SEBM025000

SHOP MANUAL

KOMATSU®

PC03-2

MACHINE MODEL	SERIAL No.
PC03-2	**21587 and up**

- This shop manual may contain attachments and optional equipment that are not available in your area. Please consult your local Komatsu distributor for those items you may require. Materials and specifications are subject to change without notice.

- PC03-2 mount the 2D68E-3A engine.

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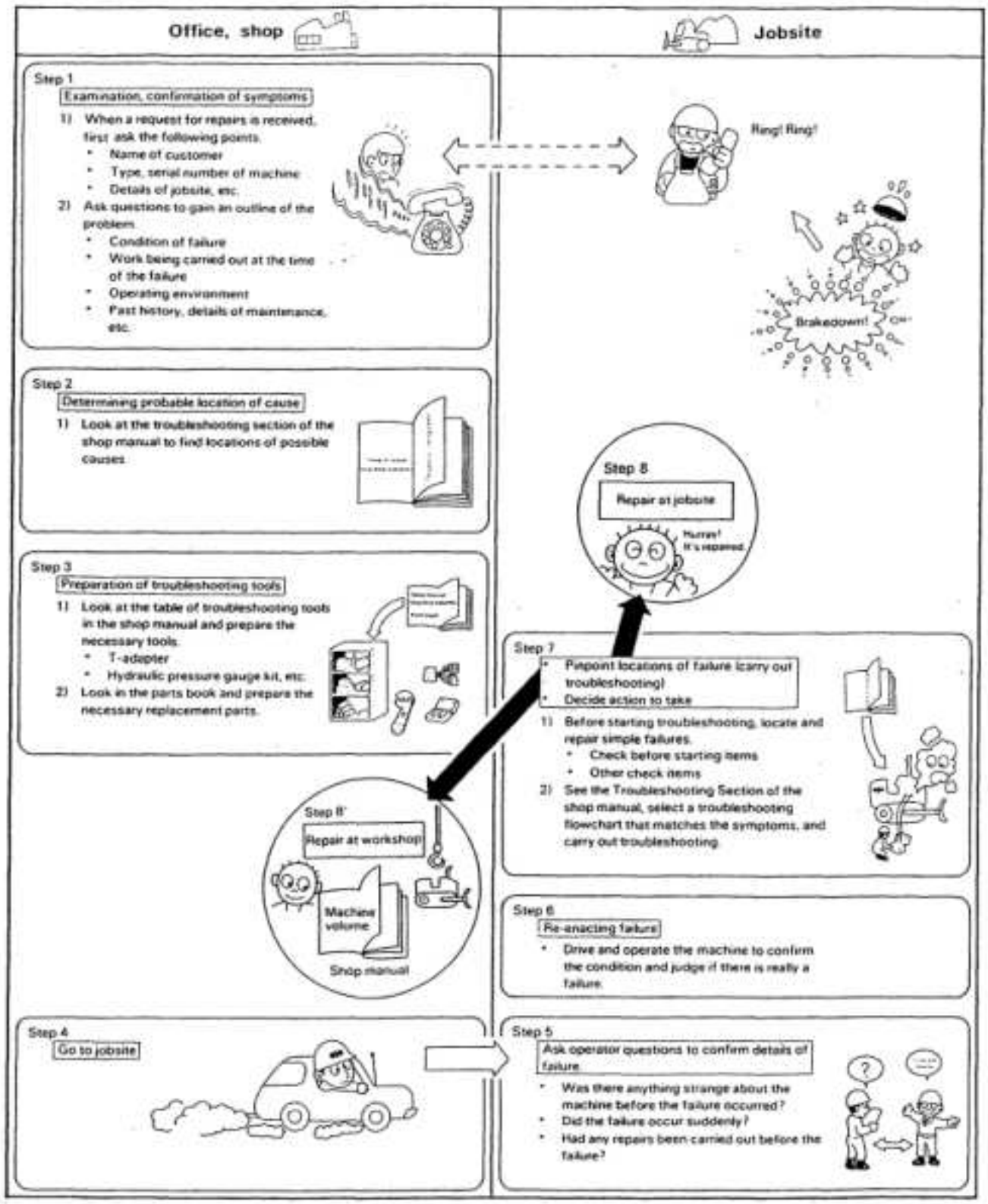
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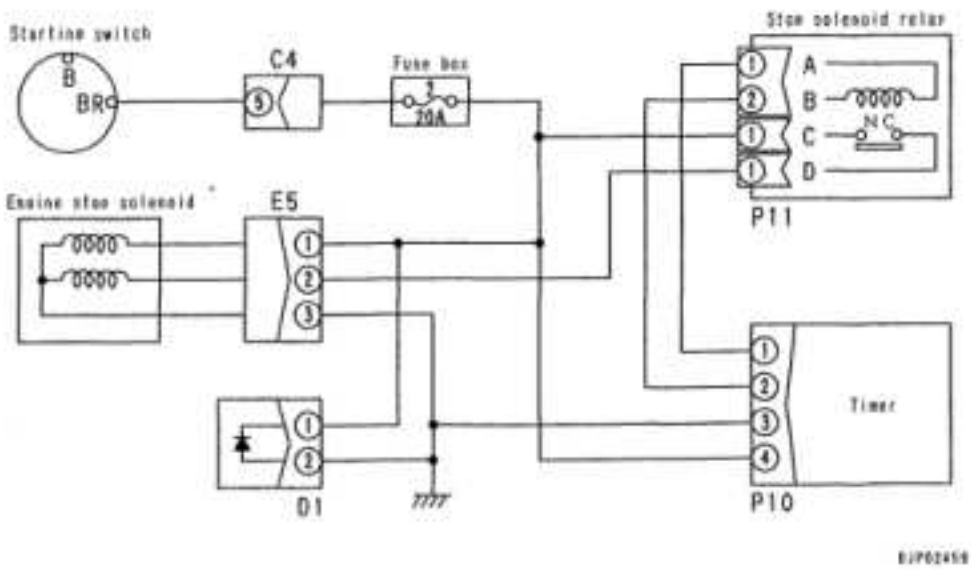
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SEQUENCE OF EVENTS IN TROUBLESHOOTING



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Cause	Remedy
Either the engine stop solenoid or the injection pump is defective.	Repair or replace
The wiring harness between E5 (female) (3) and the chassis is disconnected or has defective contact.	Repair or replace
The wiring harness is either disconnected or has defective contact somewhere between BR terminal of the engine starting switch and C4 (5), or between C4 (5) and fuse 2, or between fuse 2 and E5 (female) (1).	Repair or replace
The engine starting switch is defective.	Replace
The wiring harness between P11 (female) (D) and E5 (female) (2) is either disconnected or has defective contact.	Repair or replace
The stop solenoid relay is defective.	Replace
The wiring harness is either disconnected or has defective contact somewhere between P11 (female) (A) and P10 (female) (1), or between P11 (female) (B) and P10 (female) (2).	Repair or replace
The timer is defective.	Replace
The wiring harness is either disconnected or has defective contact somewhere between P10 (female) (3) and PS (1), or between PS (1) and the chassis.	Repair or replace
The wiring harness between fuse 2 and P10 (female) (4) is either disconnected or has defective contact.	Repair or replace
The wiring harness between fuse 2 and P (female) (C) is either disconnected or has defective contact.	Repair or replace



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1. Specifications and Performance

1-1 2D68E-3B

* Output conditions: Intake back pressure ≤ 250 mmAq, Exhaust back pressure ≤ 550 mmAq, other conditions complying with JIS D 1005–1986. After minimum 30 hour's run-in.

	Item		Model / Unit	2D68E-3B										
SPECIFICATIONS	Application		—	VM						—		—		
	Type		—	Vertical, 4-cycle water-cooled diesel engine										
	Combustion system		—	Special swirl pre-combustion chamber										
	No. of cylinders – Bore × Stroke		mm	2 – 68 × 72										
	Displacement		ℓ	0.523										
	Firing order		—	1 – 2										
	Revolution speed		rpm	2000	2200	2400	2600	2800	3000	3000	3600	3200	3400	3600
	Output*	Continuous rating	kW(HP)	—	—	—	—	—	—	7.72 (10.5)	9.12 (12.4)	—	—	—
		Max. rating	kW(HP)	5.74 (7.8)	6.25 (8.5)	6.84 (9.3)	7.43 (10.1)	7.94 (10.8)	8.46 (11.5)	8.46 (11.5)	10.0 (13.6)	8.68 (11.8)	9.19 (12.5)	9.64 (13.1)
	Max. revolution speed at no load		rpm	2180 $^{+50}_{0}$	2375 $^{+50}_{0}$	2570 $^{+50}_{0}$	2780 $^{+50}_{0}$	2970 $^{+50}_{0}$	3180 $^{+50}_{0}$	3180 $^{+50}_{0}$	3780 $^{+50}_{0}$	3425 $^{+50}_{0}$	3640 $^{+50}_{0}$	3850 $^{+50}_{0}$
	Min. revolution speed at no load			≤800						≤1500		≤800		
	Direction of rotation		—	Counterclockwise (viewed from flywheel)										
	Power take off		—	Flywheel										
	Compression ratio		—	23.0										
	Fuel injection timing (FID, b.T.D.C.)		deg	14±1						16±1				
	Compression pressure		MPa (kgf/cm²)	3.24±0.1 (33±1), at 250 rpm										
	Fuel injection pressure		MPa (kgf/cm²)	11.8 $^{+1.0}_{0}$ (120 $^{+10}_{0}$)										
	Recommended diesel gas oil		—	ISO 8217 DMA, BS 2869 A1 or A2 (Cetane No. 45 min.)										
	Lubrication system		—	Forced lubrication with trochoid pump										
	Lubricating oil capacity Max/Effective		ℓ	1.6/0.6						2.3/1.0				
	Recommended lubricating oil		—	API grade CC class or higher										
	Cooling system		—	Liquid cooling/Radiator										
	Cooling water capacity		ℓ	0.6 (for engine only)										
	Cooling fan No. of blade × dia.		mm	Discharge type, 5 × ϕ290										
	Crank V-pulley dia./ Fan V-pulley dia.		mm	ϕ95/ϕ85										
	Governor		—	Mechanical centrifugal governor (All speed type)										
	Starting system		—	Electrical										
	*1 Dimensions L × W × H		mm	373.5 × 417 × 498 / 383.5 × 417 × 498						383.5 × 409 × 540		373.5 × 417 × 540 / 383.5 × 417 × 540		
	*1 Dry weight		kg	55 / 65						65		55 / 65		
PERFORMANCE	Governing performance (full speed range)	Transient speed difference	%	≤12						≤10		≤12		
		Steady state speed band	%	≤9	≤8		≤7		≤6	≤5		≤7		
		Recovery time	sec	≤6										
		Fluctuation of revolution	rpm	≤30						≤20		≤30		
	L.O. press.	Rated operation	MPa (kgf/cm²)	0.25±0.05 (2.5±0.5)			0.29±0.05 (3.0±0.5)			0.34±0.05 (3.5±0.5)				
		Idling		≥0.06 (≥0.6)										

*1. Designation of engine dimension and dry weight in numerals.
CL/CH application: engine with flywheel housing
VM/VH application: engine with back plate/with flywheel housing

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4. Troubleshooting

4-1. Trouble causes and remedies

The following table summarizes the symptoms and causes of general troubles. If any symptom of trouble is found, a corrective action shall be taken before the said symptom develops into a serious accident.

Carefully read Chapter 6, Measurement, Inspection and Adjustments, and Chapter 7, Measuring Procedures, Service Data and Countermeasures. Familiarize yourself with Chapter 6 and Chapter 7, which practice is extremely important for extending the service life of the engine.

	Symptom of trouble / Cause	Fails to start: Engine will not start.	Fails to start: Engine starts but stops soon: Exhaust smoke: Nil	Fails to start: Engine starts but stops soon: Exhaust smoke: Less	Fails to start: Engine starts but stops soon: Exhaust smoke: More	Insufficient engine output: Exhaust color: Regular	Insufficient engine output: Exhaust color: White	Insufficient engine output: Exhaust color: Black	Poor exhaust color: During work: White	Poor exhaust color: During work: Black	High knocking sound during combustion	Abnormal engine noise	Uneven combustion sound	Hunting: During idling	Hunting: During work	Large engine vibration	Poor return to low speed	Excessive fuel consumption	Lubricating oil: Excessive consumption	Lubricating oil: Diluted by fuel oil	Lubricating oil: Mixture with water	Lubricating oil: Low L.O. pressure	Much blow-by gas	Cooling water: Overheat	Cooling water: Low water temperature	Air intake: Pressure drop	Air intake: Pressure rise	Exhaust temperature rise				Corrective action
Engine System	Improper clearance of intake/exhaust valve	O	O			O						O													O		O				Adjust valve clearance (Refer to Chapter 6, 6-2.)
	Compression leakage from the valve seat					O		O		O		O					O					O			O		O				Rap valve seat (Refer to Chapter 7, 7-1-2.)
	Seized intake/exhaust valve	O			O	O		O		O		O			O	O			O				O			O					Correct or replace.
	Blowout of cylinder head gasket					O														O			O								Replace the gasket. (Refer to Chapter 8, 8-2-(10))
	Seized or broken piston ring	O			O		O		O			O		O				O	O			O	O				O				Replace the piston ring. (Refer to Chapter 7, 7-4-3, 4, (5))
	Worn piston ring, piston and cylinder	O			O		O		O									O	O			O									Make honing and use oversize parts. (Refer to Chapter 7, 7-2-3. & 7-4-(8))
	Seized crank pin metal and bearing	O	O									O		O	O	O						O									Repair or replace.
	Improper arrangement of piston ring joints		O				O											O				O									Correct the ring joint positions. (Refer to Chapter 7, 7-4-(5))
	Reverse assembly of the piston ring						O		O									O				O									Properly reassemble. (Refer to Chapter 7, 7-4-(5))
	Worn crank pin and journal metal					O						O		O	O	O					O										Measure and replace . Refer to Chapter 7, 7-5-3. and 7-7-(5))
	Loosened connecting rod bolt											O			O						O										Tighten bolt to the specified torque. (Refer to Chapter 10, 10-1.)
	Foreign matter trapped in combustion chamber	O										O						O				O									Disassemble and repair the combustion chamber. Eliminate foreign matter.
	Excessive gear backlash											O																			Adjust meshing of gears. (Refer to Chapter 7, 7-8-(2))
	Worn valve guide of intake/exhaust valves						O											O				O									Measure and replace. (Refer to Chapter 7, 7-1-(3))
	Poor governor		O											O	O	O	O														Repair and adjust. (Refer to Chapter 13.)
	Improper open/close timing of intake/exhaust valves	O					O	O	O	O		O																			Adjust valve clearance (refer to Chapter 6, 6-2) and check intake/exhaust valve timing (Refer to Chapter 9, 9-1)
Turbocharger	Dirty blower							O		O															O						Clean the blower.
	Waste gate malfunction							O		O															O						Disassemble and inspect the waste gate.
	Worn journal bearing						O		O																						Disassemble and inspect the journal bearing.
Cooling Water System	Cooling effect of radiator, excessive								O								O						O								Malfunction of thermostat (kept closed). (Refer to Chapter 6, 6-9)
	Cooling effect of radiator, insufficient							O															O				O				Malfunction of thermostat (kept opened). (Refer to Chapter 6, 6-9) Slipping fan belt (Refer to Chapter 6, 6-3)
	Insufficient cooling water level							O															O				O				Check water leakage from Cooling water system (Refer to Chapter 6, 6-7) and clean cooling water system (Refer to chapter 3, 3-1)
	Cracked water jacket																			O	O		O								Repair and replace.
	Slackened fan belt tension							O															O				O				Adjust fan belt tension. (Refer to Chapter 6, 6-3)
	Poor thermostat							O															O	O							Check or replace. (Refer to Chapter 6, 6-9)

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