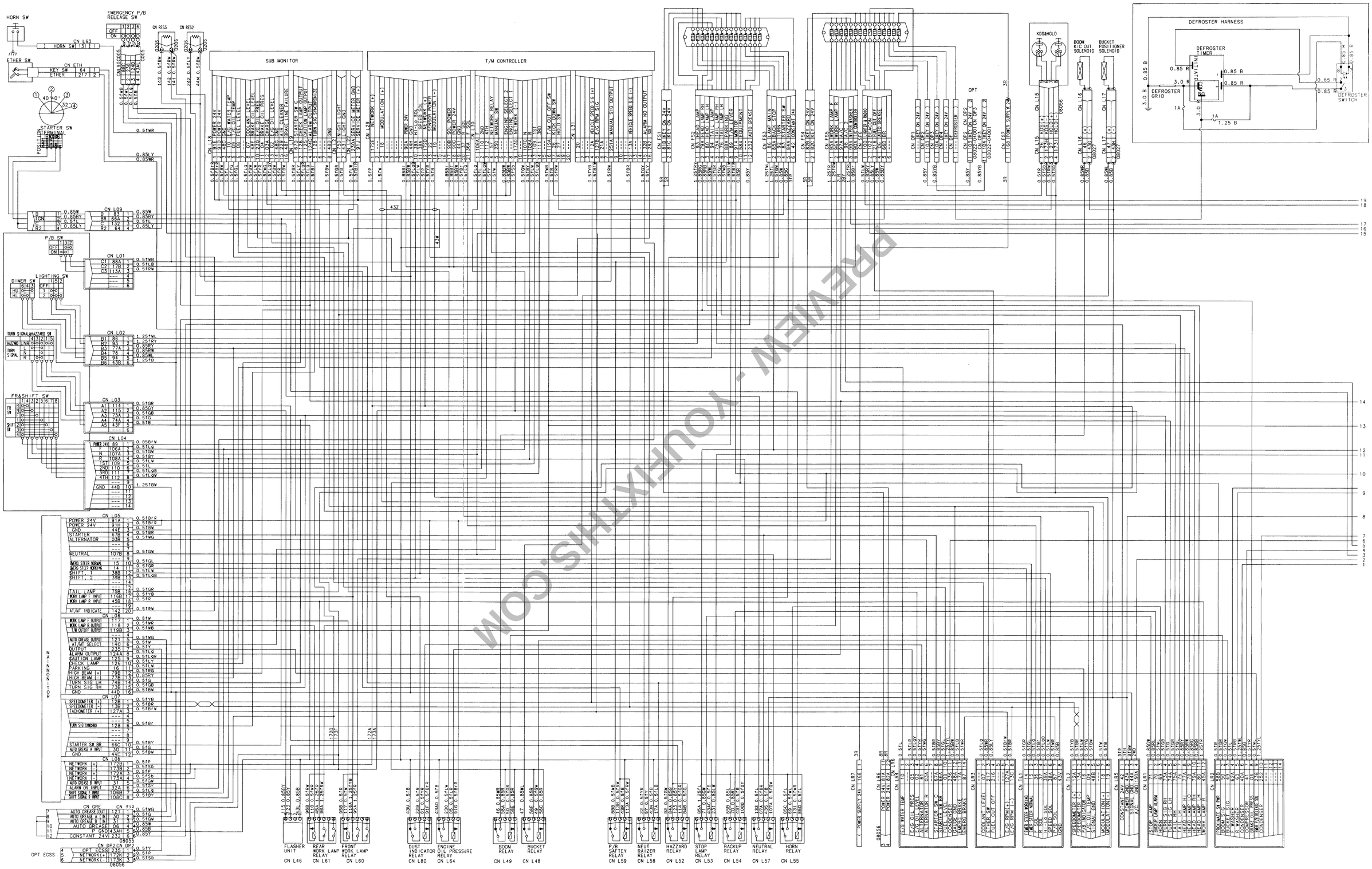
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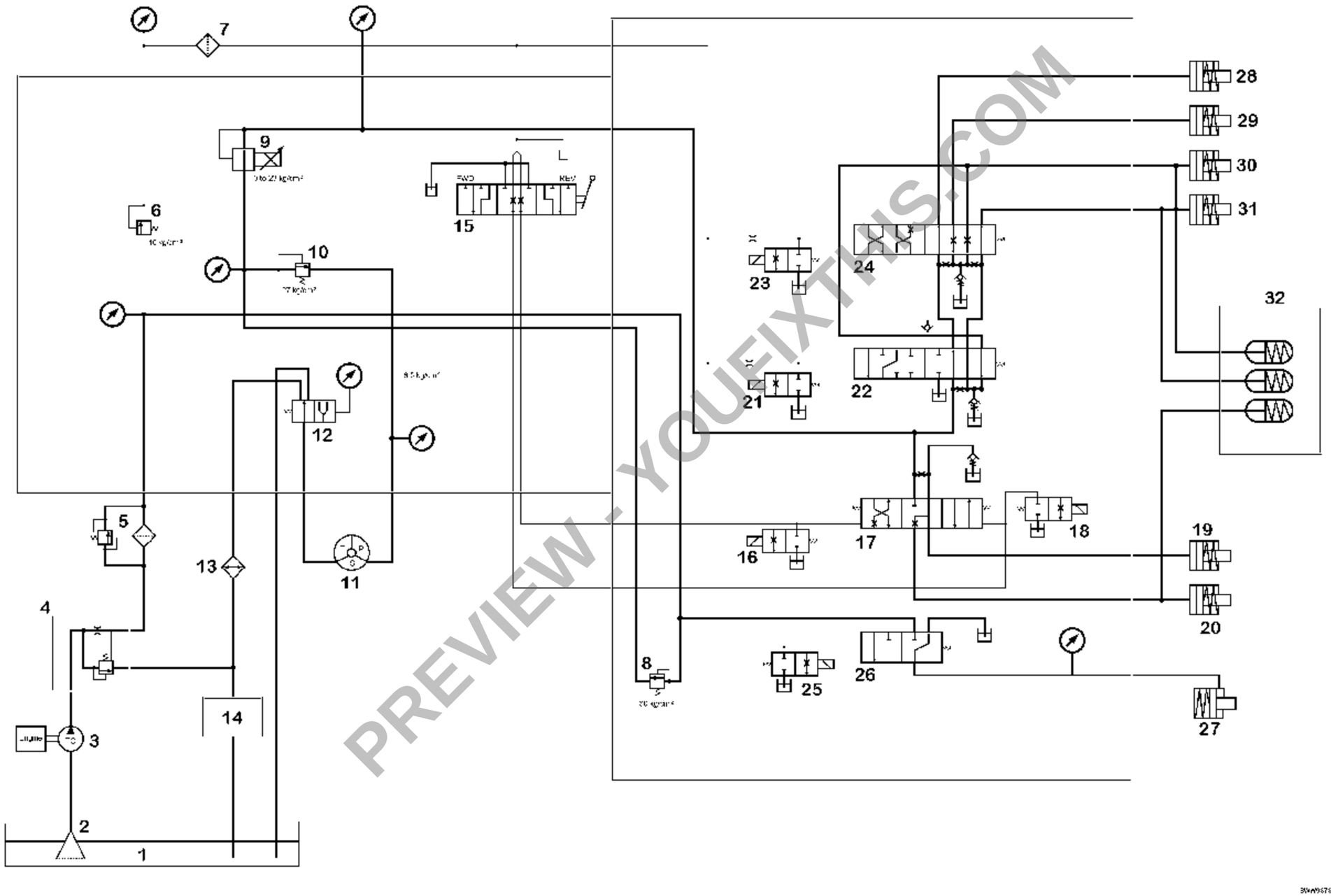
FOLDOUT 1

ELECTRICAL CIRCUIT DIAGRAM (1 OF 4)



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TRANSMISSION HYDRAULIC CIRCUIT DIAGRAM



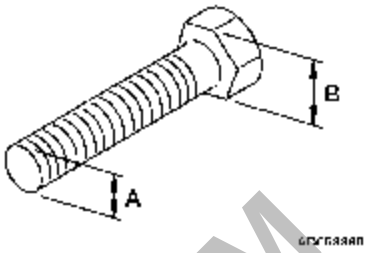
1. Transmission case
2. Strainer
3. Converter charge pump
4. Flow control valve
5. Oil filter
6. Pilot reducing valve
7. Pilot oil filter
8. Priority valve
9. Electronic modulation valve
10. Main relief valve
11. Torque converter
12. Converter outlet valve
13. Oil cooler
14. Transmission lubrication
15. Emergency manual spool
16. Solenoid valve, forward
17. Directional selector valve
18. Solenoid valve, reverse
19. Reverse clutch
20. Forward clutch
21. Solenoid valve, Hi-Lo
22. Hi-Lo selector valve
23. Solenoid valve, range
24. Range selector valve
25. Solenoid valve, parking brake
26. Parking brake valve
27. Parking brake
28. 4th clutch
29. 3rd clutch
30. 2nd clutch
31. 1st clutch
32. Accumulator

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STANDARD TIGHTENING TORQUE

STANDARD TIGHTENING TORQUE OF BOLTS AND NUTS



The following charts give the standard tightening torques of bolts and nuts.

Exceptions are given in sections of **DISASSEMBLY AND ASSEMBLY**.

Use these torques for metric bolts and nuts. (Always use torque wrench)

A Thread diameter of bolt	**B** Width across flats	(4) (H) (T) (S) (10.9)
mm	mm	**NCm**
6	10	13.2 ± 1.4
8	13	31.4 ± 2.9
10	17	65.7 ± 6.8
12	19	112 ± 9.8
14	22	177 ± 19
16	24	279 ± 29
18	27	383 ± 39
20	30	549 ± 58
22	32	745 ± 78
24	36	927 ± 98
27	41	1320 ± 140
30	46	1720 ± 190
33	50	2210 ± 240
36	55	2750 ± 290
39	60	3280 ± 340

A Thread diameter of bolt	**B** Width across flats	(7)
mm	mm	**NCm**
6	10	7.85 ± 1.95
8	13	18.6 ± 4.9
10	14	40.2 ± 5.9
12	27	82.35 ± 7.85

TIGHTENING TORQUE FOR SPLIT FLANGE BOLTS

Use these torques for split flange bolts.

A Thread diameter of bolt	**B** Width across flats	Tightening torque
mm	mm	**NCm**
10	14	65.7 ± 6.8
12	17	112 ± 9.8
16	22	279 ± 29

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ACTION CODE

Action code: E ~ ~ + CALL means that E ~ ~ and CALL are displayed alternately

Action code	Transmission control system		Buzzer	Action by operator
	Problem system	Action of machine		
E00	Speed sensor system [disconnection]	Does not shift gear automatically [gear must be shifted manually]	No	Normal operation possible using manual gear shifting
E01+CALL	Hi-Lo solenoid, speed solenoid system	Transmission range fixed [1st to 3rd, depending on case]	Yes	Travel under own power possible, call for service after moving to safe place
E03+CALL	Shift lever system	Neutral, [directional solenoid out put OFF]	Yes	Actuate EM [emergency manual] spool, open modulation solenoid manually. These actions make it possible to travel under own power. Call for service
	Directional solenoid system	Neutral [directional, modulation solenoid output OFF]		
	Modulation solenoid system	Neutral [directional, modulation solenoid output OFF]		
CALL	Short circuit with power supply on modulation solenoid wiring harness	Neutral [directional, modulation solenoid output OFF], possible that controller is burnt out	Yes	Stop machine immediately, turn start switch OFF, then call for service

FAILURE CODE

Code	**Transmission control system**
10	Modulation solenoid system
11	Modulation solenoid system
12	F solenoid valve system
13	R solenoid valve system
14	Hi-Lo solenoid valve system
16	Speed solenoid system
17	Parking brake system
20	Directional lever input system
21	Speed lever input system
22	Speed sensor input system
23	Engine speed input system

Code	**ECSS control system**
d0	Relief valve solenoid
d1	High pressure solenoid system
d2	Low pressure solenoid system
d3	Speed sensor system
d4	Abnormality in model selection

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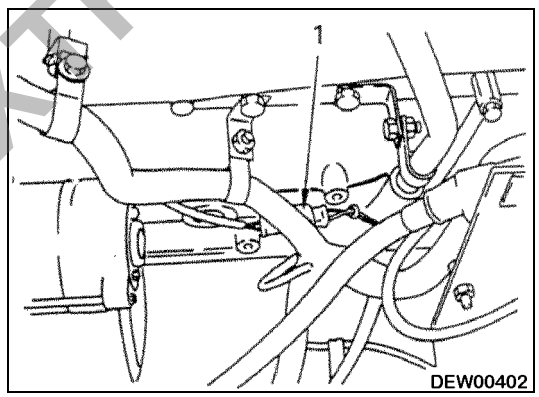
STARTING MOTOR

REMOVAL

WARNING! Disconnect the ground cable from the negative (-) terminal of the battery before proceeding.

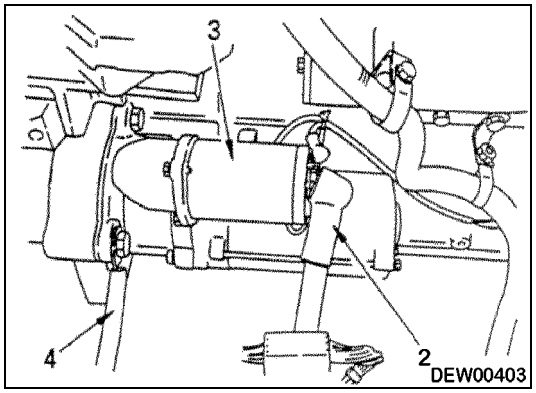
WARNING! Stop the machine on level ground and install the safety bar on the frame. Lower the bucket to the ground and stop the engine. Then apply the parking brake and block the wheels to prevent the machine from moving.

1. Open the engine hood side cover and lock it into position.
2. Unplug the wiring connector (1) and ground cable from the starting motor.



3. Disconnect the wiring (2).
4. Remove the starting motor assembly (3).

※1



INSTALLATION

- Installation is the reverse of removal.

※1

★ Connect the ground cable (4) securely after installing the starting motor (3).

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S-1 Starting performance is poor

General causes why starting performance is poor

- ! Defective electrical system
- ! Insufficient supply of fuel
- ! Insufficient intake of air
- ! Improper selection of fuel

Battery charging rate

	100%	90%	80%	75%	70%
20EC	1.28	1.26	1.24	1.23	1.22
0EC	1.29	1.27	1.25	1.24	1.23
-10EC	1.30	1.28	1.26	1.25	1.24

i At ambient temperature of 10EC or below, use ASTM D975 No. 1

! The specific gravity should exceed the value for the charging rate of 70% in the above table. In cold areas the specific gravity must exceed the value for the charging rate of 75% in the above table.

Ì Possible cause [judging from Questions and Check items]

Ê Most probable causes [judging from Questions and Check items]

Ë Possible causes due to length of use [used for a long period]

			Causes														
			Worm piston ring, cylinder	*Defective contact of valve, valve seat*	*Clogged air cleaner element*	*Clogged fuel filter, strainer*	*Clogged feed pump strainer*	*Defective intake heater [ribbon type]*	*Defective regulator*	*Defective alternator*	*Defective or deteriorated battery*	*Defective injection nozzle*	*Defective injection timing*	*Defective injection pump [rack, plunger stuck]*	*Leakage, clogging, air in fuel system*	*Clogged fuel tank air breather hole*
Questions	Confirm recent repair history																
	Degree of use of machine	Operated for long time			Ë	Ë	Ë				Ë						
	Ease of starting	Gradually became worse	Ê	Ê	Ì	Ì	Ì										
		Starts when warm						Ê			Ê						
	Indicator lamp does not light up							Ê									
	Engine oil must be added more frequently		Ê														
	Filter replacement not performed per O&MM				Ê	Ê	Ê					Ì		Ì			
	Dust indicator is red				Ê												
	Non specified fuel has been used					Ì	Ì					Ì		Ì			
Check items	Battery charge lamp is on								Ê	Ê							
	Starting motor cranks engine slowly										Ê						
	Temperature of some cylinders are low immediately after starting engine											Ê					
	Engine does not pick up smoothly and combustion is irregular		Ì	Ì								Ê					
	Blow by gas is excessive		Ê														
	Match marks on fuel injection pump are out of alignment												Ê				
	Mud is stuck to fuel tank cap																Ì
	Engine cranked with starting motor	Little fuel comes out even when pump sleeve nut is loosened												Ê			
		Little fuel comes out even when fuel filter air bleed plug is loosened				Ê	Ê							Ê			
	Leakage from fuel piping													Ì	Ê		
	There is hunting from engine [rotation is irregular]					Ì	Ì								Ê	Ì	
Troubleshooting	When compression pressure is measured, it is found to be low		Í	Í													
	When air cleaner is inspected directly, it is found to be clogged				Í												
	When fuel filter, strainer are inspected directly, they are found to be clogged					Í									Í		
	When feed pump strainer is inspected directly, it is found to be clogged						Í										
	Heater mount does not become warm							Í									
	Voltage is 26 to 30 V between alternator terminal B and terminal E with engine at low idle	Yes							Í								
		No								Í							
	Either specific gravity of electrolyte or voltage of battery is low										Í						
	Speed of some cylinders does not change when operating on reduced cylinders											Í					
	When check is made using delivery method, injection timing is found to be incorrect												Í				
	When control rack is pushed, it is found to be heavy or does not return [when blind plug is removed, it can be seen that plunger control sleeve does not move													Í			
	When fuel cap is inspected directly, it is found to be clogged																Í
	Remedy		Replace	Repair	Clean	Clean	Clean	Replace	Replace	Replace	Replace	Replace	Adjust	Replace	Correct	Clean	

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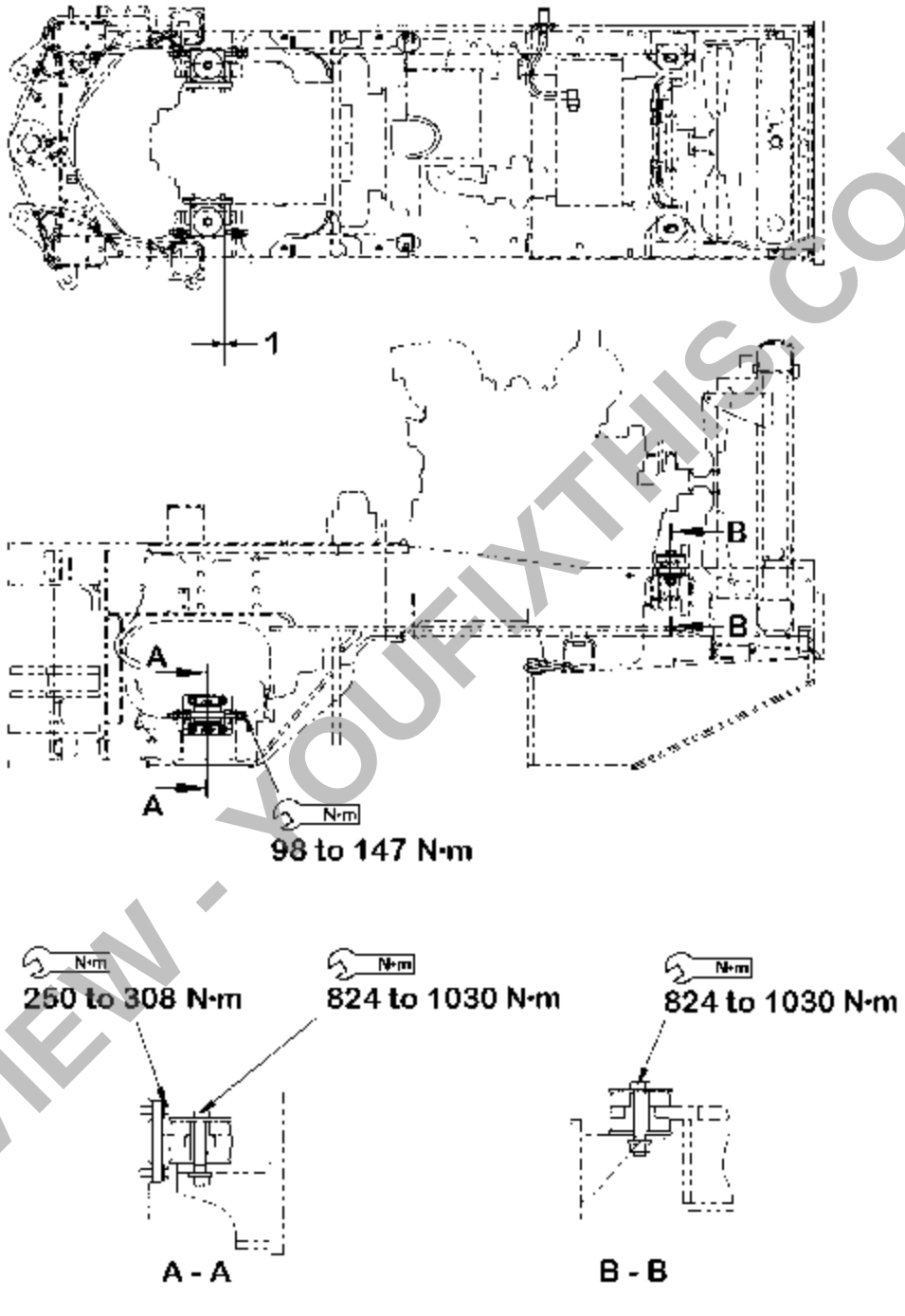
NOTE: All dimensions are based with machines equipped with 26.5-25 20PR tires.

			WA450-3 A31001 and up				WA450-3 Material Handler A35001 and up	
			4.2 m³ GP Bucket w/BOCE	3.6 m³ EX Bucket w/teeth	3.9 m³ EX Bucket w/teeth	5.2 m³ LM Bucket w/BOCE	4.6 m³ GP Bucket w/BOCE	4.2 m³ GP Bucket w/BOCE
1	Wheelbase		3400 mm	3400 mm	3400 mm	3400 mm	3400 mm	3400 mm
2	Hinge pin, maximum height		4360 mm	4360 mm	4360 mm	4360 mm	4445 mm	4445 mm
3	Hinge pin, carry height		575 mm	575 mm	575 mm	575 mm	575 mm	575 mm
4	Ground clearance		525 mm	525 mm	525 mm	525 mm	525 mm	525 mm
5	Hitch height		1240 mm	1240 mm	1240 mm	1240 mm	1240 mm	1240 mm
6	Overall height, top of stack		3450 mm	3450 mm	3450 mm	3450 mm	3450 mm	3450 mm
7	Overall height, top of cab		3460 mm	3460 mm	3460 mm	3460 mm	3460 mm	3460 mm
8	Bucket width		3170 mm	3190 mm		3170 mm	3170 mm	3170 mm
	Bucket weight		2090 kg	2110 kg		2190 kg	2150 kg	2090 kg
	Static tipping loads	Straight	17970 kg	17770 kg		17430 kg	16730 kg	16790 kg
		Full turn 40E	15600 kg	15420 kg		15130 kg	14530 kg	14590 kg
9	Dump clearance, 45E		3185 mm	3110 mm		2955 mm	3150 mm	3280 mm
10	Reach @ No. 9		1195 mm	1245 mm		1335 mm	1335 mm	1205 mm
11	Operating height		5960 mm	5915 mm		6125 mm	6050 mm	6050 mm
12	Overall length	Ground	8850 mm	8935 mm		9060 mm	9155 mm	8970 mm
		Carry	8850 mm	8920 mm		8990 mm	9060 mm	8940 mm
13	Turning radius		6870 mm	6900 mm		6960 mm	6980 mm	6920 mm
14	Digging depth	0E	80 mm	100 mm		80 mm	90 mm	90 mm
		10E	315 mm	345 mm		350 mm	360 mm	330 mm
	Break out force		19600 kg	22400 kg		16800 kg	16750 kg	19160 kg
15	Tread		2300 mm	2300 mm	2300 mm	2300 mm	2300 mm	2300 mm
16	Width over tires		3010 mm	3010 mm	3010 mm	3010 mm	3010 mm	3010 mm

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ENGINE AND TRANSMISSION MOUNT



Unit - mm

No.	Check item	Criteria	Remedy
1	Clearance between transmission bracket and adjustment bolt	1 to 1.5	Adjust

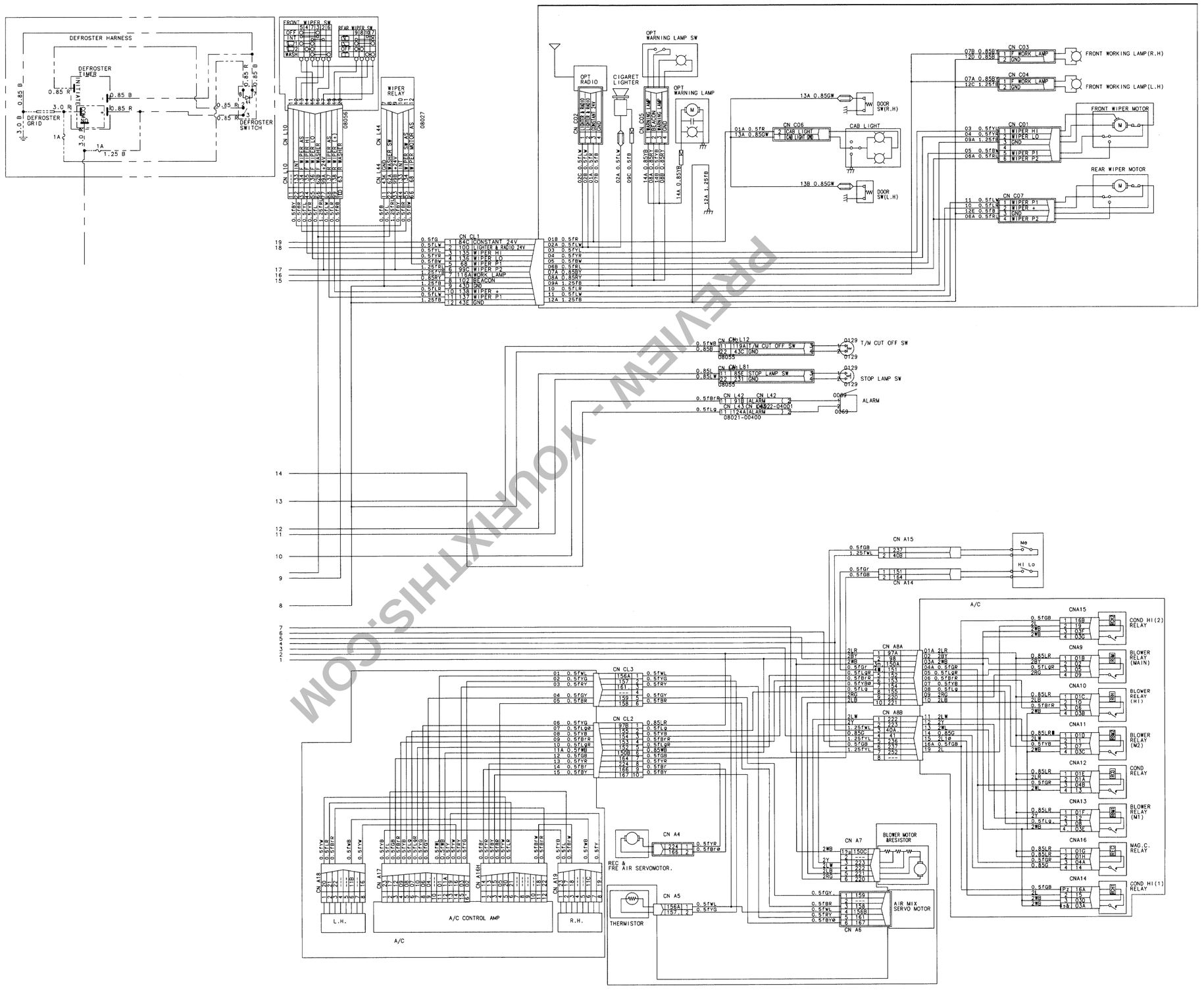
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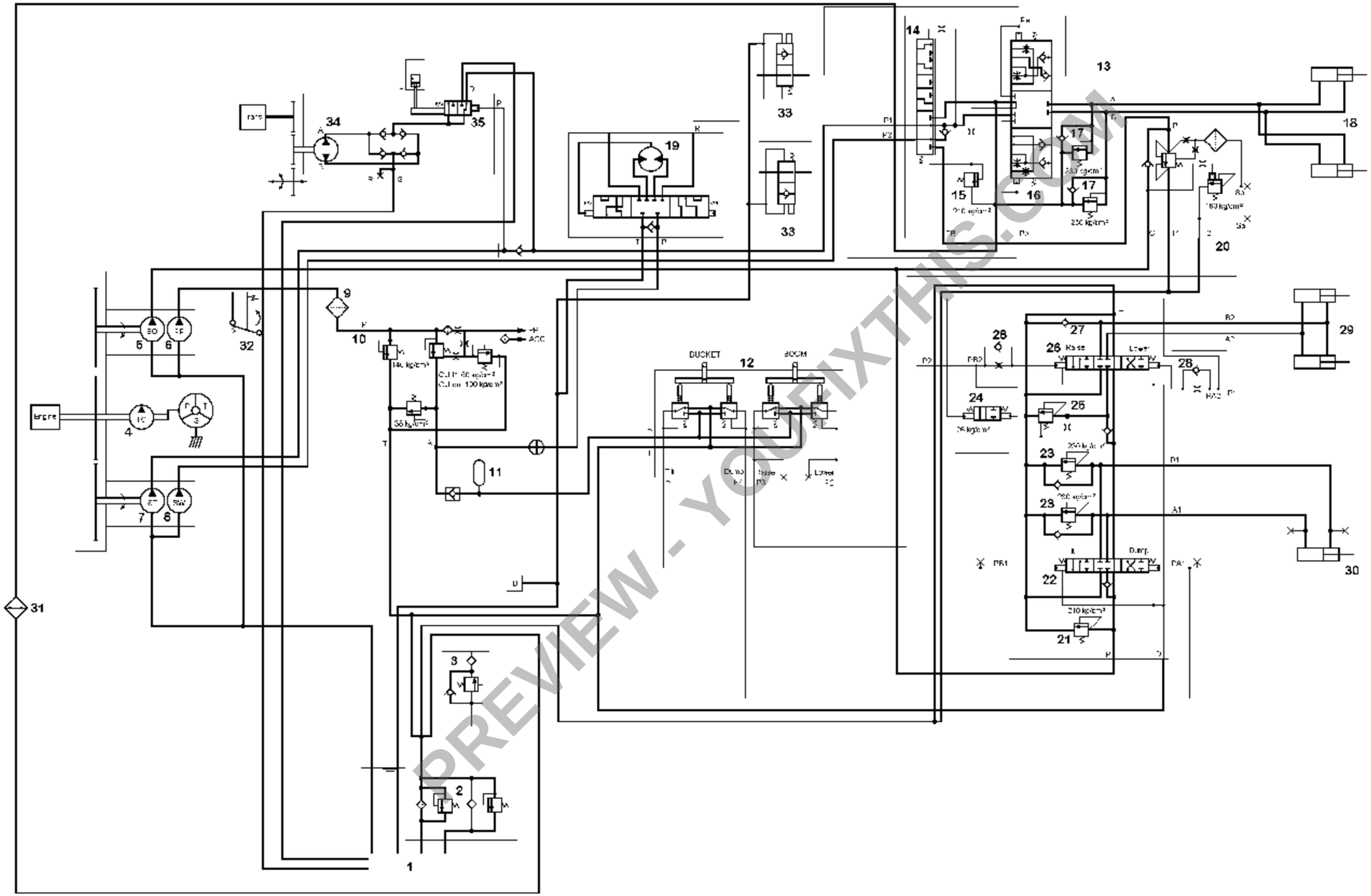
FOLDOUT 2

ELECTRICAL CIRCUIT DIAGRAM (2 OF 4)



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WORK EQUIPMENT HYDRAULIC SYSTEM DIAGRAM



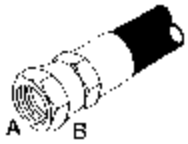
1. Hydraulic tank
2. Oil filter
3. Breather
4. Converter charge pump
5. Equipment pump
6. PPC brake pump
7. Steering pump
8. Switch pump
9. Filter
10. Accumulator charge valve
11. Accumulator
12. PPC valve
13. Steering valve
14. Flow control valve
15. Relief valve
16. Steering spool
17. Over Load relief suction valve
18. Steering cylinder
19. Steering control valve
20. Cut off valve
21. Relief valve
22. Bucket spool
23. Safety suction valve
24. Float selector valve
25. Unload valve
26. Boom spool
27. Suction valve
28. Slow return valve
29. Lift cylinder
30. Dump cylinder
31. Oil cooler
32. Flow switch
33. Stop valve
34. Emergency steering pump
35. Divider valve

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TIGHTENING TORQUE FOR HOSE NUTS

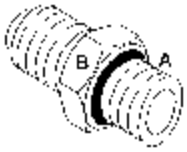
Use these torques for hose nuts.



Nominal No.	Thread diameter	Width across flats	Tightening torque
	mm	mm	**NCm**
02	14	19	24.5 ± 4.9
03	18	24	49 ± 19.6
04	22	27	78.5 ± 19.6
05	24	32	137.3 ± 29.4
06	30	36	176.5 ± 29.4
10	33	41	196.1 ± 49
12	36	46	245.2 ± 49
14	42	55	294.2 ± 49

TIGHTENING TORQUE OF O-RING BOSS CONNECTORS

Use these torques for o-ring boss connectors.



Nominal No.	**A** Thread diameter	**B** Width across flats	Tightening torque
	mm	mm	NCm
02	14	Varies depending on type of connector	34.3 ± 4.9
03, 04	20		93.1 ± 9.8
05, 06	24		142.1 ± 19.6
10,12	33		421.4 ± 58.8
14	42		877.1 ± 132.3

TIGHTENING TORQUE OF O-RING BOSS CONNECTORS

Use these torques for o-ring boss connectors.

Nominal No.	**A** Thread diameter	**B** Width across flats	Tightening torque
	mm	mm	NCm
08	8	14	7.35 ± 1.47
10	10	17	11.27 ± 1.47
12	12	19	17.64 ± 1.96
14	14	22	22.54 ± 1.96
16	16	24	29.4 ± 4.9
18	18	27	39.3 ± 4.9
20	20	30	49 ± 4.9
24	24	32	68.6 ± 9.8
30	30	32	107.8 ± 14.7
33	33	- -	127.4 ± 19.6
36	36	36	151.9 ± 24.5
42	42	- -	210.7 ± 29.4
52	52	- -	323.4 ± 44.1

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FUNCTION

The control mechanism of the transmission controller consists of controller, sensors, switches, solenoid and buzzer. The controller receives the input signal, processes it, and carries out the auto shift control by controlling the solenoid to a transmission range that matches the travel speed.

WHEN CARRYING OUT TROUBLESHOOTING

The controller has a troubleshooting function, and when a failure is detected, the buzzer sounds to warn the operator that there has been a failure, and the display also shows the failure code on the main monitor. However, A-12 to A-18 are for the when there is no display in the display area, but there is an abnormality in the control.

FAILURE CODE

No.	Failure code	Failure
A-1	10	Abnormality in modulation solenoid signal system
A-2	11	Abnormality in modulation solenoid signal system
A-3	12	Abnormality in F solenoid signal system
A-4	13	Abnormality in R solenoid signal system
A-5	14	Abnormality in Hi Lo solenoid signal system
A-6	16	Abnormality in speed solenoid signal system
A-7	17	Abnormality in brake signal system
A-8	20	Abnormality in directional lever signal system
A-9	21	Abnormality in speed lever signal system
A-10	22	Abnormality in travel speed sensor signal system
A-11	23	Abnormality in engine speed sensor signal system
A-12	---	Hold switch signal system
A-13	---	Kick down switch signal system
A-14	---	Transmission cut off signal system
A-15	---	Neutralizer signal system
A-16	---	Alarm buzzer signal system
A-17	---	Network signal system
A-18	---	Abnormality in controller power supply voltage

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ALTERNATOR

REMOVAL

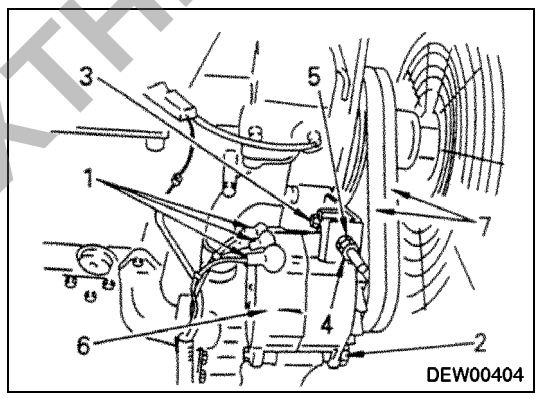
WARNING! Stop the machine on level ground and install the safety bar on the frame. Lower the bucket to the ground and stop the engine. Then apply the parking brake and block the wheels to prevent the machine from moving.

WARNING! Disconnect the cable from the negative (-) terminal of the battery.

1. Open the engine hood side cover and lock it in position.
2. Disconnect the 3 sets of wiring (1) from the alternator.
   ★ Label the wiring with tags to ease reconnection later.
3. Loosen the mounting bolt and nut (2), then loosen the adjustment plate mounting bolt (3).

※1

4. Loosen the locknut (4) and adjustment nut (5), love the alternator (6) towards the engine, then remove the fan belt (7). Use a wrench (2) to lift the tensioner (3) and release the drive belt tension, then remove the belt (4).



5. Remove the mounting bolt and nut (2), remove the adjustment plate mounting bolt, then remove the alternator (6).

INSTALLATION

- Installation is the reverse of removal.

※1

★ Adjust the fan belt tension as detailed in Section 20, TESTING AND ADJUSTING.

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S-2 Engine does not start

(1) Engine does not start

General causes why engine does not turn

- ! Internal parts of engine seized
  - i If internal parts of the engine are seized, carry out trouble-shooting for Engine stops during operations.
- ! Failure in power train
- ! Faulty electrical system

Ì Possible cause [judging from Questions and Check items]

Ê Most probable causes [judging from Questions and Check items]

Ë Possible causes due to length of use [used for a long period]

Í Items to confirm the cause

			Causes										
			Defective wiring of starting circuit	*Defective or deteriorated battery*	*Defective starter motor*	*Broken ring gear*	*Defective safety relay or safety switch*	*Defective battery relay*	*Defective battery terminal connection*	*Defective adjustment of engine stop motor wire*	*Defective engine stop motor*	*Defective start switch*
Questions	Confirm recent repair history											
	Degree of use	Operated for long period		Ë		Ë						
	Condition of horn when start switch is turned on	Horn does not sound	Ê						Ì			Ì
		Horn sound level is low		Ê								
Check items	When start switch is turned to START, pinion moves out, but	Rotating speed is low		Ê								
		Makes grating sound			Ê	Ê						
		Soon disengages again					Ê					
		Makes rattling noise and does not turn		Ì	Ì		Ì					
	When start switch is turned to START, pinion does not move out		Ê	Ì								Ì
	When start switch is turned to ON, there is no clicking sound		Carry out troubleshooting for starting circuit	Ì				Ê				
	Battery terminal is loose								Ê			
	When start switch is turned to ON, linkage does not move									Ê	Ê	
	When battery is checked, battery electrolyte is found to be low			Ê								
Troubleshooting	Specific gravity of electrolyte, voltage of battery is low			Í								
	For following condition, 1) through 5), turn start switch OFF, connect the cord and carry out troubleshooting at ON	1) When terminal B and C of start switch are connected, engine starts										Í
		2) When terminal B and C of start motor are connected, engine starts			Í							
		3) When terminal B and C of safety relay are connected, engine starts					Í					
		4) When safety switch terminal and starter motor terminal B are connected, engine starts					Í					
		5) There is no 24V voltage between battery relay terminal B and E						Í				
	When ring gear is inspected directly, tooth surface is found to be chipped					Í						
	Does not move even when engine stop motor linkage is disconnected									Í	Í	
		Remedy	Replace	Replace	Replace	Replace	Replace	Replace	Replace	Adjust	Replace	Replace

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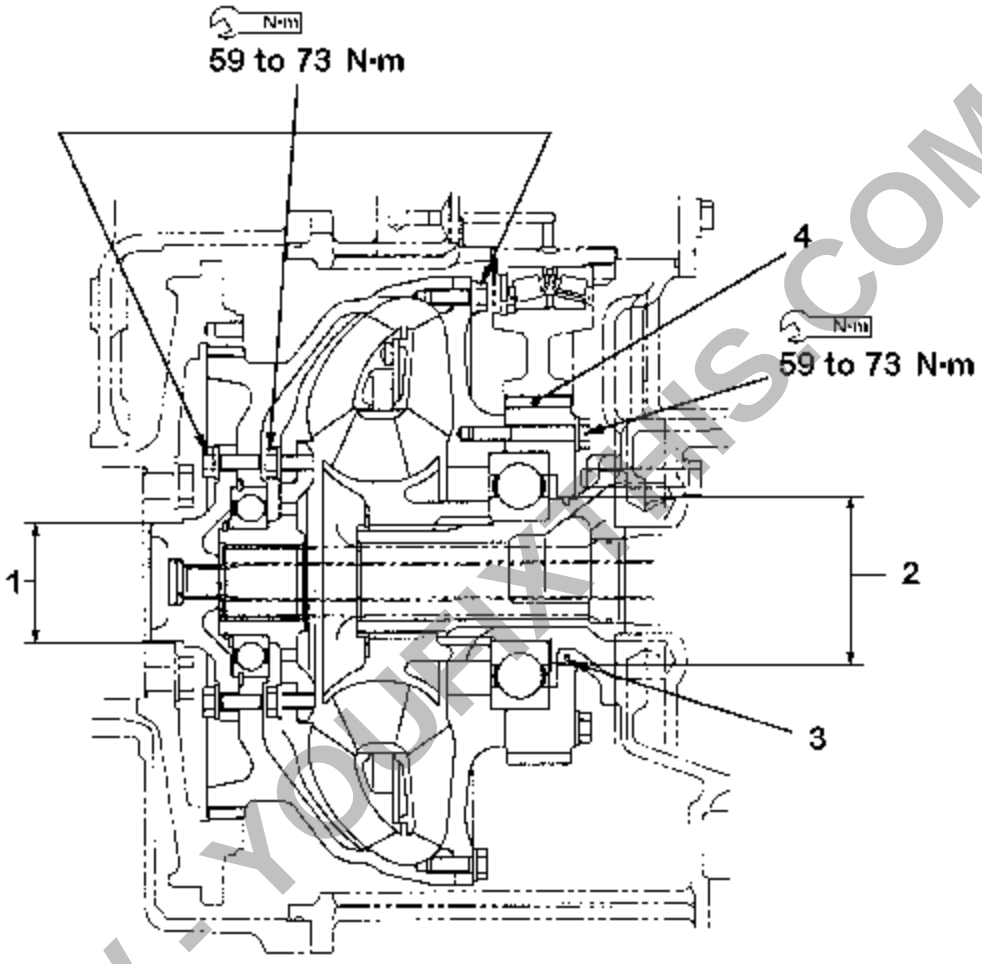
SPECIFICATIONS

				WA450-3 A31001 and up			WA450-3 Material Handler A35001 and up	
				GP Bucket w/BOCE	EX Bucket w/teeth	LM Bucket W/BOCE	4.6 m³ GP Bucket W/BOCE	4.2 m³ GP Bucket W/BOCE
Weight	Machine	23.5/25-20PR L2	No Ballast	22000 kg	22020 kg	22100 kg	22050 kg	20990 kg
			Ballast	22650 kg	22670 kg	22750 kg	22700 kg	21640 kg
		23.5/25-20PR L3	No Ballast	22310 kg	22330 kg	22410 kg	22360 kg	21300 kg
			Ballast	22960 kg	22980 kg	23060 kg	23010 kg	21950 kg
		26.5/25-20PR L3	No Ballast	22780 kg	22800 kg	22880 kg	23830 kg	21770 kg
			Ballast	23760 kg	23780 kg	23860 kg	23810 kg	22750 kg
		26.5/25-20PR L4	No Ballast	23040 kg	23060 kg	23140 kg	23090 kg	22030 kg
			Ballast	24020 kg	24040 kg	24120 kg	24070 kg	23010 kg
		26.5/25-20PR L5	No Ballast	23540 kg	23560 kg	23640 kg	23590 kg	22530 kg
			Ballast	24520 kg	24540 kg	24620 kg	24570 kg	23510 kg
	NOTE 1: The above operating weights include lubricants, coolant, full fuel tank, ROPS cab, front fenders, optional counterweight [see following], and operator. NOTE 2: DO NOT use tire ballast with the optional counterweight							
Performance	Bucket capacity			4.2 m³	3.6 m³	5.2 m³	4.6 m³	4.2 m³
	Travel speed	Forward	1st	6.6 km/h			6.6 km/h	
			2nd	12.3 km/h			12.3 km/h	
			3rd	21.8 km/h			21.8 km/h	
			4th	43.0 km/h			43.0 km/h	
		Reverse	1st	6.8 km/h			6.8 km/h	
			2nd	12.8 km/h			12.8 km/h	
			3rd	22.7 km/h			22.7 km/h	
			4th	36.0 km/h			36.0 km/h	
	Gradability			25 E			25 E	
	Turning radius			6870 mm	6900 mm	6960 mm	6980 mm	6920 mm
Engine	Model			Komatsu SA6D125E-2				
	Type			Direct injection				
	Aspiration			Turbo charged and aftercooled				
	No. of cylinders - bore x stroke			6 - 125 mm x 150 mm				
	Piston displacement			11.04 ℝ				
	Horsepower rating @ 2200 rpm		Gross power	202 kW				
			Net power	194 kW				
	Starting motor			24V, 7.5 kW				
	Alternator			24V, 50 A				
	Battery			2 x 12V, 170 Ah				

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TORQUE CONVERTER



Unit - mm

No	Check item		Criteria			Remedy
			Standard size	Tolerance	Repair limit	
1	Outside diameter of pilot		78	- 0.010 - 0.040	77.75	Repair
2	Inside diameter of seal ring contact surface		110	+ 0.035 0	110.5	
3	Stator shaft seal ring wear	Width	3	- 0.01 - 0.03	2.7	
		Thickness	4.3	± 0.1	3.9	
4	PTO drive driven gear backlash		0.18 to 0.49			

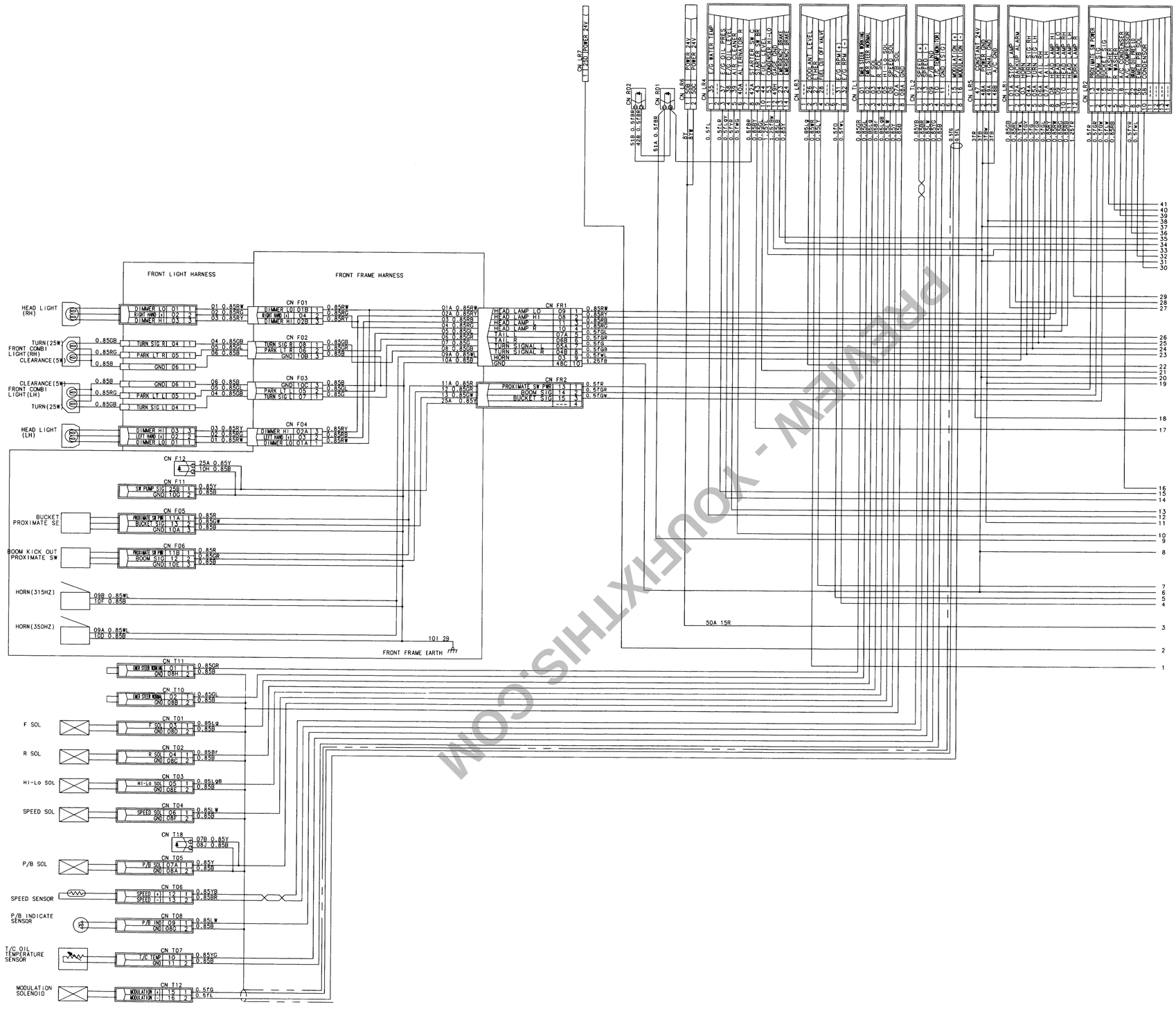
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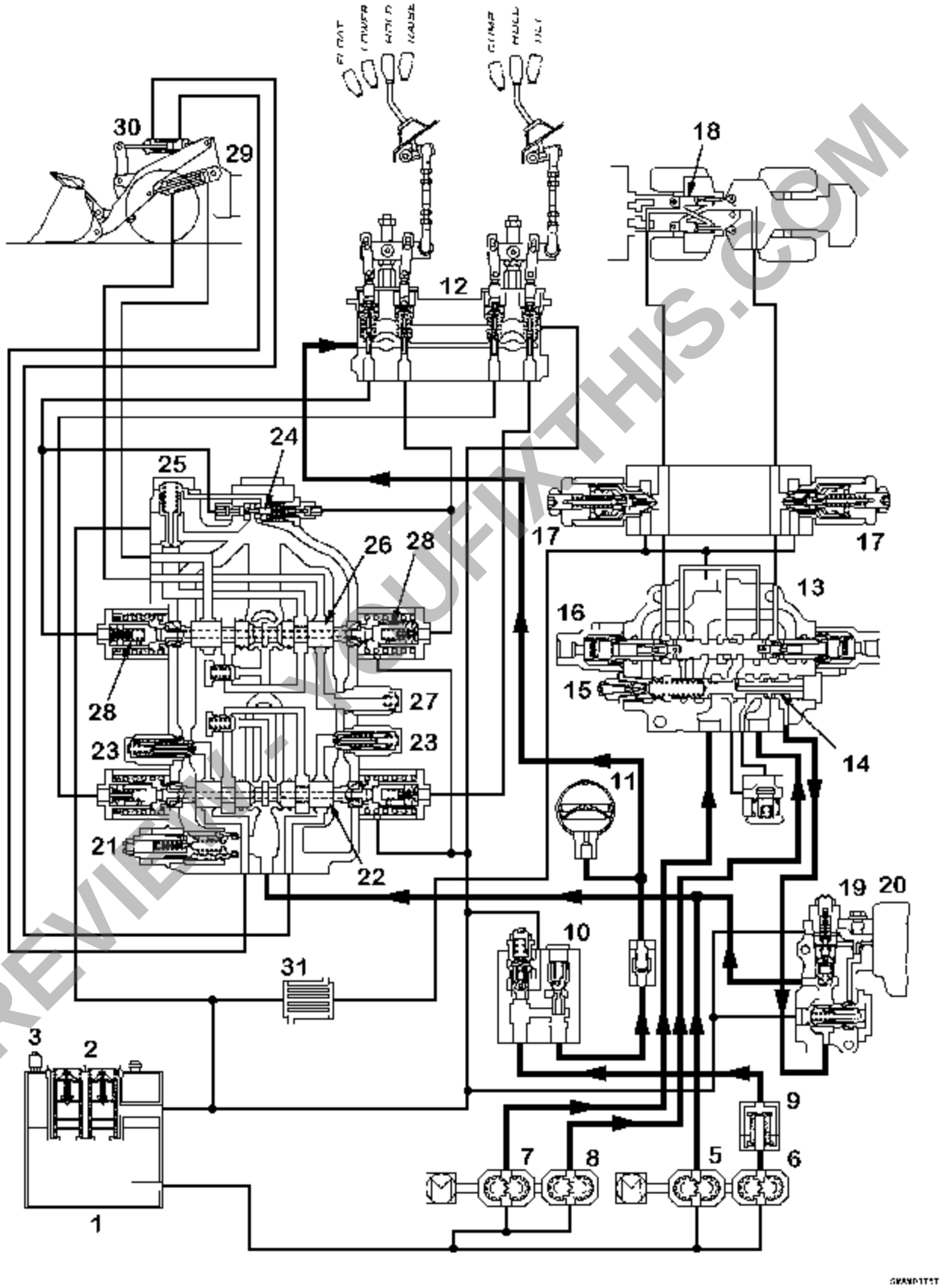
FOLDOUT 3

ELECTRICAL CIRCUIT DIAGRAM (3 OF 4)



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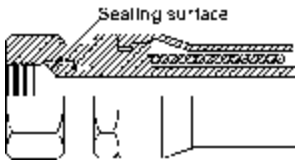
WORK EQUIPMENT HYDRAULIC CIRCUIT DIAGRAM



Conditions: Engine at low idle, work equipment control levers at hold

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TIGHTENING TORQUE FOR FLARED NUTS



Use these torques for flared part of nut.

Thread diameter	Width across flats	Tightening torque
mm	mm	**NCm**
14	19	24.5 ± 4.9
18	24	49 ± 19.6
22	27	78.5 ± 19.6
24	32	137.3 ± 29.4
30	36	176.5 ± 29.4
33	41	196.1 ± 49
36	46	245.2 ± 49
42	55	294.2 ± 49

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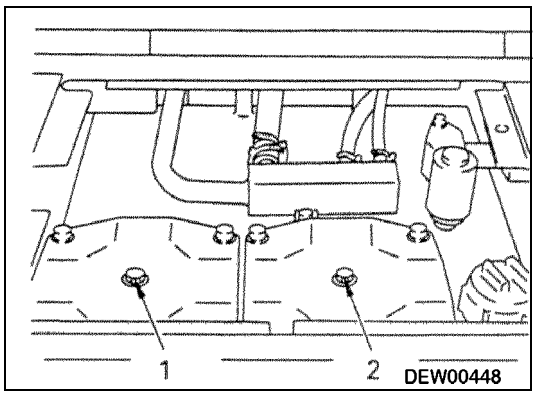
RADIATOR

REMOVAL

WARNING! 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 block the wheels to prevent the machine from moving.

WARNING! Perform the oil return operation for the air conditioner compressor (set the fan switch to the maximum position, run the engine at low idle, and operate the air conditioner for five minutes). Then use a manifold gauge and release the refrigerant slowly from the valve of the compressor.

WARNING! Loosen the oil filler cap slowly to release the pressure inside the hydraulic tank. Loosen the plugs (1) and (2) on top of the hydraulic tank filter to prevent the oil from the tank from flowing out. Then operate the steering wheel and control levers several times to release the remaining pressure in the hydraulic piping.

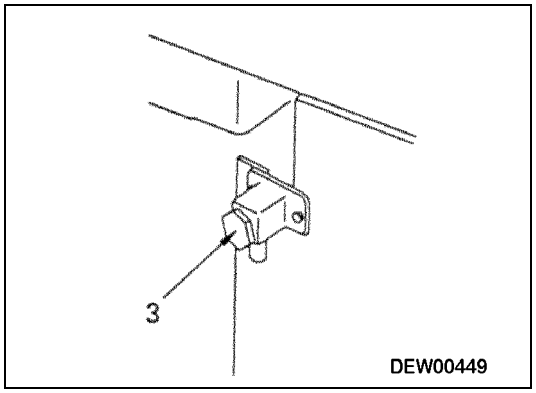


WARNING! Disconnect the cable from the negative (-) terminal of the battery before proceeding.

1. Loosen the drain valve (3) and drain the coolant.

   Coolant: 68 L (18 U.S. gal.)

   ★ Dispose of the coolant as directed by law.



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(2) Engine turns but no exhaust gas comes out

General causes why engine turns but no exhaust gas comes out
- **!** Supply of fuel impossible
- **!** Supply of fuel is extremely small
- **!** Improper selection of fuel, particularly in winter

i Standards for use of fuel, per ASTM

Fluid type	Ambient temperature EC							
	-30	-20	-10	0	10	20	30	40
Diesel fuel	D975 No 1		D975 No 2					

Ì Possible cause [judging from Questions and Check items]

Ê Most probable causes [judging from Questions and Check items]

Ë Possible causes due to length of use [used for a long period]

Í Items to confirm the cause

			Causes										
			Broken injection pump drive shaft, key	*Defective injection pump [rack, plunger seized]*	*Seized, broken feed pump piston*	*Clogged fuel filter, strainer*	*Clogged feed pump strainer*	*Lack of fuel*	*Clogged, leaking fuel piping*	*Clogged fuel tank air breather hole*	*Defective engine stop motor*	*Improper fuel used*
Questions	Confirm recent history											
	Degree of use	Operated for long period				**Ë**	**Ë**			**Ë**		
	Exhaust gas suddenly stops coming out [when starting again]		**Ê**	**Ê**	**Ê**							
	Filter replacement not performed per O&MM					**Ê**	**Ê**					
	Fuel tank is found to be empty							**Ê**				
	There is leakage from fuel piping								**Ê**			
	Mud is stuck to fuel tank cap									**Ê**		
Check items	When start switch is turned ON, linkage does not move										**Ê**	
	When fuel filter is drained, fuel does not come out											**Ê**
	Engine cranked with starter motor	1) Injection pump coupling does not rotate	**Ê**									
		2) No fuel comes out even when fuel filter air bleed plug is loosened	**Ê**			**Ì**	**Ì**					**Ì**
		3) No fuel spurts out even when injection pipe sleeve is loosened	**Ê**	**Ê**	**Ê**							
	Rust and water are found when fuel is drained					**Ì**	**Ì**					
Troubleshooting	Check injection pump directly		**Í**									
	When control rack is pushed, it is found to be heavy or does not return			**Í**								
	Check feed pump directly				**Í**							
	When fuel filter, strainer are inspected directly, they are found to clogged					**Í**						**Í**
	When feed pump strainer is inspected directly, it is found to be clogged						**Í**					
	When fuel cap is inspected directly, it is found to be clogged									**Í**		
	Does not even move when engine stop motor linkage is disconnected										**Í**	
	Remedy		Replace	Replace	Replace	Clean	Clean	Add	Repair	Repair	Replace	Replace

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			WA450-3 A31001 and up			WA450-3 Material Handler A35001 and up	
			GP Bucket w/BOCE	EX Bucket w/teeth	LM Bucket W/BOCE	4.6 m³ GP Bucket W/BOCE	4.2 m³ GP Bucket W/BOCE
Power train	Torque converter		Three element, single stage, single phase				
	Transmission		Spur gear, constant mesh multiple disc, hydraulic actuated, modulation type				
	Reduction gear		Spiral bevel gear, splash lubrication				
	Differential - standard		Straight bevel gear, torque proportioning				
	Differantial - optional		Straight bevel gear, limited slip				
	Final drive		Planetary gear, single reduction, splash lubrication				
Axle, wheel	Drive type		Front and rear wheel drive				
	Front axle		Fixed frame, full floating type				
	Rear axle		Center pin support, full floating type with 30E oscillation				
	Wheel rim		26.5/25-20 PR tires			23.5/25-20 PR tires	
			22 x 25			19.5 x 25	
	Tire inflation	Front	3.5 kg/cm^2			4.0 kg/cm^2	
		Rear	3.0 kg/cm^2			3.2 kg/cm^2	
Brakes	Main service brakes		Hydraulically actuated, sealed wet multiple disc at each wheel				
	Parking brake		Spring applied, hydraulic released wet discs inside transmission				
Steering system	Type		Articulated type				
	Structure		Full hydraulic power steering				
Hydraulic system	Gear pump Capacity @ 2140 engine rpm	Loader	302 ℓ/min				
		Steering	168 ℓ/min				
		Switch	122 ℓ/min				
		Pilot	62 ℓmin				
	Relief valve setting		210 kg/cm^2				
	Cylinders qty - bore x stroke	Boom	2 - 180 x 764 mm				
		Bucket	1 - 200 x 550 mm				
		Steering	2 - 100 x 440 mm				
Work equipment	Linkage type		Single link, Z bar				
	Bucket edge type		Flat edge with BOCE [bolt on cutting edge]				

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TRANSMISSION

Unit - mm

No.	Check item	Criteria					Remedy
		Standard size	Tolerance		Standard clearance	Clearance limit	
			Shaft	Hole			
1	Pump drive shaft and bearing clearance	65	+0.024 +0.011	0 -0.015	-0.039 to -0.011	---	Replace
2	Pump drive gear bearing and housing clearance	120	0 -0.015	+0.030 0	0 to 0.045	---	
3	Pump drive shaft and bearing clearance	50	+0.020 +0.009	0 -0.012	-0.032 to -0.009	---	
4	Pump drive gear bearing and housing clearance	90	0 -0.015	+0.030 0	0 to 0.045	---	
5	Idler gear shaft and bearing clearance	65	+0.012 +0.007	0 -0.015	-0.027 to -0.007	---	
6	Ider gear bearing and idler gear clearance	120	0 -0.018	-0.030 -0.052	-0.052 to -0.012	---	
7	Pump drive shaft and bearing clearance	40	+0.025 +0.009	0 -0.012	-0.037 to -0.009	---	
8	Pump drive gear bearing and housing clearance	80	0 -0.013	+0.030 0	0 to 0.043	---	
9	Input shaft and bearing clearance	45	+0.025 +0.009	0 -0.012	-0.037 to -0.009	---	
10	Input shaft and housing clearance	100	0 -0.015	+0.030 0	0 to 0.045	---	
11	Input shaft gear and bearing clearance	90	+0.035 +0.013	0 -0.020	-0.055 to -0.013	---	
12	Input shaft gear bearing and housing clearance	160	0 -0.025	+0.030 0	0 to 0.055	---	
13	Output shaft bearing and housing clearance	130	0 -0.018	-0.018 -0.058	-0.058 to 0	---	
14	Output shaft and bearing clearance	75	+0.030 +0.011	0 -0.015	-0.045 to -0.011	---	
15	Output shaft bearing and housing clearance	150	0 -0.018	-0.018 -0.058	-0.058 to 0	---	
16	Output shaft and bearing clearance	85	+0.035 +0.013	0.0 -0.020	-0.055 to -0.013	---	
17	Front F/1st clutch bearing and housing clearance	160	0 -0.025	+0.030 0	0 to 0.055	---	
18	Rear F/1st clutch bearing and housing clearance	160	0 -0.025	+0.030 0	0 to 0.055	---	
19	Front R/2nd clutch bearing and housing clearance	160	0 -0.025	+0.030 0	0 to 0.055	---	
20	Rear R/2nd clutch bearing and housing clearance	160	0 -0.025	+0.030 0	0 to 0.055	---	
21	Rear 3rd/4th clutch bearing and housing clearance	130	0 -0.018	+0.030 0	0 to 0.048	---	
22	Front 3rd/4th clutch bearing and housing clearance	160	0 -0.025	+0.030 0	0 to 0.055	---	
23	Rear countershaft and bearing clearance	45	+0.025 +0.009	0 -0.012	-0.037 to -0.009	---	
24	Rear countershaft bearing and housing clearance	100	0 -0.015	+0.030 0	0 to 0.045	---	
25	Front countershaft and bearing clearance	40	+0.025 +0.009	0 &-0.012	-0.037 to -0.009	---	
26	Front countershaft bearing and housing clearance	80	0 -0.013	+0.030 0	0 to -0.043	---	

		Standard size	Tolerance	Clearance limit	
27	Inside diameter of seal ring fitting face	55	+0.050 0	55.1	Replace
	Seal ring groove width	3.2	+0.076 0	3.5	
	Seal ring width	3.1	±0.05	2.8	
	Seal ring thickness	2.29	0 ! 0.13	2.1	
28	Outside diameter of sliding face of coupling oil seal R	105	0 ! 0.087	104.8	
29	Outside diameter of sliding face of coupling oil seal F	105	0 ! 0.087	104.8	

		Standard clearance	Clearance limit	
30	Output shaft cover and housing clearance	0.5 to 1.4	---	Adjust
31	Free turning torque of output shaft	0.098 to 0.98 N℃m		

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PRODUCT PUBLICATIONS INFORMATION

Various product Parts and Service Publications are available to all **KOMATSU** construction equipment owners, including operation and maintenance manuals, parts books and service manuals.

Special publications, such as service tool, air conditioning and turbocharger service manuals are also available as well as selected Operation and Service manuals in foreign languages.

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

DESCRIPTION	FORM NUMBER
PARTS BOOK - PAPER:	
Chassis and Engine	BEPB005700
PARTS BOOK - MICROFICHE:	
Chassis and Engine	BEPM005700
OPERATION AND MAINTENANCE MANUAL:	
Chassis and Engine	CEAM003800
SHOP MANUAL	
Chassis	CEBM003602
Engine	SEBM006403
SAFETY MANUAL	
Machine specific	WLT70-1

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Parts and Service Publications can *only* be acquired by authorized KOMATSU distributors using the Komatsu America International Company Parts Inventory Processing System (PIPS).

If the PIPS system is not available at the distributor location, then the following Requisition for Technical Service Publications and Service Forms can be used. Form KDC91E is shown on the reverse side of this page.

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SAFETY

SAFETY NOTICE

IMPORTANT SAFETY NOTICE

Proper service and repair is extremely important for the safe operation of your machine. The service and repair techniques recommended and described in this manual are both effective and safe methods of operation. Some of these operations require the use of tools specially designed for the purpose.

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

GENERAL PRECAUTIONS

Mistakes in operation are extremely dangerous. Read the OPERATION & MAINTENANCE MANUAL carefully **before** operating the machine.

1. Before carrying out any greasing or repairs, read all the precautions given on the decals which are fixed to the machine.

2. When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.

! Always wear safety glasses when hitting parts with a hammer.

! Always wear safety glasses when grinding parts with a grinder, etc.

3. If welding repairs are needed, always have a trained, experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, glasses, cap and other clothes suited for welding work.

4. When carrying out any operation with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR signs on the controls in the operator's compartment.

5. Keep all tools in good condition and learn the correct way to use them.

6. Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt or oil on the floor. Smoke only in the areas provided for smoking. Never smoke while working.

PREPARATIONS FOR WORK

7. Before adding oil or making repairs, park the machine on hard, level ground, and block the wheels or tracks to prevent the machine from moving.

8. Before starting work, lower blade, ripper, bucket or any other work equipment to the ground. If this is not possible, insert the safety pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning signs on them.

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.

PRECAUTIONS DURING WORK

11. 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.

12. 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.

13. Before starting work, remove the leads from the battery. ALWAYS remove the lead from the negative ($^{N}_{E_G}$) terminal first.

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