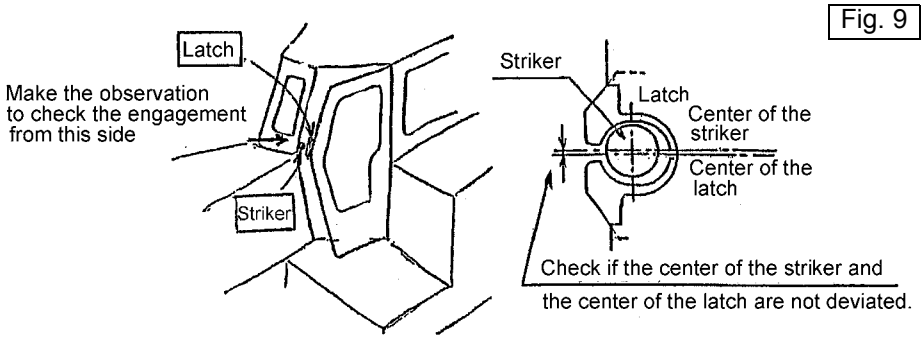
Abnormal: The back surface of the packing tape does not come in contact with the operator's cab structure when the door is being closed, or if the two sections come in a harsh contact such as peeling off the applied packing tape.

Fig. 8



(2) Check the correlation between the door latch and the striker (on both L.H and R.H side). (Fig. 9)
Moving the door toward the closing direction, observe the engaging state between the latch and the striker.

Fig. 9



Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	Other remarks			

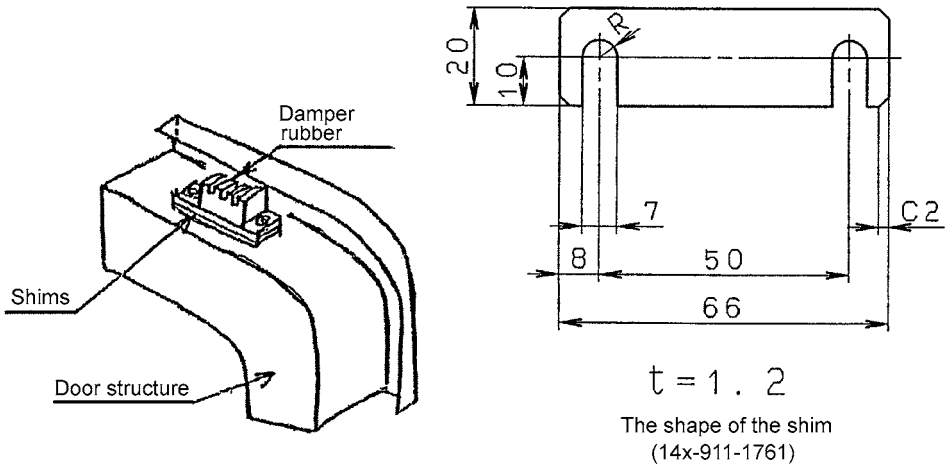
Assembly process No.	Check and adjustment of operator's cab (5/7)
M-1	

3-2 Adjustments

(1) Adjusting the elevation of the damper rubber (Fig. 10)

When adjusting the elevation of the damper rubber, supplement or reduce the shims being inserted below the damper rubber to adjust the elevation of the damper rubber properly.

Fig. 10



The shape of the shim
(14x-911-1761)

(2) Adjusting the correlation between the latch and the striker

(a) Loosening the striker mounting bolts to a temporarily tightened state, open and close the door 2 to 3 times to align the centers of the latch and the striker.

(b) Check the engaging state between the latch and the striker.

(c) Tighten the striker mounting bolts back to their original tightened state.

(d) Try to open and close the door to see if the door lock can be released smoothly. When the door lock cannot be released smoothly (when the turning effort to move the knob feels too heavy), repeat the adjustment all over again.

★ Appropriate knob turning effort: 68.6 ± 19.6 N {7 ± 2 kgf}

(3) Apply grease (G2-LI) over the latch surface.

Precautions	Necessary tools		Necessary equipment	
When the grease adhering over the latch surface dries out, the turning effort for the knob will become heavier. Therefore, apply grease sufficiently in order not to allow it to become dried up.	Name	Q'ty	Name	Q'ty
	Other remarks			

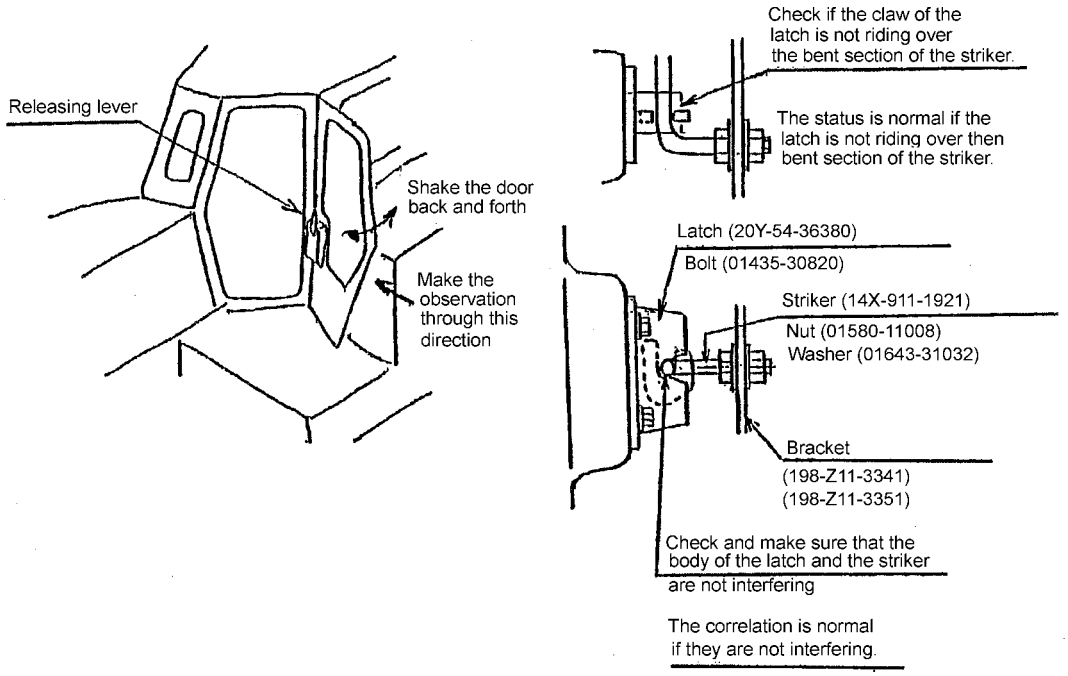
Assembly process No.	Check and adjustment of operator's cab (6/7)
M-1	

4. Checking the open-locked state of the door (Fig. 11)
   Check the correlation between the operator's cab structure and the door when the door is in open-locked state. When anything is found abnormal, make due adjustment to correct it.

4-1 Checking the current statuses

(1) Check the correlation between the open-lock latch and the striker. (Check them on both L.H and R.H sides.)
Move the door toward the opening direction to observe the engaging state between the latch and the striker. (Fig. 11)

Fig. 11



(2) Check the mounted elevation of the stopper rubber. (At 2 places each on one side. Check them on both L.H and R.H sides.)
   (a) Shaking the door back and forth in open-locked state, check for rattling.
   (b) Check if the turning effort for the releasing lever is too heavy.

Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	Other remarks			

Assembly process No.	Check and adjustment of operator's cab (7/7)
M-1	

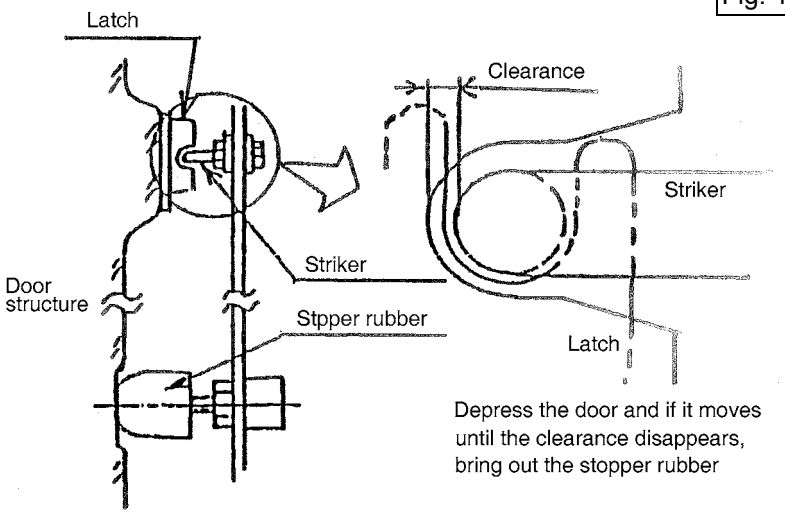
4-2 Adjustments

(1) Adjusting the correlation between the latch and the striker (Fig. 12)

Loosen the striker mounting nut and adjust the position of the striker so that it does not interfere with the latch nor the overriding over the bent section occurs before tightening the nut back to its original state.

When the interference cannot be corrected by the adjustment on the striker side, loosen the latch side mounting bolts to make the adjustment form the latch side.

Fig. 12



(2) Adjusting the elevation of the stopper rubber

(a) Loosen the stopper rubber fastening nut.

(b) When rattling exists, bring out the stopper rubber until the clearance disappears. However, in case the lock is hard to engage for the turning effort for the releasing lever is too heavy, bring back the stopper rubber within the range where rattling of the door does not occur.

(c) Tighten the fasting nut back to the original state.

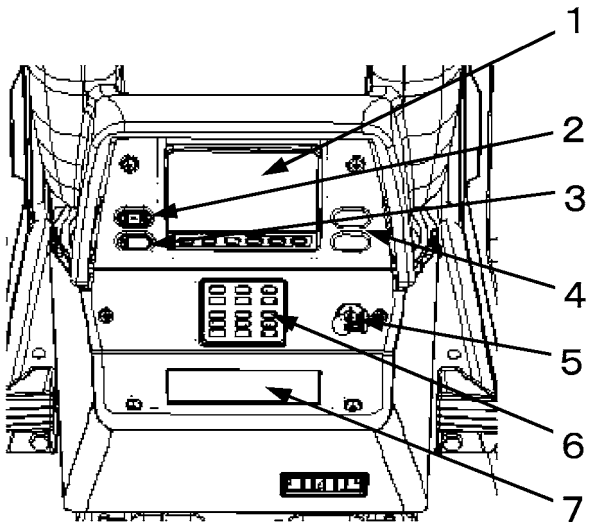
Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	Other remarks			

Assembly process No.	Inspection of machine monitor (1/14)
M-2	

Check that the "machine monitor" on the front panel can be set in the "service menu" with its special function and the "failure codes" can be displayed normally in that mode.

Front panel

Fig. 1



(1) Machine monitor

(2) Front lamp, working lamp switch

(3) Rear lamp switch

(4) Additional heater switch (if equipped)

(5) Starting switch

(6) Monitor switches portion

(7) Air conditioner panel or heater panel

★ The "Service menu" is used in "Initialization of VHMS controller" of the VHMS specification described later in "Attached material 2". Accordingly, understand the operating procedure thoroughly.

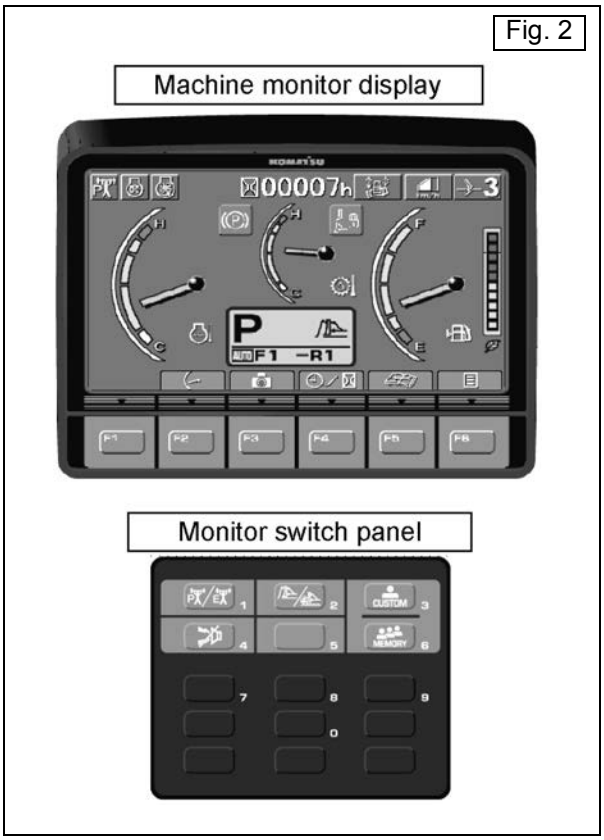
Assembly process No.	Inspection of machine monitor (2/14)
M-2	

1. Service menu
   To change the operator mode to the service menu, perform the following operation.
   This operation is always required when you use the service menu.

   1) Check of display of screen and operation of switches
      While the ordinary screen is displayed, perform the following operation with the numeral input switches.
      - Operation of switches (While pressing [4], perform the operation in order):
        [4] + [1] → [2] → [3]

      ★ This operation of the switches is accepted only while the ordinary screen is displayed.

Fig. 2



2. Display check of "Failure code"
   In the service menu, a trouble that occurred in the machine can be displayed by a classification code named the "Failure code" on lower display unit (3) of machine monitor (1). With this function, the operator can grasp the cause of the trouble precisely and repair the machine quickly.

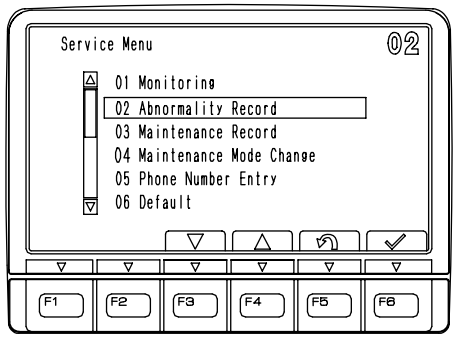
   The "Failure codes" are classified into the electrical system failure codes and mechanical system failure codes, which are displayed on lower display unit (3) by setting the service menu code of upper display unit (2) to "EE (Electrical system failure code display mode)" or "bE (Mechanical system failure code display mode)".

Assembly process No.	Inspection of machine monitor (3/14)
M-2	

3. Abnormality Record" (Mechanical system "Abnormality Record")
   The machine monitor classifies and records the abnormality which occurred in the past or which are occurring at present into the mechanical system abnormality, electrical system abnormality, and air conditioner abnormality or heater abnormality.
   To check the mechanical system "Abnormality Record", perform the following procedures.

   3.1) Selecting menu
   Select "02 Abnormality Record" on the "Service Menu" screen.

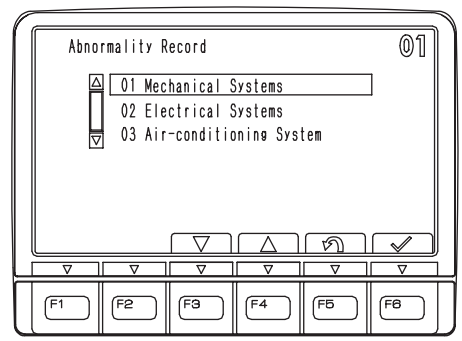
Fig. 3



   3.2) Selecting sub menu
   After the "Abnormality Record" screen is displayed, select "01 Mechanical Systems" with the function switches or numeral input switches.
   - [F3]:Move to lower record
   - [F4]:Move to upper record
   - [F5]:Return to service menu screen
   - [F6]:Confirm selection

   ★ You may enter a 2-digit code with the numeral input switches to select the record of that code and confirm it with [F6].

Fig. 4

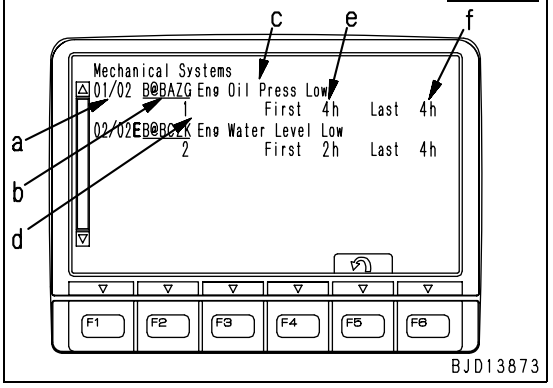


Assembly process No.	Inspection of machine monitor (4/14)
M-2	

3.3) Information displayed on "Abnormality Record" screen
On the "Mechanical Systems" screen, the following information is displayed.
(a): Occurrence order of abnormality from latest one/Total number of records
(b): Failure code
(c): Contents of trouble
(d): Number of occurrence time
(e): Service meter reading at first occurrence
(f): Service meter reach at last occurrence
- [F1]: Move to next page (screen) (if displayed)
- [F2]: Move to previous page (screen) (if displayed)
- [F5]: Return to "Abnormality Record" screen

★ If no "Abnormality Record" is recorded, "No Abnormality Record" is displayed.
★ If the number of occurrence time is 1 (first occurrence), the service meter reading at the first occurrence and that at the last occurrence are the same.
★ If [E] is displayed on the left of a failure code, the abnormality is still occurring or resetting of it has not been confirmed.
★ For all the failure codes that the machine monitor can record, see the failure codes table in "Abnormality Record (Electrical system Abnormality Record)".

Fig. 5

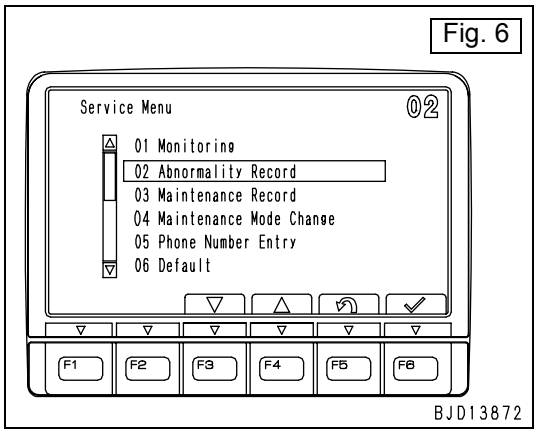


3.4) Deleting "Abnormality Record"
The contents of the mechanical system "Abnormality Record" cannot be deleted.

4. "Abnormality Record" (Electrical system "Abnormality Record")
The machine monitor classifies and records the abnormality which occurred in the past or which are occurring at present into the mechanical system abnormality, electrical system abnormality, and air conditioner abnormality or heater abnormality. To check the electrical system "Abnormality Record", perform the following procedures.

4.1) Selecting menu
Select "02 Abnormality Record" on the "Service Menu" screen.

Fig. 6

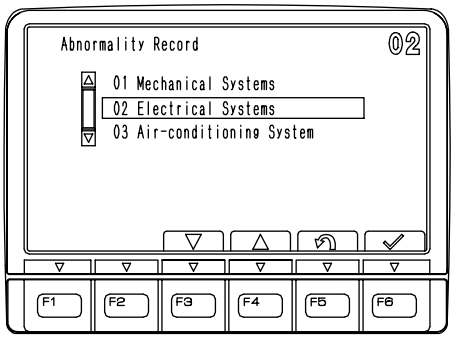


Assembly process No.	Inspection of machine monitor (5/14)
M-2	

4.2) Selecting sub menu
After the "Abnormality Record" screen is displayed, select "02 Electrical Systems" with the function switches or numeral input switches.
- [F3]: Move to lower record
- [F4]: Move to upper record
- [F5]: Return to service menu screen
- [F6]: Confirm selection

★ You may enter a 2-digit code with the numeral input switches to select the record of that code and confirm it with [F6].

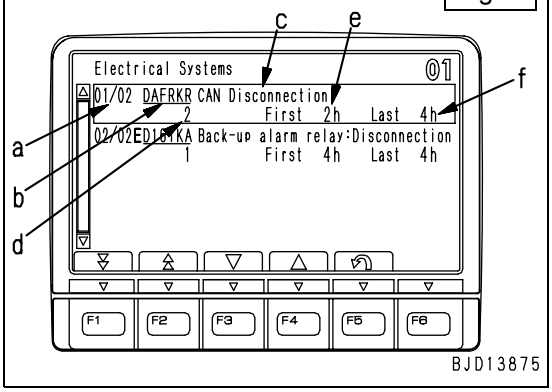
Fig. 7



4.3) Information displayed on "Abnormality Record" screen
On the "Electrical Systems" screen, the following information is displayed.
(a): Occurrence order of abnormality from latest one/Total number of records
(b): Failure code
(c): Contents of trouble
(d): Number of occurrence time
(e): Service meter reading at first occurrence
(f): Service meter reach at last occurrence
- [F1]: Move to next page (screen) (if displayed)
- [F2]: Move to previous page (screen) (if displayed)
- [F3]: Move to lower record
- [F4]: Move to upper record
- [F5]: Return to "Abnormality Record" screen

★ If no "Abnormality Record" is recorded, "No Abnormality Record" is displayed.
★ If the number of occurrence time is 1 (first occurrence), the service meter reading at the first occurrence and that at the last occurrence are the same.
★ If [E] is displayed on the left of a failure code, the abnormality is still occurring or resetting of it has not been confirmed.
★ For all the failure codes that the machine monitor can record, see the failure codes table.

Fig. 8



Assembly process No.	Inspection of machine monitor (6/14)
M-2	

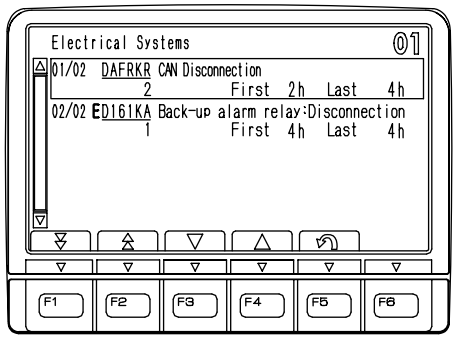
4.4) Deleting "Abnormality Record"

4.4-1) While the "Electrical Systems" screen is displayed, perform the following operation with the numeral input switches.

- Operation of switches (While pressing [4], perform the operation in order): [4] + [1] → [2] → [3]

★ Operate the switches similarly to the procedure for changing the ordinary display to the service menu.

Fig. 9



BJD13876

4.4-2) Check that the screen is set in the delete mode, and then delete the items one by one or together with the function switches.

★ If the screen is set in the delete mode, [CLEAR] graphic mark is indicated at [F2].

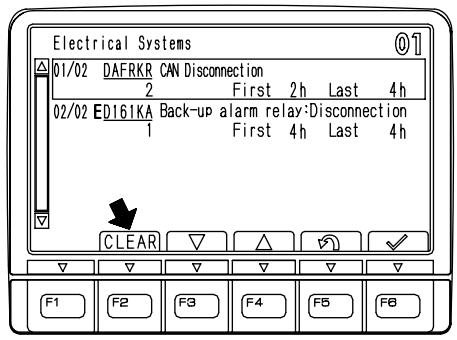
- [F2]: Delete all items
- [F3]: Move to lower item
- [F4]: Move to upper item
- [F5]: Return to "Abnormality Record" screen
- [F6]: Delete selected item

★ To delete items one by one: Select the item to be deleted with [F3] or [F4] and press [F6].

★ To delete all items together: Press [F2], and all the items are deleted, regardless of selection of the items.

★ If [E] is displayed on the left of a failure code, the deleting operation is accepted but the information is not deleted.

Fig. 10



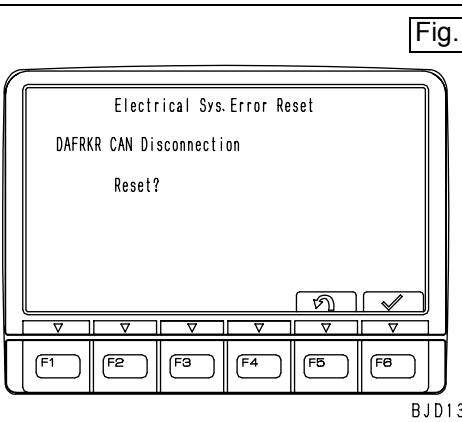
BJD13877

4.4-3) After the "Electrical Sys. Error Reset" screen is displayed, operate the function switches.

- [F5]: Return to "Electrical Sys. Error Reset" screen (Delete mode)
- [F6]: Execute deletion

★ The following figure shows the screen displayed when the items are deleted one by one (which is a little different from the screen displayed when all the items are deleted together).

Fig. 11

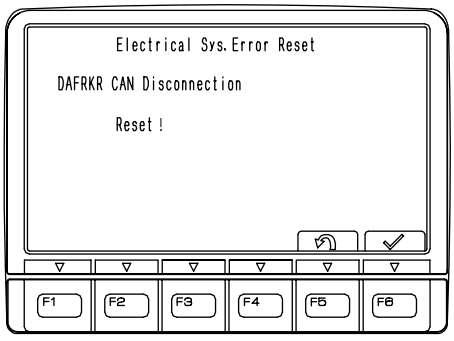


BJD13878

4.5) If the screen to notify completion of deletion is displayed and then the "Electrical Sys. Error Reset" (delete mode) screen is displayed, the deletion of the "Abnormality Record" is completed.

★ After a while, the screen returns to the "Electrical Sys. Error Reset" screen.

Fig. 12



5. Failure code
As described above, the "failure codes“ are classified and displayed into the "electrical system failure codes" and "mechanical system failure codes". For the details of each code, see "Testing and adjusting volume" or "Troubleshooting volume of the shop manual.

The major "failure codes" are listed on the following pages.

Assembly process No.	Inspection of machine monitor (8/14)
M-2	

Error codes list (Related to machine controller)

Failure	Trouble	Applicable equipment	Action code
2300NR	Brake Themal Load Abnormality	P/T	—
2301NR	Steering Brake RH Themal Load Abnormality	P/T	—
2302NR	Steering Brake LH Themal Load Abnormality	P/T	—
AA10NX	Air Cleaner Clogging	MON	—
AB00MA	Battery Charge Abnormal	MON	—
B@BAZK	Eng Oil Level Low	MON	—
B@BCZK	Eng Water Level Low	MON	—
B@CENS	T/C Oil Overheat	P/T	—
B@HANS	Hyd Oil Overheat	P/T	—
B@HAZK	Hyd Oil Level Low	W/E	—
F@BBZL	ENG blow-by pressure high level	VHMS	—
F@BYNR	F exhaust temp high level (2)	VHMS	—
F@BYNS	F exhaust temp high level (1)	VHMS	—
F@BZNR	R exhaust temp high level (2)	VHMS	—
F@BZNS	R exhaust temp high level (1)	VHMS	—
1380MW	Lock up clutch:Slip	P/T	E00
1500L0	Transmission clutch:Abnormal	P/T	E03
15E0MW	Transmission clutch:Slip	P/T	E00
15SAL1	Forward clutch:Fill high	P/T	E03
15SALH	Forward clutch:Fill Low	P/T	E03
15SBL1	Reverse clutch:Fill high	P/T	E03
15SBLH	Reverse clutch:Fill Low	P/T	E03
15SEL1	Speed 1st clutch:Fill high	P/T	E03
15SELH	Speed 1st clutch:Fill Low	P/T	E03
15SFL1	Speed 2nd clutch:Fill high	P/T	E03
15SFLH	Speed 2nd clutch:Fill Low	P/T	E03
15SGL1	Speed 3rd clutch:Fill high	P/T	E03
15SGLH	Speed 3rd clutch:Fill Low	P/T	E03
15SJL1	L/U :Fill high	P/T	E02
15SJLH	L/U :Fill low	P/T	E02
1800MW	P/T clutch:Slip	P/T	E02
2201L1	Right clutch:Fill high	P/T	E04
2201LH	Right clutch:Fill low	P/T	E04
2202L1	Left clutch:Fill high	P/T	E04
2202LH	Left clutch:Fill low	P/T	E04
2301L1	Right brake:Fill high	P/T	E04
2301LH	Right brake:Fill low	P/T	E04
2302L1	Left brake:Fill high	P/T	E04
2302LH	Left brake:Fill low	P/T	E04
7RFAKA	ECM ACC CUT RELAY:Disconnection	W/E	E00
7RFAKB	ECM ACC CUT RELAY:Short circuit	W/E	E00
D110KB	Battery Relay:Drive Short Circuit	W/E	E00
D111KA	ENG.hold relay:Disconnection	W/E	E00
D111KB	ENG.hold Relay:Drive Short Circuit	W/E	E00
D130KA	Neutral relay:Disconnection	P/T	E02

Assembly process No.	Inspection of machine monitor (9/14)
M-2	

Failure	Trouble	Applicable equipment	Action code
D130KB	Neutral relay:Short circuit	P/T	E02
D161KA	Back-up alarm releay:Disconnection	P/T	E01
D161KB	Back-up alarm releay:Short circuit	P/T	E01
D182KZ	Preheater Relay Abnormality	P/T	E01
D190KA	ACC signal relay:Disconnection	W/E	E00
D190KB	ACC signal relay:Short circuit	W/E	E00
D1EFKA	Pre lub. motor relay:Disconnection	P/T	E02
D1EFKB	Pre lub. motor relay:Short circuit	P/T	E02
D862KA	GPS Antenna Open Circuit	—	—
DAFGMC	GPS Module Error	—	—
DAFRKR	Monitor:Can communication lost(PT)	P/T	E03
DAFRMC	CAN Discon (Monitor Detected)	MON	E03
DB2RKR	ENG cont.:Can communication lost(PT)	P/T	E03
DB90KT	WE controller:Abnormality in controller	W/E	E01
DB91KK	WE controller:Source voltage reduction	W/E	E04
DB92KK	WE controller:Output voltage reduction	W/E	E04
DB97KK	WE cont.:Sensor voltage 5V (2) reduction	W/E	E00
DB99KQ	WE controller:Type select signal	W/E	E04
DB9RKR	WE controller:Can communication lost(PT)	P/T	E03
DBB0KK	VHMS controller:Source voltage reduction	VHMS	E00
DBB0KQ	VHMS Connector Connection Abnormality	VHMS	E00
DBB3KK	VHMS controller:Source voltage reduction	VHMS	E00
DBB5KP	VHMS:Output sensor1 voltage reduction	VHMS	E00
DBB6KP	VHMS:Output sensor2 voltage reduction	VHMS	E00
DBB7KP	VHMS:Output sensor3 voltage reduction	VHMS	E00
DBBQKR	PT cont. :Can communication lost(VHMS)	VHMS	E00
DBE0KT	PT controller:Abnormality in controller	P/T	E01
DBE1KK	PT controller:Source voltage reduction	P/T	E04
DBE2KK	PT controller:Output voltage reduction	P/T	E04
DBE5KK	PT cont.:Sensor voltage5V (1) reduction	P/T	E03
DBE6KK	PT cont.:Sensor voltage 24V reduction	P/T	E03
DBE7KK	PT cont.:Sensor voltage 5V (2) reduction	P/T	E01
DBE9KQ	PT controller:Type select signal	P/T	E04
DBERKR	PT controller:Can communication lost(WE)	W/E	E03
DD12KA	Shift up Sw:Disconnection	P/T	E02
DD12KB	Shift up Sw:Short circuit	P/T	E02
DD13KA	Shift down Sw:Disconnection	P/T	E02
DD13KB	Shift down Sw:Short circuit	P/T	E02
DD14KA	Parking lever Sw:Dissconnection	P/T	E03
DD14KB	Parking lever Sw:Short circuit	P/T	E03
DDB9KA	Reverse SW:Disconnection	P/T	E03
DDB9KB	Reverse SW:Short circuit	P/T	E03
DDB9L4	Reverse SW Signal disagreement	P/T	E03
DDE2KA	Pre lub. oil press sw:Disconnection	P/T	E02
DDK3KA	Forward SW:Disconnection	P/T	E03
DDK3KB	Forward SW:Short circuit	P/T	E03

Assembly process No.	Inspection of machine monitor (10/14)
M-2	

Failure	Trouble	Applicable equipment	Action code
DDK3L4	Forward SW Signal disagreement	P/T	E03
DDK5KA	Shift switch disconnection	P/T	E02
DDK5KB	Shift switch short circuit	P/T	E02
DDN2LD	Blade tilt RH pressure SW abnormality	W/E	E00
DDN3LD	Blade tilt LH pressure SW abnormality	W/E	E00
DDN7KA	WEQ Knob Sw(down):Disconnection	W/E	E02
DDN7KB	WEQ Knob Sw(down):Short circuit	W/E	E02
DDN9KA	WEQ Knob Sw(up):Disconnection	W/E	E01
DDN9KB	WEQ Knob Sw(up):Short circuit	W/E	E01
DDNALD	Blade lift up pressure SW abnormality	W/E	E00
DDNBLD	Ripper lift up pressure SW abnormality	W/E	E00
DDNCLD	Ripper lift down pressure SW abnormality	W/E	E00
DDNDLD	Ripper tilt in pressure SW abnormality	W/E	E00
DDNELD	Ripper tilt back pressure SW abnormality	W/E	E00
DDNFLD	Blade lift down pressure SW abnormality	W/E	E00
DDNLKA	Weq lock Sw:Disconnection	W/E	E03
DDNLKB	Weq lock Sw:Short circuit	W/E	E03
DDT5KA	Neutral switch disconnection	P/T	E04
DDT5KB	Neutral switch short circuit	P/T	E04
DDT5KQ	Lever SPEC selection signal disagreement	P/T	E04
DDTSL1	S/C :Fill high	P/T	E02
DDTSLH	S/C :Fill low	P/T	E02
DGE5KX	Ambient temp sensor abnormality	VHMS	—
DGS1KX	Hyd oil temp:signal abnormal	P/T	E01
DGT1KA	T/C oil temp sensor:Abnormal	W/E	E01
DGT1KX	T/C oil temp sensor:Abnormal	W/E	E01
DGT5KA	F exhaust temp sensor disconnection	VHMS	E00
DGT5KB	F exhaust temp sensor short circuit	VHMS	E00
DGT6KA	R exhaust temp sensor disconnection	VHMS	E00
DGT6KB	R exhaust temp sensor short circuit	VHMS	E00
DH21KA	Weq pressure sensor:Disconnection	W/E	E00
DH21KB	Weq pressure sensor:Short circuit	W/E	E00
DHE5KB	ENG blow-by pressure sensor disconnection	VHMS	E00
DHE5KY	ENG blow-by pressure sensor short circuit	VHMS	E00
DHT3KX	T/M oil pressure sensor abnormality	VHMS	E00
DHT5KA	T/C in-pressure sensor:Disconnection	P/T	E02
DHT5KB	T/C in-pressure sensor:Short circuit	P/T	E02
DHT7KA	T/C out-pressure sensor:Disconnection	P/T	E02
DHT7KB	T/C out-pressure sensor:Short circuit	P/T	E02
DK10KA	Fuel control Dial:Disconnection	P/T	E03
DK10KB	Fuel control Dial:Short circuit	P/T	E03
DK30KA	ST lever1:Disconnection	P/T	E03
DK30KB	ST lever1:Short circuit	P/T	E03
DK30KX	ST lever:Out of normal range	P/T	E04
DK30KZ	ST lever:Disconnection or short circuit	P/T	E04
DK30L8	ST lever:Signal mismatch	P/T	E03

Assembly process No.	Inspection of machine monitor (11/14)
M-2	

Failure	Trouble	Applicable equipment	Action code
DK31KA	ST lever2:Disconnection	P/T	E03
DK31KB	ST lever2:Short circuit	P/T	E03
DK40KA	Brake potentiometer:Disconnection	P/T	E01
DK40KB	Brake potentiometer:Short circuit	P/T	E01
DK55KX	FR lever:Out of normal range	P/T	E04
DK55KZ	FR lever:Disconnection or short circuit	P/T	E04
DK55L8	FR lever:Signal mismatch	P/T	E03
DK56KA	FR lever1:Disconnection	P/T	E03
DK56KB	FR lever1:Short circuit	P/T	E03
DK57KA	FR lever2:Disconnection	P/T	E03
DK57KB	FR lever2:Short circuit	P/T	E03
DK60KA	Acceleration sensor:Disconnection	P/T	E01
DK60KB	Acceleration sensor:Short circuit	P/T	E01
DKH1KA	Pitch angle sensor:Disconnection	P/T	E03
DKH1KB	Pitch angle sensor:Short circuit	P/T	E03
DLF1KA	T/C out-speed sensor:Disconnection	P/T	E00
DLM3KA	Fan rev. sensor:Disconnection	W/E	E02
DLM3MB	Fan control:Decline	W/E	E02
DLT3KA	T/M out-speed sensor:Disconnection	P/T	E01
DLT3KB	T/M out-speed sensor:Abnormal	P/T	E01
DW59KA	Blade dual selector SOL disconnection	W/E	E01
DW59KB	Blade dual selector SOL short circuit	W/E	E01
DW59KY	Blade dual selector SOL hot short	W/E	E01
DW5AKA	Blade pitch selector SOL disconnection	W/E	E02
DW5AKB	Blade pitch selector SOL short circuit	W/E	E02
DW5AKY	Blade pitch selector SOL hot short	W/E	E02
DW7BKA	Fan rev EPC:Disconnection	W/E	E01
DW7BKB	Fan rev EPC:Short circuit	W/E	E01
DWN3KA	Ssp solenoid:Disconnection	P/T	E04
DWN3KB	Ssp solenoid:Short circuit	P/T	E04
DWN3KY	SSP solenoid:Short circuit	P/T	E04
DWN5KA	Fan pump solenoid 1:Disconnection	W/E	E01
DWN5KB	Fan pump solenoid 1:Short circuit	W/E	E01
DWN5KY	Fan pump solenoid 1:Hot Short	W/E	E02
DWNCKA	Fan pump solenoid 2:Disconnection	W/E	E01
DWNCKB	Fan pump solenoid 2:Short circuit	W/E	E01
DWNCKY	Fan pump solenoid 2:Hot Short	W/E	E02
DXH1KA	Lock-up ECMV:Disconnection	P/T	E02
DXH1KB	Lock-up ECMV:Short circuit	P/T	E02
DXH1KY	Lock-up ECMV:Short circuit	P/T	E03
DXH4KA	1st clutch ECMV:Disconnection	P/T	E03
DXH4KB	1st clutch ECMV:Short circuit	P/T	E03
DXH4KY	1st clutch ECMV:Short circuit	P/T	E03
DXH5KA	2nd clutch ECMV:Disconnection	P/T	E03
DXH5KB	2nd clutch ECMV:Short circuit	P/T	E03
DXH5KY	2nd clutch ECMV:Short circuit	P/T	E03

Assembly process No.	Inspection of machine monitor (12/14)
M-2	

Failure	Trouble	Applicable equipment	Action code
DXH6KA	3rd clutch ECMV:Disconnection	P/T	E03
DXH6KB	3rd clutch ECMV:Short circuit	P/T	E03
DXH6KY	3rd clutch ECMV:Short circuit	P/T	E03
DXH7KA	R clutch ECMV:Disconnection	P/T	E03
DXH7KB	R clutch ECMV:Short circuit	P/T	E03
DXH7KY	R clutch ECMV:Short circuit	P/T	E04
DXH8KA	F clutch ECMV:Disconnection	P/T	E03
DXH8KB	F clutch ECMV:Short circuit	P/T	E03
DXH8KY	F clutch ECMV:Short circuit	P/T	E04
DXH9KA	Right clutch ECMV:Disconnection	P/T	E03
DXH9KB	Right clutch ECMV:Short circuit	P/T	E03
DXH9KY	Right clutch ECMV:Hot Short	P/T	E04
DXHAKA	Left clutch ECMV:Disconnection	P/T	E03
DXHAKB	Left clutch ECMV:Short circuit	P/T	E03
DXHAKY	Left clutch ECMV:Hot Short	P/T	E04
DXHBKA	Right brake ECMV:Disconnection	P/T	E04
DXHBKB	Right brake ECMV:Short circuit	P/T	E04
DXHBKY	Right brake ECMV:Short circuit	P/T	E04
DXHCKA	Left brake ECMV:Disconnection	P/T	E04
DXHCKB	Left brake ECMV:Short circuit	P/T	E04
DXHCKY	Left brake ECMV:Short circuit	P/T	E04
DXJBKA	S/C ECMV:Disconnection	P/T	E02
DXJBKB	S/C ECMV:Short circuit	P/T	E02
DXJBKY	S/C ECMV:Short circuit	P/T	E02
DY2HKA	Pre lub. motor:Disconnection	P/T	E02
dAFRKR1	Monitor:Can communication lost(WE)	W/E	E03
dB2RKR2	ENG controller:Can communication lost(WE)	W/E	E03

Assembly process No.	Inspection of machine monitor (13/14)
M-2	

Error codes list (Related to engine controller)

Failure	Trouble	Applicable equipment	Action code
B@BAZG	Eng Oil Press Low	ENG	—
B@BCNS	Eng Water Overheat	ENG	—
CA111	ECM Critical Internal Failure	ENG	E03
CA115	Eng Ne and Bkup Speed Sens Error	ENG	E03
CA122	Chg Air Press Sensor High Error	ENG	E03
CA1228	EGR Valve Servo Error 1	ENG	E03
CA123	Chg Air Press Sensor Low Error	ENG	E03
CA131	Throttle Sensor High Error	ENG	E03
CA132	Throttle Sensor Low Error	ENG	E03
CA135	Eng Oil Press Sensor High Error	ENG	E03
CA141	Eng Oil Press Sensor Low Error	ENG	E01
CA144	Coolant Temp Sens High Error	ENG	E01
CA145	Coolant Temp Sens Low Error	ENG	E01
CA153	Chg Air Temp Sensor High Error	ENG	E01
CA154	Chg Air Temp Sensor Low Error	ENG	E01
CA1625	EGR Valve Servo Error 2	ENG	E03
CA1633	KOMNET Datalink Timeout Error	ENG	E03
CA187	Sens Supply 2 Volt Low Error	ENG	E03
CA212	Eng Oil Temp Sensor High Error	ENG	E01
CA213	Eng Oil Temp Sensor Low Error	ENG	E01
CA2185	Throt Sens Sup Volt High Error	ENG	E03
CA2186	Throt Sens Sup Volt Low Error	ENG	E03
CA221	Ambient Press Sens High Error	ENG	E01
CA222	Ambient Press Sens Low Error	ENG	E01
CA2249	Rail Press Very Low Error	ENG	E03
CA227	Sens Supply 2 Volt High Error	ENG	E03
CA2271	EGR Valve Pos Sens High Error	ENG	E03
CA2272	EGR Valve Pos Sens Low Error	ENG	E03
CA234	Eng Overspeed	ENG	E02
CA2351	EGR Valve Sol Current High Error	ENG	E03
CA2352	EGR Valve Sol Current Low Error	ENG	E03
CA238	Ne Speed Sens Supply Volt Error	ENG	E03
CA263	Fuel Temp Sensor High Error	ENG	E01
CA265	Fuel Temp Sensor Low Error	ENG	E01
CA271	IMV/PCV1 Short Error	ENG	E03
CA272	IMV/PCV1 Open Error	ENG	E03
CA273	PCV2 Short Error	ENG	E03
CA274	PCV2 Open Error	ENG	E03
CA322	Inj #1(L#1) Open/Short Error	ENG	E03
CA323	Inj #5(L#5) Open/Short Error	ENG	E03
CA324	Inj #3(L#3) Open/Short Error	ENG	E03
CA325	Inj #6(L#6) Open/Short Error	ENG	E03
CA331	Inj #2(L#2) Open/Short Error	ENG	E03
CA332	Inj #4(L#4) Open/Short Error	ENG	E03
CA342	Calibration Code Incompatibility	ENG	E03

Assembly process No.	Inspection of machine monitor (14/14)
M-2	

Failure	Trouble	Applicable equipment	Action code
CA351	Injectors Drive Circuit Error	ENG	E03
CA352	Sens Supply 1 Volt Low Error	ENG	E03
CA386	Sens Supply 1 Volt High Error	ENG	E03
CA441	Battery Voltage Low Error	ENG	E03
CA442	Battery Voltage High Error	ENG	E03
CA449	Rail Press Very High Error	ENG	E03
CA451	Rail Press Sensor High Error	ENG	E03
CA452	Rail Press Sensor Low Error	ENG	E03
CA553	Rail Press High Error	ENG	E03
CA554	Rail Press Sensor In Range Error	ENG	E03
CA559	Rail Press Low Error	ENG	E03
CA689	Eng Ne Speed Sensor Error	ENG	E03
CA731	Eng Bkup Speed Sens Phase Error	ENG	E03
CA757	All Continuous Data Lost Error	ENG	E03
CA778	Eng Bkup Speed Sensor Error	ENG	E03

Assembly process No.	Checking operation of dual tilt mechanism (If equipped)
M-3	

<Dual tilt operation> (Fig. 1)

(C)+(B): Left dual tilt (While selector switch (C) is in the DUAL position, move the knob in direction (B).) (Fig. 2)

(C)+(A): Right dual tilt (While selector switch (C) is in the DUAL position, move the knob in direction (A).) (Fig. 2)

If the blade is tilted while knob switch (C) is in the DUAL position, it is tilted more than by the normal tilting operation. (Fig. 2)

The dual tilt operation is applicable while the blade is raised, hold, or lowered, regardless of its position.

Fig. 1

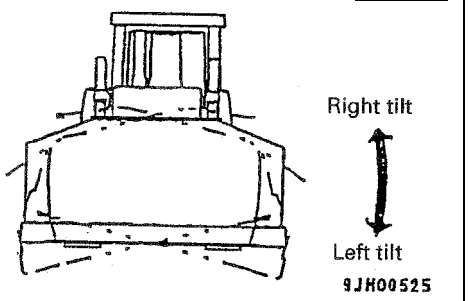
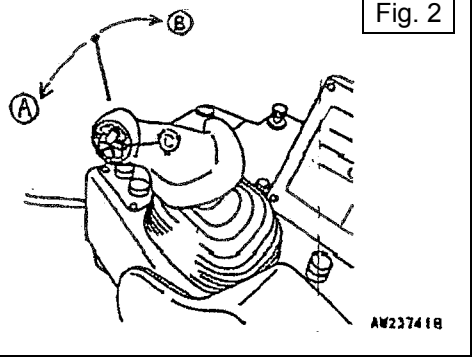


Fig. 2



<Pitch operation> (Fig. 3)

(D)+(B) Reverse pitch: Reduce the cutting edge angle (Pressing button (D) and move the knob in direction (B).) (Fig. 4)

(D)+(A) Reverse pitch: Increase the cutting edge angle (Pressing button (D) and move the knob in direction (A).) (Fig. 4)

The pitch circuit is given priority. If the pitch button is pressed while the blade is being tilted, the blade is pitched.

Fig. 3

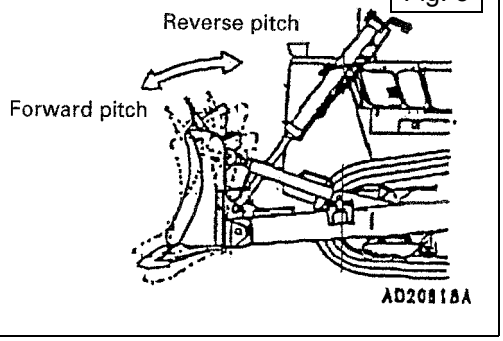
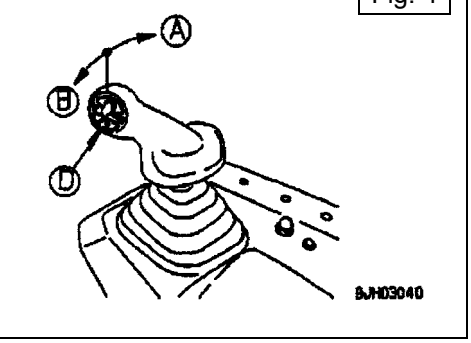


Fig. 4

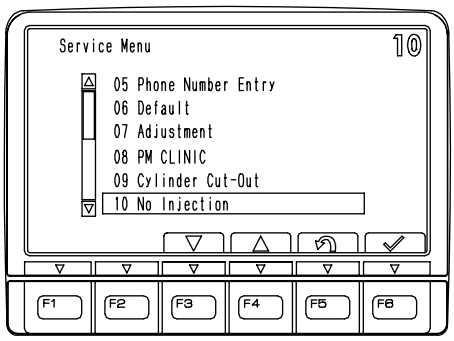


Assembly process No.	Setting procedure for USER ADJUST MODE (1/2)
M-4	

Display of No Injection
If the engine is operated after long storage of the machine, it may be worn or damaged because of insufficient lubrication with oil. To prevent this, the function to lubricate the engine before starting it by cranking it without injecting fuel is installed.
Set the No Injection while the engine is stopped.

1. Selecting menu
   Select "10 No Injection" on the "Service Menu" screen.

Fig. 1

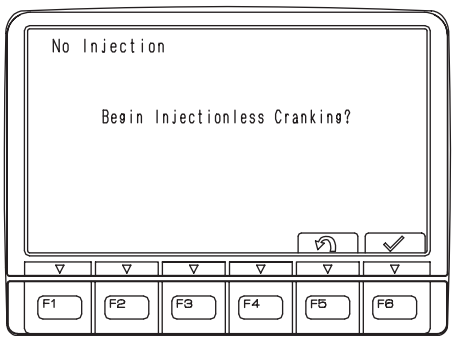


BJD14147

2. Displaying check screen
   If the "No Injection" screen is displayed, the machine monitor asks the operator if no-injection cranking should be performed. Answer with the function switch.
   - [F5]: Do not perform (Return to Service menu screen)
   - [F6]: Perform

   ★ While the screen is changing to the following screen, the screen of "Communication between controllers is being checked" is displayed.

Fig. 2



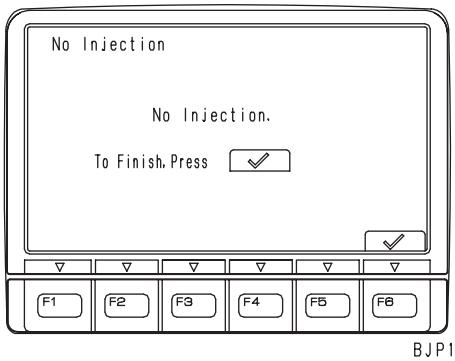
BJP14656

3. Starting no-injection cranking
   If no-injection cranking (Fuel injection in no cylinders) becomes effective, that is displayed on the screen. Under this condition, crank the engine with the starting motor.

   ★ While the screen is changing to the following screen, the screen of "Setting is being prepared" is displayed.

   ★ Limit the cranking time to 20 seconds to protect the starting motor.

Fig. 3

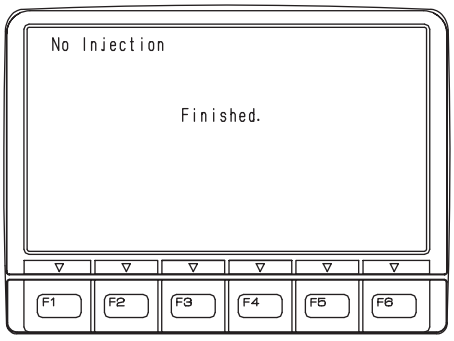


BJP14657

Assembly process No.	Setting procedure for USER ADJUST MODE (2/2)
M-4	

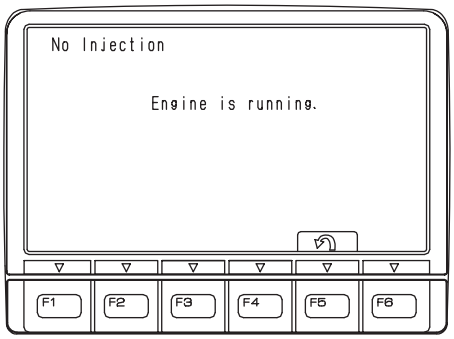
4. Finishing no-injection cranking
   After completing the no-injection cranking operation, press [F6], and finish of no-injection cranking is displayed and the screen returns to the "Service Menu" screen automatically.

Fig. 4



5. Prohibiting no-injection cranking
   If the operator tries to perform the no-injection cranking while the engine is running, the message that the engine is running is displayed and the no-injection cranking is not set effective.
   This function can be selected even while the engine is running. If the no-injection cranking is performed, however, the message of "Engine is running" is displayed on the screen.

Fig. 5



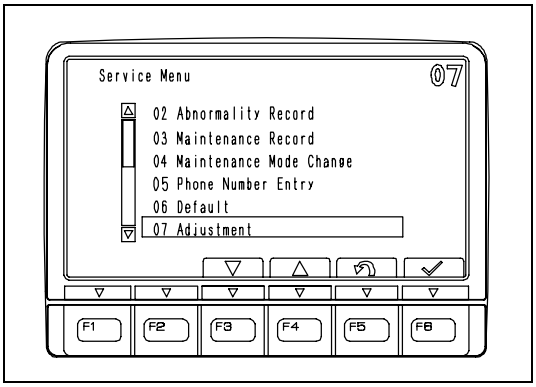
Assembly process No.	Setting procedure for maximum cooling fan speed
M-5	

During measurement of the cab internal pressure in "M-1: Check and adjustment of operator's cab", the cooling fan speed can be set forcibly to the maximum which is the measurement condition with the adjustment mode of the service menu of the machine monitor.

For changing the service menu, see [M-2 Inspection of machine monitor].

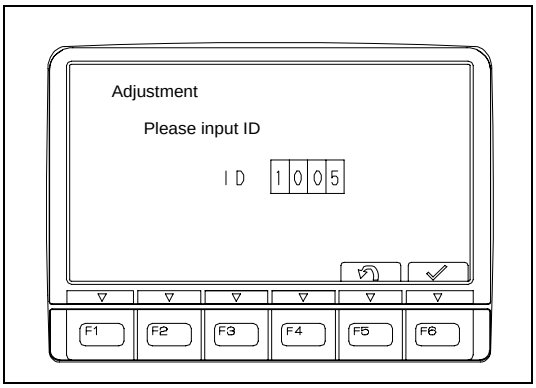
1. Step

1.1 Turn the starting switch to the ON position and display the machine monitor screen.

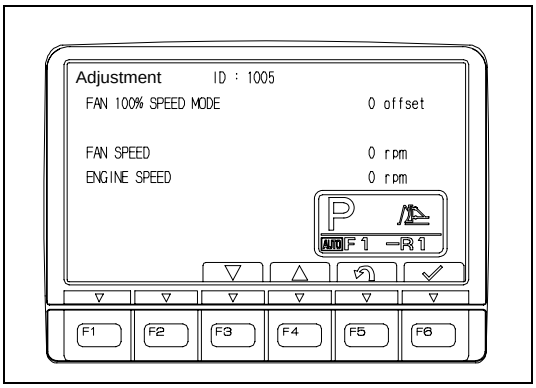


1.2 Select "07 Adjustment" on the service menu screen.

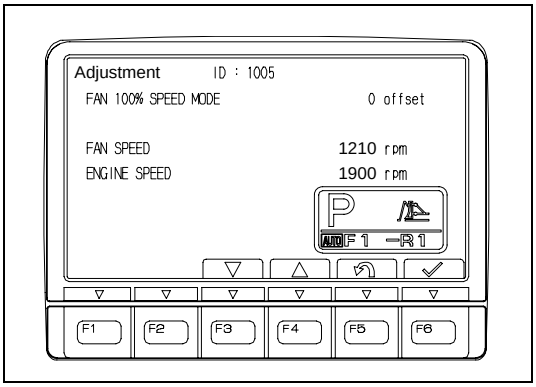
1.3 Input adjustment ID "1005" and confirm it.



1.4 The monitor screen changes to adjustment ID "1005".



1.5 Start the engine and run at high idle under this condition, and the cooling fan speed is kept at the maximum.
The fan speed is displayed in the "FAN SPEED" section of the screen, and the engine speed in the "ENGINE SPEED" section.



1.6 This mode can be reset by pressing function switch "F5" or turning the starting switch to the OFF position.

Note: Do not touch any function switch other Dthan F5. If you do, the fan speed setting may change.

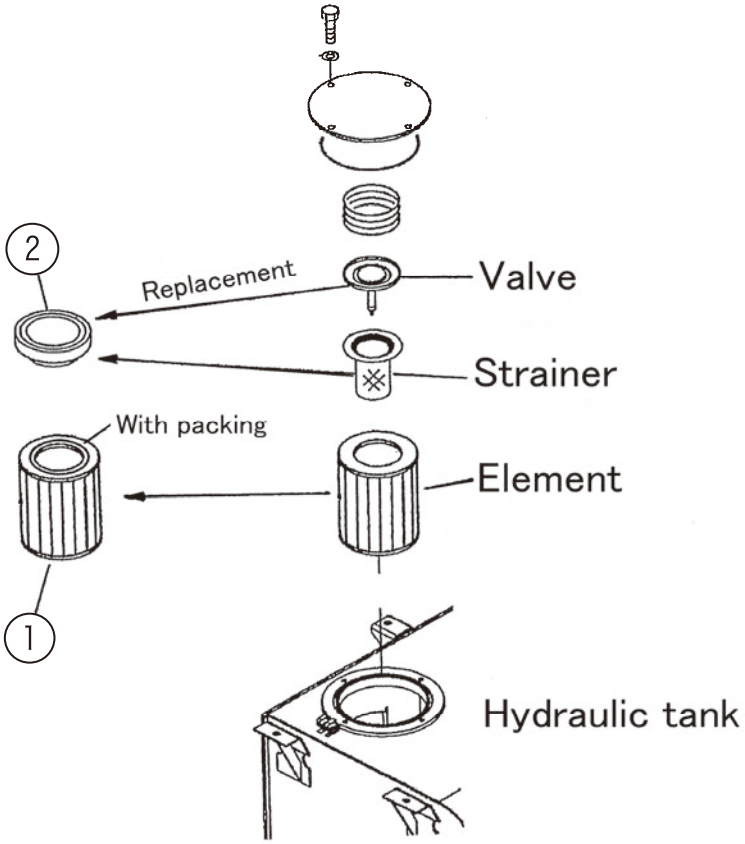
Assembly process No.	Replacement of return filter (Replacement of standard filter → special flushing parts) (1/2)
M-6	

1. Replace the element of hydraulic oil return filter with exclusive flushing element (1), and replace valve and strainer with plate (2).

★ When replacing the elements, take out the element slowly so that refuses adhered to the element do not fall inside. Also, take out refuses by hand from the case.

★ Confirm the installing condition of the element in accordance with "2. Installing Condition of Element".

★ When the atmospheric temperature is below –15°C, do not use (2). Replace only the element and flush the circuit while running the engine at low idle.



No.	Part Name	Part No.	Q'ty	
1	Element	208-60-71170	1	Exclusive flushing element
2	Plate	21T-60-13730	1	

★ Removed standard element (208-60-71123), strainer (07069-25400) and valve (208-60-71160) will be used again after flushing is finished. Accordingly, clean and keep them so that they will not be damaged.

Assembly process No.	Replacement of return filter (Replacement of standard filter → special flushing parts) (2/2)
M-6	

2. Installing condition of element

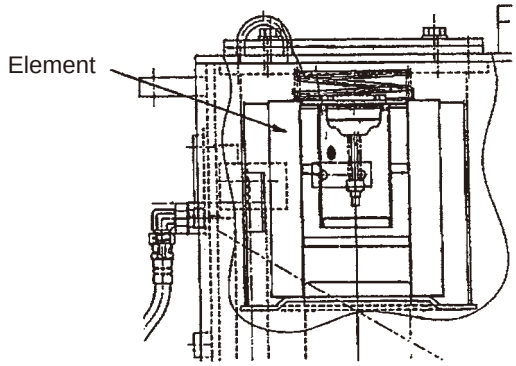


Fig. 1 Good condition

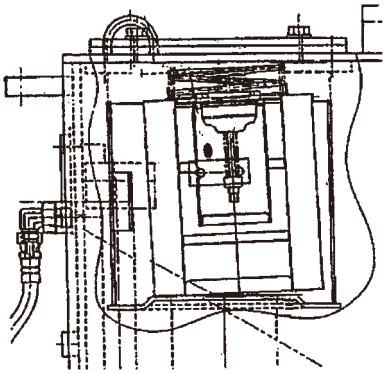


Fig. 2 Bad condition

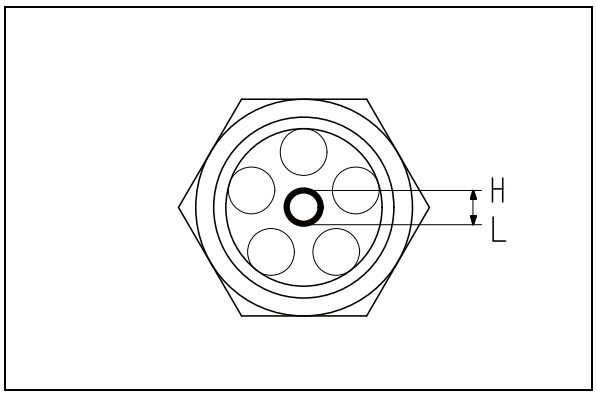
★ Do not insert the element so that it stands on the step at the bottom of the case as shown in Fig. 2.
When the filter case is filled with oil, it is difficult to check if the element is inserted correctly, so turn the element by hand after inserting it in the case. When it turns smoothly, it is considered to be inserted correctly.

Assembly process No.	Flushing of hydraulic circuit, and bleeding air from hydraulic cylinders (Part 1)
M-7	

After the assembly work is completed, flush the hydraulic circuit and bleed air from the hydraulic cylinders.

★ When performing the assembly process No. M-6 to M-9, the assembly process No. A-21 "Bleeding air from hydraulic cylinders" can be neglected. However, the air bleeding mentioned in assembly process No. A-12 "Installation of blade" and A-9 "Installation of ripper" must be performed.
★ Never run the engine at high idle to avoid the damage to the flushing elements.
★ If from the beginning the engine is run at full throttle, or the cylinders are operated to the end of their stroke, the piston packing may be damaged, so never operate in this way.
★ Check the oil level, and add oil to the specified level if necessary.

1. Flushing of fan circuit



1) Check the oil level in the hydraulic tank.
(Check that the oil level is between "L" and "H" of the sight gauge. If it is not between "L" and "H", add oil.)

2) Start the engine and run it for approximately 10 minutes at low idle.
3) Then run the engine for approximately 30 minutes in 1,000 to 1,200 rpm.
4) Check the oil level in the hydraulic tank.
(Check that the oil level is between "L" and "H" of the sight gauge. If it is not between "L" and "H", add oil.)

2. Bleeding air and flushing of cylinder with piston valve (blade lift cylinder)

1) While running the engine at low idle, extend and retract the cylinder for 5 minutes.
However, do not move the cylinder to the stroke end.
★ Operate the piston rod to approx. 100 mm from the end of the stroke; do not relieve the circuit under any circumstances.

2) Keeping the engine at low idle, retract the cylinder to a point approx. 100 mm before the end of the stroke, then use fine control (at least 10 seconds) to retract the cylinder to the end of its stroke. While operating the lever, hold the cylinder in this position for 3 minutes.

3. Bleeding air and flushing of cylinder without piston valve (Blade tilt cylinder, ripper lift cylinder, ripper tilt cylinder)

1) Check the oil level in the hydraulic tank.
(Check that the oil level is between "L" and "H" of the sight gauge. If it is not between "L" and "H", add oil.)

2) While running the engine at low idle, extend and retract the cylinder for 5 minutes.
However, do not move the cylinder to the stroke end.
★ Operate the piston rod to approx. 100 mm from the end of the stroke; do not relieve the circuit under any circumstances.

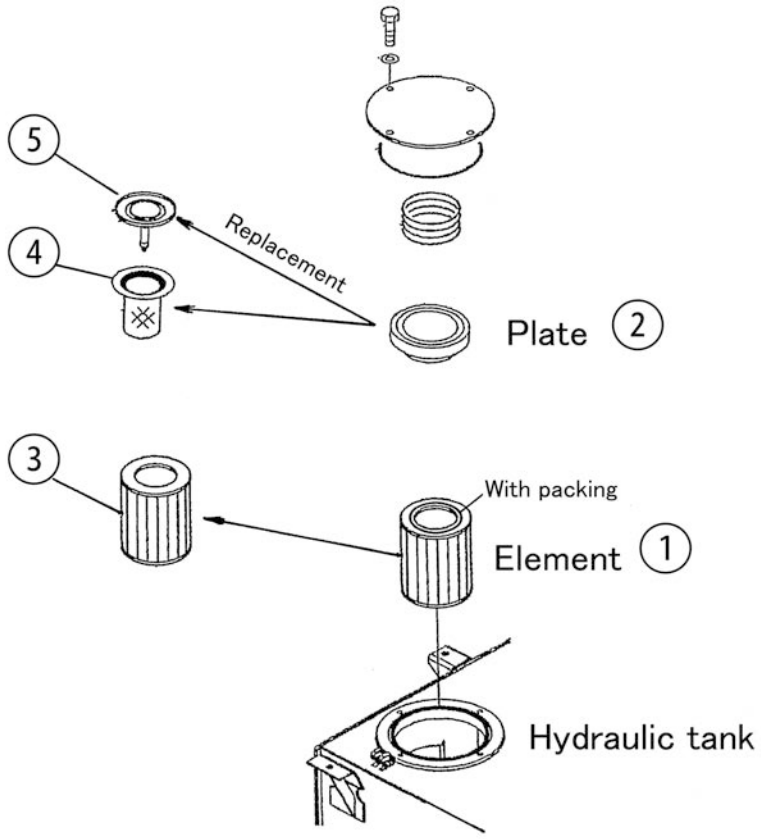
Assembly process No.	Replacement of return filter (Replacement of special flushing parts → standard filter) (1/2)
M-8	

1. After the flushing is finished for work equipment circuit, replace the exclusive flushing parts with stored original element (3), strainer (4) and valve (5).

   ★ When replacing the elements, take out the element slowly so that refuses adhered to the element do not fall inside. Also, take out refuses by hand from the case.

   ★ When atmospheric temperature is at -15°C or lower, pay attention that the valve and the strainer are not replaced with the plate.

   ★ Keep accordance with the procedure in “2. Installing condition of element” as the element capacity will be lower if the installing condition is wrong.



No.	Part Name	Part No.	Q'ty	
3	Element	208-60-71123	1	Standard element
4	Strainer	07069-25400	1	
5	Valve	208-60-71160	1	

   ★ Scrap the used flushing element. Keep accordance with the local laws for scraping.

   ★ Replaced plate is reusable, so it is recommended to store it for the next flushing work.

Assembly process No.	Replacement of return filter (Replacement of special flushing parts →standard filter) (2/2)
M-8	

2. Installing condition of element

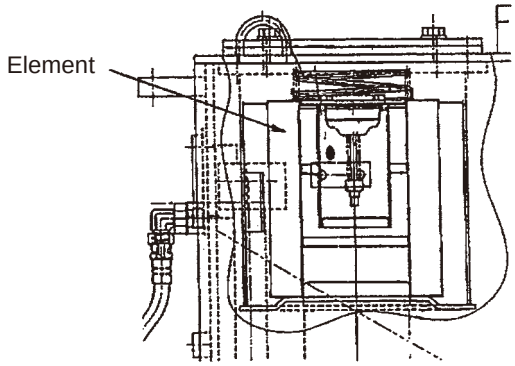


Fig. 1 Good condition

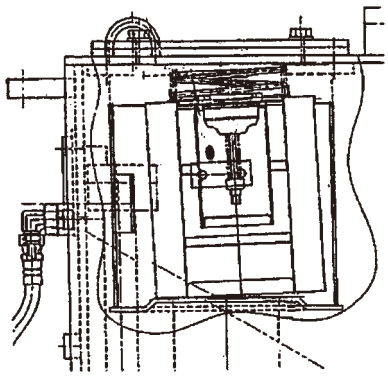


Fig. 2 Bad condition

★ Do not insert the element so that it stands on the step at the bottom of the case as shown in Fig. 2.
When the filter case is filled with oil, it is difficult to check if the element is inserted correctly, so turn the element by hand after inserting it in the case. When it turns smoothly, it is considered to be inserted correctly.

Precautions	Necessary tools		Necessary equipment	
	Name	Q'ty	Name	Q'ty
	Others			

Assembly process No.	Bleeding air from hydraulic cylinders (Part 2)
M-9	

1. Bleeding air from cylinder with piston valve (Blade lift cylinder)

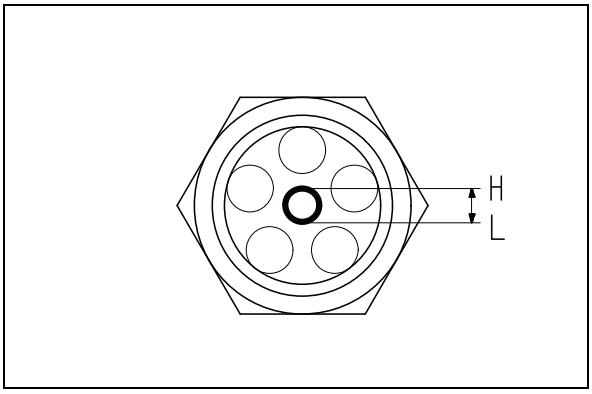
   1) With the engine at high idle, retract the cylinder to a point approx. 100 mm before the end of the stroke, then use fine control (at least 10 seconds) to retract the cylinder to the end of its stroke. While operating the lever, hold the cylinder in this position for 1 minute.

2. Bleeding air from cylinder without piston valve (Blade tilt cylinder, ripper lift cylinder, ripper tilt cylinder)

   1) While running the engine at high idle, repeat this operation for 5 minutes. Then run the engine at low idle and operate the piston rod to the end of its stroke to relieve the circuit.

3. After bleeding the air, leave the engine stopped for 1 hour.

   1) After leaving for 1 hour, check the oil level in the hydraulic tank.
   (Check that the oil level is between "L" and "H" of the sight gauge. If it is not between "L" and "H", add oil.)



⚠ Check the oil level, and add oil to the specified level if necessary.

APPENDIX 1.

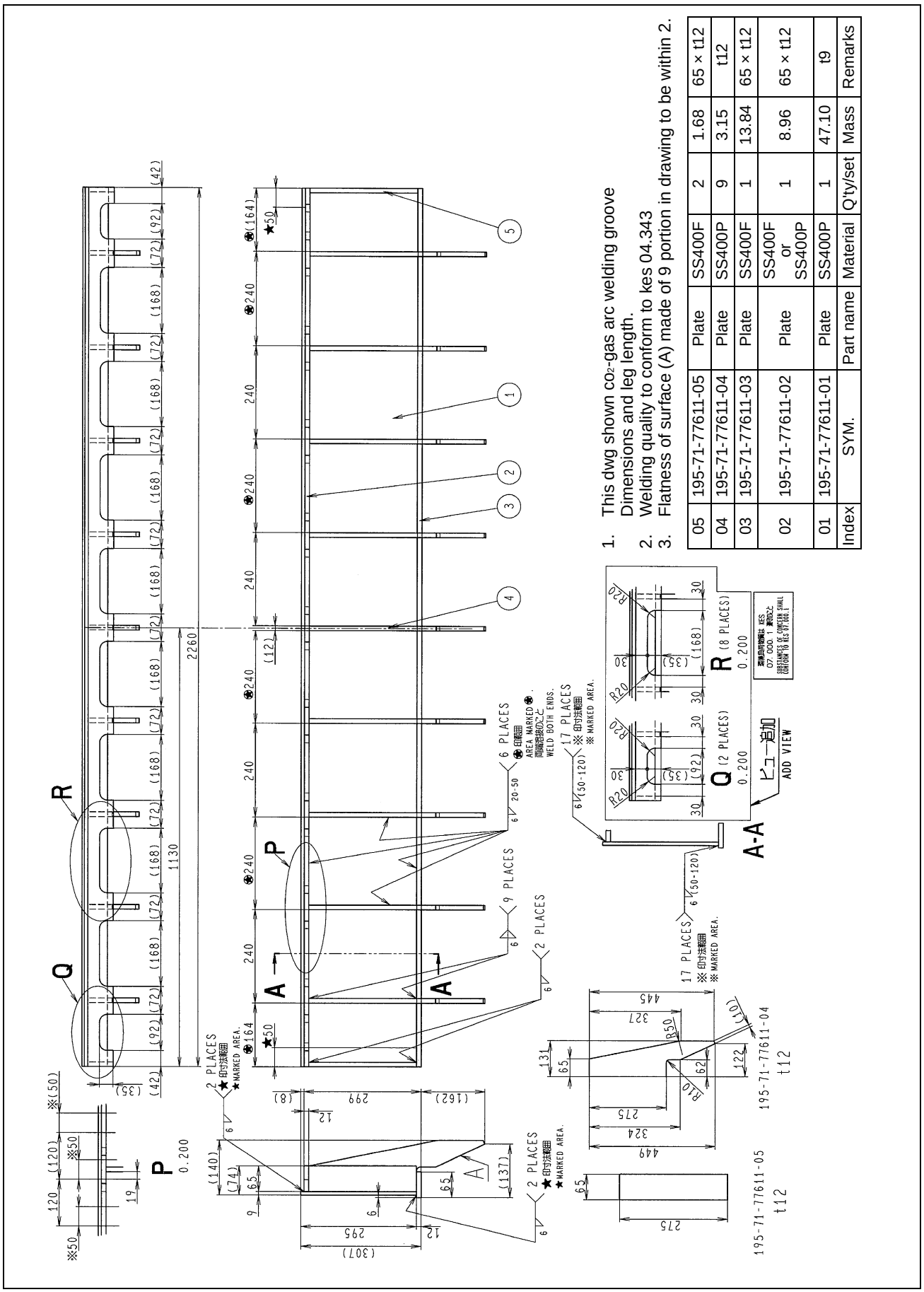
Installation procedure for spill guard (Installation by welding)

★ Weld the spill guard to the blade according to the following procedure.

1. Spill guard fabrication drawings

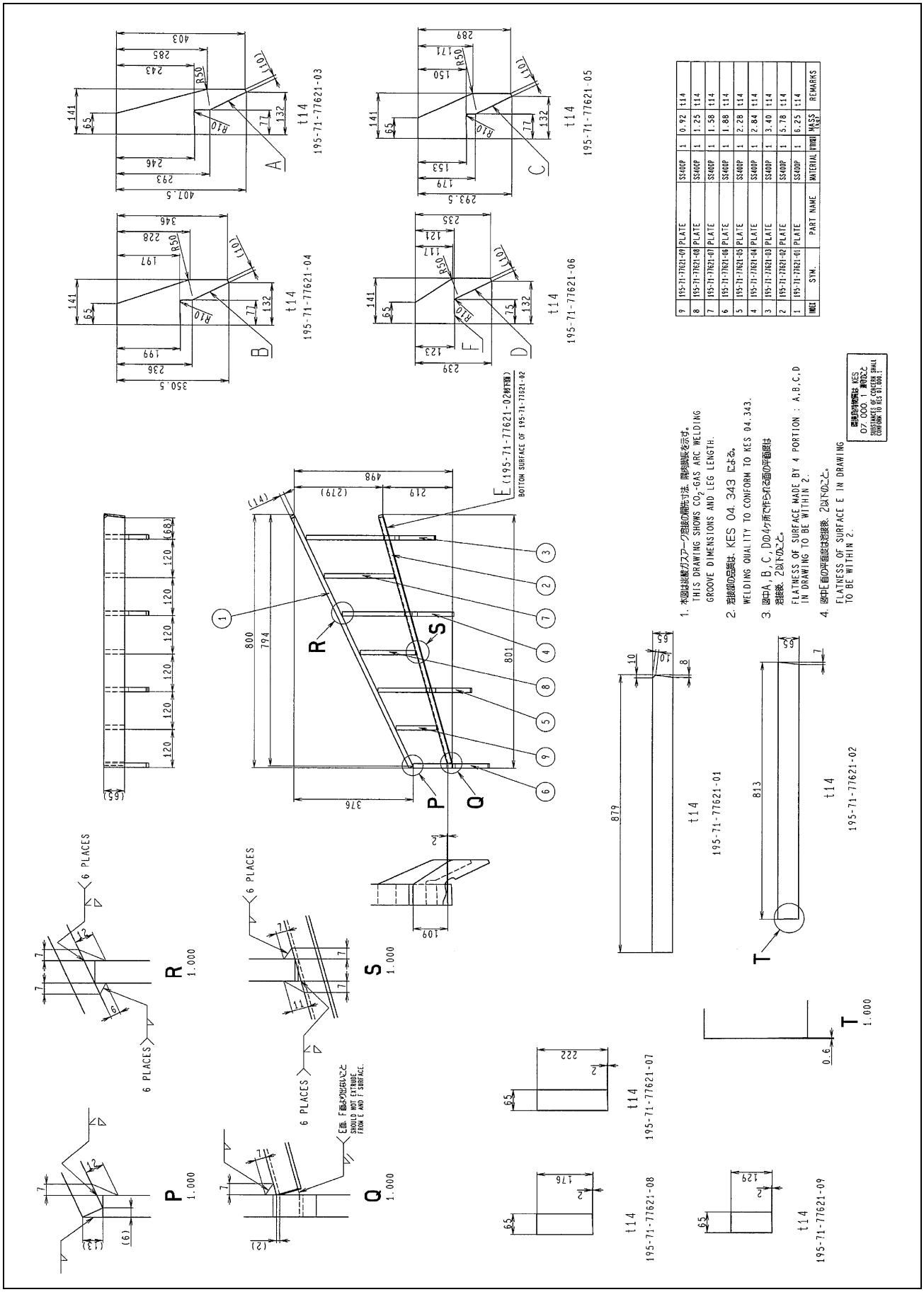
1-1. For semi U-blade

(1) Spill guard (middle): 195-71-77611 fabrication drawing

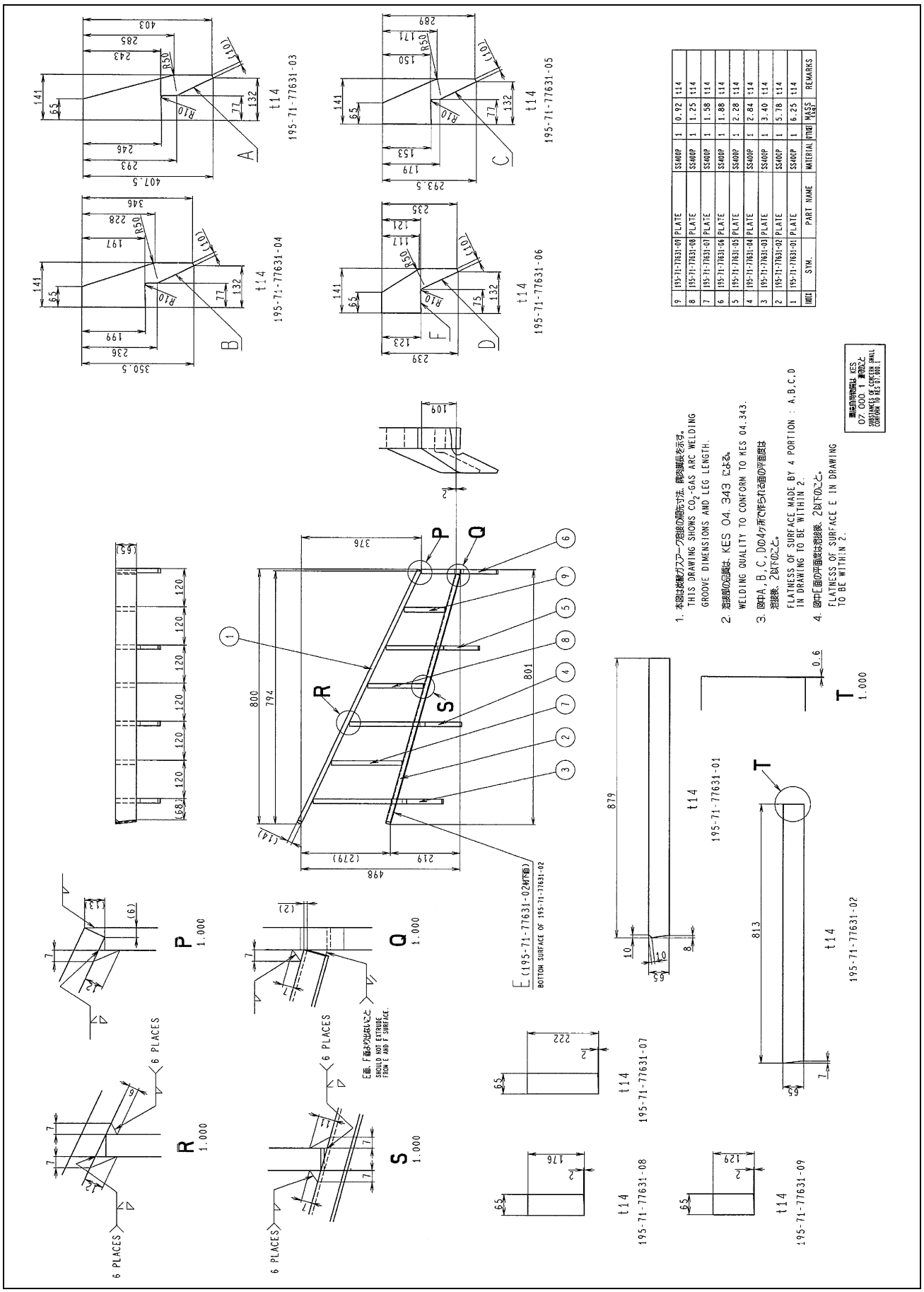


Index	SYM.	Part name	Material	Q'ty/set	Mass	Remarks
05	195-71-77611-05	Plate	SS400F	2	1.68	65 × t12
04	195-71-77611-04	Plate	SS400P	9	3.15	t12
03	195-71-77611-03	Plate	SS400F	1	13.84	65 × t12
02	195-71-77611-02	Plate	SS400F or SS400P	1	8.96	65 × t12
01	195-71-77611-01	Plate	SS400P	1	47.10	t9

(2) Spill guard (Left): 195-71-77621 fabrication drawing

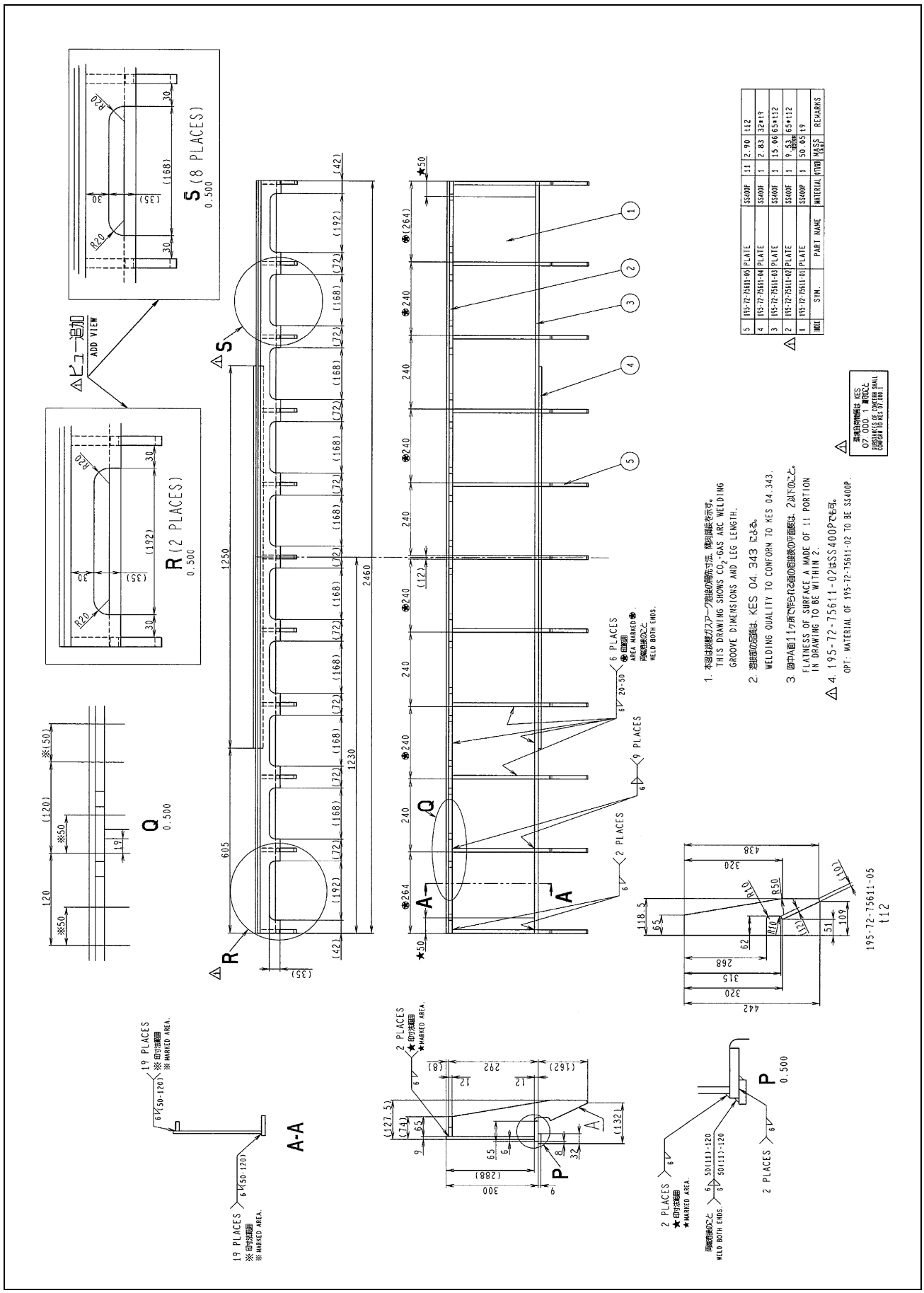


(3) Spill guard (Right): 195-71-77631 fabrication drawing



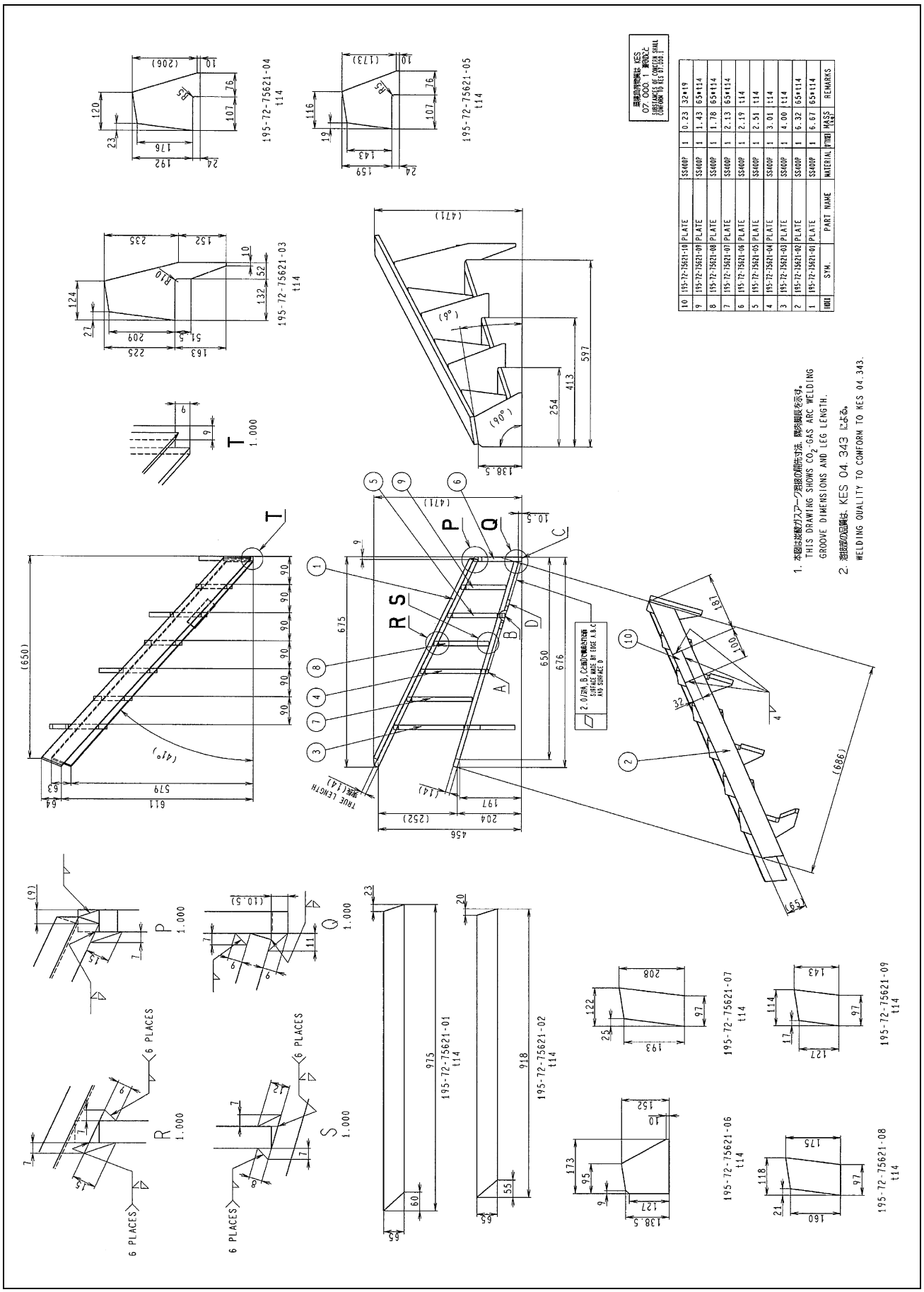
1-2 For U-blade

(1) Spill guard (middle): 195-72-75611 fabrication drawing



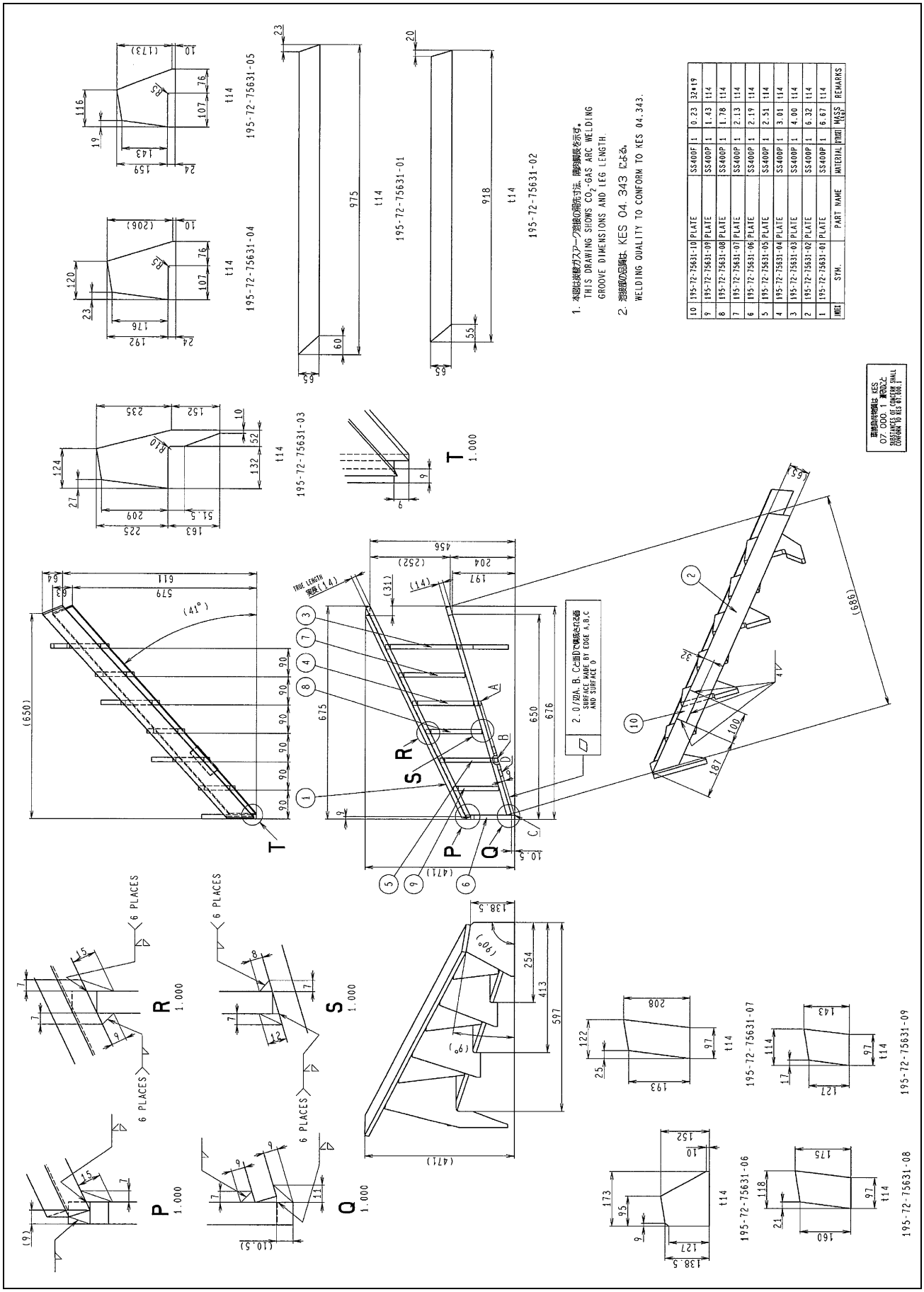
NO.	SYM.	PART NAME	MATERIAL	QTY.	MASS (kg)	REMARKS
5		195-72-75611-05 PLATE	SS400P	11	2.90	t12
4		195-72-75611-04 PLATE	SS400P	1	2.83	32×19
3		195-72-75611-03 PLATE	SS400P	1	15.06	65×112
2		195-72-75611-02 PLATE	SS400P	1	9.63	65×112
1		195-72-75611-01 PLATE	SS400P	1	50.05	t19

(2) Spill guard (Left): 195-72-75621 fabrication drawing

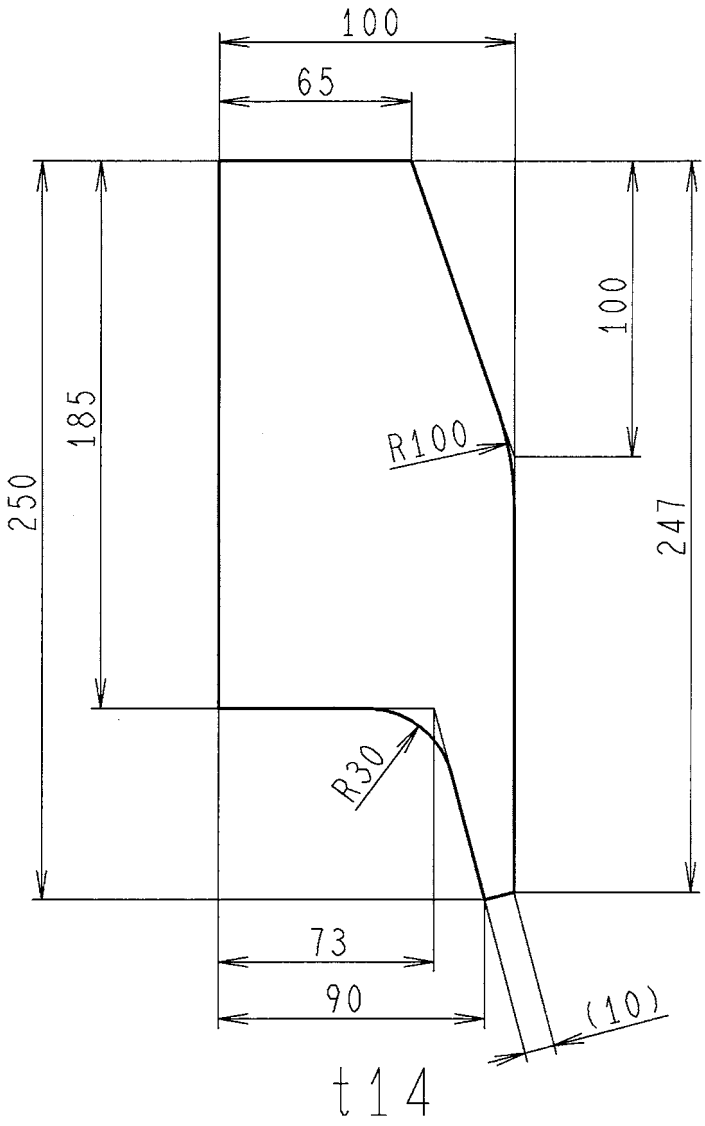


NO.	SYM.	PART NAME	MATERIAL	(PIECE)	MASS	REMARKS
10	195-72-75621-10	PLATE	SS400P	1	0.23	32×19
9	195-72-75621-09	PLATE	SS400P	1	1.43	65×114
8	195-72-75621-08	PLATE	SS400P	1	1.78	65×114
7	195-72-75621-07	PLATE	SS400P	1	2.13	65×114
6	195-72-75621-06	PLATE	SS400P	1	2.19	t14
5	195-72-75621-05	PLATE	SS400P	1	2.51	t14
4	195-72-75621-04	PLATE	SS400P	1	3.01	t14
3	195-72-75621-03	PLATE	SS400P	1	4.00	t14
2	195-72-75621-02	PLATE	SS400P	1	6.32	65×114
1	195-72-75621-01	PLATE	SS400P	1	6.67	65×114

(3) Spill guard (Right): 195-72-75631 fabrication drawing



1-3 Semi U-blade, U-blade (plate)
For semi U-blade, U-blade (2 pcs./machine) 195-71-77690



2. Installation (Welding) of spill guard

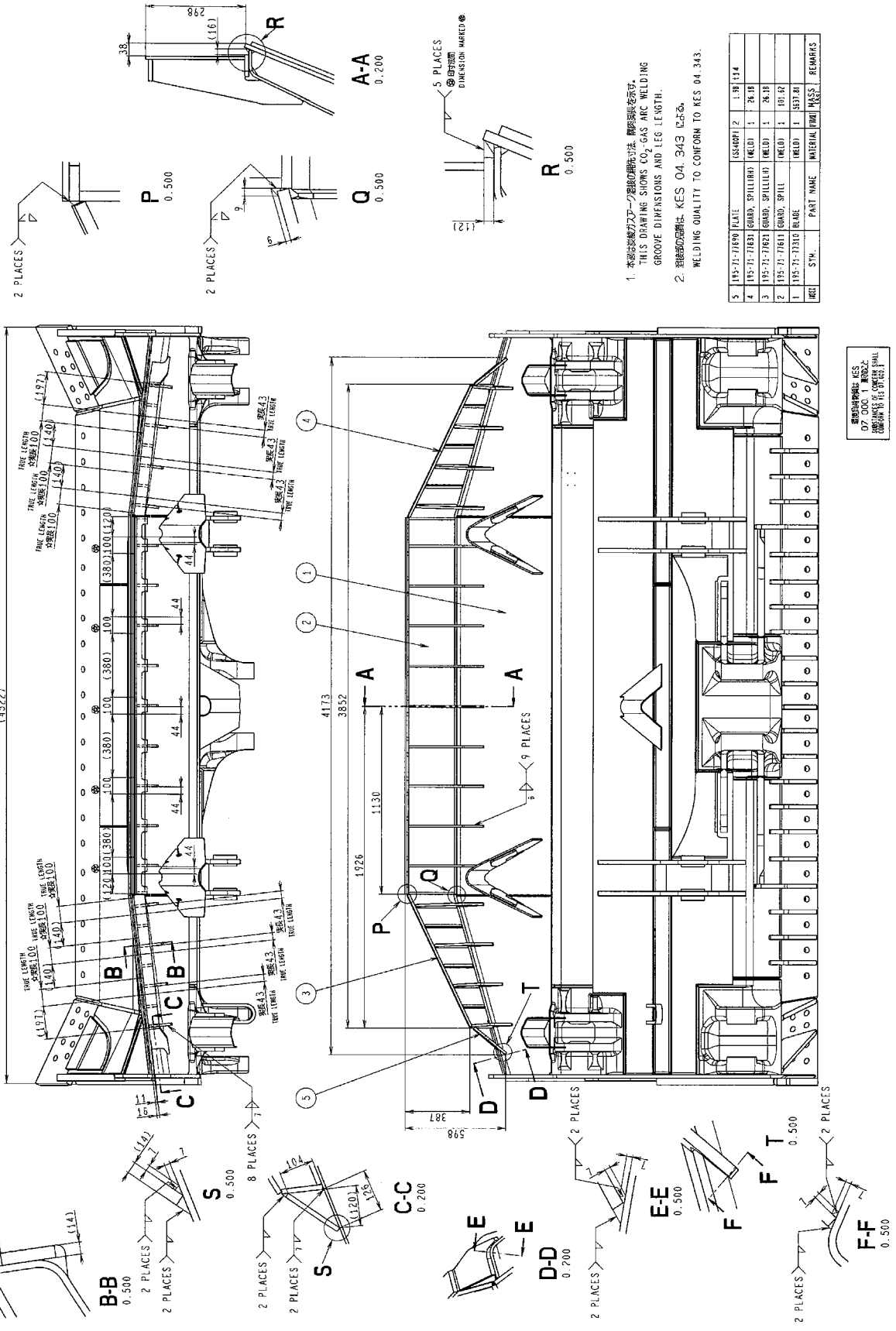
(1) After making the spill guard, weld it to the blade according to "3. Installation drawing for spill guard" shown below.

(2) Precautions for welding
  (a) Remove all matter harmful to welding such as dirt, rust, and paint from the parts to be welded.
  (b) If the parts to be welded are wet, dry them with a gas burner.
  (c) Do not use anti-spatter agents.
  (d) Use coated welding rods specified by JIS 4316 (Low-hydrogen welding rod for mild steel) or welding wires specified by JIS YGW11.
  (e) Before using coated welding rods, dry them at 300 – 350 °C for 30 – 60 minutes.
  (f) Preheat the area about 50 mm from the bead to be laid at 150 - 200 °C. When the ambient temperature is below 10 °C, post-heat the same area at 150 – 200 °C, too.
  (g) Set the welding current to the lower limit of the current range specified for the diameter of the welding rod or wire.
  (h) When performing multi-layer welding, weave the welding rod.
  (i) Do not weld by letting the melted metal flow, but weld from below to above with sufficient penetration. Keep the arc as short as possible and take care not to make an overlap, undercut, etc.
  (j) Before welding the spill guards, remove all the paint from the parts to be welded with a grinder (See note marked with ★ below). Then, perform tack welding, permanent welding and finishing in order.
    ★ If the painted surface is welded, the base metal cracks easily.
  (k) Connect the ground cable to a part from which the paint has been removed or a part at which the cable can be grounded securely (blade unit).
  (l) When welding the spill guard with the blade assembly installed to the machine (body), cover the rods of the blade lift cylinder and blade tilt cylinder to protect them from welding spatters.

3. Spill guard installation (welding) procedure

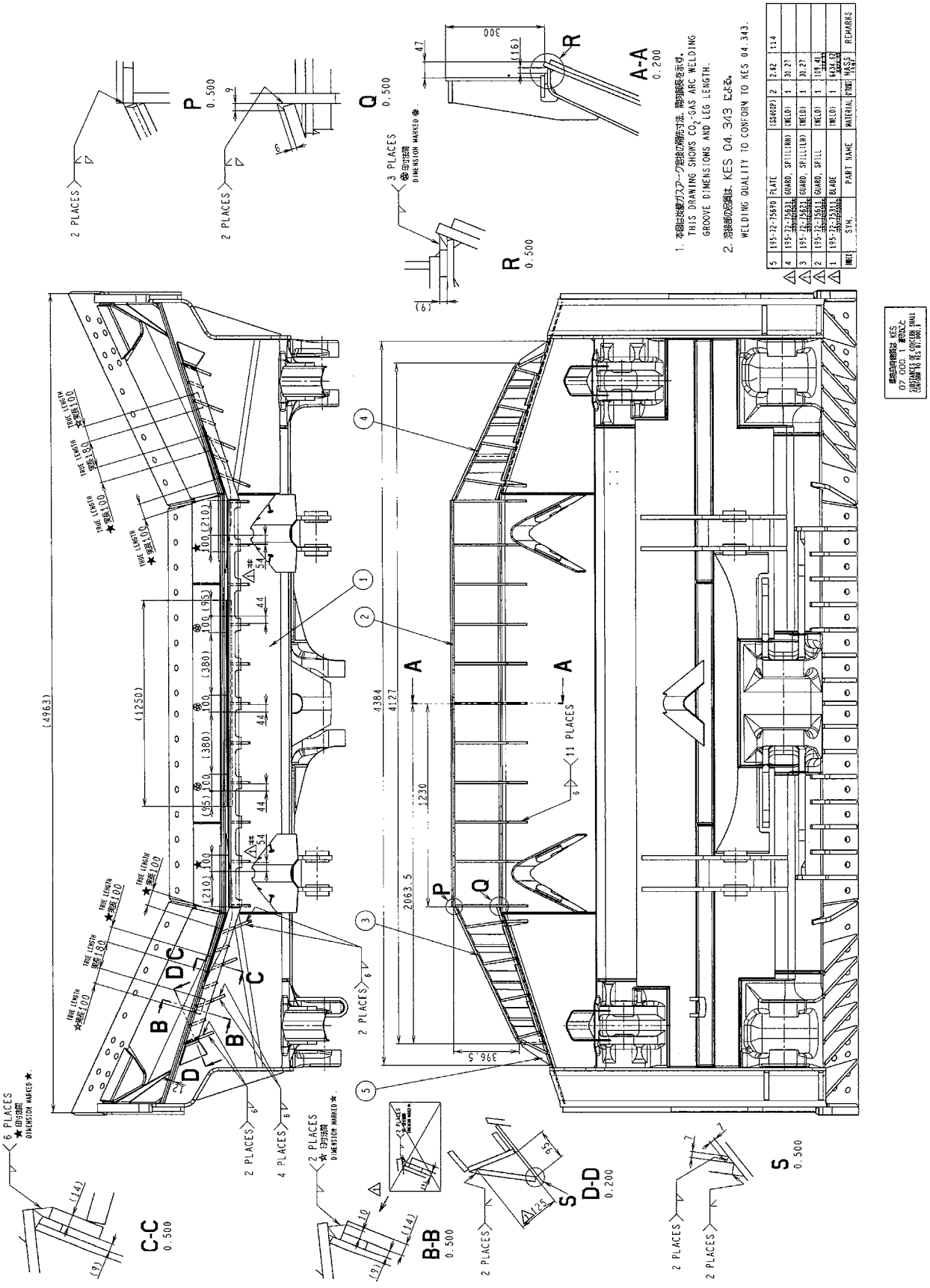
3-1. For semi U-dozer

As shown in Fig., weld spill guards (1), (2) and (3) to the semi U-blade.



3-2. For U-dozer

As shown in Fig., weld spill guards (1), (2) and (3) to the U-blade.



APPENDIX 2.

PRECAUTIONS FOR INITIALIZATION PROCEDURES FOR VHMS CONTROLLER

Initialization procedures for VHMS controller

★ Initialization tools for VHMS controller

Symbol		Part No.	Part name
Z	1	799-608-3211	Diskette
	2	799-608-3220	Wiring harness
	3	Commercially available	Notebook type personal computer (OS: Windows98/2000/NT/Me/XP/VISTA* Terminal "RS232C" is with it)

* VHMS setup tool Ver3.06.00.03 or newer VHMS analysis tool Ver3.05.00.00 or newer

★ Before starting full operation after completion of local assembly or before resuming operation after storage for a long period, initialize the VHMS controller according to the following procedure.

★ Machine data collected with the VHMS controller are stored and managed in WebCARE database. To process the data smoothly on the WebCARE, it is necessary to set the VHMS controller consistently. If it is not set correctly, data will not be taken into the WebCARE and data in the VHMS controller may not be utilized. Accordingly, be sure to carry out the initialization.

★ For the method of installing the VHMS Initialization Program to the personal computer, refer to the Operation and Maintenance Manual contained in the package of diskette **Z1**.

★ Since the service menu of the monitor panel will be used in the following procedure, read "Special functions of monitor panel" and understand the operating procedure in advance.

★ The initialization procedures cover both "ORBCOMM Specification" and "ORBCOMMLESS Specification". In case of "ORBCOMMLESS" Specification", omit the procedures necessary for "ORBCOMM Specification" only.

★ During the initialization work, confirm each work according to the "VHMS Initialization Work Checklist".

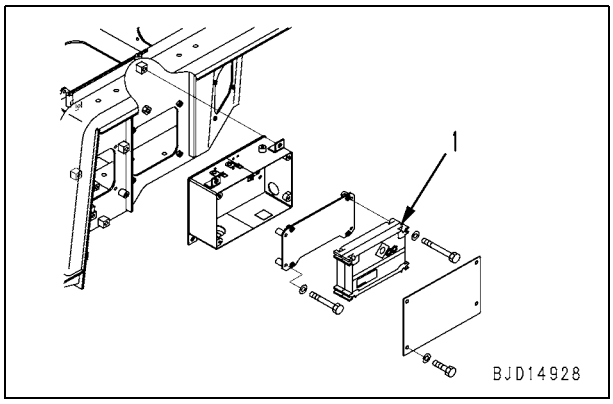
1. Check of machine information, engine information and controller information

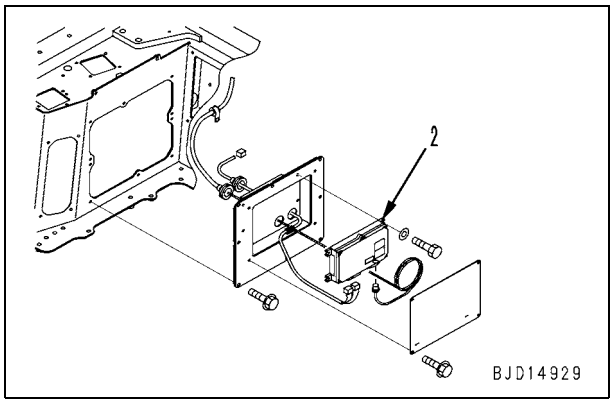
★ This step is a work performed on the whole machine.

Check and record the machine information, engine information, VHMS controller information and ORBCOMM terminal information.

No.	Information to be checked
1	Machine model
2	Machine serial No.
3	Current service meter reading
4	Engine serial No.
5	Transmission serial No.
6	VHMS controller serial No.
7	ORBCOMM terminal serial No. [For ORBCOMM specification only]

★ VHMS controller (1) is in the control box on the left side of the floor and ORBCOMM terminal (2) is in the control box on the right side of the floor.





2. Connection of personal computer

1) Make sure that the starting switch is in the OFF position.

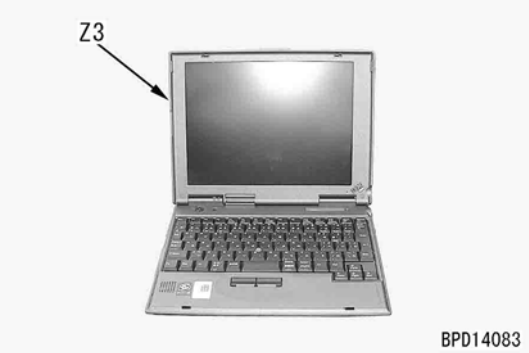
⚠ **Be sure to connect and disconnect the personal computer while starting switch is in the OFF position.**

2) Connect personal computer **Z3** and download connectors (VDW) and (DL1) by wiring harness **Z2**.

★ The download connectors are installed to the following places.

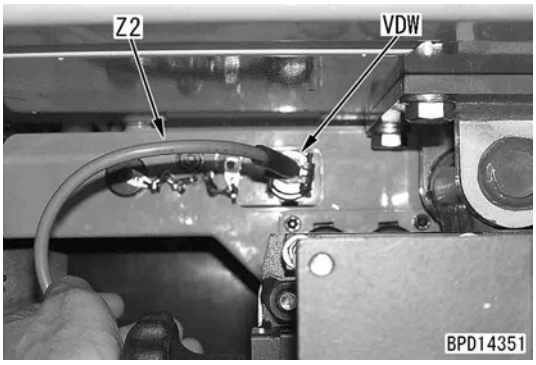
- (VDW): Inside of cab (Left rear lower part)
- (DL1): Left rear side of machine (Side of backup lamp)

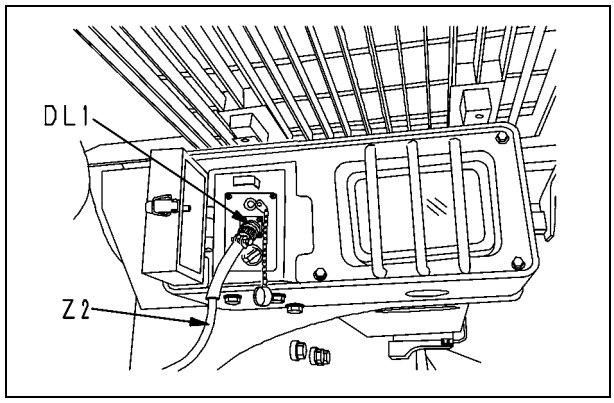
★ Connect the personal computer to the RS232C terminal.



★ Execute initialization of VHMS from the connector in the cab.

★ Use the ground download connector for only downloading.



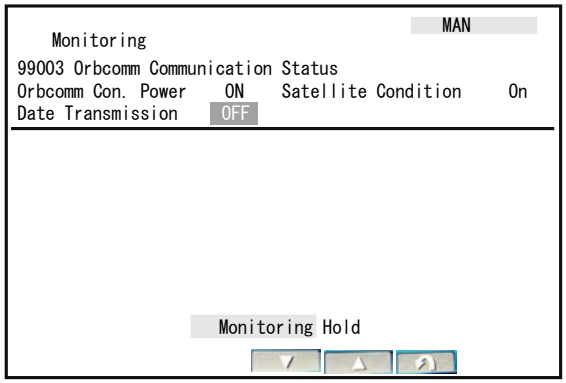


3. Check of operation and satellite capturing condition of VHMS controller

★ This step is a work performed in the operator's cab.

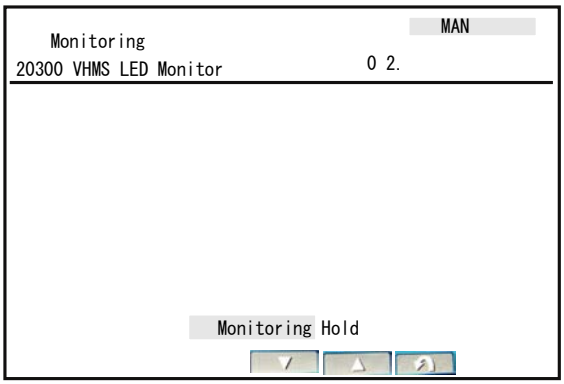
★ Check of satellite capturing condition is necessary o only [ORBCOMM specification].

1) Set the starting switch in the ON position.
2) Switch the monitor panel to Service Menu and select "Monitoring".
3) Input ID = 99003.

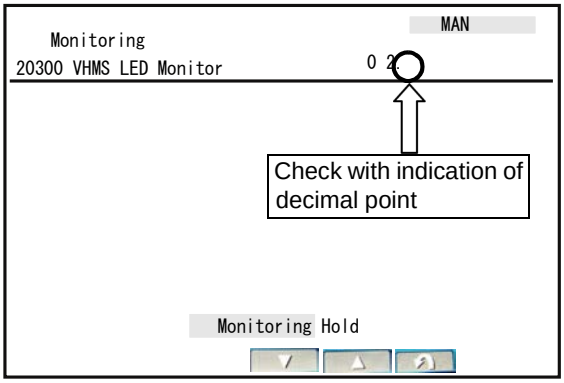


4) Judge the operation of the ORBCOMM controller by the state of the dot at the right bottom of the LED digit of the VHMS controller.

5) The dot at the right bottom of the LED digit of the VHMS controller can be checked in the multi-information display unit of the monitor by the following method.
   1] Set the starting switch in the ON position.
   2] Switch the monitor panel to Service Menu and select "Monitoring".



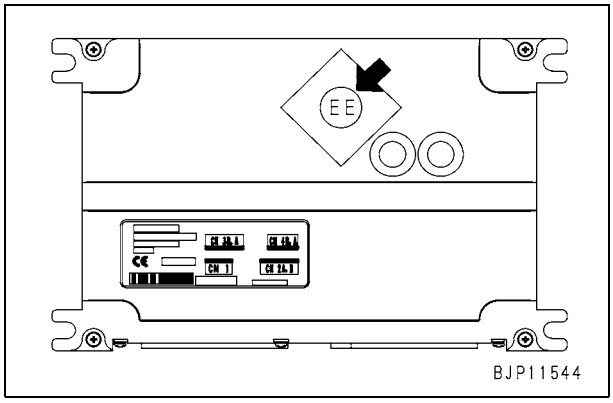
6) At a time 3 minutes or more after start of VHMS, confirm either by the LED (light-emitting-diode) display of decimal point on the lower right of VHMS controller or by the display of decimal point on the lower right of the monitor panel.



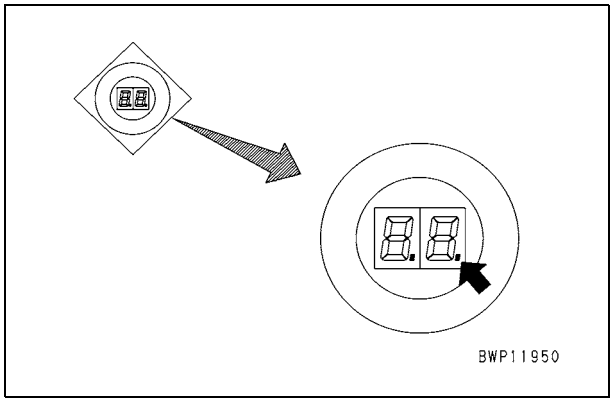
Right decimal point	Display
OFF	• Power is not supplied to ORB-COMM controller. • Communication line to VHMS controller is abnormal.
ON	• Satellite is not captured. • Power is supplied to ORB-COMM controller. • Communication line to VHMS controller is normal.
Blinking	• Power is supplied to ORB-COMM controller. • Communication line to VHMS controller is normal. • Satellite is captured.

4. When checking satellite capturing condition with VHMS controller

1) Watch the 7-segment LED of the VHMS controller to check that the controller is operating normally.



2) Watch the decimal point LED on the right of the right-hand 7 segments of the VHMS controller to check that the ORBCOMM controller is capturing the satellite [ORB-COMM specification].
   ★ Check the communication satellite capturing condition of the ORBCOMM controller on the VHMS controller side.
   ★ If the ORBCOMM controller is normal, the decimal point LED of the right-hand 7 segments flashes.



5. Startup of VHMS initialization tool

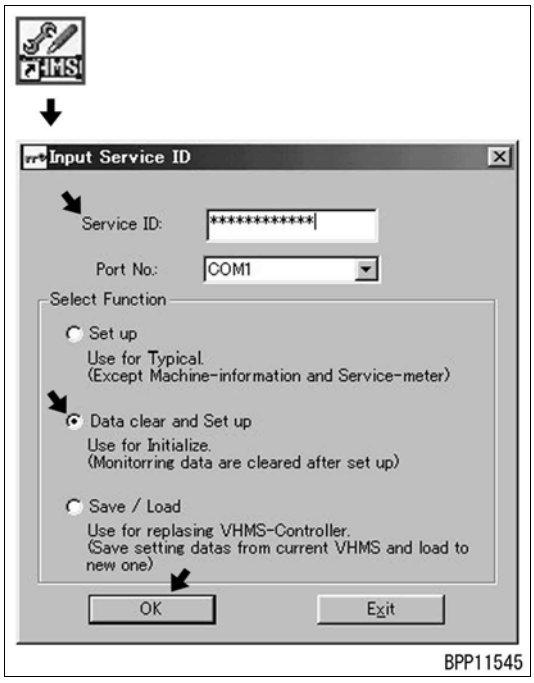
★ This step is a work performed in the operator's cab (on the personal computer).

1) Turn on the personal computer and start the OS.
2) Click the icon of [VHMS Initialization Tool] on the personal computer screen to start the VHMS initialization tool.

Important

★ The setting screen varies with the version No. of the VHMS setting tool.
★ When using a tool before Ver. 3.5.2.1 (CD-ROM), set the VHMS in step 5.
★ When using an updated tool (Ver. 3.5.2.1 or after), set the VHMS in step 6.
★ It is recommended to download the latest VHMS setting tool from the WebCARE and update your tool. (Related material: Servicemate SMP-623)

3) Input the 10-digit service ID in [Service ID].
   ★ Service ID: **7826147000**
4) Select [Data clear and Set up] in the [Select Function] column.
5) Press the [OK] button to go to the setup screen.

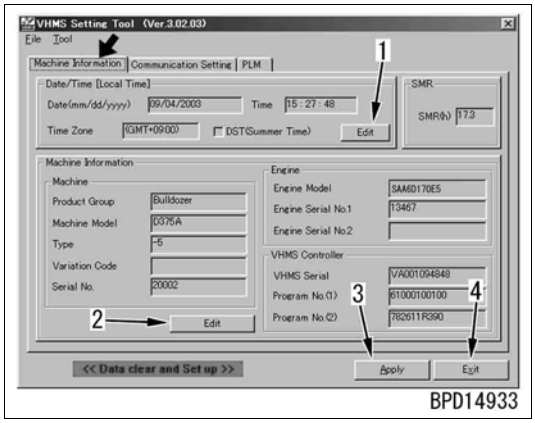


6. Initialization of VHMS controller (Tool before Ver. 3.5.2.1)

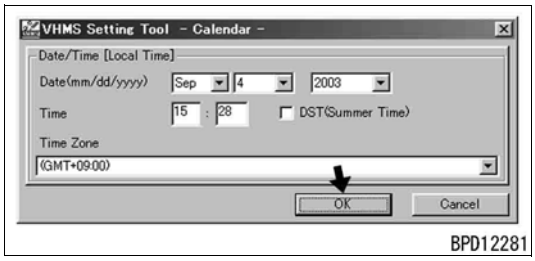
★ This step is a work performed in the operator's cab (on the personal computer).
★ When initializing, do not change the data of service meter [SMR].

[Machine information]

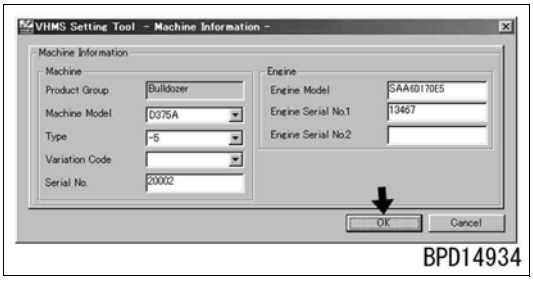
1) Open the [Machine information] tab.
   ★ The [Machine information] tab is displayed first in the [Data clear and Set up] menu.
2) Check all the data.



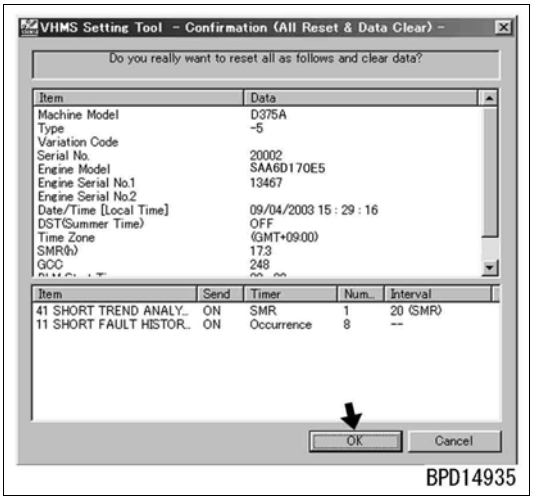
3) If information in the [Date/Time] box is not correct, change it according to the following procedures:
   1] Press [Edit] button (1) on the right lower part of the [Date/Time] box to display the correction screen.
   2] Correct the information and press the [OK] button.



4) If information in the [Machine information] box is not correct, change it according to the following procedures:
   1] Press the [Edit] button (2) on the right lower part of the [Machine information] box to display the correction screen.
   2] Correct the information and press the [OK] button.

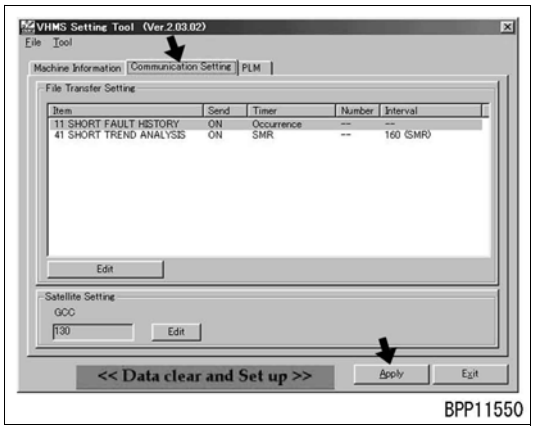


5) After checking/changing all the data in [Machine information], press [Apply] button (3) to settle the setting.
   ★ Press the [Apply] button (3), and the screen for checking the setting will appear. Check the setting again and press the [OK] button if the setting is correct.
   ★ In case of the ORBCOMM Specification, execute [Communication Setting] first and then settle the setting.

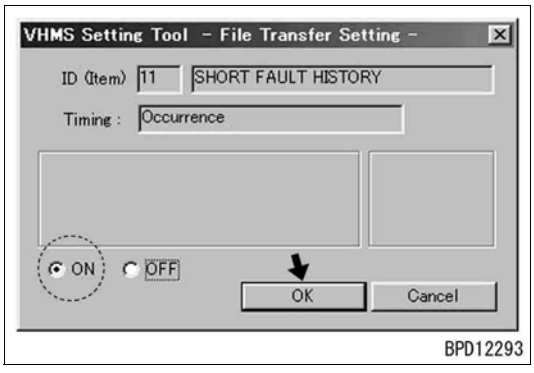


[Communication Setting] [For ORBCOMM specification only]

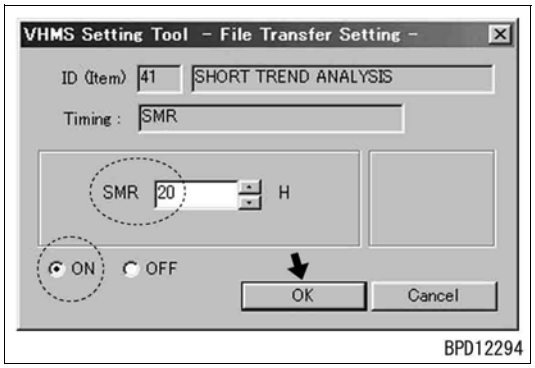
★ Execute this setting after requesting for opening of the ORBCOM terminal and finishing the opening procedure.
   6) Open the [Communication Setting] tab.
   7) Check all the data.



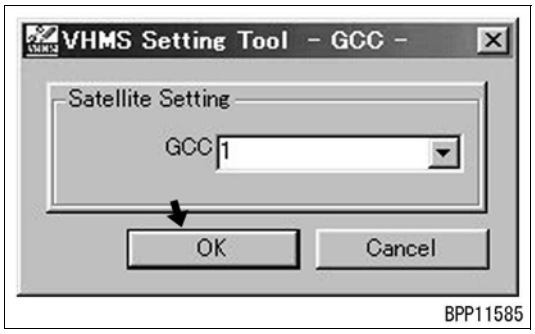
8) To change the setting in [SHORT FAULT HISTORY], follow the procedure below:
   1] Select [SHORT FAULT HISTORY] on the screen and press [Edit] button (5) on the left lower part of the [File Transfer Setting] block to display the setting screen.
   2] Change the setting and then press the [OK] button.
      ★ At initialization, select [Occurrence] at [Timing] and set the function to [ON].



9) To change setting in [SHORT TREND ANALYSIS], follow the procedures below:
   1] Select [SHORT TREND ANALYSIS] on the screen and press [Edit] button on the left lower part of the [File Transfer Setting] block to display the setting screen.
   2] Change the setting and then press the [OK] button.
      ★ At initialization, input [20h] to [SMR] and set the function to [ON].

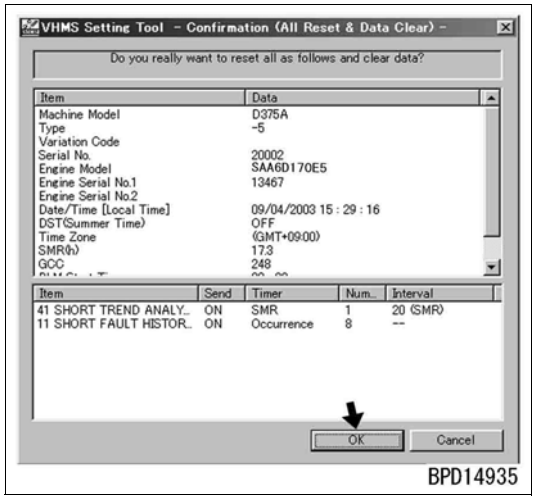


10) To change the setting of [Satellite Setting], follow the procedure below.
   1] Press the [Edit] button in the [Satellite Setting] block to display the setting screen.
   2] Set the GCC Code to the applicable area and then press the [OK] button.

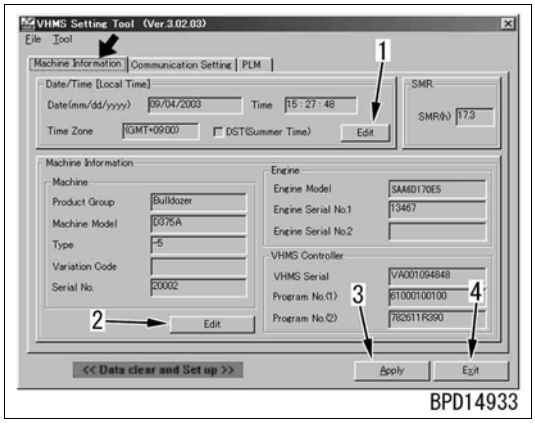


GCC codes and applicable areas			
Code	Applicable Area	Code	Applicable Area
1	U.S.A.	122	Korea
120	Italy	1	Brazil
120	Malaysia	130	Japan

11) After checking/changing all the data in [Communication Setting], press [Apply] button to settle the setting.
   ★ If the [Apply] button is pressed, the screen for checking the setting appears. Check the setting again and press the [OK] button if the setting is correct.



12) After checking/changing the data of [Machine Information] and [Communication Setting], press the [Exit] button at the right lower part of the screen to finish [VHMS Initialization Tool].

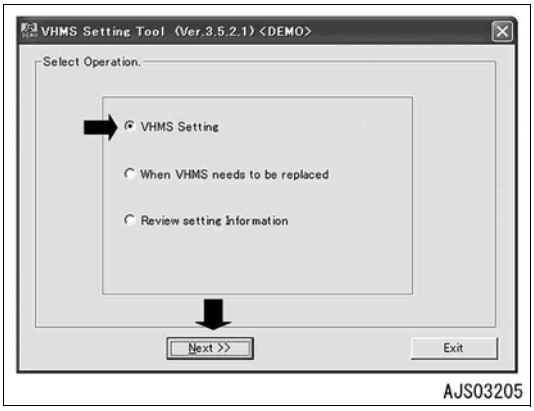


7. Initialization of VHMS controller (Ver. 3.5.2.1 or after)

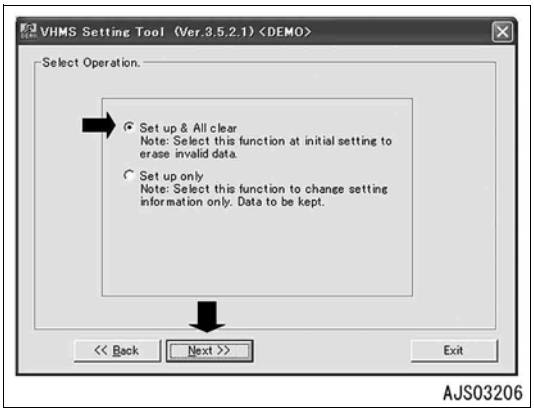
★ This step is a work performed in the operator's cab (on the personal computer).

★ When initializing, do not change the data of service meter [SMR].

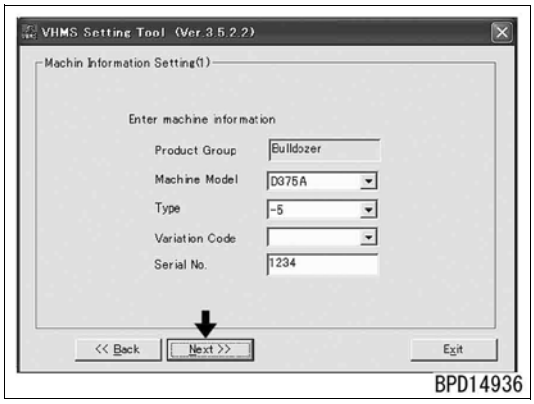
1) Select [VHMS Setting] and press the "Next" button.



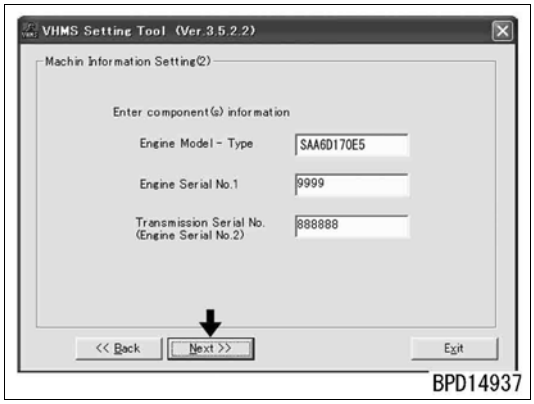
2) Select [Set up & All clear] and press the "Next" button.



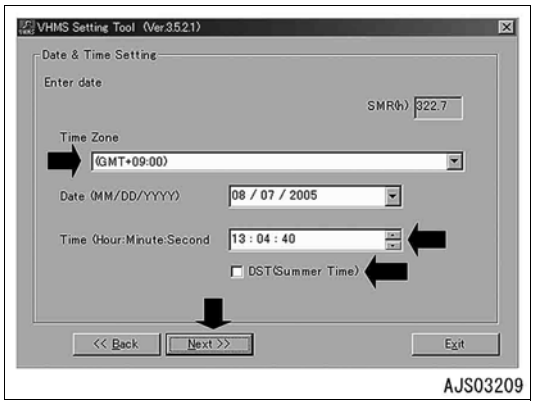
3) Check the machine information. If it does not need to be corrected, press the "Next" button.



★ If the VHMS was installed additionally, the information of [Serial No.] etc. must be input.

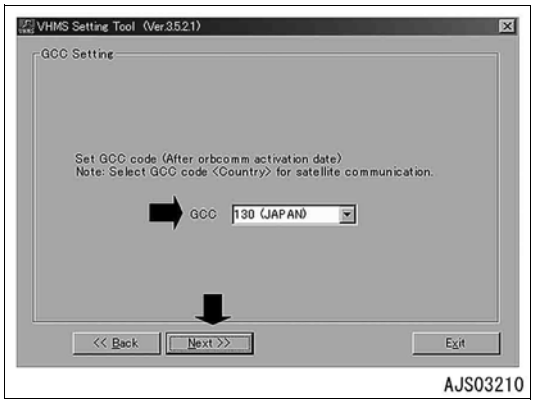


4) Select the time zone.
5) Input the local time.
6) If the DST (Daylight Saving Time) is used now, select it and press the "Next" button.

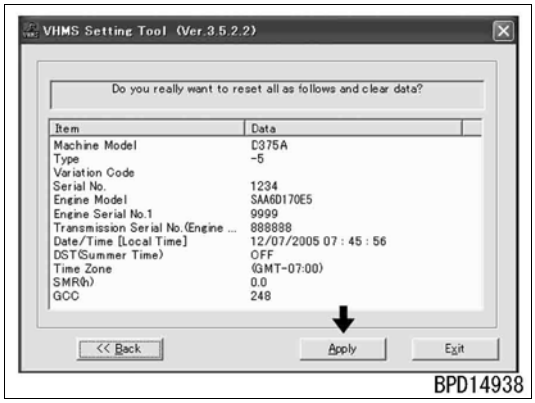


7) Set the GCC Code to the applicable area and then press the "Next" button.

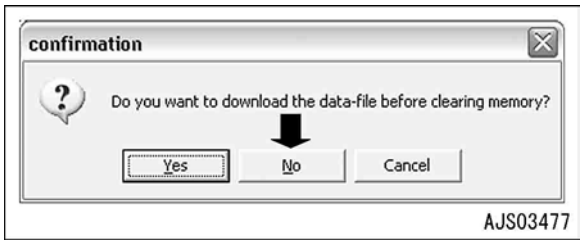
GCC codes and applicable areas			
Code	Applicable Area	Code	Applicable Area
1	U.S.A.	122	Korea
120	Italy	1	Brazil
120	Malaysia	130	Japan

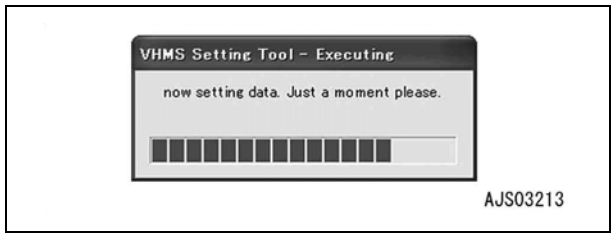


8) The contents of the setting are displayed finally. If there is not a problem, press the "Apply" button.



9) The system asks you if you save the data before changing the setting. If you do not need to save, select "NO".





10) After finishing the work of changing the contents of initialization, press the "OK" button to finish the program.

8. Procedures for executing Quick Pm

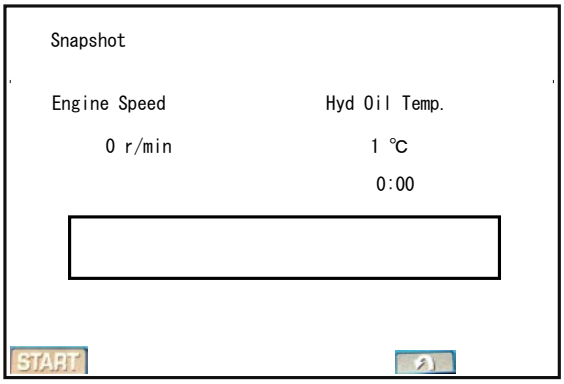
★ The Quick Pm means the Pm Clinic executed with the manual snap shot function of the monitor panel.

★ Data in 7 minutes 30 seconds are saved in the VHMS controller.

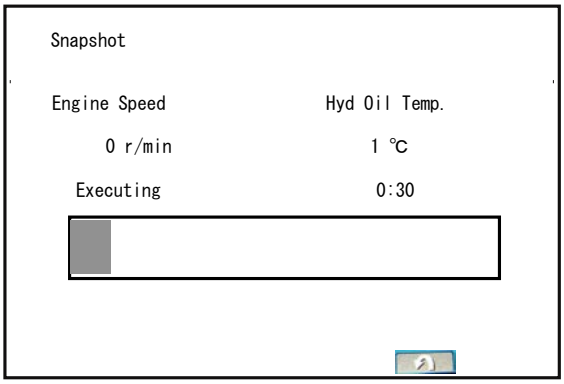
⚠ **Stop the machine on a flat place.**

⚠ **Check that the engine coolant temperature and torque converter oil temperature are within the operating range.**

1) Start the engine.
2) Set the monitor panel to display the service menu.
   ★ For the operating method, see "Special functions of monitor panel".
3) Selection and execution of mode.
   1] Select "Snap shot" on the mode selection screen.



   2] "START" is displayed and the system is set in the waiting state.
   3] When selecting "START", snapshots will start.
      ★ After the snap shot operation starts, the elapsed time is displayed on the upper line.
      ★ To stop the snapshots during the execution, select "↶".



- Color of the bar is yellow for the first 5 minutes and red thereafter.

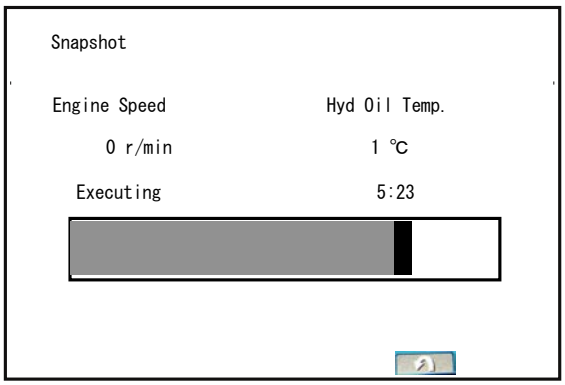


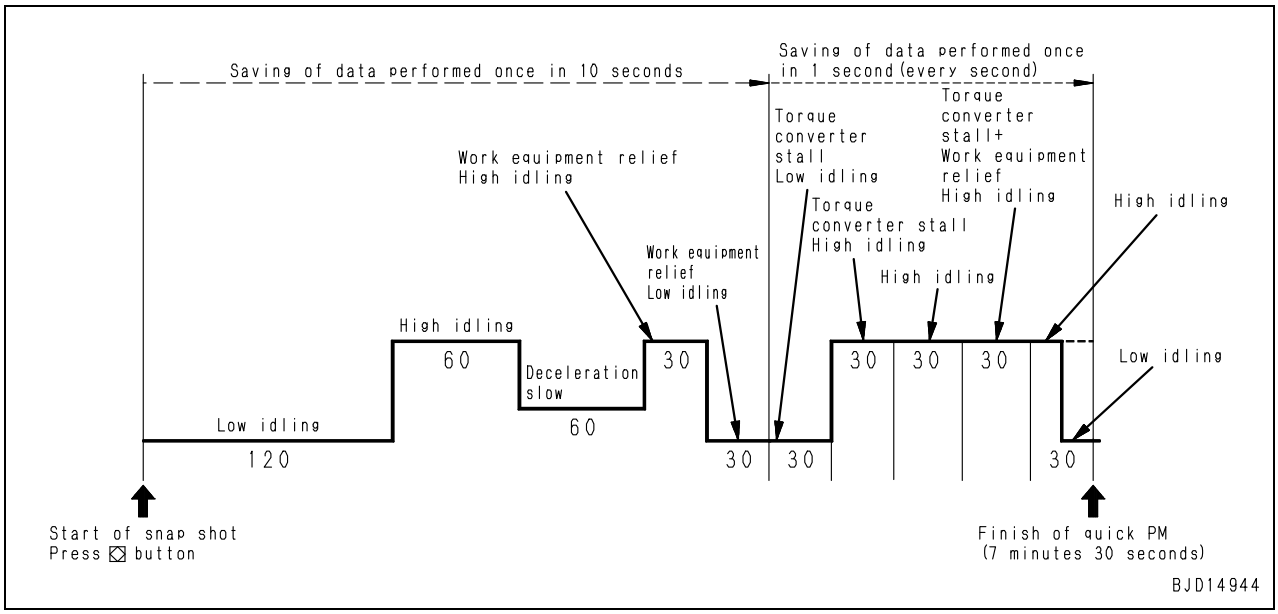
Table 1 Operations of machine to be executed while snap shot is operated

No.	Start	Finish	Time (sec)	State of machine	Operation of machine						
					Transmission	Steer-ing	Work equipment	Fuel control dial	Decelera-tor pedal	Brake pedal	Parking brake
1	0:00	1:00	60	Low idle	N	LH	N	LOW	HI	Released	Released
2	1:00	2:00	60		N	RH	N	LOW	HI	Released	Released
3	2:00	3:00	60	High idle	N	N	N	HI	HI	Released	Released
4	3:00	4:00	60	Deceleration slow	N	N	N	HI	LOW	Released	Released
5	4:00	4:30	30	Relief & high idle	N	N	Ripper lift	HI	HI	Released	Released
6	4:30	5:00	30	Relief & low idle	N	N		LOW	HI	Released	Released
7	5:00	5:30	30	Torque converter stall & low idle	N→F1→F2→F3→N→R1→R2→R3→N	N	N	LOW	HI	ON	Released
8	5:30	6:00	30	Torque converter stall (F3) & high idle (Note 1)	N→F3 (Shift to F3, then run engine at full throttle)	N	N	HI	LOW→ Shift to F3, then HI	ON	Released
9	6:00	6:30	30	High idle	N	N	N	HI	HI	Released	Released
10	6:30	7:00	30	Torque converter stall + Relief	N→F3 (Shift to F3, then run engine at high idle)	N	Ripper lift	HI	LOW→ Shift to F3, then HI	ON	Released
11	7:00	7:30	30	High idle→ Low idle (Note 2)	N	N	N	HI→ LOW	HI	Released	ON

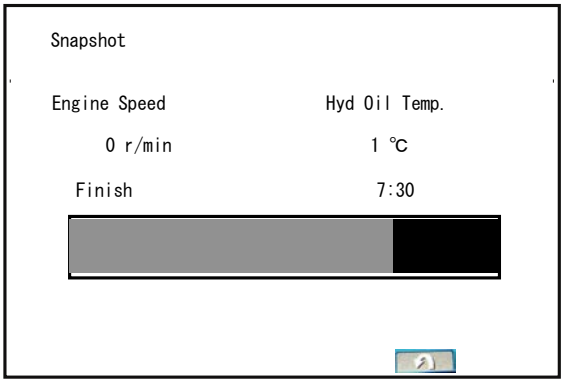
(Note 1): Press the brake pedal fully and shift the gear to F3, then run the engine at full throttle.
(Note 2): Keep running the engine at low idle until the oil temperature is lowered to the normal level.

★ While the torque converter is stalled and the 1st gear speed is selected, do not heighten the engine speed to high idle.

★ After stalling the torque converter, watch the power train oil temperature gauge and take care not to overheat the power train oil.
(The torque converter stall time of 30 seconds is a reference time. When the power train oil temperature gauge reaches the top of the green range, return the transmission to the N (Neutral) position and run the engine at high idle to lower the oil temperature.)



4] The screen shown below appears 7 minutes 30 seconds after the snap shot is started, and then the initial screen appears 5 seconds after. (End of snap shot)



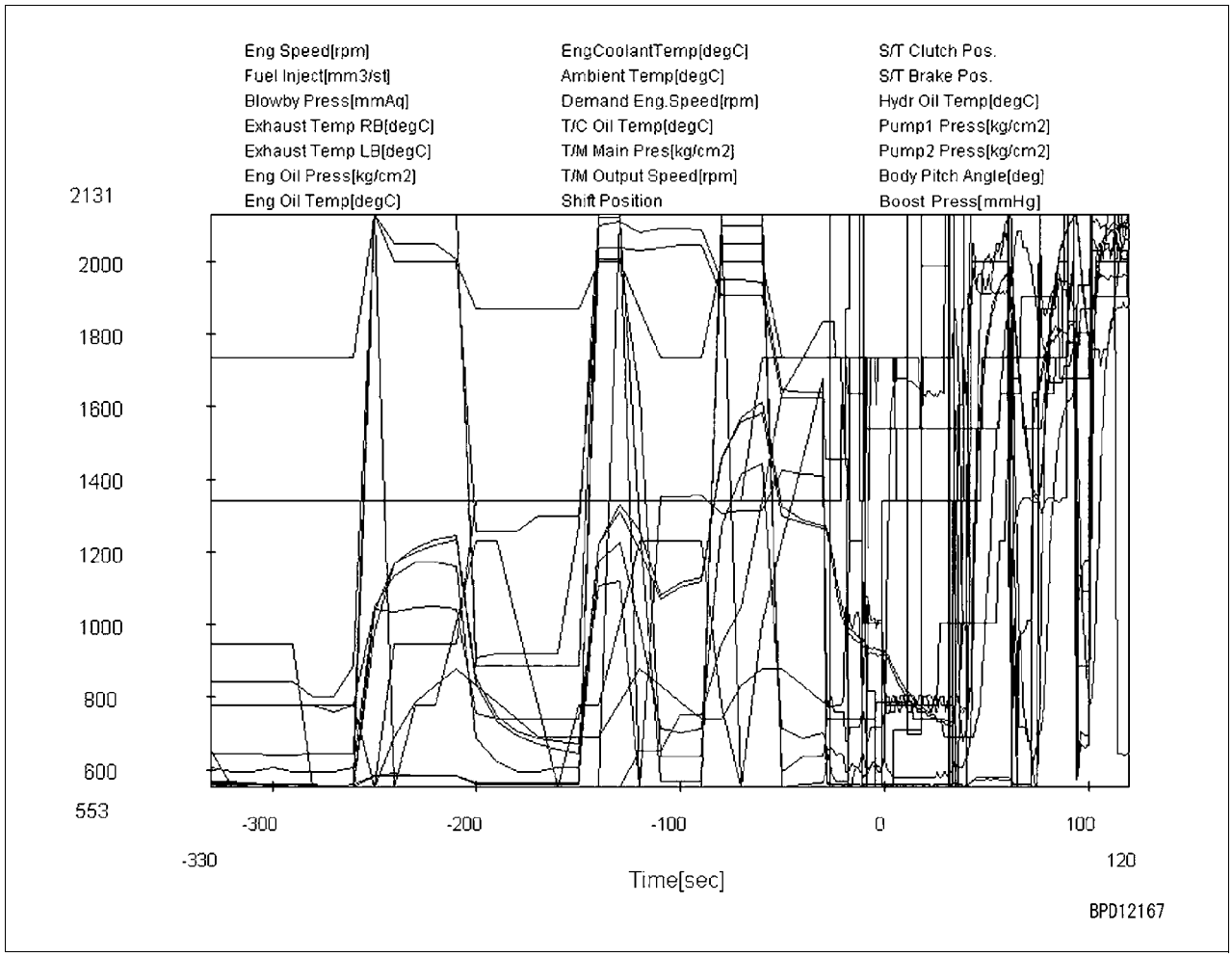
Important
The data of the Quick Pm is recorded only once. If the Quick Pm is executed again, the current data are overwritten. Accordingly, be sure to save the data in the personal computer after executing the Quick Pm, referring to "8. Downloading of set data".

5] Using the analysis tool, read the data of the Quick Pm.

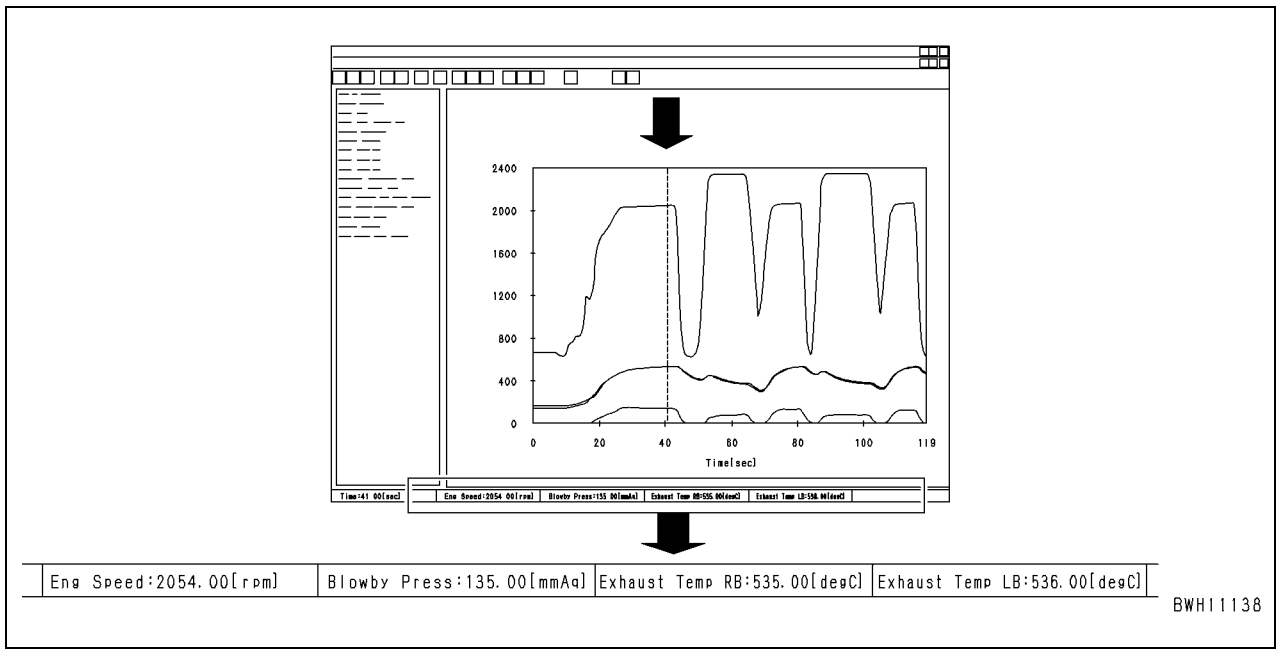
★ For the usage of the analysis tool, see the operation manual.

6] Open the data of the Quick Pm and translate them into a graph.

★ Set the time to the X-axis and set the following items to the Y-axis.
- Engine Speed
- Fuel Inject
- Blowby Press
- Exhaust Temp FB (Exhaust temperature of front bank: 1, 2, 3)
- Exhaust Temp RB (Exhaust temperature of rear bank: 1, 2, 3,)
- Boost press
- Engine Oil Press
- Engine Oil Temp
- Eng Coolant Temp
- Ambient Temp
- Demand Eng Speed (Engine speed demanded by controller)
- T/C Oil Temp (Torque converter oil temperature)
- T/M Main Press (Transmission main relief pressure)
- T/M Output Speed (Transmission output speed)
- Shift Position (Transmission, travel, gear speed)
- S/T Clutch Pos. (Steering clutch position)
- S/T Brake Pos. (Steering brake position)
- Hydr Oil Temp (Hydraulic oil temperature)
- Pump 1 Press (Work equipment pump 1 oil pressure)
- Body Pitch Angle (Pitch angle)
- Fan Speed



7] Click a point in the graph, and the value of each test item at that point on the X-axis is displayed under the graph.
(Example of displayed graph: This is different from the actual graph.)



8] Enter the above value in the Pm Clinic Inspection Sheet.

★ The relationship between the data necessary for the Pm Clinic and the test conditions is as follows.

State of machine	Test items								
	Engine speed	Blow-by pressure	Engine oil pressure	Exhaust temperature	Transmission main pressure	Shift position	Steering clutch position	Steering brake position	Work equipment pump (FR)
Engine at low idle	○		○		○		○	○	
Engine at high idle	○		○		○				
Deceleration slow	○								
Relief & engine at high idle	○								○
Relief & engine at low idle									○
Torque converter stall & engine at slow idle					○	○		○	
Torque converter stall (F3) & engine high idle	○	○		○					
Engine at high idle									
Torque converter stall & relief	○								
Engine at high idle → Engine at low idle								○	

●Shift position

Test value	Measuring method
-1	R1 and lock up OFF
-2	R2 and lock up OFF
-3	R3 and lock up OFF
1	R1 and lock up OFF
2	R2 and lock up OFF
3	R3 and lock up OFF
0	N
-11	R1 and lock up ON
-12	R2 and lock up ON
-13	R3 and lock up ON
11	R1 and lock up ON
12	R2 and lock up ON
13	R3 and lock up ON

●Steering clutch position

Test value	Measuring method
11	Left clutch ON and right clutch ON
10	Left clutch ON and right clutch OFF
1	Left clutch OFF and right clutch ON
0	Left clutch OFF and right clutch OFF

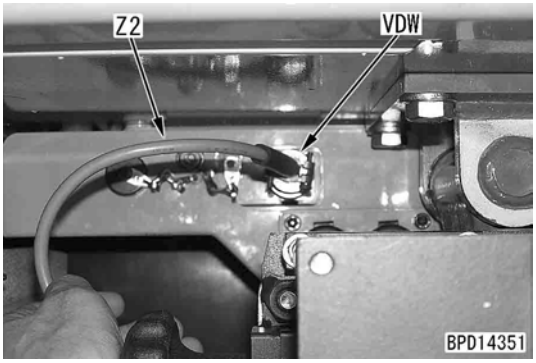
●Steering brake position

Test value	Measuring method
11	Left clutch ON and right clutch ON
10	Left clutch ON and right clutch OFF
1	Left clutch OFF and right clutch ON
0	Left clutch OFF and right clutch OFF

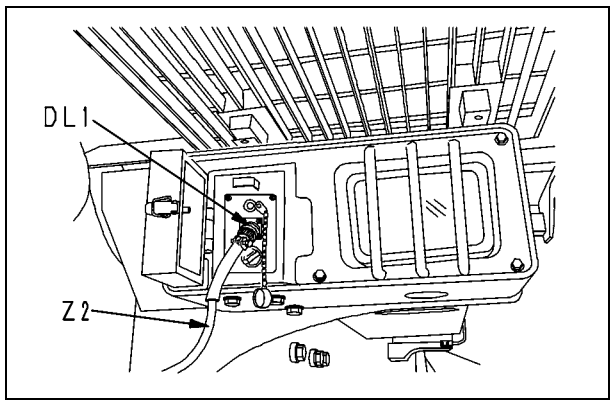
9. Downloading of set data

1) Connect personal computer **Z3** and download connectors (VDW) in the cab or ground download connector (DL1) by wiring harness **Z2**.

★ Download connector (VDW) in the cab is installed to the left rear lower part of the operator's seat.

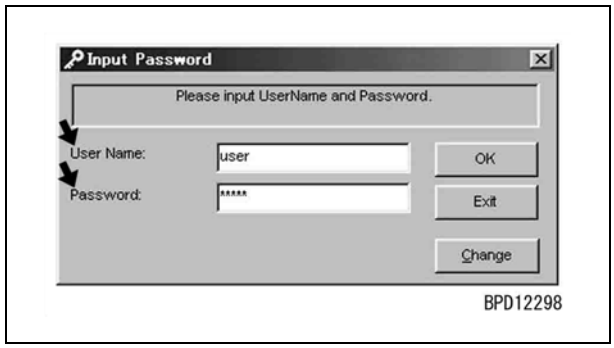


★ The ground download connector (DL1) is installed to the side of the left backup lamp on the rear frame of the machine.

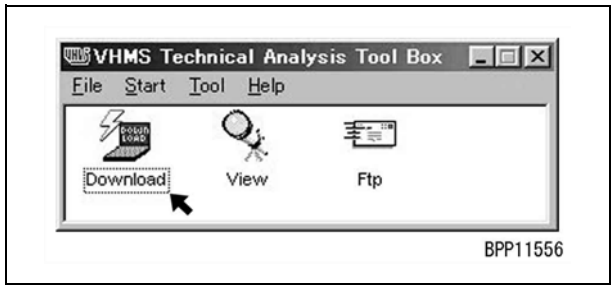


2) When using download connector (VDW) in the cab, set the starting switch in the ON position.
3) When using ground download connector (DL1), turn switch (3) ON.
   ★ The green LED lights up.
4) Operate the icon of [VHMS Technical Analysis Tool] on the personal computer to start the VHMS technical analysis tool.

★ Input [User Name] and [Password].
★ For the operation procedures, see the Operation and Maintenance Manual for VHMS Technical Analysis Tool.



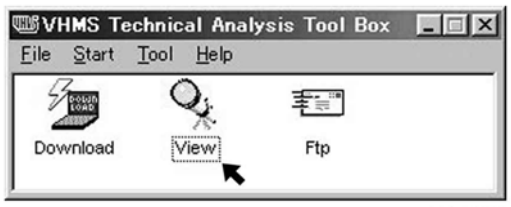
5) Use the [Download] function to download the data recorded in the VHMS controller to the personal computer.
   ★ For the operation procedures, see the Operation and Maintenance Manual for VHMS Technical Analysis Tool.
   ★ Make sure that downloading has completed before proceeding to the next step.



10. Check of downloaded data

★ This step is a work performed in the operator's cab (on the personal computer).

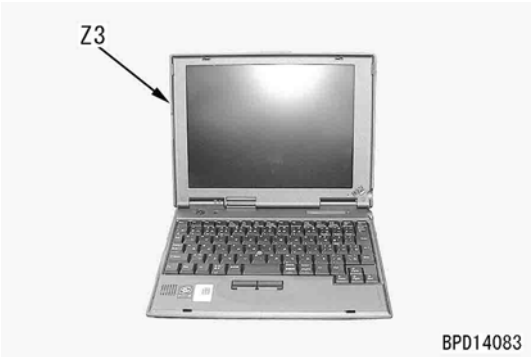
1) Check the set data with the [View] function.
   - ★ For the operation procedures, refer to the Operation and Maintenance Manual for VHMS Technical Analysis Tool.
   - ★ Make sure that the [MFA0] code at the time when the snapshot was operated is displayed in [Fault History].
   - ★ Make sure that the snap shot data is recorded.



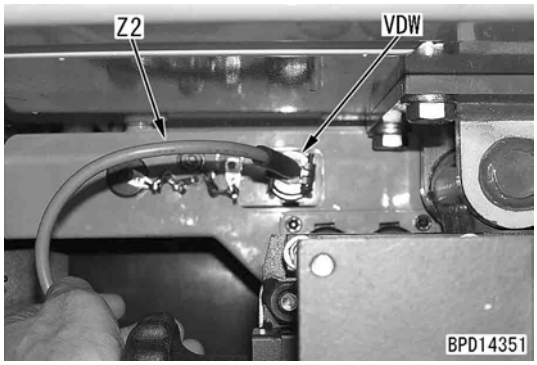
2) After checking the set data, terminate [VHMS Technical Analysis Tool].

11. Disconnection of Personal Computer

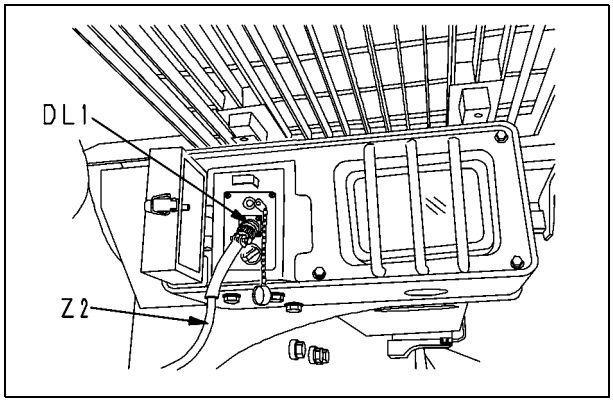
1) Make sure that the starting switch is in the OFF position.
   - ⚠ **Be sure to turn off the starting switch before connecting or disconnecting the personal computer.**
2) Finish the OS of the personal computer and then turn the personal computer OFF.



3) If the data was downloaded in the cab, disconnect wiring harness **Z2** from download connector (VDW).



4) If the data was downloaded on the ground, turn switch (3) OFF and disconnect wiring harness **Z2** from download connector (DL1).



12. Communication to Komatsu

After completing steps 1 to 9 successfully, send the "VHMS/WebCARE setting notification form" to VHMS/WebCARE Support Center of Komatsu, Tokyo.

- ★ Since Komatsu has to set the receiving side of the satellite communication, be sure to inform Komatsu of the completion of the setting.
- ★ Send the VHMS data by Notes (LAN) or E-mail (WAN).

Komatsu VHMS/WebCARE Support Center

2-3-6, Akasaka Minato-ku Tokyo, Japan

FAX: 81-3-5561-4766 (from outside of Japan)
FAX: 03-5561-4766 (Domestic user)

E-mail: webcare@komatsu.co.jp

VHMS Initialization Work Check Sheet

(Objective model: D375A-6 Bulldozer)

Date of setting:	
DB/Branch name:	
Filled by:	

Setting step		Check item	Result	
1	Check of nameplates of chassis and components	Model name		
		Serial No.		
		Engine serial No.		
		Transmission controller serial No.		
		VHMS controller serial No.		
2	Connection of personal computer and VHMS controller	Is connection made securely?	yes	no
3	Check of operation VHMS controller	Is operation normal? (Decimal counting up must be displayed after rotation.)	yes	no
4	Starting of VHMS Initialization Tool	Is setting tool set in "Data Clear and Set up" mode?	yes	no
5	Initialization of VHMS controller (Setting of machine information) Set basic information of machine to VHMS controller in this step.	Is model name correct?	yes	no
		Is machine serial No. input correctly?	yes	no
		Is engine serial No. input correctly?	yes	no
		Is today's date displayed?	yes	no
		Does clock indicate present time?	yes	no
		Is SMR input correctly?	yes	no
6	Saving of set items	Is LED (7-segment) turned OFF?	yes	no
7	Check of VHMS function	Does LED operate normally?	yes	no
8	Execution of Quick Pm Clinic	Are service mode and "SNAPSHOT" selected and is switch pressed?	yes	no
9	Saving operation of VHMS	Is LED (7-segment) turned OFF?	yes	no
10	Downloading	Does LED operate normally?	yes	no
11	Check of downloaded data	Are all files downloaded?	yes	no
		Time of downloading (by wristwatch)		
		[Check of data]		
		Is there MFA0 error in Fault History?	yes	no
		Are SMR and time in Fault History matched to set values?	yes	no
		Are all data of Snap Short 0 prepared?	yes	no
12	Saving operation of VHMS	Is LED (7-segment) turned OFF?	yes	no

ORBCOMM Opening Work Check Sheet

(Objective model: D375A-6 Bulldozer)

Date of setting:	
DB/Branch name:	
Filled by:	

Setting step		Check item	Result	
1	Check of nameplates of chassis and components	Model name		
		Serial No.		
		Engine serial No.		
		Transmission serial No.		
		VHMS controller serial No.		
		ORBCOMM controller serial No.		
2	Connection of personal computer and VHMS controller	Is connection made securely?	yes	no
3	Check of operation VHMS controller	Is operation normal? (Counting up must be displayed after rotation.)	yes	no
4	Starting of VHMS Initialization Tool	Is setting tool set in "Set up" mode?	yes	no
5	Initialization of VHMS controller 1. Setting of communication (Machine information and PLM have been set)	Enter set value of S. Fault History.		
		Execution of communication	on	off
		Number of communications (Default: 8)		
		Enter set value of S. Trend Analysis.		
		Execution of communication	on	off
		Interval (Default: 20 H)		hrs
		Enter set value of S. Payload data (If PLM is installed).		
		Execution of communication	on	off
		Time to start collection		
		Collection interval (Number of days)		day
	2. Setting of start of communication	Is GCC code set? (130 for Japan)	yes	no
6	Saving of set items	Is LED (7-segment) turned OFF after saving operation?	yes	no
7	Check of operation of ORBCOMM controller	How is display of decimal point on VHMS monitor (7-segment)? (Off, On, Slow flashing, quick flashing)	yes	no

To: VHMS / WebCARE Support Center
FAX : 81-3-5561-4766

SEKN5051-1
Attached Sheet

VHMS / WebCARE Basis Information Sheet

For Machine Registration into WebCARE	*Please describe clearly.*
<<DB information>>	
Distributor name / Branch	/
Person in charge	
e-mail address	
DB code(GCPS code)	
<<Customer information>>	
Customer name / Site name	/
<<Machine information>>	
Model - type	
Serial No.	
Engine Serial No. (Enter both of two engines if mounted.)	/
Transmission Serial No.	
Unit No.	
Date of Orbcomm activation	

For initial download data check	*Result*	
Reason for VHMS setting *Check the reason on the right. *For replacement,enter the serial No.of the replaced component below each column (**Note**).	○	**(Note 1)** **The new machine delivery or Retro - Fit**
	○	**(Note 1)** **Replace the VHMS controller.**
	○	**(Note 2 or 3)** **Replace the component.** **(engine or transmission)**
Setting date	(mm:dd:yyyy) (: :)	
Setting time (Checked by watch)	(HH :MM: SS) (: :)	
Person in charge of setting		
Service Meter Reading		
(**Note1**) New VHMS controller serial number.		
(**Note2**) New engine serial number. Enter both of two engines if mounted.	No.1 Engine ( )	
	No.2 Engine ( )	
(**Note3**) New transmission serial number.		
GCC code(If Orbcomm is equipped)		
Time difference (GMT)	**(Time Zone offset : 00)**	
Summer time (Daylight Savings Time)	**ON / OFF**	
Did you initialize VHMS as described in the shop manual ?	**YES**	

*****Important*****

***After entering the VHMS/WebCARE Basis Information Form,fax or email it to the following location with the initial download data.**

VHMS / WebCARE support center (Product Support Div. Komatsu LTD.)

TEL : 81-3-5561-2765 * FAX : 81-3-5561-4766 *** EMAIL : webcare@komatsu.co.jp**

KOMATSU

Report No._____

Field assembly inspection report

After completion of assembling a machine, make inspections according to these check sheets for assuring machine performance and quality.

Model-Type	Machine Serial No.	User Unit No.	Engine Model	Engine Serial No.
D375A-6			SAA6D170E-5	

Service Meter Reading	Date of Inspection
Location of Machine at Inspection	
Distributor's Name	

Specification			
Blade	U	Semi U	(Dual Single)
Ripper or counterweight	VGR.	VMR.	CW ( )
Shoe width	610 mm	710 mm	810 mm
Others			

Customer's Name	Address:	Signature:	Delivery Report No. attached
		Date:	

Inspector's Comments:

Inspector's Name:	KOMATSU USE ONLY :
Title	C. Sheet Receiving Date :
Signature:	By :
	Remark:

Check sheets filling instructions:

1. Use following indexes for entry of judgement

☑..... Normal
☒..... Abnormal
☒ ..... Correction made on abnormal point
☒..... Not applied

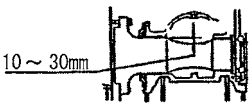
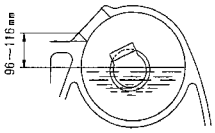
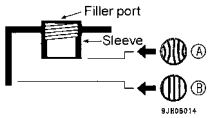
2. Enter actually measured values in parenthese, [ ].

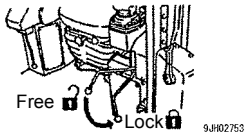
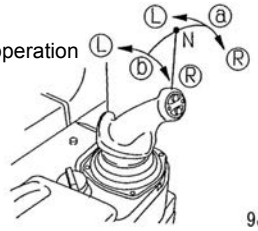
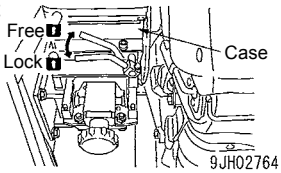
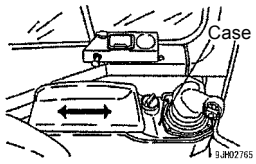
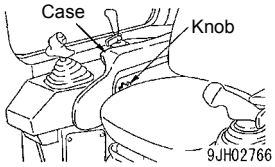
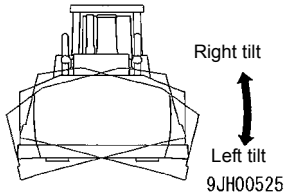
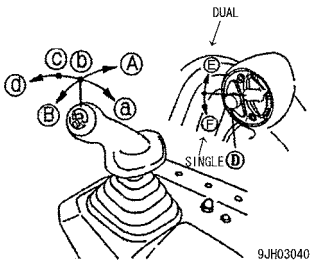
Notes:

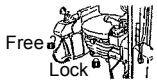
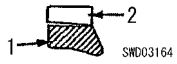
(1) Criteria are based on the standards when the machine is shipped out of the factory.

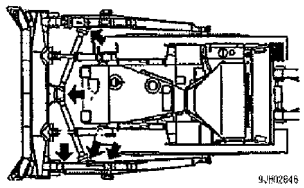
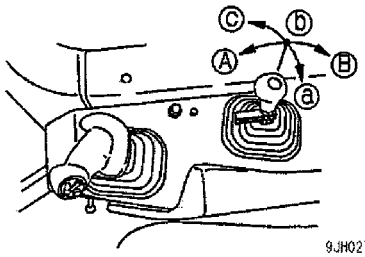
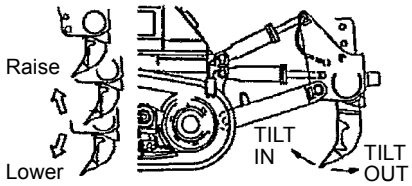
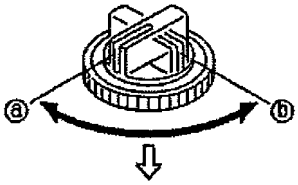
SUBMITTANCE OF THIS REPORT (AND CHECK SHEETS) TO KOMATSU IS ONE OF THE CONDITIONS OF WARRANTY VALIDATION, COPY FOR KOMATSU SHALL BE FORWARDED TO THE KOMATSU REGIONAL OFFICE TOGETHER WITH THE COPY OF DELIVERY SERVICE REPORT.

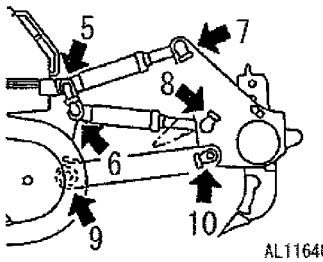
Printed in Japan

Category	Inspection item			Inspection	Criteria	
Battery	Check of electrolyte level Check of battery unit				Must be between L and H. Must be free from grease, looseness of terminals, and cracking.	
Water and oil level	Radiator water level				Above the bottom of strainer net	Radiator  9XD03149
	Reserve tank water level				Low to Full	
	Antifreeze % 65 58 50 41 30 °C -50 -40 -30 -20 -10	Refer to Operation & Maintenance Manual			Must be contained.	
	Engine oil level				(H + L) / 2 to H + 20	Engine: Stopped
	Power train oil level				(H + L) / 2 to H + 20	Engine: Stopped (After 3 – 5 min)
	Damper case oil level				(H + L) / 2 to H + 20	Engine: Stopped
	Hydraulic tank oil level • Between H - L  SXD03150				H to L sight gauge	Pitch back on the ground. Ripper point on the ground. (Shank must be vertical.) Stop the engine.
	Final drive oil level		LH		H to H + 20	See operation manual. Stop the engine.
			RH			
	Pivot shaft oil level  10 ~ 30mm		LH		H + 10 to H + 30 from shaft end	See operation manual.
			RH			
	Recoil spring oil level  96 ~ 116mm		LH		H = 96 to 116	See operation manual.
			RH			
	Use the diagram below for reference, and check if the electrolyte reaches the bottom of the sleeve.  Filler port Sleeve Ⓐ Ⓑ 9JE05014				Correct level Ⓐ Tool low Ⓑ	The electrolyte level is up to the bottom of the sleeve, so the surface tension causes the surface to rise and the plate appears to be warped. The electrolyte level is not up to the bottom of the sleeve, so the plate appears normal.
	Window washer tank water level		LH		Full	
	Fuel tank				Full	
Inspection	Horn				Must be of no beat sound or sound deterioration.	
	Backup alarm (Starting engine)				Backup alarm must sound when the T/M lever is at the back position.	
	Monitor display				When starting switch is turned ON, caution lamp, warning lamp and alarm buzzer are turned ON simultaneously for 2 seconds.	
	Operation of service meter (Engine: Low idling)				No error code indicated in the service meter. Before engine start, meter must not operate when the key switch turned on.	
	Charge lamp (Engine: Low idling)				Must not light up when all electrical equipment are turned on.	
	Lamp ON (Heated lamp, tail lamp and work lamp)				Must light up when turned on.	
	Heater hose cock.				Must be fully open.	
	Controller error code indication (make sure that error does not recur)				Clear error code after confirming it.	
	Air bleeding of the hydraulic cylinder 1. Start and run the engine for 5 minutes at low idling. 2. With the engine at low idling, extract and retract the cylinder 4 to 5 times without bringing it to the stroke end. 3. With the engine at high idling, stop the cylinder at 100 mm before the stroke end. Then slowly bring it to the stroke end. Hold it at the position for 1 minute.				Perform air bleeding of the hydraulic cylinder.	

Category	Inspection item	Inspection	Criteria
Function/ operation	Check of auto shift-down function (When stalled)		Auto shift-down function must not work when stalled.
	Effect of parking brake lever Free Lock 		When parking brake lever is in FREE position, engine must not start. Travel and gear shifting must be prohibited when locked. Confirmation of "Lock" indication of the monitor panel
	Operability of travel lever • Gear shifting operation • Travel direction change operation • Steering operation (To each direction) Play when lever is in “N” position. 		Must be free from hitch and abnormal sound. Must not come off notch. Must be free from hitch and abnormal sound. Must return smoothly. Max. 10 mm
	Check of the gear speed indication on the monitor panel. • Must be able to be shifted to any position with the engine at low idling and the brake turned on.		N, F1, F2, F3L, F3, R1, R2, R3L and R3 are all indicated. Must be of no indication error.
	Check of longitudinal adjustment of steering lever box • Adjustment of steps • Check of lock lever of box (Upper and lower)   		Must be adjustable. Must not move after locking.
	Check of the deceleration pedal operation • Set the fuel dial to high idle position. • Check the deceleration RPM		Must work smoothly. Must be contained play at high idle. 850 – 950 rpm
	Check of the fuel dial operation		Must move smoothly.
	Check of tilting directions 		Blade must move to left. Blade must move to right.
	Operation of isolator • Check of operation of engine emergency stop switch		Switch must work properly.
Dual	Check of dual tilt and pitch direction Check of tilt direction 		
	Pitch back		Blade must move backward. (D) + (B)
	Pitch dump		Blade must move forward. (D) + (A)
	LH dual tilt		Blade must move to left (both cylinders move) (E) + (B)
	RH dual tilt		Blade must move to right (both cylinders move) (E) + (A)
	LH tilt		Blade must move to left (right cylinder moves) (B) + (F)
	RH tilt		Blade must move to right (left cylinder moves) (A) + (F)

Category	Inspection item		Inspection	Criteria
Work equipment	Clearance between straight frame and track	Left mm		Difference between right and left must be 30 mm or less (when measured on flat ground). Move the blade up and down and stop it at 100 mm above ground, then measure.
		Right mm		
	Check of the safety lever lock function 			No actuator must work when the safety lock lever is at ON position. In addition, engine is required not to start when the lever is free. (The lever may move, but the work equipment never moves.) Confirmation of "Lock" indication of the monitor panel
	Check of the blade lever floating Check of the blade lever floating notch release			Must be of no hydraulic drift (Engine: Low idling) Engine stops at floating, then notch must be released.
	Check of the quick drop valve operation • Quick dropping of the blade from top position.			At the engine full, set the blade lever at down position. When the lever is set at the N position after the blade drops by 1000 mm, it must stop.
	Main relief valve function (Engine: Low idling)			Must be bridged with the blade and the ripper (Chassis)
	Check of the accumulator function (blade, ripper)			Must function immediately after the engine stops then drop from the top to the ground.
	Blade cylinder OL • Leakage from U-packing, damaged rod, quick drop valve, tube, flange or dust seal	LH		Must be none.
		RH		
	Tilt cylinder/pitch cylinder OL • Leakage from U-packing, damaged rod, quick drop valve, tube, flange or dust seal	LH		Must be none.
		RH		
	End bit, cutting edge mounting bolt			Must be tightened.
	Blade and bit stopper contact 1. End bit 2. Stopper 			Must be contacted (partial contact is acceptable)
Ground peripherals	Track tension adjustment • With the gear at F1 and the engine at low idling, travel on flat place for about 10 m, and when the grouser comes over the first carrier roller, stop the machine by depressing the brake pedal.	LH	20 – 30 mm	Tense a string or a bar between the first carrier roller and the idler to measure distance between the string (bar) and the grouser. Max. 20 mm
		RH	20 – 30 mm	
	Carrier roller alignment • Travel on flat place with the gear at F1 and R1 for about 10 m, repeatedly about 3 or 4 times, then gradually apply brake to stop.	LH		Flanges must be free from contact with links at all times. 
		RH		
	Undercarriage OL • Leakage from idler, carrier roller, bogie, pivot shaft, adjustment cylinder, and lubricated track (plug, seal)	LH		Must be none.
		RH		
Cabin	Beat noise inside the cabin, beat noise of the outer cover			Must be none.
	Space between S/T lever and the cabin at forward travel + left steering with the S/T lever at the front position.			Must be 40 mm or more.
	Opening/closing and locking effect of the cabin doors.			Must work smoothly to securely lock the doors by door-locking or key-locking.
	Cabin door-open lock release lever			Lever must operate smoothly and unlock securely. (Unlock: Door is pushed out of stopper rubber section.)
	Opening/closing and locking effect of the left/right side slide glass			Must work smoothly to securely lock.
	Lighting of the room lamp			Must come on/go off by turning the switch on/off.
	Operation of the window wiper and the window washer			Must be on/off by turning the switch on/off. Wiper: Must operate smoothly (without beat noise)
	Operation of the radio and cassette system (Volume, tuning, AM/FM switching, cassette)			Must operate correctly
	Operation of the cigar lighter Ash tray installation			Must be red-heated. Must be installed.
	Power supply of 12 V (Accessory socket, etc.) • Check by connecting the ratio unit			Power of 12 V must be supplied.
	Operation of the air conditioner			Cold and warm air must be able to be switched by monitor operation. Air flow amount must be able to be adjusted (Hi, Mid or Lo)
	Air flow amount must be able to be adjusted (Hi, Mid or Lo) • Louver must be smoothly switched (Left/right of monitor panel)			Air comes out from each blowout port.

<table>
<tr><th>Cate-gory</th><th>Inspection item</th><th>Inspec-tion</th><th colspan="2">Criteria</th></tr>
<tr><td rowspan="7">Lubrication</td><td rowspan="7">Portions to be lubricated
• Equalizer bar side pin shaft
• Equalizer bar center pin shaft
• Blade lift cylinder support shaft and yoke
• Brace center pin
• Blade oblique arm ball joint
• Brace screw</td><td></td><td>Q'ty</td><td rowspan="7">Example: When U-blade is used
 
9JH02845</td></tr>
<tr><td></td><td>2</td></tr>
<tr><td></td><td>1</td></tr>
<tr><td></td><td>6</td></tr>
<tr><td></td><td>2</td></tr>
<tr><td></td><td>3</td></tr>
<tr><td></td><td>2</td></tr>
<tr><td rowspan="15">Ripper</td><td>Check of ripper direction
 
9JH02739
(a) Raise
(c) Lower
(A) Tilt in
(B) Tilt out</td><td></td><td colspan="2" rowspan="3"> 
</td></tr>
<tr><td></td></tr>
<tr><td></td></tr>
<tr><td>Ripper lift cylinder OL
• U-packing, damaged rod, tube, flange, dust seal loosing
LH
RH</td><td></td><td colspan="2">Must be none</td></tr>
<tr><td>Ripper tilt cylinder OL
• U-packing, damaged rod, tube, flange, dust seal loosing
LH
RH</td><td></td><td colspan="2">Must be of no contact.</td></tr>
<tr><td>Contact with the hose at ripper operation
(Entire operation area must be checked)</td><td></td><td colspan="2">Must be of no contact.</td></tr>
<tr><td>Creak of the ripper link pin</td><td></td><td colspan="2">Must be of no creak.</td></tr>
<tr><td>Check of the pin puller switch direction
(a): Pin out
(b): Pin in
 

9JH03103</td><td></td><td colspan="2">Must be the same as the pin puller cylinder operation direction.</td></tr>
<tr><td>Check of the pin puller cylinder hose cramp position
(Entire operation area must be checked)</td><td></td><td colspan="2">Must be of no contact Must be of no excess hose tension.</td></tr>
<tr><td>Pin puller cylinder OL
• Leakage from U-packing, damaged rod, tube of flange</td><td></td><td colspan="2">Must be none</td></tr>
<tr><td>Portions to be lubricated
• Ripper lift cylinder head (8)
• Ripper lift cylinder bottom (6)
• Ripper tilt cylinder head (7)
• Ripper tilt cylinder bottom (5)
• Ripper arm pin (front) (9)
• Ripper arm pin (rear) (10)</td><td></td><td>Q'ty</td><td>Must be lubricated (right and left)
 

AL116400</td></tr>
</table>

Refer to the “Testing and adjusting” on Shop manual for the measurement

<Precautions for measurement>
Measure each performance value after each oil temperature has increased.
(Reference) Engine coolant temperature: Within operating range
Power train oil temperature: 75 – 85 °C
Hydraulic oil temperature: 45 – 55 °C

Engine speed

Category	Item	Condition	Unit	Standard	Measurement value	Criteria
Engine	Engine speed * Measure stall speed 1 segment before red range of torque converter oil temperature gauge	Run engine at low idling (low speed).	rpm	700 – 800		
		Run engine at high idling (at full throttle).	rpm	1850 – 1900		
		Set decelarator at low speed.	rpm	850 – 950		
		Stall torque converter. (Service mode: 0530)	rpm	1480 – 1580		
		Stall torque converter and work equipment relief. (Service mode: 0530)	rpm	1450 – 1550		
		Engine speed while hydraulic pump is in relief (blade tilt relief)	rpm	1850 – 1900		
	Manual E mode	Run engine at full throttle and set transmission in N.	rpm	1350 – 1450		

Hydraulic pressure

Category	Item	Condition	Unit	Standard	Measurement value	Criteria
Torque convertor	Inlet pressure	Run engine at full throttle and set transmission in N.	Mpa	0.69 – 1.05		
			{kg/cm²}	7.0 – 10.7		
		Run engine at low speed and set transmission in N.	Mpa	0.03 – 0.25		
			{kg/cm²}	0.3 – 2.5		
	Outlet pressure	Run engine at full throttle and set transmission in N.	Mpa	0.44 – 0.70		
			{kg/cm²}	4.5 – 7.0		
		Run engine at low speed and set transmission in N.	Mpa	0.03 – 0.20		
			{kg/cm²}	0.3 – 2.0		

Hydraulic pressure

Category	Item		Condition	Unit	Standard	Measurement value	Criteria
Oil pressure Work equipment	Work equipment pump (Relief pressure)	Blade tilt relief	Run engine at low speed and set transmission in N.	Mpa	27.5 – 29.4		
				{kg/cm²}	280 – 300		
			Run engine at full throttle and set transmission in N.	Mpa	27.5 – 29.4		
				{kg/cm²}	280 – 300		

Work equipment speed

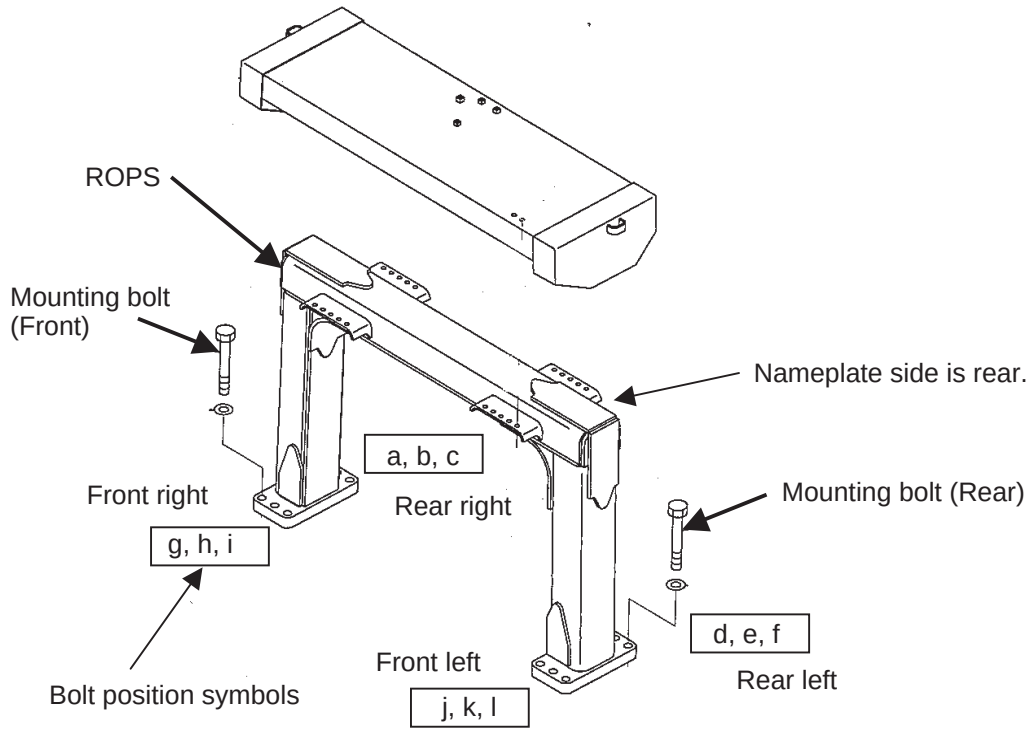
Category	Item	Condition		Unit	Standard	Measurement value	Criteria
	Blade lift Semi U	RAISE	Run engine at full throttle.	sec	3.7 – 4.7		
	Blade lift Full U	RAISE	Run engine at full throttle.	sec	3.7 – 4.7		
	Single tilt Semi U • Full U	LEFT tilt	Run engine at full throttle.	sec	2.5 – 3.5		
		RIGHT tilt	Run engine at full throttle.	sec	2.5 – 3.5		
	Single tilt (Dual tilt specification) Full U • Semi U	LEFT tilt	Run engine at full throttle.	sec	2.5 – 3.5		
		RIGHT tilt	Run engine at full throttle.	sec	2.5 – 3.5		
	Dual tilt	LEFT tilt	Run engine at full throttle.	sec	2.5 – 3.5		
		RIGHT tilt	Run engine at full throttle.	sec	2.5 – 3.5		
	Dual tilt	Pitch DUMP	Run engine at full throttle.	sec	2.5 – 3.5		
	Ripper tilt	Tilt IN	Run engine at full throttle.	sec	4.5 – 5.5		
		Tilt BACK	Run engine at full throttle.	sec	2.8 – 3.8		

Hydraulic drift of work equipment

Category	Item	Condition	Unit	Standard	Measurement value	Criteria
	Blade lift	Cutting edge height: 500 – 800 mm.	mm/min	Max. 65/5		
	Ripper lift	Ripper point height: 300 – 600 mm.	mm/min	Max. 25/5		

Tightening torque record/check sheet for ROPS mounting bolts

Sketch



Recording column

Mounting bolt specification : M30 × 110 mm ---- 12 pieces
Specified tightening torque : 1,520 – 1,910 Nm {155 – 195 kgm}

Record of measured values : Symbolize the bolt positions as [a, b, c], [d, e, f], [g, h, i] and [j, k, l] from the right to the left.

Bolt position		Record (Unit:)
Rear right	a	
	b	
	c	
Rear left	d	
	e	
	f	
Front right	g	
	h	
	i	
Front left	j	
	k	
	l	