

3. STARTING AND STOPPING THE ENGINE

1) CHECK INDICATOR LIGHTS

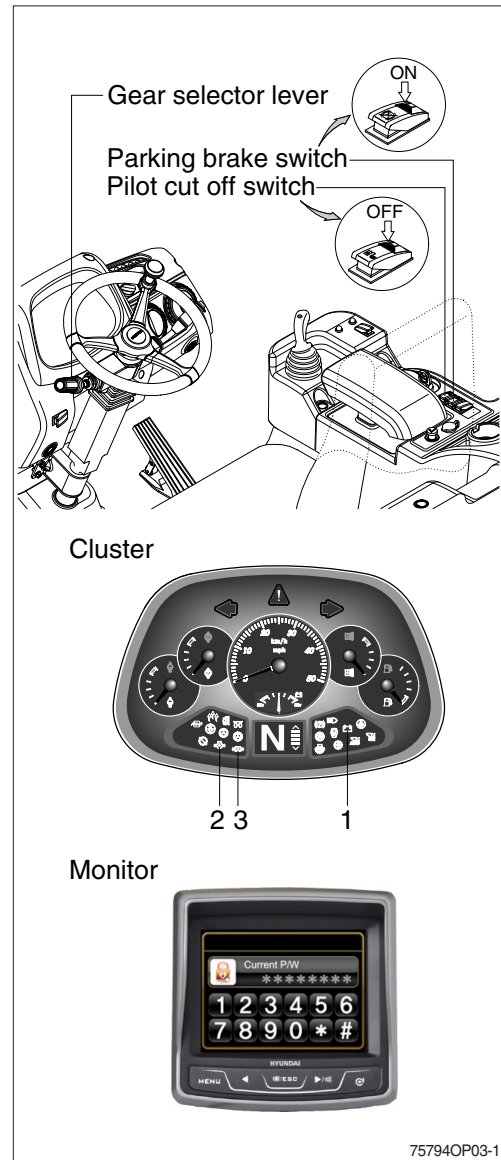
- (1) Check if the parking brake switch is ON.
- (2) Check if the gear selector lever is in neutral position.
- (3) Check if the pilot cut off switch is OFF.
- (4) Turn the key to the ON position, and check followings.

· Cluster

- ① If all the lamps light ON after sounding buzzer for 3 seconds.
 - ※ **If the lamps do not light or the buzzer is not sounded, check disconnection of wire.**
- ② Only below lamps will light ON and all the other light will be turn OFF after 3 seconds.
 - Charging warning lamp (1)
 - Engine oil pressure warning lamp (2)
 - Brake fail warning lamp (3)

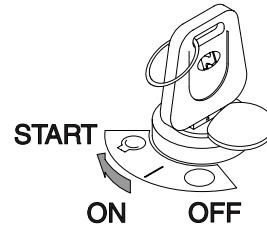
· Monitor

- ① The buzzer sounds for 3 seconds with HYUNDAI logo on monitor.
- ② If the ESL mode is set to the enable, enter the password to start engine.
- ③ If the password has failed 5 times, please wait 30 minutes before re-attempting to enter the password.



2) STARTING ENGINE IN NORMAL TEMPERATURE

- ※ **Sound the horn to warn the surroundings after checking if personnel or obstacles are in the area.**
- (1) Check if the parking brake is locked (with the parking switch ON).
- (2) Check if the gear selector lever is in the neutral position.
- (3) Check if the pilot cut off switch is locked (with the switch OFF)
- (4) Turn the starting switch to START position to start the engine.
- ※ **Do not crank the engine for more than 20 seconds. If the engine does not start, allow the starter to cool for about 2 minutes before attempting to start the engine again.**
- (5) Release the starting switch instantly after the engine starts to avoid possible damage to the starting motor.
- ※ **Refer to the START PROCEDURE on the page 0-12.**

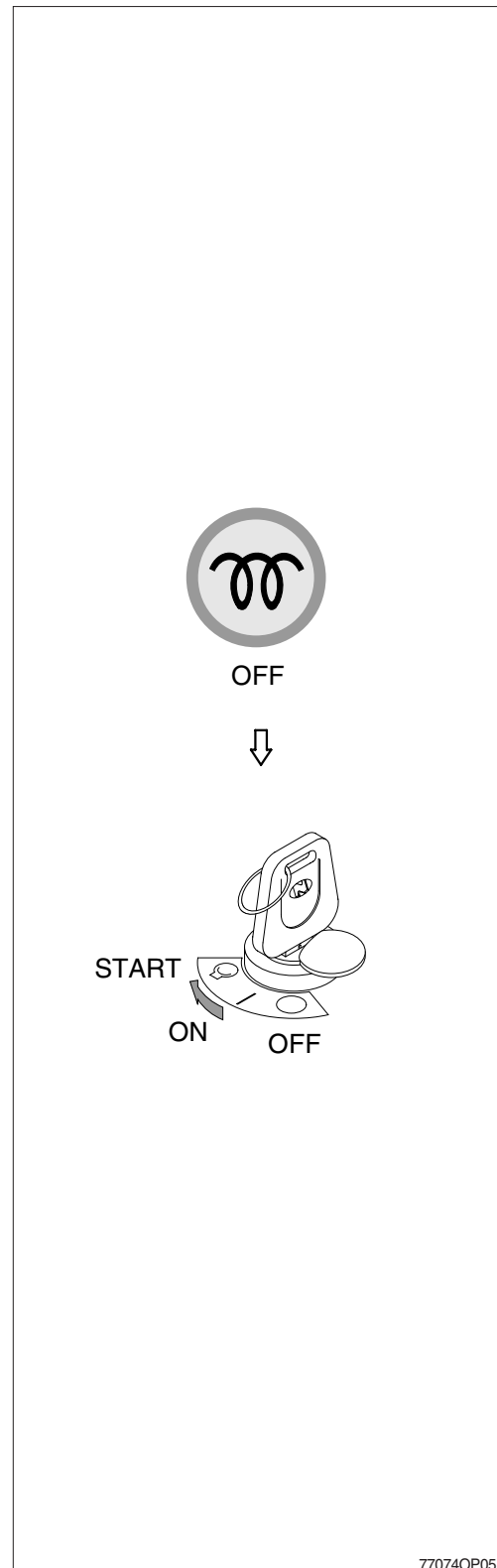


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3) STARTING ENGINE IN A COLD WEATHER

- ※ Sound horn to warn surroundings after checking if there are obstacles in the area.
- ※ Replace the engine oil, coolant and fuel referring to recommended oils at page 6-9.
- ※ Fill the anti-freeze solution to the coolant as required.
- ※ If you turn ON the starting switch, the fuel warmer is automatically operated to heat the fuel by sensing the coolant temperature.

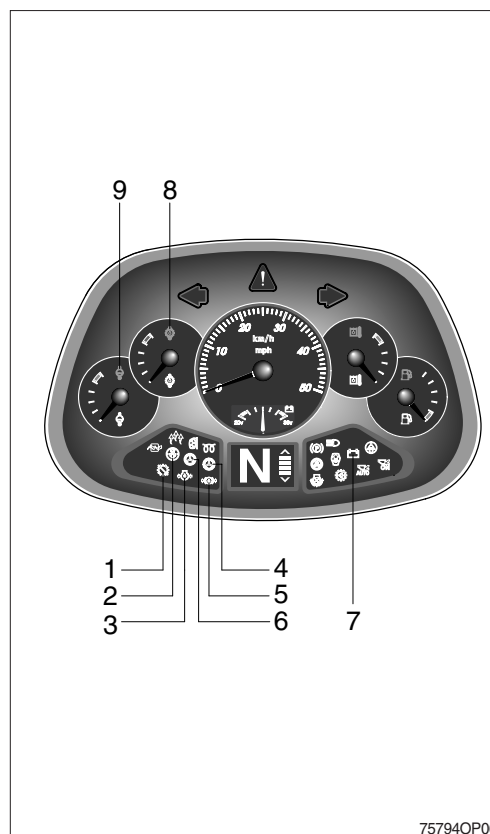
- (1) Check if the parking brake is locked (with the parking switch ON).
- (2) Check if the gear selector lever is in the neutral position.
- (3) Check if the pilot cut off switch is locked (with the switch OFF)
- (4) Turn the starting switch to ON position, and wait 1~2 minutes. More time may take according to ambient temperature.
- (5) Start the engine by turning the starting switch to START position after the preheater pilot lamp OFF.
- (6) After the preheater pilot lamp goes out, wait 5 minutes more for heating of fuel heater.
 - ※ If the engine does not start, allow the starter to cool for about 2 minutes before attempting to start the engine again.
- (7) 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.
 - ※ Before the warming-up operation is completed, do not operate the equipment.
 - ※ Operate machine at less than normal loads and at slow idle speed, right after engine warming-up.
 - ※ Run the engine for 10~15 minutes at low idle when the ambient temperature is below -15°C .



4) 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 (1-7) OFF?
 - (4) Check the following after warming up operation.
 - ① Is the indicator of water temperature gauge (8) in the operating range?
 - ② Is the indicator of transmission oil temperature gauge (9) in the operating range?
 - ③ Is the engine sound and the color of exhaust gas normal?
 - ④ Are the sound and vibration normal?
- ※ **Do not increase engine speed quickly after starting, it can make damage engine or turbocharger.**
- ※ **If there are problems in the control panel, stop the engine immediately and correct problem as required.**



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5) TRANSMISSION COLD STARTING

- (1) At an oil temperature in the shifting circuit $< -12^{\circ}\text{C}$, the transmission must be warmed-up for some minutes.
- (2) This must be carried out in neutral with an increased engine speed.
- (3) Until this oil temperature is reached, the electronics remains in neutral, and the symbol of the cold start phase will be indicated on the display.
 - Indication on the display : * *
- (4) After the indication on the display is extinguished, the full driving program can be utilized out of NEUTRAL.

※ **Transmission warning**



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Symbol	Meaning	Remarks
LF, LR	Limp home gear	-
**	Oil temperature too low, no gear available	Warm up engine/ transmission
WS	Warning sump temperature	Alternate between WS and actual gear/ direction while driving, in neutral only displayed WS if no fault is detected ※ Cool down transmission
WT	Warning torque converter temperature	Alternate between WS and actual gear/ direction while driving, in neutral only displayed WS if no fault is detected ※ Cool down transmission

6) TO STOP THE ENGINE

- ※ If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency.
 - ※ In particular if the engine has overheated, do not abruptly stop it but run it at medium speed to allow it to cool gradually, then stop it.
- (1) Place the gear selector lever in neutral.
 - (2) Push the parking brake switch to the ON position.
 - (3) Run the engine for five minutes at low idle with no load.
 - (4) Return the key of starting switch to the OFF position.
 - (5) Remove the key to prevent other people using the machine.
 - (6) Push the pilot cut off switch to the OFF position.
 - (7) Lock the cab door.

