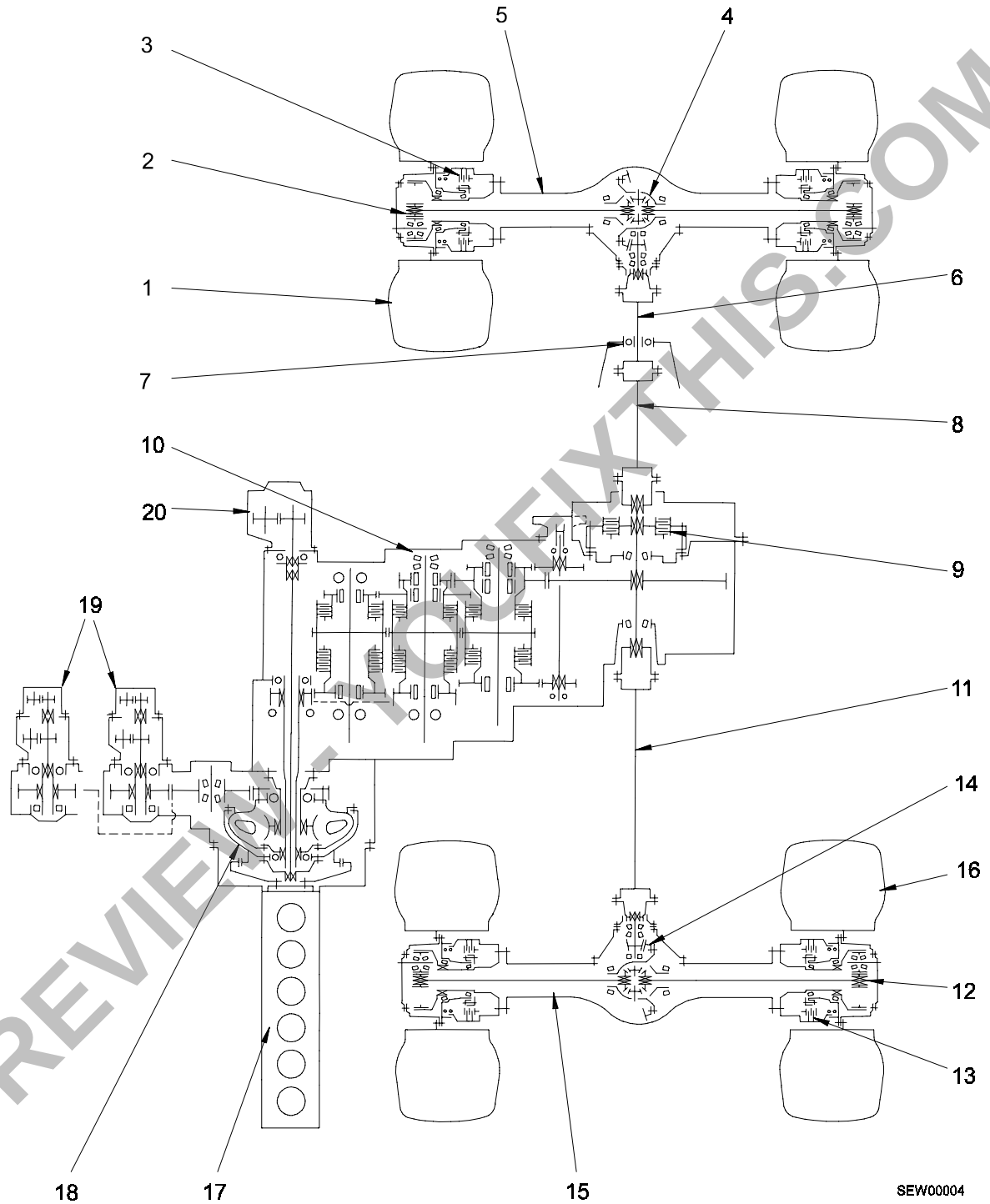
POWER TRAIN SYSTEM

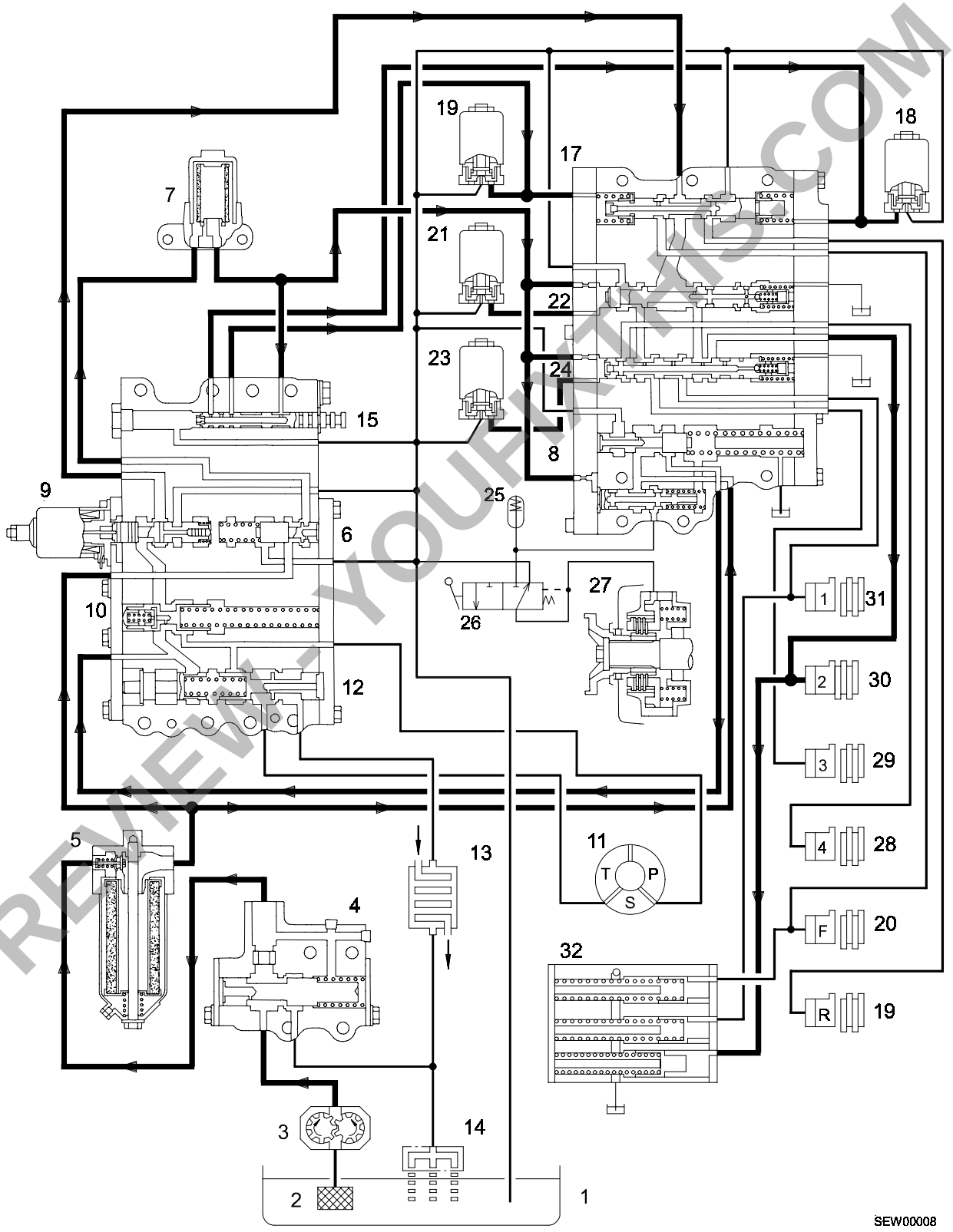


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TRANSMISSION HYDRAULIC SYSTEM DIAGRAM

(Conditions: Engine at low idling, transmission shift lever at neutral)



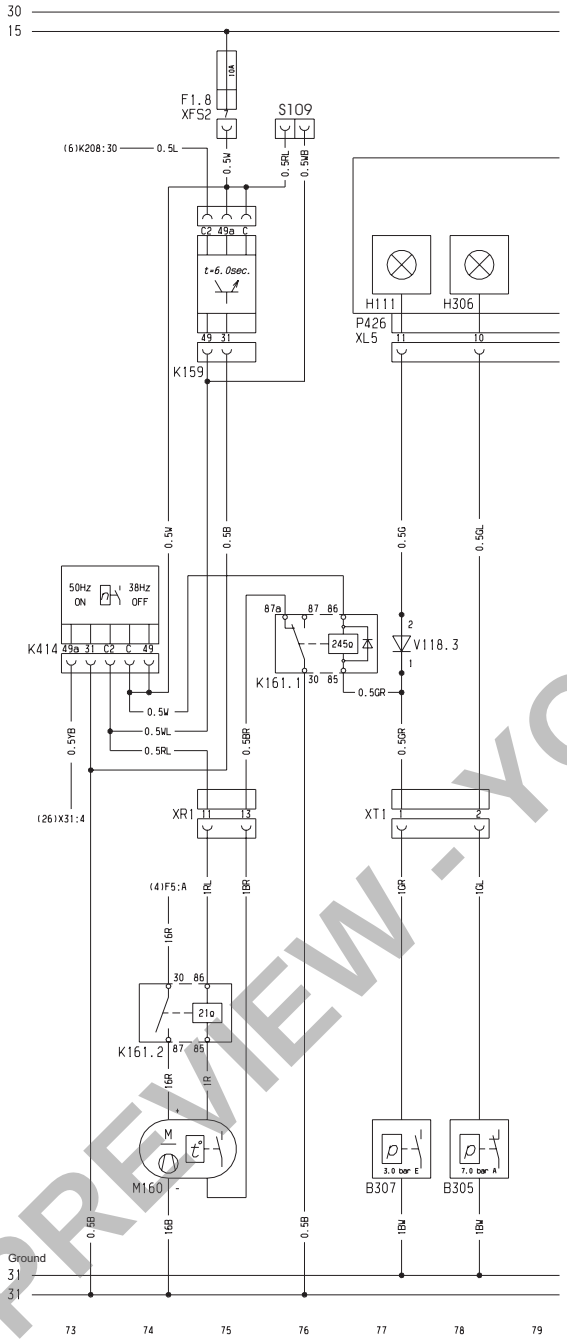
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WIRING DIAGRAM EMERGENCY STEERING

SN WA420H30432 and up

Operating mode with time relay



	Description
H111	Lamp steering oil pressure
H306	Lamp emergency steering pump
S109	Plug for taster test emergency steering pump
V118	Diode
XFS	Connector fuses
XL	Connector platform
XR	Connector rear frame

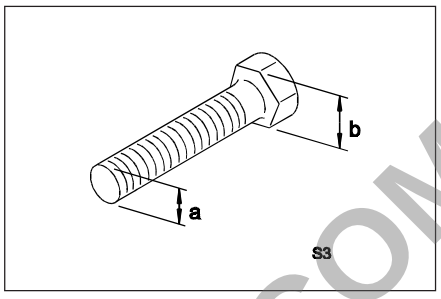
	Description
B305	Sender emergency steering pump pressure (7 bar)
B307	Sender air pressure (3 bar)
K159	Time relay (6 sec.) for test emergency steering pump
K161	Relay emergency steering pump
K414	Rpm sensor emergency steering pump
P426	Main Monitor
M160	Emergency steering pump

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TORQUE LIST

Unless otherwise specified, tighten the metric bolts and nuts to the torque shown in the table. The tightening torque is determined by the width across flats of the nut and bolt.
If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.



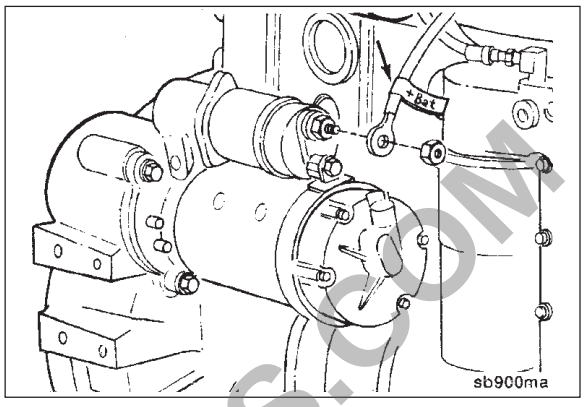
Tread diameter of the bolt (mm) (a)	Width across flat (mm) (b)	(T) (H) S2		
		Nm	kgm	lbft
6	10	13.2 ± 1.4	1.35 ± 0.15	9.73 ± 1.03
8	13	31,4 ± 2,9	3,2 ± 0,3	23.2 ± 2.1
10	17	65,7 ± 6,8	6,7 ± 0,7	48.5 ± 5.0
12	19	112 ± 9,8	11,5 ± 1,0	82.6 ± 7.2
14	22	177 ± 19	18,0 ± 2,0	131 ± 14
16	24	279 ± 29	28.5 ± 3	206 ± 21
18	27	383 ± 39	39 ± 3	282 ± 29
20	30	549 ± 58	56 ± 6	405 ± 43
22	32	745 ± 78	76 ± 8	549 ± 58
24	36	927 ± 98	94.5 ± 10	684 ± 72
27	41	1320 ± 140	135 ± 15	973 ± 100
30	46	1720 ± 190	175 ± 20	1270 ± 140
33	50	2210 ± 240	225 ± 25	1630 ± 180
36	55	2750 ± 290	280 ± 30	2030 ± 210
39	60	3280 ± 340	335 ± 35	2420 ± 250

NOTE
When tightening panels or other parts having tightening fixtures made of plastic, be careful not to use excessive tightening torque: doing so will damage the plastic parts.

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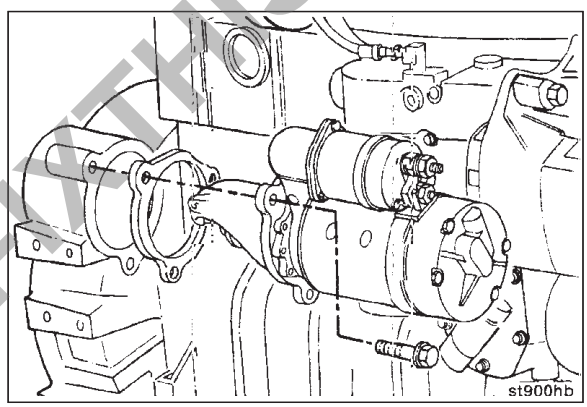
REMOVAL OF STARTING MOTOR ASSEMBLY



⚠ Disconnect the cable from the negative (–) terminal of the battery.

1. Open engine hood side cover LH and lock in position.
2. Disconnect wiring.
3. Remove starting motor assembly.

INSTALLATION OF STARTING MOTOR ASSEMBLY



- Carry out installation in the reverse order to removal.

★ When installing the starting motor assembly, install ground connection securely.

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SEQUENCE OF EVENTS IN TROUBLESHOOTING

Office, shop

Jobsite

Step 1

Examination, confirmation of symptoms

1) When a request for repairs is received, first ask the following points.
   - Name of customer
   - Type, serial number of machine
   - Details of jobsite, etc.
2) Ask questions to gain an outline of the problem.
   - Condition of failure
   - Work being carried out at the time of the failure
   - Operating environment
   - Past history, details of maintenance, etc.



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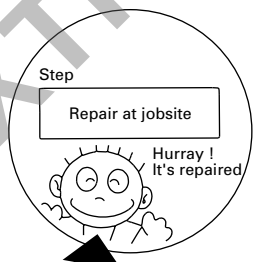
Step 2

Determining probable location of cause

1) Look at the troubleshooting section of the shop manual to find locations of possible causes.



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TEW00185

Step 3

Preparation of troubleshooting tools

1) Look at the table of troubleshooting tools in the shop manual and prepare the necessary tools.
   - T-adapter
   - Hydraulic pressure gauge kit, etc.
2) Look in the parts book and prepare the necessary replacement parts.



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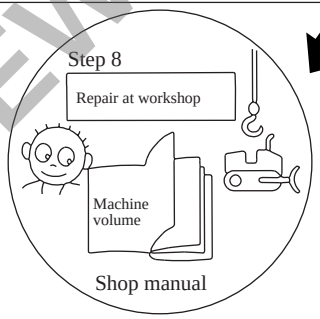
Step 7

- Pinpoint locations of failure (carry out troubleshooting)
- Decide action to take

1) Before starting troubleshooting, locate and repair simple failures.
   - Check before starting items
   - Other check items
2) See the Troubleshooting Section of the shop manual, select a troubleshooting flowchart that matches the symptoms, and carry out troubleshooting.



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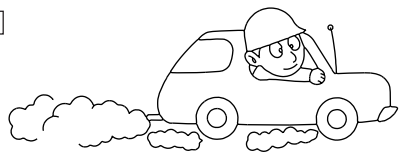
Step 6

Re-enacting failure

- Drive and operate the machine to confirm the condition and judge if there is really a failure.

Step 4

Go to jobsite

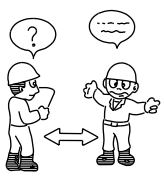


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Step 5

Ask operator questions to confirm details of failure.

- Was there anything strange about the machine before the failure occurred?
- Did the failure occur suddenly?
- Had any repairs been carried out before the failure?

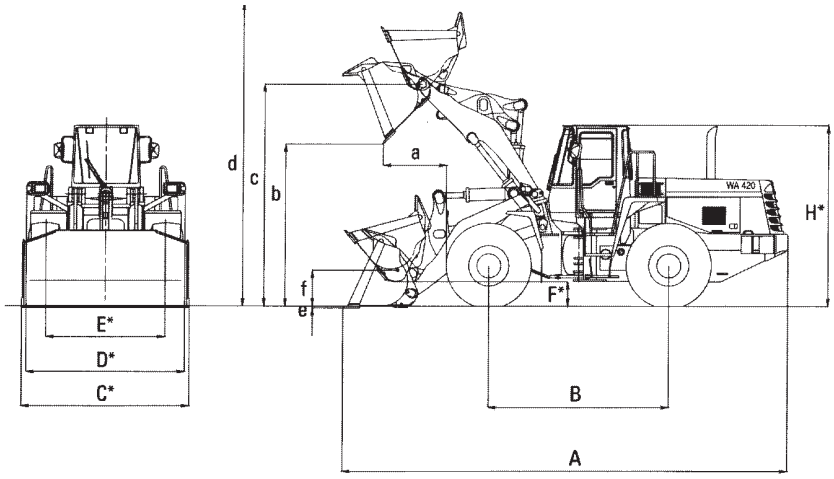


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Up to SN WA420H30296



Buckets (Capacities to ISO 7546)		m³	3.6	4.0
	Specific density	t/m³	1.8	1.6
	Bucket weight without teeth	kg	1.720	1.770
	Static tipping load (straight)	kg	15250	14770
	Static tipping load (at a 40° angle	kg	13270	12850
	Breakout force, hydraulic	kN	193	181
	Hydraulic lifting capacity, on ground	kN	211	205
	Operating weight *	kg	20020	20070
a	Reach at 45°	mm	966	1022
b	Dumping height at 45°	mm	3080	3024
c	Lift height, hinge pin	mm	4186	4186
d	Height to upper edge of bucket	mm	5716	5716
e	Digging depth	mm	38	38
f	Bucket height when travelling	mm	467	467
A	Overall length	mm	7937	8017
B	Wheelbase	mm	3300	3300
C	Bucket width	mm	3000	3000
D	Width across tyres	mm	2920	2920
E	Track width	mm	2200	2200
F	Ground clearance	mm	465	465
H	Overall height	mm	3445	3445

These figures refer to the machine fitted with 26.5 R 25 SPT 7 LD tyres.
Where tyres to type 23.5 R 25 are used, the vertical dimensions reduce by 50 mm.

Special buckets:
3.3 m³ HD bucket
5.8 m³ bucket for lightweight materials

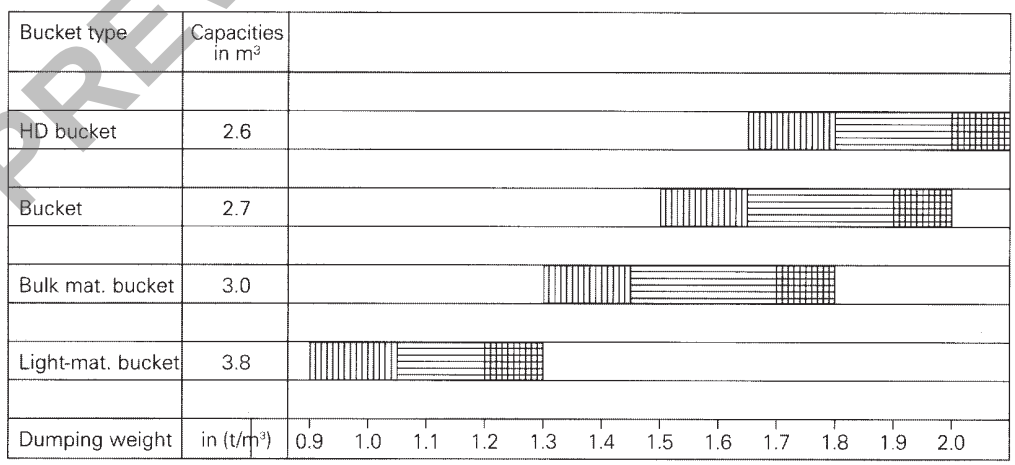
The standard 3.6/4.0 m³ buckets shown in the table can also be supplied with bolt-on cutting edges to increase capacities to 3.7/4.1 m³.

Data will be modified according to:

	Additional counter-weight	Tyre pressures 26.5 R 25
Weight	+ 325 kg	+1560 kg
dump load		
0°	+ 875 kg	+ 2530 kg
45°	+ 730 kg	+ 2225 kg
Overall length	+ 175 mm	–

L_{pA} = 76 dB(A)
L_{wA} = 108 dB(A)

* Machine without any counterweight.



The actual volume will usually exceed the ISO/SAE classification. The table shows optimum bucket data, depending on the material involved.

Material	Bucket contents %	Density t/m³
Earth	100–115	1.5–1.6
Clay	110–120	1.5–1.7
Sand	100–110	1.4–1.8
Gravel	100–110	1.5–2.0
Rock	75–100	1.6–2.0

420-003G

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FOREWORD

GENERAL

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

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

STRUCTURE AND FUNCTION

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

TESTING AND ADJUSTING

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

DISASSEMBLY AND ASSEMBLY

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

MAINTENANCE STANDARD

This section gives the judgement standards when inspecting disassembled parts.

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NOTICE

The specifications contained in this shop manual are subject to change at any time and without any advance notice. Use the specifications given in the book with the latest date.

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SAFETY
SAFETY NOTICE

IMPORTANT SAFETY NOTICE

Proper service and repair is extremely important for safe machine operation. Some of the described service and repair techniques require the use of tools specially designed by Komatsu for the specific purpose.

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

GENERAL PRECAUTIONS

Mistakes in operation are extremely dangerous. Read the OPERATION AND MAINTENANCE MANUAL carefully BEFORE operating the machine!

Always follow the safety rules valid in your country carefully!

1. Before carrying out any greasing or repairs, read all the precautions given on the decals which are fixed to the machine.
2. When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.
   - Always wear safety glasses when hitting parts with a hammer.
   - Always wear safety glasses when grinding parts with a grinder, etc.
3. If welding repairs are needed, always have a trained, experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, glasses, cap and other clothes suited for welding work.
4. When carrying out any operation with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR signs on the controls in the operator's compartment.
5. Keep all tools in good condition and learn the correct way to use them.
6. Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places.

Always keep the work area clean and make sure that there is no dirt or oil on the floor.
Never smoke while working.
Smoke only in the areas provided for smoking.

PREPARATIONS FOR WORK

7. Before adding oil or making any repairs, park the machine on hard, level ground, and block the wheels or tracks to prevent the machine from moving.
8. Before starting work, lower blade, ripper, bucket or any other work equipment to the ground and install the safety bar on the frame. If this is not possible, insert the safety pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning signs on them.
9. When disassembling or assembling, support the machine with blocks, jacks or stands before starting work.
10. Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine. Never jump on or off the machine. If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

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PRECAUTIONS DURING WORK

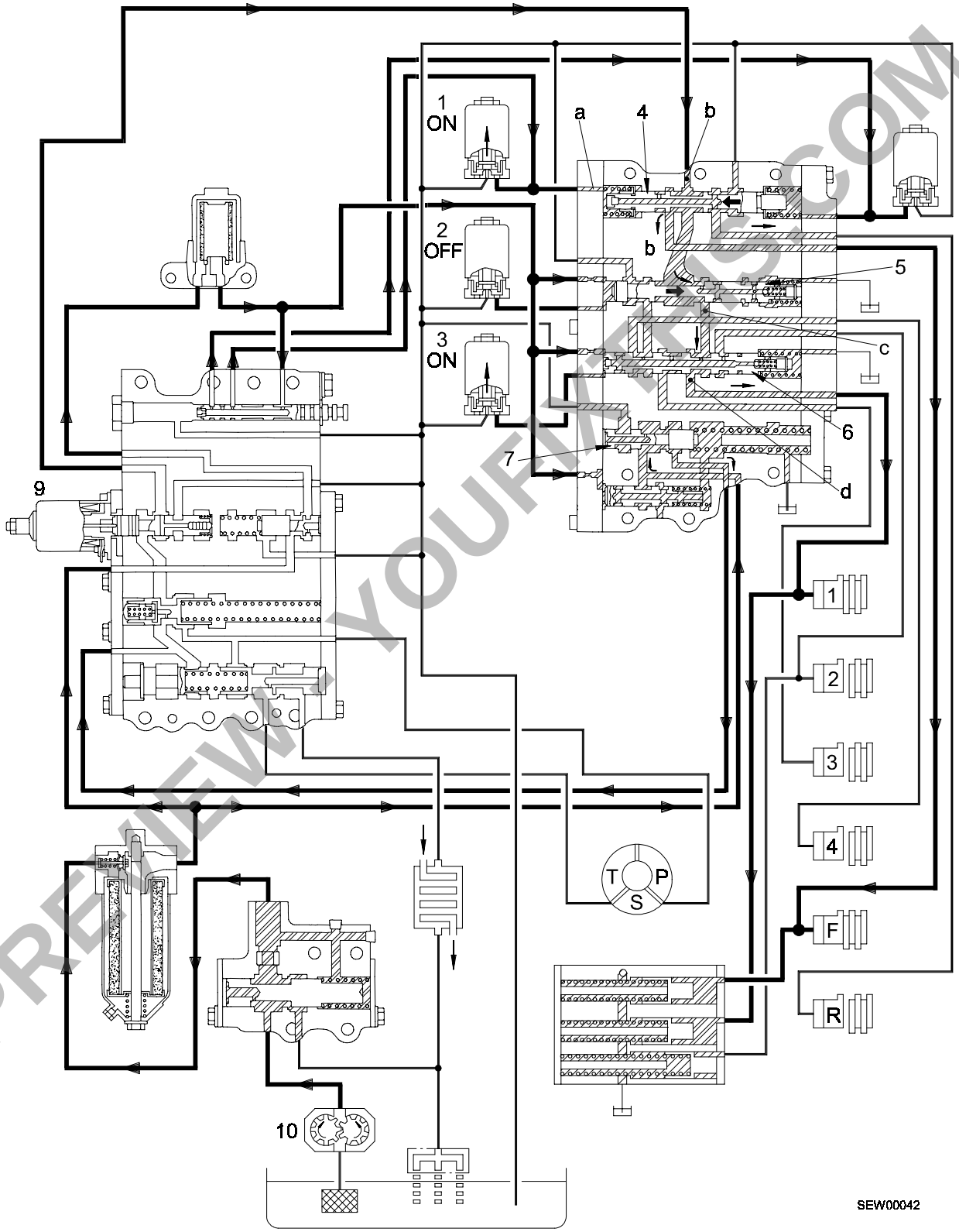
11. When measuring hydraulic pressure, check that the measuring tool is correctly assembled before taking any measurements.
12. When removing the oil filler cap, drain plug or hydraulic pressure measuring plugs, loosen them slowly to prevent the oil from spurting out.
    Before disconnecting or removing components of the oil, water or air circuits, first remove the pressure completely from the circuit.
13. The water and oil in the circuits are hot when the engine is stopped, so be careful not to get burned.
    Wait for the oil and water to cool before carrying out any work on the oil or water circuits.
14. Before starting work, remove the leads from the battery. Always remove the lead from the negative (–) terminal first.
15. When raising heavy components, use a hoist or crane.
    Check that the wire rope, chains and hooks are free from damage.
    Always use lifting equipment which has ample capacity.
    Install the lifting equipment at the correct places.
    Use a hoist or crane and operate slowly to prevent the component from hitting any other part. Do not work with any part still raised by the hoist or crane.
16. When removing covers which are under internal pressure or under pressure from a spring, always leave two bolts in position on opposite sides. Slowly release the pressure, then slowly loosen the bolts to remove.
17. When removing components, be careful not to break or damage the wiring. Damaged wiring may cause electrical fires.
18. When removing piping, stop the fuel or oil from spilling out. If any fuel or oil drips onto the floor, wipe it up immediately. Fuel or oil on the floor can cause you to slip, or can even start fires.
19. As a general rule, do not use gasoline to wash parts. In particular, use only the minimum of gasoline when washing electrical parts. Do not smoke!
20. Be sure to assemble all parts again in their original places.
    Replace any damaged parts with new parts.
    - When installing hoses and wires, be sure that they will not be damaged by contact with other parts when the machine is being operated.
21. When installing high pressure hoses, make sure that they are not twisted. Damaged tubes are dangerous, so be extremely careful when installing tubes for high pressure circuits. Also, check that connecting parts are correctly installed.
22. When aligning two holes, never insert your fingers or hand. Be careful not to get your fingers caught in a hole.
23. When assembling or installing parts, always use the specified tightening torques. When installing protective parts such as guards, or parts which vibrate violently or rotate at high speed, be particularly careful to check that they are installed correctly.

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TRANSMISSION OIL PRESSURE SYSTEM DIAGRAM

Operation of FORWARD 1st



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Operation

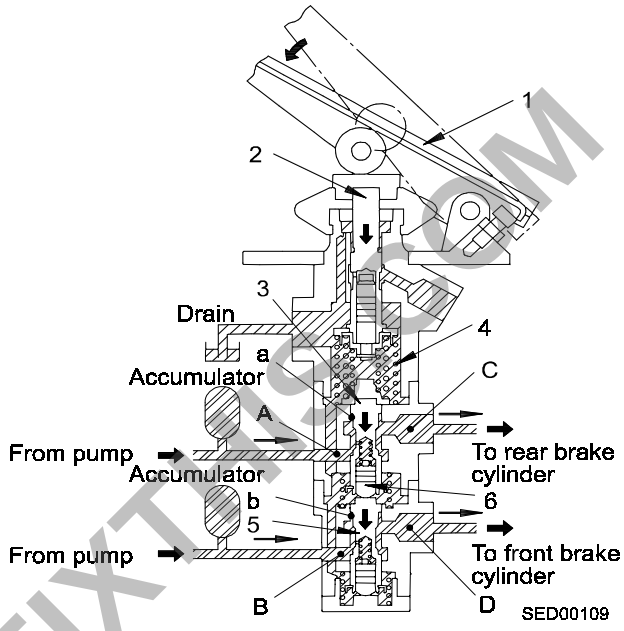
Brake applied (right brake valve)

Upper portion

- When brake pedal (1) is depressed, the operating force is transmitted to spool (3) through rod (2) and spring (4). When spool (3) goes down, drain port a is closed, and the oil from the pump and accumulator flows from port A to port C and actuates the rear brake cylinders.

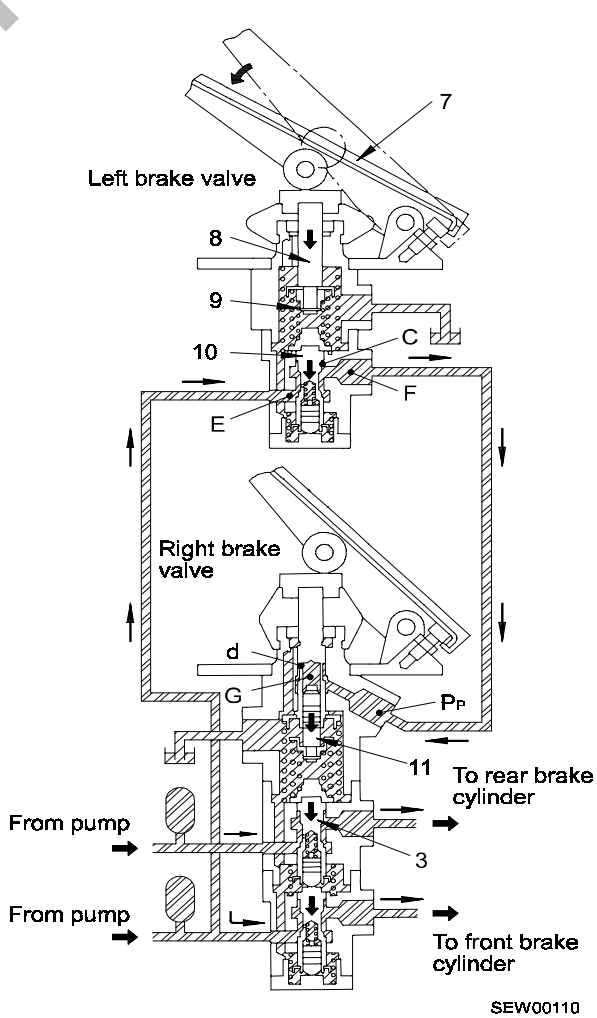
Lower portion

- When brake pedal (1) is depressed, the operating force is transmitted to spool (3) through rod (2) and spring (4). When spool (3) goes down, spool (5) is also pushed down by plunger (6). When this happens, drain port b is closed, and the oil from the pump and accumulator flows from port B to port D and actuates the front brake cylinders.



Brake applied (left brake pedal)

- When pedal (7) is depressed, spool (10) is pushed up by rod (8) and spring (9), and drain port C is closed. The oil from the pump and the accumulator flows from port E to port F.
- Port F of the left brake valve and port P_P of the right brake valve are connected by a hose, so the oil flowing to port F flows to pilot port P_P of the right brake valve.
- The oil entering pilot port P_P enters port G from orifice d, and pushes piston (11). The spring pushes spool (3) down, so the operation is the same as when the right brake valve is depressed.

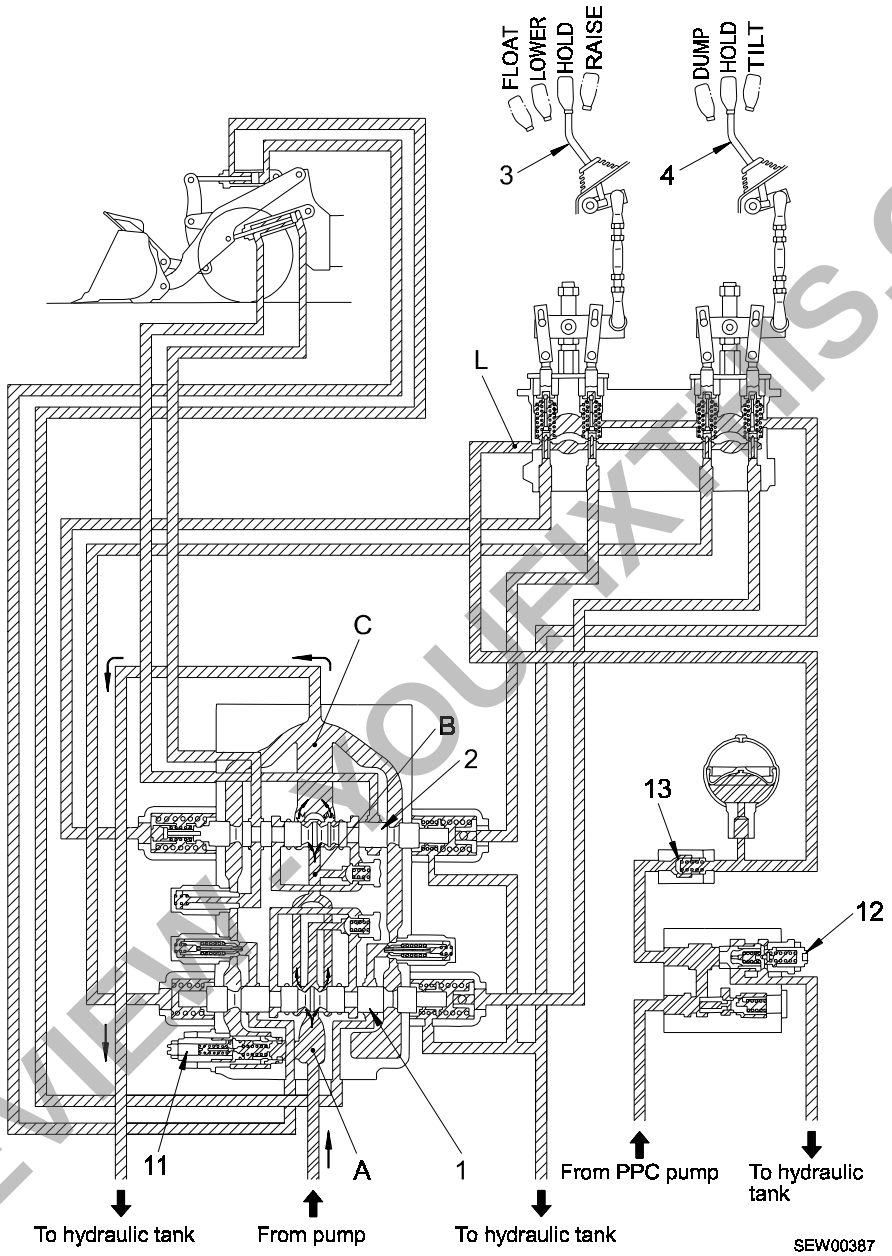


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BOOM AND BUCKET SPOOL HOLD POSITION

Schematic sketch only!

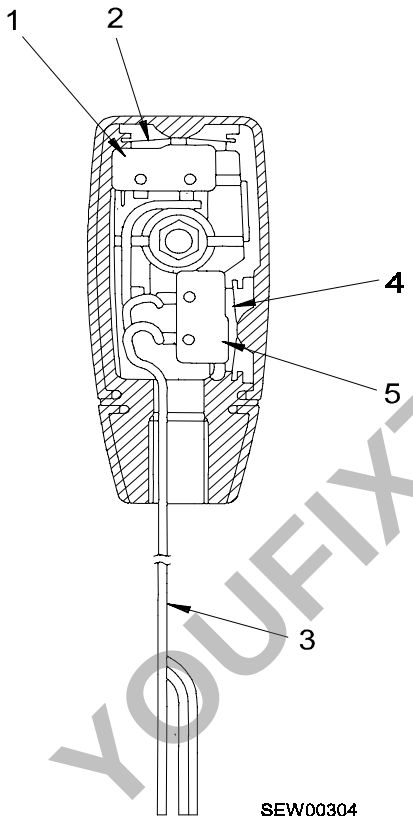


Operation

- The oil enters port A from the pump, and the maximum pressure is set by relief valve (11).
- Bucket spool (1) is at the HOLD position, so the bypass circuit is open and the oil at port A passes around the spool and flows to port B. Boom spool (2) is also at HOLD, so the bypass circuit is open and the oil at port B passes around the spool, enters port C of the drain circuit, passes through the filter, and returns to the tank.
- The oil from the PPC pump passes through check valve (13), and enters port L of the PPC valve. However, the boom and bucket levers are at the HOLD position, so the oil returns to the hydraulic tank from PCC relief valve (12).

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KICK-DOWN, HOLD SWITCH



1. Kick-down switch
2. Spring
3. Wiring harness
4. Spring
5. Hold switch

KICK-DOWN SWITCH

Operation

- The kick-down (shifting down from 2nd → 1st) is actuated only when traveling in F2.
- When traveling in F2, if it is desired to shift down to 1st without operating the speed lever, operate the kick-down switch on the boom lever to ON to shift down to F1.
- After this, even if the kick-down switch is pressed, the transmission is kept at F1.

Cancellation (or not actuated)

- When directional lever is at N
- When directional lever is at R
- When speed lever is not at 2nd
- When starting switch is OFF

HOLD SWITCH

- The hold switch is installed to the boom lever, and when the hold switch is pressed, the speed range displayed on the main monitor transmission indicator is held.
- Press the hold switch again to cancel.

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Cause	Fault recognition	Remedy
Low pressure too high High pressure too high	- System too full - Condenser is dirty or blocked - Blower faulty or wrong rotational direction - Condenser blocked	- Clean condenser or replace - Repair blower or replace
Low pressure too low High pressure too high	- Dryer blocked - Faulty expansion valve - Compressor faulty	- Replace dryer - Replace expansion valve - Replace compressor
Low and high pressure the same	- Compressor faulty	- Check drive belt - belt pulley - magnetic clutch, if all correct, proceed as for "Compressor does not switch on"
Low pressure too low High pressure normal	- Faulty expansion valve - Dirty or blocked vaporiser	- Replace expansion valve - Clean or replace vaporiser
Low pressure too low High pressure too low	- Expansion valve faulty - Not enough coolant - Insufficient cooling effect only for short time; water in system, expansion valve iced up as a result - Dryer or expansion valve partially blocked - Vaporiser iced up - Thermoswitch not working	- Replace expansion valve - Refill air conditioning system - Evacuate system, replace dryer - Replace dryer and expansion valve - Check the ON and OFF times of the compressor - Adjust or replace the thermoswitch
Compressor switches on and off at speed	- Loose contact in the electrical system - Coolant pressure too high	- Check electrical system (air conditioner switch, thermostat) - Check air conditioning system pressure and refill if necessary
Compressor constantly running as well	- Thermostat not working	- Check whether sensor lead has been pushed into the vaporiser correctly - Check whether the sensor lead is okay - Adjust or replace thermostat
Compressor does not switch on	- Not enough coolant in system - Air conditioning system power supply interrupted	- Check air conditioning system pressure and refill if necessary - Check electrical system
Condenser fan not working	- Fault in the electrical system - Fan faulty	- Check electrical system - Repair fan or replace

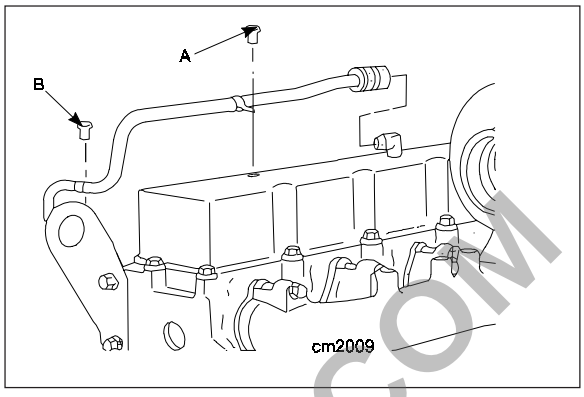
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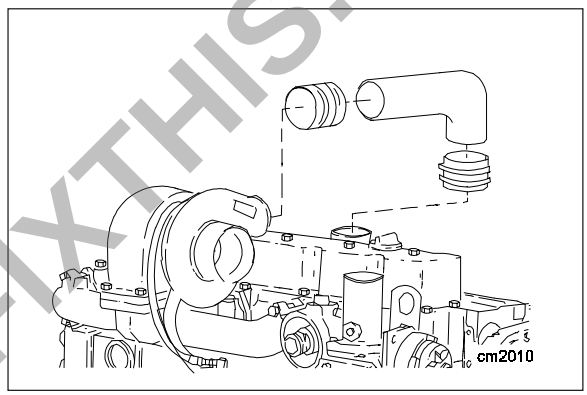
Install the crankcase vent tube and secure with the support clamps and hose clamp.

kgm A = 24 Nm

kgm B = 43 Nm



Install the air crossover tube and any other parts previously removed to gain access to the valve cover.



Install the engine hood.

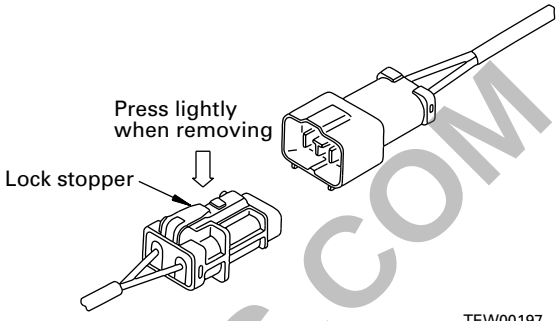
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2) Removing, installing, and drying connectors and wiring harnesses

Disconnecting connectors

(1) Hold the connectors when disconnecting.
When disconnecting the connectors, hold the connectors and not the wires.
For connectors held by a screw, loosen the screw fully, then hold the male and female connectors in each hand and pull apart. For connectors which have a lock stopper, press down the stopper with your thumb and pull the connectors apart.

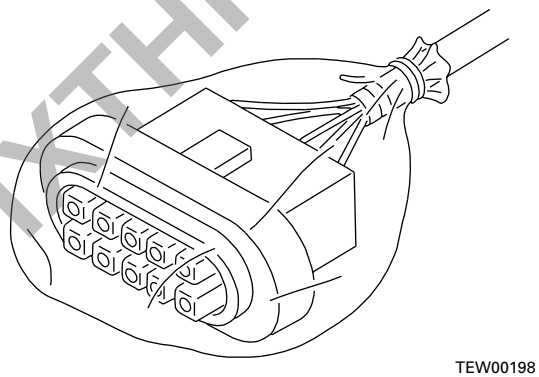


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(2) Action to take after removing connectors
After removing any connector, cover it with a vinyl bag to prevent any dust, dirt, oil, or water from getting in the connector portion.

Connecting connectors

(1) Check the connector visually.
   a. Check that there is no oil, dirt, or water stuck to the connector pins (mating portion).
   b. Check that there is no deformation, defective contact, corrosion, or damage to the connector pins.
   c. Check that there is no damage or breakage to the outside of the connector.
   ★ If there is any oil, water, or dirt stuck to the connector, wipe it off with a dry cloth. If any water has got inside the connector, warm the inside of the wiring with a dryer, but be careful not to make it too hot as this will cause short circuits.
   ★ If there is any damage or breakage, replace the connector.

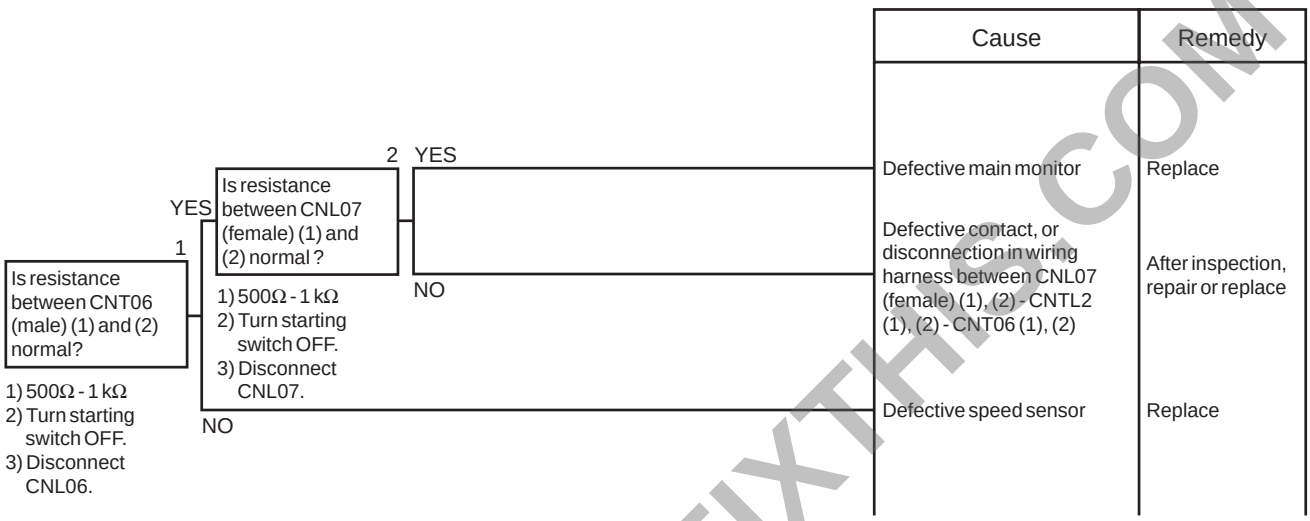

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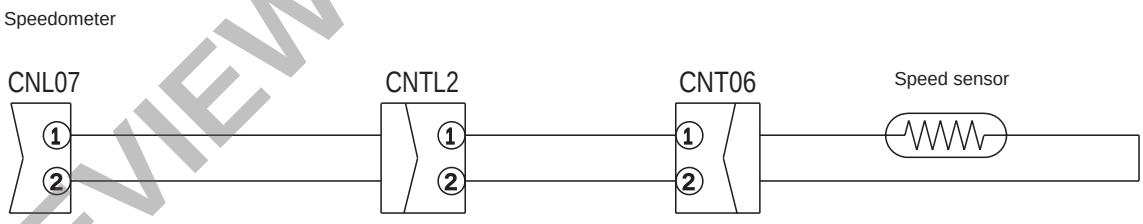
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M-3 Speedometer display does not work properly

★ Before carrying out troubleshooting, check that all the related connectors are properly inserted.
★ Always connect any disconnected connectors before going on the next step.
★ Check that the gap between the speed sensor and gear is normal.





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(WA320-3H manual gear shift)

○: 0 – 0.5 V
●: 20 – 30 V

(H – L) (Speed)

Transmission range	Between CNT03 (female) (1) chassis ground	Between CNT04 (female) (1) chassis ground
1	○	●
2	○	○
3	●	○
4	●	●

Table 1 (normal)

Transmission range	Between CNT03 (female) (1) chassis ground	Between CNT04 (female) (1) chassis ground
1	○	○
2	○	○
3	○	○
4	○	○

Table 2-1 (abnormal)

Transmission range	Between CNT03 (female) (1) chassis ground	Between CNT04 (female) (1) chassis ground
1	○	●
2	○	○
3	○	○
4	○	●

Table 2-2 (abnormal)

Transmission range	Between CNT03 (female) (1) chassis ground	Between CNT04 (female) (1) chassis ground
1	○	○
2	○	○
3	●	○
4	●	○

Table 2-3 (abnormal)

Transmission range	Between CNT03 (female) (1) chassis ground	Between CNT04 (female) (1) chassis ground
1	○	●
2	○	○
3	●	○
4	○	○

Table 2-4 (abnormal)

Transmission range	Between CNT03 (female) (1) chassis ground	Between CNT04 (female) (1) chassis ground
1	○	●
2	○	○
3	●	○
4	●	○

Table 2-5 (abnormal)

Transmission range	Between CNT03 (female) (1) chassis ground	Between CNT04 (female) (1) chassis ground
1	○	●
2	○	○
3	●	○
4	○	●

Table 2-6 (abnormal)

Transmission range	Between CNT03 (female) (1) chassis ground	Between CNT04 (female) (1) chassis ground
1	●	●
2	●	○
3	●	○
4	●	●

Table 2-7 (abnormal)

Transmission range	Between CNT03 (female) (1) chassis ground	Between CNT04 (female) (1) chassis ground
1	○	●
2	○	●
3	●	●
4	●	●

Table 2-8 (abnormal)

Transmission range	Between CNT03 (female) (1) chassis ground	Between CNT04 (female) (1) chassis ground
1	●	●
2	●	●
3	●	●
4	●	●

Table 2-9 (abnormal)

(F) (R)

Directional lever	Between CNT01 (female) (1) chassis ground	Between CNT02 (female) (1) chassis ground
FORWARD	●	○
REVERSE	○	●

Table 3 (normal)

Directional lever	Between CNT01 (female) (1) chassis ground	Between CNT02 (female) (1) chassis ground
FORWARD	○	○
REVERSE	○	●

Table 4-1 (abnormal)

Directional lever	Between CNT01 (female) (1) chassis ground	Between CNT02 (female) (1) chassis ground
FORWARD	●	○
REVERSE	○	○

Table 4-2 (abnormal)

Directional lever	Between CNT01 (female) (1) chassis ground	Between CNT02 (female) (1) chassis ground
FORWARD	○	○
REVERSE	○	○

Table 4-3 (abnormal)

Directional lever	Between CNT01 (female) (1) chassis ground	Between CNT02 (female) (1) chassis ground
FORWARD	●	●
REVERSE	○	●

Table 4-4 (abnormal)

Directional lever	Between CNT01 (female) (1) chassis ground	Between CNT02 (female) (1) chassis ground
FORWARD	●	○
REVERSE	●	●

Table 4-5 (abnormal)

Directional lever	Between CNT01 (female) (1) chassis ground	Between CNT02 (female) (1) chassis ground
FORWARD	●	●
REVERSE	●	●

Table 4-6 (abnormal)

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T-7 Steering is heavy

Ask the operator the following questions.

- Did the problem suddenly start?
  Yes = Steering equipment damaged or broken
- Was there previously any symptom, such as heavy steering?
  Yes = Wear of internal parts of steering equipment, defective seal

Checks before troubleshooting

- Is the hydraulic oil level correct? Is the type of oil correct?
- Is there any abnormality in the steering gear box mount, column, or linkage?
- Is the stopper for the steering valve control lever properly adjusted?
- Is there any leakage of oil from the hydraulic hoses, valves, or cylinders?
- Is there any scuffing of the center hinge pin bearing or steering cylinder pin or bushing?
- Is the tire inflation pressure correct?

Checking for abnormalities

- Measure the operating force of the steering wheel and the time taken to turn the steering, and check the values in the Standard Value Table to check if there is any abnormality.

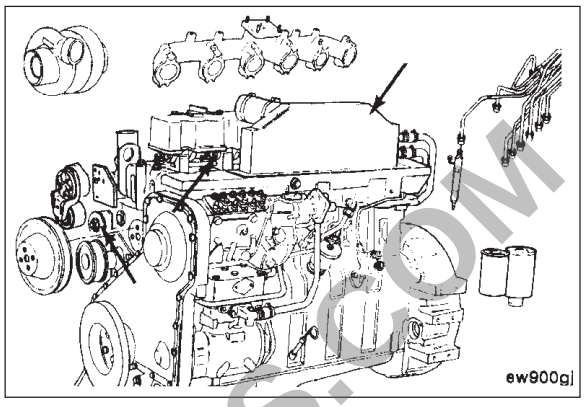
No.	Problems / Causes → Remedy	Tank-pump a	Valves b	Valves c	Valves d	Valves e	Others f	Others g	Others i
		△ ×	△A ×	△ ×	△ ×	△ ×	△C ×	△C ×	△ ×
1	Steering is heavy when turned in both direction (left and right)	○	○		○	○			○
2	Steering is heavy when turned in one direction (left or right)			○		○			
3	Steering is particularly heavy when engine is at low speed	○				○			
4	Boom lifting speed is low when engine is runnig at full throttle	○							
5	Steering is heavy and steering wheel jerks	○							
6	Hydraulic oil overheats						○		
7	Oil pressure in steering circuit is low		○	○	○	○			
8	Oil pressure rises in return piping for steering cylinder						○	○	

Causes: Steering and switch pump; Steering relief valve; Safety valve; Demand spool; Defect inside steering cylinder (oil leakage from piston seal); Clogged filter at hydraulic oil return side, defective bypass valve; Clogged oil cooler; Defect inside steering gear box (beaaring, worm nut); Defective hydraulic pump; Defect inside steering valve

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Removal



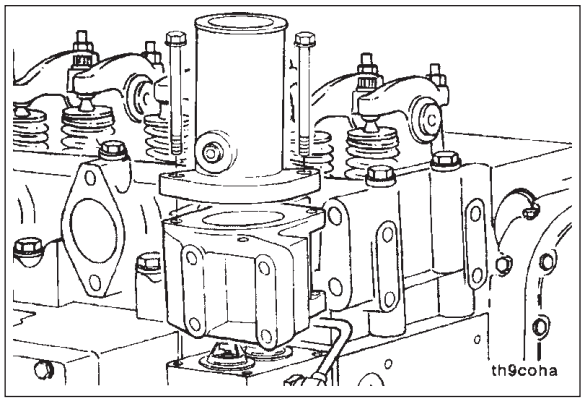
Drain the cooling system.

- Remove the turbocharger.
- Remove the aftercooler or intake cover.
- Remove the exhaust manifold.
- Remove the fuel lines and injector nozzles.
- Remove the valve cover, rocker lever assemblies and push rods.
- Remove the fuel filters.
- Remove the fan hub.
- Remove the alternator.
- Remove the belt tensioner.

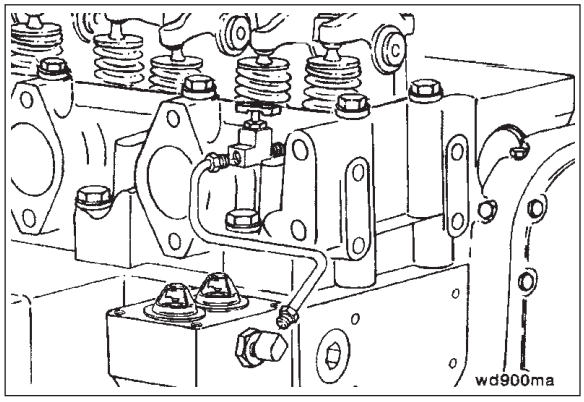
For details refer to CUMMINS Troubleshooting and Repair Manual. P/N. 36 66 003-01

NOTE: Insome applications it may be easier to remove the thermostat housing to gain access to the exhaust manifold capscrew for No. 1 cylinder.

Remove the thermostat housing/coolant outlet assembly.



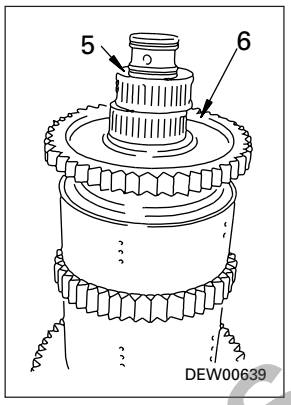
Disconnect the coolant vent tube.

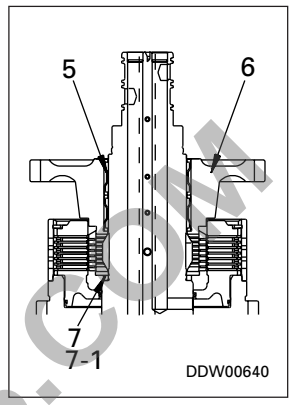


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4) Needle bearing, 4th gear
   i) Assemble spacer (7-1) and thrust washer (7) inside clutch case in order.
      ★ Before assembling the spacer, warm it up at 80°C – 120°C for 80 minutes.
      Thrust washer: Oil (EO10-CD)
   ii) Install 4th gear (6) to shaft, and assemble needle bearing (5).

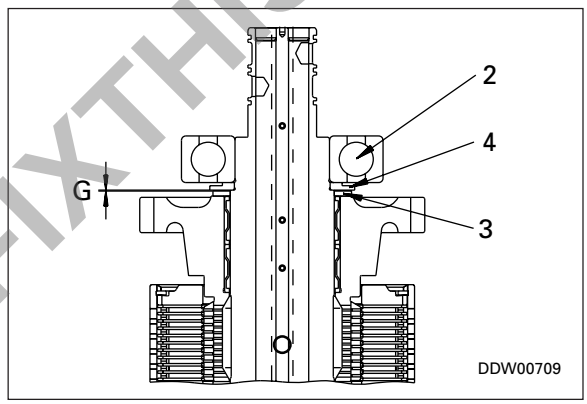




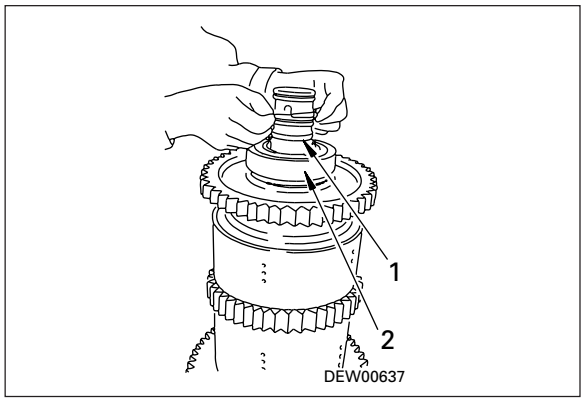
5) Bearing, thrust washer
   i) Assemble thrust washer (3) and spacer (4) to shaft in order.
      ★ Before assembling bearing (2) and spacer (4), warm them up at 80°C – 120°C for 80 minutes.
      ★ When press fitting the bearing, check that there is no clearance.

      Thrust washer (3): Oil (EO10-CD)

   ii) Press fit bearing (2) to shaft.
      ★ After press fitting the bearing, check the dimension of clearance G between spacer (4) and thrust washer (3).
         ★ G: 0.37 – 1.33 mm
            (4th clutch end)



6) Seal rings
   Install 3 seal rings (1) to shaft.

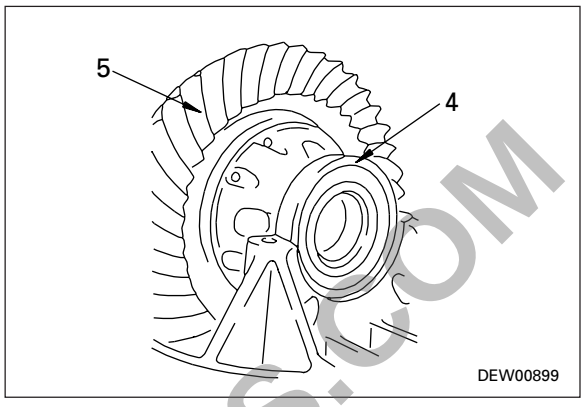


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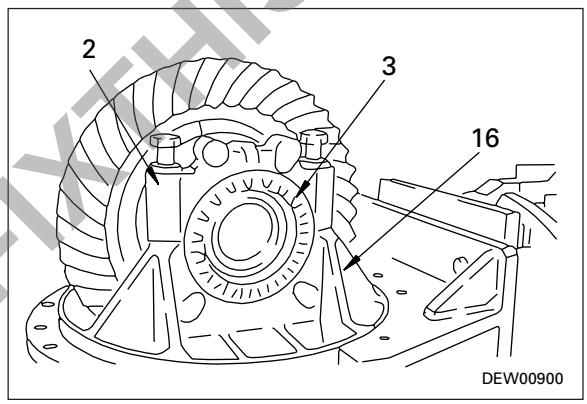
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8. Differential gear
   1) Raise gear (5), and assemble bearing cup (4) to bearing, then install to case.

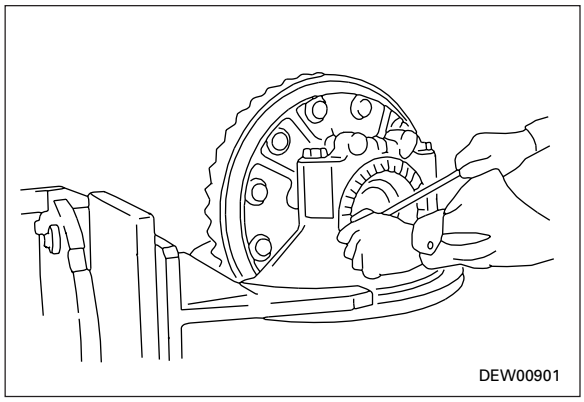


   2) Align with thread of differential case (16), and install adjustment ring (3).

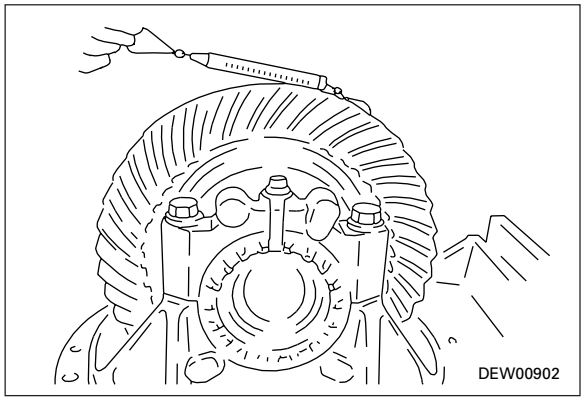
   3) Align match mark and install bearing cap (2).
      ★ Be careful not to damage the thread of the cap.



9. Adjusting preload of bearing
   1) Turn adjustment ring with a bar until ring gear contacts pinion gear, and adjust until there is no more backlash.
      ★ Rotate the bearing sufficiently to give complete contact between the bearing and other contact parts, then tap the ring gear with a copper hammer.
      ★ Coat the bearing well with oil.
      ★ If the adjustment ring on one side is loosened one turn, tighten the adjustment ring on the other side by one turn.



   2) Install spring balance to ring gear, and measure free rotation torque.
      Free rotation torque:
      19.6 – 24.5 N (2.0 – 2.5 kg)
      ★ Target value: 24.5 N (2.5 kg)

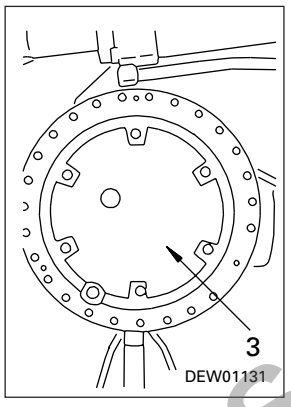


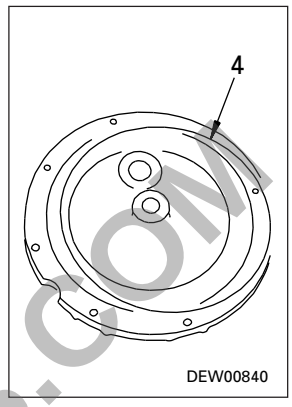
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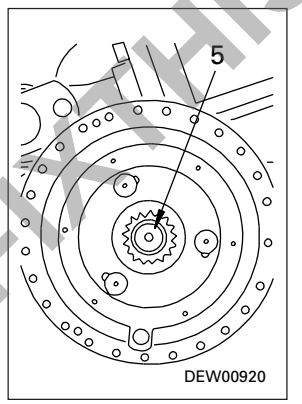
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3. Cover
   Remove cover (3), then remove O-ring (4).



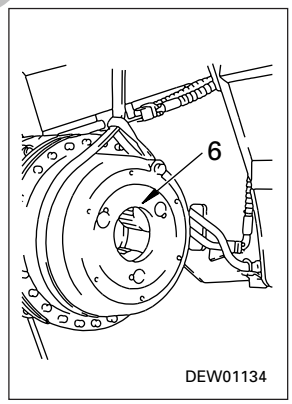


4. Axle shaft
   Using forcing screws (Thread dia.=12mm, Pitch=1.75mm), pull out axle shaft (5) approx. 200 mm.

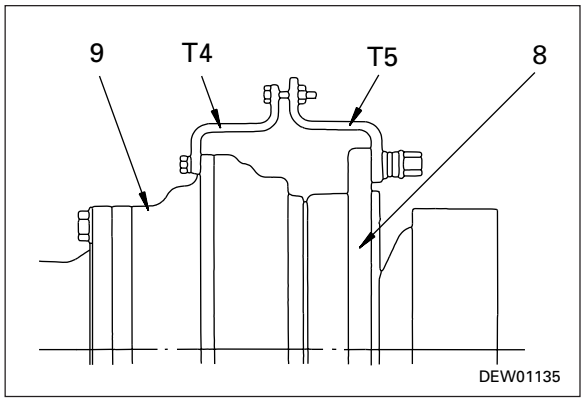


5. Planetary carrier
   Remove 3 mounting bolts, and lift off planetary carrier (6).
   - ★ Make match marks and use as a guide when assembling.
   - ★ Be careful of the center of gravity and remove slowly.

   kg Planetary carrier: 86 kg

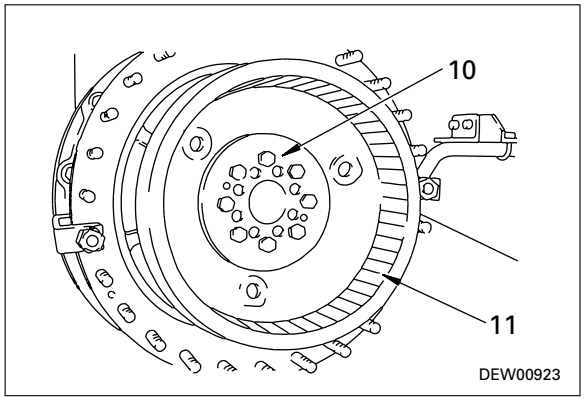


6. Ring gear
   1) Using tools T4 and T5, secure wheel hub (8) and brake (9).
      - ★ Install tools T4 and T5 at three equally spaced places, then use a washer to adjust the clearance.



   2) Remove mounting bolts of retainer (10), then remove ring gear (11).
      - ★ Check the number and thickness of the shims between the retainer and the axle housing, and keep in a safe place.

   kg Ring gear: 35 kg



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REMOVAL OF AIR CONDITIONER UNIT ASSEMBLY

⚠ Stop the machine on level ground and install the safety bar on the frame. Lower the bucket to the ground and stop the engine. Then apply the parking brake and put blocks under the wheels to prevent the machine from moving.

⚠ Disconnect the cable from the negative (–) terminal of the battery.

- Remove the cover under the cab.
- After carrying out the oil return operation for the compressor, use a gauge manifold and release the refrigerant slowly from the core of the compressor high-pressure and low-pressure valves.

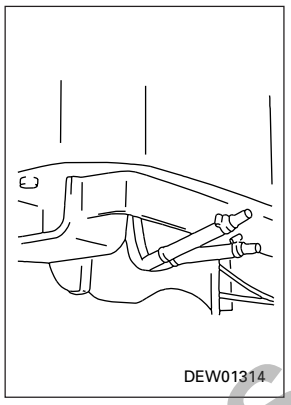
- To carry out the oil return operation, set the fan switch to the maximum position, then run the engine at low idling and operate the air conditioner for 5 minutes.

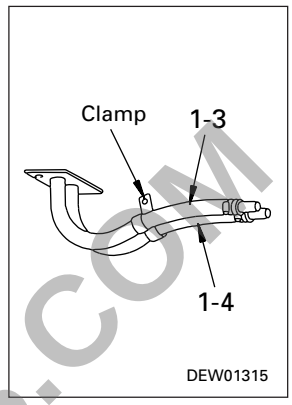
⚠ If the refrigerant gets into your eyes, it may cause loss of sight, so always wear safety glasses.

1. Loosen clamp of heater hoses (1-3) and (1-4), and disconnect hoses.

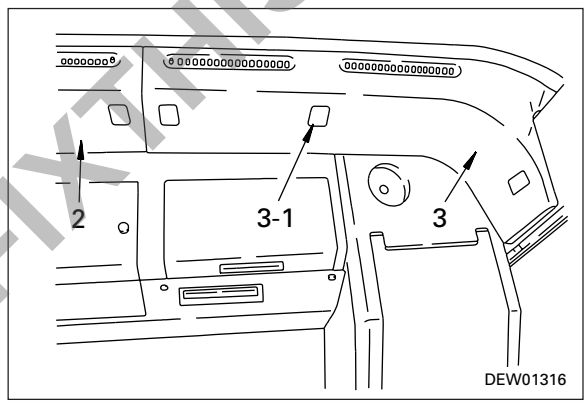
2. Remove cab rear covers (2) and (3).
   - ★ Slide the operator's seat forward and tip it to the front.
   - ★ Remove the blind cap (3-1).
   - ★ Remove 2 bolts and loosen 6 bolts.

3. Remove 5 mounting bolts of cover (4), then remove cover.
4. Remove seat support cover (5).

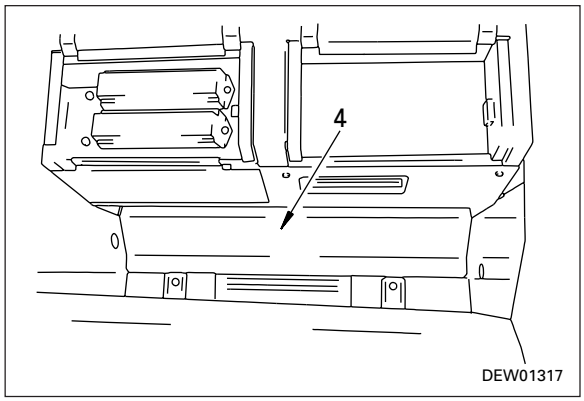

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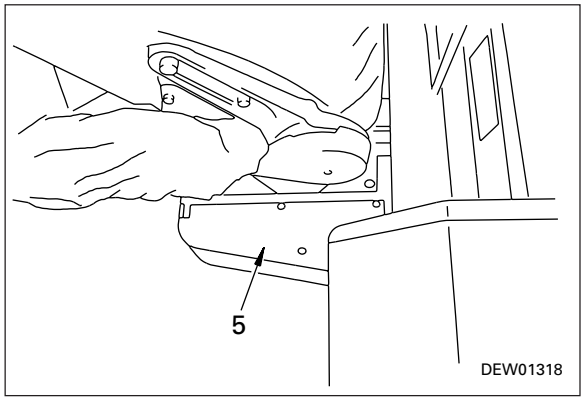
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