CX31B
CX36B

Compact Hydraulic Excavator

CX31B - PIN PW14-46519 - and higher

CX36B - PIN PX15-21105 - and higher

SERVICE MANUAL

Part number S5PW0032E02

English

August 2010

CASE CONSTRUCTION

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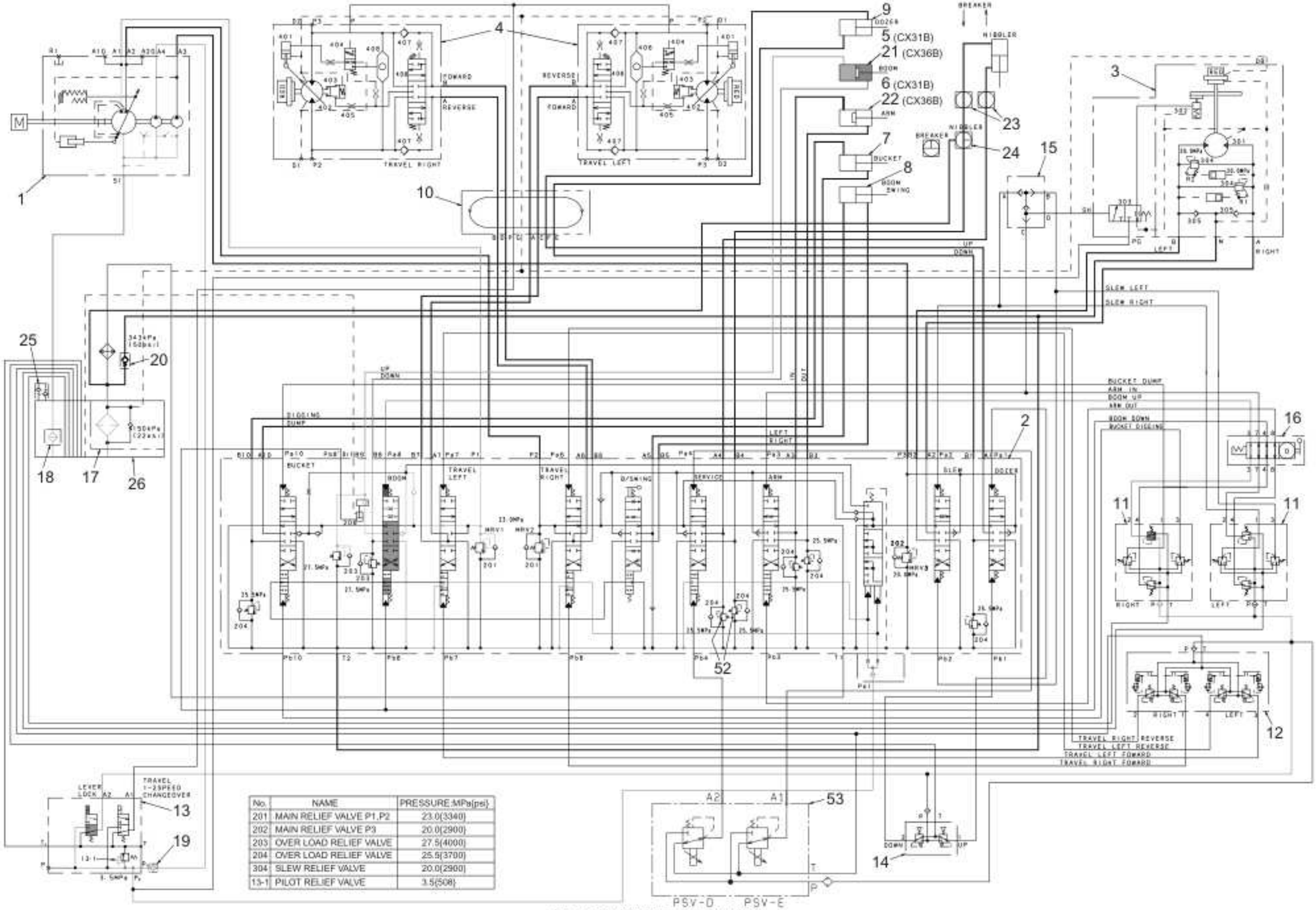
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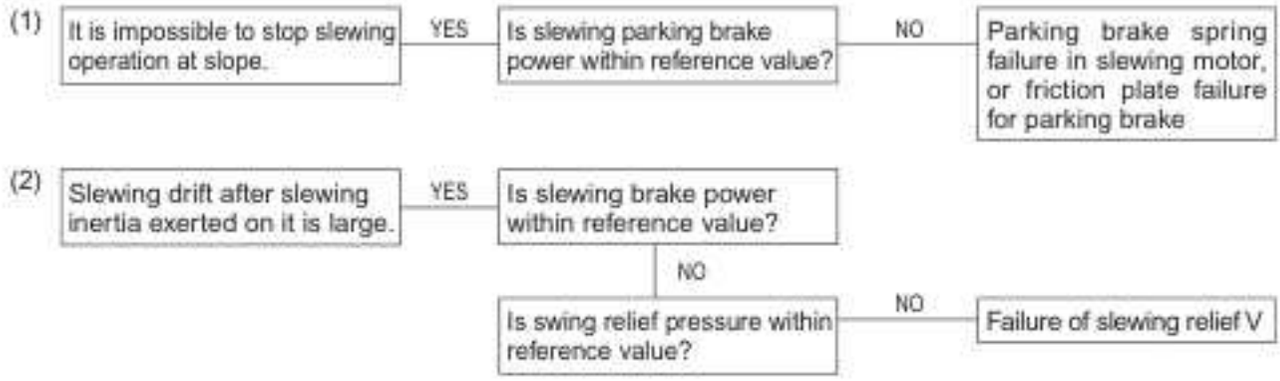


No.	NAME	PRESSURE:MPa{psi}
201	MAIN RELIEF VALVE P1,P2	23.0{3340}
202	MAIN RELIEF VALVE P3	20.0{2900}
203	OVER LOAD RELIEF VALVE	27.5{4000}
204	OVER LOAD RELIEF VALVE	25.5{3700}
304	SLEW RELIEF VALVE	20.0{2900}
13-1	PILOT RELIEF VALVE	3.5{508}

Boom circuit : Boom up operation

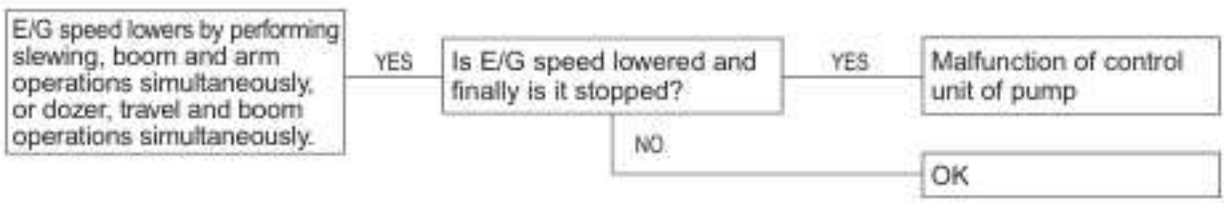
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42.3.3.4 MALFUNCTION OF SLEWING OPERATION

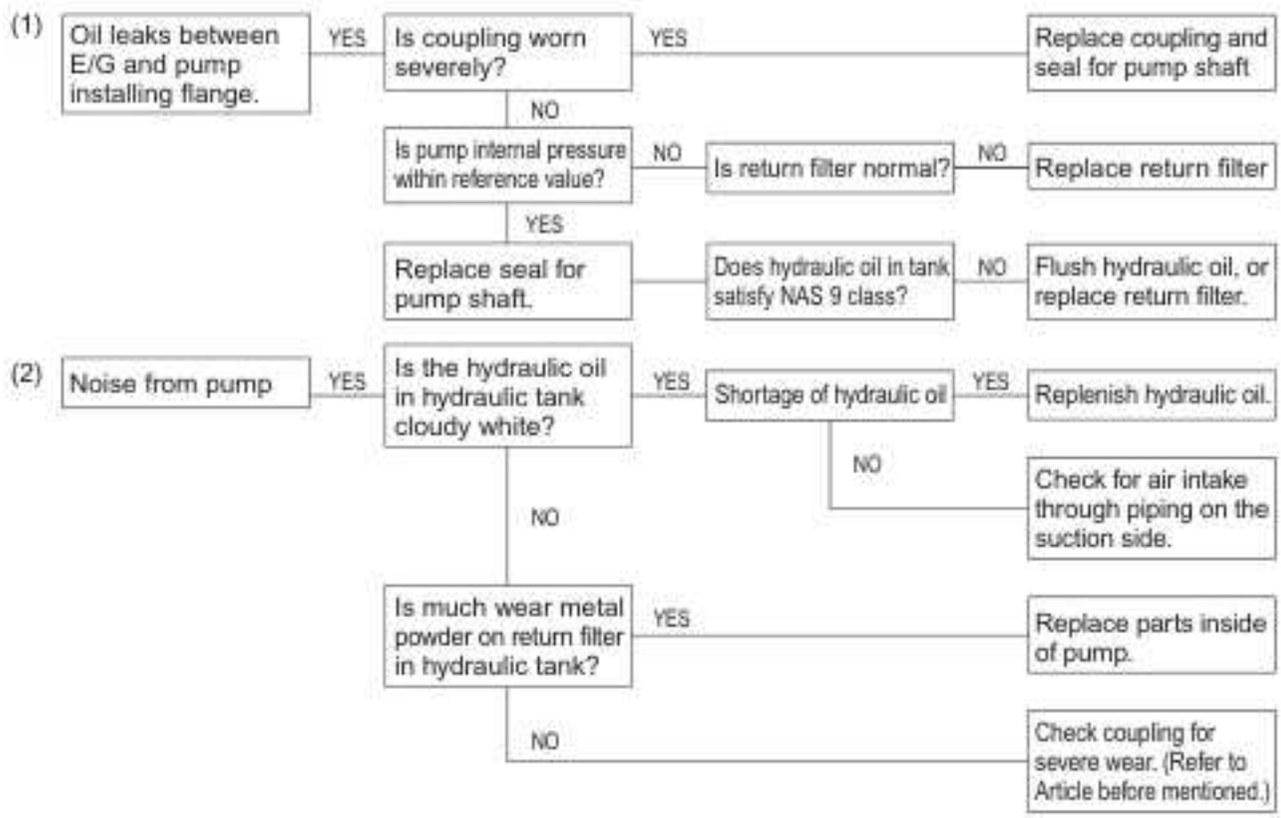


42.3.4 PUMP

42.3.4.1 ENGINE SPEED IS REDUCED DUE TO PUMP LOAD



42.3.4.2 MALFUNCTION OF PUMP



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4TNV98 (~ EPA Tier2)

Engine Model	4TNV98						
Version	CL			VM			
Type	Vertical In-line Diesel Engine						
Combustion System	Direct Injection						
Aspiration	Natural						
No. of Cylinders	4						
Bore x Stroke	98 x 110mm						
Displacement	3.319L						
Continuous Rated Output	min^{-1}	1500	1800				
	kW	30.9	36.8				
	PS	42.0	50.0				
Max. Rated Output (Net)	min^{-1}	1500	1800	2000	2200	2400	2500
	kW	34.6	41.2	41.9	45.6	49.3	51.1
	PS	47.0	56.0	57.0	62.0	67.0	69.5
High Idling	min^{-1}	1600 ± 25	1895 ±25	2180 ± 25	2400 ± 25	2590 ± 25	2700 ± 25
Engine Weight (Dry) *with Flywheel Housing	248 kg			235 kg			
PTO Position	Flywheel End						
Direction of Rotation	Counterclockwise Viewed From Flywheel End						
Cooling System	Liquid-Cooled with Radiator						
Lubricating System	Forced Lubrication with Trochoid Pump						
Normal Oil Pressure at Rated Engine Speed	0.29 - 0.39 MPa						
Normal Oil Pressure at Low Idle Speed	0.06 MPa						
Starting System	Electric Starting (Starter Motor: DC12V (2.3 kW)) ***						
	Alternator: DC12V, 40A***						
	Recommended Battery Capacity: 12V, 64Ah*** (5h rating)						
Dimensions (L x W x H)*	719 x 498 x 742 mm						
Engine Oil Pan Capacity**	10.5/6.0L (Dipstick Upper Limit / Lower Limit)						
Engine Coolant Capacity	4.2L Engine Only						
Standard Cooling Fan	410mm O.D., 6 Blade Pusher-Type ***						
Crank V-pulley dia./ Fan V-pulley dia.	ϕ130/ ϕ130mm ***						

* *Engine specifications without radiator.*

** *Engine oil capacity for a "Deep Standard" oil pan. Refer to the operation manual provided by the driven machine manufacturer for the actual engine oil capacity of your machine.*

*** *May vary depending on application.*

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CAUTION

Do not operate the engine if the alternator is producing unusual sounds. Damage to the alternator will result.

0000039en

CAUTION

If the engine coolant pump must be replaced, replace the engine coolant pump as an assembly only. Do not attempt to repair the engine coolant pump or replace individual components.

0000041en

CAUTION

Use a new special O-ring between the engine coolant pump and the joint. Be sure to use the special O-ring for each engine model. Although the O-ring dimensions are the same as a commercially available O-ring, the material is different.

0000042en

CAUTION

Remove or install the high-pressure fuel injection lines as an assembly whenever possible. Disassembling the high-pressure fuel injection lines from the retainers or bending any of the fuel lines will make it difficult to reinstall the fuel lines.

0000047en

CAUTION

After marking the position of the pump drive gear, do not rotate the engine crankshaft. Rotating the crankshaft will cause the fuel injection pump to become misaligned.

0000048en

CAUTION

Do not use a high-pressure wash directly on the alternator. Water will damage the alternator and result in inadequate charging.

0000049en

CAUTION

Do not reverse the positive (+) and negative (-) ends of the battery cable. The alternator diode and stator coil will be damaged.

0000050en

CAUTION

When the battery indicator goes out, it should not come on again. The battery indicator only comes on during operation if the alternator fails. However, if an LED is used in the battery indicator, the LED will shine faintly during normal operation.

0000051en

CAUTION

Using a non-specified V-belt will cause inadequate charging and shorten the belt life. Use the specified belt.

0000052en

CAUTION

Agricultural or other chemicals, especially those with a high sulfur content, can adhere to the IC regulator. This will corrode the conductor and result in battery over-charging (boiling) and charging malfunctions. Consult Yanmar before using the equipment in such an environment or the warranty is voided.

0000053en

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⚠ CAUTION



COOLANT HAZARD!

- Wear eye protection and rubber gloves when you handle long life or extended life engine coolant. If contact with the eyes or skin should occur, flush eyes and wash immediately with clean water.
- Failure to comply may result in minor or moderate injury.

0000005en

⚠ CAUTION



FLYING OBJECT HAZARD!

- ALWAYS wear eye protection when servicing the engine and when using compressed air or high-pressure water. Dust, flying debris, compressed air, pressurized water or steam may injure your eyes.
- Failure to comply may result in minor or moderate injury.

0000003en

⚠ CAUTION

Be sure to secure the engine solidly to prevent injury or damage to parts due to the engine falling during work on the engine.

0000006en

⚠ CAUTION



PINCH HAZARD!

Carefully rotate the alternator toward the cylinder block while loosening the V-belt. Failure to comply may result in minor or moderate injury.

0000014en

⚠ CAUTION

If any oil pump component clearance exceeds its limit, the oil pump must be replaced as an assembly.

0000015en

CAUTION

- Only use diesel fuels recommended by Yanmar for the best engine performance, to prevent engine damage and to comply with EPA / ARB warranty requirements.
- Only use clean diesel fuel.
- NEVER remove the primary strainer (if equipped) from the fuel tank filler port. If removed, dirt and debris could get into the fuel system causing it to clog.

0000004en

CAUTION

NEVER attempt to adjust the low or high idle speed limit screw. This may impair the safety and performance of the machine and shorten its life. If adjustment is ever required, contact your authorized Yanmar industrial engine dealer or distributor.

0000045en

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Symptoms and conditions of failure / Possible causes		Starting failure: Starter does not rotates: ECU failure lamp does not go on immediately after turning on the key	Starting failure: Starter does not rotates: ECU failure lamp goes on immediately (within 2 seconds) after turning on the key	Starting failure: Starter rotates: Engine does not start up (without initial ignition)	Starting failure: Starter rotates: Engine does not start up (it stops immediately after initial ignition)	Starting failure: Starter rotates: It takes longer than before to start up engine	Engine stall after start up: Smoke: None	Engine stall after start up: Smoke: Slight	Engine stall after start up: Smoke: Remarkable	Speed control error: Revolution speed cannot be changed with accelerator (stays at a constant speed)	Speed control error: No load: Cannot be set to particular speed	Speed control error: No load: Poor acceleration	Speed control error: No load: Does not smoothly return to low speed	Speed control error: No load: Hunting occurs	Speed control error: Workload: Hunting occurs	Engine output low: Smoke color: Normal	Engine output low: Smoke color: White	Engine output low: Smoke color: Black	Noise and vibration: High knocking sound at combustion time	Noise and vibration: Uneven combustion sound	Noise and vibration: Abnormal sound (other than combustion sound) from engine	Noise and vibration: Engine vibrates heavily	Lubricating oil: Too much lubricating oil consumed	Lubricating oil: Lubricating oil diluted with fuel	Lubricating oil: Lubricating oil mixed with water	Lubricating oil: Oil pressure low (oil pressure warning lamp lit)	Cooling water: Overheat (water temperature warning lamp lit)	Cooling water: Water temperature low	Intake air: Pressure low (air cleaner warning lamp lit)	Intake air: Pressure high	Exhaust gas: Workload: White exhaust gas	Exhaust gas: Workload: Black exhaust gas	Exhaust gas: Too much blow-bye	Exhaust gas: Exhaust gas temperature high	Fuel: Too much fuel consumed	Fuel: Fuel mixed with water (oil-water separator warning lamp lit)	Fuel: Fuel filter fouled shortly	Electrical parts: Battery charge error (charge lamp lit)	Electrical parts: ECU failure lamp flashes	Electrical parts: ECU failure lamp stops flashing immediately (within 2 seconds) after turning off the key	Electrical parts: Specific ECU control functions fail	Electrical parts: Fuses get blown or broken (repeatedly)	Corrective Action	Referenced page number
Electrical system	Fuse blown or broken	○	○				○																																	●	Replace the fuse.	
	Starter faulty		○	○																																				●	Repair or replace the starter.	See "Starter" (on page 11-9).
	Alternator faulty			○																																	○					Repair or replace the alternator.	See "Removing the Alternator" (on page 12-12).
	Wires disconnected	○	○	○			○																														○	○	○	○		Repair or replace the disconnected wire(s) of the harness.	
	Wires short-circuited (sheathing broken); overloaded by the power consumption by additional devices	●																																						●	Inspect, repair, or replace the harnesses and wires as needed. Reexamine the additional devices.	
	Battery voltage low		○	○																																	–					Inspect and charge the battery.	See "Inspecting the Electrolyte Level and Charging the Battery" (on page 5-23).
	Key switch faulty or disconnected	○					○																																	○		Repair or replace the harness. Replace the key switch.	
	Key switch instantly cut off				○		○																																			Replace the key switch.	
	Starter relay faulty, disconnected, or short-circuited		○																																							Repair or replace the harness. Replace the starter relay.	
	Main relay faulty (except for sticking of the contact, which is undetectable by ECU)	○																																						○		Repair or replace the harness. Replace the main relay.	
	Actuator relay faulty (contact failure undetectable by ECU)		?	?			○																																			Replace the actuator relay.	
	Start assist relay faulty (contact failure undetectable by ECU)			○		○													●												△												Replace the start assist relay.	
	Accelerator sensor signal error (an error undetectable by ECU)									○			○	○				○																									Repair or replace the accelerator sensor.	
	Water temperature sensor signal error (an error undetectable by ECU)			○		○							●	●				●																									Replace the water temperature sensor.	
	Speed sensor signal error (an error undetectable by ECU, such as caused by noise)				○	●	○						○	○				○																									Repair or replace the fuel injection pump.	Monitor the engine speed using the diagnosis tool.
	Rack position sensor signal error (an error undetectable by ECU)					●	○					●	○	○				○																									Repair or replace the fuel injection pump.	Monitor the rack position sensor signal using the diagnosis tool.
	Rack actuator malfunctioning (an error undetectable by ECU)					●	○					●	○	○				○																									Repair or replace the fuel injection pump.	Monitor the rack actuator using the diagnosis tool.
	ECU failure lamp disconnected																																							○		Replace the lamp. Repair or replace the harness.	
	ECU faulty (ECU self diagnosis failure)	○	○							○																														○	○		Replace the ECU.	

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