# SHOP MANUAL

KOMATSU®

# PC20MR-2

| Machine model | Serial number |
|---|---|
| **PC20MR-2** | **15001 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.
- PC20MR-2 mount the 3D76E-5N engine.
- For details of the engine, see the 68E-88E Series Engine Shop Manual.


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# Classification and procedures of troubleshooting

## Classification of troubleshooting

| Mode | Contents |
|---|---|
| E-mode | Troubleshooting for electric system [Except monitor panel] |
| H-mode | Troubleshooting for hydraulic and mechanical system |
| M-mode | Troubleshooting for monitor panel |
| S-mode | Troubleshooting for engine unit |

## Procedure for troubleshooting

If a possible fault is detected in the machine, find a corresponding fault in the table of "Possible faults and troubleshooting Nos.", then go to the indicated troubleshooting section.

## Possible faults and troubleshooting Nos.

| No. | Possible fault | | Troubleshooting | | | |
|---|---|---|---|---|---|---|
| | | | E-mode | H-mode | M-mode | S-mode |
| **Possible faults related to engine** | | | | | | |
| 1 | Engine does not start normally | Engine does not start | E-1 | | | ● |
| 2 | | Engine starts but stops later | | | | ● |
| 3 | Engine output is insufficient | | | H-2 | | ● |
| 4 | Exhaust gas color is bad | | | | | ● |
| 5 | Knocking sound is high | | | | | ● |
| 6 | Engine makes abnormal sound | | | | | ● |
| 7 | Combustion sound is uneven | | | | | ● |
| 8 | Engine hunts | During idling | | | | ● |
| 9 | | During work | | | | ● |
| 10 | Engine vibrates largely | | | | | ● |
| 11 | Engine speed does not lower quickly | | | | | ● |
| 12 | Fuel is consumed much | | | | | ● |
| 13 | Lubricating oil | Lubricating oil is consumed much | | | | ● |
| 14 | | Lubricating oil is diluted with fuel | | | | ● |
| 15 | | Lubricating oil is mixed in coolant | | | | ● |
| 16 | | Lubricating oil pressure is low | | | | ● |
| 17 | Much blow-by gas is produced | | | | | ● |
| 18 | Coolant | Engine overheats | | | | ● |
| 19 | | Coolant temperature is high | | | | ● |
| 20 | Intake air | Intake air pressure is low | | | | ● |
| 21 | | Intake air pressure is high | | | | ● |
| 22 | Exhaust temperature is high | | | | | ● |
| 23 | Engine does not stop | | E-2 | | | |



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| Machine model | | | | PC20MR-2 | |
|---|---|---|---|---|---|
| | | | | Canopy specification | Cab specification |
| Serial number | | | | 15001 and up | |
| Engine | | | Model | 3D76E-5N | |
| | | | Type | 4-cycle, water cooled, in-line direct injection type, swirl chamber type | |
| | | | No. of cylinders - bore x stroke | mm | 3 – 76 × 82 |
| | | | Piston displacement | ℓ {cc} | 1.115 {1,115} |
| | Performance | | Flywheel horsepower | kW {HP}/rpm | 15.5 {20.8} / 2,500 |
| | | | Maximum torque | Nm {kgm}/rpm | 66.7 {6.8} / 1,600 |
| | | | High idling speed | rpm | 2,680 |
| | | | Low idling speed | rpm | 1,450 |
| | | | Min. fuel consumption ratio | g/kWh {g/HPh} | 265 {198} |
| | | | Starting motor | | 12V, 1.4 kW |
| | | | Alternator | | 12V, 40A |
| | | | Battery (*1) | | 12V, 45Ah × 1 (50B24L) |
| | | | Radiator<br>• Core type | | AL louver type fin |
| Under-carriage | | | Carrier roller | | 2 on each side |
| | | | Track roller | | 3 on each side |
| | | | Track shoe (Rubber shoe) | | Unit-type rubber crawler |
| | | | Track shoe (Steel shoe) | | Assembly-type double grouser: 44 each side |
| Hydraulic system | Hydraulic pump | | Type x no. | | Variable displacement piston type x 1, gear type x 1 |
| | | | Theoretical capacity | $cm^3$/rev | 22 + 6.4 |
| | | | Set pressure | | |
| | | | For travel, work equipment | MPa {$kg/cm^2$} | 24.5 {250} |
| | | | For swing | MPa {$kg/cm^2$} | 16.2 {165} |
| | | | For blade | MPa {$kg/cm^2$} | 21.6 {220} |
| | Control valve | | Type x no. | | 8-spool type x 1 |
| | | | Control method | | Hydraulic assist type |
| | Hydraulic motor | | Travel motor | | Variable-displacement piston motor (with counterbalance valve, parking brake) x 2 |
| | | | Swing motor | | Fixed-displacement piston motor (with brake valve, swing shaft brake) x 1 |
| | Hydraulic tank | | | | Box-shaped, open type |
| | Hydraulic oil filter | | | | Tank return side |
| | Hydraulic oil cooler | | | | Air cooled (Drawn-CUP) |
| | Work equipment cylinder | Boom cylinder | Cylinder type | | Double acting piston |
| | | | Inside diameter of cylinder | mm | ø70 |
| | | | Outside diameter of piston rod | | ø40 |
| | | | Stroke | | 454 |
| | | | Max. distance between pins | | 1,187 |
| | | | Min. distance between pins | | 733 |

*1: The battery capacity (Ah) is based on 5-hour rate.



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| | Cause | | Standard value in normalcy and references for troubleshooting | | |
|---|---|---|---|---|---|
| Presumed cause and standard value in normalcy | | | ★Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch. | | |
| | 8 | Grounding fault in wiring harness (Contact with ground circuit) | Between T-F2 (BR) – FB1 (1) wiring harness and chassis ground | Resistance | Min. 1 MΩ |
| | | | Between FB1 (11) – M3 (female) (4) or RM2 (female) (1) or M9 (female) (1) or D1 (female) (1) wiring harness and chassis ground | Resistance | Min. 1 MΩ |
| | | | Between M3 (female) (1) – RM1 (female) (1) wiring harness and chassis ground | Resistance | Min. 1 MΩ |
| | | | Between M3 (female) (2) – RM1 (female) (2) wiring harness and chassis ground | Resistance | Min. 1 MΩ |
| | | | Between RM3 (female) (1) – M9 (female) (2) wiring harness and chassis ground | Resistance | Min. 1 MΩ |



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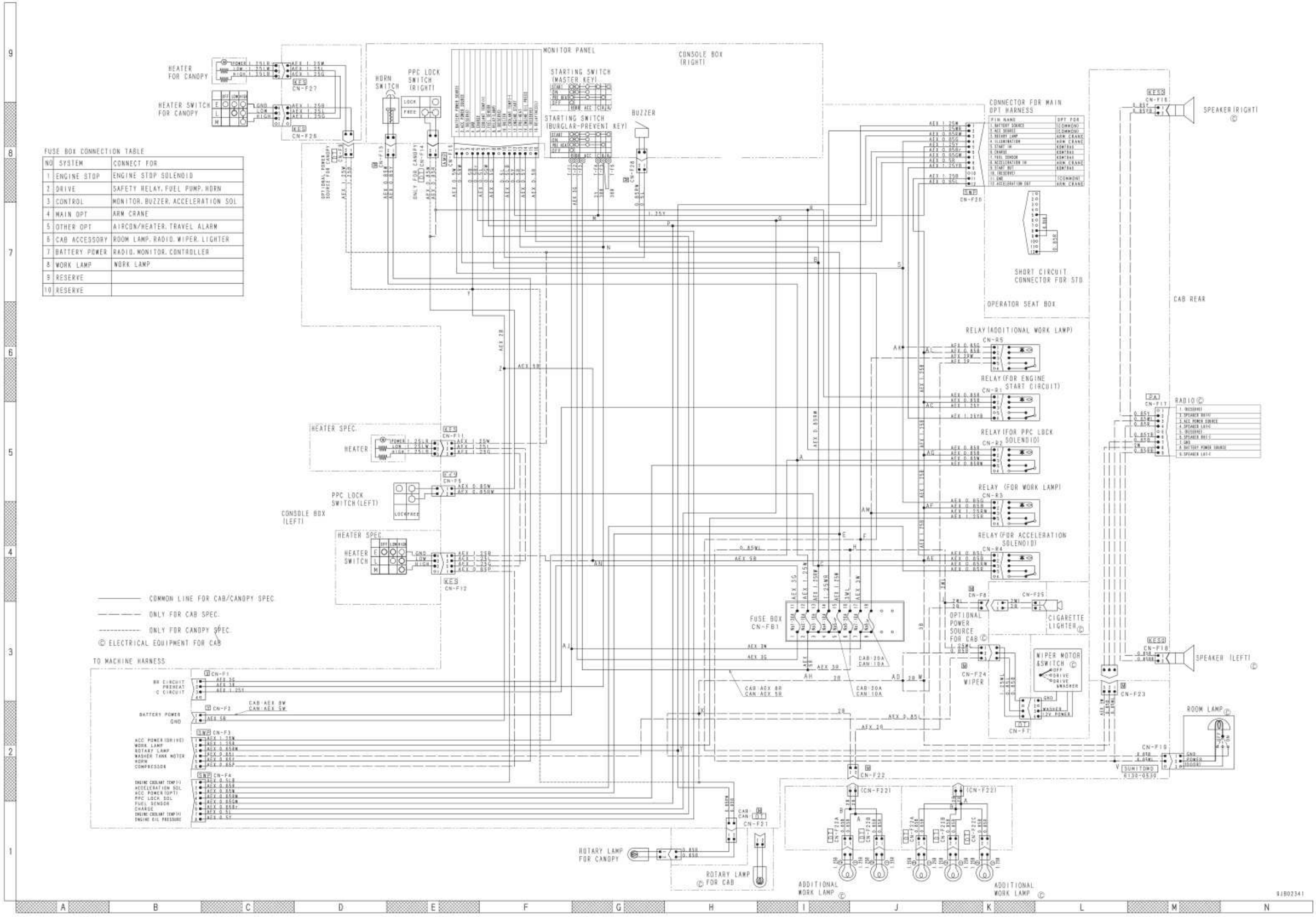
★ This troubleshooting chart is transferred from the Shop Manual for 3D76E-5 Engine.

| Symptom of trouble | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engine hunts | | | | | Lubricating oil | | | | | Coolant | | Intake air | | | |
| During idling | During work | Engine vibrates largely | Engine speed does not lower quickly | Fuel is consumed much | Lubricating oil is consumed much | Lubricating oil is diluted with fuel | Lubricating oil is mixed in coolant | Lubricating oil pressure is low | Much blow-by gas is produced | Engine overheats | Coolant temperature is low | Intake air pressure is low | Intake air pressure is high | Exhaust temperature is high | Remedy |
| | | | | | | | | | | | | ○ | | ○ | Adjust valve clearance |
| | | | | ○ | | | | | ○ | | | ○ | | ○ | Fit valve seat |
| | ○ | ○ | | | | ○ | | | ○ | | | ○ | | | Repair or replace |
| | | | | | | | ○ | | | ○ | | | | | Replace gasket |
| ○ | | ○ | | | ○ | ○ | | | ○ | ○ | | | | ○ | Replace piston ring |
| | | | | | ○ | ○ | | | ○ | | | | | | Finish by honing or use oversize parts |
| ○ | ○ | ○ | | | | | | | ○ | | | | | | Repair or replace |
| | | | | | ○ | | | | ○ | | | | | | Correct position of abutment joint |
| | | | | | ○ | | | | ○ | | | | | | Correct assembly |
| ○ | ○ | ○ | | | | | | ○ | | | | | | | Measure and replace |
| | | ○ | | | | | | ○ | | | | | | | Tighten to specified torque |
| | | | | | ○ | | | | ○ | | | | | | Disassemble and repair |
| | | | | | | | | | | | | | | | Adjust meshing of gears |
| | | | | | ○ | | | | ○ | | | | | | Measure and replace |
| ○ | ○ | ○ | ○ | | | | | | | | | | | | Adjust |
| | | | | | | | | | | | | | | | Adjust valve clearance |
| | | | | | | | | | | | | | | | |
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## Electrical circuit diagram (1/2)




FUSE BOX CONNECTION TABLE

| NO | SYSTEM | CONNECT FOR |
|---|---|---|
| 1 | ENGINE STOP | ENGINE STOP SOLENOID |
| 2 | DRIVE | SAFETY RELAY, FUEL PUMP, HORN |
| 3 | CONTROL | MONITOR, BUZZER, ACCELERATION SOL |
| 4 | MAIN OPT | ARM CRANE |
| 5 | OTHER OPT | AIRCON/HEATER, TRAVEL ALARM |
| 6 | CAB ACCESSORY | ROOM LAMP, RADIO, WIPER, LIGHTER |
| 7 | BATTERY POWER | RADIO, MONITOR, CONTROLLER |
| 8 | WORK LAMP | WORK LAMP |
| 9 | RESERVE | |
| 10 | RESERVE | |



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