

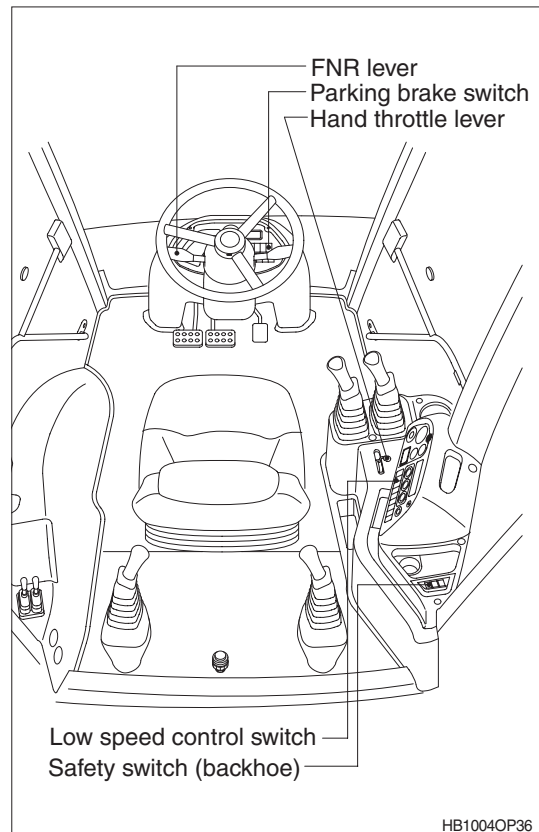
3. STARTING THE ENGINE

- 1) Read and comply with “check before starting the engine”.
- 2) Check if the parking brake is locked (with the parking switch ON).
- 3) Check if the FNR lever is in the neutral position.
- 4) Check if the hydraulic safety switch is in the lock position.
- 5) Set the hand throttle lever to minimum.
Make sure that hand throttle lever is set at the minimum engine rpm position.
- 6) It is recommended that the low speed control switch is select ON when starting the engine to reduce the load on the engine and help it start.

▲ Breathing the machine exhaust gases can harm and possibly kill you. Do not operate the machine in closed spaces without making sure there is good ventilation.

7) NORMAL ENGINE START

- ※ Sound the horn to warn the surroundings after checking if personnel or obstacles are in the area.
- (1) Turn the starting switch to START position to start the engine.
 - ※ If the engine does not start, allow the starter to cool for about 2 minutes before attempting to start the engine again.
 - (2) Release the starting switch instantly after the engine starts to avoid possible damage to the starting motor.



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8) COLD WEATHER ENGINE START

※ Sound horn to warn surroundings after checking if there are obstacles in the area.

※ Replace the engine oil and fuel referring to recommended oils at page 6-8.

(1) Fill the anti-freeze solution to the coolant as required.

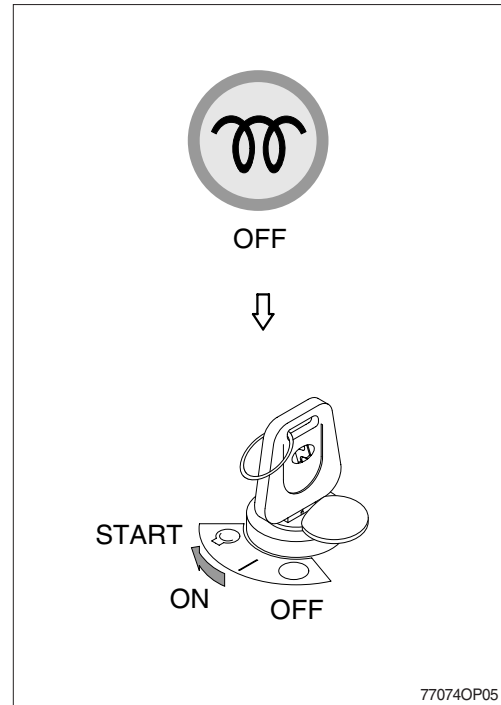
(2) Turn the starting switch to ON position, and wait the air heater working lamp OFF.

※ When the air heater working lamp is turned ON, the preheating function is actuated within 10~20 seconds in accordance with coolant temperature.

(3) Start the engine by turning the starting switch to START position after the glow warning lamp OFF.

(4) Release starting switch immediately after starting engine. The starting switch will automatically return to the ON position.

※ After engine started, the preheating function is actuated to reduce the white smoke.



9) INSPECTION AFTER ENGINE START

Inspect and confirm the following after engine starts.

(1) Is the level gauge of hydraulic oil tank in the normal level?

(2) Are there leakages of oil or water?

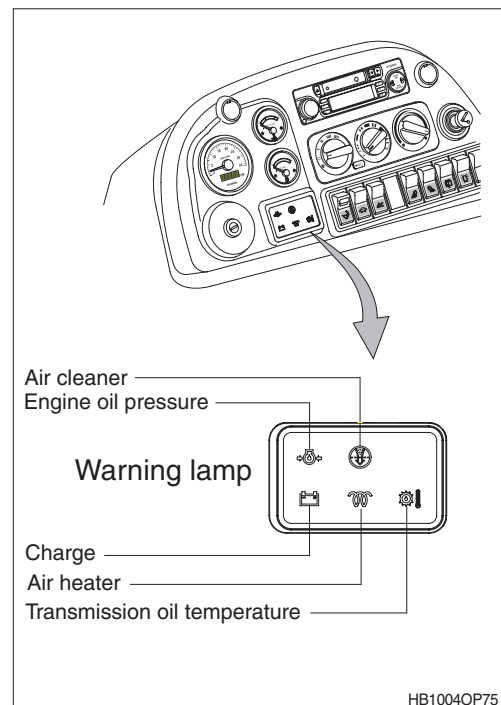
(3) Are all the warning lamps turned OFF?

(4) Are the engine sound and the color of exhaust gas normal?

(5) Are the sound and vibration normal?

※ Do not increase engine speed quickly after starting, it can damage engine and/or turbo-charger.

※ If there are problems in the cluster, stop the engine immediately and correct problems as required.



10) WARMING-UP OPERATION

- ※ The most suitable temperature for the hydraulic oil is about 50°C (122°F).
It can cause serious trouble in the hydraulic system by sudden operation when the hydraulic oil temperature is below 25°C (77°F).
Then temperature must be raised to at least 25°C (77°F) before starting work.
- (1) Run the engine at low idle speed for 5 minutes.
 - (2) Speed up the engine by accel dial and run the engine at mid-range speed.
 - (3) Operate bucket lever for 5 minutes.
 - ※ Do not operate anything except bucket lever.
 - (4) Run the engine at the high speed and operate the bucket lever and arm lever for 5-10 minutes.
 - ※ Operate only the bucket lever and arm lever.
 - (5) This warming-up operation will be completed by operation of all cylinders several times, and operation of swing and traveling.
 - ※ Increase the time for warming-up during winter.

