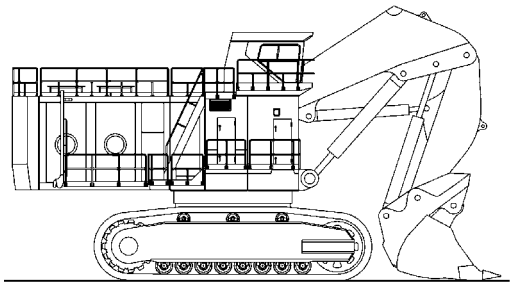
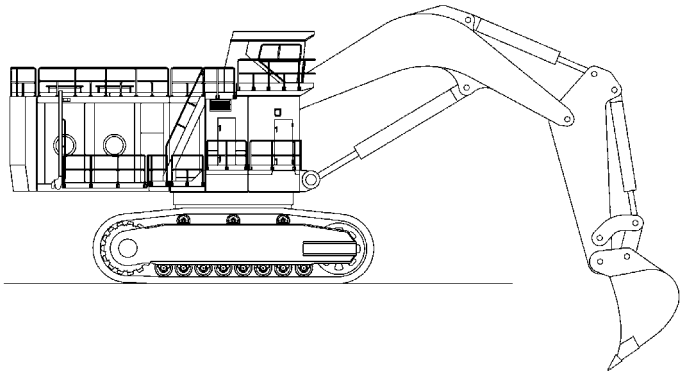
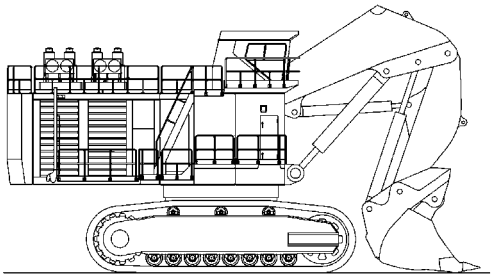
KOMATSU
MINING GERMANY

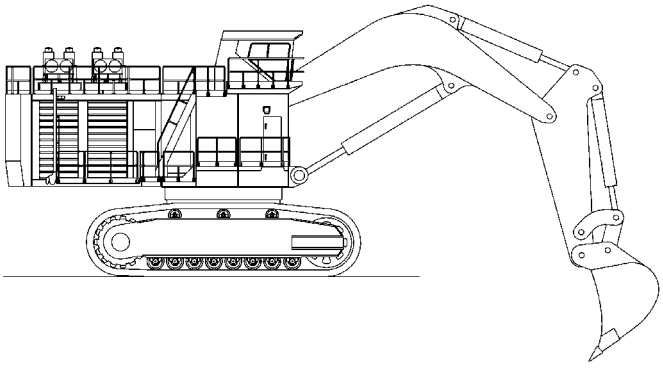
General Assembly Procedure

Hydraulic Mining Shovel PC8000









All stated information corresponds to the present development and is subject to possible future changes without prior notice.

Delivery of the Excavator

The excavator is being delivered disassembled into its main components.

For assembling the excavator follow the instructions in this manual.

- **Various bolts used e.g. for transport security, blanking plates etc. will be re-used during final assembly.**
- **Please take out small parts stored in the cab refrigerator.**

Symbols

- **WARNING**
  Refers to orders and prohibitions designed to prevent injury or extensive damage.

Personnel entrusted with work on the machine must have read the Assembly Manual, the Operation,- Lubrication- and Maintenance Manual and in particular the section on safety before beginning work. Reading the instructions after work has begun is too late.

If there are any questions concerning the assembling procedure, contact your local Service Center.

Prior to first operation, inspect the excavator thoroughly with the Service Engineer responsible for the erection of the machine. Check all fluid levels according to the Lubrication and Maintenance Schedule.

Damages and defects caused by incorrect operation and maintenance are not covered by the manufacturers guarantee.

- **If the excavator is equipped with a fire suppression system, make sure that the system is ready for operation.**

Service

For all questions related to your excavator please contact your local Service Center.

In all your written or phoned inquiries please indicate the model and serial number of your excavator.

- **Before assembling/disassembling, lifting or transporting this excavator contact your local Service Center for all the necessary instructions for safe and economic assembling/ disassembling, lifting and transportation procedures of your excavator.**

Assembling of the Excavator

- **Assembling of the excavator must be carried out only by personnel with special knowledge of the excavator. Improper assembling procedures can cause severe accidents with personal injury.**

The sequence of assembly is shown in this Manual. Disassembling is basically the reverse order of the assembling procedure.

Transportation and Lifting

The transport dimensions and weights of the excavator's components are listed in this manual.

Observe the operating permits of the flat-bed trailers used for transportation. They contain the permissible load, loading width and height.

- **Observe the federal, state and local laws and regulations for transportation of heavy units. Know the safety rules and laws before you transport this excavator.**
- **Make sure the flat-bed trailer and the components of the excavator are equipped with the correct safety devices.**
- **Secure the excavator and all components transported on the trailer against movement.**
- **Use exclusively approved handling equipment**
- **When lifting components make sure that the handling elements do not cause damage to the component**
- **Secure the components safety before removing the lifting straps, ropes or chains.**
- **Wear safety clothing, goggles, respirator and other safety devices, whenever working conditions make this necessary.**
- **Provide hoists of sufficient capacity to lift heavy units. Refer to the weight specifications.**

- **Be sure to observe the instructions in the "Assembly Procedure Manual".**
- **Lifting gear, tools and other suspension systems must be in good condition and of sufficient lifting capacity.**
- **Be sure hydraulic cylinders and attachment components are properly supported from hoist and securely remove, before removing supporting pins.**
- **Floors must be clean and dry. After draining operations be sure all spillage is cleaned up.**

Electric energy

- **All work on medium and high voltage systems has to be carried out by authorized Electricians having the permission to work on medium and high voltage systems.**
- **All safety devices requested by the National Safety Administration must be available and used for work on the medium and high voltage systems.**

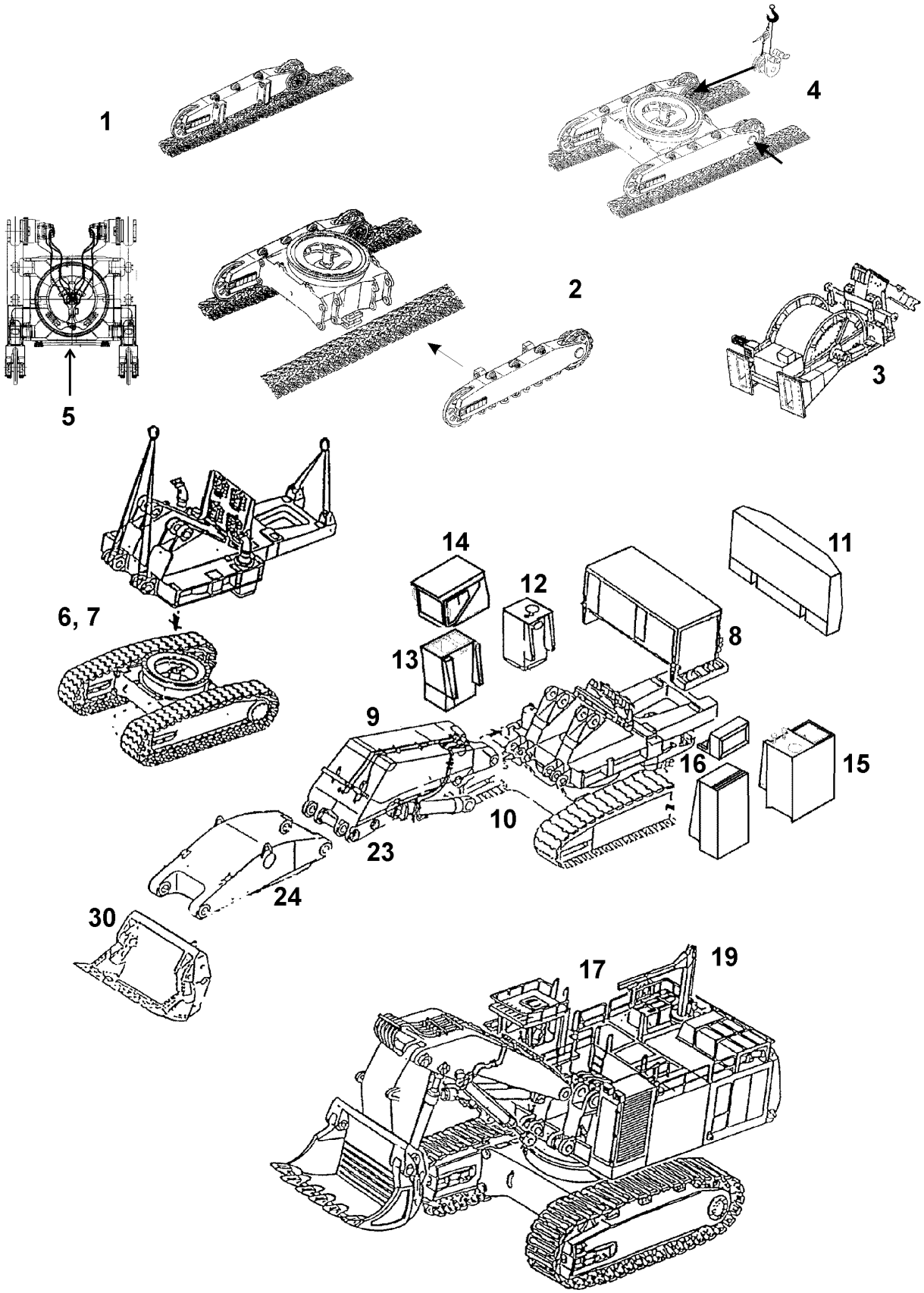
Required MANPOWER

		Diesel drive	Electric drive
	Customer	5 Mechanic 1 Electrician	5 Mechanic 2 Electrician
Supervision:	Dealer or Komatsu Mining Germany	1 Mechanic 1 Electrician	1 Mechanic 1 Electrician
Testing; Adjustment; Commissioning	Komatsu Mining Germany	1 Service Engineer	1 Service Engineer

Average assembly and commissioning time schedule*

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Assembly																					
Testing; Adjustment; Commissioning																					

* Dependent on mine conditions (shifts, weather, ...)



Z22914

Assembly sequence: Z22914

Assembly Site Requirements

- Well levelled and compacted ground appr. 150 x 150 ft/50 x 50 m
- A container to store the tools, to keep the paper work and for sheltering
- 2 mobile cranes min. load capacity 150 metric tons
- 1 small crane, load capacity appr. 25 metric tons

Qty.	Specification	Designation
01	8 metric tons	Telescopic fork lift
04	6 metric tons	Chain pull
04	35 metric tons	Shackles
04	5 metric tons t	Shackles
04	1 metric ton	Shackles
04	Piece M 10 - M 30	Eye bolts
01	M20	Whirl (backhoe attachment only) 
04	30 metric tons - 8 m length	Ropes
04	25 metric tons - 8 m length	Ropes
04	16 metric tons - 8 m length	Ropes
04	12 metric tons - 8 m length	Ropes
01	50 mm - 1200mm length	Push bar
01	10 mm x 3500mm length	Push bar
01	5 kg	Hammer
30	300 x 300 x 1000 mm	Wooden blocks
10	300 x 300 x 2500 mm	Wooden blocks
02	10- 50 t	Hydraulic jacks
01	50 m	Cable drum
01	2 x 100 m	4 pole cable for temporary connection to 380 V
01	6 mm - 46 mm	Combination spanner
01	50 mm - 75 mm	Open end spanner
01	30 mm - 75 mm	Combination spanner
01	3/4“	Impact wrench
01	1/2“	Impact wrench
01	1/2“	Ratchet
01	3/4“	Ratchet
01	13 mm - 19 mm	Sockets
01	24 mm - 36 mm	Socket
01	0 - 7800 Nm	Hydraulic torque wrench
01	0 - 250 Nm	Torque wrench
01	25 - 60 Nm	Torque wrench
01	250 – 500 Nm	Torque wrench
01		Hand drill

Qty.	Specification	Designation
01		Electric welding machine
01		Lights for the illumination of the working area
01		Hand lamp
07	600 bar	Pressure gauge (6 pieces factory supply)
03	60 bar	Pressure gauge (1 piece factory supply)
03	25 bar	Pressure gauge (1 piece factory supply)
01	15 bar	Pressure gauge
02		Multimeter Part No. 232 619 40*
01	0 - 2500 min-1	Contactless revolution indicator
02	1,5 mm² 30 m	electric extension cables with connectors
01	from M6 - M 36	Thread cutting set
01		Level gauge
01		Test adapter
01 Set		Allen key
01 Set		Cable connector
01 Set		Screw driver
01		Side cutter
01		Tip pliers
01		Combination pliers
01		Pipe pliers
01	Part No. 232 621 40	Cordless Headphone Intercom

* If available an electronic testing device for pressure, voltage and RPM, similar Hydrotechnic System 6000

For electric driven machines only.

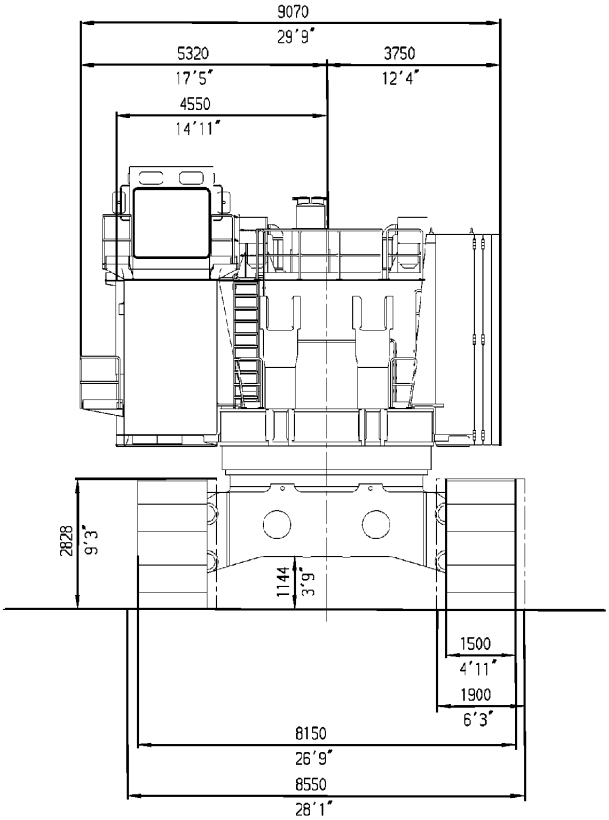
Qty.	Specification	Designation
01	5-10 kV Part No. 232 389 40 3-6 kV Part No. 232 390 40	Electronic unipolar voltage meter
01	Part No. 232 386 40	Universal grounding short-circuiting device
01	Part No. 232 387 40	Insulation tester
01	Part No. 232 388 40	Phase-sequence indicator
01	Part No. 232 593 40	Shock pulse measuring instrument
01	Part No. 232 594 40	Shock pulse transducer
01	Part No. 232 595 40	Shock pulse transducer

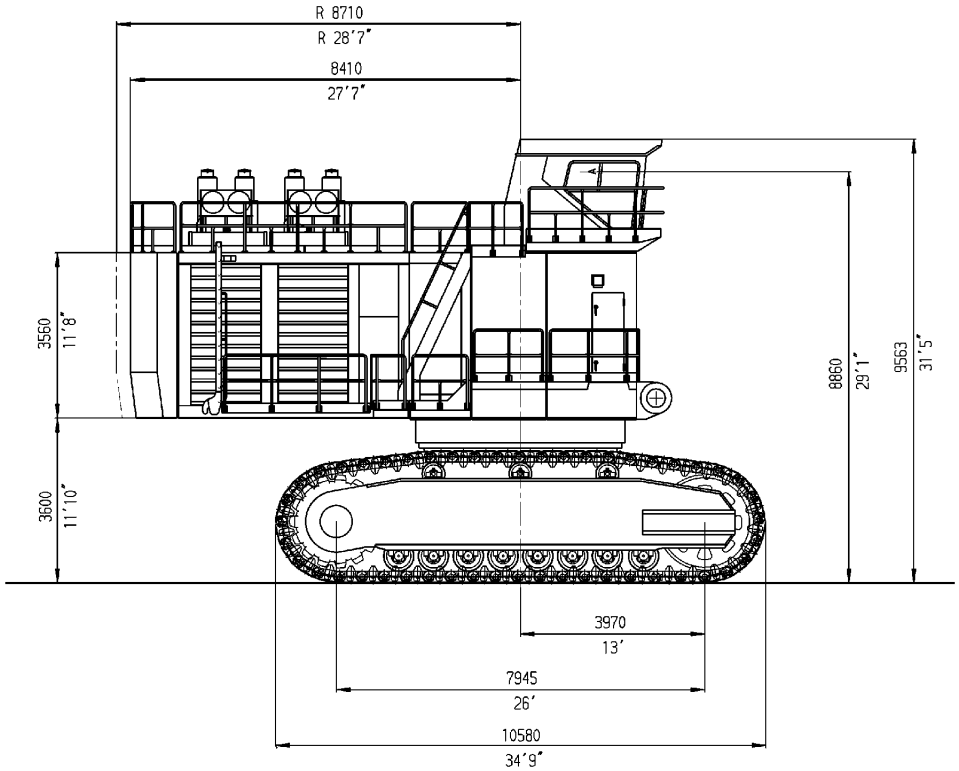
Space and Placing Requirements

On the following page, the components are indicated in their approximate dimensions.
They are unloaded in a way that a min. space of 1 meter (3 ft) is left between the components, and that there is enough space for the trucks and the cranes.

Preparation for Assembly

- Unload all components so that no more move is necessary!
- All pins, bushings, borings, bearings and contact surfaces of components must be clean.
- Torque values are listed in the Lubrication- and Maintenance Manual - unless being listed in this Assembly Procedure Booklet.
- Obey all applicable safety and local regulations strictly!
- Ensure correct lifting procedures and ensure use of adequate lifting gears!
- High voltage installation works must be carried out by authorized specialists only.


9070
29'9"
5320
17'5"
3750
12'4"
4550
14'11"
2828
9'3"
1144
3'9"
1500
4'11"
1900
6'3"
8150
26'9"
8550
28'1"


R 8710
R 28'7"
8410
27'7"
3560
11'8"
3600
11'10"
8860
29'1"
9563
31'5"
3970
13'
7945
26'
10580
34'9"

Z22915

KOMATSU
MINING GERMANY

PACKING LIST

PACKING LIST
KOMATSU HYDRAULIC MINING SHOVEL
MODEL PC 8000-6 WITH FRONT SHOVEL ATTACHMENT
EXAMPLE FOR AN ELECTRIC DRIVEN MACHINE

Colli No.	ea.	Kind of Packing	Dimensions in cms L	W	H	Volume in m	Freight tons	DESCRIPTION	Weights (kgs) NET	GROSS
1	1	unpacked	930	179	240	39,953	46.000	crawler side-frame w/o track pads	46.000	46.000
2	1	unpacked	930	179	240	39,953	46.000	crawler side-frame w/o track pads	46.000	46.000
3to10	8	unpacked	498	190	38	28,764	88.800	8 sets track pads w/10 track pads 1900 mm ea. 11.100kg	88.800	88.800
11to12	2	unpacked	406	190	38	5,863	17.760	2 sets track pads w/8 track pads 1900mm ea. 8.880 kg	17.760	17.760
13	1	unpacked	567	503	267	76,149	76.149	centre	54.300	54.300
14	1	unpacked	1130	475	400	214,700	214.700	superstructure platform	86.250	86.250
15	1	unpacked	730	380	90	24,966	44.500	counterweight	44.500	44.500
16	1	unpacked	833	530	395	174,389	174.389	machinery house w/2 electric motors	49.000	49.000
17	1	unpacked	328	180	372	21,963	21.963	switch cabinet	7.000	7.000
18	1	unpacked	270	191	355	18,307	18.307	hydraulic tank	7.000	7.000
19	1	unpacked	262	203	370	19,679	19.679	cab base	5.000	5.000
20	1	unpacked	910	290	345	91,046	91.046	boom w/o cylinders	47.500	47.500
21	1	unpacked	670	290	280	54,404	54.404	stick w/o cylinders	32.500	32.500
22	1	unpacked	570	420	400	95,760	95.760	33.0-cu.m. front shovel clam	32.200	32.200
23	1	unpacked	530	450	230	54,855	54.855	33.0-cu.m. front shovel backwall	28.300	28.300
24	1	case	537	269	238	34,380	34.380	oil cooler	7.295	8.600
25	1	case	389	329	308	39,418	39.418	accessories	4.755	6.000
26	1	case	494	466	104	23,941	23.941	slew ring	12.955	14.750
27	1	case	697	359	288	72,064	72.064	cable drum	7.355	9.550
28	1	case	387	309	246	29,417	29.417	accessories	4.565	5.700
29	1	drum	244	165	244	9,823	9.823	cable	6.900	7.920
30	1	Container						20'OT Container Nr. GRIU 200813-0 w/accessories	3.340	5.500
31	1	Container						40'OT Container Nr. TRLU 923822-9 w/accessories	24.050	27.900
32	1	Container						20'OT Container Nr. GCNU 200388-7 w/accessories	21.770	24.000
33	1	Container						20'OT Container Nr. GRIU 200855-1 w/accessories	11.340	13.500
			Total m -->			1.169,794	1.273.355	<--Total Frt TOTAL Weights kgs	696.435	715.530

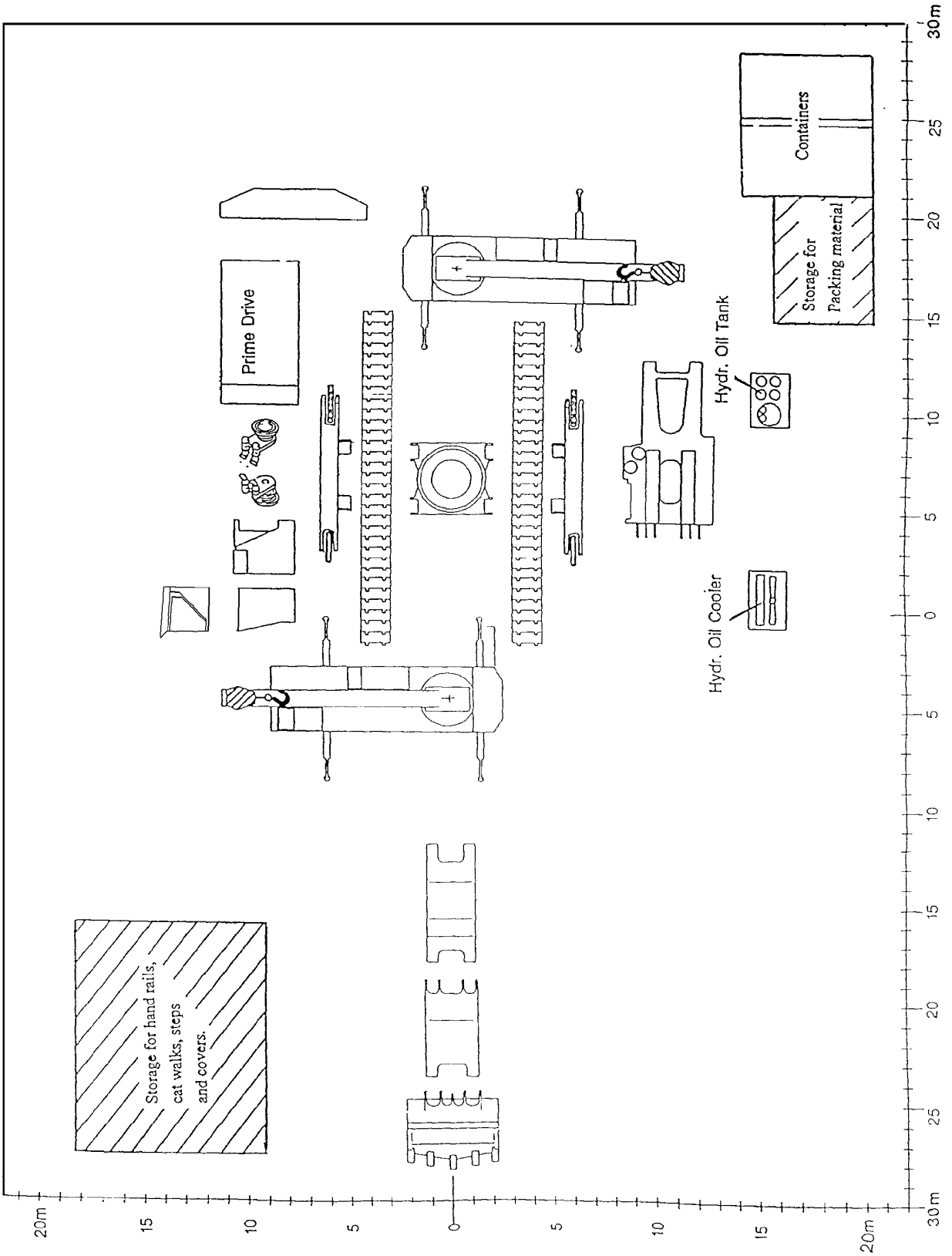
Dimensions and weights have been designed to allow transportation within limits of most states. But also a quick assembly has been considered as an added feature of these dimensions and weights which are subject to change.

KOMATSU
MINING GERMANY

PACKING LIST
KOMATSU HYDRAULIC MINING SHOVEL
MODEL PC 8000-6 WITH FRONT SHOVEL ATTACHMENT
EXAMPLE FOR A DIESEL ENGINE POWERED MACHINE

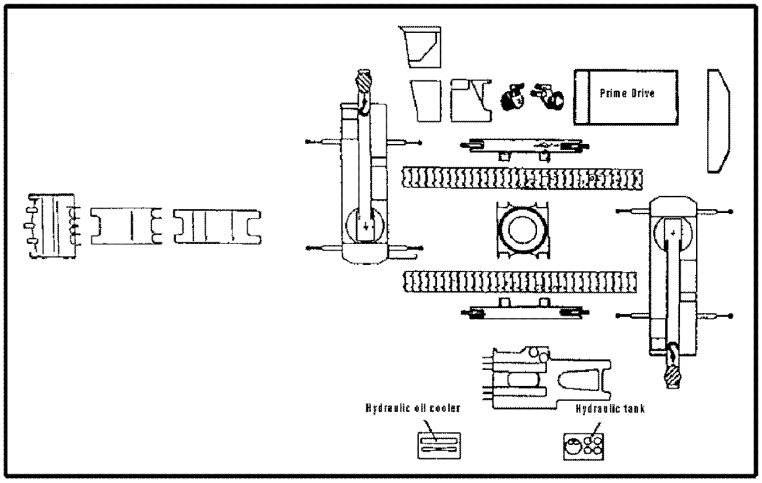
PACKING LIST

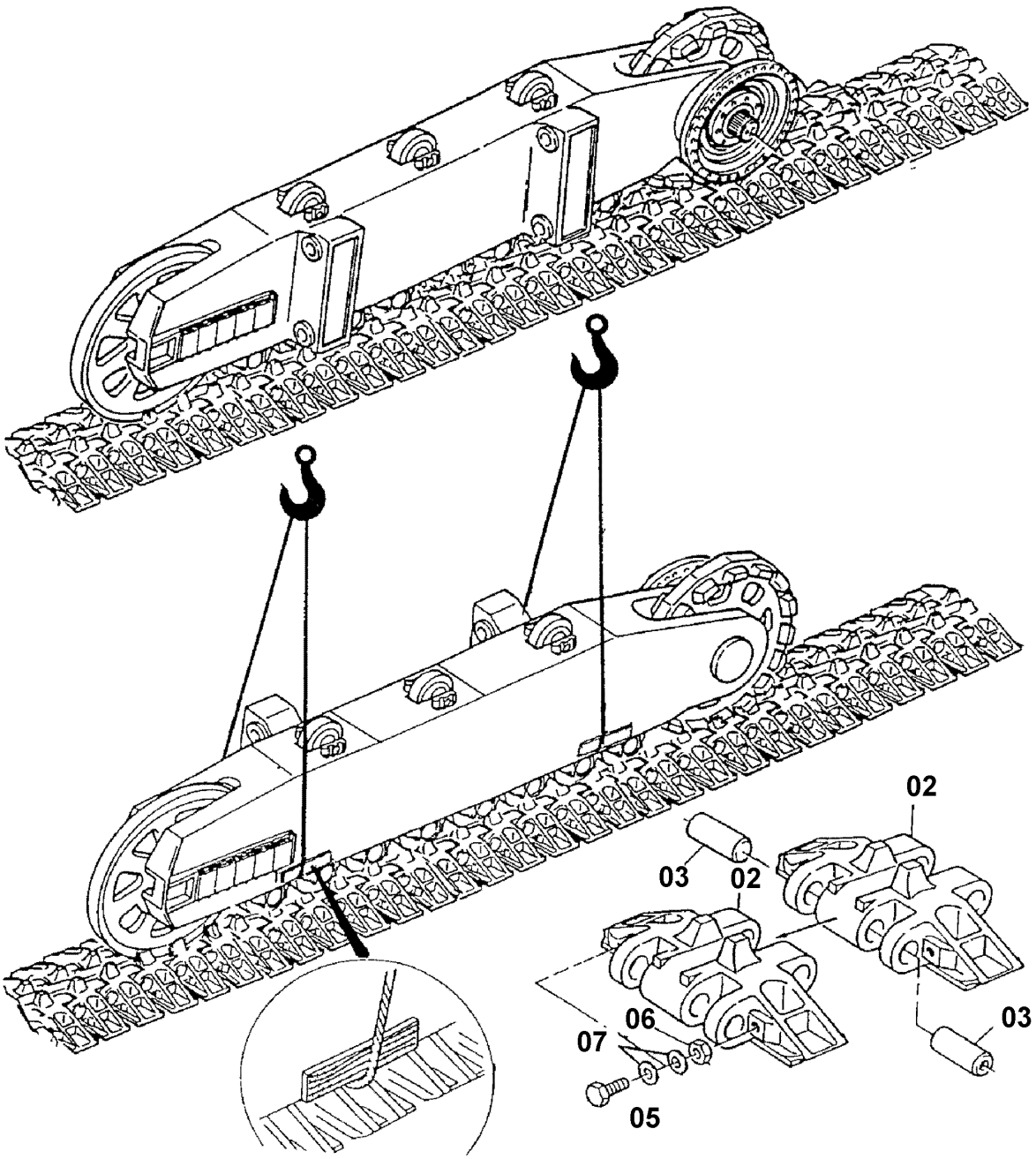
Colli No.	ea.	Kind of Packing	Dimensions in cms L	W	H	Volume in m	Freight tons	DESCRIPTION	Weights (kgs) NET	GROSS
1	1	unpacked	930	179	240	39,953	46.000	crawler side-frame w/o track pads	46.000	46.000
2	1	unpacked	930	179	240	39,953	46.000	crawler side-frame w/o track pads	46.000	46.000
3to10	8	unpacked	598	150	38	27,269	94.400	8 sets track pads w.ea 12 track pads 1500 mm ea.11.800 kg	94.400	94.400
11	1	unpacked	567	503	267	76,149	76.149	carbody	54.300	54.300
12	1	unpacked	1130	475	400	214,700	214.700	superstructure platform	86.250	86.250
13	1	unpacked	730	380	90	24,966	44.500	counterweight	44.500	44.500
14	1	unpacked	833	530	395	174,389	174.389	Machinery house w/two diesel engines	59.000	59.000
15	1	unpacked	350	150	374	19,635	19.635	fuel tank	5.400	5.400
16	1	unpacked	270	191	355	18,307	18.307	hydraulic tank	7.000	7.000
17	1	unpacked	262	203	370	19,679	19.679	cab base	5.000	5.000
18	1	unpacked	910	290	345	91,046	91.046	boom w/o cylinders	47.500	47.500
19	1	unpacked	670	290	280	54,404	54.404	stick w/o cylinders	32.500	32.500
20	1	unpacked	534	460	200	49,128	49.128	38.0-cu.m. front shovel backwall	25.400	25.400
21	1	unpacked	560	260	425	61,880	61.880	38.0-cu.m. front shovel bowl	16.250	16.250
22	1	case	537	269	238	34,380	34.380	oil cooler	8.100	8.700
23	1	case	389	309	248	29,810	29.810	accessories	5.200	6.100
24	1	case	494	466	104	23,941	23.941	slew ring	13.700	14.750
25	1	case	389	329	308	39,418	39.418	driver's cabine	4.755	5.700
26	1	unpacked	575	205	90	10,609	15.500	ESC0 S145 lip	15.500	15.500
27	1	Container						20'Container w/accessories	22.340	24.600
28	1	Container						20'Container w/accessories	5.470	7.700
29	1	Container						20'Container w/accessories	11.970	14.200
30	1	Container						40'Container w/accessories	23.850	27.550
			Total m -->			1.049,614	1.153.265	<--Total Frt TOTAL Weights kgs	680.385	694.300


Containers
Storage for Packing material
Prime Drive
Hydr. Oil Tank
Hydr. Oil Cooler
Storage for hand rails, cat walks, steps and covers.
30m
25
20
15
10
5
0
5
10
15
20
25
30m
20m
15
10
5
0
5
10
15
20m

Z22916

Illust. (Z22916)Configuration of Components on Erection Site.


Prime Drive
Hydraulic oil cooler
Hydraulic tank


02
03
02
06
07
03
05

Z22917

1. Mounting of Crawler Segments to the Side Frames: Z22917

1. Position the crawler plate segments as shown (3 eyes pointing to the idler wheel) on flat ground so that pin (03) enters easy (48 track pads each side).
2. Slide in pins and secure them with the items(05, 06 + 07)

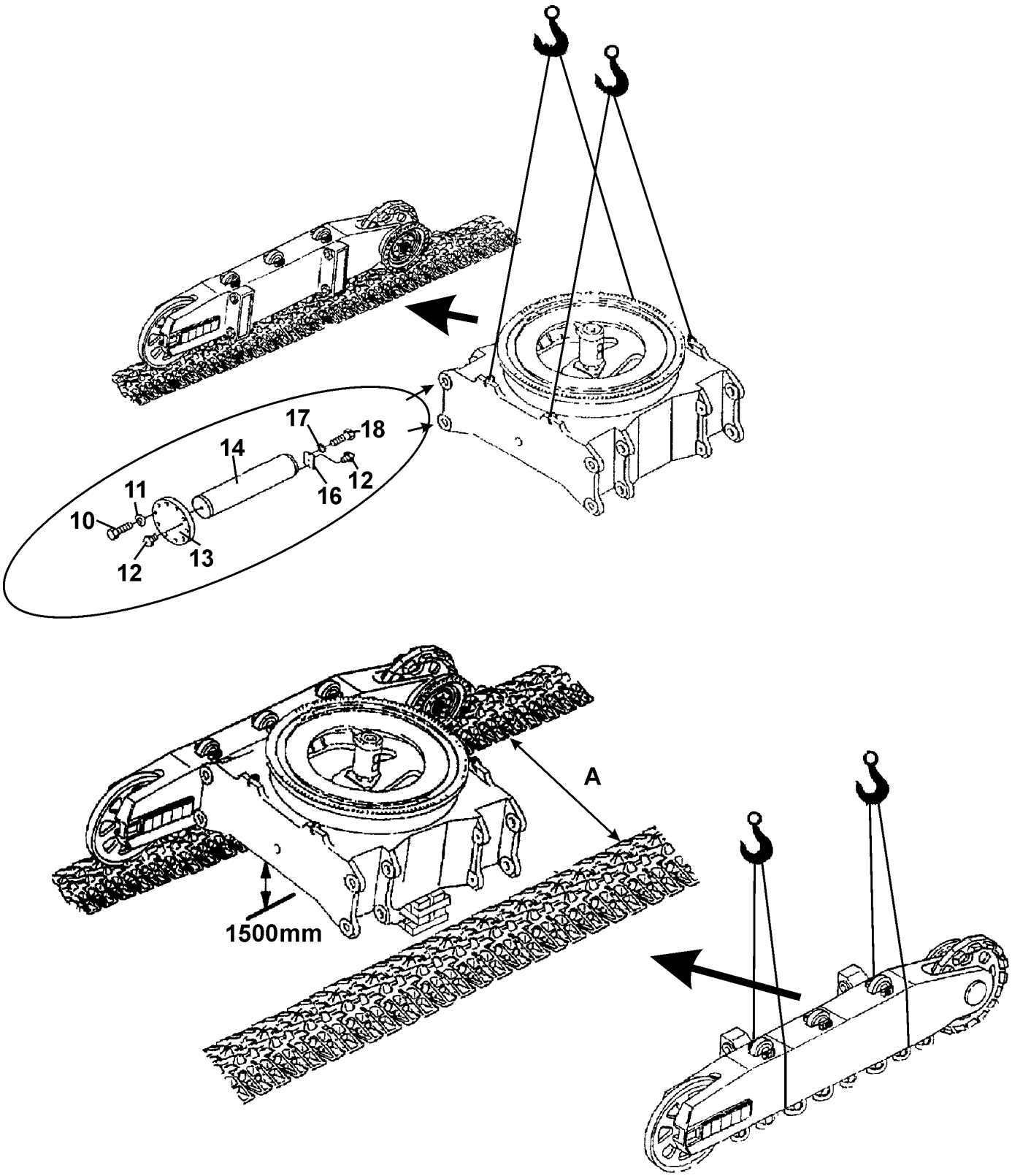
- **Insert bolts (05) the right way so that the bolt head will come in contact with the pin (03).**
  Hardened portion of bolt head (colored marking) must point to pin (03) (refer to SB AH00513A).
  Tighten nut and spot weld nut (06) with the threaded bolt end (05).

3. Push back the track tensioner cylinder by means of opening the cock valve in the side frame.
4. Position the side frame on top of the chain in a way that the idler wheel stays two track pads back from the end of chain.

- **Support side frame properly!**
  DANGER OF ACCIDENT!

5. Lift with a crane the other end of the chain and fold it over the sprocket so that the drive nudges hook up in the sprocket teeth, lower the chain end and close up over the idler wheel.
6. With a Porto Power Pump connected to feed line of the track tensioning system tension the track chain properly (This will allow easier mounting of the side frame to the car body) close up cock valve behind the tensioner cylinder.

- **Closing the chain after mounting the final drives because of the width of the crawler segments.**
  (Refer to page 31).

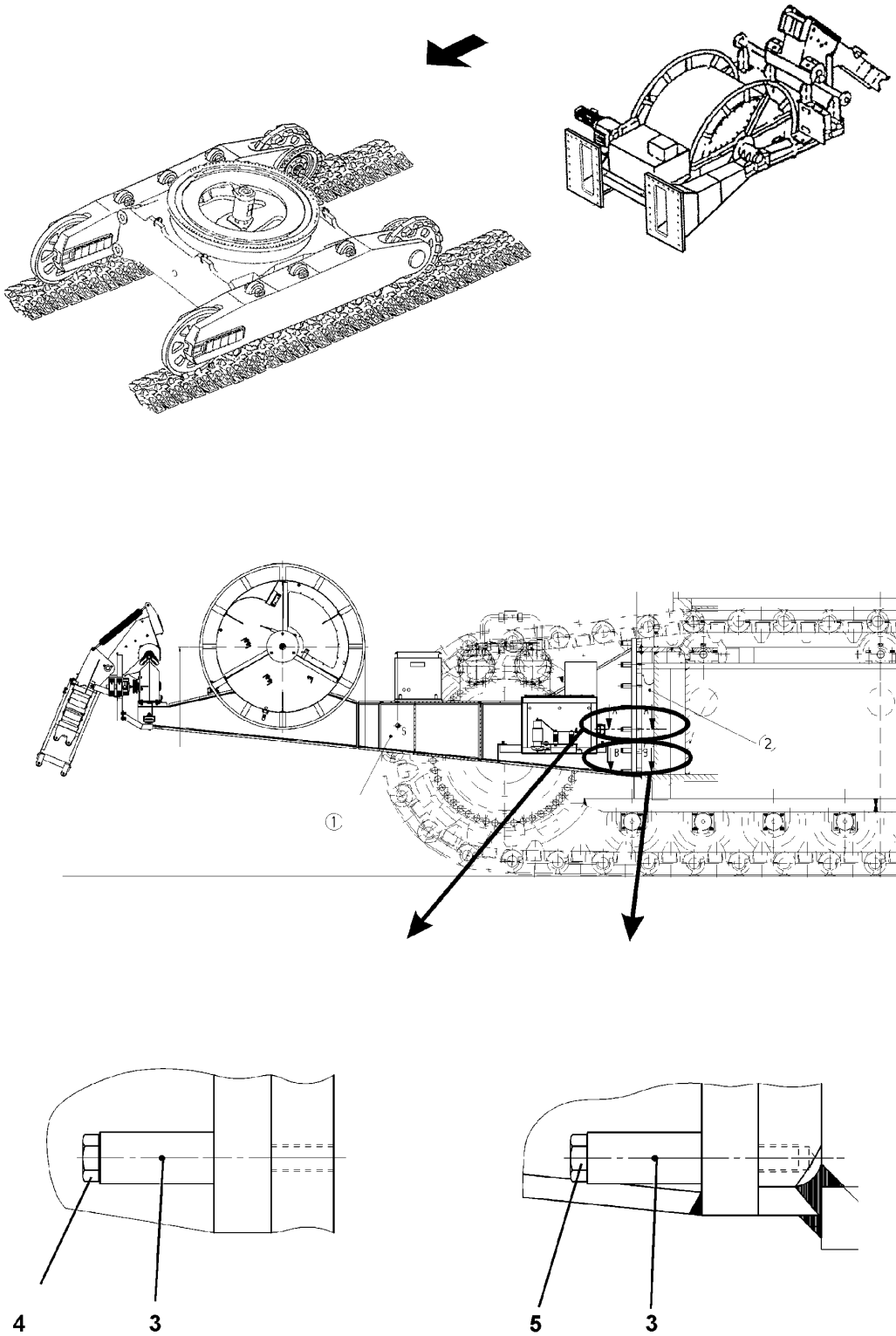


Z22918

2. Assembly of Undercarriage: Z22918

1. Attach center carbody to the cranes.
2. Align center carbody over the first side frame and let it downwards.
   Align upper borings first and insert pins (14).
3. Align lower borings and insert pins (14).
4. Support center carbody with wooden blocks in a way that the free side is appr. 1500 mm above ground level.
   This makes it easier to fit the 2nd side frame.
5. Lift the 2nd side frame with the cranes slantwise and align over the center carbody; let it downwards and insert lower pins first.
6. Align upper borings and insert the last pins.
7. Lift up the undercarriage a little and remove the wooden blocks.
8. Secure all pins with the retainer plates (13 +16) and bolts (10/11 + 17/18) and grease all pins through the grease nipples (12) in the retainer plates.
9. Open the cocks inside the side frames for hydraulic crawler tensioning system (ex works: closed).
10. For more information refer to the Maintenance Manual.

Pos.	Description	Tightening torque
10	Bolt (M20)	360 Nm
12	Grease nipple (M12)	74 Nm

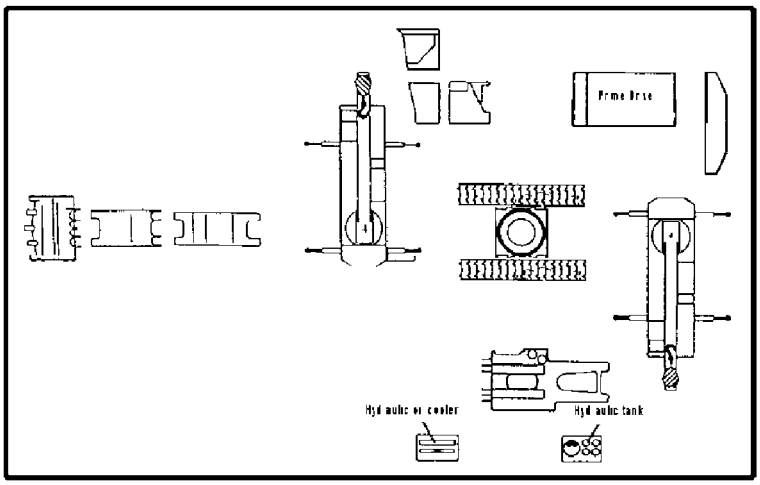


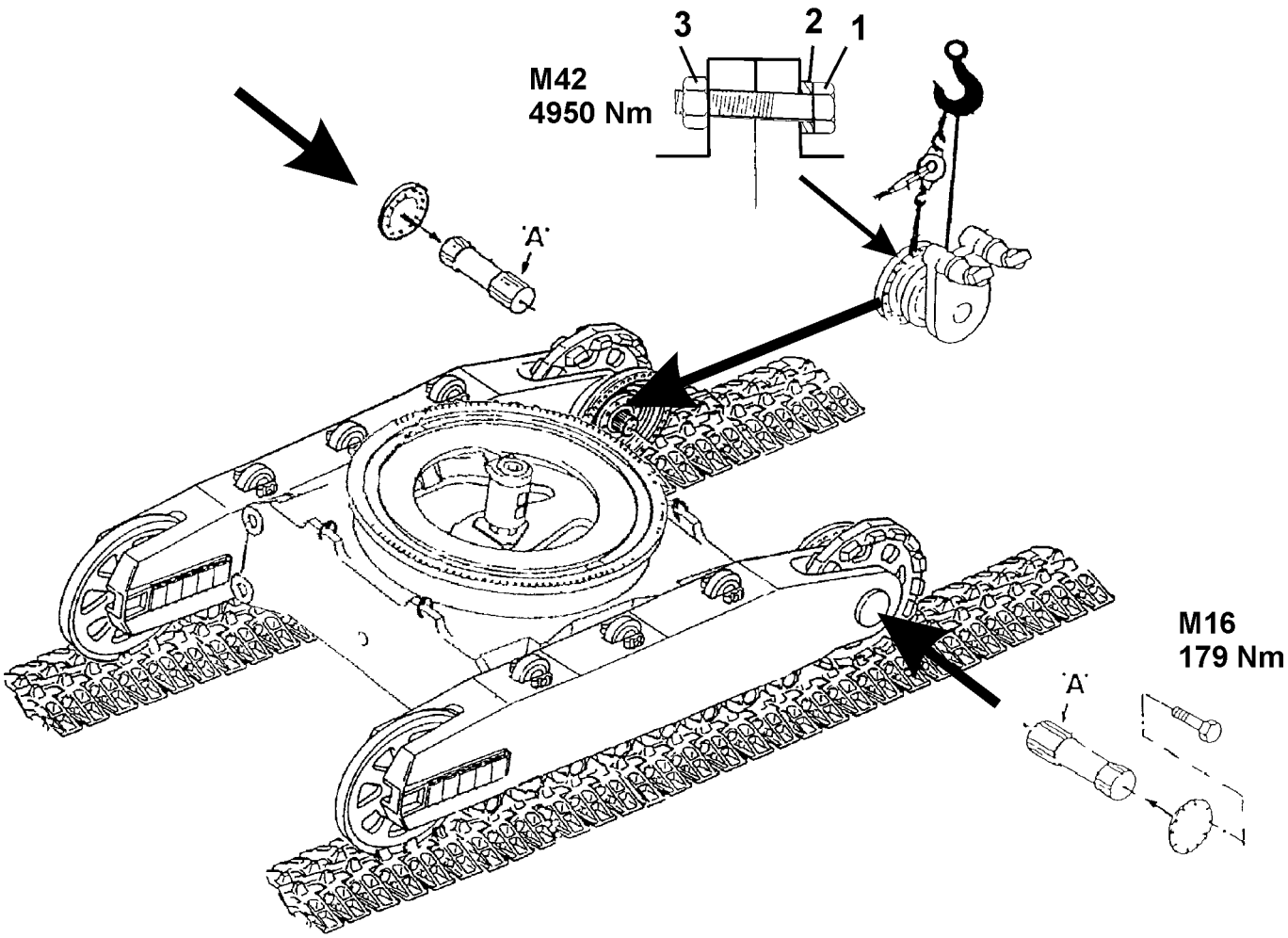
Z22919

3. Assembly of Cable Reel Unit: Z22919

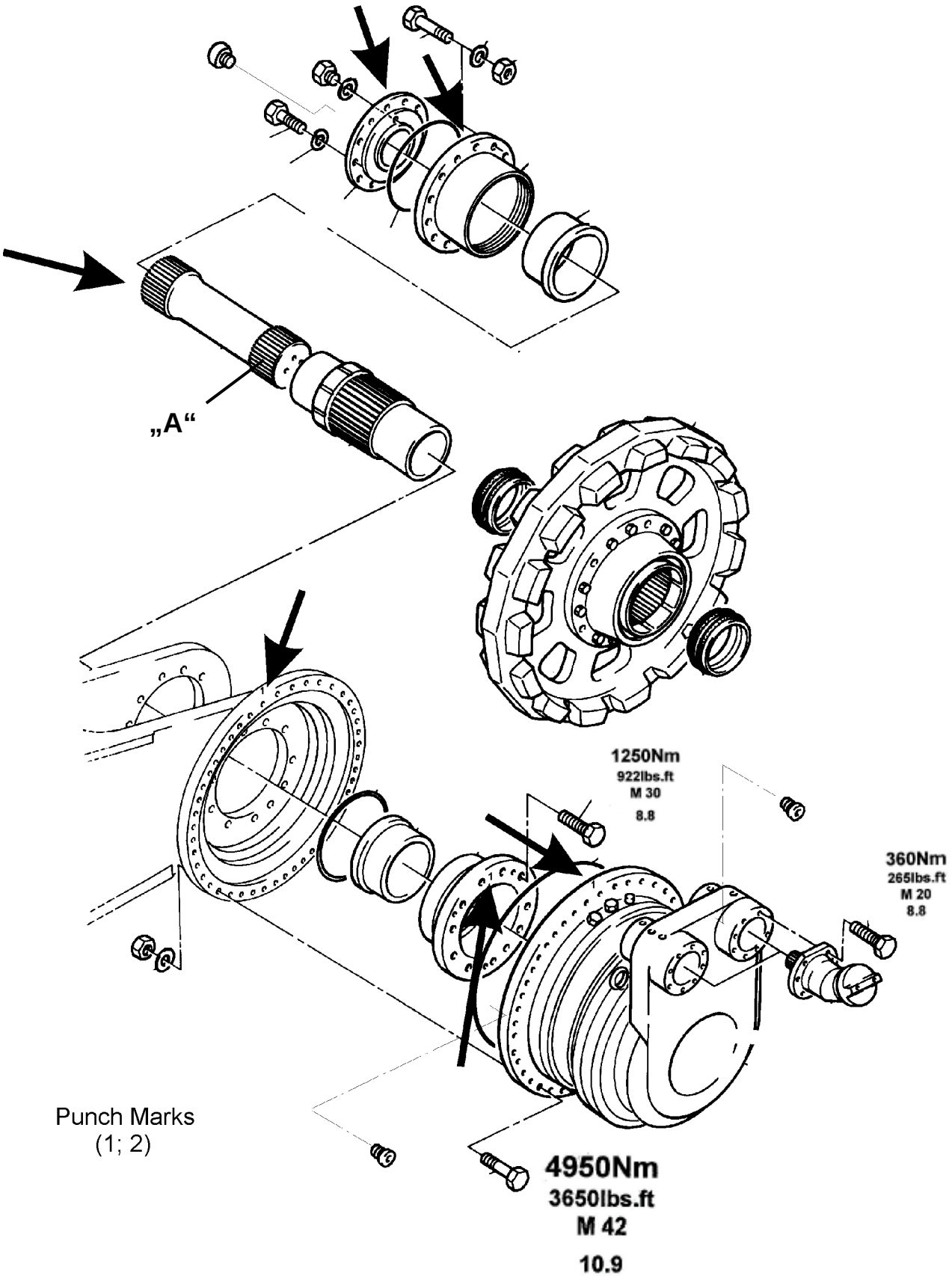
1. Lift cable reel unit and align with the undercarriage brackets.
2. Connect the cable reel frame by means of the bolts (4; 5) and the sleeves (3) with the undercarriage.

Pos.	No.	Description	Tightening torque
3	38	Sleeve	---
4	34	Bolt (M24x200)	880 Nm
5	4	Bolt (M24x180)	880 Nm


Prime Drive
Hydraulic oil cooler
Hydraulic tank


3
2
1
M42
4950 Nm
A
M16
179 Nm
A

Z22920


„A“
1250Nm
922lbs.ft
M 30
8.8
360Nm
265lbs.ft
M 20
8.8
Punch Marks
(1; 2)
4950Nm
3650lbs.ft
M 42
10.9

Z22921

4. Mounting of Final Drives: Z22921

1. Attach both travel gear boxes.
2. Open disk brake by means of hand pump (pressure min. 25 bar max. 35 bar).
3. Open the hydraulic lines of all travel motors.
4. Remove one hydraulic motor and turn the gear drive manually until all splines of gear and sprocket are aligned.
3. Insert drive shaft.

- **It is very important that for this work the inner splines of the sprocket are well aligned. Use the small crane and aid devices.**
  Insert long spline (side "A") into the gear box.

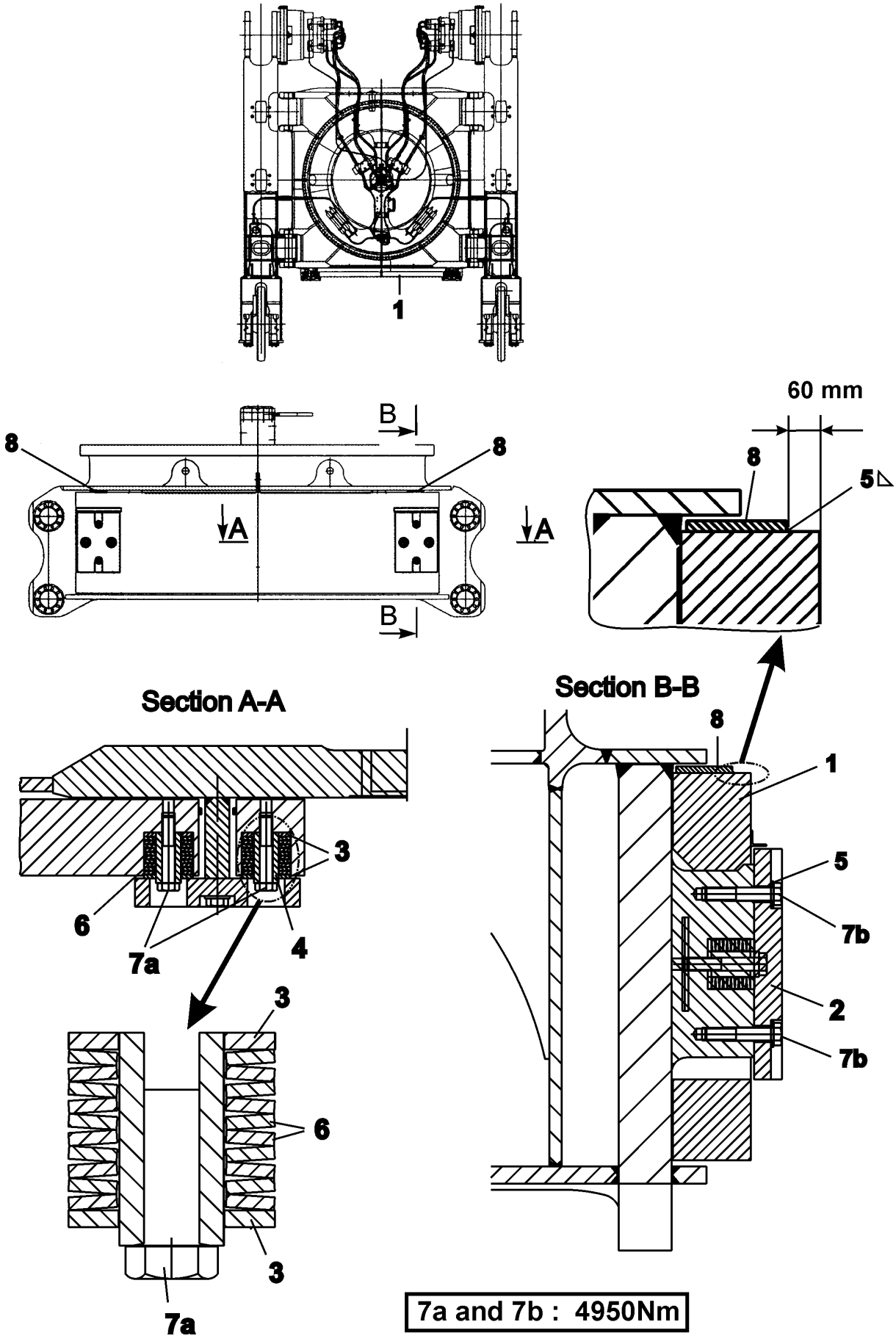
- **Connect pipe work between brake blocks and travel motors after mounting of the superstructure.**

5. Fill up and/or check the gear oil levels in gear boxes, brake housings and final drives (refer to Maintenance Manual).
6. Tighten all bolts with the required torque.

- **All drive unit parts e.g. drive shaft, cover, flange bushing of one crawler assembly are marked with the same punch mark 1 or 2 (illust. Z22921).**

Closing the chains

1. Lift with a crane the end of the chain and fold it over the sprocket so that the drive nudges hook up in the sprocket teeth, lower the chain end and close up over the idler wheel.


1
B
8
8
A
A
B
60 mm
8
5
Section A-A
3
6
7a
4
3
6
3
7a
Section B-B
8
1
5
7b
2
7b
7a and 7b : 4950Nm

Z22993

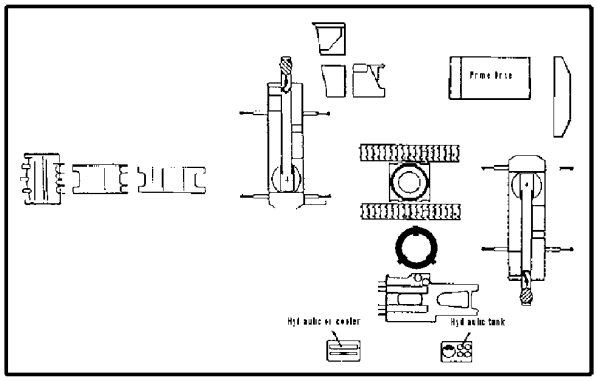
5. Electric drive only:
Mounting of auxiliary weight at the undercarriage: Z22993

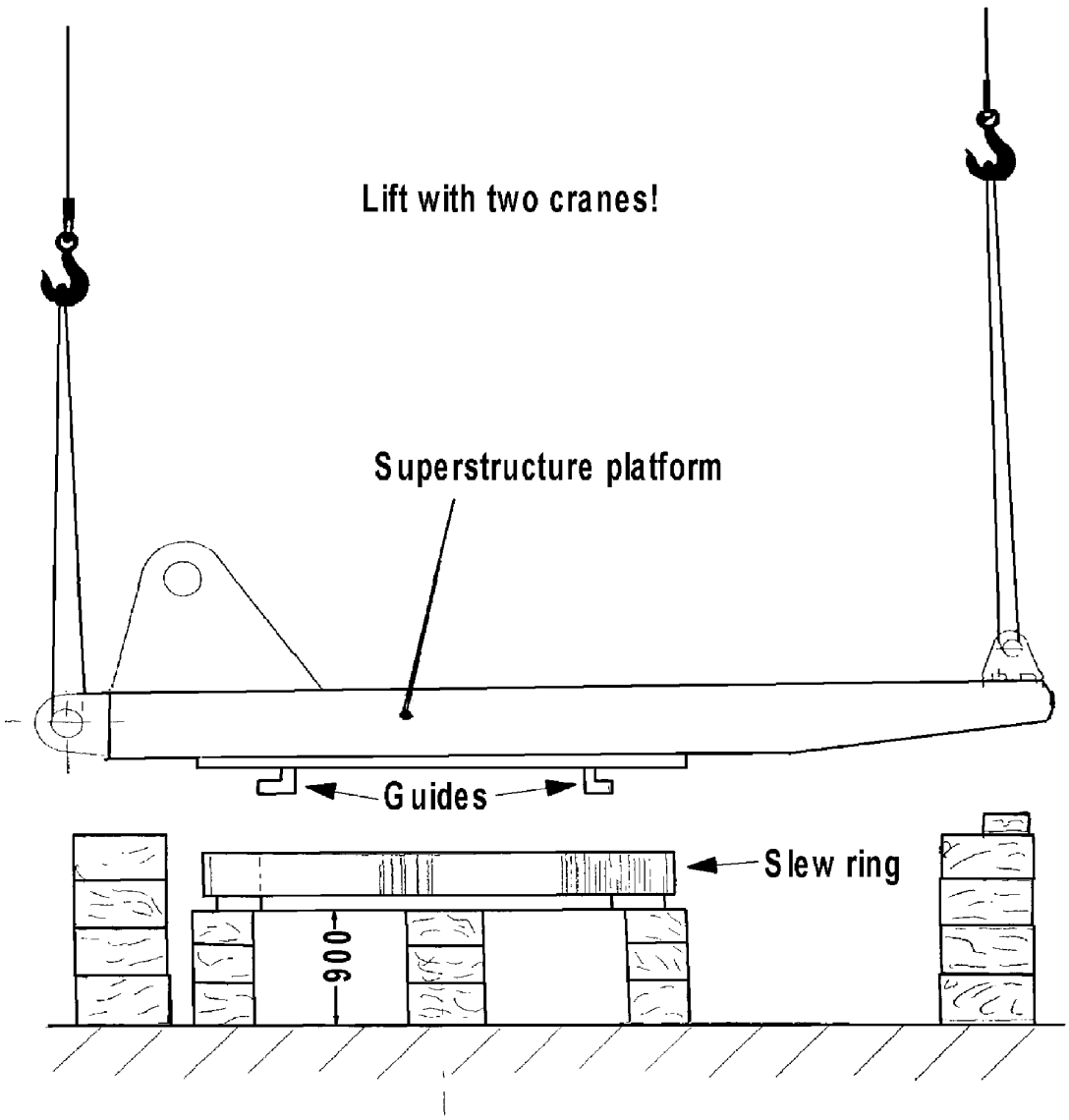
Legend for illustration Z22993

1. Weight (approximately 12 t)
2. Plate
3. Washer 160/82x13
4. Resilient sleeve
5. Washer 82/43x8
6. Cup spring
7. Bolt M42 / 10.9 (4950 Nm)
8. Plate 20x180x200

Mounting

1. Install the weight (1).
2. Install the bolts (7a) with resilient sleeve (4).
3. Install 4 times: one plate (3), 10 cup springs and a second plate (3).
4. Install the both plates (2).
5. Install the 4 bolts (7b).
6. Weld on the plate (8) as shown.




Lift with two cranes!
Superstructure platform
Guides
Slew ring
900

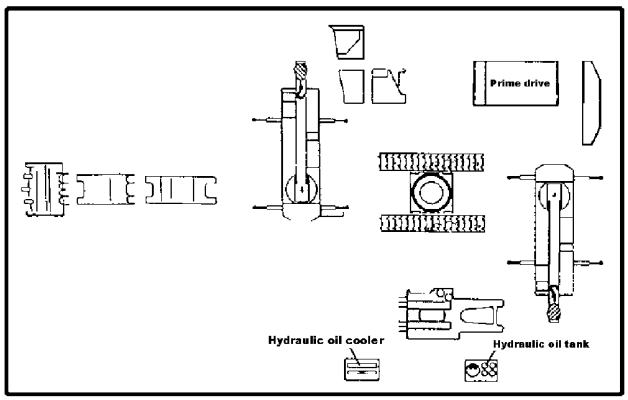
Z22922

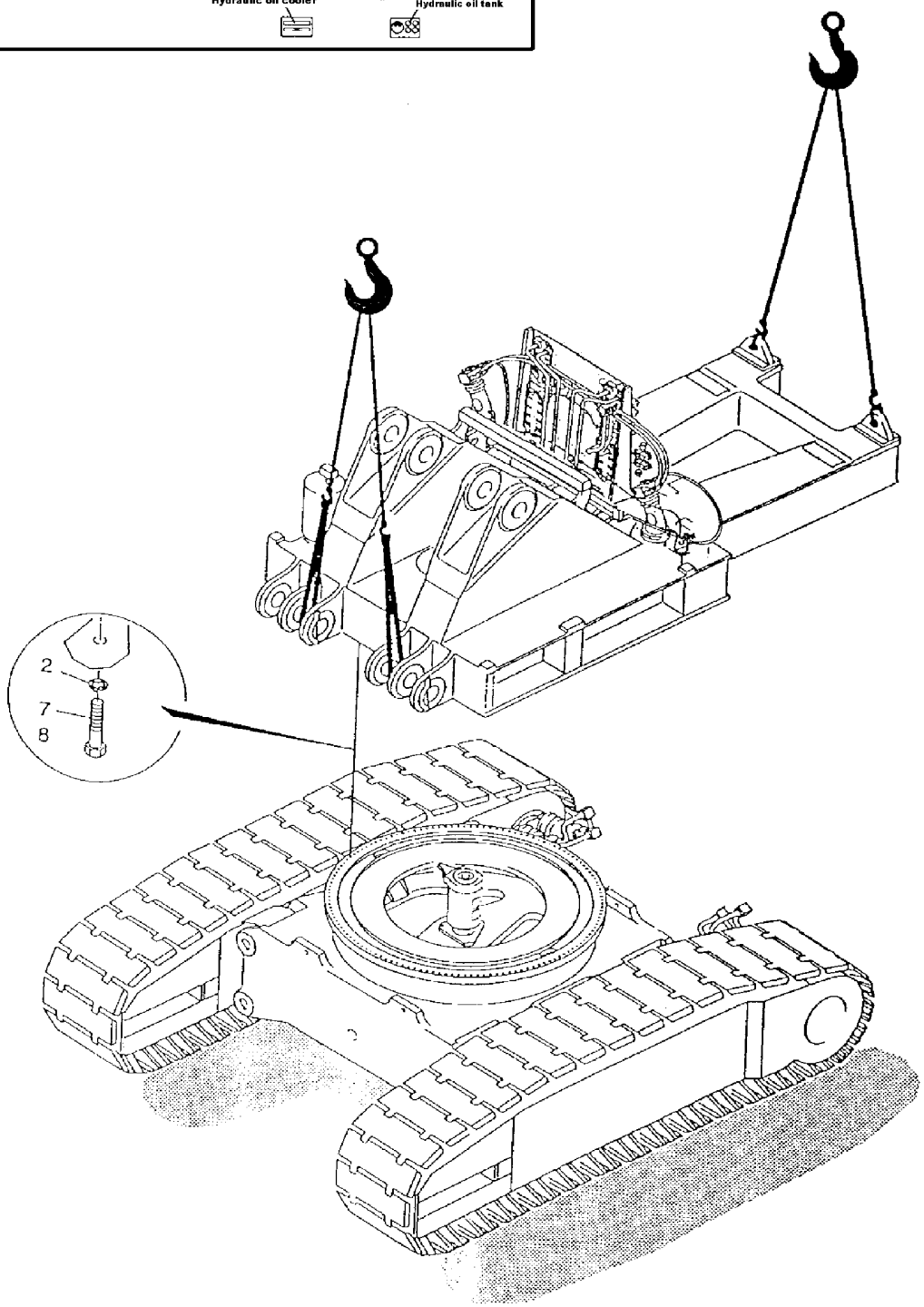
6. Mounting of Slew Ring underneath the Superstructure Platform: Z22922

- Take the 8 slew ring bolts for determination of the tightening torque from the box and store them separately. (Identification of this bolts, Bolt head has a center bore).
- Weld the test block for determination of the tightening torque to a heavy steel plate (approx. 500 x 700 x 25 mm).
- Open the transport box for the slewring and lift them with the 4 attached eye bolts and the transport cross still in place, on a approx. 90 cm (3 feet) high wooden stack
- Place the slewring on the wooden stack that the S+SS marking points 90° to the left in travel direction. The wooden stack should be placed not further then 2 meters away from the assembled undercarriage.
- Clean the contact surface on slewring to be absolutely grease free and dry.
- Attach lifting ropes as shown in the sketch on previous page.
- Lift superstructure platform by means of two cranes and clean contact surface to be absolutely grease free and dry.
- Swing platform over the slewring and lower until the two contact surfaces are still 5 - 6 mm apart, then support the platform with additional wooden stacks (do not rest the platform on slewring, and do not unhook from the cranes while working underneath).
- With the help of all mounting bolts pull up the slewring against the superstructure.
- In case it is necessary to turn the swing gear pinion use a porto power pump for releasing the slew parking brakes. Do not apply more than 50 bar of pressure or this may destroy the seals in the brake cylinder. The hydraulic lines of all swing motors have to be opened.
- The backlashes at the swing gears are preadjusted at works by using the guides (Z22922). Proceed „Backlash Adjustment“ as specified in the service bulletin (AH00511a) if necessary.
- Check if the „S“ position of the inner and outer ring of the slew ring is correct. (Ref. Service Bulletin AH00511a). Turn the ring if necessary.

- **Make sure that all bolts are mounted with spacers or hard surface washers.**
  Lubricate contact surface area on bolt head and thread with the factory delivered grease.

- Tighten all slewring bolts with the special determined torque.
  Refer to Service Bulletin AH00511a.
- Clean the surface of all teeth of the slew ring carefully and lubricate it by hand with the special grease for the slew ring lubrication system.
- Connect all grease lines.
- Install the dummy wheels.





Z22923

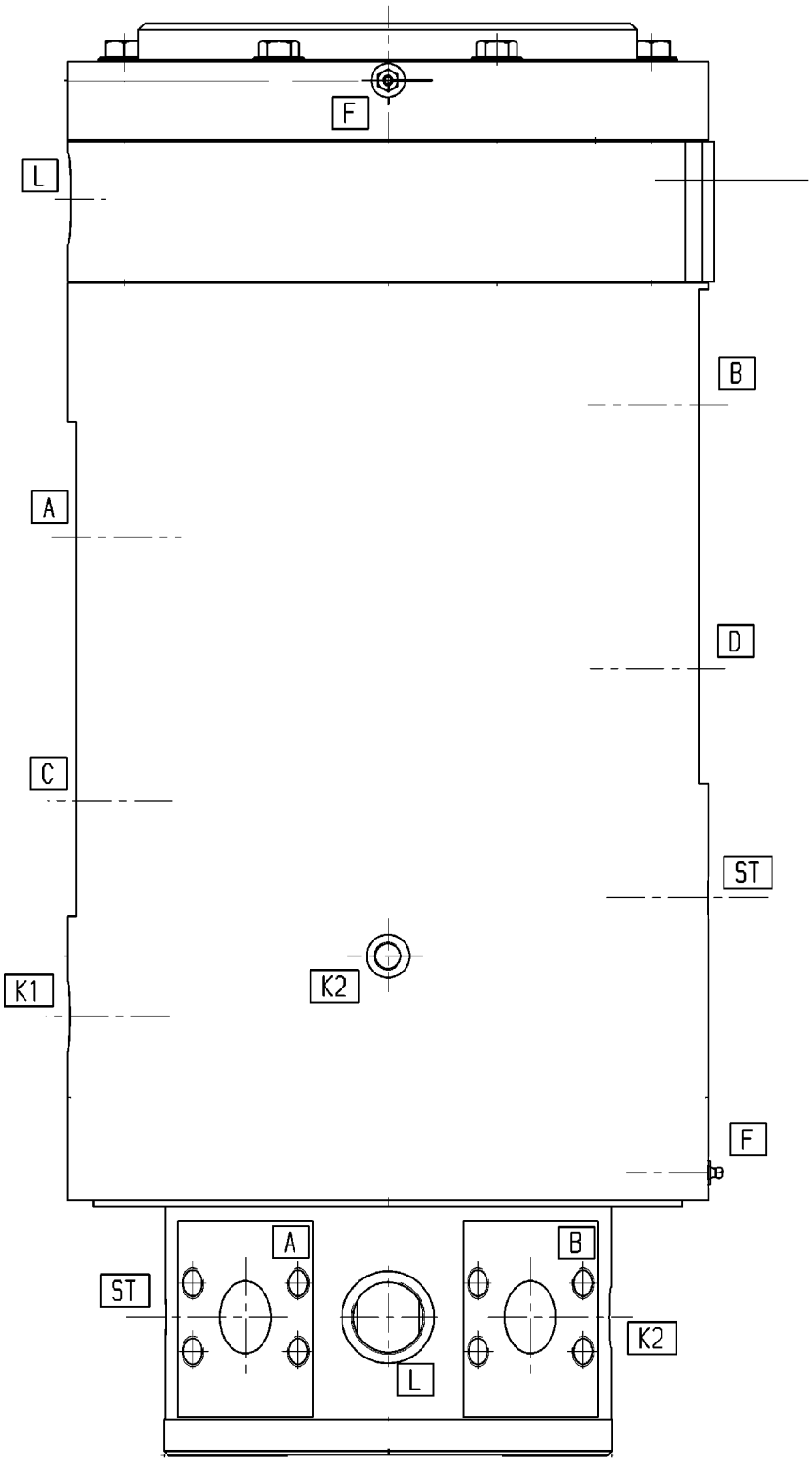
7. Assembly of the Superstructure Platform onto the Undercarriage: Z22923

1. Lift the superstructure platform off the ground to clean the surface (contact area) of the slew ring.
2. Clean very carefully the contact surface for the slew ring in the center of the carbody.
3. Prepare all bolts (07 + 08) and thrust washers (02). Lubricate the threads as well as the head surface of the bolts with compound P/N 324 969 40.
4. On electric driven machines only
   Introduce high voltage cable. Pay attention alignment of the driving pins for the slip ring.

- **For easy alignment install 2 guide pins (∅ 36 x 250, one end threaded M36 x 50mm other end pointed ~25mm) to the swing ring thread bores. One to the front and on to the rear. This simplifies the alignment of the slew ring to the undercarriage.**

5. Align superstructure platform to the center carbody and lower it as required to insert 4 bolts.
6. Install one bolt at each 90° (for alignment) and lower superstructure platform so that there is a very little clearance between slew ring and center carbody.
7. Install all bolts and pre-tighten.
   Tighten the bolts cross-wise with the determined value (Refer to Service Bulletin AH00511a last edition).
8. Mount slewring protection.

- **If appr. 10 bolts (front and rear) are tightened the superstructure platform can be unhooked from the cranes.**



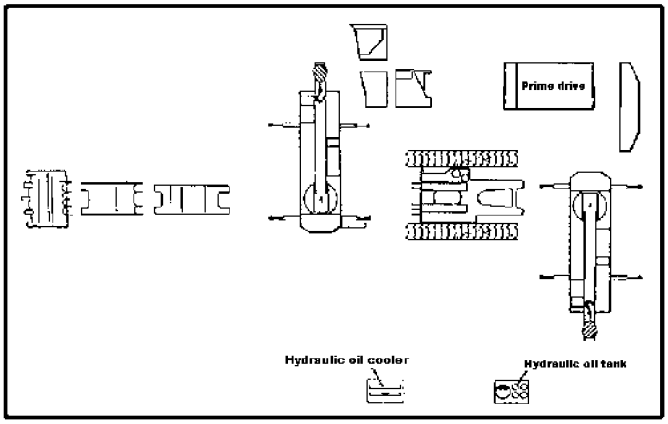
Z22924

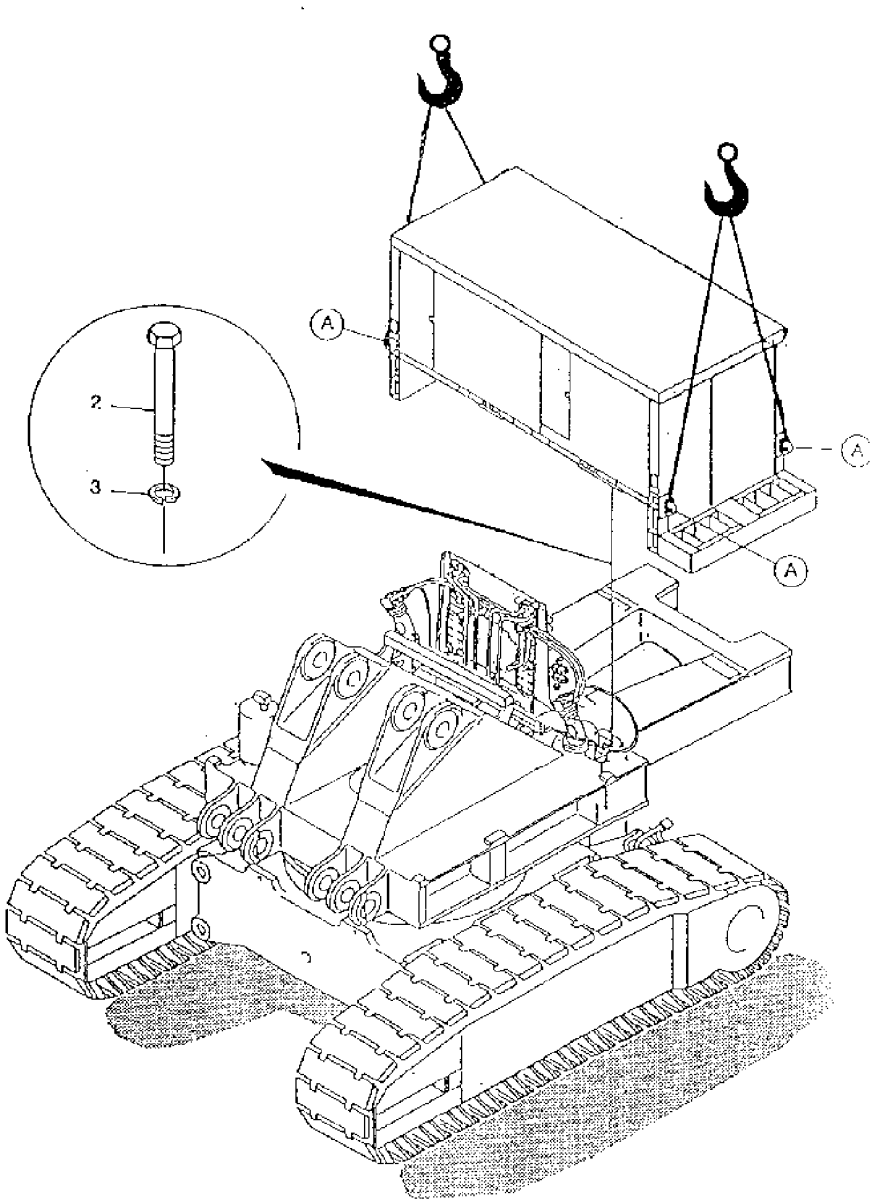
7.1 Rotary Distributor Z22924

Ports:

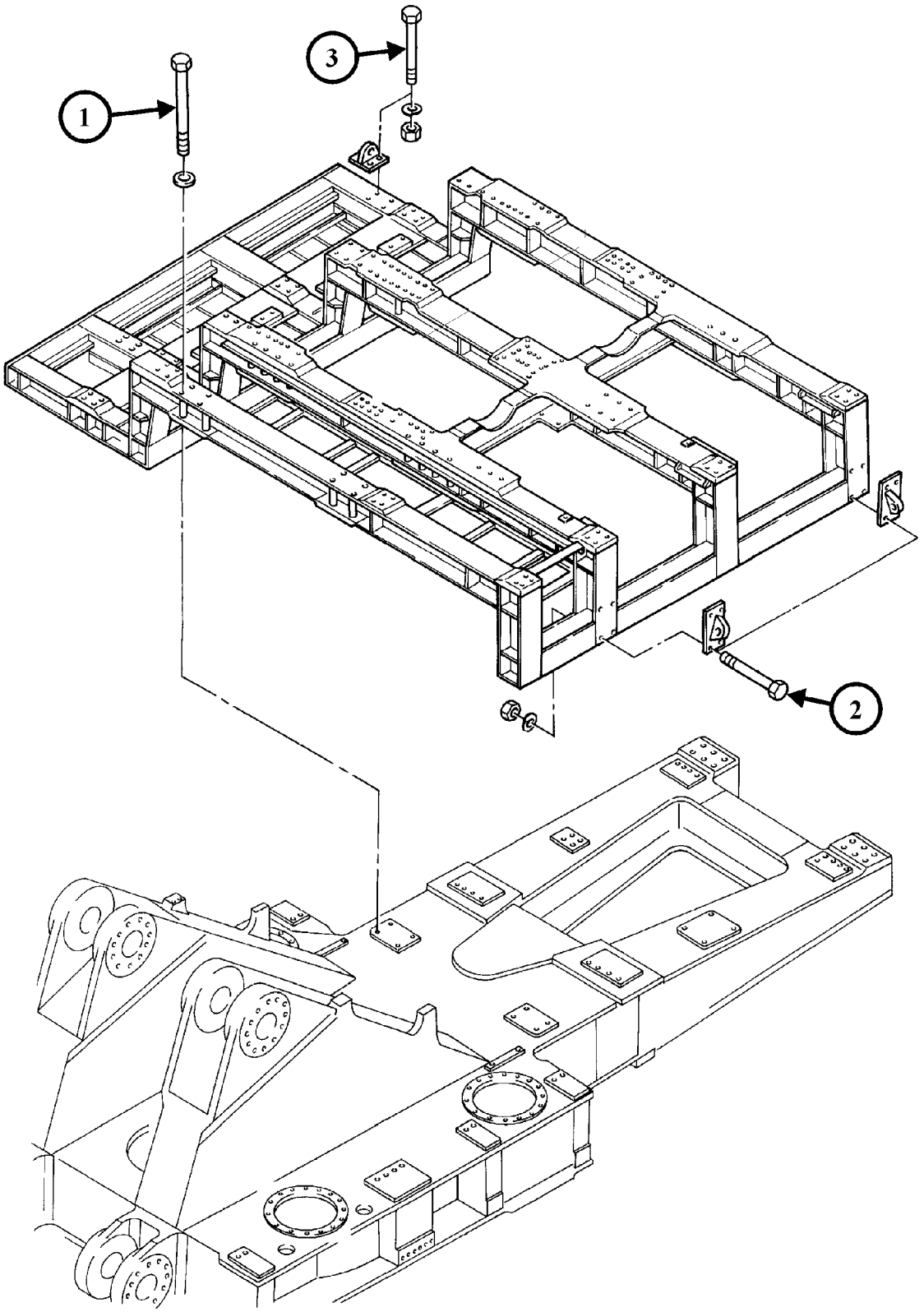
A - D	Service lines
F	Grease
L	Leak (case drain) oil
ST	Control oil
K1/K2	Return oil to tank

- **Torques for flange connections refer to page 148.**





Z22925



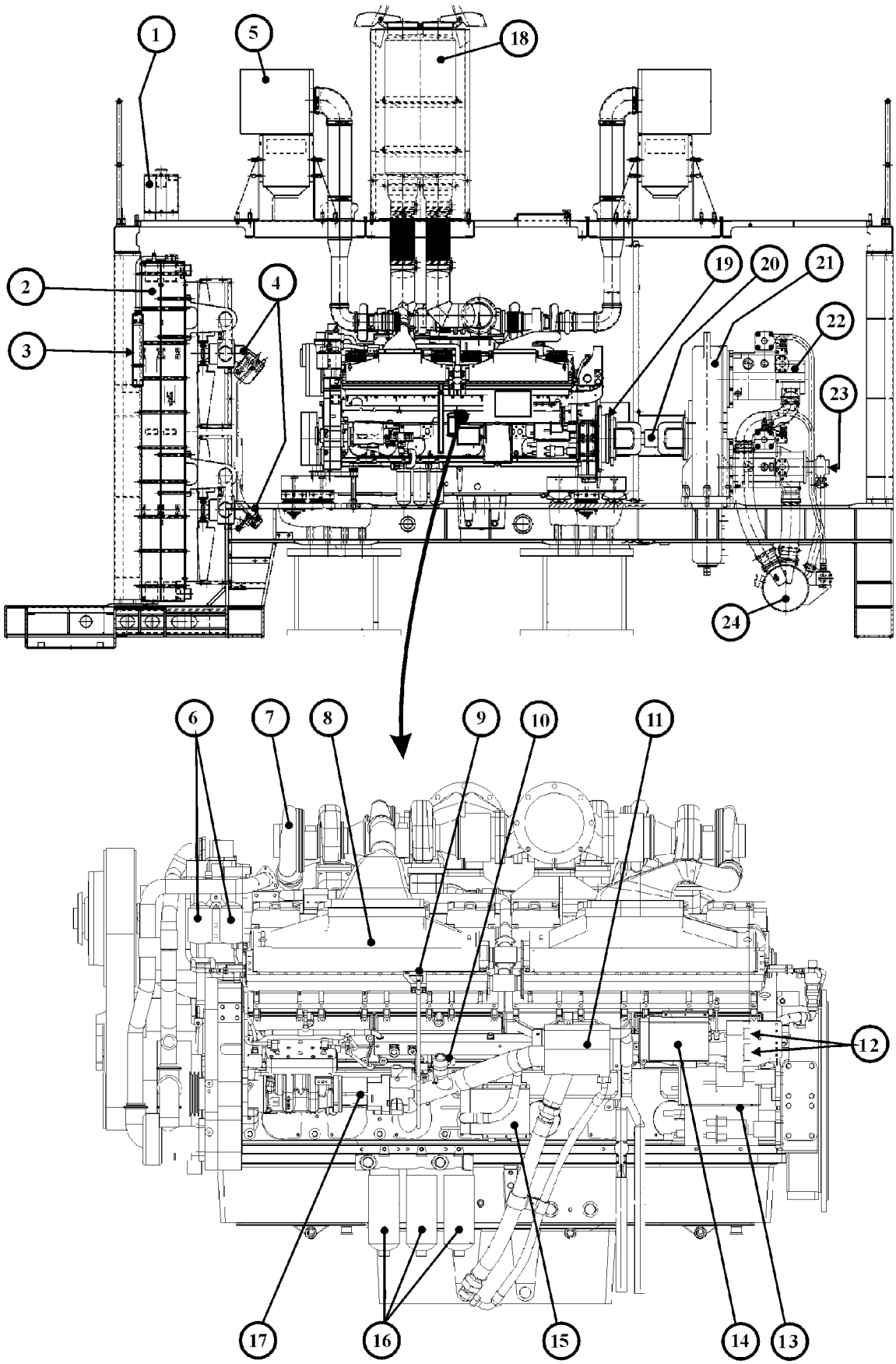
Z22926

8. Assembly of the Prime Drive Unit to the Superstructure Platform: Z22925 / Z22926

1. Clean the contact surfaces of the superstructure and engine house from the anticorrosive paste with a appropriate solvent.
2. Prepare all bolts, washers and grease the threads and the washers as well as the head surface of the bolts. Use normal bearing grease. Don't use special grease from swing ring connection.
5. Attach the unit to the crane (use only the attached lifting points (A).
6. Lower the unit as required so that two bolts with washers (02 + 03) for guiding can be inserted.
7. Lower the unit fully and insert all bolts with washers.
   Tighten the bolts with the resp. torque. (This must be done directly because later-on it may be difficult to reach the bolts).
8. Remove the lifting brackets (A).

Reference No.:	Bolt size mm	Grade	SW * mm	Tightening torque Nm	Qty.
(1)	M30	10.9	46	1770	32
(2)	M36	10.9	55	3100	8
(3)	M36	10.9	55	3100	8

* SW = Wrench size



Z22927

8.1 Overview Drive unit

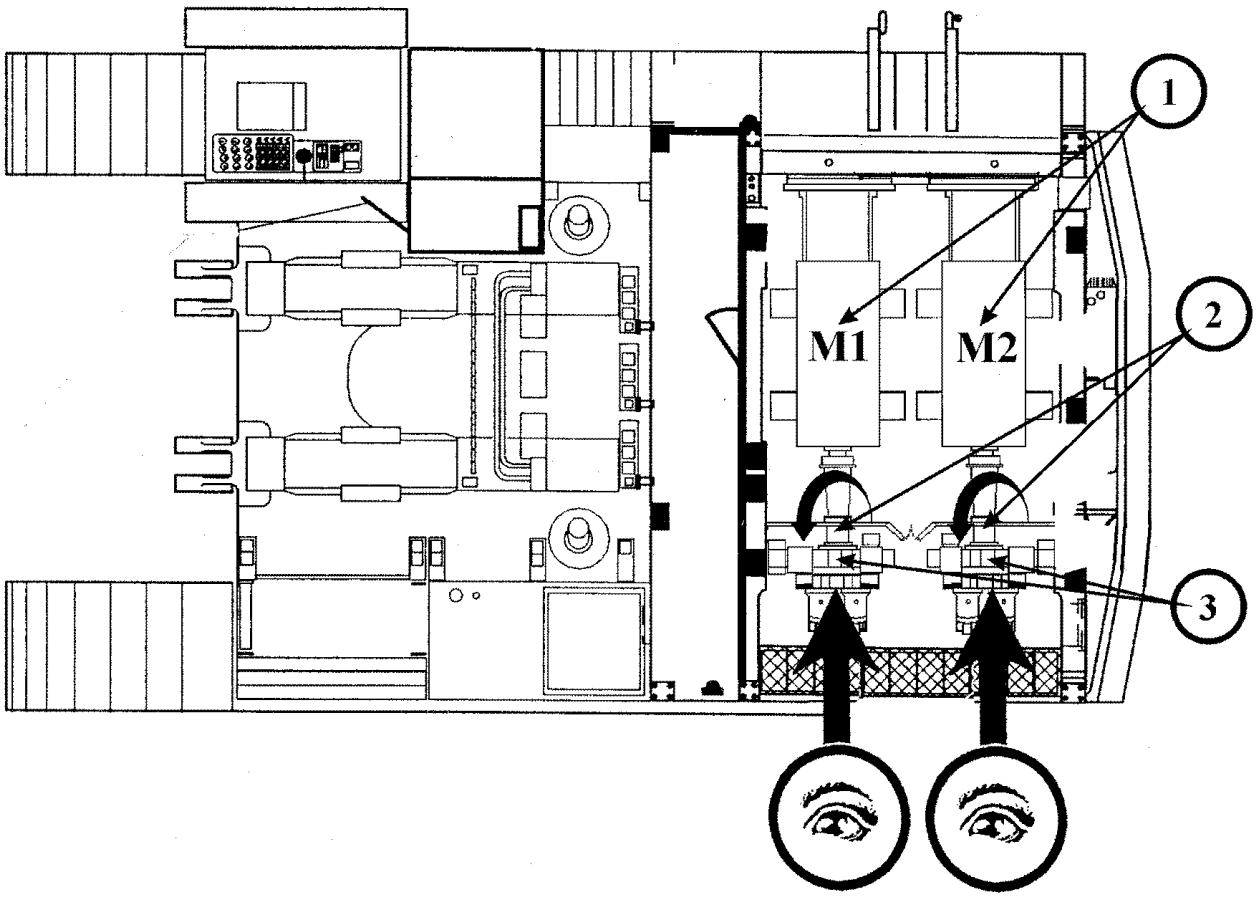
REMARK
The illustration shows the front power unit, viewed from operator's cab side.

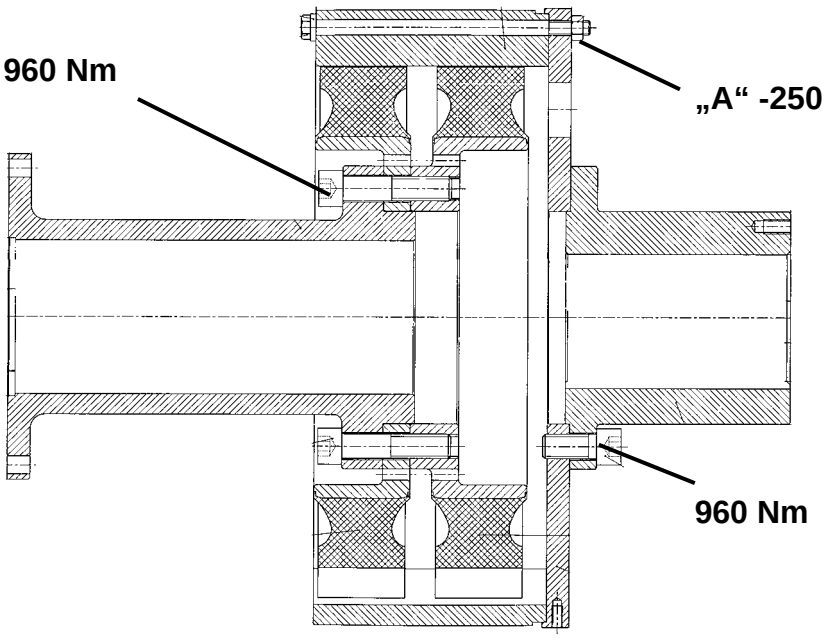
Legend for illustration Z22927

1. Coolant expansion tank for radiator
2. Coolant radiator
3. Fuel cooler
4. Hydraulic motor for radiator fan drive
5. Engine air cleaner assembly
6. Coolant filters
7. Turbocharger
8. Aftercooler
9. Engine oil level gauge
10. Engine oil filler tube
11. Crankcase breather
12. Data link connectors for shovel interface harness
13. Starter motors
14. ECM for the engine monitoring system CENSE
15. ECM for the QSK fuel system (Quantum)
16. Fuel filters
17. Fuel pump
18. Exhaust muffler assembly
19. Flexible coupling, oil filled
20. Drive shaft
21. Pump distributor gear PTO
22. Main hydraulic pumps
23. Piggyback gear type pump
24. Suction oil reservoir

Required Direction of Motor Rotation: ◆ CCW ◆
Viewed from Pump Distributor Gear side in direction of the Motor

← Front





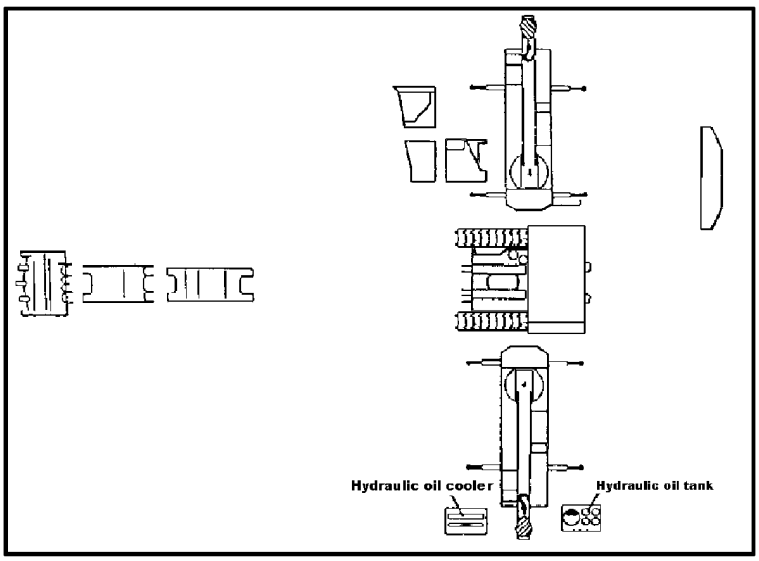
Refer to Service Bulletin AH01523b

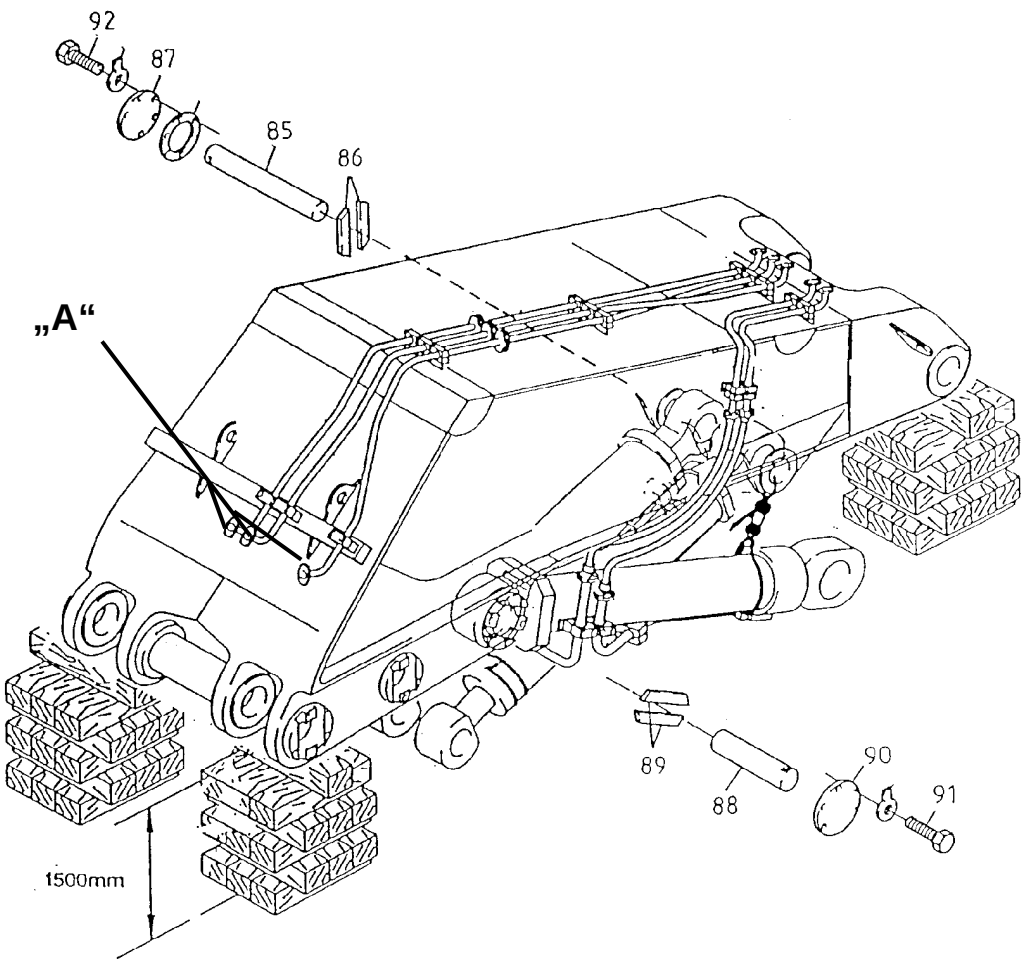
8.2 Electric drive: Direction of motor rotation; mounting the coupling

(1) Main Drive Motor
(2) Flexible Coupling
(3) Pump Distributor Gear (PTO)

- **Check the direction of motor rotation before mounting the couplings.**
- **If the couplings are assembled already, remove the nuts “A” for this test.**

1. Start motor for a short run up, just enough to determine direction of rotation. Direction should be counter clockwise (ccw) viewed from PTO gear.
   If direction of rotation is wrong change the power supply cable terminal use.


Hydraulic oil cooler
Hydraulic oil tank


92
87
85
86
„A“
89
88
90
91
1500mm

Z22932

9. Preassembly Boom- and Stick Cylinders to the Boom: Z22932

- **For the mounting of the pin seals please refer to page 130.**

1. Position the boom about 1.50 meter (5 feet) elevated on wooden beams, see sketch.
2. Mount the stick cylinder underneath the boom, use fork lift or similar devices
3. Connect bottom part with the boom
4. Secure the rod end of the cylinder with steel rope as in the shown manner.
5. Install pins (85/88) and pin locking parts (86/87/92)
6. By means of ropes and chain pulls secure all cylinders to the boom. Cylinder weight approx. 8 tons.

ATTENTION DANGER OF ACCIDENTS !

Preassembly of boom with boom cylinders

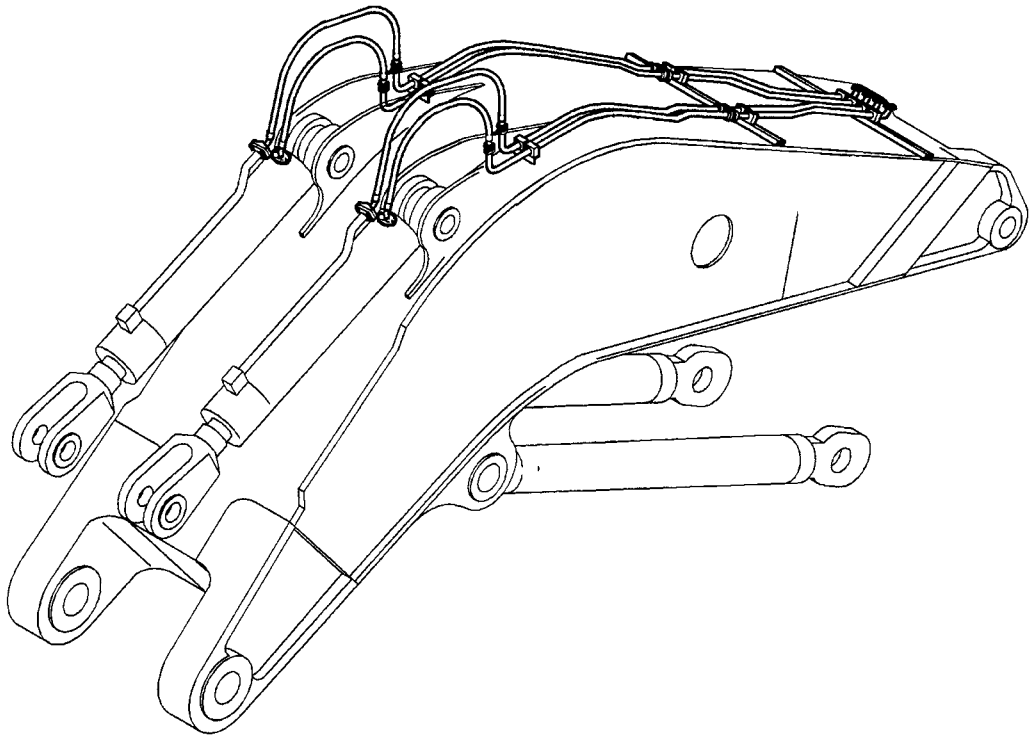
1. Lift boom cylinder with a fork lift in position and connect the barrel side of the cylinder with the boom
2. The barrel side of the cylinder will be tied up with a steel rope as shown .

ATTENTION DANGER OF ACCIDENTS !

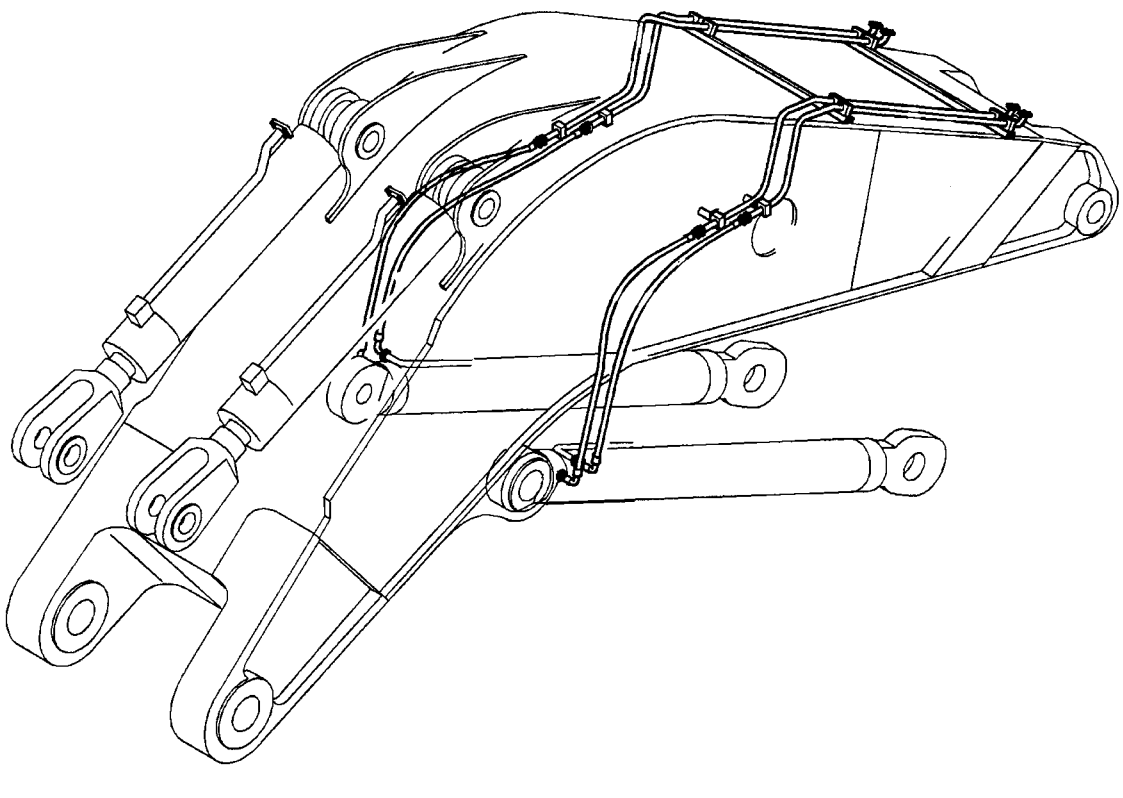
Preassembly of Hoses

1. Connect all hydraulic hoses to the stick cylinders, to the boom cylinders and to the stick and secure it if necessary.
2. Connect also lubrication lines as many as possible.
3. Connect all hoses from the boom to the stick at the boom side (“A”) and fasten it at the boom backward.

- **Torques for flange connections refer to page 148.**

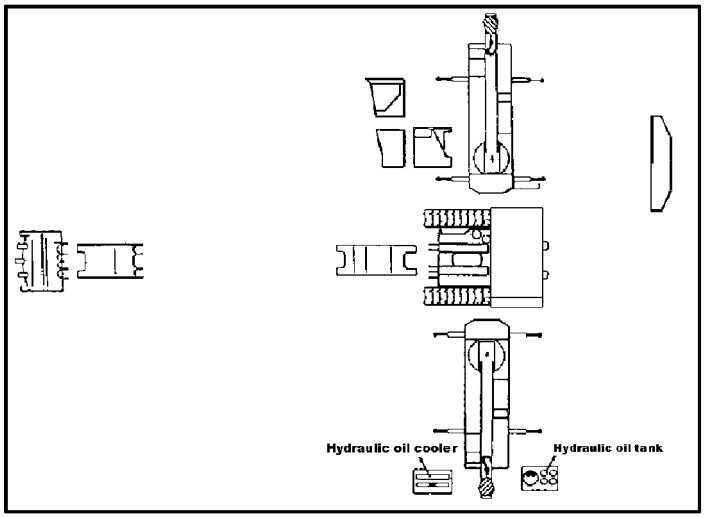


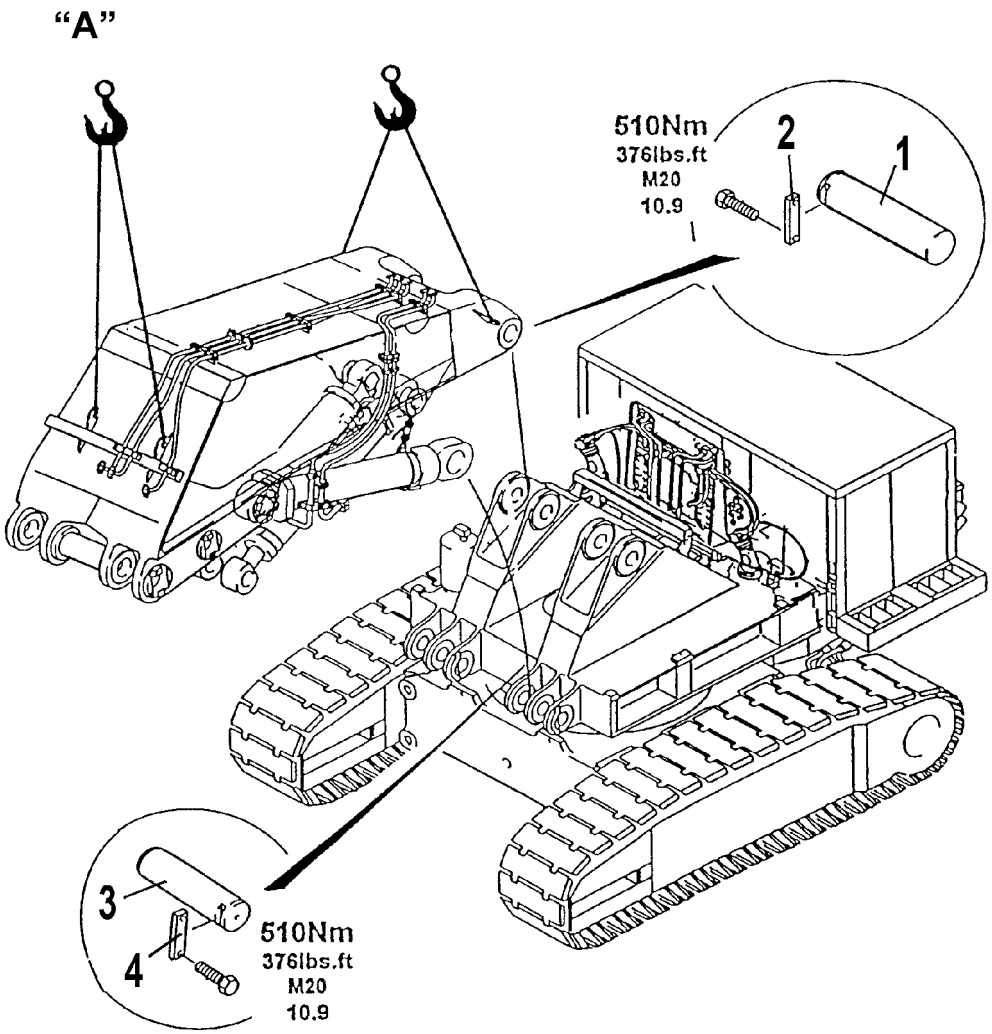
Z23007



Z23008

9.1 Preassembly Boom- and Stick Cylinders to the Boom (Backhoe attachment) : Z23007; Z23008


Hydraulic oil cooler
Hydraulic oil tank


"A"
510Nm
376lbs.ft
M20
10.9
2
1
3
4
510Nm
376lbs.ft
M20
10.9

Z22933

10. Mounting of Boom Z22933

- **For mounting of the pin seals please refer to page 130.**

1. Attach the boom to the cranes.
2. Lift the boom with the cylinders attached.(You can alleviate your job, if you lift the front part of the boom higher than the back part.)
3. Align the boom with the boom bearings of the superstructure.
4. Lower the boom until the borings of the boom and the boom bearings are aligned.
5. Insert both pins (01) and secure with the retainers (02)

- **The boom must be still attached to the crane “A”!**

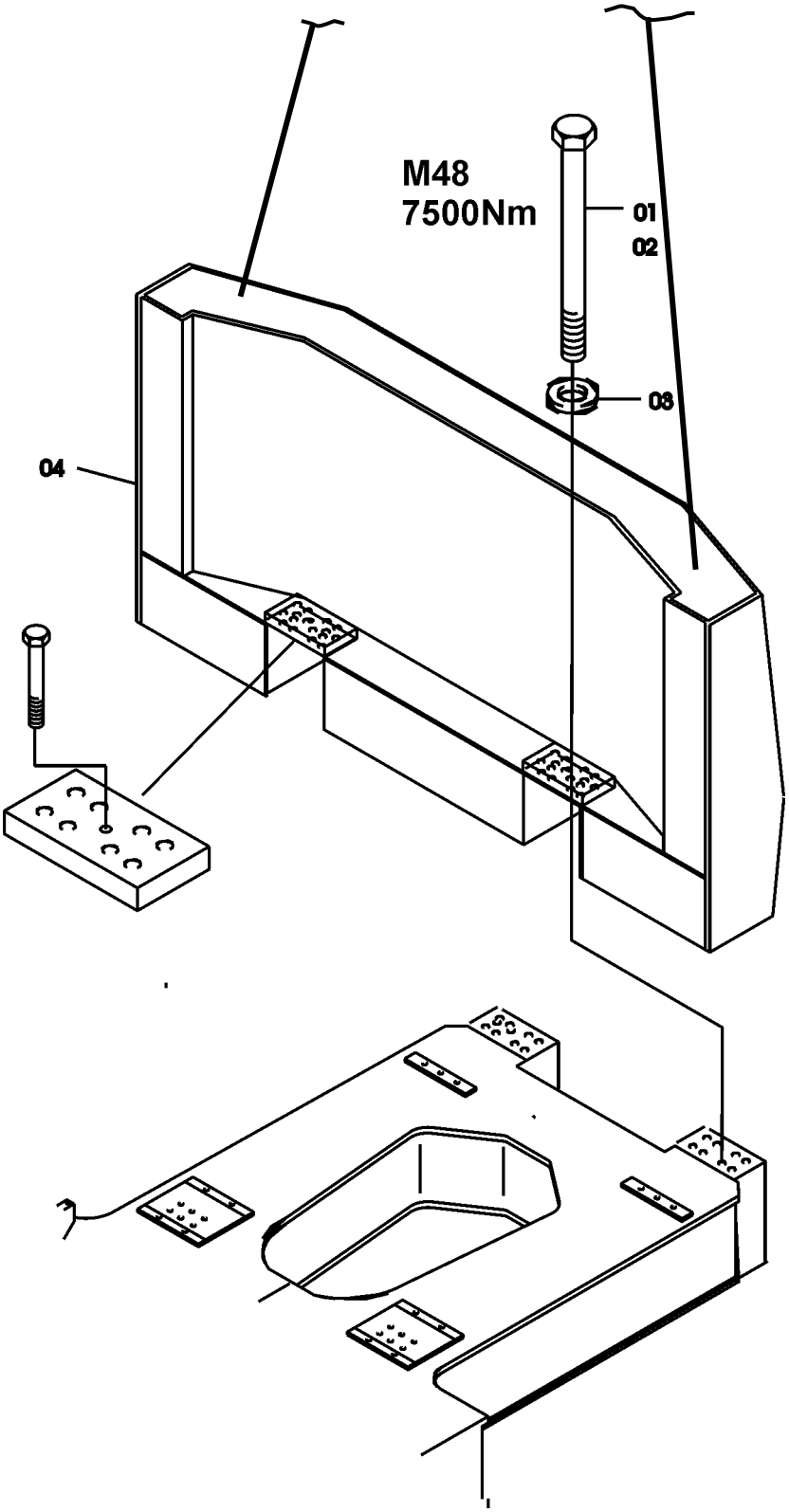
6. Lift one boom cylinder with the other crane or a chain pull and disconnect the transport fastenings.

- **Don’t open the plugged hydraulic ports of the cylinder.**
- **Open the transport fastenings very carefully, because of a sliding cylinder rod by its own mass.**

7. Lower the boom cylinder until the boring of the cylinder and the superstructure bearings are aligned.

- **If necessary lower or raise the boom for easier alignment.**

8. Insert the pin (03) and secure with the retainer (04).
9. Fix the 2nd cylinder in the same manner.
10. Unhook boom from the crane.



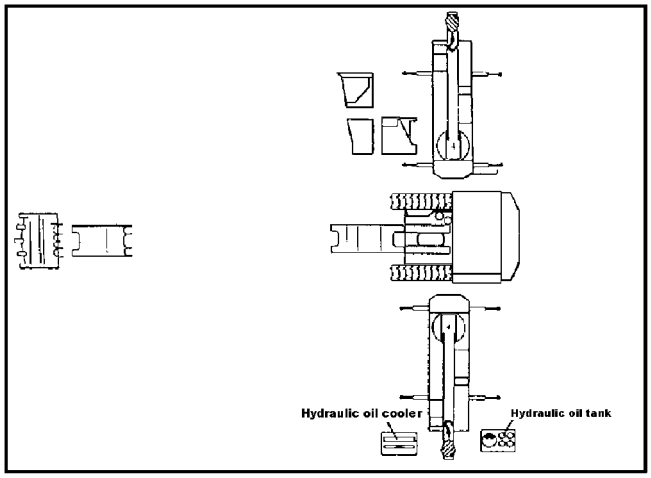
Z22934A

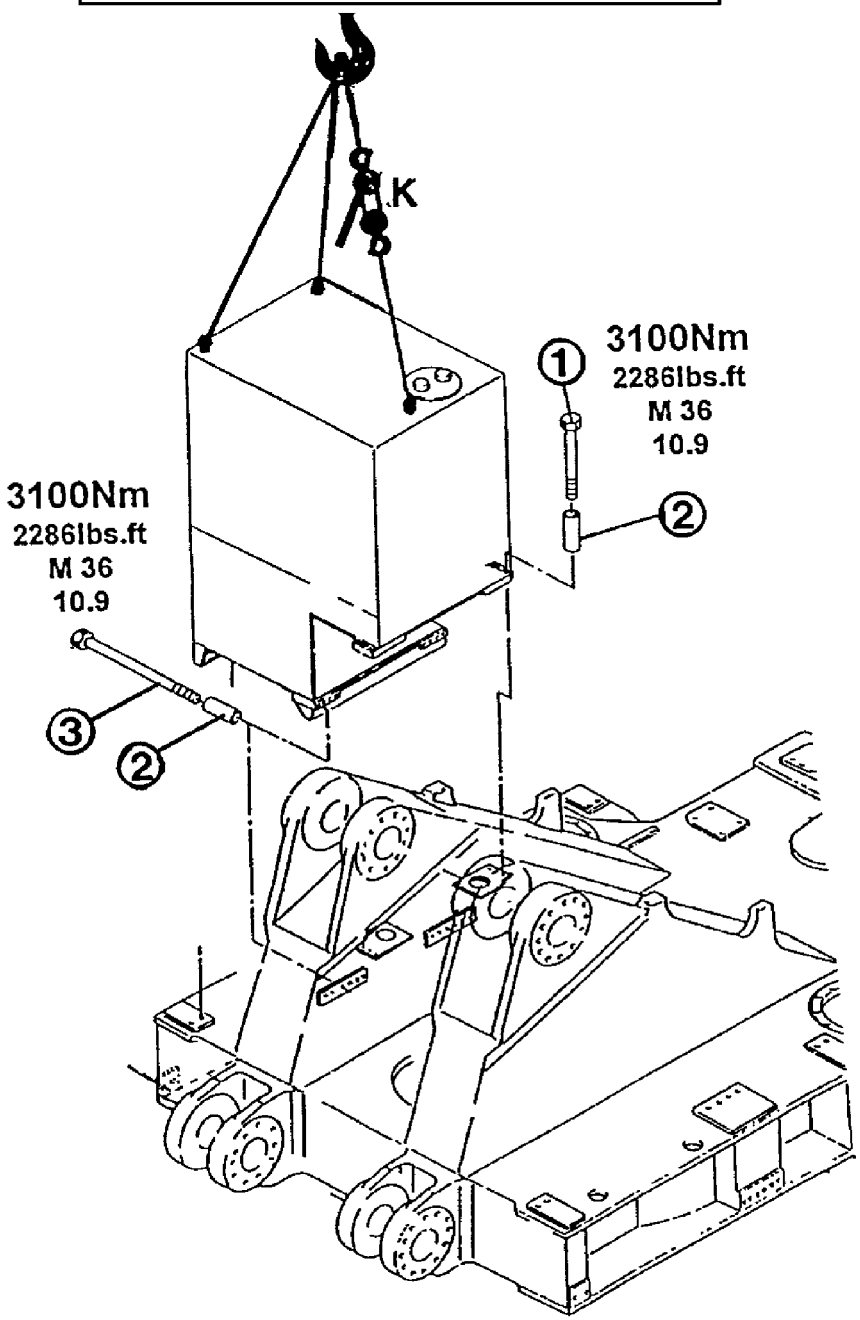
11. Mounting of Counterweight: Z22934A

1. Clean the contact surfaces between the superstructure and the Counterweight from the anticorrosive paste with a appropriate solvent.
2. Prepare all bolts, washers and grease the threads and the washers as well as the head surface of the bolts with normal grease. Don't use special grease from swing ring connection.
3. Lift the counterweight to the platform align and install bolts (01), washers (03). Tighten with required torque.

Reference No.:	Bolt size mm	Grade	SW * mm	Tightening torque Nm	Qty.
(04)Counterweight					
(01) Mounting bolts	M48	10.9	75	7500	**16**

* SW = Wrench size


Hydraulic oil cooler
Hydraulic oil tank

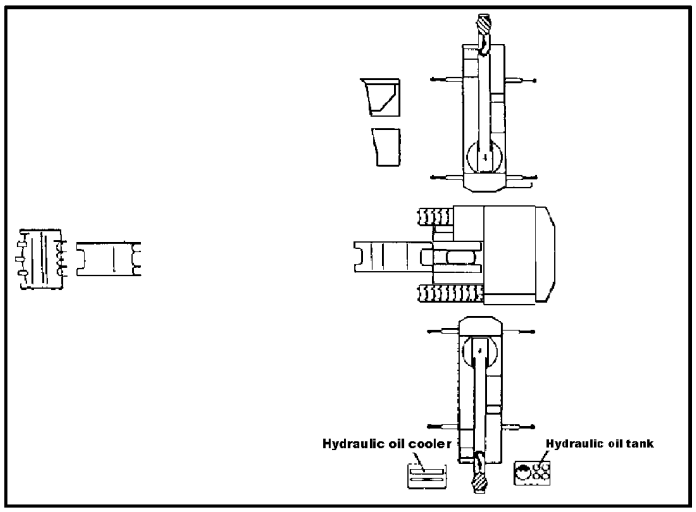

K
3100Nm
2286lbs.ft
M 36
10.9
1
2
3100Nm
2286lbs.ft
M 36
10.9
3
2

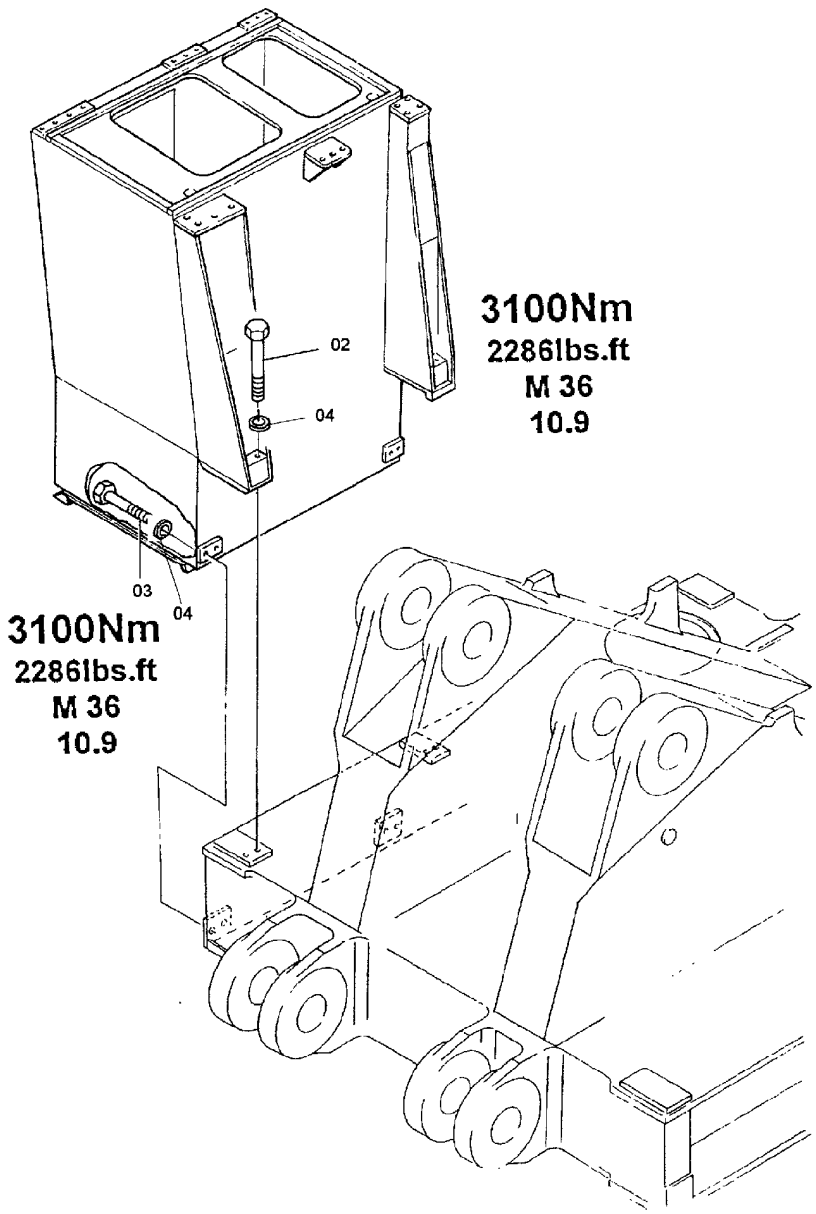
Z22935

12. Mounting the Fuel Tank: Z22935
or
Main Switch Cabinet for electric Driven Unit

2. Clean the contact surfaces between the superstructure and the Fuel Tank from the anticorrosive paste with a appropriate solvent.
3. Prepare all bolts, washers and grease the threads and the washers as well as the head surface of the bolts with normal grease. Don't use special grease from swing ring connection.
3. Lift the fuel tank.
   Eyebolts are delivered with the machine.
4. Align the fuel tank to the superstructure platform and lower the fuel tank as required so that two bolts (1) M36 with sleeves (2) can be inserted.
5. Lower the fuel tank fully and insert all bolts (1/3) M30 with sleeves (2). Tighten the bolts with the resp. torque.
6. Connect fuel lines and electric cables.

- **Using slings for the heavy parts together with a chain pull (see „K") allows easy alignment.**


Hydraulic oil cooler
Hydraulic oil tank


02
04
3100Nm
2286lbs.ft
M 36
10.9
03
04
3100Nm
2286lbs.ft
M 36
10.9

Z22936

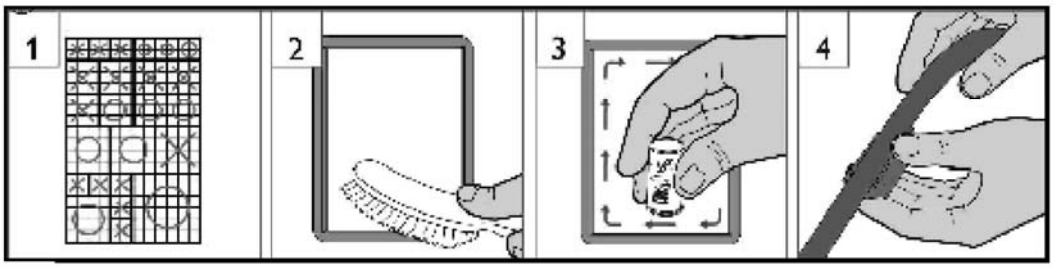
13. Mounting of Cab Support Z22936

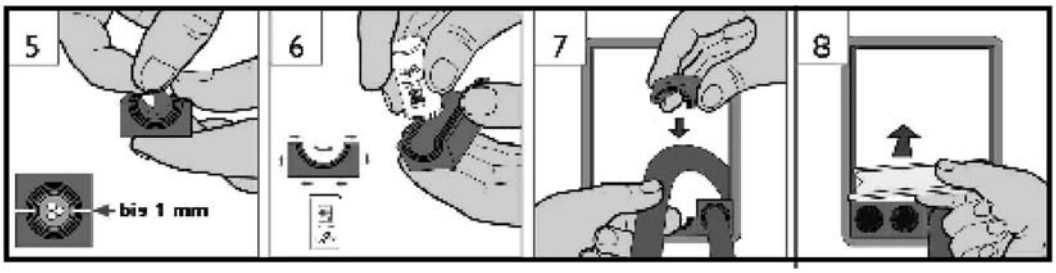
1. Lift the cab support.

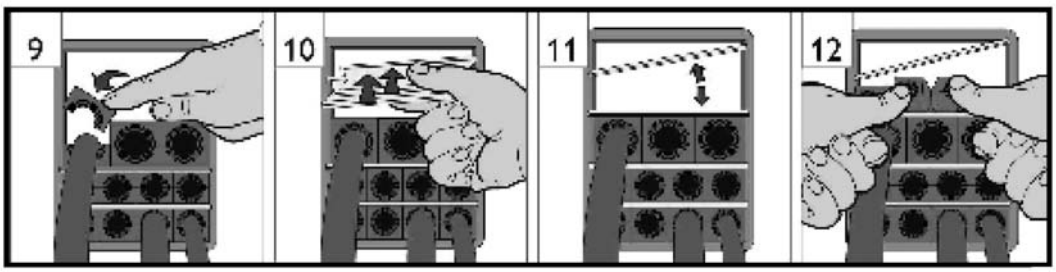
- **Using slings for the heavy parts together with a chain puller allows easy alignment.**

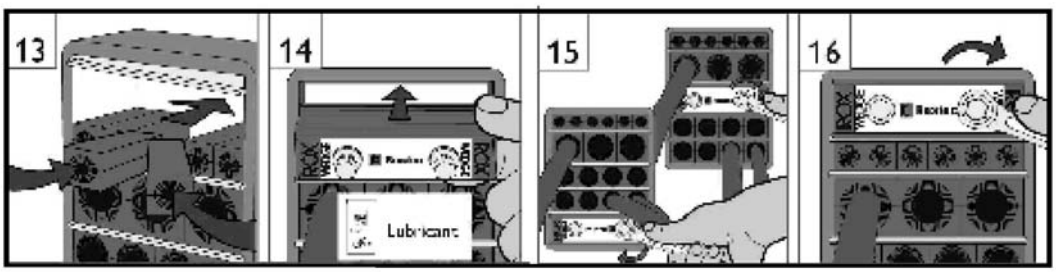
2. Align the cab support to the superstructure and lower the support as required so that two bolts (2) with washers (4) can be installed.
3. Lower the support fully and insert all bolts (3) with washers (4). Tighten the bolts with the resp. torque.

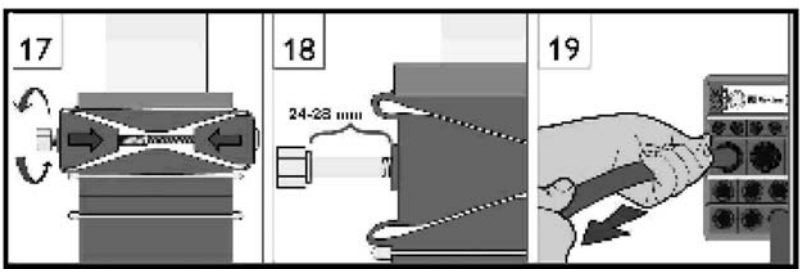
- **The special Cable Transfer Elements for sealing the cab support are stored in the cab refrigerator.**
- **Install it as shown in the pictures at the following page.**


1
2
3
4


5
bis 1 mm
6
7
8


9
10
11
12

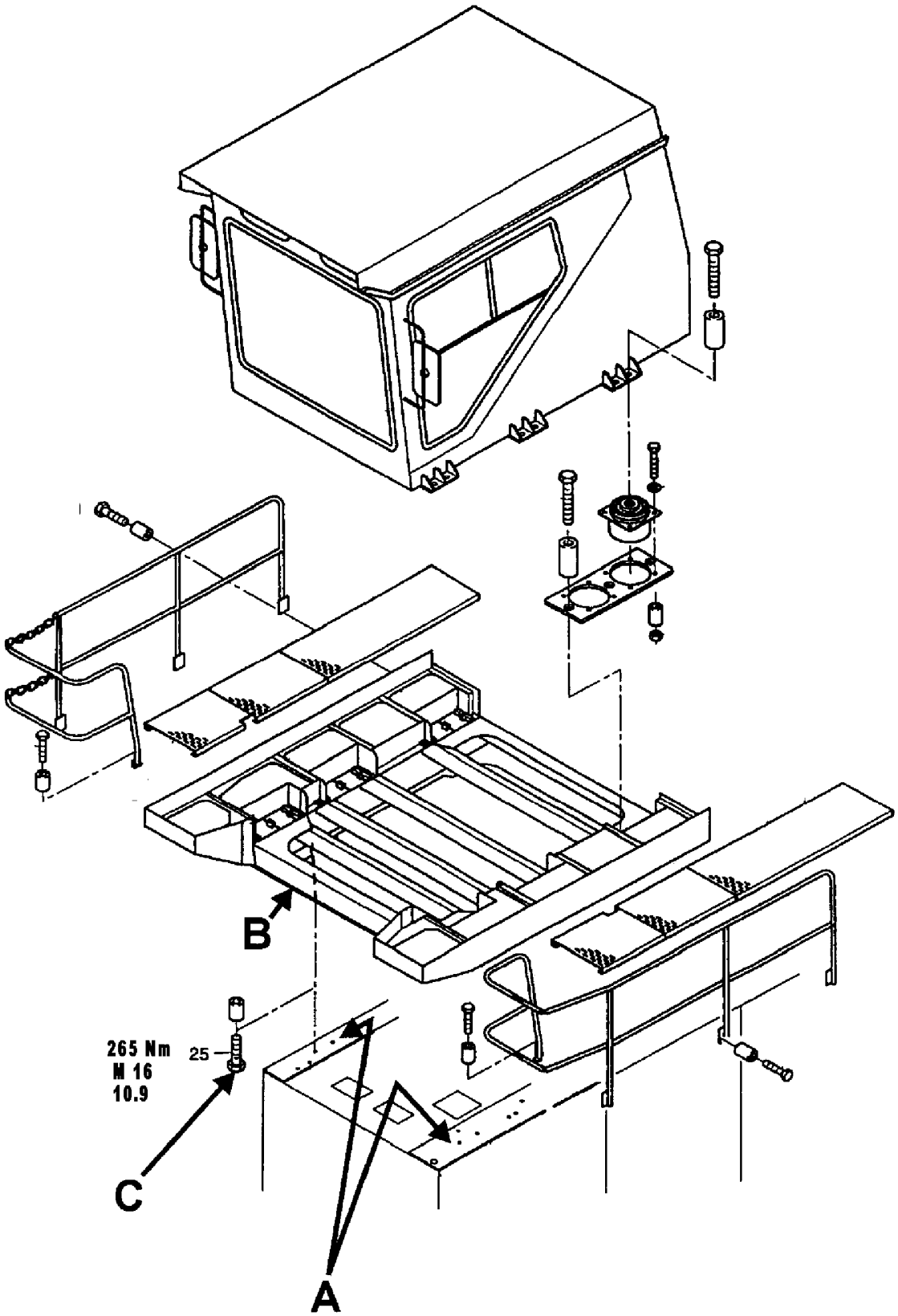

13
14
Lubricant
15
16


17
18
24-28 mm
19

Z22937

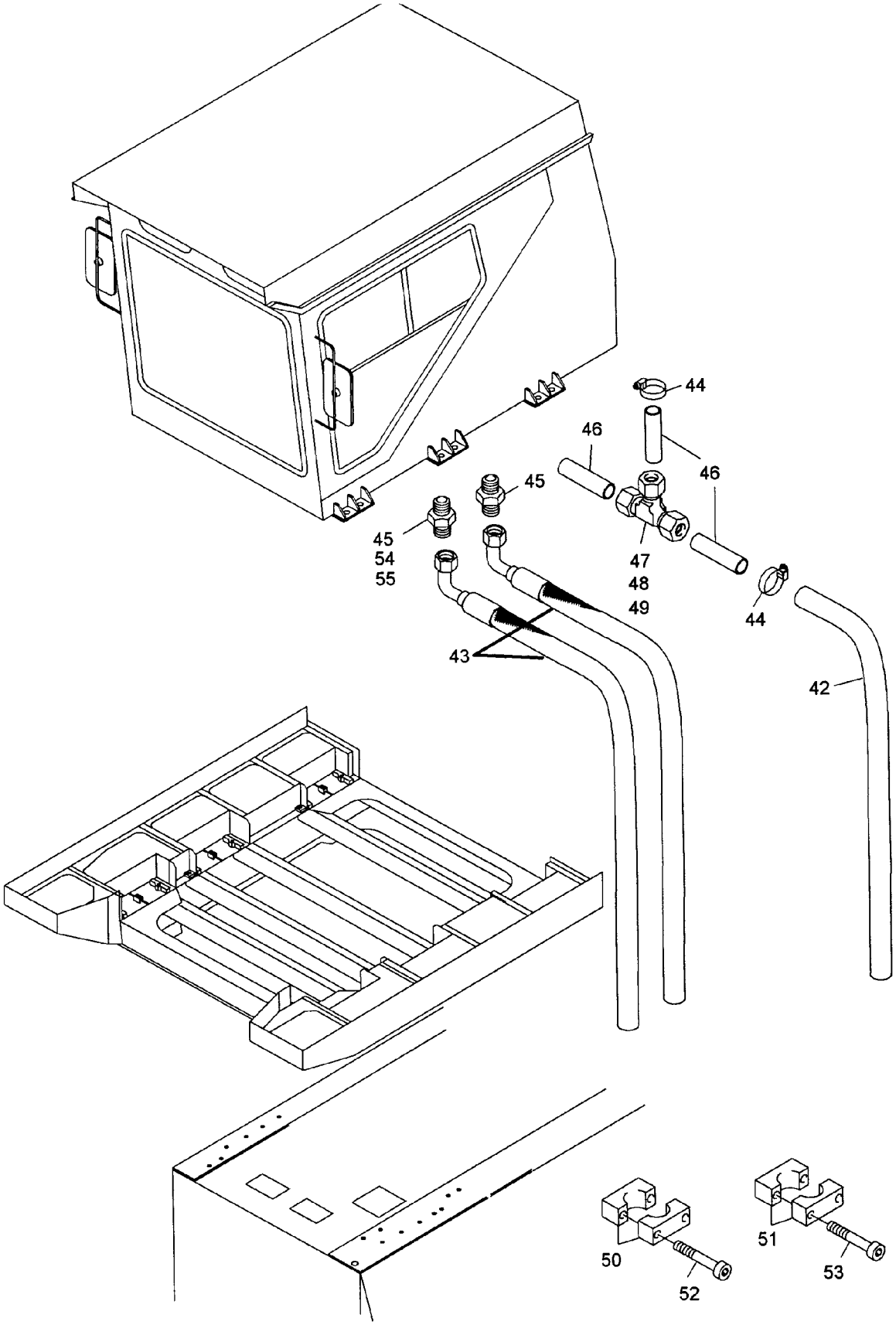
13.1 Mounting of Cable transfer to the Operators Cab Z22937

The special Cable Transfer Elements for sealing the cab are stored in the cab refrigerator.
Install it as shown in the pictures on the previous pages.



Z22938

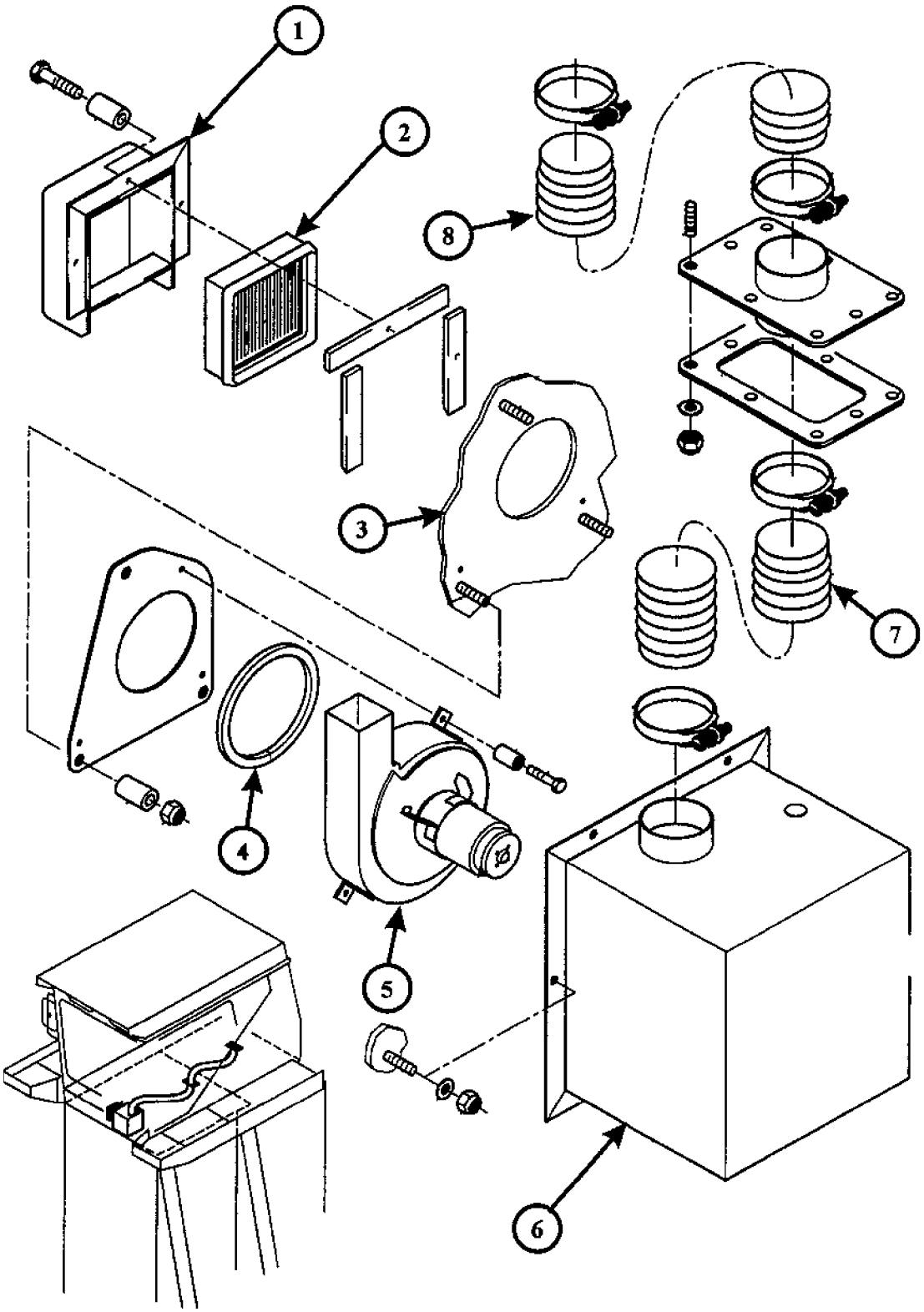
- **Before lowering the cab onto the cab base mount the air hose to cab bottom.**
  Refer to Illust. 22940 pos. (8) page 66.



Z22939

14. Mounting of Operator's Cab Z22938; Z22939

1. Apply sealing compound " Epple 28" onto the whole contact surfaces (A) of the cab base. The sealing compound is delivered with the machine in a 1 liter can.
2. Lift the cab.
   Eyebolts are delivered with the machine.
3. Align the cab support frame (B) with the cab base contact surfaces (A).
4. Lower the cab support frame onto cab base.
5. Apply "Loctite 222" onto the thread of all mounting bolts (C) and fasten the cab support frame (B) with bolts (C) and resilient sleeves onto the cab base. Loctite 222 is delivered with the machine in a 250 ml tube.
6. Mount the handrails to the cab support frame
7. Mount the hoses for the cab water heating.



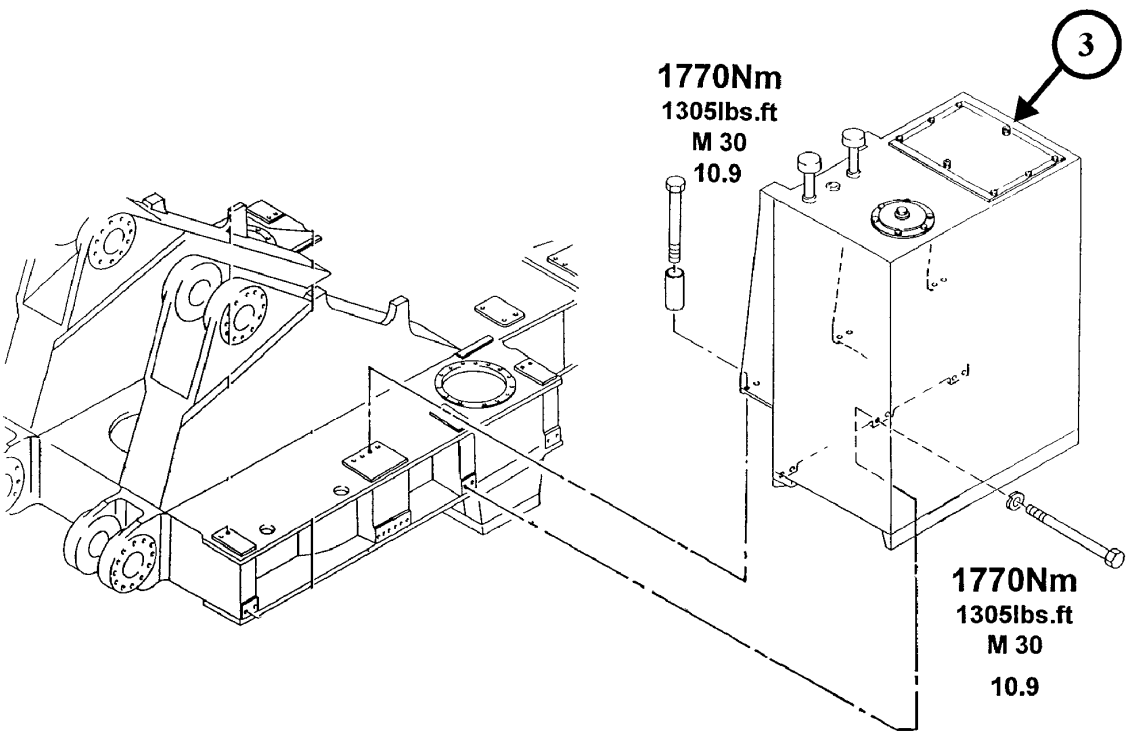
Z22940

14.1 Mounting of the Cab air cleaner (Cab support to Cab) Z22940

Legend for illustration Z22940

1. Air cleaner housing located on cab base
2. Filter element
3. Cab base wall
4. Seal ring
5. Cab blower
6. Blower housing
7. Air hose to base roof
8. Air hose to cab bottom

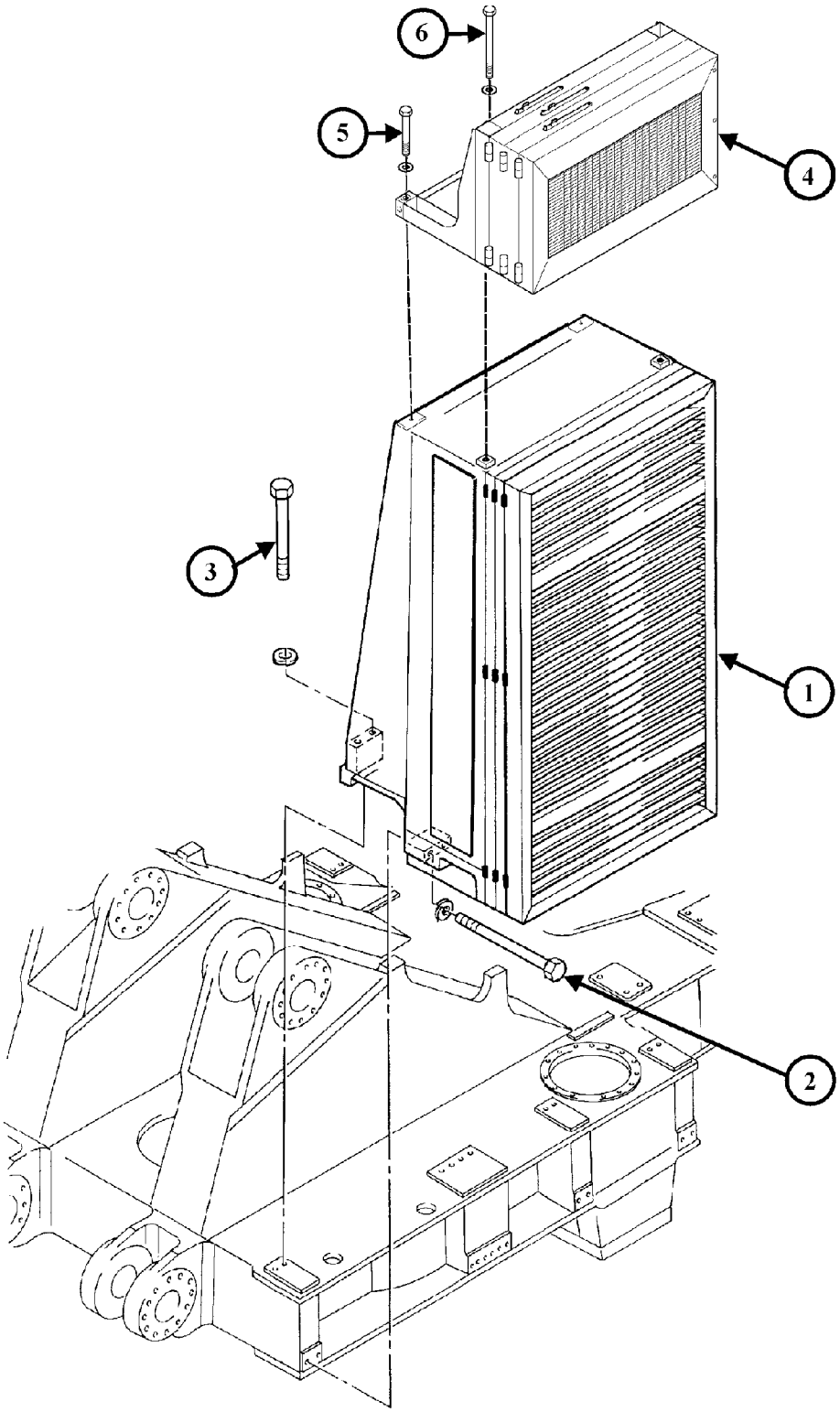
Connect the Cap air cleaner as shown at drawing Z22940.



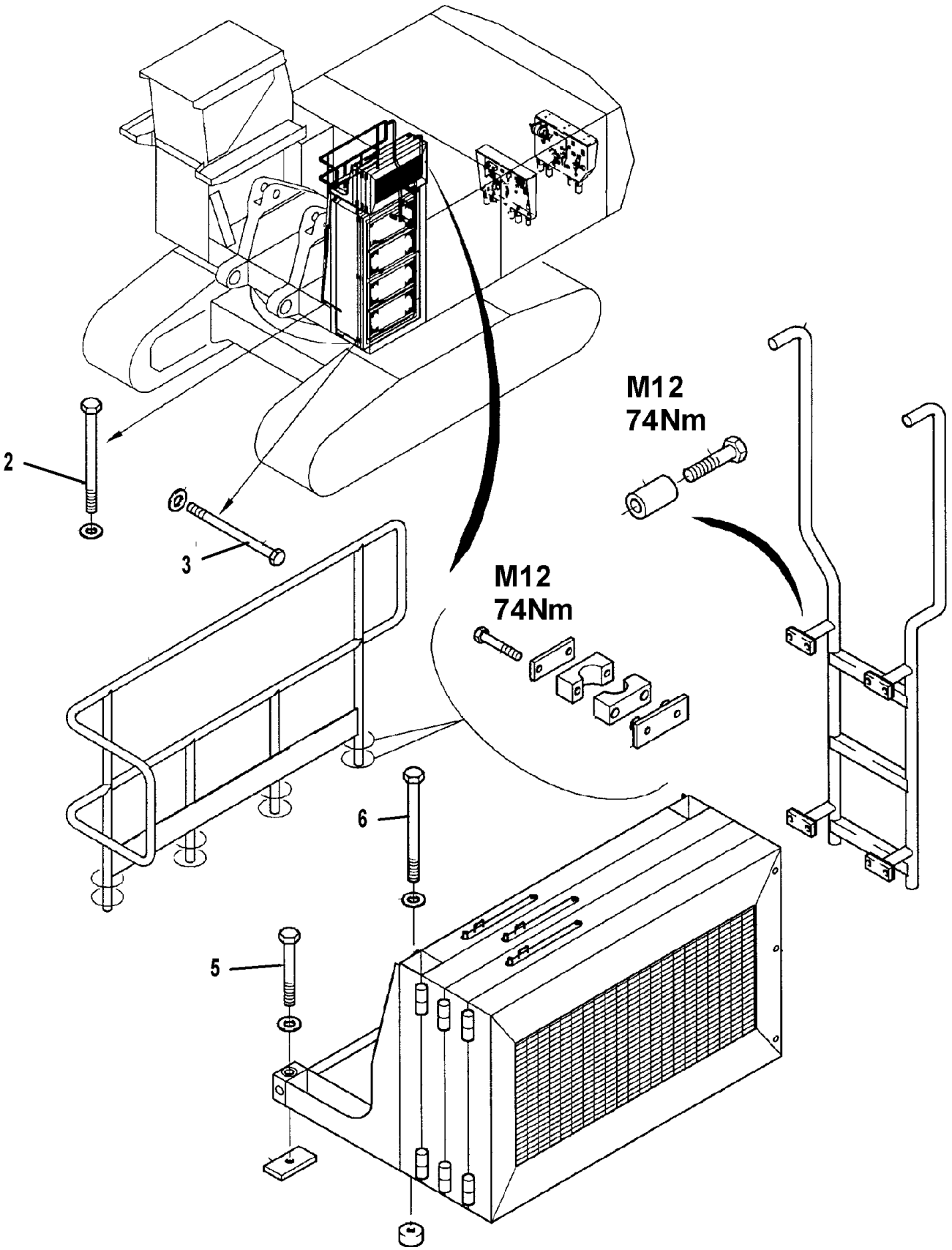
Z22941

15. Mounting of Hydraulic Oil Tank Z22941

1. Attach the crane to the hydraulic oil tank.
2. Clean the contact surfaces between the superstructure and the Hydraulic Oil Tank from the anticorrosive paste with a appropriate solvent.
3. Prepare all bolts, washers and grease the threads and the washers as well as the head surface of the bolts with normal grease. Don’t use special grease from swing ring connection.
4. Lift the Hydraulic Oil Tank.
   Eyebolts are delivered with the machine.
5. Align the Hydraulic Oil Tank with the superstructure.
6. Lower the Hydraulic Oil Tank fully down and install all bolts.
   Tighten the bolts with the resp. torque.
7. Connect all hoses, pipes and electric cables.



Z22942



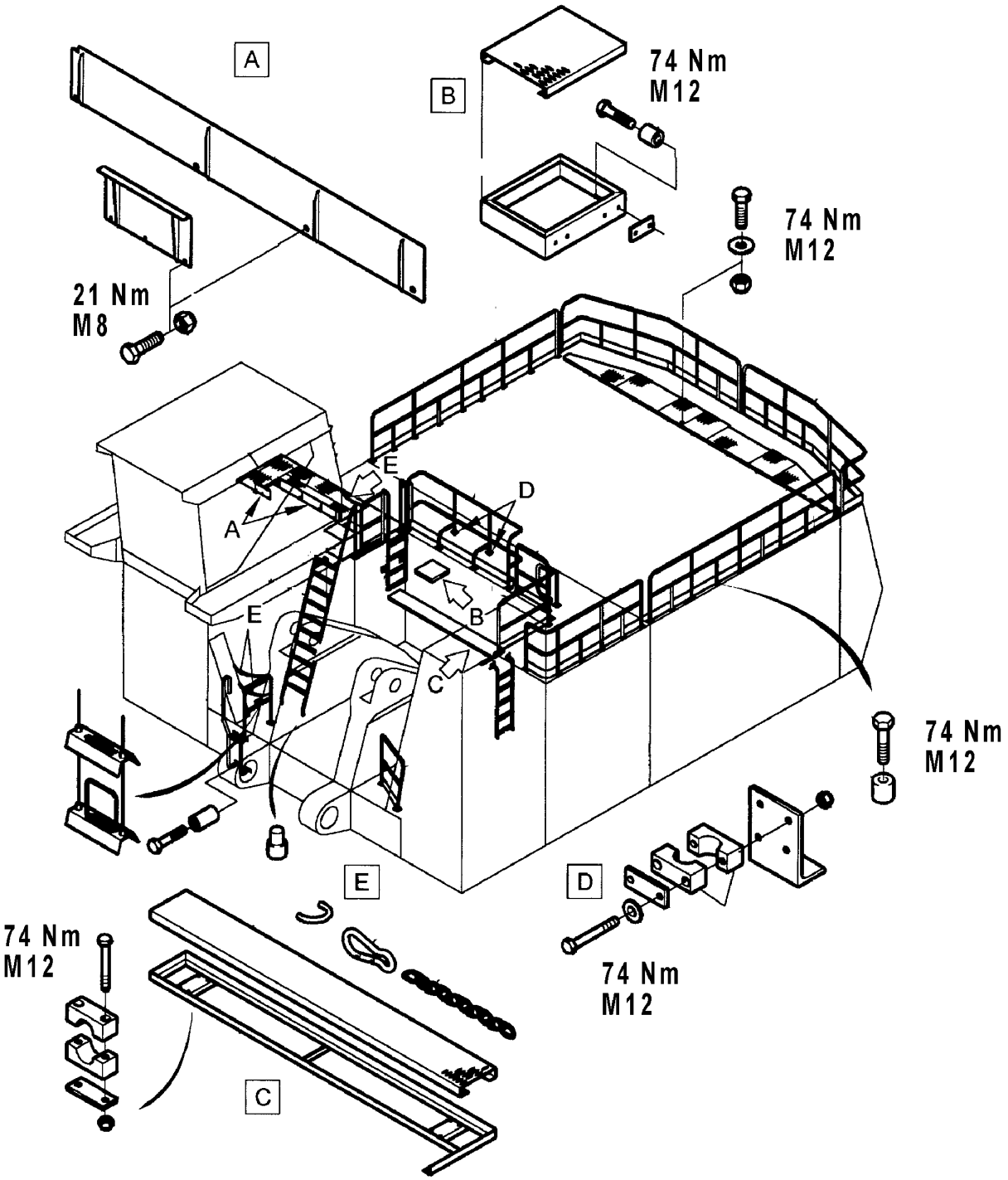
Z22943

16. Mounting of Hydraulic Oil Coolers Z22942; Z22943

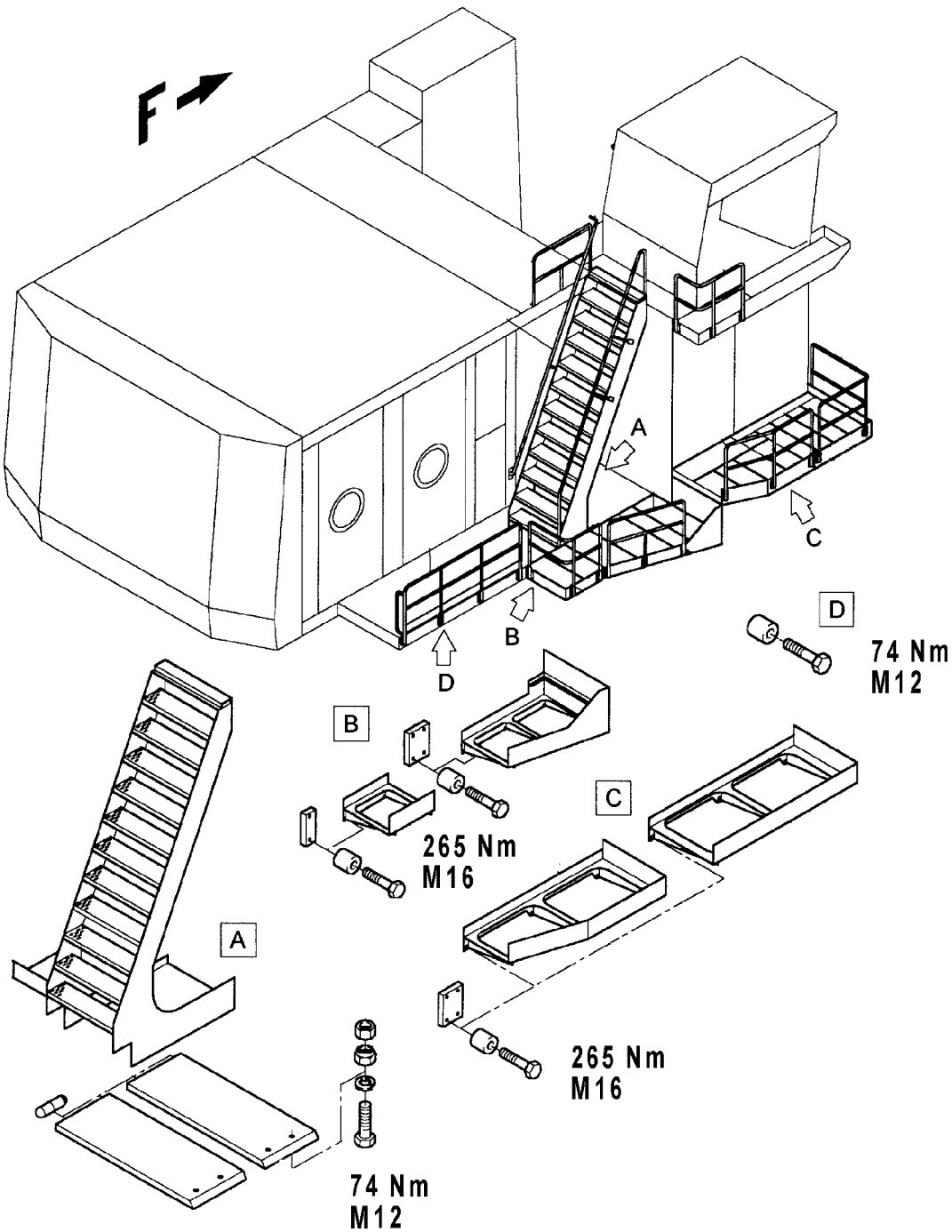
1. Attach the crane to the hydraulic oil cooler. Eyebolts are delivered with the machine.
2. Clean the contact surfaces between the superstructure and the Hydraulic Oil Cooler from the anticorrosive paste with a appropriate solvent.
3. Prepare all bolts, washers and grease the threads and the washers as well as the head surface of the bolts with normal grease. Don't use special grease from swing ring connection.
4. Lift the Hydraulic Oil Cooler (1).
5. Align the Hydraulic Oil Cooler with the superstructure.
   (Pay attention to the location of the hydraulic lines!)
6. Lower the Hydraulic Oil Cooler fully down and install all bolts (2) + (3). Tighten the bolts with the resp. torque.
7. Lift the additional hydraulic oil coolers (4) and align with thread bores on the hydraulic oil coolers (1).
8. Install the mounting bolts (5) + (6) and tighten.

Reference No.:	Bolt size mm	Grade	SW * mm	Tightening torque Nm	Qty.
(2)	M36	10.9	55	3100	4
(3)	M36	10.9	55	3100	4
(5)	M36	10.9	55	3100	2
(6)	M36	10.9	55	3100	2

* SW = Wrench size


A
B
74 Nm
M12
74 Nm
M12
21 Nm
M8
E
D
A
E
B
C
74 Nm
M12
E
D
74 Nm
M12
74 Nm
M12
C

Z22944

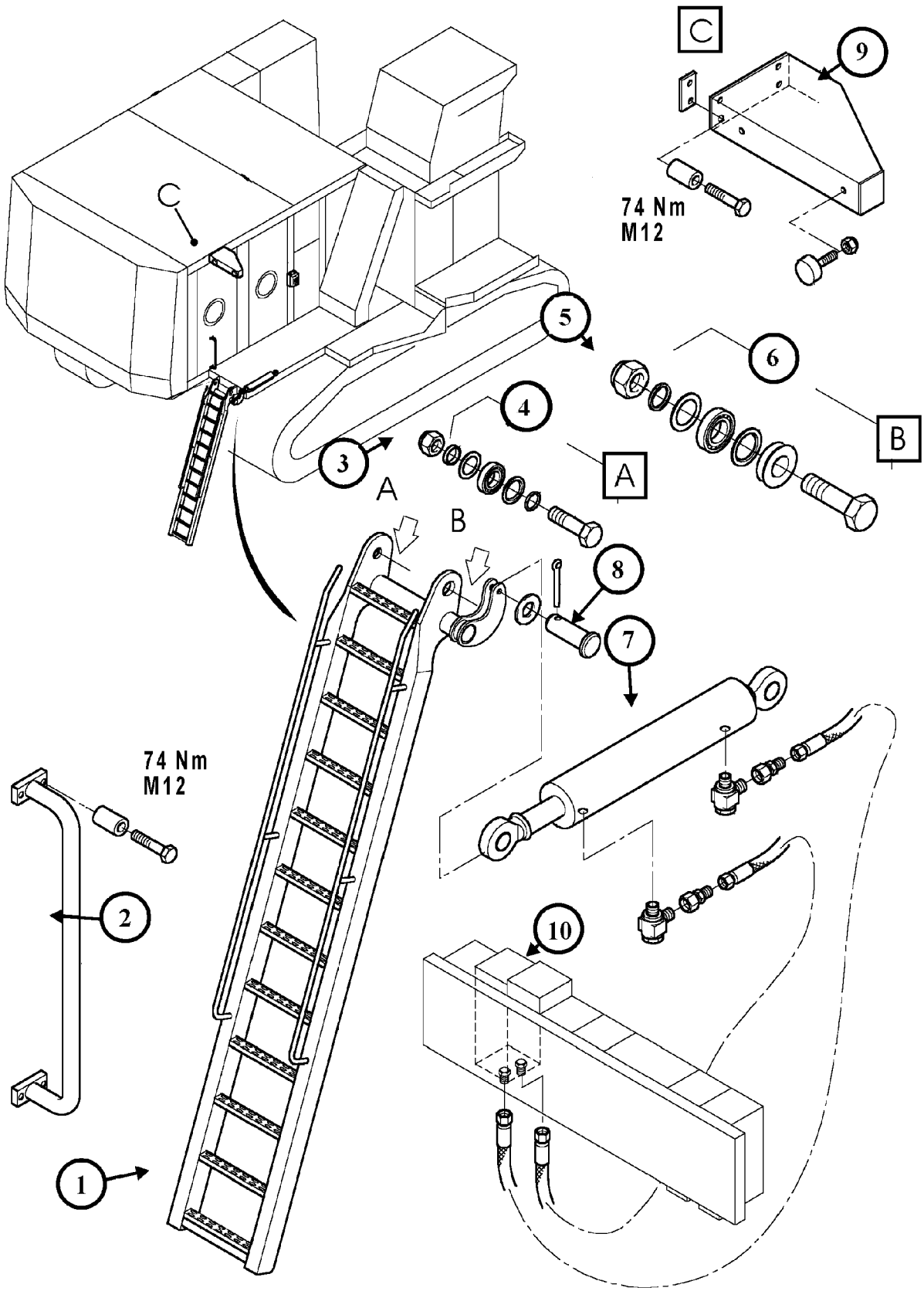


Z22945

17. Mounting Hand Rails, Cat Walks, Steps, Stairs and Ladders: Z22944; Z22945

Install all handrails, cat walks, steps and small ladders by means of bolts and distance sleeves with the resp. torque.

- **Clean the contact surfaces between handrail flange and mounting flange from the anticorrosive paste and paint.**



Z22946

18. Install the hydraulic access ladder Z22946

Legend

1. Access ladder
2. Hand rail
3. Self locking nut (M24) for LH bearing assembly (4)
4. LH bearing assembly
5. Self locking nut (M39) for RH bearing assembly (6)
6. RH bearing assembly
7. Ladder lifting cylinder
8. Pivot pin
9. Stop bar
10. Valve bank in machinery house

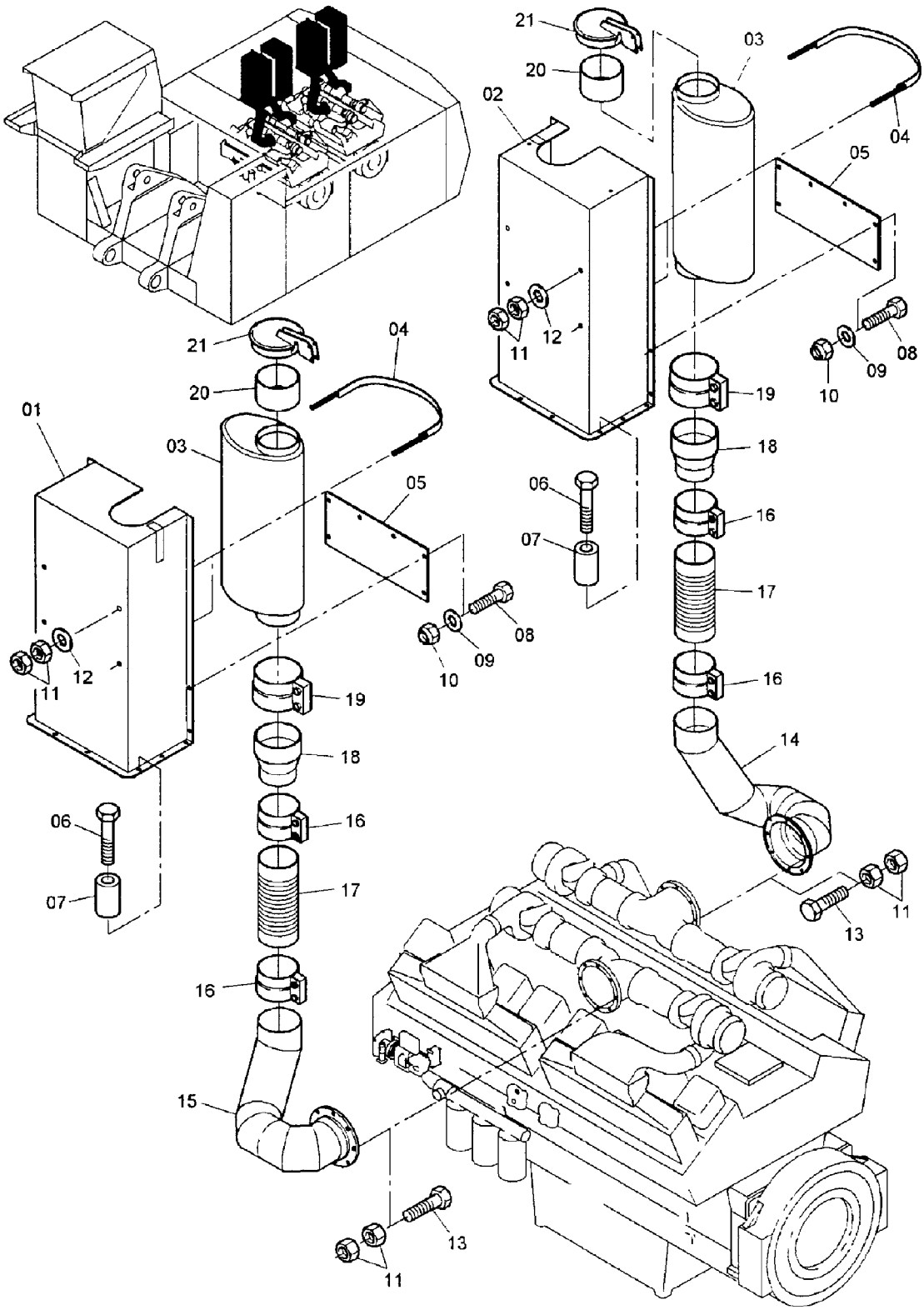
Mount hinged ladder (1)
Connect ladder lifting cylinder (7)
Assemble ladder bearings (A) and (B)
Tighten the self locking nuts (3) and (5) according to the values listed below.

Tightening Procedure for Self Locking Nuts (3 and 5):
Screw on the nuts until they have contact with the ladder carrier frame.
Then tighten the nuts further by turning them through an angle of 45° (1/8 turn).

Clamping Torque of Self Locking Nut (3): New nut: 106 Nm
Used nut: 12 Nm minimum
Clamping Torque of Self Locking Nut (5): New nut: 200 Nm
Used nut: 20 Nm minimum

If the clamping torque of nuts (3 and 5) is less than the minimum required value, replace them with new self locking nuts.
Lubricate both eyes of hydraulic cylinder (7). Make sure both pivot pins (8) are properly secured with cotter pins.

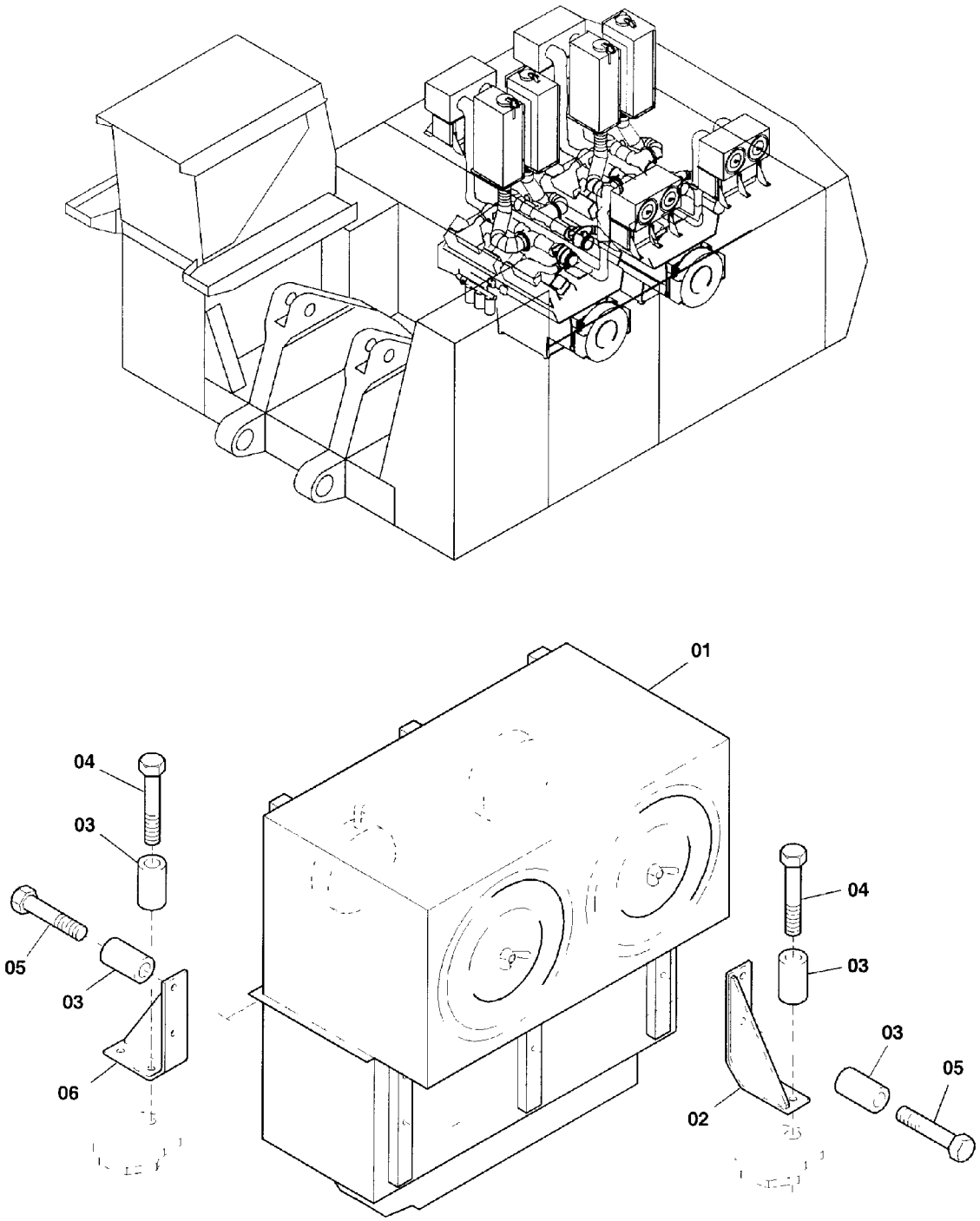
If the torque load is not stated otherwise refer to standard torque chart for torque data.
Insert bolts with Multi-Purpose Grease MPG, KP2K on thread and head.
When selecting the tightening torque observe quality grade and bolt size.



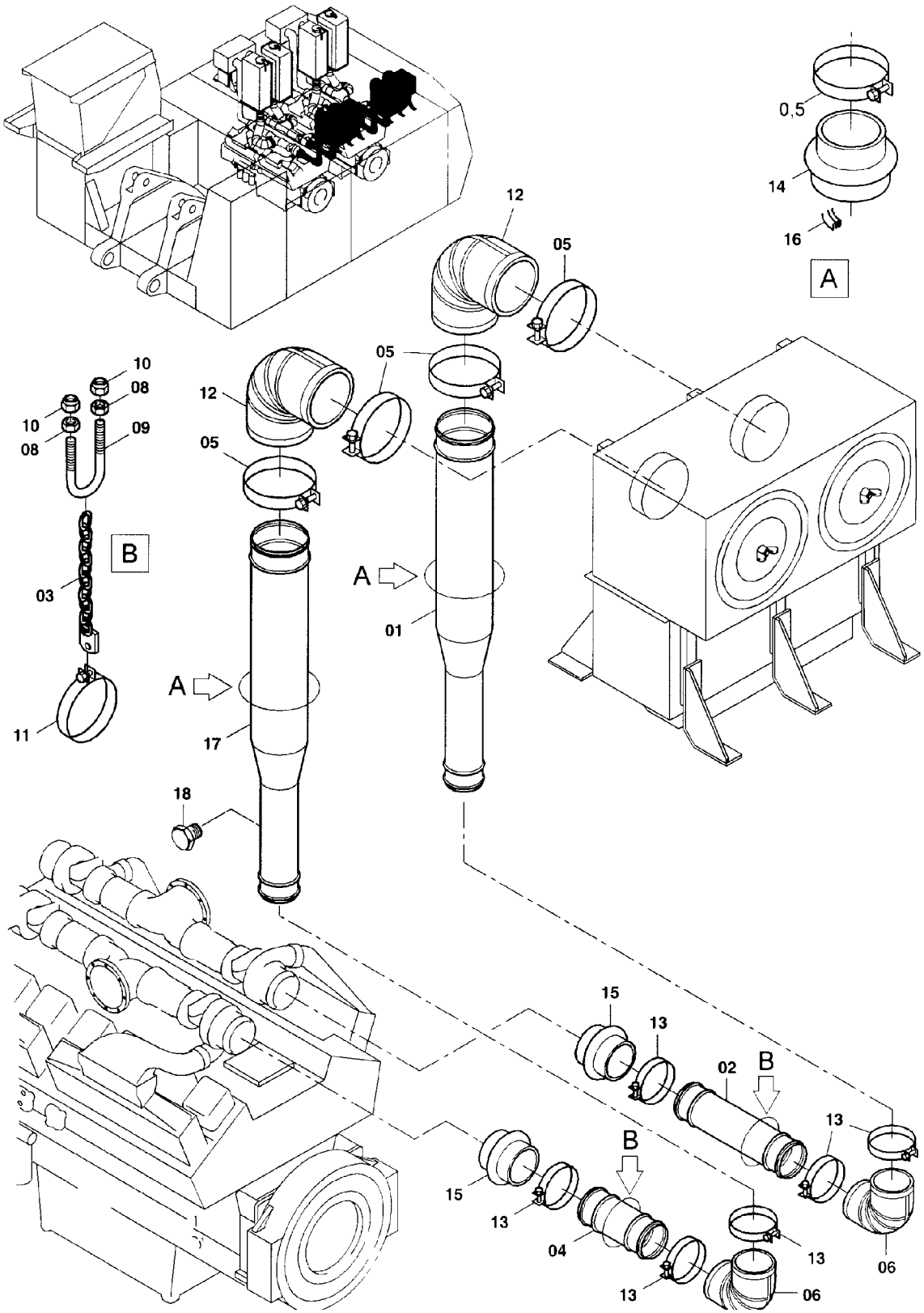
Z22928

19. Installation of Muffler assy, and Cover: Z22928

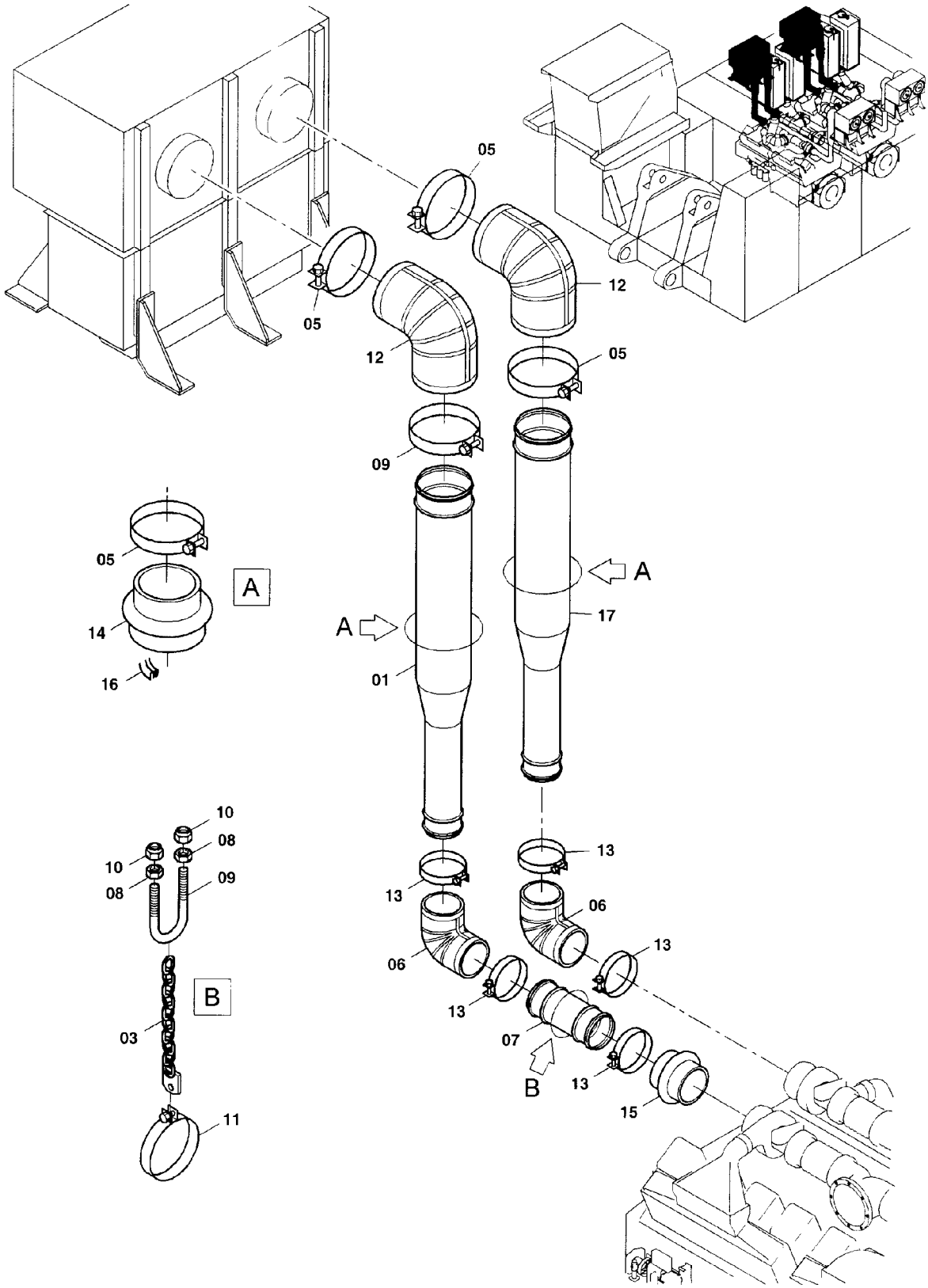
1. Install mufflers assy. according to drawing beside.



Z22929



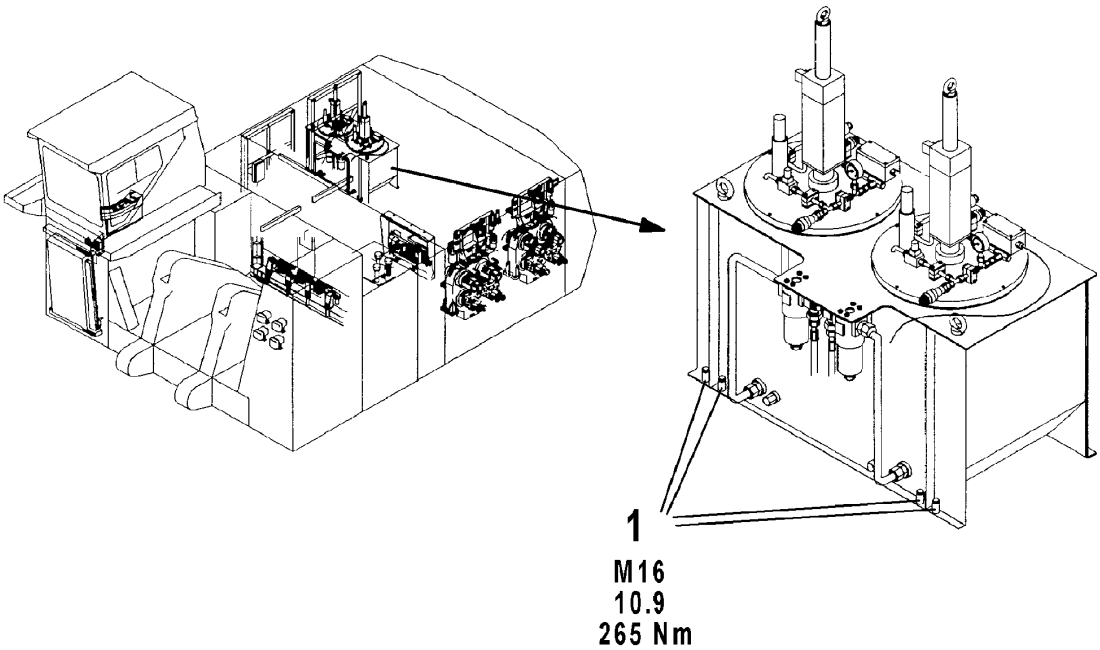
Z22930


05
12
05
12
05
09
05
14
16
A
A
A
17
01
10
08
10
08
09
B
03
11
13
13
06
06
13
13
07
B
13
15

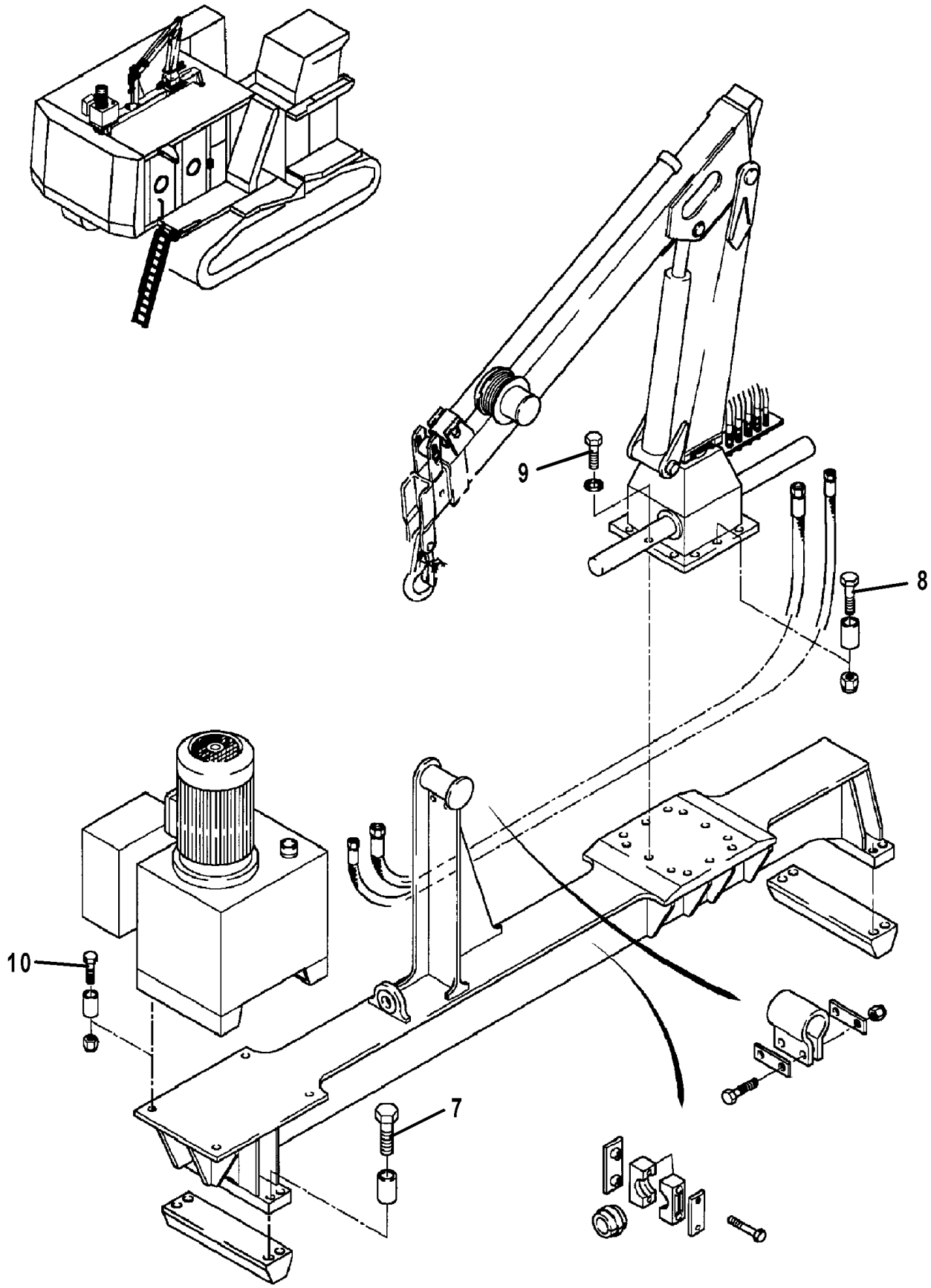
Z22931

20. Installation of Air Filters: Z22929 - Z22931

1. Install air filters according to drawings on the previous pages.



Z22947



Z22948

21. Installation of Lubrication Station and auxiliary Crane Z22947; Z22948

1. Lift the lubrication station in its position on the machine house deck and fasten it with the bolts and distance sleeves.
2. Lift auxiliary crane on top of machine and fasten with the bolts and distance sleeves as shown.
3. Tighten all bolts with the resp. torque, hook up all hydraulic and electric connections.

Reference No.:	Bolt size mm	Grade	SW * mm	Tightening torque Nm	Qty.
(7)	M24	10.9	36	880	8
(8)	M20	10.9	30	510	10
(9)	M20	10.9	30	510	2
(10)	M12	8.8	19	74	16

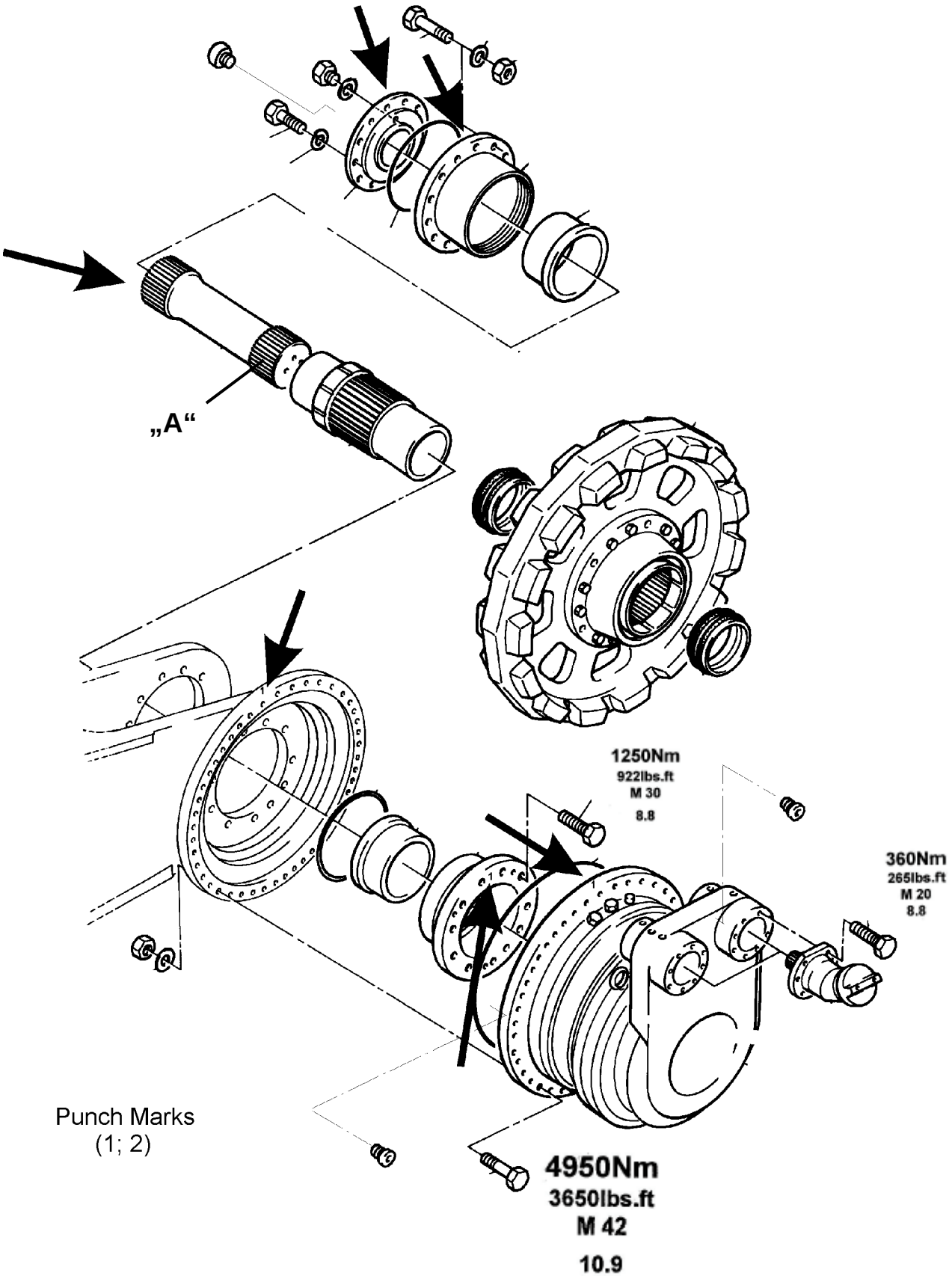
22. Connection of cable harnesses to the X - boards

1. Connect the cables to the junction board X2 as shown at the following pages.
2. Connect the cables to the junction box X3 at the tank.
3. Connect the plug connections and cables below the cab support.
4. Connect two battery cables from switch cabinet (cab support) to engine house roof (option electric driven machines).
5. Connect all cables for different working lights.

- **Electric Driven Machines only.**
  This must be done by authorized personnel only.

6. Connect cables from medium voltage cabinet into high voltage cabinet.
7. Connect high voltage cables.

   7.1a From slip ring into high voltage cabinet
   7.2 From slip ring into cable reel unit junction box
   7.3a From high voltage switch cabinet to electric motor (connection box)
   7.4 From power supply into cable reel unit.
   This can be done only from mine site personnel.


„A“
1250Nm
922lbs.ft
M 30
8.8
360Nm
265lbs.ft
M 20
8.8
Punch Marks
(1; 2)
4950Nm
3650lbs.ft
M 42
10.9

Z22921

6. Mounting of Slew Ring underneath the Superstructure Platform: Z22922

- Take the 8 slew ring bolts for determination of the tightening torque from the box and store them separately. (Identification of this bolts, Bolt head has a center bore).
- Weld the test block for determination of the tightening torque to a heavy steel plate (approx. 500 x 700 x 25 mm).
- Open the transport box for the slewring and lift them with the 4 attached eye bolts and the transport cross still in place, on a approx. 90 cm (3 feet) high wooden stack
- Place the slewring on the wooden stack that the S+SS marking points 90° to the left in travel direction. The wooden stack should be placed not further then 2 meters away from the assembled undercarriage.
- Clean the contact surface on slewring to be absolutely grease free and dry.
- Attach lifting ropes as shown in the sketch on previous page.
- Lift superstructure platform by means of two cranes and clean contact surface to be absolutely grease free and dry.
- Swing platform over the slewring and lower until the two contact surfaces are still 5 - 6 mm apart, then support the platform with additional wooden stacks (do not rest the platform on slewring, and do not unhook from the cranes while working underneath).
- With the help of all mounting bolts pull up the slewring against the superstructure.
- In case it is necessary to turn the swing gear pinion use a porto power pump for releasing the slew parking brakes. Do not apply more than 50 bar of pressure or this may destroy the seals in the brake cylinder. The hydraulic lines of all swing motors have to be opened.
- The backlashes at the swing gears are preadjusted at works by using the guides (Z22922). Proceed „Backlash Adjustment“ as specified in the service bulletin (AH00511a) if necessary.
- Check if the „S“ position of the inner and outer ring of the slew ring is correct. (Ref. Service Bulletin AH00511a). Turn the ring if necessary.

- **Make sure that all bolts are mounted with spacers or hard surface washers.**
  Lubricate contact surface area on bolt head and thread with the factory delivered grease.

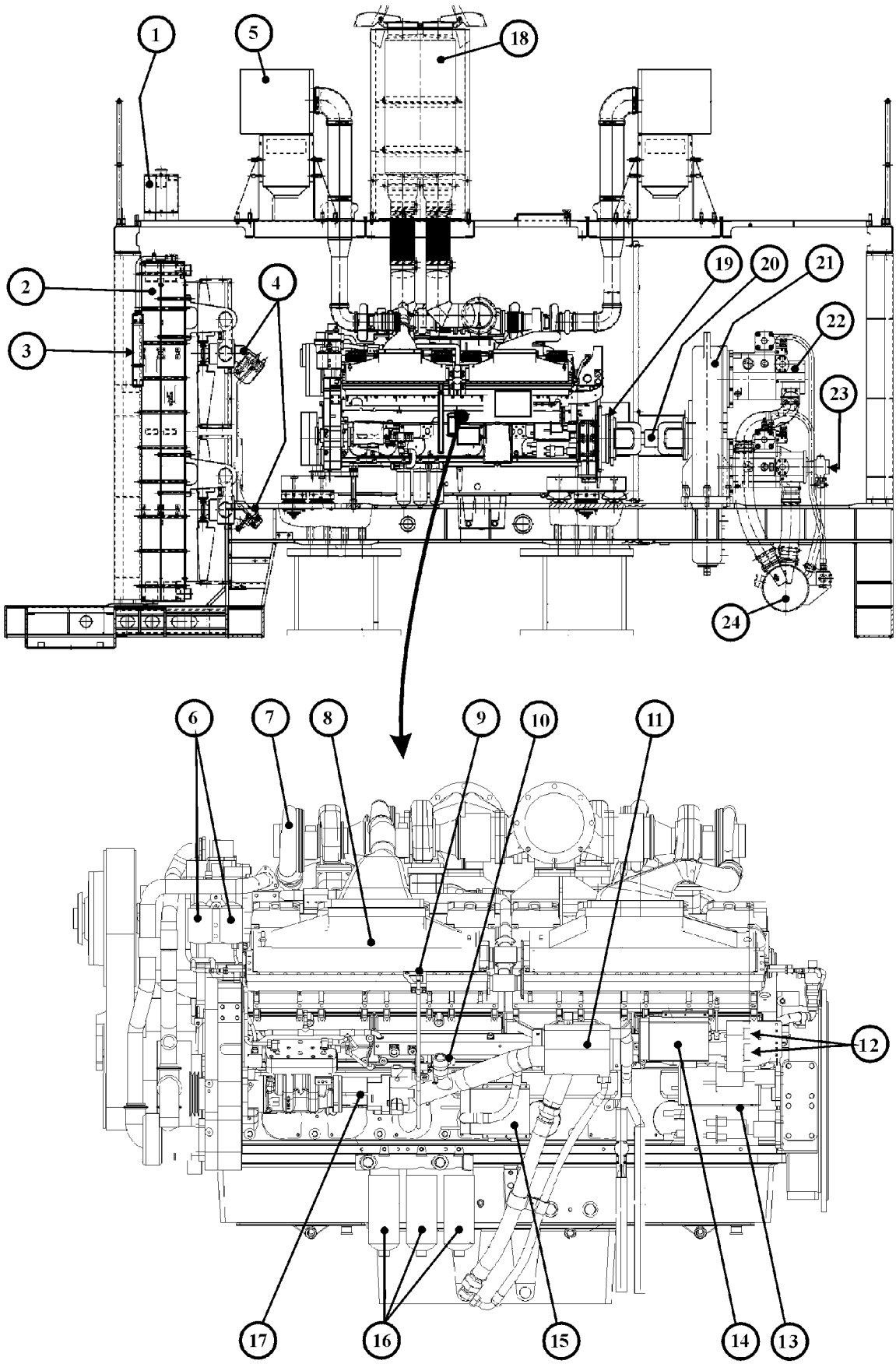
- Tighten all slewring bolts with the special determined torque.
  Refer to Service Bulletin AH00511a.
- Clean the surface of all teeth of the slew ring carefully and lubricate it by hand with the special grease for the slew ring lubrication system.
- Connect all grease lines.
- Install the dummy wheels.

7.1 Rotary Distributor Z22924

Ports:

A - D	Service lines
F	Grease
L	Leak (case drain) oil
ST	Control oil
K1/K2	Return oil to tank

- **Torques for flange connections refer to page 148.**



Z22927

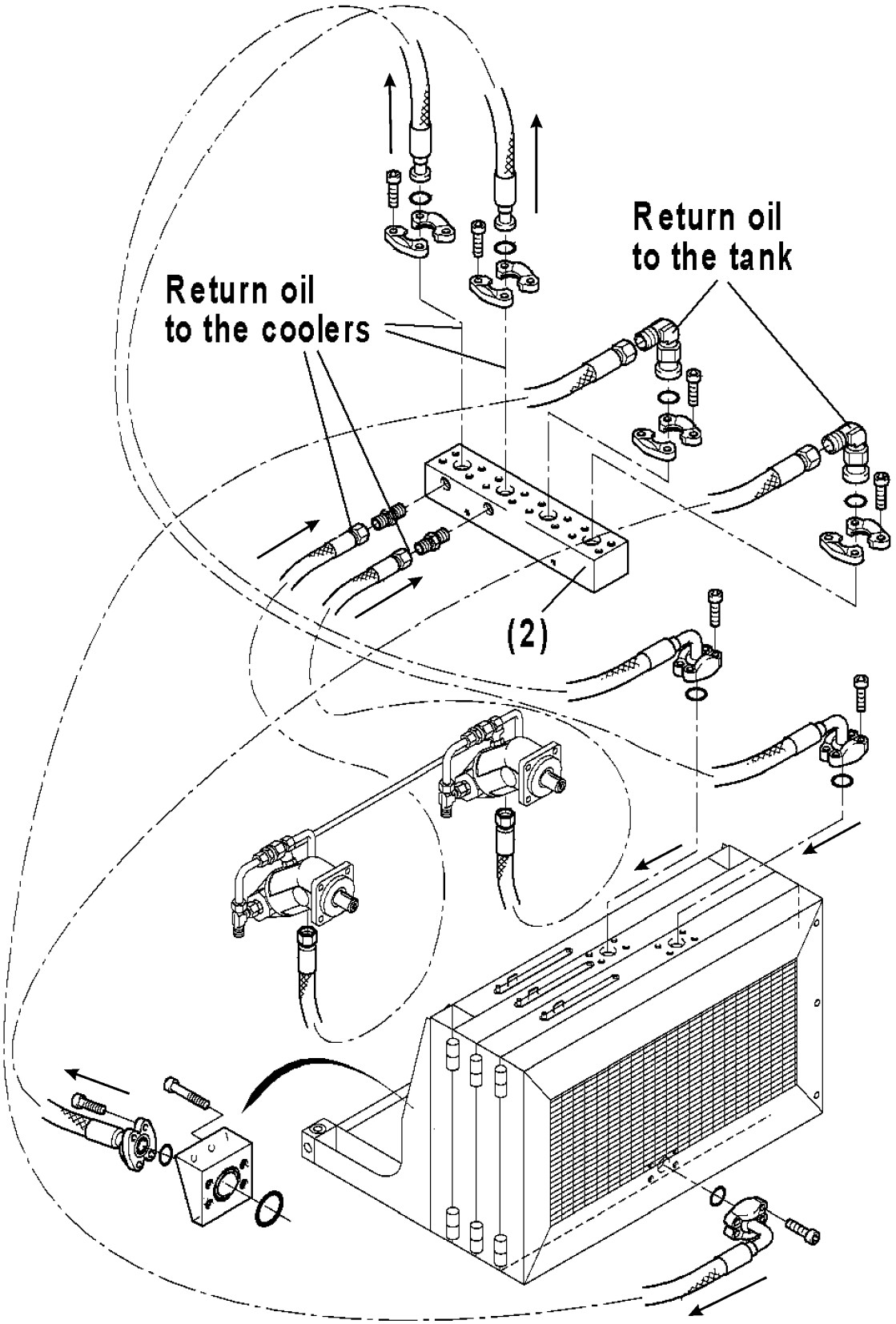
23. Installation of Hose connections on Hydr. Tank and Hydr. Oil Coolers: Z22949; Z22950

1. Connect hydraulic hoses coming from the cooler to the hydraulic tank (C + F) (Z 20573a1).
2. Connect hydraulic hoses (L20 + L22, L23 - 26 and L28 - L32) to the return oil collector (R).
3. Mount compensator (8) to the tube (3).

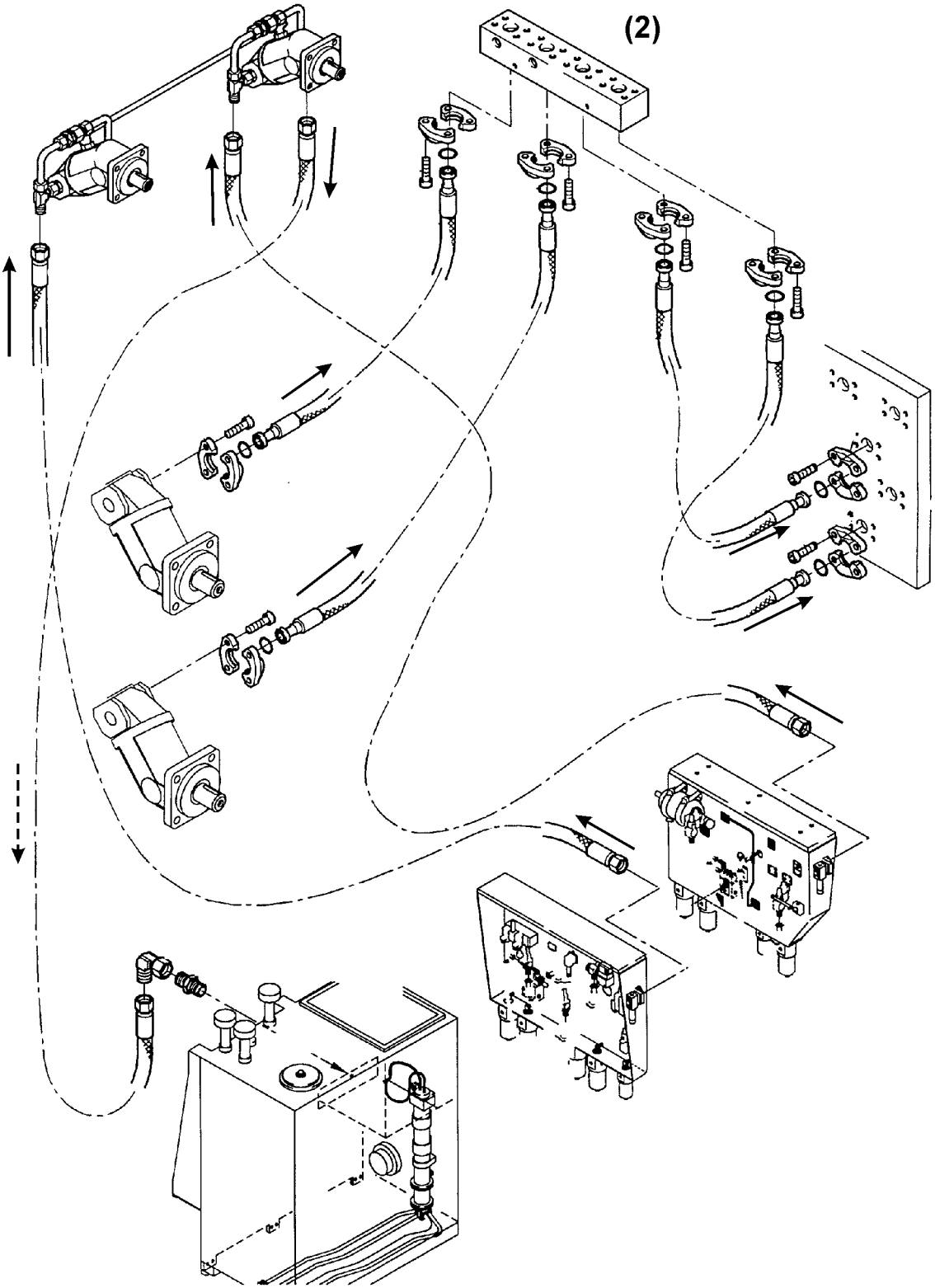
Do not damage the gaskets and the surfaces.

4. Tightening torque for the self-locking nuts at the compensator (8) approximately 85 Nm, so that the resulting gap between the flanges on both sides is equal.
5. Connect all remaining return lines to the tank (refer to hydraulic circuit diagram).

- **Torques for flange connections refer to page 148.**



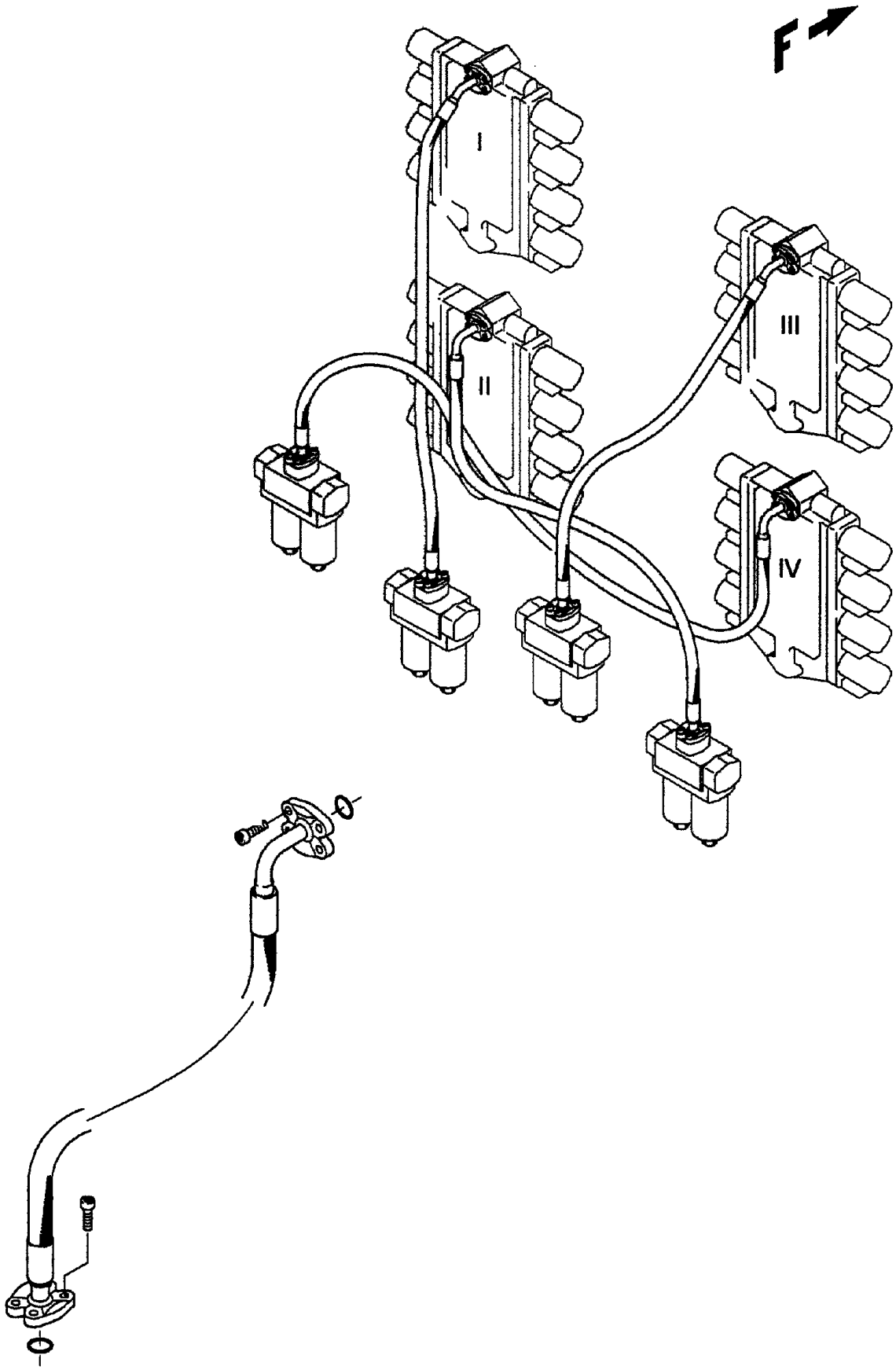
Z22951



Z22952

23.1 Installation of Hose connections on Auxiliary Hydraulic Oil Cooler (Z22951 and Z22952)

Install the hoses by using the drawings Z22951; Z22952 and the hydraulic circuit diagrams.



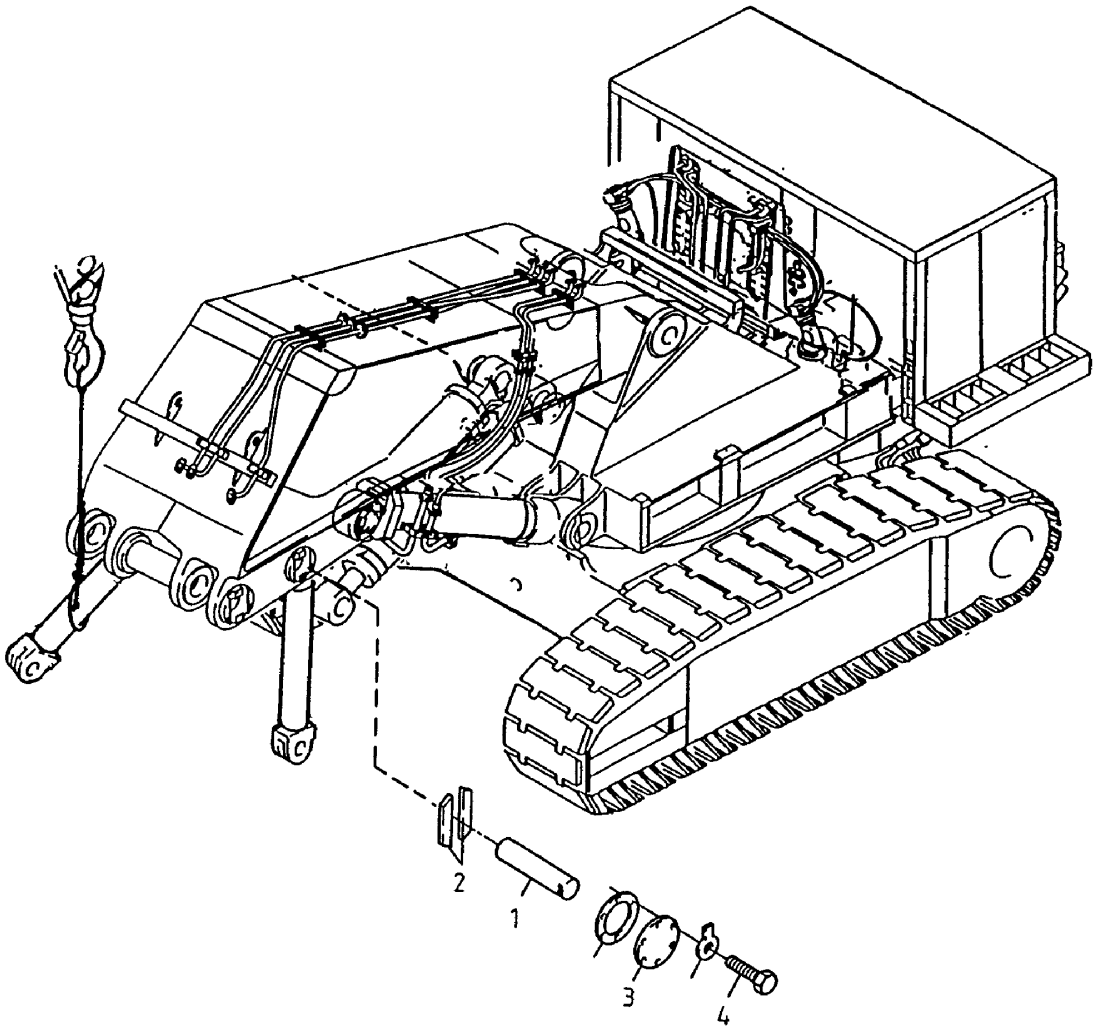
Z22953

24. Installation of HP- Hoses in between HP - Filters and Main Valve Blocks: Z22953

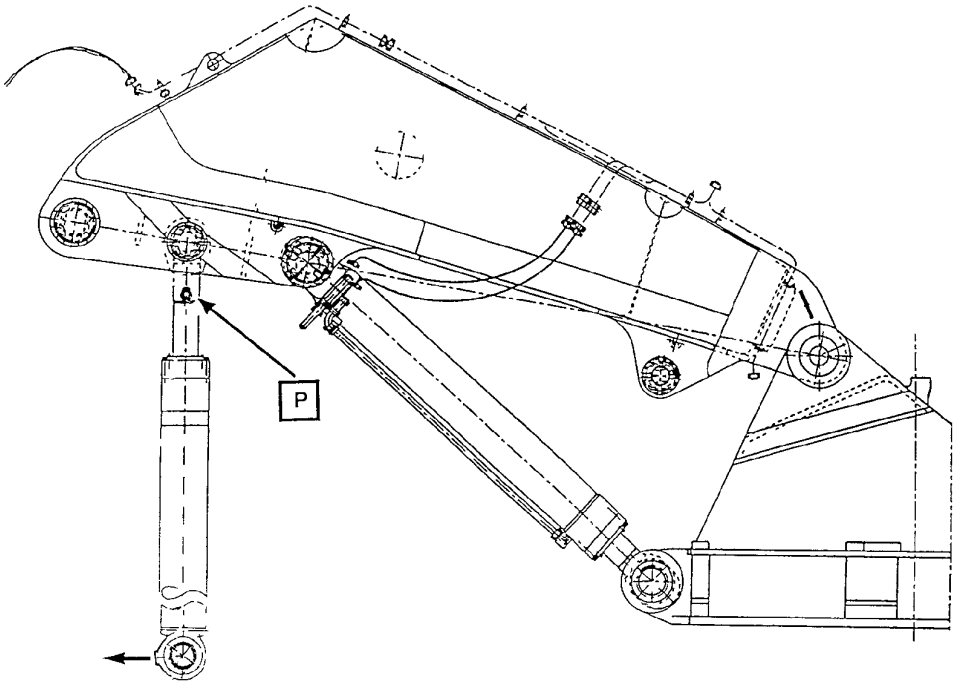
1. Install all high pressure hoses (HP) between the high pressure filters and the main valve blocks.

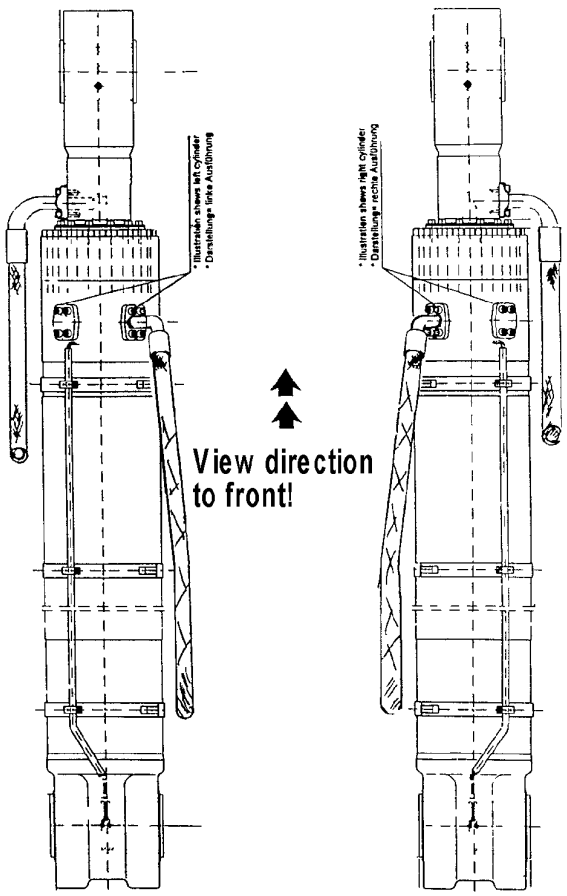
2. Tighten bolts to the resp. torque.

- **Torques for flange connections refer to page 148.**



Z22954



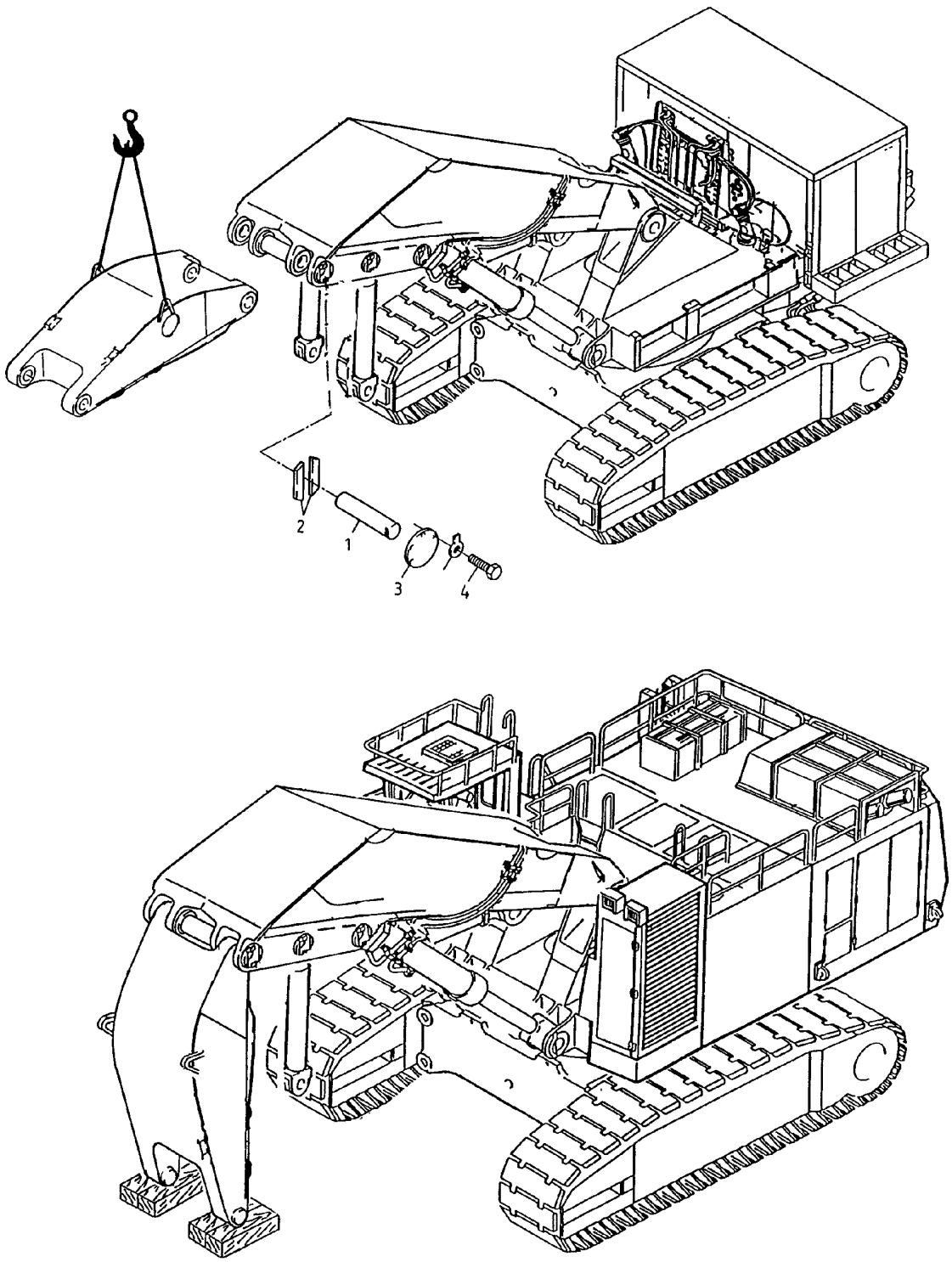


Z22955

25. Mounting of Bucket Cylinders : Z22954; Z22955

- **For the mounting of the pin seals please refer to page 130.**

1. Hook up bucket cylinders that way that rod side shows approx. 45° up to the bearings at the boom.
2. Align the rod eyes with borings at the boom.
3. Pay attention that the port for the hydraulic line to the piston side (P) shows outside.
4. Install pin (1).
5. Install axle stirrup (2).
6. Install shackle (3) with washer (04) and bolt (5).

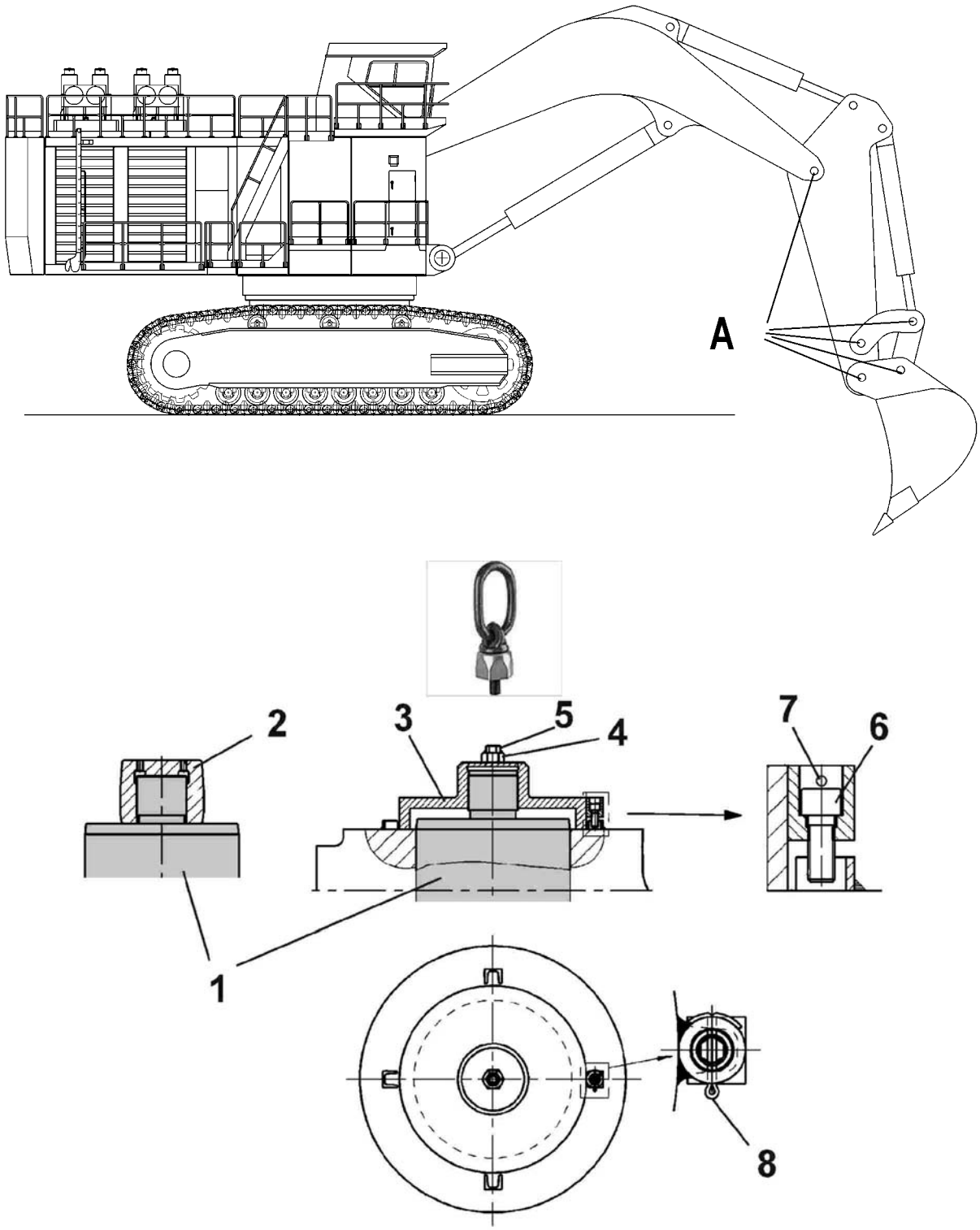


Z22956

26. Mounting of Stick: Z22956

- **For the mounting of the pin seals please refer to page 130.**

1. The boom must be in lower position.
2. Lift the stick to the boom and align stick and boom borings.
3. Install pin (1), strippups (2), plate (3) , washer and bolt (4).
4. Lower the stick by means of crane and place lower end onto some wooden blocks.



Z22989

26.1 Mounting of Stick: Z22989 (Backhoe attachment)

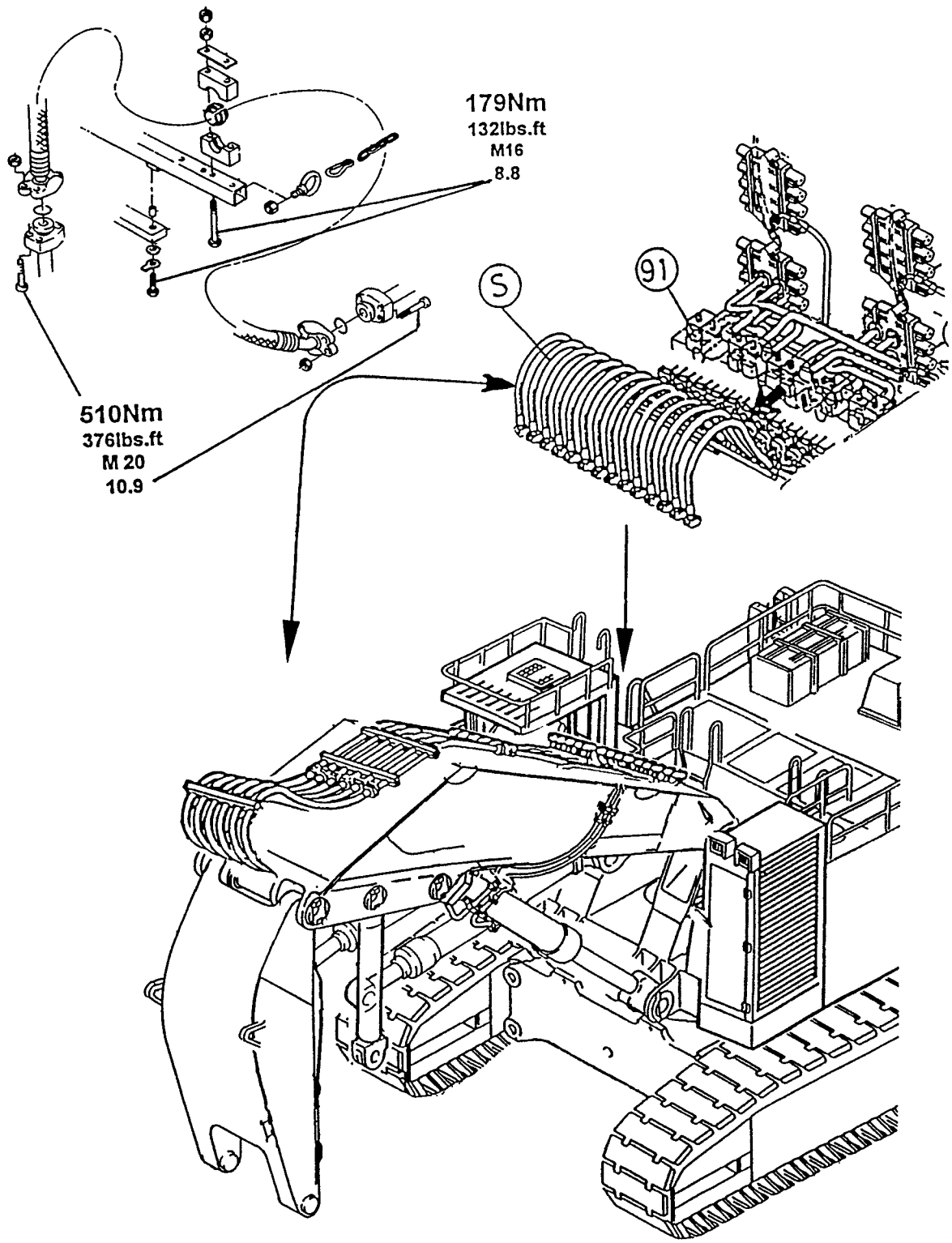
Legend for illustration Z2289

A Location of Pins with a fine thread end
1. Pin
2. Cap for mounting
3. Final cap
4. Nut for mounting the final cap
5. Nut for mounting whirl
6. Safety bolt
7. Hole for the cotter pin
8. Cotter pin

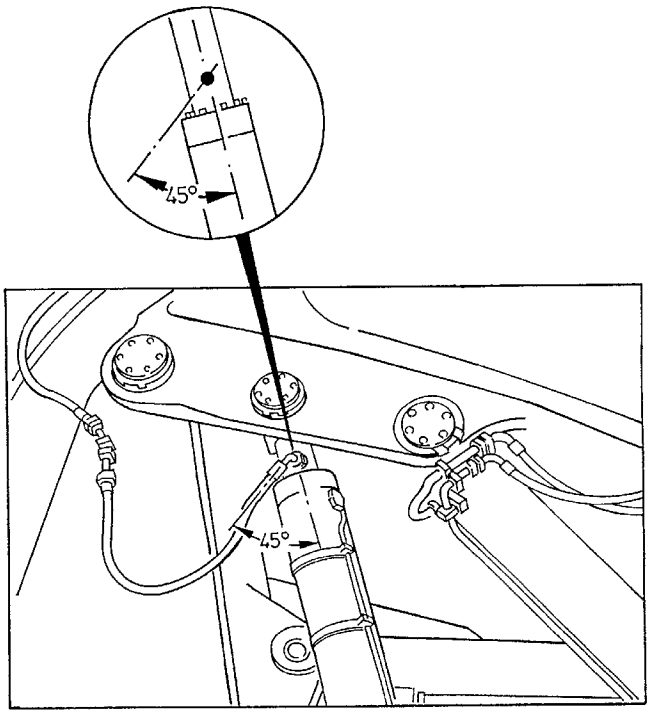
Installing of this kind of pins:

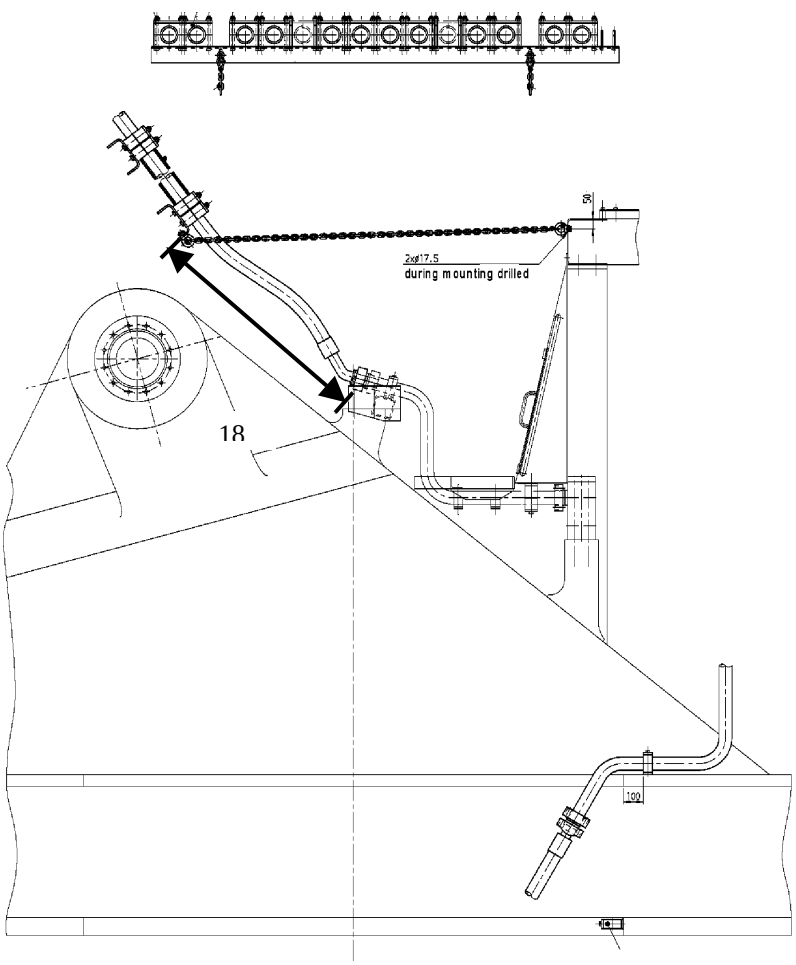
1. Secure the thread with the mounting cap.
2. Install the pin.
3. Remove the mounting cap.
4. Install a whirl (M20) in the nut (5).
5. Lift the Final cap (3) with a crane, tilt it and turn it on the pin(1) by using the nut (4) (M30).
6. Secure the cap as shown with the bolt (6).
7. Secure the bolt (6) with the cotter pin (8).

- **There is only one mounting cap for all pins.**



Z22957





Z22958

27. Installation of Hose connections to the boom: Z22957; Z22958

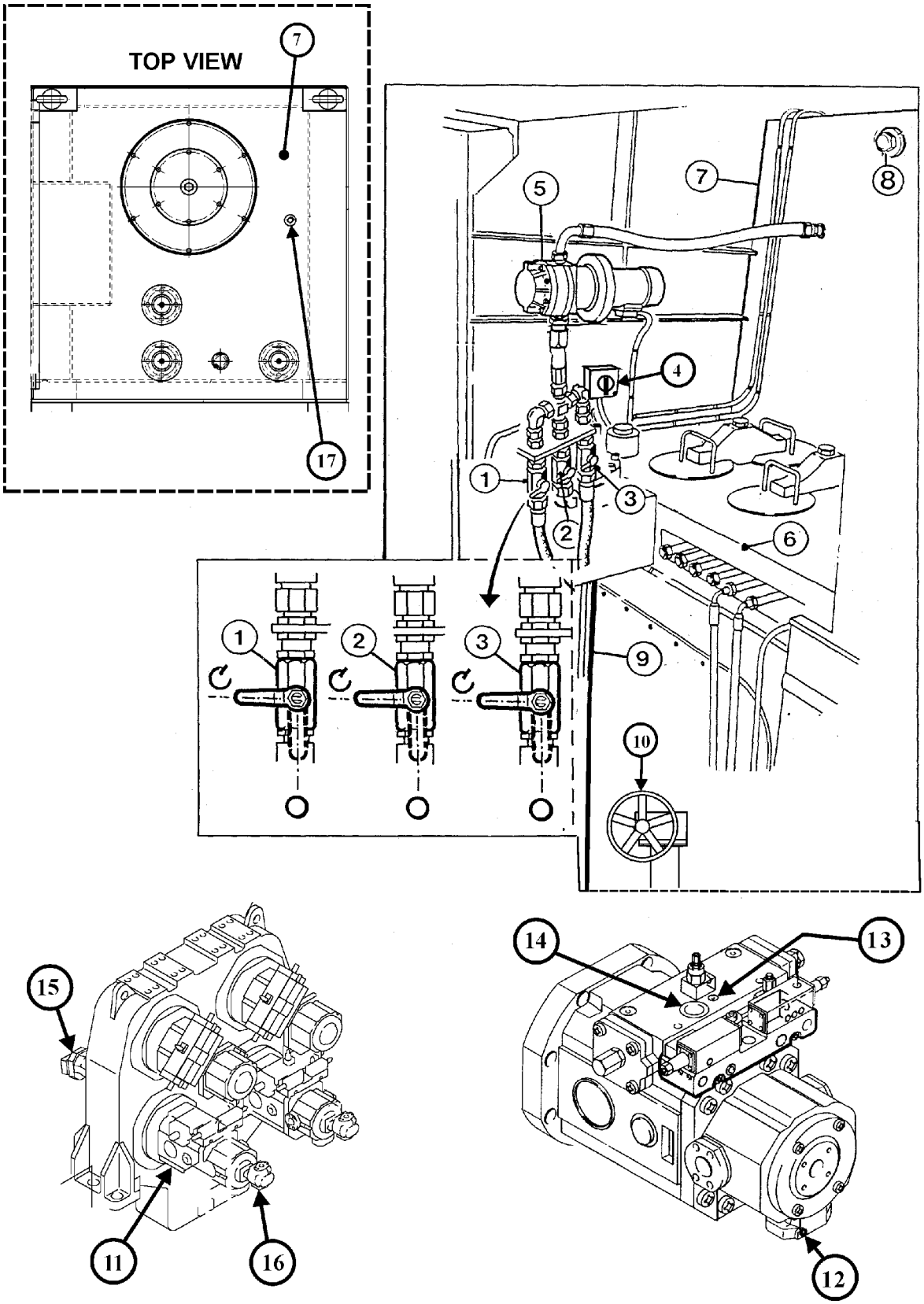
1. Connect hoses (S) in between distributor manifold (91) and boom piping and tighten bolts to the required torque.

2. Install or connect hose connections to the
   - boom
   - boom cylinders
   - stick cylinders
   - bucket cylinders
   - and boom to the stick

   and tighten to the required torque

- **Pay attention the hose fitting to the rod side of the bucket cylinder are in an angle of 45° to vertical.**

- **Torques for flange connections refer to page 148.**



Z22959

28. Filling up hydraulic tank Z22959

- **Connect all lines of the refilling arm* (hydraulic oil; fuel; grease).**
  *** if so equipped**

For capacity's and further information refer to the Maintenance Manual.

Filling up hydraulic oil
Fill up hydraulic oil to the maximum level. Be sure the main shut off valve (10) is open. Do it via the service arm below the engine house or direct through the refilling plug of the hydraulic tank if so equipped. Use only hydraulic oil according to the Maintenance Manual. Observe the oil level with the hydraulic tank level gauge.

Filling up via service arm:
Connect hydraulic oil supply line from service truck / station to the filling adapter on the central refilling panel of the swing down service arm.

Filling up via refilling plug:
Open the refilling plug. Fill up the hydraulic oil. The new oil flows through the return oil filter into the main tank. During filling up observe the filter chamber oil level through the refilling plug. It can be overflow because of the filter flow resistance.

Remove air from the hydraulic system:
- Open vent plugs (12) on the pump suction ports of all eight main pumps (11) and on the four gear type pumps (16). As soon as bubble free oil flows out tighten the vent plugs (12).
- Open the vent plugs on top of both axial piston pumps (15). As soon as bubble free oil flows out tighten the vent plugs on both axial piston pumps (15).

Check oil level in the eight main pump housings:
- Remove oil level and filler plug (13). The oil level in the pump housing should reach the lower edge of the opening. The port (14) of the leakage oil return line can also be used for checking and filling of the pump housing.
- If necessary add hydraulic oil up to the lower edge of the filler opening.
- Insert and tighten filler plug (13) respectively connect leakage oil return line to port (14).
- Make sure the main pump housings are correctly filled, other-wise the pump drive shaft bearings could be damaged due to lack of lubrication.

Final checks:
Check hydraulic oil level and check the complete system for leak-age; especially the connection between main oil and suction oil reservoir. Make sure the main shut-off valve is completely open.

28.1 Filling up fuel tank

If so equipped do it via the service arm below the engine house, otherwise fill up direct through the refilling plug on top of the fuel tank.

Filling up via the service arm:
Connect the fuel supply hose from the fuel service truck to the coupling of the service arm. Use only a correct matched coupling. The fuel supply system of the service truck must equipped with a pressure activated cut-out nozzle. The fuel nozzle cut-out pressure should be adjusted to 0,38 bar. If this pressure is too low for filling the fuel tank up to the correct level, gradually increase the cut-out pressure until the pressure is sufficient for filling up to the correct level. For this adjustment check the real fuel level via the tank plug on top of the fuel tank, use a suitable dip stick.
The maximum flow rate should not exceed 680 liter per minute.

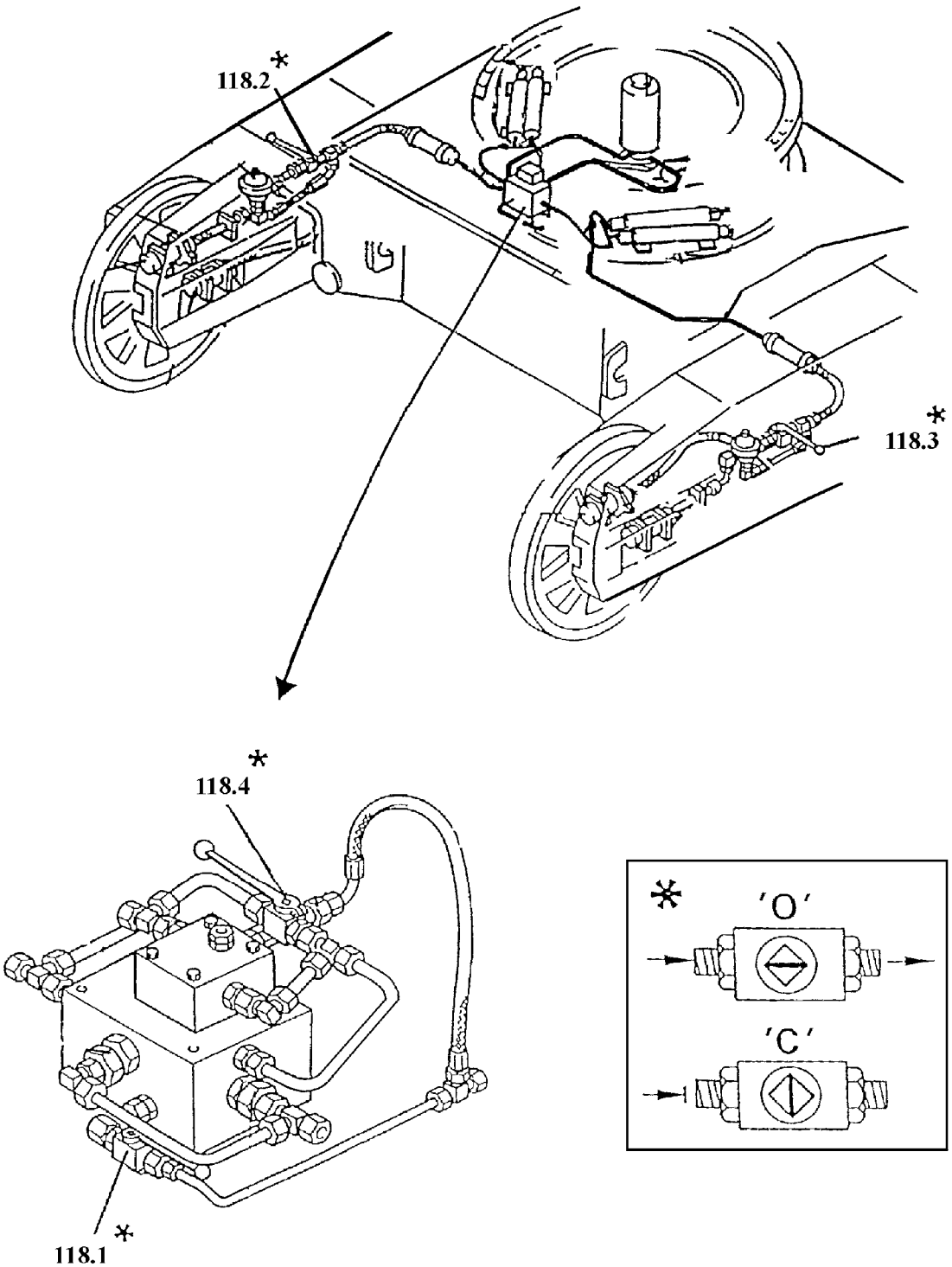
29. Pre-checks for initial Start-up

Engine commissioning

- **The local working safety rules must be strictly observed.**
- **Only service personnel necessary for first start up testing are allowed to be on the excavator.**
- **The operator must have read and understood the operation manual.**
- **Remove all tools and other not fixed material from excavator especially from moving parts.**

1. Be sure that all hand rails, catwalks and steps etc. are correctly installed.
2. Make sure that all hoses and electrical connections are correctly established. Ex works, all disconnected hose lines and electrical cables are marked with identification numbers.
3. Check all fluid levels and correct if necessary.
   Fill up the respective grease container for the Central lube system and the Swing circle lube system *.
4. Make sure that the shut off valve between the main hydraulic tank and the suction tank is completely open.
5. Make sure that the hoses for the clam cylinders are covered with sealing plates if the bucket is not assembled.
6. Bleed the engine fuel lines and filters.
7. Bleed the suction side of each main pumps *. Use adequate receptacle to collect out flowing oil. Be sure that the plug seal is in good condition. Tighten the plug securely.
8. Fill up each main pump housings with hydraulic oil *.
9. Bleed pump housing of the fan piston pumps *.

*(For more information refer to Maintenance Manual.)



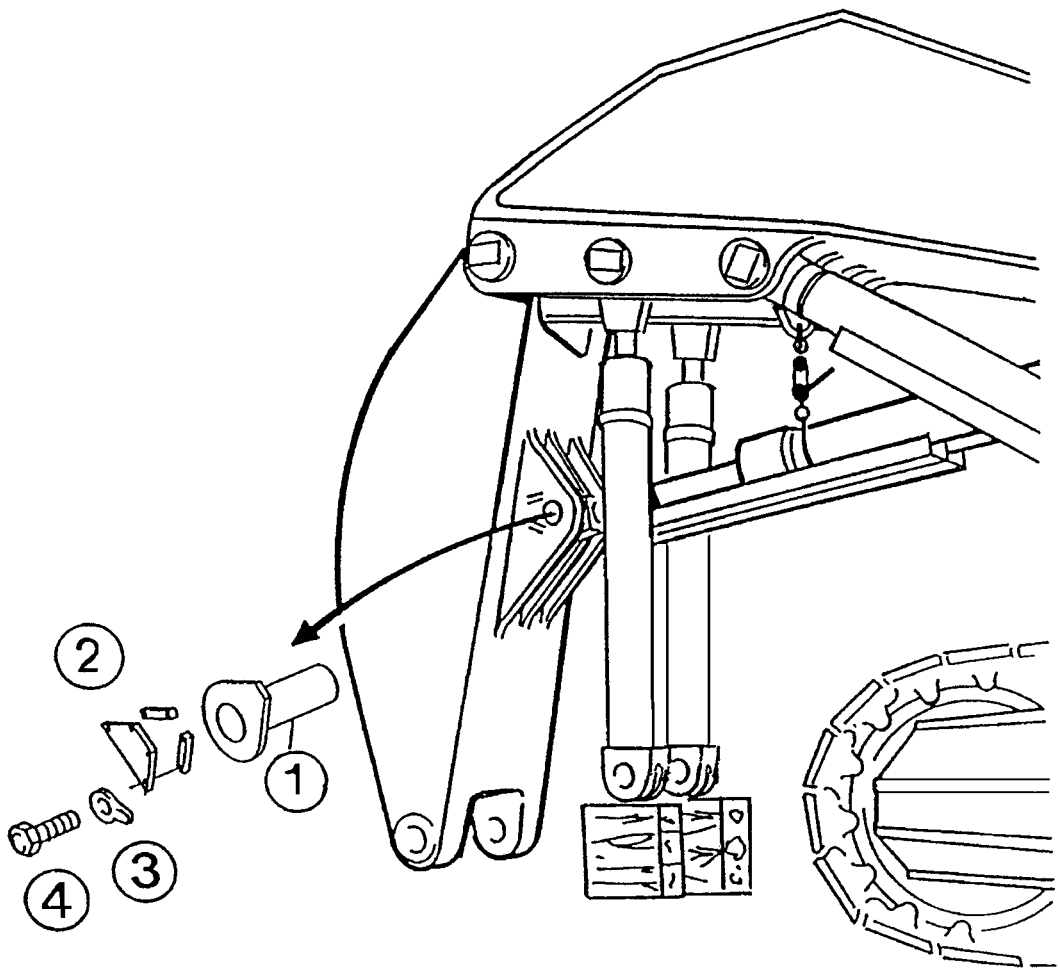
Z22960

10. Bleed the suction side of each gear pumps. Open the relevant plug at the suction flange until bubble free oil flows out. Be careful use adequate receptacle to collect out flowing oil. Be sure that the plug seal is in good condition. Tighten the plug securely.
11. Make sure that the cocks for the hydraulic track tensioning system are in the required position Z22960:
    118.1 OPEN
    118.2 OPEN
    118.3 OPEN
    118.4 CLOSED
    To check the correct valve position remove lever and check the marking. The valve is open if the marking is in line of the valve ports or it is closed if the marking is cross to the valve ports.
12. Prior to putting this machine into operation fill the final drive housings in both crawler carriers with gear oil “CLP 220”.
    Check oil levels in all gear units and in the hydraulic oil reservoir (refer to Maintenance Manual).
13. Check the messages from the ETM display.
14. Activate swing parking brake by using switch S29 on dash board.
15. Start engine. Let engine run with low idle about 5 min to unload the system from air. During and after starting pay attention to the instructions in the Operation Manual. .

- **Observe the hydraulic oil level. Especially during the first minutes of engine running and the first moving of each function.**
- **If the level reach the low level mark of the hydraulic oil level gauge stop engine and add new hydraulic oil.**

16. Check function of the hydraulic access ladder. Let engine run in low idle. Move the ladder several times fully up and down by using switch S84. The ladder should be moving in both directions as long as the switch is activated. When the ladder reaches near the upper or lower position it must change to a lower moving speed. In the upper position the ladder must have firmly contact to the rubber stopper.
17. Check moving of the service arm. Let engine run in low idle. Enable the service arm moving with switch S94 (cabin, dash board). Move the service arm by using the pull switch below the engine house from ground. Move the service arm several times fully up and down. In the upper position the service arm must be in firm contact to the rubber stopper.
18. Now the machine can be temporary operated only for any further assembly.

- **The hydraulic access ladder and the service arm must be in upper position to enable excavator functions.**



Z22961

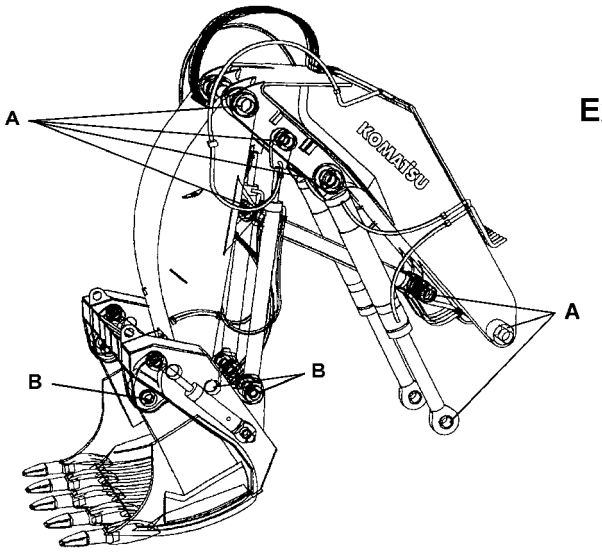
30. Mounting of Stick Cylinders to the Stick: Z22961

- **For mounting of the pin seals please refer to page 130.**

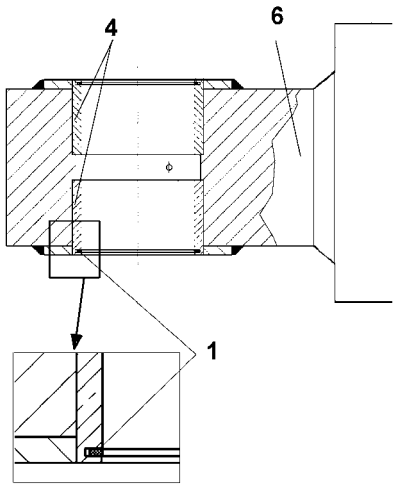
1. Hook up stick cylinders to chain pull and remove transport fastening.
2. Lower stick cylinder by means of chain pull.
3. Start the engine and extend cylinder rod. Align with bearing at stick.

- **Be careful there is a time delay between lever moving and cylinder moving.**
- **Keep distance to the cylinder connection area and cylinder rod.**
- **Check the correct pin connection alignment with only visual inspection, never reach into the pin and bore connection area.**

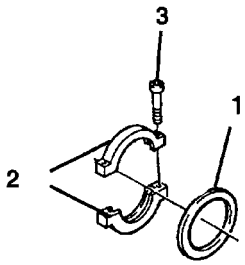
4. Install pin (1), plat (2) and washer (3) with bolt (4).



Example inner seal (A)



Example outer seal (B)



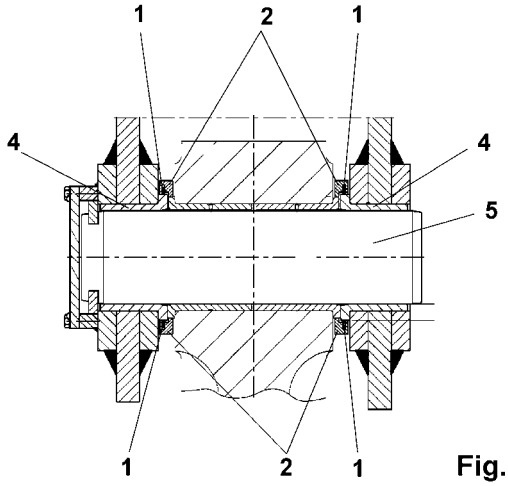


Fig. Y

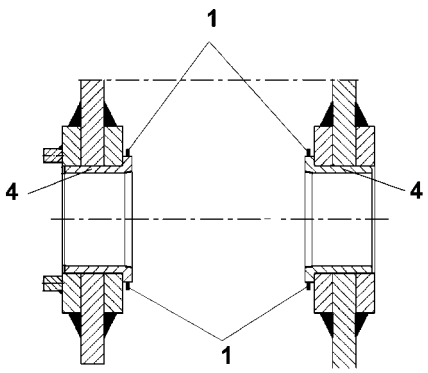
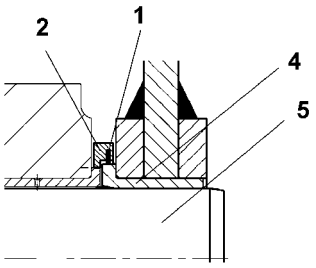


Fig. X



Z 22042

31. Mounting of the Pin Seals

The illustration shows the mounting places of the inner bushing seals (A) and the outer bushing seals (B) of the front shovel attachment..

Legend illust. Z 22042:

A Position of inner pin seal with seal groove
B Position of outer pin seal with fixing halve
1. Seal ring
2. Fixing halve
3. Bolt
4. Bushing
5. Pin
6. Cylinder eye

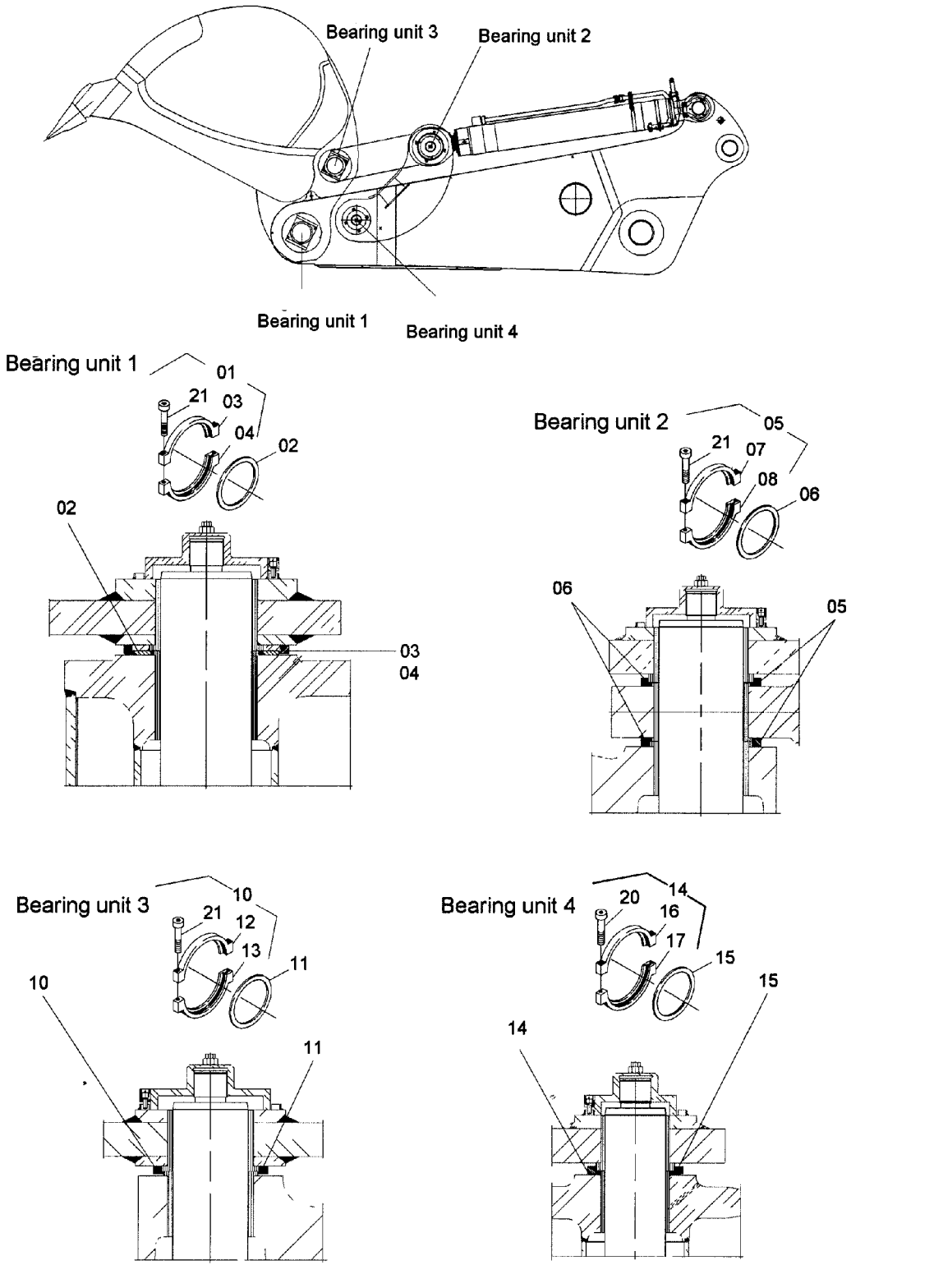
Mounting procedure for the inner pin seals (A):

1. Remove respective pins
2. Fill the grooves inside of the bushings with grease
3. Install the seals and align it.
4. Assemble the boom and the stick as described in this manual.

Mounting procedure for the outer pin seals (B):

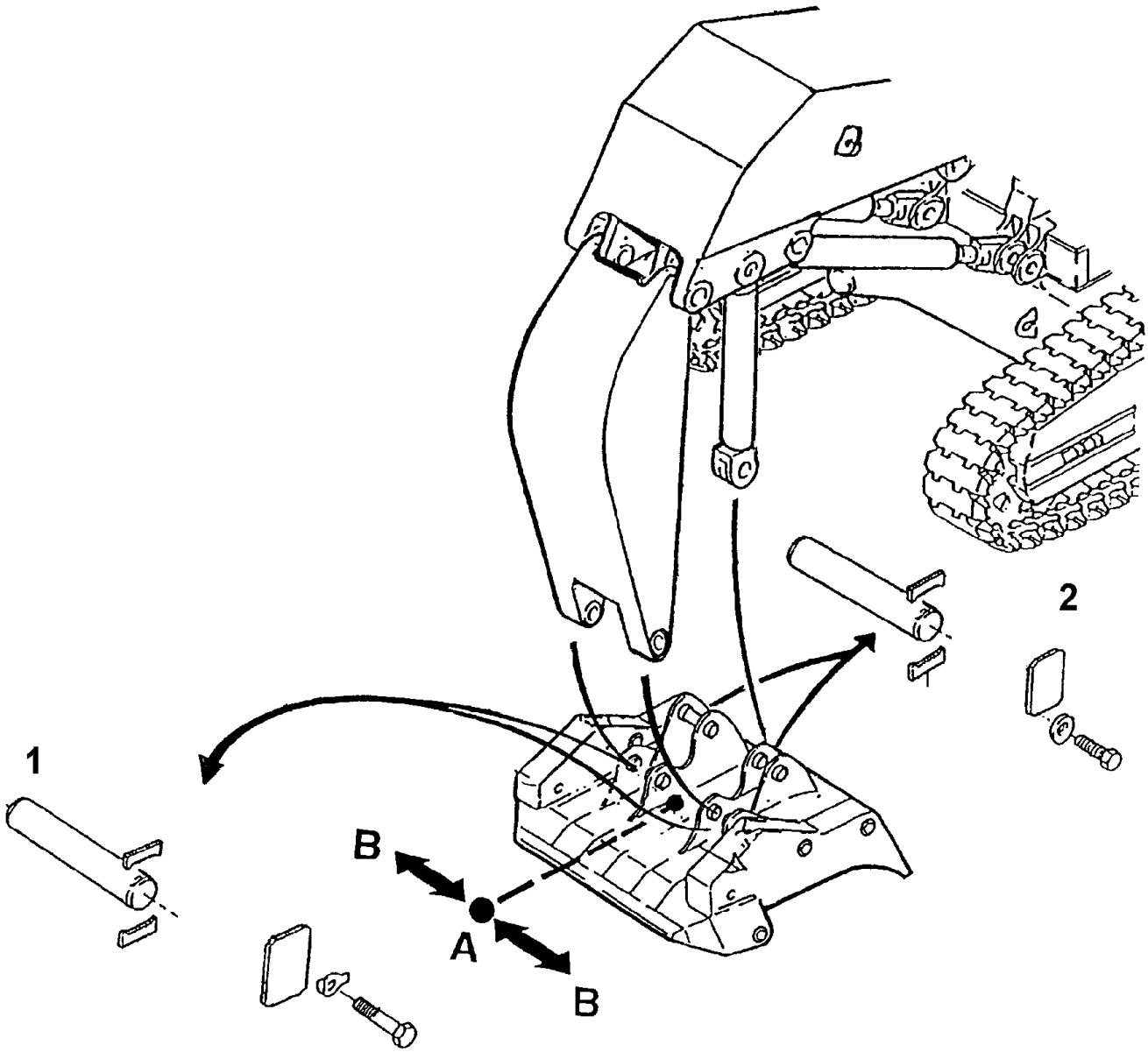
1. Remove respective pins.
2. Slide seals (1) on the collar of the respective bushings in the rear wall of bucket Fig. X.
3. Assemble the bucket as described on the following pages.
4. Install both fixing halves (2) over the seal ring (1) and tighten bolts (3). Fig. Y shows the already assembled pin connection.

- **The fixing halves must be turned to the correct position because of two different inner diameters.**
- **Fill the groove of the fixing halves before installing with grease.**
- **Proper functioning of the seal is only established in case of an intact seal ring.**

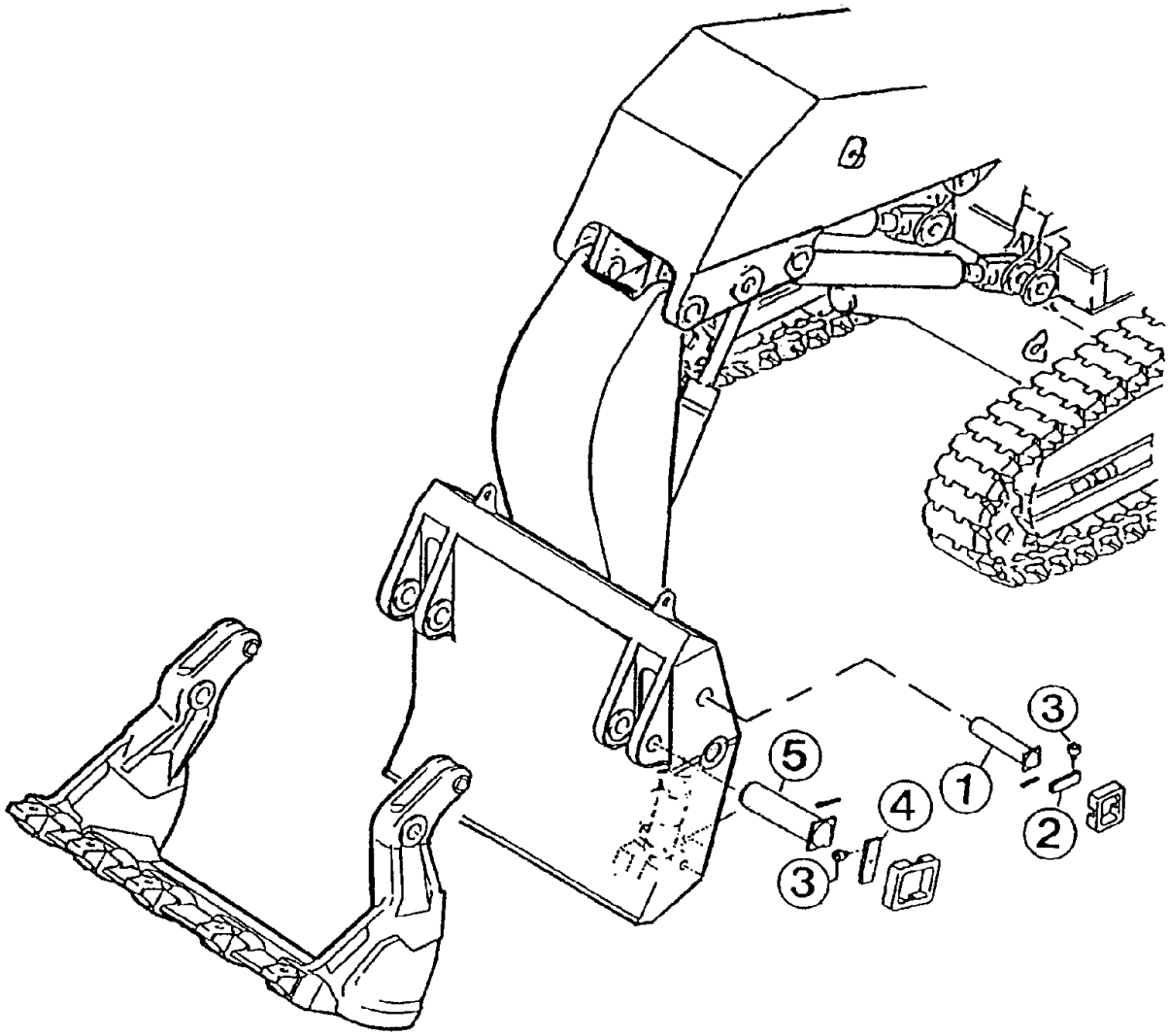

Bearing unit 3
Bearing unit 2
Bearing unit 1
Bearing unit 4
Bearing unit 1
01
21
03
04
02
02
03
04
Bearing unit 2
05
21
07
08
06
06
05
Bearing unit 3
10
21
12
13
11
10
11
Bearing unit 4
14
20
16
17
15
15
14

Z23006

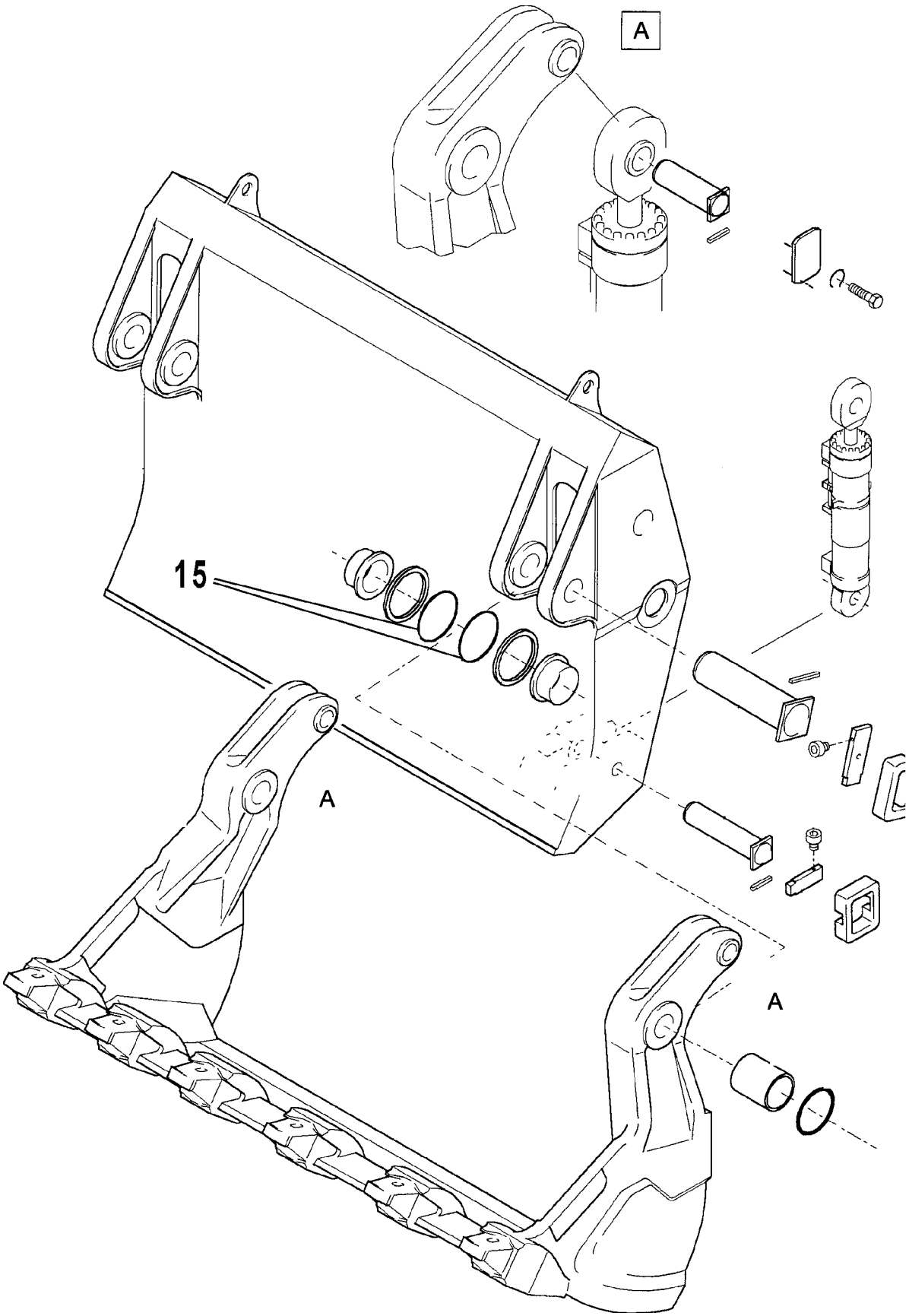
31.1 Mounting of the Pin Seals



Z 21876



Z 21877



Z22962

32. Assembly of Bullclam Bucket to the Stick (Z21876; Z22962)

Delivery in two parts (clam - rear wall)

1. Place the rear wall as shown on the ground (Z21876).
2. Prepare the pin seals according to page 130.
3. Lift the attachment and retract the stick until the stick is in a vertical position.

△

- **For mounting of the pin seals please refer to page 130.**
- **Be careful, watch the bucket cylinder hose, because the cylinder is not fixed.**
- **Make sure that the bucket cylinder is in the correct position. The contact surface from the cylinder eye must point to the front, away from the machine.**

4. Move the excavator to the rear wall.
5. Push the pins (1) from (A) to (B) so far as the stick can mount.
6. Align the bores of the stick with the bores of the rear wall.
7. Insert pins (1) from outside to inside (B to A) and secure with the axle stirrups and install lock plates (3)
8. Push the pins (2) from (A) to (B) so far as the bucket cylinders can mount.
9. By moving extending the bucket cylinders align the cylinder eyes with the bores of the rear wall.
10. Push pins (2) from outside to inside (B to A) so far that the axle stirrup (4) can be installed.
11. Connect the hydraulic hoses (clam cylinder hose) to the rear wall.
12. Retract the clam cylinder fully in
13. Place the clam shell into position as shown (Z21877).
14. Push out all pins (1 and 5).
15. Align the rear wall borings by moving boom, stick and bucket cylinder with the clam borings.

△

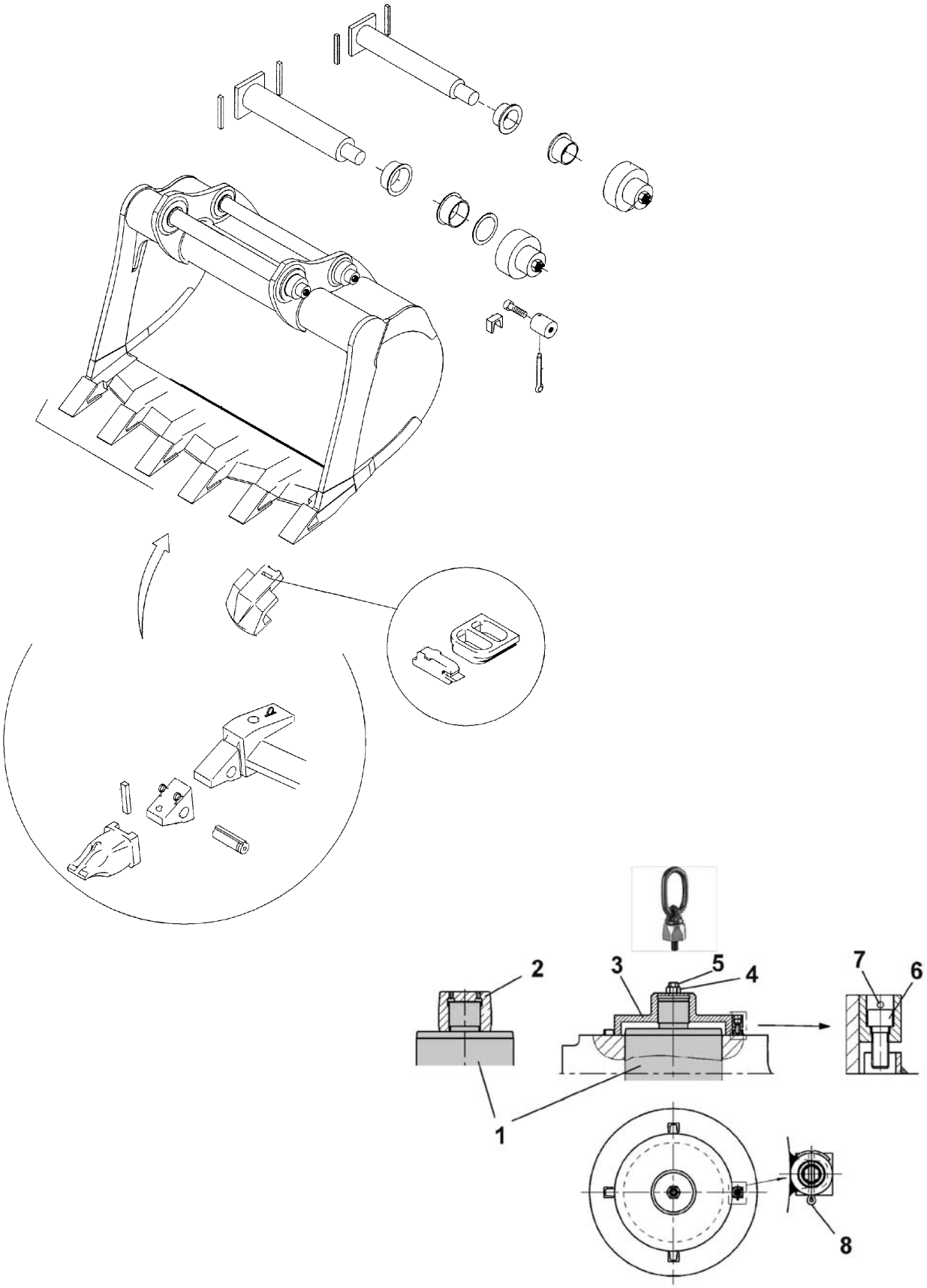
- **Be careful, watch the clam cylinder.**

16. Install pins (5) and lock with catch (3+4).

- **Do not forget the O – rings (15) refer to drawing 22962!**

17. Extend clam cylinders to align them with borings in the clam. Install pins (1) and lock them with catch (2+3).
18. Connect all grease lines to the bucket and ensure that all grease points are greased before machine is put into operation. Connect line to the end of line switch.
    Refer to Service Manual “Lubrication Systems”, Section “Commissioning”.

- **For further information about the tooth system refer to Service Bulletin AH03510.**



Z23005

32.1 Assembly of Backhoe to the Stick (Z23005)

Legend for illustration Z23005

1. Pin
2. Cap for mounting
3. Final cap
4. Nut for mounting the final cap
5. Nut for mounting whirl
6. Safety bolt
7. Hole for the cotter pin
8. Cotter pin

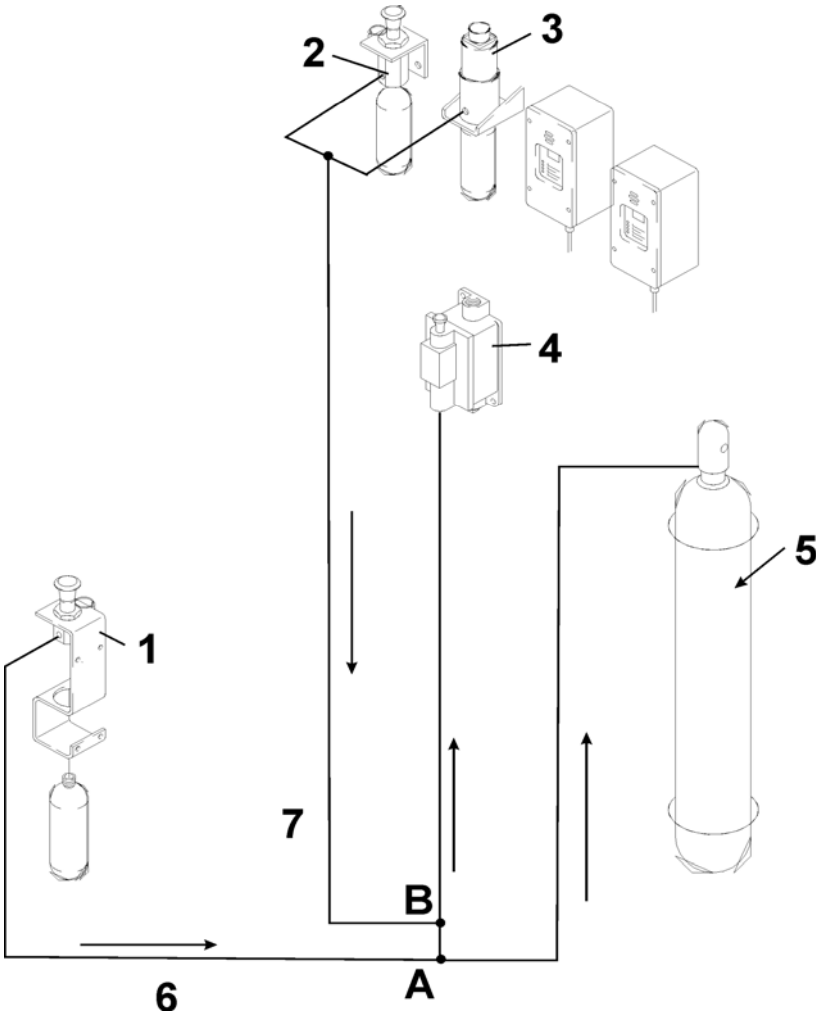
Installing of this kind of pins:

1. Secure the thread with the mounting cap.
2. Install the pin.
3. Remove the mounting cap.
4. Install a whirl (M20) in the nut (5).
5. Lift the Final cap (3) with a crane, tilt it and turn it on the pin(1) by using the nut (4) (M30).
6. Secure the cap as shown with the bolt (6).
7. Secure the bolt (6) with the cotter pin (8).

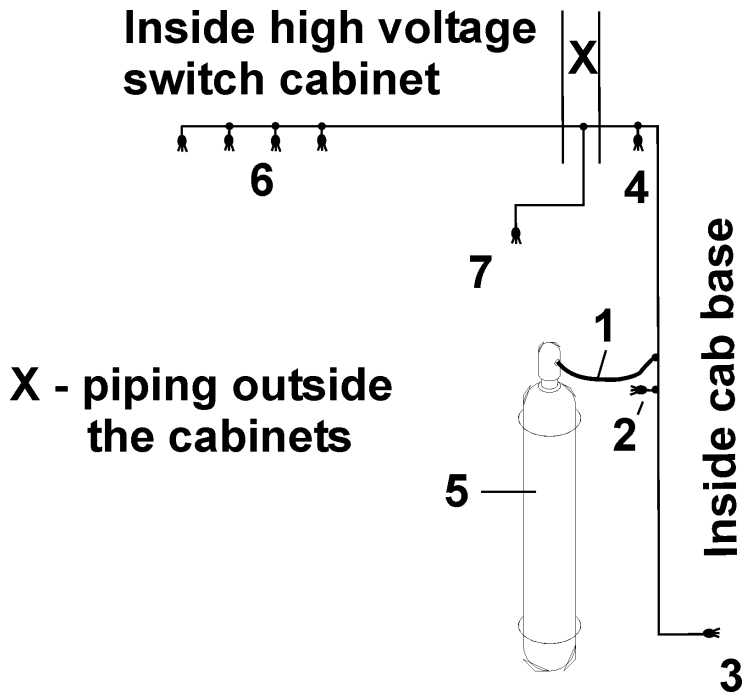
- **There is only one mounting cap for all pins.**

- **For further information about the tooth system refer to Service Bulletin AH03510.**

A – Checkfire MP-N (basically)



Z23009



Z23010

33. Assembling and testing the Fire Detection, Actuation and Suppression System

The excavator is equipped with two different systems:

A – Checkfire MP-N electric detection and actuation system which controls the Carbon Dioxide fire suppression system for the following areas:

- Slip ring unit;
- High voltage switch cabinet;
- Medium and low voltage switch cabinet in the cab base.

B – Checkfire SC-N electric detection and warning system which monitors the machinery house via a linear detection wire.

A – Checkfire MP-N electric detection and actuation system

Z23009 – Principle representation of the pneumatic actuation system

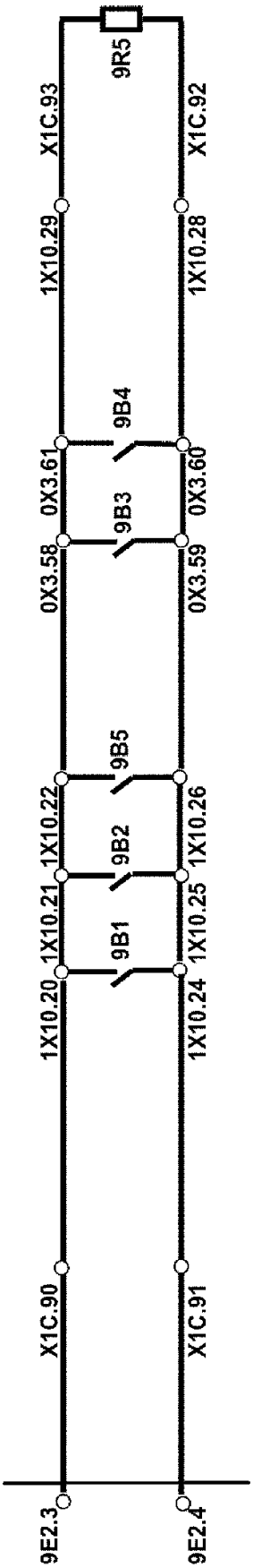
1. Strike button at the power house door for manual actuation
2. Strike button in the operators cab for manual actuation
3. Automatic actuator controlled by thermal detectors
4. Pressure switch shuts off the main motors depend on the activators (1; 2; 3)
5. Steel cylinder filled with extinguishing gas Carbon Dioxide (cab base).
6. Hose from the strike button at the power house to the cab base.
7. Hose from the operators cab to the cab base.

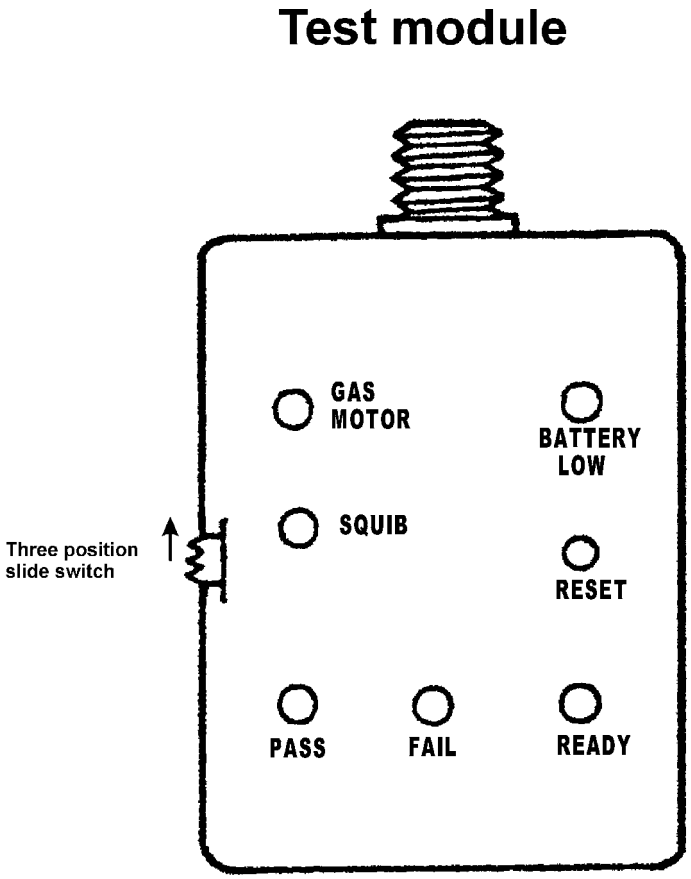
A; B Connection points in the cab base below the floor.

Z23010 - Principle representation of the extinguishing gas Carbon Dioxide system

1. Second hose at the gas steel cylinder in the cab base.
2. Extinguishing gas pour out nozzle nearby the gas steel cylinder.
3. Extinguishing gas pour out nozzle below the floor in the cab base.
4. Extinguishing gas pour out nozzle at the overhead wall in the cab base.
5. Steel cylinder filled with extinguishing gas Carbon Dioxide (cab base).
6. Extinguishing gas pour out nozzles in the high voltage cabinet.
7. Extinguishing gas pour out nozzle at slip ring.

- **All necessary parts are packed in a separate box.**





9R5	End of line resistor
X1C	Operators cab; dash board
1X10	Cab support; mounting plate opposite the X2 - board
0X3	High voltage cabinet, mounting board
9E2	Central unit (MP-N)
9B1	Temperature sensor LV cabinet
9B1	Temperature sensor LV cabinet
9B3	Temperature sensor HV cabinet
9B4	Temperature sensor HV cabinet
9B5	Temperature sensor slip ring current collector

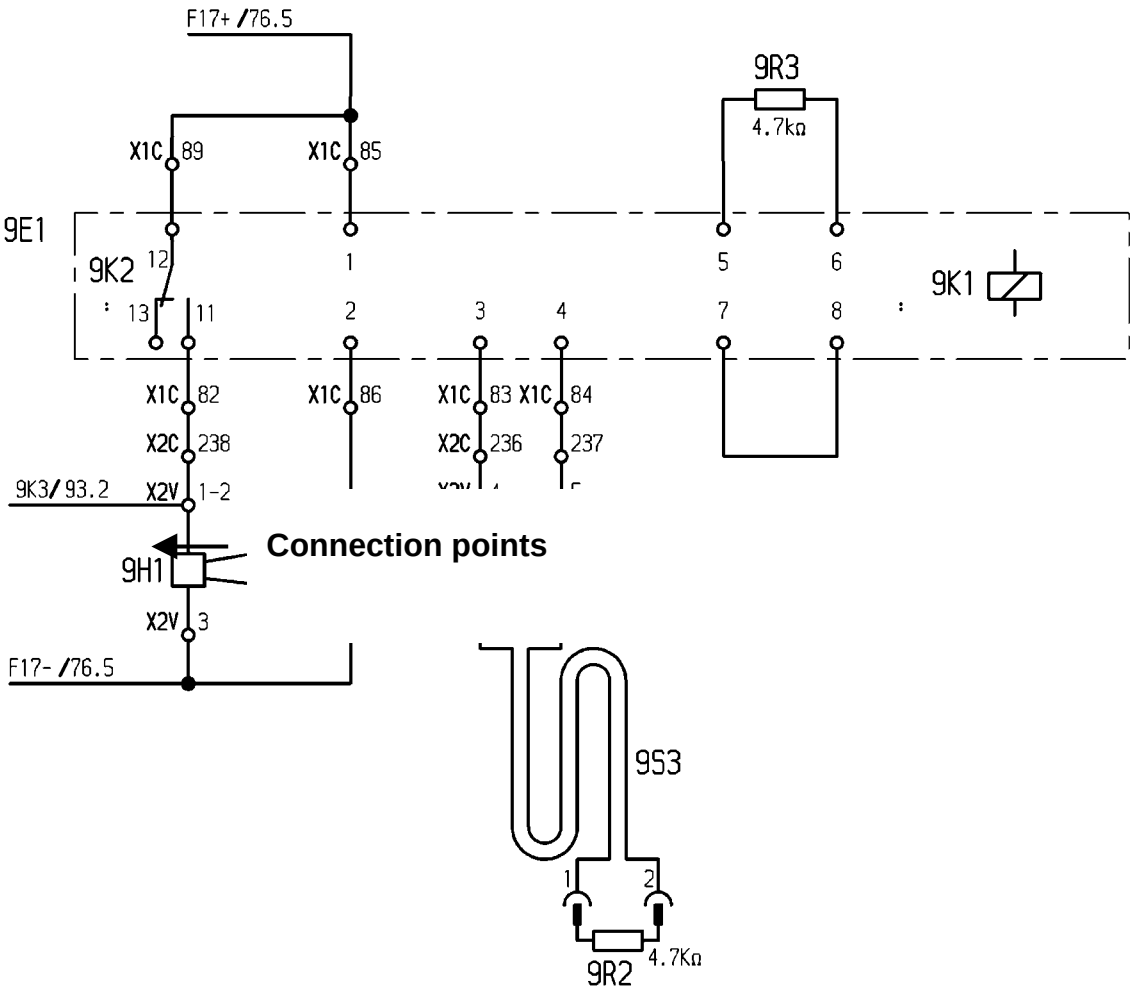
Z23013

Assembling procedure:

1. Connect the hose (6) at “A” below the floor in the cab base (Z23009).
   Lay this hose in the cable channel below the high voltage cabinet and below the cab base.
2. Connect the hose (7) at “B” below the floor in the cab base(Z23009).
3. Connect the gas tubes of the high voltage cabinet with the tubes of the cab support (outside) (“X” at Z23010).
   The necessary pipes are in the box of the fire suppression system.
4. Connect the pipe from the slip ring (nozzle 7) outside the cabinets (Z23010).
5. Remove the protection cap from the gas steel cylinder and mount the adapter out of the box with auxiliary parts. Connect the pilot line coming from “A” and “B” to the gas steel cylinder (Z23009).
6. Connect the extinguishing gas hose with the gas steel cylinder (cab base) but first after testing the electrical function – refer some pages later).
7. Electrical connections at the mounting plate (cub support) (Z23013):

Coming from		**Connection to**
Cab	X1C90	1X10.20
	X1C91	1X10.24
	X1C92	1X10.28
	X1C93	1X10.29
Slip ring / temperature sensor	9B5	1X10.22
	9B5	1X10.26
High voltage cabinet / temperature sensor	9B3 / 0X3.58	1X10.21
	9B3 / 0X3.59	1X10.25
	9B4 / 0X3.60	1X10.28
	9B4 / 0X3.61	1X10.29

B – Checkfire SC-N



Z23014

Symbol	Designation; location
9E1	Central unit SC-N; operators cab
9H1	Horn; above the door of the cab support
9S3	Detection wire; below the roof of the machinery house
X1C	Operators cab; dash board
X2C	X2 – board; cab support
X2V	X2 – board; cab support

Testing of the electrical function

1. Insert the battery in the test module and in the central unit;
2. Connect the test module with the actuator cable of the central unit;
3. Open the dash board and bridge the terminals X1C.92 and X1C.93 (that imitates a closed temperature sensor);
4. Put the three-position slide switch located on the left side of the test module in the upper position (“gas motor”).
5. Depress the “Reset” button on the tester. This will illuminate the “ready LED” if it is not already illuminated.
6. Once the unit activates, the unit tester will indicate a ”Pass” or “Fail” status resulting from the test.
7. Remove the bridge at terminals X1C.92 and X1C.93.

Placing the system in the service

- **The activating of the system has to be carried out after the testing of the electrical function.**

1. Insert the three LT-10-R Cartridges (one in the strike button at the power house door for manual actuation; one in the strike button in the operators cab for manual actuation and one in the automatic actuator in the operators cab).
2. Connect the actuator cable with the central unit.
3. Connect the extinguishing gas hose with the gas steel cylinder.

B – Checkfire SC-N electric detection and warning system (Z23014)

Assembling procedure:

1. Connect the lines “1” and “2” coming from the machinery house in the cab support with the ports X2V.4 and X2V.5.

Testing of the electrical function

1. Insert the battery in the central unit;
2. Open the dash board and bridge the terminals X1C.83 and X1C.84 (that imitates a fire in the machinery house);
3. If the horn sounds, remove the bridge of the ports at the dash port.

34. Checks and Adjustments Prior to Commissioning

Refer to the hydraulic and electric circuit diagrams

To bleed all individual hydraulic circuits slowly operate all functions for some minutes (travel, slew and all attachments motions).

1. Test of the complete hydraulic system.
2. Test of the complete electric system 24 V.
3. Test of the pre-heating system
4. Test of EBL (Electronic Bucket Limiting system)
5. Test of ECS-system, if installed
   Refer to the Service Manual ECS-system.

For electric driven machines only.

6. Test of battery charging unit.
7. Test of main motor protection relay
8. Test of all other motor overload relays.

In order to keep the excavator in first-class operating condition use only genuine Komatsu Mining Germany replacement parts.
The use of any part other than the genuine parts releases the Komatsu Mining Germany from any guarantee.

-

Metric standard thread

Bolt size	Wrench	Tightening torque MA (Nm)		
		8.8	10.9	12.9
M 8	13	21	31	36
M 10	17	43	63	73
M 12	19	74	108	127
M 14	22	118	173	202
M 16	24	179	265	310
M 18	27	255	360	425
M 20	30	360	510	600
M 22	32	485	690	810
M 24	36	620	880	1030
M 27	41	920	1310	1530
M 30	46	1250	1770	2080
M 33	50	1690	2400	2800
M 36	55	2170	3100	3600
M 39	60	2800	4000	4700
M 42	65	3500	4950	5800
M 45	70	4350	6200	7200
M 48	75	5200	7500	8700
M 52	80	6700	9600	11200
M 56	85	8400	12000	14000
M 60	90	10400	14800	17400
M 64	95	12600	17900	20900
M 68	100	15200	21600	25500

The torque indications on the chart attached are valid only when the bolts are manufactured according to DIN.

Threads and bolt heads must be greased carefully with grease KP2K.

The surfaces of contact which should screwed together have to be free of grease.

Divergencing torques: Bolts at excavator slew rings (see Service Bulletin AH00511a)

Metric fine thread

Bolt size	Wrench	Tightening torque MA (Nm)		
		8.8	10.9	12.9
M 8x1.00	13	23	33	39
M 10x1.00	17	48	70	82
M 12x1.25	19	81	119	139
M 14x1.50	22	127	187	219
M 16x1.50	24	191	280	330
M 18x2.00	27	270	385	450
M 20x2.00	30	380	540	630
M 22x2.00	32	510	720	850
M 24x2.00	36	680	960	1130
M 27x2.00	41	990	1410	1650
M 30x2.00	46	1380	1960	2300
M 33x2.00	50	1850	2650	3100
M 36x3.00	55	2300	3250	3850
M 39x3.00	60	3000	4200	4950
M 42x3.00	65	3750	5300	6200
M 45x3.00	70	4600	6600	7700
M 48x3.00	75	5700	8100	9500
M 52x3.00	80	7300	10400	12100
M 56x4.00	85	8900	12600	14800
M 60x4.00	90	11000	15600	18300
M 64x4.00	95	13300	19000	22200
M 68x4.00	100	16100	22900	27000

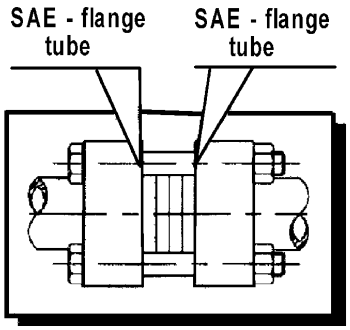
The torque indications on the chart attached are valid only when the bolts are manufactured according to DIN.

Threads and bolt heads must be greased carefully with grease KP2K.

The surfaces of contact which should screwed together have to be free of grease.

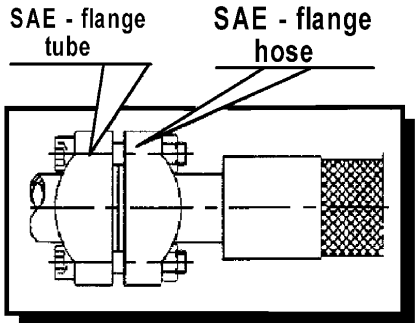
Divergencing torques: Bolts at excavator slew rings (see Service Bulletin AH00511a).

Example of assembly 1



4 X bolt + nut

Example of assembly 2

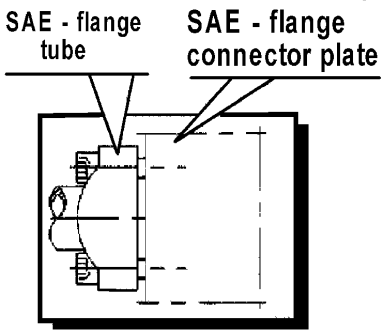


4 X cylinder head screw + nut

Torques:

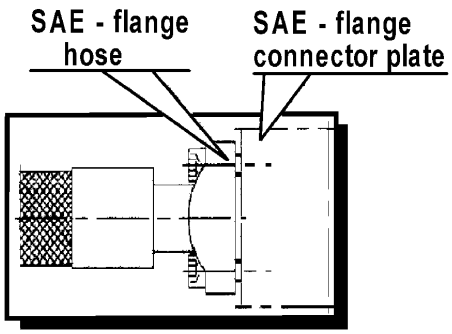
M12 - 074 Nm
M14 - 118 Nm
M16 - 179 Nm
M20 - 360 Nm

Example of assembly 3



4 X cylinder head screw

Example of assembly 4



4 X cylinder head screw

Torques:

M12 - 108 Nm
M14 - 173 Nm
M16 - 265 Nm
M20 - 510 Nm

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