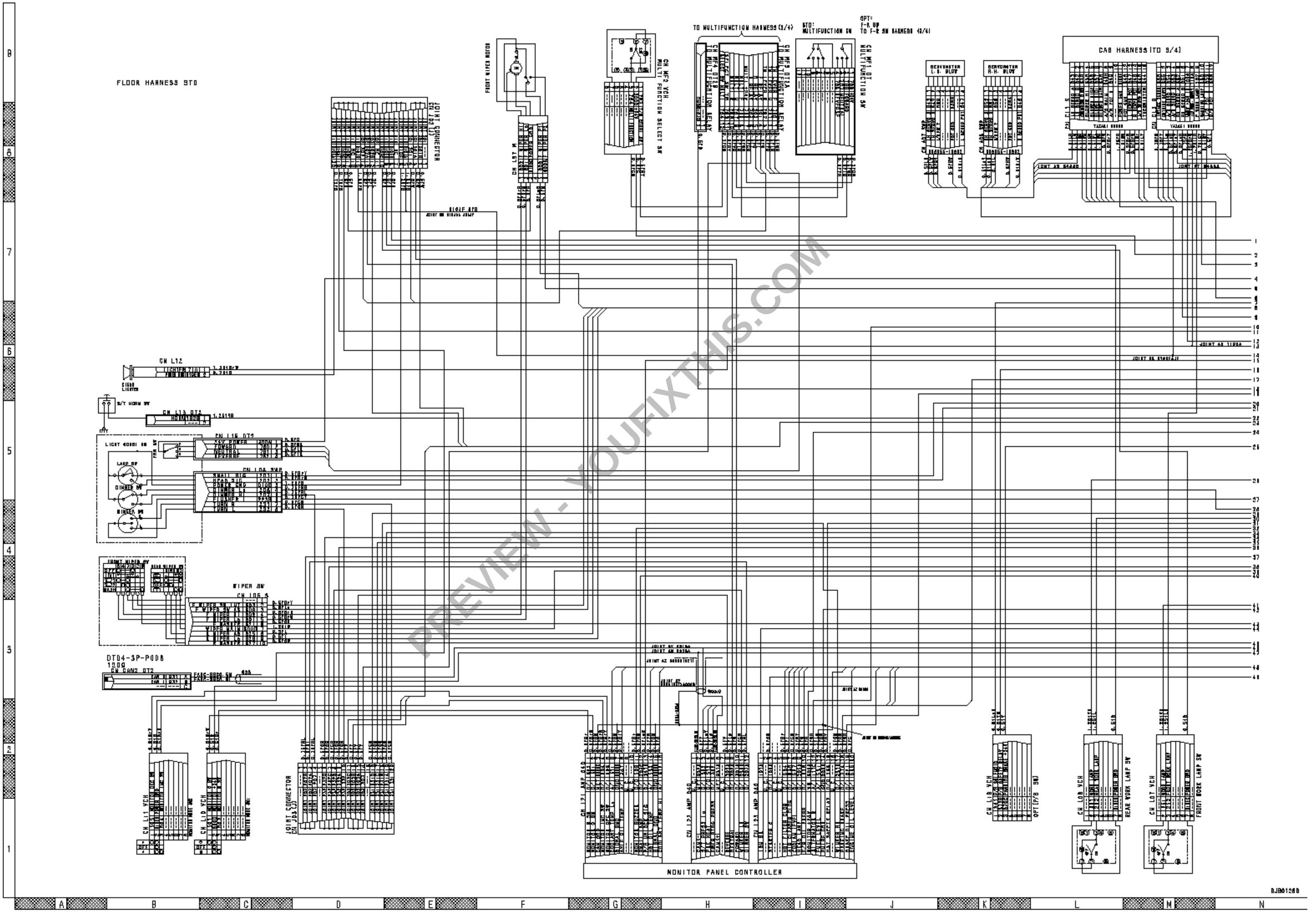
ELECTRICAL CIRCUIT DIAGRAM 1/4 (1/4)

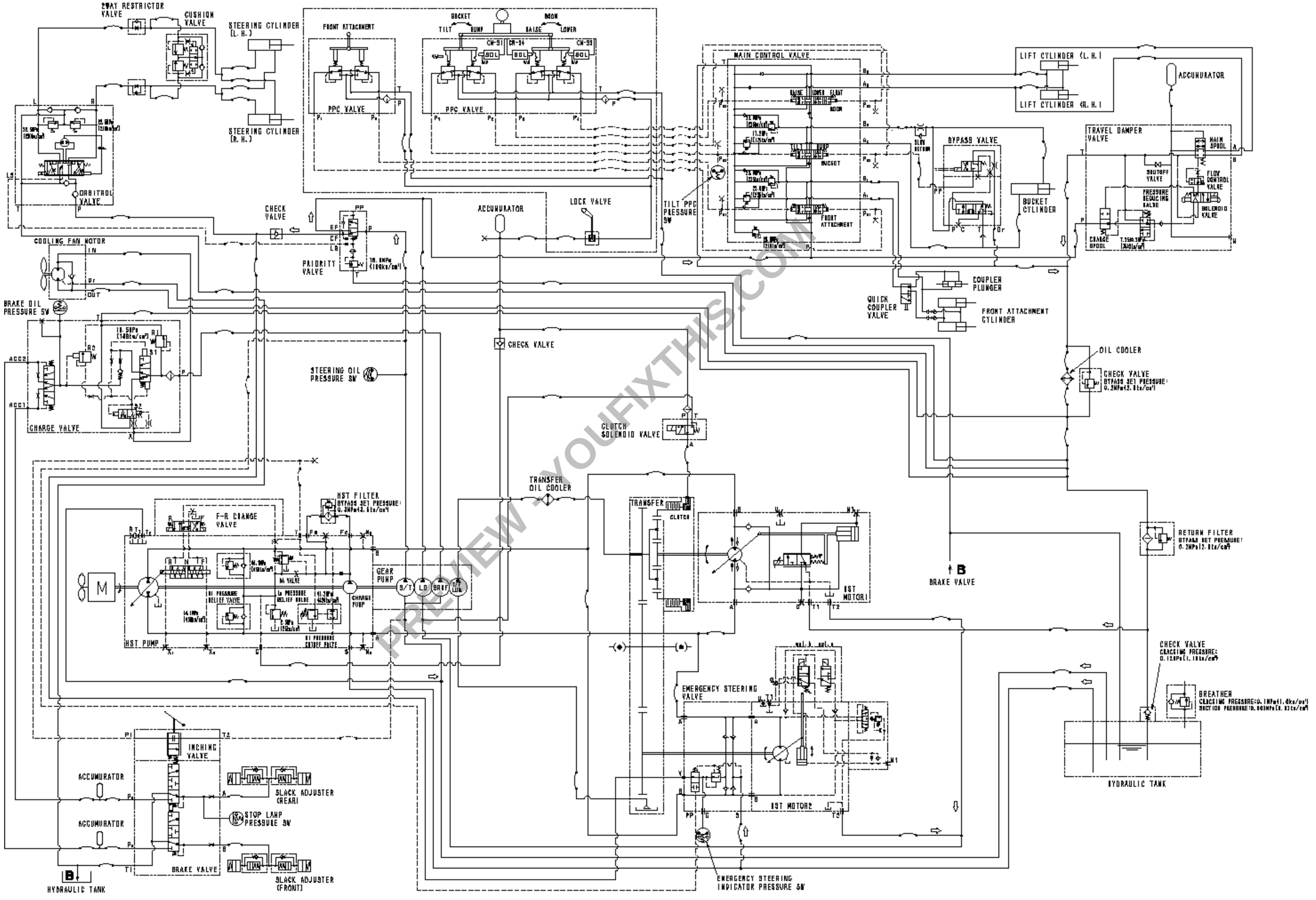


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HYDRAULIC CIRCUIT DIAGRAM

WA250PT-5



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STANDARD TIGHTENING TORQUE

STANDARD TIGHTENING TORQUE TABLE (WHEN USING TORQUE WRENCH)

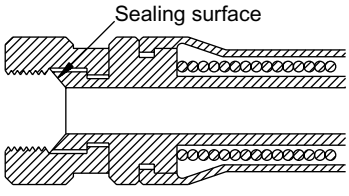
★ In the case of metric nuts and bolts for which there is no special instruction, tighten to the torque given in the table below.

Thread diameter of bolt	Width across flats	 CDL00372	
mm	mm	Nm	kgm
6	10	13.2 ± 1.4	1.35 ± 0.15
8	13	31 ± 3	3.2 ± 0.3
10	17	66 ± 7	6.7 ± 0.7
12	19	113 ± 10	11.5 ± 1
14	22	177 ± 19	18 ± 2
16	24	279 ± 30	28.5 ± 3
18	27	382 ± 39	39 ± 4
20	30	549 ± 59	56 ± 6
22	32	745 ± 83	76 ± 8.5
24	36	927 ± 103	94.5 ± 10.5
27	41	1320 ± 140	135 ± 15
30	46	1720 ± 190	175 ± 20
33	50	2210 ± 240	225 ± 25
36	55	2750 ± 290	280 ± 30
39	60	3290 ± 340	335 ± 35

Thread diameter of bolt	Width across flats	 CDL00373	
mm	mm	Nm	kgm
6	10	7.85 ± 1.95	0.8 ± 0.2
8	13	18.6 ± 4.9	1.9 ± 0.5
10	14	40.2 ± 5.9	4.1 ± 0.6
12	27	82.35 ± 7.85	8.4 ± 0.8

TABLE OF TIGHTENING TORQUES FOR FLARED NUTS

★ In the case of flared nuts for which there is no special instruction, tighten to the torque given in the table below.



SAD00483

Thread diameter	Width across flat	Tightening torque	
mm	mm	Nm	kgm
14	19	24.5 ± 4.9	2.5 ± 0.5
18	24	49 ± 19.6	5 ± 2
22	27	78.5 ± 19.6	8 ± 2
24	32	137.3 ± 29.4	14 ± 3
30	36	176.5 ± 29.4	18 ± 3
33	41	196.1 ± 49	20 ± 5
36	46	245.2 ± 49	25 ± 5
42	55	294.2 ± 49	30 ± 5

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Failure code table

Failure Code	Location of Failure (Location, component with failure)	Nature of Failure (Problem, nature of failure)	Controller	Action code
(HST controller related)				
989F00	Transmission protection caution	Actuated (00)	HST	E00
DGH1KX	HST oil pressure sensor	Input signal outside range (KX)	HST	E03
DLE2LC	Engine revolution sensor (Speed signal mismatch) (LC)	*See separate table (LC)	HST	E03
DW25KZ	HA solenoid system	Disconnection or short circuit (KZ)	HST	E03
DX19KZ	EP solenoid system	Disconnection or short circuit (KZ)	HST	E03
DX20KZ	Clutch solenoid system	Disconnection or short circuit (KZ)	HST	E03
(Monitor related)				
15B0NX	HST oil filter	Clogging (NX)	MON	E01
2G42ZG	Accumulator	Drop in oil pressure (ZG)	MON	E03
989F00	Transmission protection caution	Actuated (00)	MON	E00
989FN1	HST overrun	Overrun (N1)	MON	E02
AA1ANX	Air cleaner	Clogging (NX)	MON	E01
AB00L6	Battery charging circuit (Alternator terminal R signal detected when engine stopped)	*See separate table (L6)	MON	E03
AB00MA	Battery charging circuit (No signal from alternator terminal R, Abnormal detection)	Function impossible (MA)	MON	E03
B@BAZG	Engine oil pressure	Drop in oil pressure ((ZG)	MON	E01
B@BAZK	Engine oil	Drop in level (ZK)	MON	E01
B@BCNS	Engine coolant temperature	Overheat (NS)	MON	E02
B@BCZK	Radiator coolant level	Drop in level (ZK)	MON	E01
B@C7NS	Brake oil temperature	Overheat (NS)	MON	E02
B@CRNS	HST oil temperature	Overheat (NS)	MON	E02
D5ZHL6	Starting switch "C" (IGN "C" abnormal input signal)	*See separate table (L6)	MON	E01
DAF0KT	Controller	Abnormally inside controller (KT)	MON	E03
DAJ0KR	HST controller (Communication shut-down)	Defective communication (Abnormally in applicable component system) (KR)	MON	E03
DD15LD	Monitor panel mode selector switch 1 [■] (Panel switch 1) input error	*See separate table (LD)	MON	E01
DD16LD	Monitor panel mode selector switch 1 [□] (Panel switch 2) input error	*See separate table (LD)	MON	E01
DD17LD	Monitor panel mode selector switch 2 [<] (Panel switch 3) input error	*See separate table (LD)	MON	E01
DD18LD	Monitor panel mode selector switch 2 [>] (Panel switch 4) input error	*See separate table (LD)	MON	E01
DD1CLD	Sub-total switch failure	*See separate table (LD)	MON	E01
DDK3KB	Shift lever F and R signals same time input	Short circuit (KB)	MON	E03
DDS5L6	Steering oil pressure drop	*See separate table (L6)	MON	E03
DDY0LD	Cancel switch abnormal	*See separate table (LD)	MON	E01
DGE2KX	Engine water temperature sensor (High temperature) system abnormal	Input signal outside range (KX)	MON	E01
DGE3L6	Engine water temperature sensor (Low temperature) system abnormal	*See separate table (L6)	MON	E01
DGH1KX	HST oil temperature sensor system abnormal	Input signal outside range (KX)	MON	E01

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REMOVAL, INSTALLATION OF FUEL INJECTION PUMP ASSEMBLY

SPECIAL TOOLS

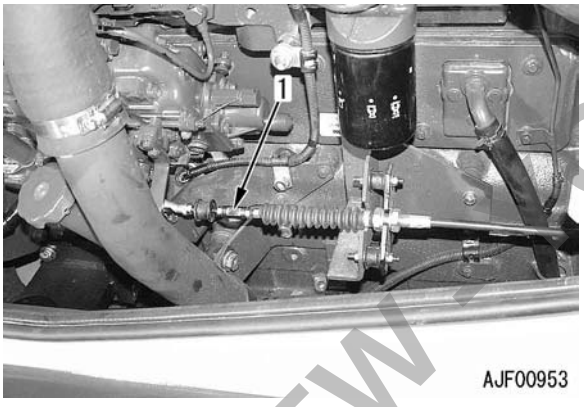
Symbol		Part No.	Part Name	Necessity	Q'ty	New/Remodel	Sketch
A	1	795-799-1131	Gear	■	1		

REMOVAL

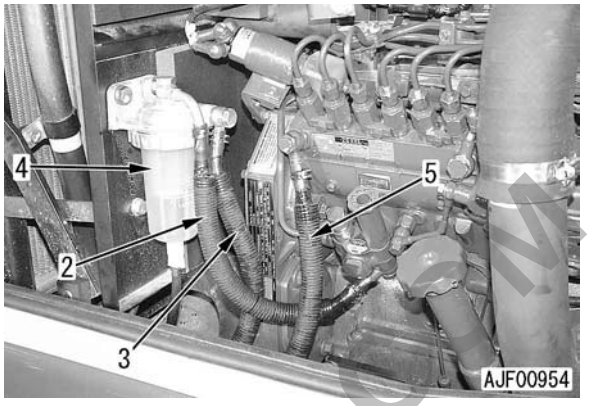
Lower the work equipment to the ground and stop the engine.

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

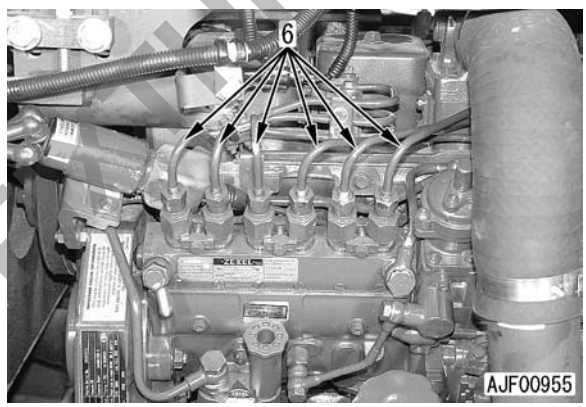
1. Open the engine right side cover.
2. Disconnect fuel control cable (1) from the fuel injection pump. [*1]



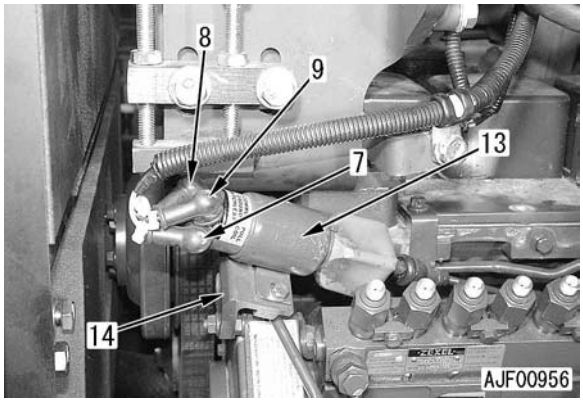
3. Disconnect fuel supply hoses (2) and (3).
4. Disconnect fuel filter (4).
5. Disconnect fuel return hose (5).



6. Remove 6 fuel injection tubes (6). [*2]



7. Disconnect engine stop solenoid terminals PULL (7), HOLD (8), and GND (9).
8. Remove cotter pin (10) and nut (11), and then remove engine stop solenoid rod (12) from the fuel injection pump.
9. Remove engine stop solenoid (13) and bracket (14) together. [*3]



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Error Code [DHH1KX] (HST oil pressure sensor input signal outside range (KX))

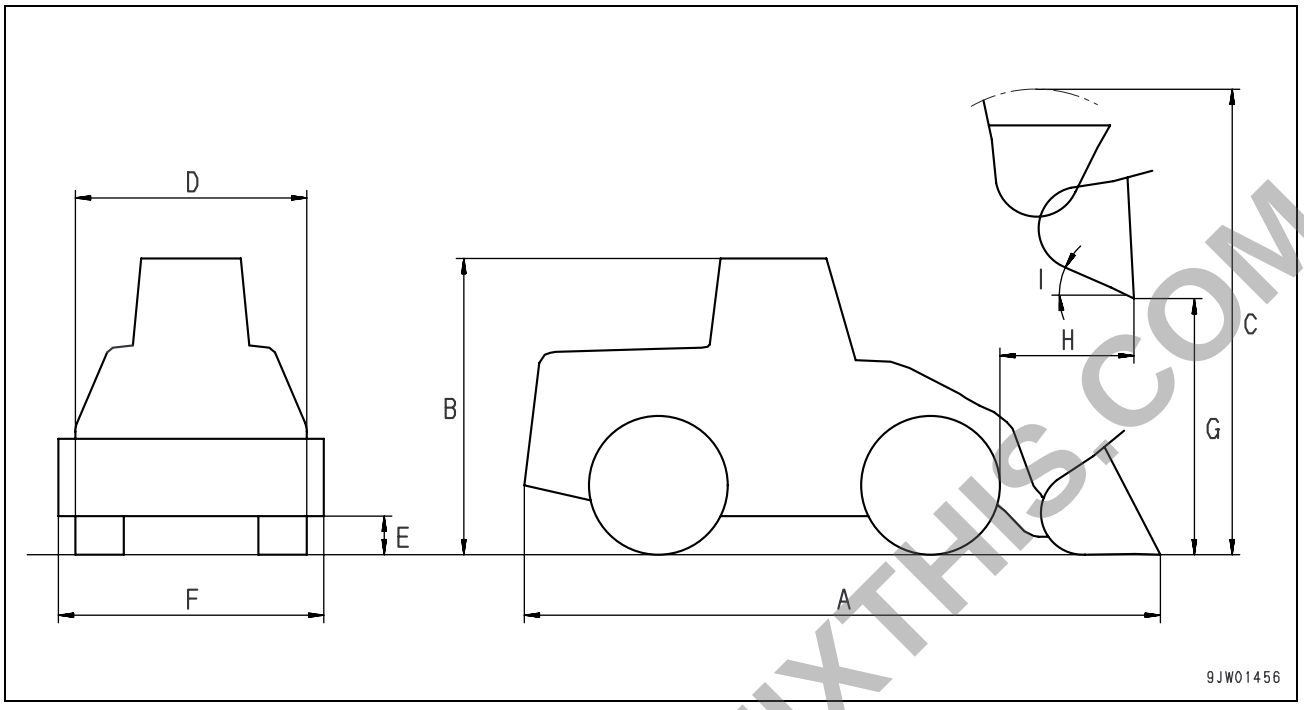
Action Code	Error Code	Controller Code	Trouble	HST oil pressure sensor input signal outside range (KX)
E03	DHH1KX	HST		
Description of Trouble	• There is disconnection, short circuit with ground, short circuit with power source in HST oil pressure sensor system, so HST oil pressure sensor signal is not input.			
Machine monitor or controller Reaction	• Error is sent to machine monitor through CAN communications, and machine monitor turns HST safety relay ON (cuts motor 1, clutch solenoid circuit).			
Effect on Machine	• Travels but drive power is low			
Related Information				

	Causes		Standard Value in Normal State and Remarks on Troubleshooting		
Possible Causes and Standard Values	1	Defective HST oil pressure sensor	1) Turn starting switch OFF. 2) Disconnect connector T11. 3) Insert T-adapter. 4) Connect connector. 5) Turn starting switch ON		
			Between T11 (A) and (C)	Voltage	0.5 - 4.5 V
			Between T11 (A) and (B)	Voltage	4 - 6 V
	2	Wiring harness discontinuity (Disconnection or defective contact)	1) Turn starting switch OFF. 2) Disconnect connectors L41 and T11. 3) Connect T-adapter		
			Wiring harness between L41 (Female) (3) and T11 (Female) (C)	Resistance	1Ω and below
			Wiring harness between L41 (Female) (4) and T11 (Female) (A)	Resistance	1Ω and below
			Wiring harness between L41 (Female) (12) and T11 (Female) (B)	Resistance	1Ω and below
	3	Wiring harness ground fault	1) Turn starting switch OFF. 2) Disconnect connectors L41 and T11. 3) Connect T-adapter		
			Wiring harness between L41 (Female) (3) and T11 (Female) (C)	Resistance between L41 (Female) (3), T11 (Female) (C) and chassis ground	1MΩ and above
			Wiring harness between L41 (Female) (4) and T11 (Female) (A)	Resistance between L41 (Female) (4), T11 (Female) (A) and chassis ground	1MΩ and above
			Wiring harness between L41 (Female) (12) and T11 (Female) (B)	Resistance between L41 (Female) (12), T11 (Female) (B) and chassis ground	1MΩ and above
	4	Hot short-circuiting between harnesses	1) Turn starting switch OFF. 2) Disconnect connectors L41 and T11. 3) Connect T-adapter. 4) Turn starting switch ON		
			Wiring harness between L41 (Female) (3) and T11 (Female) (C)	Voltage between L41 (Female) (3), T11 (Female) (C) and chassis ground	1V and below
			Wiring harness between L41 (Female) (4) and T11 (Female) (A)	Voltage between L41 (Female) (4), T11 (Female) (A) and chassis ground	1V and below
			Wiring harness between L41 (Female) (12) and T11 (Female) (B)	Voltage between L41 (Female) (12), T11 (Female) (B) and chassis ground	1V and below
	5	Defective HST controller	1) Turn starting switch OFF. 2) Disconnect connector L41. 3) Insert T-adapter. 4) Connect connector. 5) Turn starting switch ON		
			Between L41 (3) and (4)	Voltage	0.5 - 4.5 V
			Between L41 (12) and (4)	Voltage	4 - 6 V

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GENERAL ASSEMBLY DRAWINGS

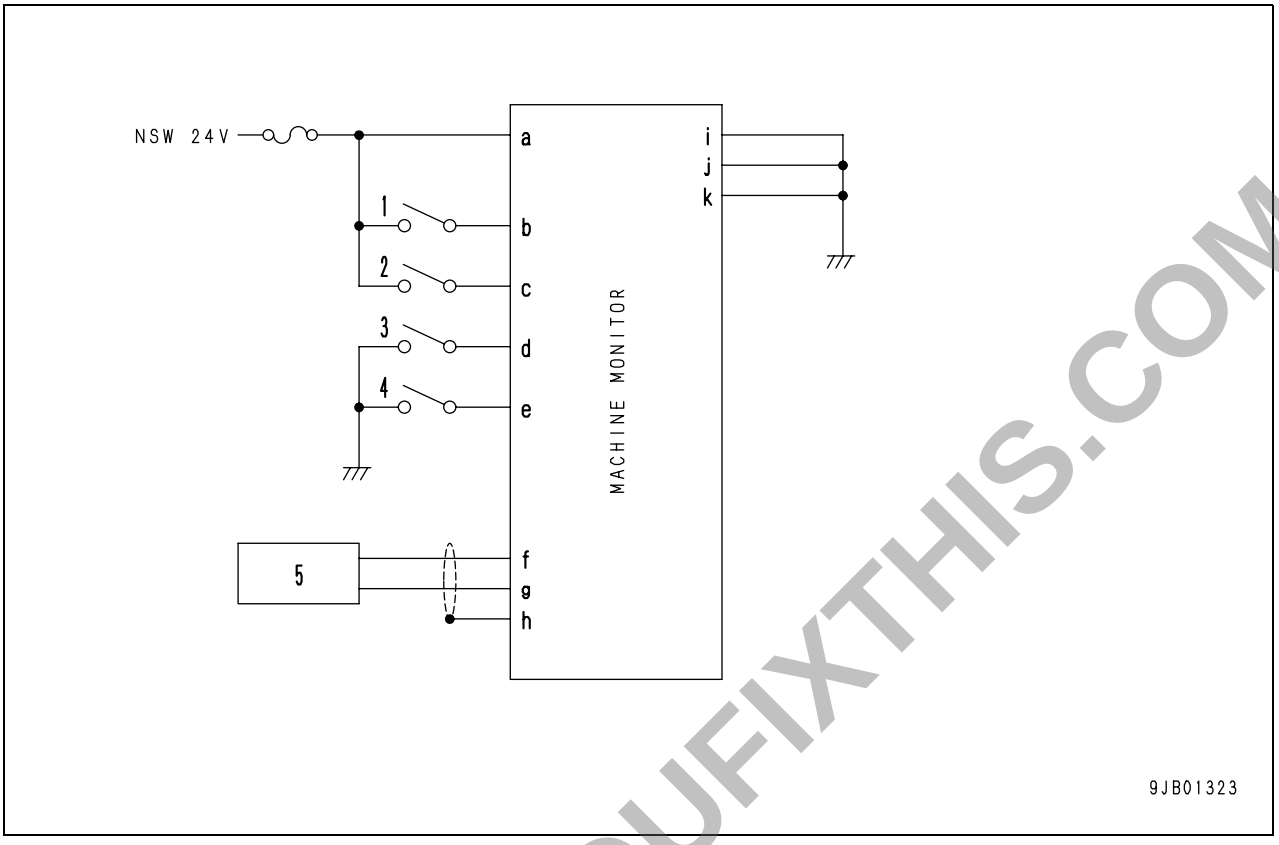


	Item		Unit	WA250-5H	WA250PT-5H
	Operating weight		kg	10,950	12,450
	Rated load		kg	3,680	3,540
	Bucket capacity (piled)		m^3	2.1	2.0
	Engine model		—	KOMATSU SAA6D102E-2-A Diesel engine	
	Flywheel horse power		kW {HP} / rpm	101{135} / 2,000	
A	Overall length		mm	6,905	7,575
B	Overall height		mm	3,200	3,200
C	Overall height when bucket is raised		mm	5,040	5,400
D	Overall width		mm	2,470	2,470
E	Min. ground clearance		mm	465	465
F	Bucket width		mm	2,685	2,560
G	Dumping clearance	Tip of cutting edge/Tip of tooth	mm	2,910	2,840 / 2,730
H	Dumping reach	Tip of cutting edge/Tip of tooth	mm	920	1,075 / 1,230
I	Bucket dump angle		deg.	45	45
	Min. turning radius	Tip of cutting edge/Tip of tooth	mm	5,775	5,840 / 5,920
		Center of outside wheel	mm	4,950	4,950
	Travel speed	F1	km / h	4.0 – 13.0	4.0 – 13.0
		F2	km / h	13.0	13.0
		F3	km / h	18.0	18.0
		F4	km / h	38.0	38.0
		R1	km / h	4.0 – 13.0	4.0 – 13.0
		R2	km / h	13.0	13.0
		R3	km / h	18.0	18.0
		R4	km / h	38.0	38.0

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Power supply and network



1. Monitor panel mode selector switch 1 "◇"
2. Monitor panel mode selector switch 1 "◆"
3. Monitor panel mode selector switch 2 "<"
4. Monitor panel mode selector switch 2 ">"
5. HST controller

Connection table of connector pins of machine monitor

Symbol	Connector pin No.
a	CNL23-11
b	CNL21-2
c	CNL21-1
d	CNL21-4
e	CNL21-5
f	CNL22-6
g	CNL22-2
h	CNL21-3
i	CNL21-7
j	CNL21-15
k	CNL23-14

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TABLE OF TIGHTENING TORQUES FOR SPLIT FLANGE BOLTS

★ In the case of split flange bolts for which there is no special instruction, tighten to the torque given in the table below.

Thread diameter	Width across flat	Tightening torque	
mm	mm	Nm	kgm
10 12 16	14 17 22	65.7 ± 6.8 112 ± 9.8 279 ± 29	6.7 ± 0.7 11.5 ± 1 28.5 ± 3

TABLE OF TIGHTENING TORQUES FOR O-RING BOSS PIPING JOINTS

★ Unless there are special instructions, tighten the O-ring boss piping joints to the torque below.

Norminal No.	Thread diameter	Width across flat	Tightening torque	
	mm	mm	Nm	kgm
02 03, 04 05, 06 10, 12 14	14 20 24 33 42	Varies depending on type of connector.	34.3 ± 4.9 93.1 ± 9.8 142.1 ± 19.6 421.4 ± 58.8 877.1 ± 132.3	3.5 ± 0.5 9.5 ± 1 14.5 ± 2 43 ± 6 89.5 ± 13.5

TABLE OF TIGHTENING TORQUES FOR O-RING BOSS PLUGS

★ Unless there are special instructions, tighten the O-ring boss plugs to the torque below.

Norminal No.	Thread diameter	Width across flat	Tightening torque	
	mm	mm	Nm	kgm
08 10 12 14 16 18 20 24 30 33 36 42 52	08 10 12 14 16 18 20 24 30 33 36 42 52	14 17 19 22 24 27 30 32 32 n 36 n n	7.35 ± 1.47 11.27 ± 1.47 17.64 ± 1.96 22.54 ± 1.96 29.4 ± 4.9 39.2 ± 4.9 49 ± 4.9 68.6 ± 9.8 107.8 ± 14.7 127.4 ± 19.6 151.9 ± 24.5 210.7 ± 29.4 323.4 ± 44.1	0.75 ± 0.15 1.15 ± 0.15 1.8 ± 0.2 2.3 ± 0.2 3 ± 0.5 4 ± 0.5 5 ± 0.5 7 ± 1 11 ± 1.5 13 ± 2 15.5 ± 2.5 21.5 ± 3 33 ± 4.5

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Failure Code	Location of Failure (Location, component with failure)	Nature of Failure (Problem, nature of failure)	Controller	Action code
DGR1KA	Brake oil temperature sensor system abnormal	Disconnection (KA)	MON	E01
DGR1KX	Brake oil temperature sensor system abnormal	Short circuit (KB)	MON	E01
DHE4L6	Engine oil pressure sensor disconnect	*See separate table (L6)	MON	E01

Separate table: Detailed phenomena of problem code (L)

Problem code	Nature
L0	Fill signal ON 2 or more channels for clutches not forming a set are input at same time
L1	Fill signal is ON when command current to ECMV is OFF
L2	Fuel pressure is greater than maximum specified value
L3	Corresponding component cannot be controlled
L4	ON/OFF signals for 2 systems do not match
L5	Potentiometer signal and switch signal do not match
L6	Engine speed signal, terminal C signal, signals for oil pressure switch, water temperature, etc. do not match operating condition or stopped condition of machine
L8	Analog signals for 2 systems do not match
LC	Speed signals for 2 systems do not match
LD	Switch has been kept pressed for abnormally long time
LH	Fill signal is OFF when command current to ECMV is ON

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REMOVAL, INSTALLATION OF CYLINDER HEAD ASSEMBLY

SPECIAL TOOLS

Symbol		Part No.	Part Name	Necessity	Q'ty	New/Remodel	Sketch
A	3	795-799-1171	Puller	■	1		
	4	790-331-1110	Wrench	■	1		

REMOVAL

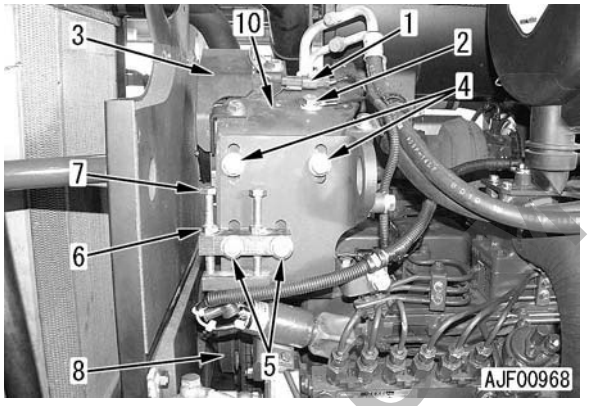
Stop the vehicle on a level place and set the safety bar to the frame.

Lower the work equipment to the ground, stop the engine, apply the parking brake, and put chocks under the tires.

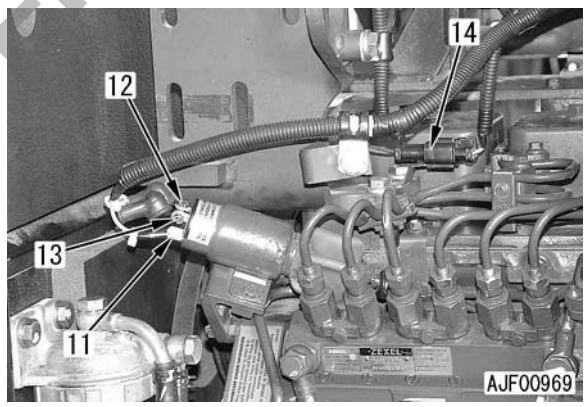
Disconnect the cable from the negative (-) terminal of the battery.

1. Remove engine assembly. For details, see Removal, Installation of engine assembly.
2. Drain the coolant.

   Coolant: **17 ℓ**
3. Remove the air conditioner compressor according to the following procedure.
   1) Disconnect wiring connector E16 (1) and ground terminal E22 (2).
   2) Remove cover (3).
   3) Loosen 2 mounting bolts (4) and 2 mounting bolts (5).
   4) Loosen 2 locknuts (6) and 2 adjustment bolts (7).
   5) Remove air conditioner compressor belt (8). [*1]
   6) Remove 2 mounting bolts (4), 2 mounting bolts (5), and air conditioner compressor and bracket assembly (10).
      ★ Place the air conditioner piping by the side of the engine without disconnecting it.

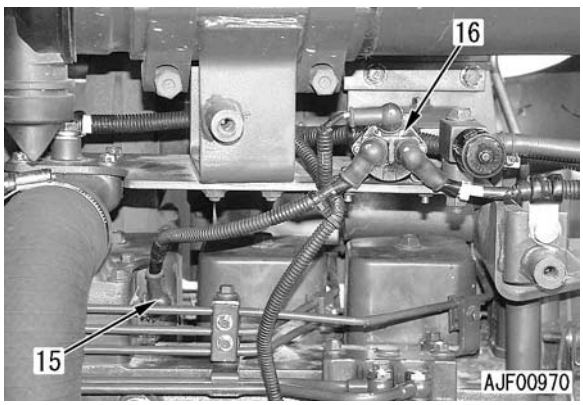


4. Disconnect the following wiring connectors and terminals.
   ★ Disconnect the wiring harness clamps, too.
   - (11): PULL
   - (12): HOLD
   - (13): GND
   - (14): E14



   - (15): E09

5. Remove the mounting bolts of heater relay (16).



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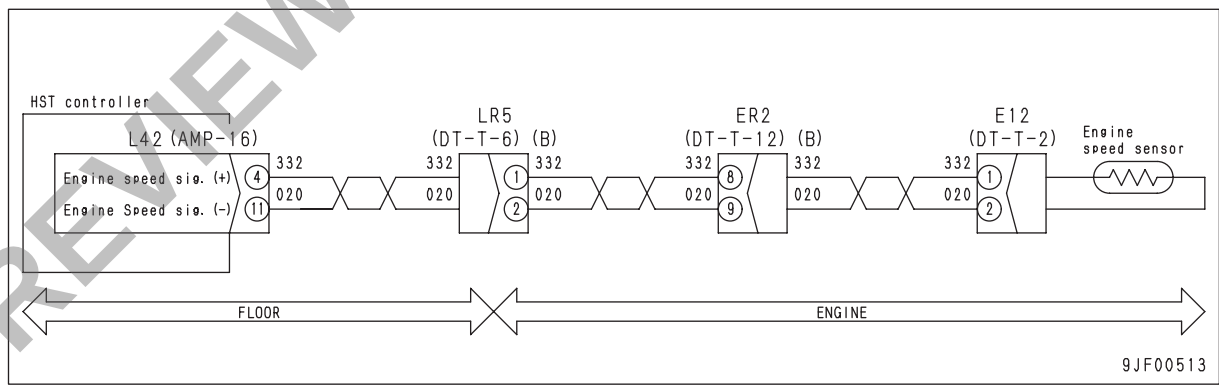
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Error Code [DLE2LC] (Engine revolution sensor revolution speed signal mismatch (LC))

Action Code	Error Code	Controller Code	Trouble	Engine revolution sensor revolution speed signal mismatch (LC)
E03	DLE2LC	HST		
Description of Trouble	• There is an abnormality in the speed calculated from the speed sensor signal and signal speed from the engine revolution signal.			
Machine monitor or controller Reaction	• Error is sent to machine monitor through CAN communications, and machine monitor turns HST safety relay ON (cuts motor 1, clutch solenoid circuit).			
Effect on Machine	• Travels but drive power is low			
Related Information				

	Causes		Standard Value in Normal State and Remarks on Troubleshooting		
Possible Causes and Standard Values	1	Defective engine revolution sensor	1) Turn starting switch OFF. 2) Disconnect connector E12. 3) Connect T-adapter		
			Between E12 (Male) (1) and (2)	Resistance	500 - 1,000Ω
			Between E12 (Male) (1), (2) and chassis ground	Resistance	1MΩ and above
	2	Wiring harness ground fault	1) Turn starting switch OFF. 2) Disconnect Connectors L42, E12. 3) Connect T-adapter		
			Wiring harness between L42 (Female) (4) and E12 (Female) (1)	Resistance between L42 (Female) (4), E12 (Female) (1) and chassis ground	1MΩ and above
	3	Hot short-circuiting between harnesses	1) Turn starting switch OFF. 2) Disconnect Connectors L42, E12. 3) Insert T-adapter. 4) Connect connector. 5) Turn starting switch ON		
			Wiring harness between L42 (Female) (4) and E12 (Female) (1)	Voltage between L42 (Female) (4), E12 (Female) (1) and chassis ground	1V and below
	4	Defective HST controller	1) Turn starting switch OFF. 2) Disconnect connector L42. 3) Insert T-adapter. 4) Connect connector. 5) Turn starting switch ON		
			Between L42 (Female) (4) and (11)	Voltage (AC range)	0.5V and above

Related circuit diagram



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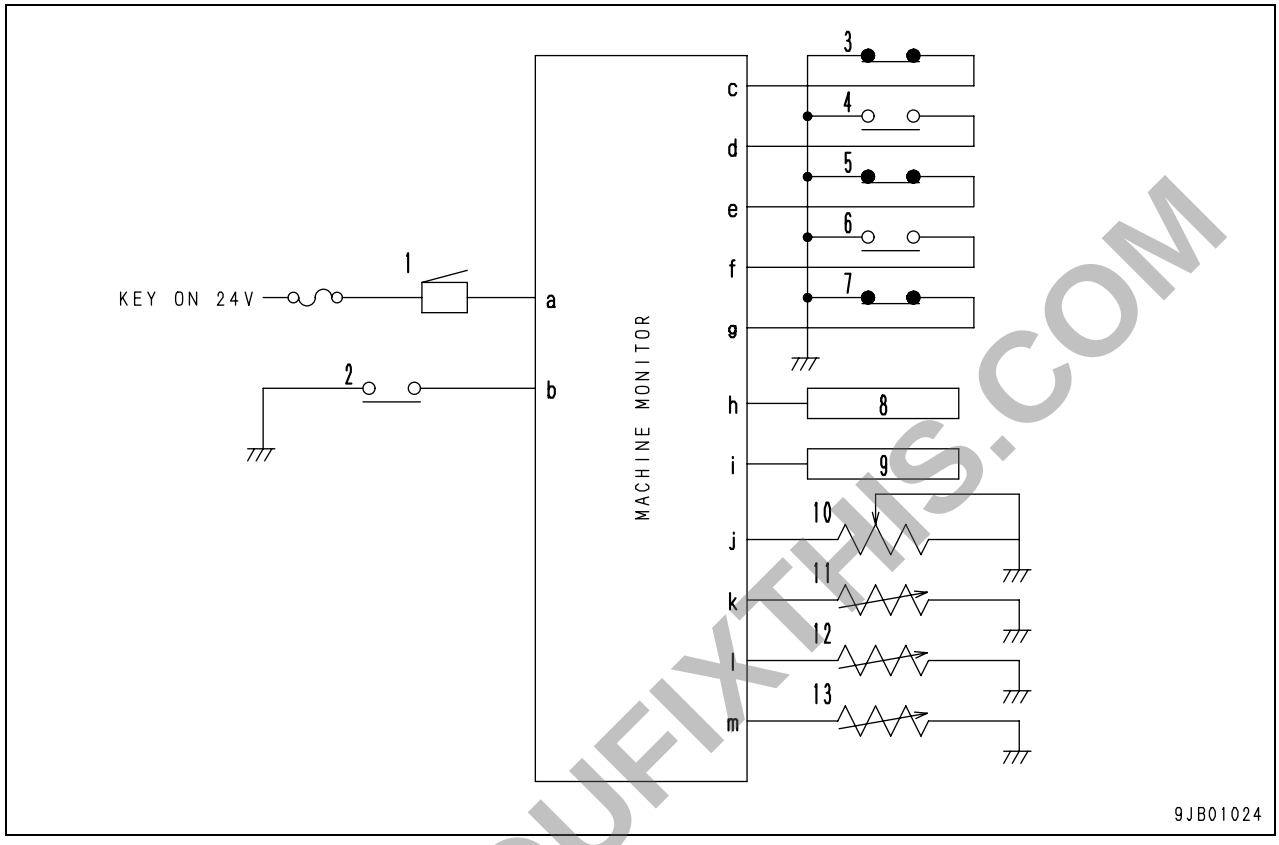
SPECIFICATIONS

Machine model				WA250-5H	WA250PT-5H
Serial No.				WA250H50051 and up	WA250H60051 and up
Weight	Operating weight		kg	10,950	12,450
	Distribution (front) SAE travel posture		kg	4,330	5,270
	Distribution (rear) SAE travel posture		kg	6,620	7,180
Performance	Bucket capacity (piled)		m³	2.1	2.0
	Rated load		kg	3,680	3,540
	Travel speed	FORWARD 1st	km / h	4.0 – 13.0	4.0 – 13.0
		FORWARD 2nd	km / h	13.0	13.0
		FORWARD 3rd	km / h	18.0	18.0
		FORWARD 4th	km / h	38.0	38.0
		REVERSE 1st	km / h	4.0 – 13.0	4.0 – 13.0
		REVERSE 2nd	km / h	13.0	13.0
		REVERSE 3rd	km / h	18.0	18.0
		REVERSE 4th	km / h	38.0	38.0
	Max. rimpull	FORWARD	kN {kg}	98 {10,000}	96 {9,800}
		REVERSE	kN {kg}	98 {10,000}	96 {9,800}
	Gradeability		deg.	25	25
	Min. turning radius	(Center of outside wheel)	mm	4,950	4,950
	Min. turning radius (Tip of cutting edge/Tip of tooth)	[SAE travel posture]	mm	5,775	5,840 / 5,920
Dimensions	Overall length (Tip of cutting edge/Tip of tooth)		mm	6,905	7,575
	Overall width (chassis)		mm	2,470	2,470
	Bucket width (Without tooth/With tooth)		mm	2,685	2,560
	Overall height (top of cab)		mm	3,200	3,200
	Overall height (Bucket approx. raised to max.)		mm	5,040	5,400
	Wheel base		mm	2,900	2,900
	Tread		mm	1,930	1,930
	Min. ground clearance		mm	465	465
	Max. height of bucket hinge pin		mm	3,795	3,965
	Dumping clearance (Tip of cutting edge/ Tip of tooth)		mm	2,910	2,840 / 2,730
	Dumping reach (Tip of cutting edge/Tip of tooth)		mm	920	1,075 / 1,230
	Steering angle		deg.	40	40
	Bucket tilt angle (travel posture)		deg.	50	44
	Bucket tilt angle (max. height)		deg.	66	55
	Bucket dump angle (max. height)		deg.	45	50
	Digging depth (10° dump) (Tip of cutting edge/Tip of tooth)		mm	245	305 / 385

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Sensing



1. Alarm buzzer
2. HST filter clogging sensor
3. Steering oil pressure sensor
4. Emergency steering oil pressure sensor
5. Coolant level sensor
6. Brake oil pressure sensor
7. Engine oil pressure sensor
8. Parking brake not applied signal
9. Parking brake indicator signal
10. Fuel level sensor
11. HST oil temperature sensor
12. Coolant temperature sensor (for monitor)
13. Axle oil temperature sensor

Connection table of connector pins of machine monitor

Symbol	Connector pin No.
a	CNL21-11
b	CNL23-6
c	CNL22-3
d	CNL22-5
e	CNL23-8
f	CNL23-19
g	CNL23-10
h	CNL21-13
i	CNL23-18
j	CNL23-13
k	CNL21-14
l	CNL21-16
m	CNL21-8

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TIGHTENING TORQUE FOR 102 ENGINE SERIES

1) BOLT AND NUTS

Use these torques for bolts and nuts (unit: mm) of Cummins Engine.

Thread diameter	Tightening torque	
mm	Nm	kgm
6	10 ± 2	1.02 ± 0.20
8	24 ± 4	2.45 ± 0.41
10	43 ± 6	4.38 ± 0.61
12	77 ± 12	7.85 ± 1.22

2) EYE JOINTS

Use these torques for eye joints (unit: mm) of Cummins Engine.

Thread diameter	Tightening torque	
mm	Nm	kgm
6	8 ± 2	0.81 ± 0.20
8	10 ± 2	1.02 ± 0.20
10	12 ± 2	1.22 ± 0.20
12	24 ± 4	2.45 ± 0.41
14	36 ± 5	3.67 ± 0.51

3) TAPERED SCREWS

Use these torques for tapered screws (unit: inch) of Cummins Engine.

Thread diameter	Tightening torque	
inch	Nm	kgm
1 / 16	3 ± 1	0.31 ± 0.10
1 / 8	8 ± 2	0.81 ± 0.20
1 / 4	12 ± 2	1.22 ± 0.20
3 / 8	15 ± 2	1.53 ± 0.41
1 / 2	24 ± 4	2.45 ± 0.41
3 / 4	36 ± 5	3.67 ± 0.51
1	60 ± 9	6.12 ± 0.92

TIGHTENING TORQUE TABLE FOR HOSES (TAPER SEAL TYPE AND FACE SEAL TYPE)

★ Tighten the hoses (taper seal type and face seal type) to the following torque, unless otherwise specified.

★ Apply the following torque when the threads are coated (wet) with engine oil.

Nominal size of hose	Width across flats	Tightening torque (Nm {kgm})		Taper seal type	Face seal type	
		Range	Target	Thread size (mm)	Nominal thread size - Threads per inch, Thread series	Root diameter (mm) (Reference)
02	19	35 - 63 {3.5 - 6.5}	44 {4.5}	14	$\frac{9}{16}$ - 18UNF	14.3
03	22	54 - 93 {5.5 - 9.5}	74 {4.5}	–	$\frac{11}{16}$ - 16UN	17.5
	24	59 - 98 {6.0 - 10.0}	78 {8.0}	18	–	–
04	27	84 - 132 {8.5 - 13.5}	103 {10.5}	22	$\frac{13}{16}$ - 16UN	20.7
05	32	128 - 186 {13.0 - 19.0}	157 {16.0}	24	1 - 14UNS	25.4
06	36	177 - 245 {18.0 - 25.0}	216 {22.0}	30	$1\frac{3}{16}$ - 12UNF	30.3
(10)	41	177 - 245 {18.0 - 25.0}	216 {22.0}	33	–	–
(12)	46	197 - 294 {20.0 - 30.0}	245 {25.0}	36	–	–
(14)	55	246 - 343 {25.0 - 35.0}	294 {30.0}	42	–	–

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REMOVAL, INSTALLATION OF ENGINE ASSEMBLY

REMOVAL

Stop the vehicle on a level place and set the safety bar to the frame.

Lower the work equipment to the ground, stop the engine, apply the parking brake, and put chocks under the tires.

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

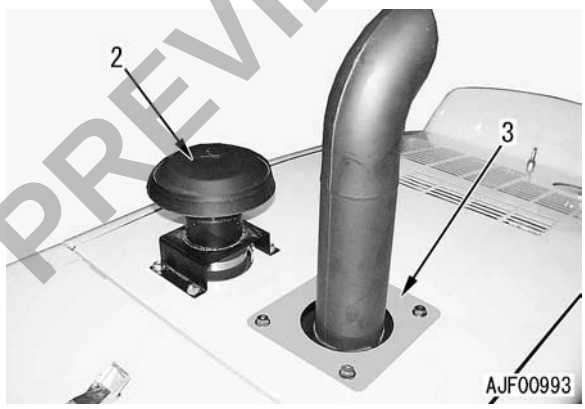
1. Drain the coolant.

   Coolant: **17 ℓ**

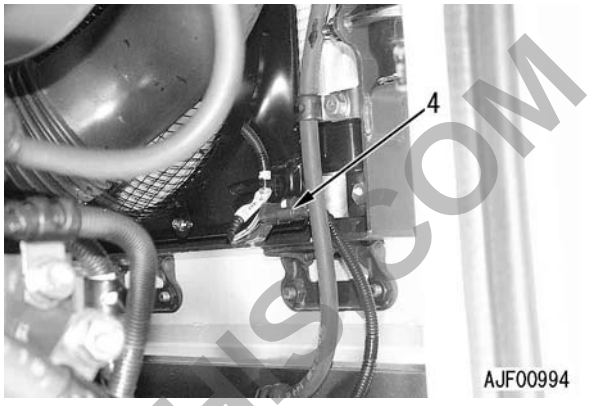
2. Remove the engine hood assembly according to the following procedure.
   1) Remove right and left fenders (1).

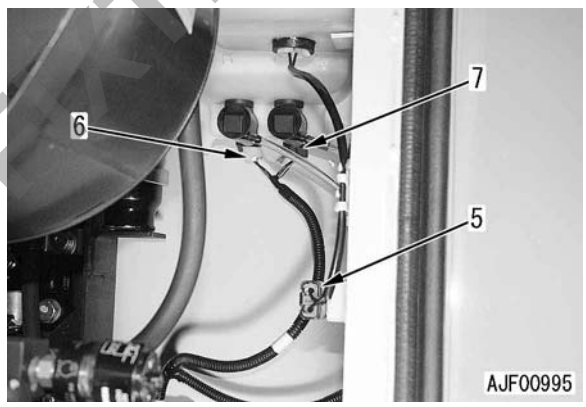


   2) Remove precleaner (2). [*1]
   3) Remove cover (3).

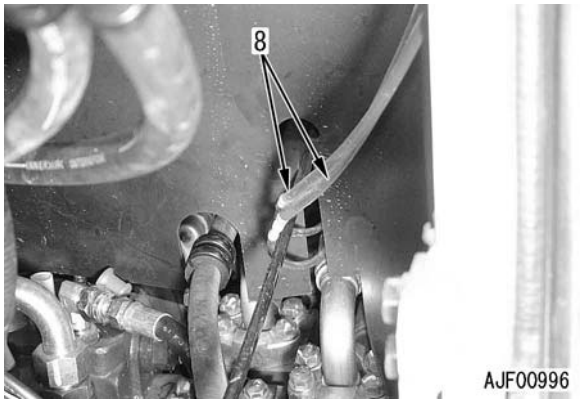


   4) Disconnect wiring connectors B04 (4), B05 (5), B06 (6), and B07 (7) from the front side of the engine hood.





   5) Disconnect 2 windshield washer hoses (8).



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Error Code [DW26KZ] (Motor 2 solenoid system discontinuity or short-circuiting (KZ))

Action Code	Error Code	Controller Code	Trouble	Motor 2 solenoid system discontinuity or short-circuiting (KZ)
E03	DW26KZ	HST		
Description of Trouble	• Excessive electricity flows when output to motor 2 solenoid circuit is ON; no electricity flows when output is ON or electricity flows when output is ON.			
Machine monitor or controller Reaction	• No action.			
Effect on Machine	• Travel speed does not increase. • Travel speed indicator on machine monitor stays at 0 km/h and does not move			
Related Information				

	Causes		Standard Value in Normal State and Remarks on Troubleshooting			
Possible Causes and Standard Values	1	Defective motor 2 solenoid	1) Turn starting switch OFF. 2) Disconnect connector T07. 3) Connect T-adapter			
			Between T07 (Female) (1) and (2)		Resistance	10 - 30Ω
			Between T07 (Female) (3) and (4)		Resistance	10 - 30Ω
			Between T07 (Female) (1), (2) and chassis ground		Resistance	1MΩ and above
	2	Defective reverse relay (L107)	1) Turn starting switch OFF. 2) Interchange relay (L107) with normal relay, 3) Turn starting switch ON. 4) Operate FNR switch			
			Does condition become normal when reverse relay (L107) is interchanged with normal relay?	The condition is abnormal		Relay (L107) is normal
				The condition is normal		Defective relay (L107)
			1) Turn starting switch OFF. 2) Disconnect connector L107. 3) Solid part check			
			Between L107 (Male) (5) and (6)		Resistance	200 - 40Ω
			1) Turn starting switch OFF. 2) Disconnect connector L107. 3) Check as individual part. 4) Apply impressed voltage between L107 (Male) (5) - (6)			
			Between L107 (Male) (1) and (2)	Applies 24V impressed voltage between L107 (Male) (5) - (6)	Resistance	1Ω and below
				Does not apply voltage between L107 (Male) (5) - (6)	Resistance	1MΩ and above
	3	Defective FNR switch	1) Turn starting switch OFF. 2) Disconnect connector L15. 3) Connect T-adapter			
			Between L15 (Male) (1) and (4)	Operate FNR lever F	Resistance	1MΩ and above
				Operate FNR lever N	Resistance	1MΩ and above
				Operate FNR lever R	Resistance	1Ω and below
	4	Defective diode (D09)	1) Turn starting switch OFF. 2) Interchange diode (D09) with normal diode. 3) Turn starting switch ON. 4) Operate FNR switch			
			Does condition become normal when diode (D09) is interchanged with normal diode?	The condition is abnormal		Diode (D09) is normal
				The condition is normal		Defective diode (D09)

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Machine model				WA250-5H	WA250PT-5H
Serial No.				WA250H50051 and up	WA250H60051 and up
Engine	Model			SAA6D102E-2-A	
	Type			4-cycle, water-cooled, in-line, 6-cylinder, direct injection with turbocharger, aftercooler	
	No. of cylinders - bore x stroke		mm	6 – 102 x 120	
	Piston displacement		ℓ {cc}	5.88 {5,880}	
	Flywheel horsepower		kW / rpm	101 / 2,000	
			{HP / rpm}	{135 / 2,000}	
	Maximum torque		Nm / rpm	618 / 1,400	
			{kgm / rpm}	{63 / 1,400}	
	Min. fuel consumption ratio		g / kWh {g / HPh}	224 {167}	
	High idling speed		rpm	2,225	
	Low idling speed		rpm	825	
	Starting motor			24 V 4.5 kW	
	Alternator			24 V 60 A	
	Battery			24 V 110 Ah x 2 pcs.	
Power train	HST pump			Variable displacement swash plate-type piston pump	
	HST motor 1			Variable displacement swash plate-type piston motor	
	HST motor 2			Variable displacement swash plate-type piston motor	
	Transfer			Multiple shaft planetary compound-type, spur gear constant mesh-type, 2 alternative power systems	
	Reduction gear			Spiral bevel gear, splash lubrication type	
	Differential			Straight bevel gear type, torque portioning	
	Final drive			Planetary gear 1-stage, splash lubrication type	
Axle	Drive type			Front and rear wheel drive	
	Front axle			Fixed to frame, semi-floating type	
	Rear axle			Center pin support, semi-floating type	
Tire	Tire size			20.5–25–12PR	
	Rim size			25x17.00–1.7	
	Inflation pressure	Front tire	kPa {kg / cm²}	274 {2.8}	
		Rear tire	kPa {kg / cm²}	274 {2.8}	
Brakes	Main brake	Braking system		4 wheel braking, Front and rear wheel independent system control	
		Brake type		Enclosed wet multiple disc type	
		Operation method		Hydraulically controlled	
		Control method		Hydraulic power servo assisted brake	
	Parking brake	Braking system		Speed change gear output shaft braking	
		Brake type		Wet multiple disc type	
		Operation method		Mechanical type	
		Control method		Hand lever type	

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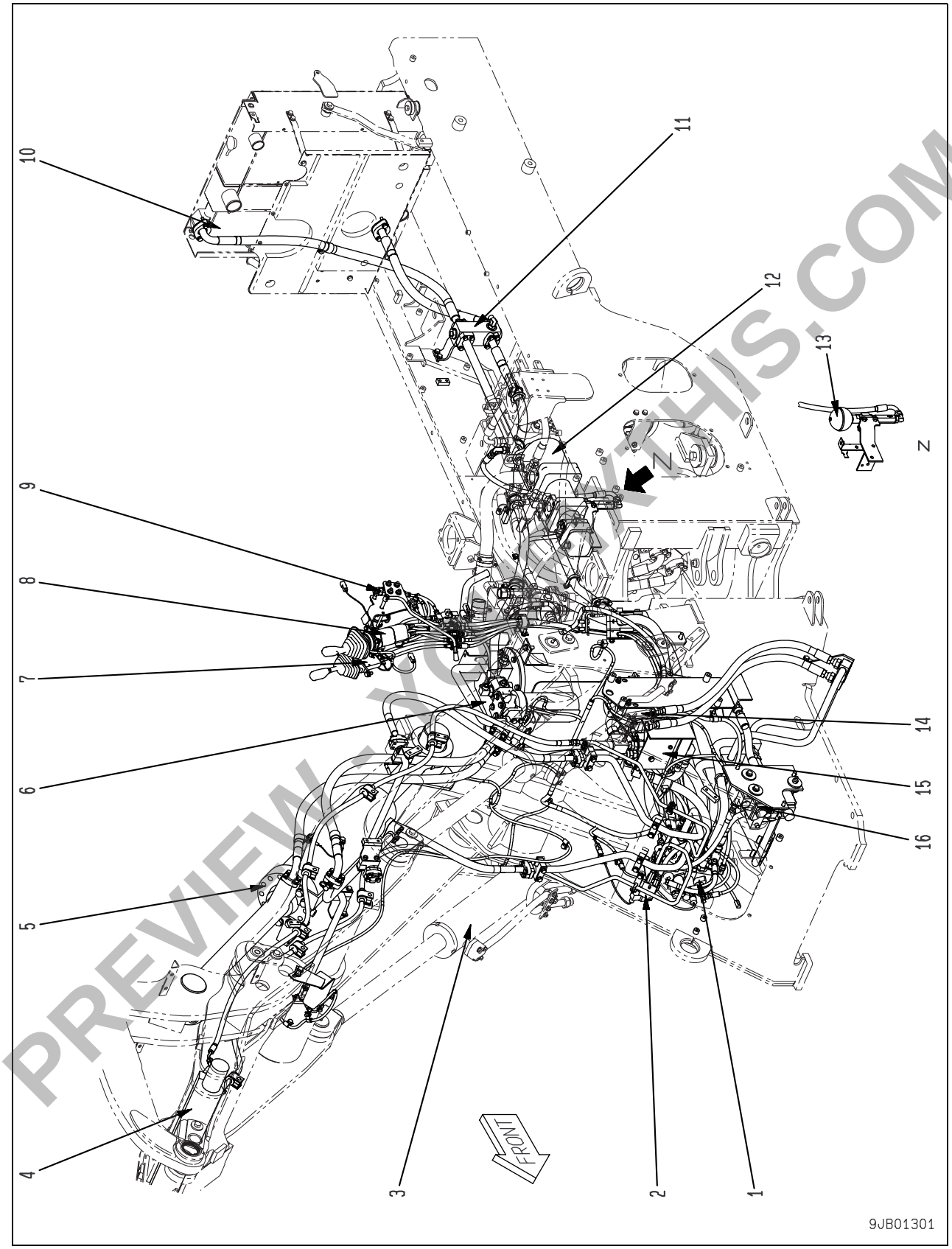
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WA250PT-5



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Machine model						WA250-5	
Category	Item		Measurement Conditions		Unit	Standard Value For New Machine	Service Limit Value
Work equipment control lever	Operating effort	Lift arm	• Engine water temperature: Operating range • Engine speed: Low idling • Hydraulic oil temperature: 60 - 80°C	HOLD→RAISE	N {kg}	$14.7\,^{+4.9}_{0}$ {$1.5\,^{+0.5}_{0}$}	29.4 {3}
				RAISE→HOLD		$18.6\,^{+4.9}_{0}$ {$1.9\,^{+0.5}_{0}$}	35.3 {3.6}
				HOLD→LOWER		$12.3\,^{+4.9}_{0}$ {$1.25\,^{+0.5}_{0}$}	25.7 {2.6}
				LOWER→HOLD		-	-
				LOWER→FLOAT		$18.6\,^{+4.9}_{0}$ {$1.9\,^{+0.5}_{0}$}	35.3 {3.6}
				FLOAT→HOLD		$21.6\,^{+4.9}_{0}$ {$2.2\,^{+0.5}_{0}$}	39.7 {4.0}
		Bucket		HOLD→DUMP		$16.7\,^{+4.9}_{0}$ {$1.7\,^{+0.5}_{0}$}	32.3 {3.3}
				HOLD→TILT		$14.7\,^{+4.9}_{0}$ {$1.5\,^{+0.5}_{0}$}	29.4 {3}
				TILT→HOLD		$18.6\,^{+4.9}_{0}$ {$1.9\,^{+0.5}_{0}$}	27.9 {2.9}
	Travel	Lift arm		HOLD→RAISE	mm	46 ± 9	46 ± 12
				HOLD→LOWER		46 ± 9	46 ± 12
				LOWER→FLOAT		14 ± 9	14 ± 12
		Bucket		HOLD→DUMP		60 ± 9	60 ± 12
				HOLD→TILT		46 ± 9	46 ± 12
Engine	Engine speed	HST stall	• Engine water temperature: Operating range • HST oil temperature: 60 - 80°C • Hydraulic oil temperature: 45 - 55°C		rpm	2,180 ± 100	2,180 ± 200
		Hydraulic stall				2,070 ± 100	2,070 ± 200
		Full stall (HST stall + Hydraulic stall)				2,040 ± 200	2,040 ± 300

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Error Code [DX19KZ] (Motor 1 solenoid system discontinuity or short-circuiting (KZ))

Action Code	Error Code	Controller Code	Trouble	Motor 1 solenoid system discontinuity or short-circuiting (KZ)
E03	DX19KZ	HST		
Description of Trouble	• Excessive electricity flows when output to motor 1 solenoid circuit is ON; no electricity flows when output is ON or electricity flows when output is ON.			
Machine monitor or controller Reaction	• No action.			
Effect on Machine	• Travels but drive power is low			
Related Information				

	Causes		Standard Value in Normal State and Remarks on Troubleshooting			
Possible Causes and Standard Values	1	Defective motor 1 solenoid	1) Turn starting switch OFF. 2) Disconnect connector T06. 3) Connect T-adapter			
			Between T06 (Female) (1) and (2)		Resistance	15 - 35Ω
			Between T06 (Female) (1), (2) and chassis ground		Resistance	1MΩ and above
	2	Defective HST safety relay (L111)	1) Turn starting switch OFF. 2) Interchange relay (L111) with normal relay. 3) Turn starting switch ON. 4) Operate FNR switch			
			Does condition become normal when HST safety relay (L111) is interchanged with normal relay?		The condition is abnormal	Relay (L111) is normal
					The condition is normal	Defective relay (L111)
			1) Turn starting switch OFF. 2) Disconnect connector L111. 3) Solid part check			
			Between L111 (Male) (1) and (2)		Resistance	200 - 400Ω
			1) Turn starting switch OFF. 2) Disconnect connector L111. 3) Solid part check. 4) Applies impressed voltage between L111 (Male) (1) - (2)			
			Between L111 (Male) (3) and (5)	Applies 24V impressed voltage between L111 (Male) (1) - (2)	Resistance	1Ω and below
				Does not apply voltage between L111 (Male) (1) - (2)	Resistance	1MΩ and above
	3	Wiring harness discontinuity (Disconnection or defective contact)	1) Turn starting switch OFF. 2) Disconnect Connectors L23, L41, L111, T06 and fuse FS1 (12). 3) Connect T-adapter			
			Wiring harness between T06 (Female) (1) and L41 (Female) (6)		Resistance	1Ω and below
			Wiring harness between T06 (Female) (2) and L111 (Female) (5)		Resistance	1Ω and below
			Wiring harness between L111 (Female) (3) and chassis ground		Resistance	1Ω and below
			Wiring harness between L111 (Female) (2) and L23 (Female) (15)		Resistance	1Ω and below
			Wiring harness between fuse FS1 (12) and L111 (Female) (1)		Resistance	1Ω and below
	4	Wiring harness ground fault	1) Turn starting switch OFF. 2) Disconnect Connectors L23, L41, L111, T06 and fuse FS1 (12). 3) Connect T-adapter			
			Wiring harness between T06 (Female) (1) and L41 (Female) (6)	Resistance between T06 (Female) (1), L41 (Female) (6) and chassis ground		1MΩ and above
			Wiring harness between T06 (Female) (2) and L111 (Female) (5)	Resistance between T06 (Female) (2), L111 (Female) (5) and chassis ground		1MΩ and above
			Wiring harness between fuse FS1 (12) and L111 (Female) (1) *	Resistance between fuse FS1 (12), L111 (Female) (1) and chassis ground		1MΩ and above
			In the above case of marked mark (*), the fuse is blown.			

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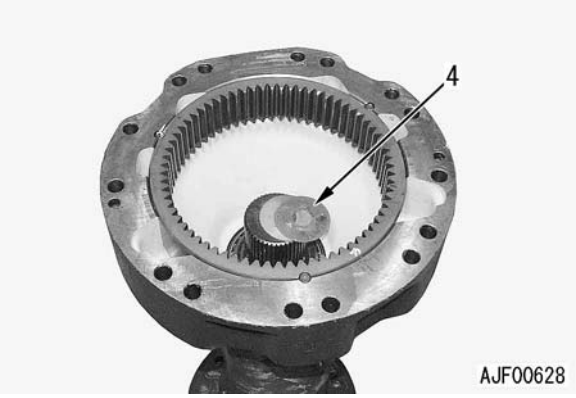
e) Impossible to switch vents

Action Code	Error Code	Controller Code	Trouble	Defective air conditioner e) Impossible to switch vents
-	-	-		
Description of Trouble	• Impossible to switch vents			
Machine monitor or controller Reaction	• No reaction.			
Effect on Machine	• Impossible to switch vents			
Related Information				

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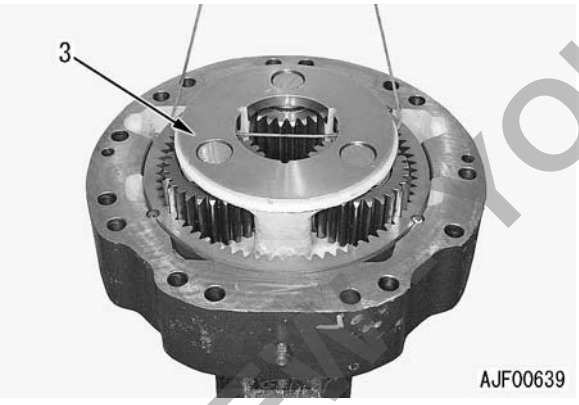
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6. Planetary carrier assembly
   1) Install shim (4) selected in steps 3.-8) to the end of the axle shaft.



   2) Sling and install planetary carrier assembly (3).

When installing the planetary carrier, take care not to catch your fingers in the gear.

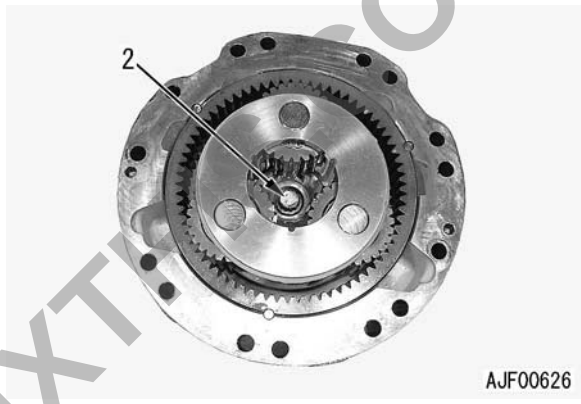


   3) Tighten mounting bolt (2).
      ★ Degrease and clean the bolt hole of the axle shaft and mounting bolt.

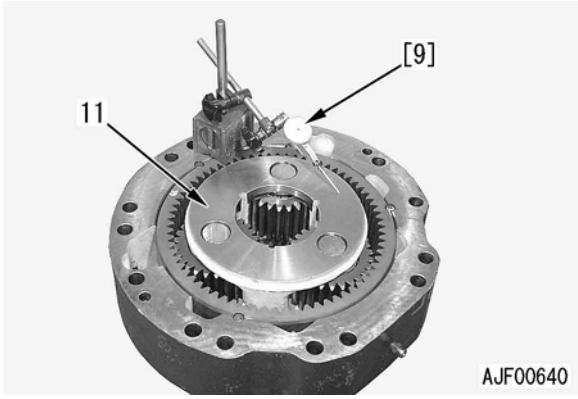
      Mounting bolt: **Adhesive (LT-2)**

      Mounting bolt:
      490 - 608 Nm {50 - 62 kgm}

      ★ Clean the shaft end and planetary carrier spline thoroughly before installing.



   4) Install dial gauge [9] to axle housing (11) and measure the end play of the planetary carrier.
      • End play of planetary carrier:
      0 - 0.1 mm



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