

1. SUGGESTIONS FOR NEW MACHINES

- 1) It takes about 100 operation hours to enhance its designed performance.
- 2) Operate according to below three steps and avoid excessive operation for the initial 100 hours.

Service meter	Load
Until 10 hours	About 60 %
Until 100 hours	About 80 %
After 100 hours	100 %

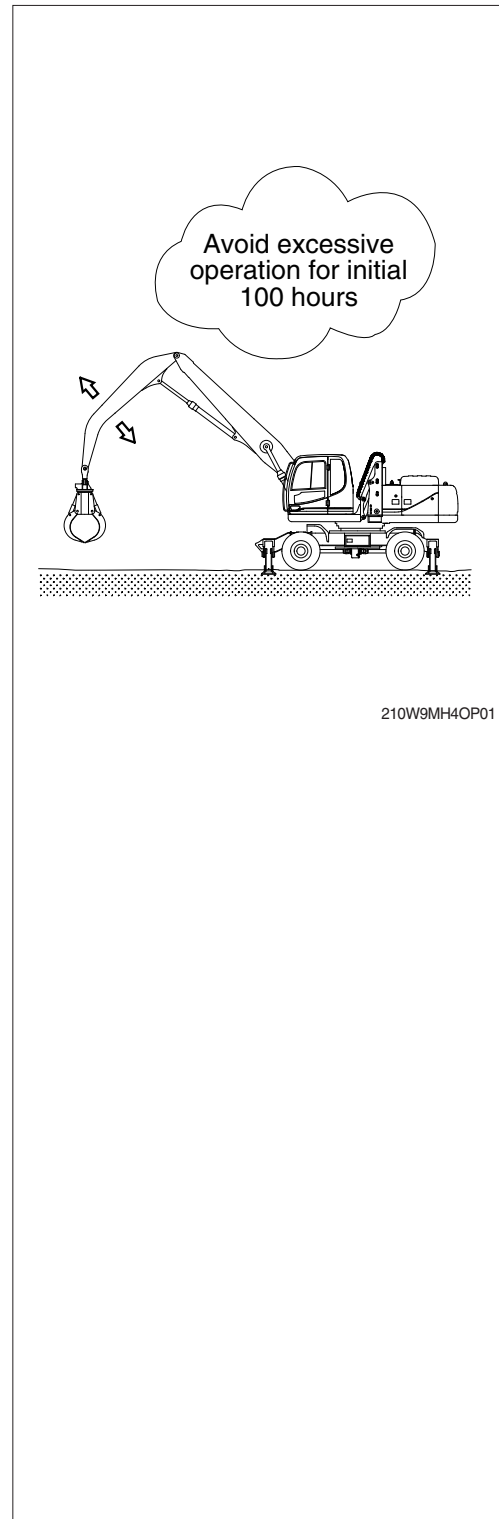
※ **Excessive operation may deteriorate the potential performance of machine and shorten lifetime of the machine.**

3) Be careful during the initial 100 hours operation

- (1) Check daily for the level and leakage of coolant, engine oil, hydraulic oil and fuel.
- (2) Check regularly the lubrication and fill grease daily all lubrication points.
- (3) Tighten bolts.
- (4) Warm up the machine fully before operation.
- (5) Check the gauges occasionally during the operation.
- (6) Check if the machine is operating normally during operation.

4) Replace followings after initial operation hours.

Checking items	Hours
Engine oil	50
Engine oil filter element	
Fuel filter	
Prefilter	
Transmission oil	100
Hydraulic oil return filter element	250
Hydraulic oil tank drain filter cartridge	
Line filter element	
Swing reduction gear oil	
Axle oil	500



2. CHECK BEFORE STARTING THE ENGINE

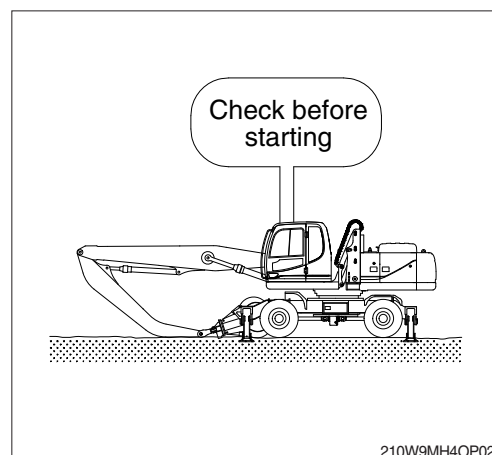
1) Look around the machine and under the machine to check for loosen nut or bolts, collection of dirt, or leakage of oil, fuel or coolant and check the condition of the work equipment and hydraulic system. Check also loosen wiring, and collection of dust at places which reach high temperature.

※ **Refer to the daily check on the chapter 6, maintenance.**

2) After checking air pressure of tire, make sure that around the machine is clear.

3) Adjust seat to fit the contours of the operator's body for the pleasant operation.

4) Adjust the rear view mirror.



3. STARTING AND STOP THE ENGINE

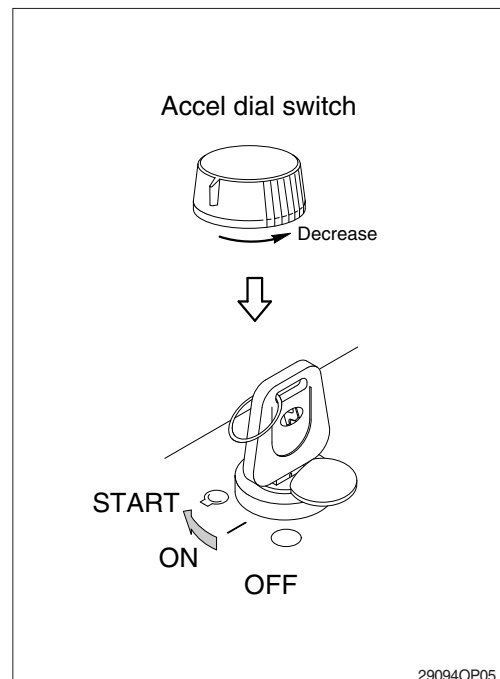
1) CHECK INDICATOR LIGHTS

- (1) Check if all the operating levers are in the neutral position.
- (2) Turn the starting switch to the ON position.
Buzzer sounding for 4 seconds with HYUNDAI logo on cluster.
 - ※ If the ESL mode is set to the enable, enter the password to start engine.
 - ※ If the password has failed 5 times, please wait 30 minutes before re-attempting to enter the password.
 - ※ Refer to page 3-17 for ESL mode.
- (3) After initialization of cluster, the operating screen is displayed on LCD (1).
Also, self-diagnostic function is carried out.



2) STARTING ENGINE IN NORMAL TEMPERATURE

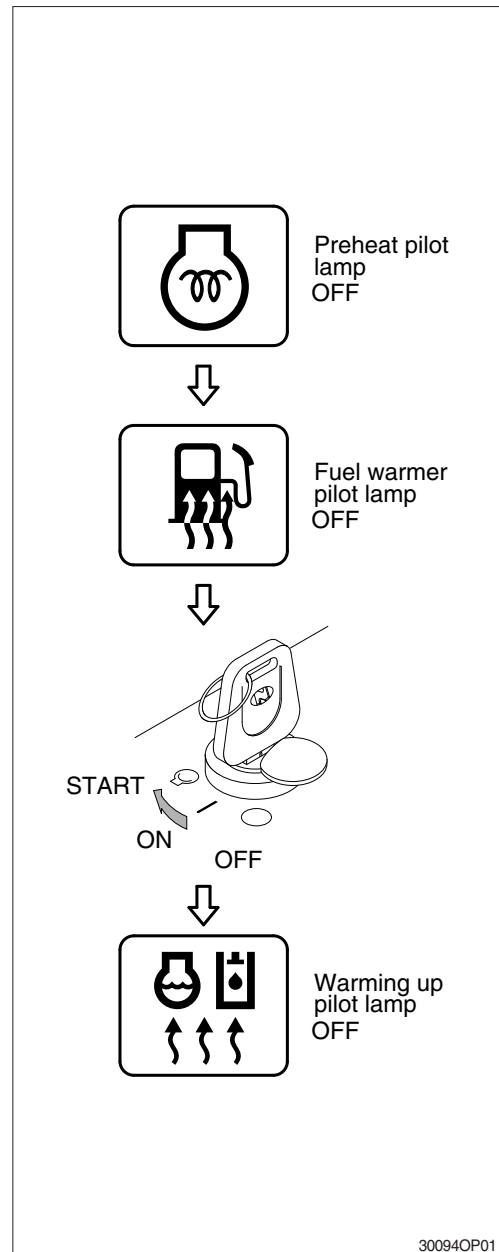
- ※ Sound the horn to warn the surroundings after checking if personnel or obstacles are in the area.
- (1) Turn the accel dial switch to low idle position.
 - (2) Turn the starting switch to START position to start the engine.
 - ※ Do not hold the starting switch in the START position for longer than 20 seconds.
The start system may be seriously damaged.
 - ※ If the engine does not start, allow the stator to cool for about 2 minutes before re-attempting to start the engine again.
 - (3) Release the starting switch instantly after the engine starts to avoid possible damage to the starting motor.



3) STARTING ENGINE IN COLD WEATHER

- ※ 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 2-10.
- ※ 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 all the levers are in the neutral position.
 - (2) Turn the accel dial switch to low idle position.
 - (3) Turn the starting switch to the ON position, and wait 1~2 minutes. More time may take according to ambient temperature.
 - (4) Wait for five minutes to warm up the engine after the preheating pilot lamp off, and then turn the starting switch to the 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.
- (5) Release the starting switch immediately after starting engine.
 - (6) If the temperature of the coolant is lower than 30°C the warming up automatically starts.
- ※ Do not operate the working devices, or convert the operation mode into other mode during the warming up.



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 turned OFF (1-10)?
 - (4) Are the indicator of water temperature gauge (11) and hydraulic temperature gauge (12) in the operating range?
 - (5) Are the engine sound and the color of exhaust gas normal?
 - (6) Are the sound and vibration normal?
- ※ **Do not increase engine speed quickly after starting, it can damage engine or turbocharger.**
 - ※ **If there are problems in the cluster, stop the engine immediately and correct problems as required.**

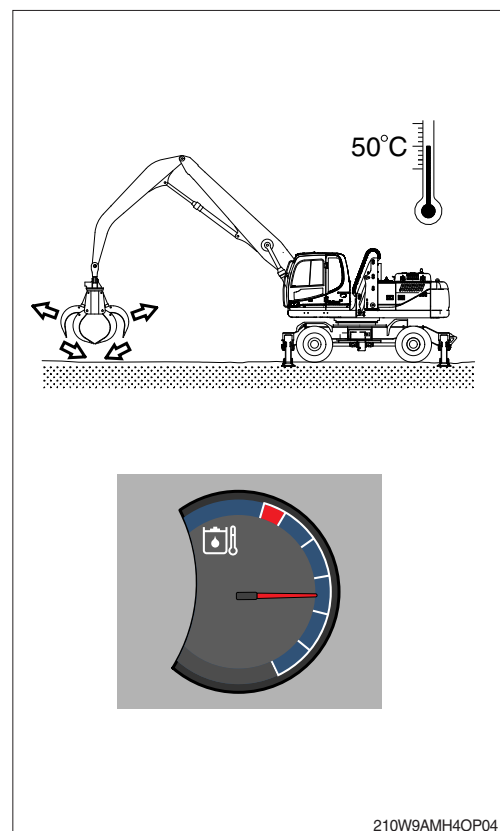


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5) WARMING-UP OPERATION

- ※ **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 grapple lever for 5 minutes.
- ※ **Do not operate anything except grapple lever.**
- (4) Run the engine at the high speed and operate the grapple lever and arm lever for 5-10 minutes.
- ※ **Operate only the grapple 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.**

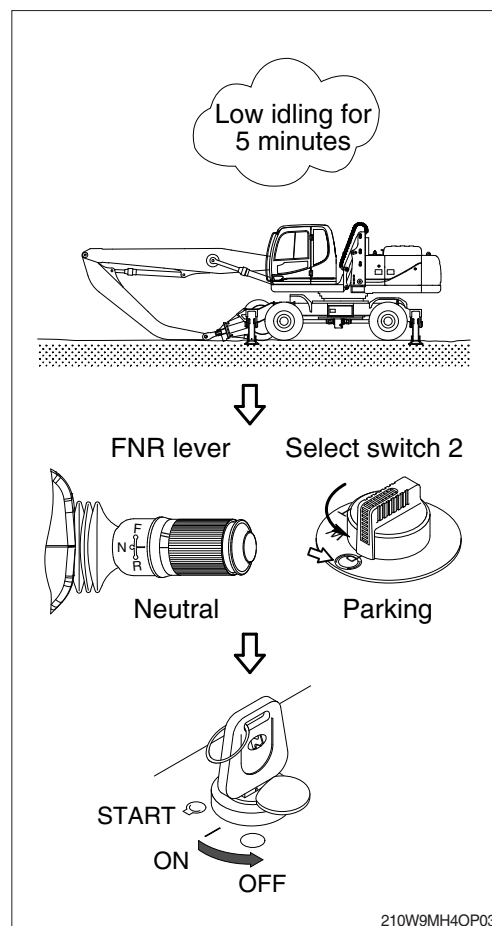


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6) TO STOP THE ENGINE

- ※ 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 FNR lever in the neutral.
- (2) Down the grapple, outrigger and dozer blade on the ground then put all the levers in the neutral position.
- (3) Put the select switch 2 in the parking position.
- (4) Run the engine at low idling speed for about 5 minutes.
- (5) Return the key of starting switch to the OFF position.
- (6) Remove the key to prevent other people using the machine and LOCK safety lever.
- (7) Lock the cab door.



4. MODE SELECTION SYSTEM

1) STRUCTURE OF MECHATRONICS SYSTEM

CAPO, Computer Aided Power Optimization system, is the name of mode selection system developed by Hyundai.

※ Please refer to chapter 3, cluster for below modes setting.

(1) Power mode

Power mode designed for various work loads supports high performance and reduces fuel consumption.

- P mode : Heavy duty power
- S mode : Standard power
- E mode : Economy power

(2) Work mode

Null

(3) User mode

- ① User mode is useful for setting the user preferable power quickly.
(engine speed, power shift and idle speed)
- ② There are two methods for use of user mode.

a. In operation screen

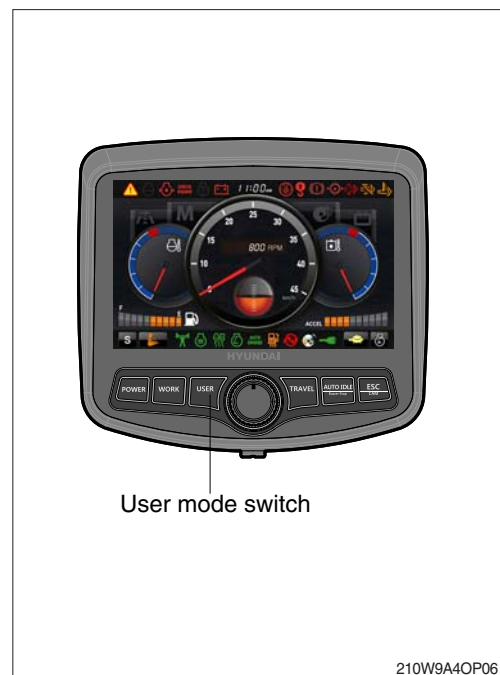
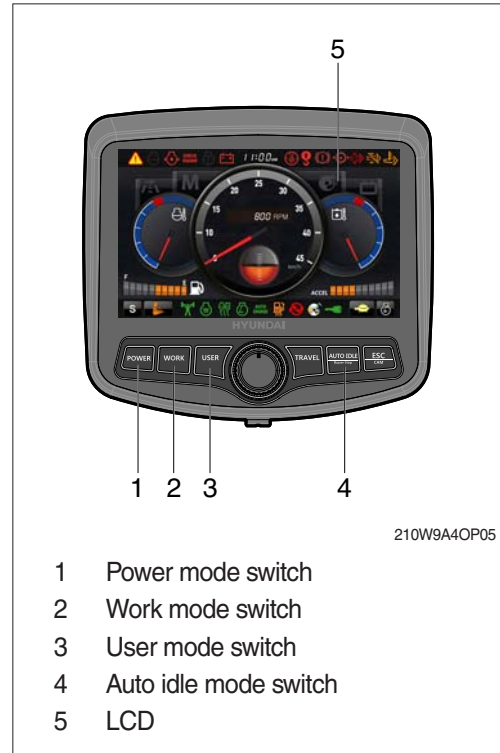
User mode switch is used to memorize the current machine operating status and activate the memorized user mode.

Refer to page 3-11.

b. In menu

Engine high idle rpm, auto idle rpm and pump torque (power shift) can be modulated and memorized separately in menu status.

- Each memory mode has a initial set which are mid-range of max engine speed, power shift and auto idle speed.



- High idle rpm, auto idle rpm and EPPR pressure can be adjusted and memorized in the U-mode.

※ Refer to the page 3-13 for setting the user mode (available on U mode only).

- LCD segment vs parameter setting

Step ()	Engine speed (rpm)	Idle speed (rpm)	Power shift (bar)
1	1250	750	0
2	1300	800	3
3	1350	850	6
4	1400	900	9
5	1450	950	12
6	1500	1000 (auto decel)	16
7	1550	1050	20
8	1600	1100	26
9	1650	1150	32
10	1700	1200	38

※ One touch decel & low idle : 850 rpm



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(4) Auto idle mode

Pilot lamp ON : Auto idle function is activated.

Pilot lamp OFF : Auto idle function is canceled.

(6) Monitoring system

Information of machine performance as monitored by the MCU can be displayed on the LCD. Refer to the page 3-14.

(7) Self diagnostic system

① MCU (Machine Control Unit)

The MCU diagnoses machine status and problems and displays fault code in the cluster (fault code detected by MCU is composed of HCESPN and FMI).

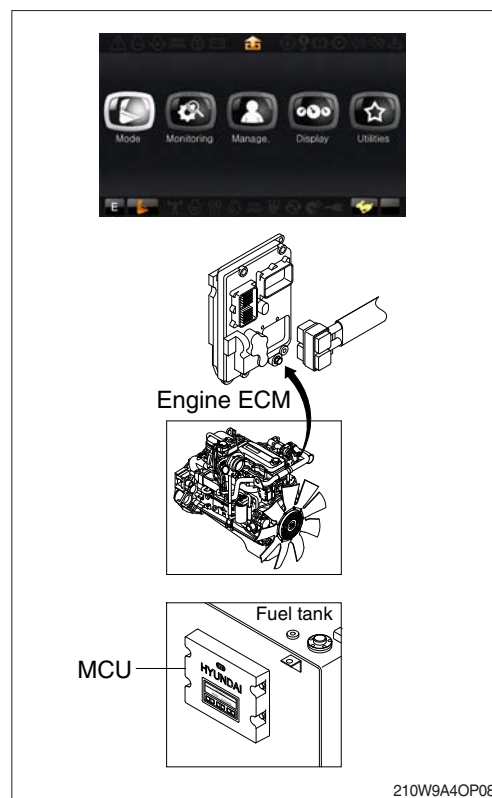
② Engine ECM (Electronic Control Module)

If the engine or relevant system has problem, engine ECM detects and displays on the LCD as fault codes (this code is composed of SPN and FMI).

※ Refer to the page 3-14 for LCD display.

(8) Anti-restart system




The system protects the starter from inadvertent restarting after the engine is already operational.



2) HOW TO OPERATE MODE SELECTION SYSTEM

(1) When start key switch is turned ON

- ① When start key switch is turned on, the cluster turns on and buzzer sounds for 4 seconds. And then main information as gauges and engine speed are displayed on LCD.
- ② Initial default mode settings are displayed in the cluster.

Mode		Status
Power mode	E	ON
Work mode	Grapple ()	ON
Travel mode	Low ()	ON
Auto idle		ON

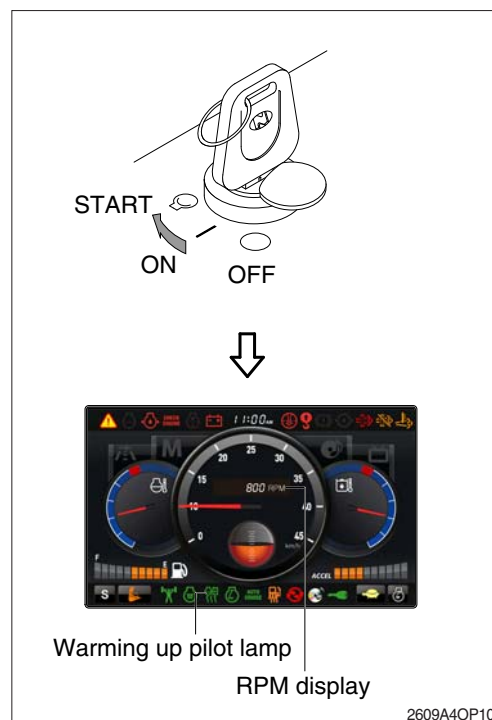
※ These setting can be changed at U mode.

- ③ Self-diagnostic function can be carried out from this point.



(2) After engine start

- ① When the engine is started, rpm display indicates low idle, 850 ± 100 rpm.
- ② If coolant temperature is below 30°C , the warming up pilot lamp lights ON and after 4 seconds the engine speed increases to 1000 ± 100 rpm automatically to warm up the machine.
 - After 2-3 minutes, you can select any mode depending on job requirement.



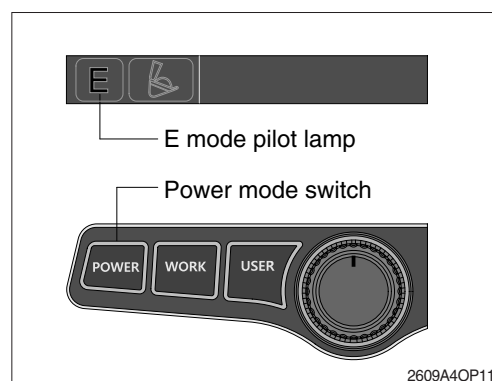
3) SELECTION OF POWER MODE

(1) E mode

The accel dial is set 10 and the auto idle mode is canceled.

Engine rpm	Effect
1350 ± 50	Variable power control in proportion to lever stroke (improvement in fuel efficiency) ※ Same power as S mode in full lever operation.

※ When the accel dial is located below 9 the engine speed decreases about 50~100 rpm per dial set.

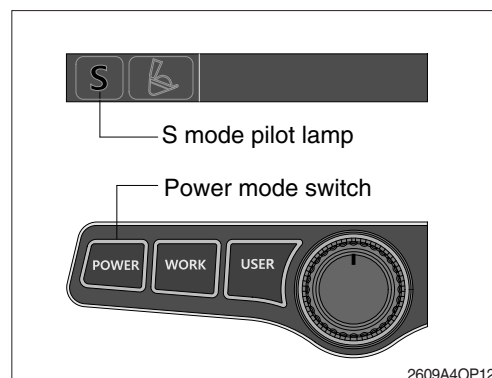


(2) S mode

The accel dial is set 10 and the auto idle mode is canceled.

Engine rpm	Effect
1500 ± 50	Standard power

※ When the accel dial is located below 9 the engine speed decreases about 50~100 rpm per dial set.

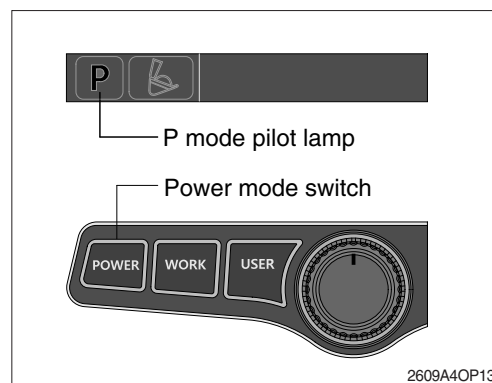


(3) P mode

The accel dial is set 10 and the auto idle mode is canceled.

Engine rpm	Effect
1700 ± 50	Approximately 120 % of power and speed available than S mode.

※ When the accel dial is located below 9 the engine speed decreases about 50~100 rpm per dial set.

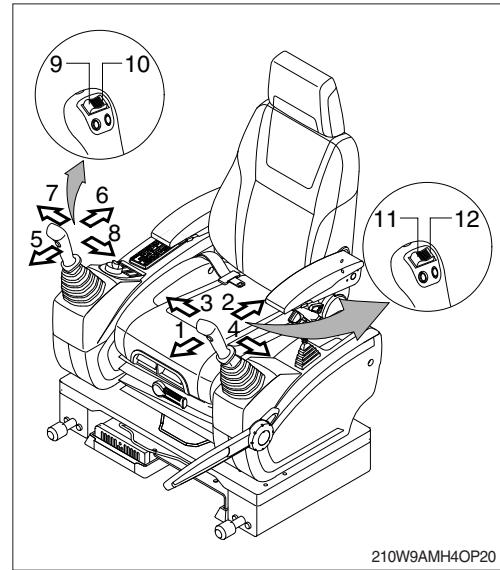


5. OPERATION OF WORKING DEVICE

※ **Confirm the operation of control lever and working device.**

- 1) Left control lever controls arm and swing.
- 2) Right control lever controls boom and bucket.
- 3) When you release the control lever, control lever returns to neutral position automatically.
- 4) Always wear the safety belt during the operation of the machine.

※ **When operating swing, consider the swing distance by inertia.**

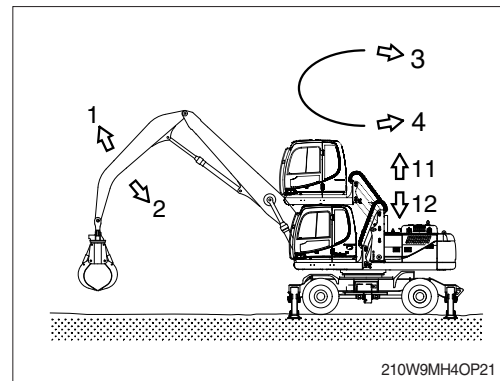


※ **Left control lever**

- 1 Arm roll-out
- 2 Arm roll-in
- 3 Swing right
- 4 Swing left

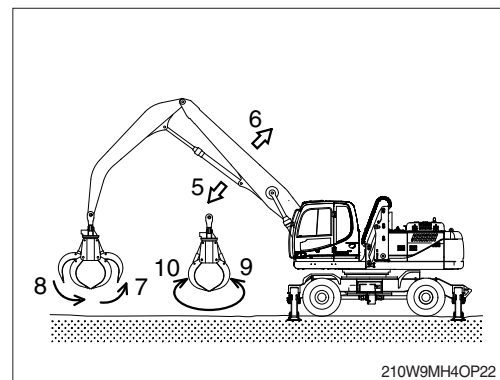
※ **Cab elevating (option)**

- 11 Cab up
- 12 Cab down



※ **Right control lever**

- 5 Boom lower
- 6 Boom raise
- 7 Grapple open
- 8 Grapple closed
- 9 Grapple counterclockwise rotation
- 10 Grapple clockwise rotation



6. OPERATION OF CAB

1) CAB WITH HYDRAULIC ELEVATION

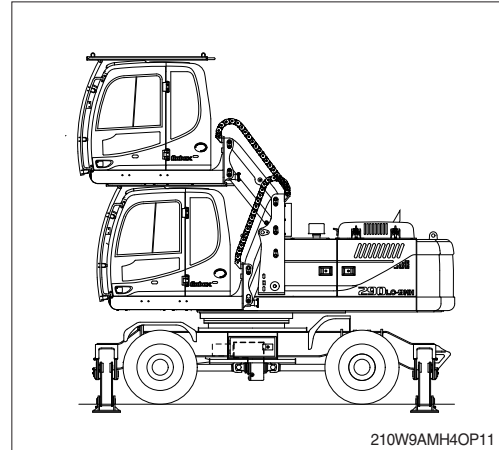
The cab can be steplessly elevated hydraulically to a viewing height of 5.27 m.

2) BEFORE PLACING INTO OPERATION

The lifting equipment of the cab must be subjected to a function test every day.

- ▲ The cab may only be repaired whilst in elevated position when the lift frame is adequately supported.**

A sleeve may be affixed to the piston rod of the lift frame cylinder to support the cab.



3) DURING THE OPERATION

Only enter or leave the cab when it is in the lower end position. The cab must not be elevated.

Staying on steps is forbidden. During all movements of the cab, the machine operator must take care to ensure that she/he and other persons are not in danger.

- ▲ When working with elevated cab, special care must be taken to ensure that no overhead power lines are touched. If the machine has touched an overhead power line, it must only be left or touched by persons standing outside the cab when it is certain that the machine is no longer in contact with the power line or the current has been switched off. Refer to page 1-7.**
- ▲ When loading long and thin parts which stand out of the loading grab, these parts may break into the cab if the loading grab swing out strongly.**

4) DRIVING WITH ELEVATED CAB

- ▲ There is a danger of accident if the routes are not free of obstructions or are on an incline and the cab is elevated. The stability of the machine could be negatively affected.**
- Do not move the machine with the cab elevated.

5) SWITCHING OFF THE MACHINE

The cab must be returned to the rest position.

6) POSITIONING THE CAB

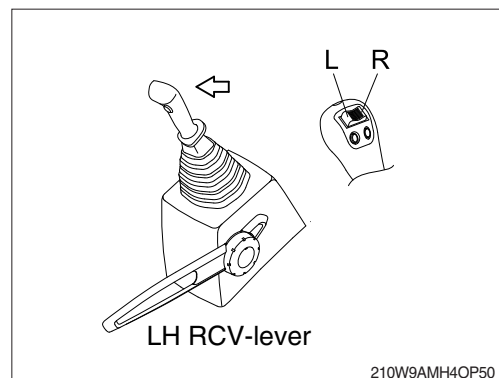
The cab can be steplessly elevated hydraulically.

- ▲ When the cab is being moved, the left-hand armrest must be folded down and the cab door shut.**

ADJUST THE CAB HEIGHT-WISE AS FOLLOWS :

The upward/downward height adjustment of the cab can be performed :

- Cab elevating selection switch : ON position
- By holding down the push-button (L) until the cab reaches the desired working height.
- Holding down the push-button (R) lowers the cab.



7) CARRYING LOADS WITH LOADING MACHINES

Basic requirement :

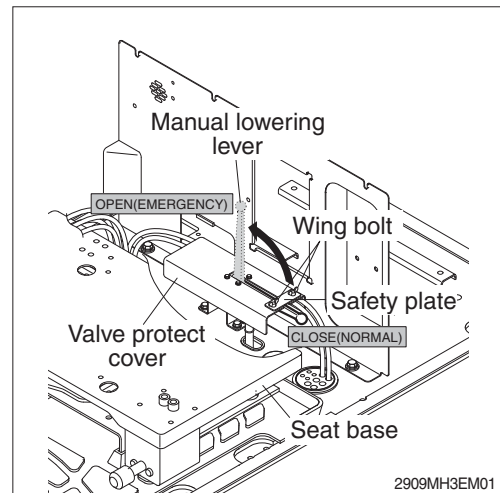
- Level and solid ground which has sufficient carrying capacity must be secured for the travel path.
The upperstructure must be positioned longitudinal to the lower frame (forwards or backwards).
- Maximum permissible deviation 5°.
- The turning of the uppercarriage with the outriggers up and with loads is not allowed.
- The upperstructure must be secured against rotation.
- Observe the position of the lower frame to the upperstructure with regards to the guidance and directional control (accelerator pedal).
- Secure the loads against swinging out.
- During traversing of loads, the maximum permissible speed is 9.2 km/h.
- During traversing of loads, consider the changes in the behavior of the machine : avoid reduced stability due to dynamic loads; sudden changes in speed and directions.
- The 4-point outriggers must be retracted completely prior to traversing (risk of accident).
- Recommendation : only travel via steering axle.
- Locking of the oscillating axle cylinder during the traverse with boom via the oscillating axle.

8) MANUAL LOWERING METHOD OF THE ELEVATING CAB FOR EMERGENCY

- (1) This is used to lower the elevating cab when the elevating cab is elevated position and the engine is shut down unintentionally.
- (2) Emergency manual lowering lever is located the back side of the operator seat.

(3) Operating method

- ① Remove the safety plate by loosen the wing bolts on top side of the valve protect cover.
 - ② Push up the manual lowering lever to the OPEN (emergency) direction.
 - ③ Push down the manual lowering lever to the CLOSE (normal) direction when the cab is lowered completely.
 - ④ Reassemble the safety plate by using the wing bolts.
- ※ The manual lowering lever should be positioned to the CLOSE (normal) direction before starting the engine.



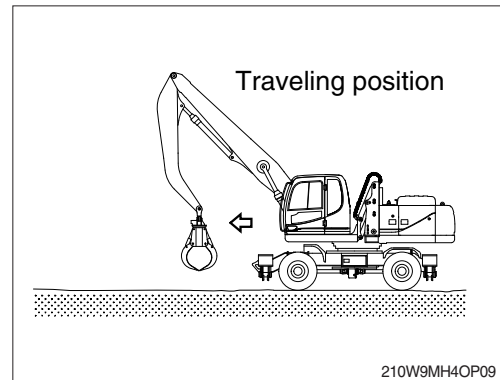
7. TRAVELING OF THE MACHINE

1) BASIC OPERATION

(1) Traveling position

It is the position which the rear axle is in the rear and the working device is forward.

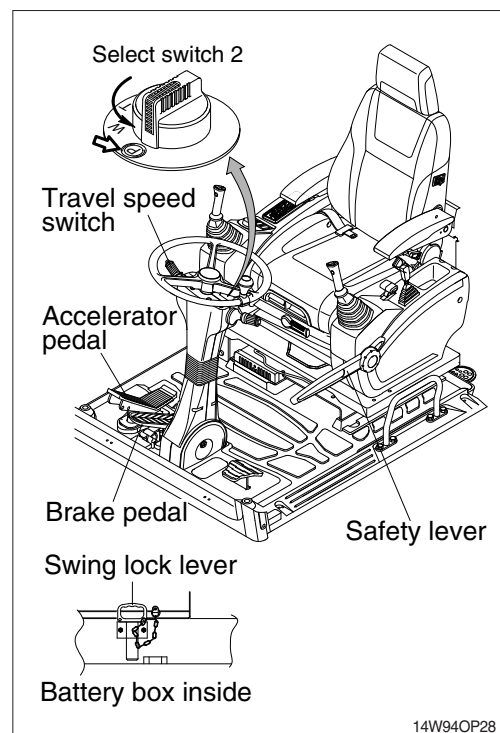
- ▲ **Travel directions will be reversed if lower structure is positioned with rear axle in front.**



(2) Traveling operation

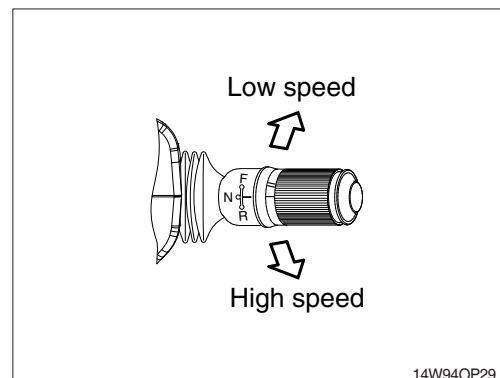
When warm-up operation is completed after the engine is started, move the machine according to the following procedure.

- ① Set the swing lock lever to lock position.
 - ② Release the safety lever.
 - ③ Put the select switch 2 in the traveling position.
 - ④ Lift up the outrigger.
 - ⑤ Select traveling direction.
 - ⑥ Place the two speed switch in low speed.
 - ⑦ Press gently the accelerator pedal to move the machine.
- ※ **When speed up on a slope, a noise for valve of travel motor may occur. It is not out of order in machine but peculiar sound.**
- ※ **Be sure that the brake works normally on the safe place before fast traveling.**



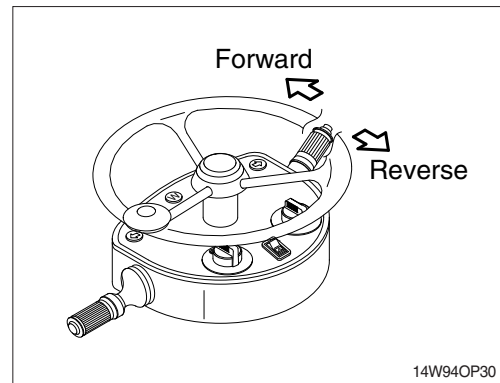
(3) Changing speed

If you want to change the speed, select the travel speed switch desired position.



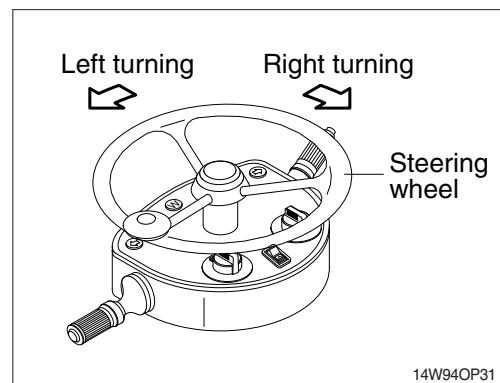
(4) Changing direction (forward/reverse)

- ① Be sure to stop the machine when changing the direction forward or backward while traveling.
 - ② Put the FNR lever in the desired position to change direction.
- ※ **When changing direction, check beforehand there is no obstacle in the direction you will be headed.**
 - ※ **It could be cause of machine failure to change the direction forward or backward while traveling.**



(5) Turning the machine

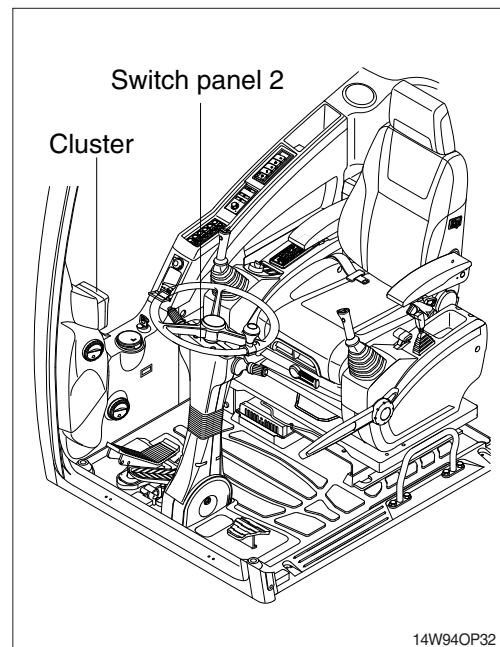
- ① Turn the machine by moving the steering wheel into the desired direction.
 - ② You can turn the machine to the left or right.
- ※ **Do not turn the machine abruptly when traveling at high speed and avoid turn on a slope.**
- ▲ **Steering does not function with engine OFF.**



(6) Precautions when driving

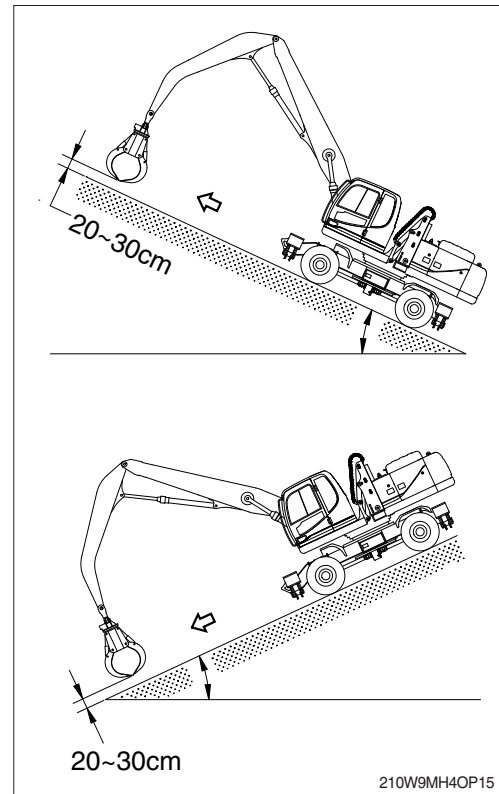
The operators must be familiar with the following precautions including general safety hints.

- ① If the warning lamp lights up on the cluster, stop the machine immediately and check carefully whether the relevant parts are out of order or not.
- ② Do not allow the engine to run at overload.
- ③ Stop the engine and check as soon as finding out abnormal noise or smell.
- ④ Check the pilot lamp of switch panel 2 frequently.
- ⑤ Do not allow passengers or riders on the machine while it is running or in operation.
- ⑥ Never get on or off the machine while it is moving.



2) TRAVELING ON A SLOPE

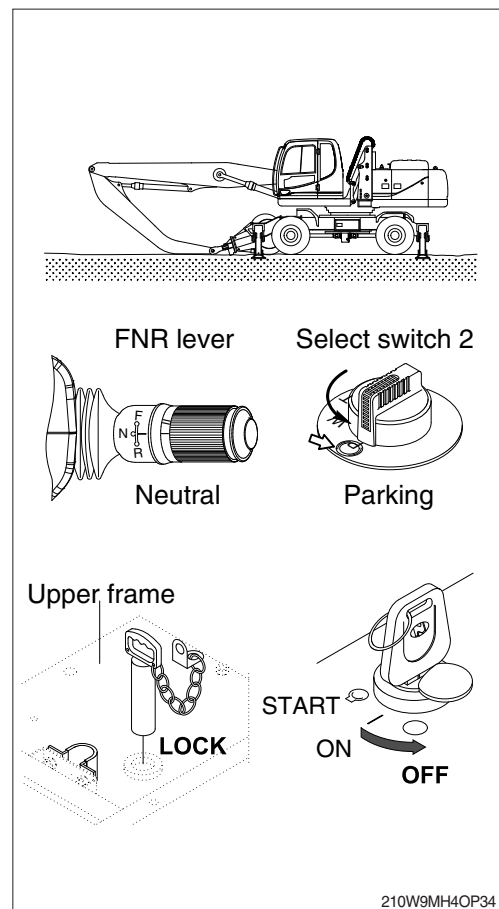
- (1) Never travel down a slope in neutral.
 - (2) Lower the grapple 20 to 30 cm (1 ft) to the ground.
 - (3) If the machine starts to slide or loses stability, stop the machine.
 - (4) When parking on a slope, place blocks behind the tires to prevent sliding.
- ※ **Machine can not travel effectively on a slope when the oil temperature is low. Do the warming-up operation when it is going to travel on a slope.**
- ▲ **Be careful when working on slopes. It may cause the machine to lose its balance and turn over.**
- ▲ **Never work on a slope with the cab in an elevated position.**



3) PARKING THE MACHINE

To park the machine, keep the steps below.

- (1) Release the accelerator pedal slowly.
 - (2) Depress the brake pedal.
 - (3) Place the FNR lever in the neutral.
 - (4) Put the select switch 2 in the parking position and release the brake pedal.
 - (5) Lower the grapple and outrigger to the ground.
 - (6) Stop the engine, place the start key switch in the OFF and remove the key.
 - (7) Lower the safety lever to lock position.
 - (8) Lock the swing lock lever and the cab door.
 - (9) Lower the cab to the fully down position.
 - (10) Put the grab on the ground and ensure that nobody can be hurt by the grapple tips.
- ※ **Whenever parking on a slope, always block the tires after lowering the grapple to the ground.**
- ※ **Contain the outrigger lock pin in the tool box to avoid loss.**



4) TOWING THE MACHINE

Except for an emergency, do not tow this machine.
If it is inevitable to tow this machine, observe the following.

(1) General

- ① Parking brake cylinder of the machine is operated by the spring force and released by hydraulic pressure.
If the engine does not operate, the brake will be operated to stop the machine.
 - ② When the machine is towed move it for a repair to nearby place at the low speed.
Transport it on a trailer, if it has to be moved for a long distance.
 - ③ When the steering device and the brake of the machine to be towed can not be operated, transport by trailer.
- ▲ **Injury or death could result if a disabled machine is towed incorrectly.**
 - ▲ **If your machine is towed by another machine, ALWAYS use a wire rope with a sufficient towing capacity.**
 - ▲ **NEVER allow a disabled machine to be towed on a slope.**
 - ▲ **When connecting up a towing machine, do not let anyone enter the area between the towing machine and the equipment being towed.**
 - ▲ **Set the towing machine and the towing connection of the equipment being towed in a straight line when connecting it.**
 - ▲ **Never tow machine using a light-duty towing hook.**

(2) Towing the machine

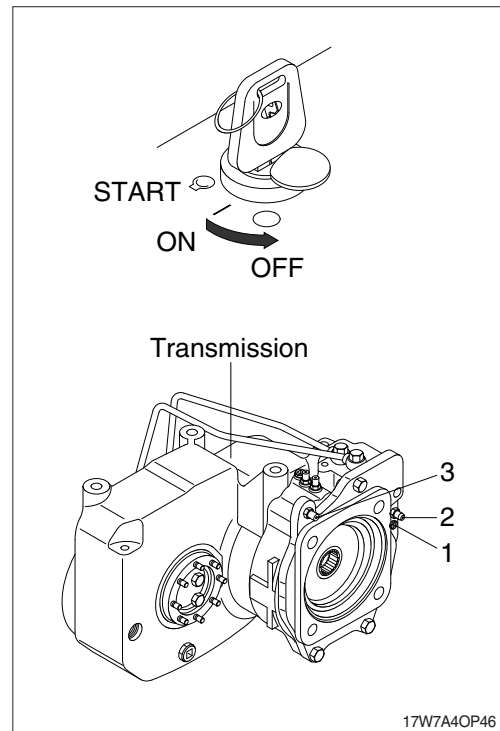
- ① The emergency device is to interrupt the power flow between input and output in case of control pressure failure or a travel motor defect and thus allows an emergency towing of the machine.
 - Towing speed : Max 10 km/h
 - Towing distance : Max 5 km
- ② Since there is no transmission lubrication, damages may occur due to lacking oil supply if the instruction are no observed. For a long distance it is best to have transported the defective machine on a trailer.

③ Activate the emergency device

- Turn the start key OFF position.
- Block the machine against rolling away.
- By means of a grease gun pump in the grease on the grease nipple (1) until it comes visibly out at the pressure relief valve (3) of the parking brake.

④ Deactivate the emergency device

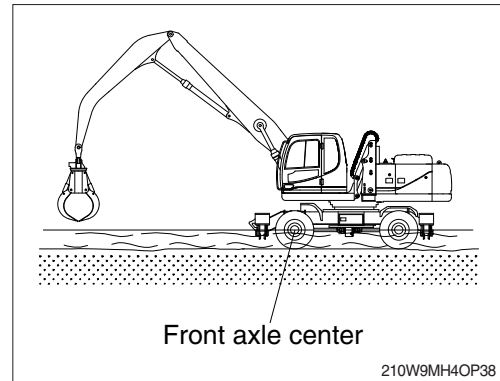
- The bleeder (2) of the parking brake must be opened and then shift into the road speed (apply a control pressure of 30 to 35 bar at the connection of the brake).
- Then close the bleeder again.



5) PRECAUTIONS FOR OPERATION

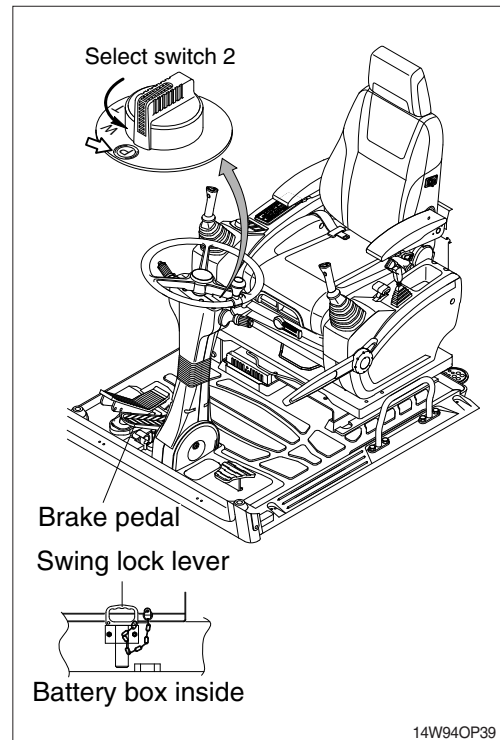
(1) Permissible water depth

- ① Do not immerse the machine in water by more than the permissible depth (axle center).
- ② For parts that have been immersed in water for a long time, pump in grease until the old grease comes out from the bearings.



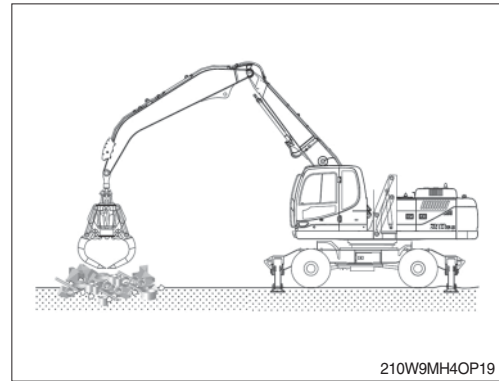
(2) When the brake does not operate

- ① If the machine does not stop even though the brake pedal is applied, put the parking position to activate the emergency brake by select switch 2.
- ※ **After using the parking brake as an emergency brake, ask Hyundai dealer to check complete brake system.**
- ⚠ **Never use emergency brake, except when the service brake fails.**

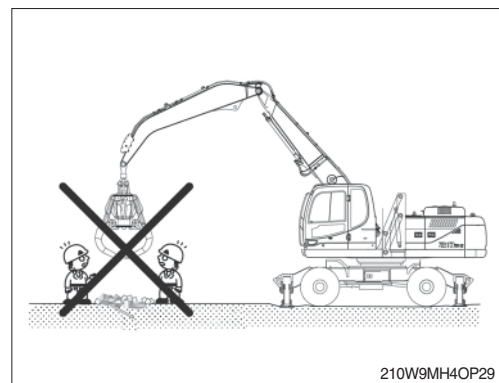


8. EFFICIENT WORKING METHOD

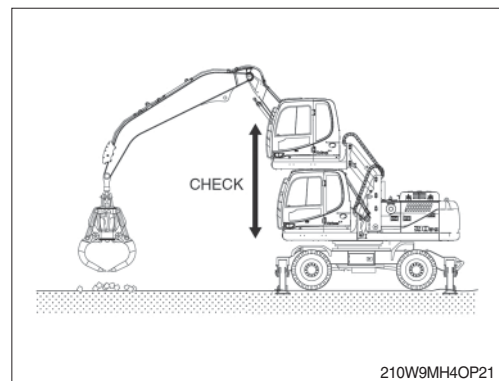
- 1) This machine is designed to handle light material only. (ex. waste handling).



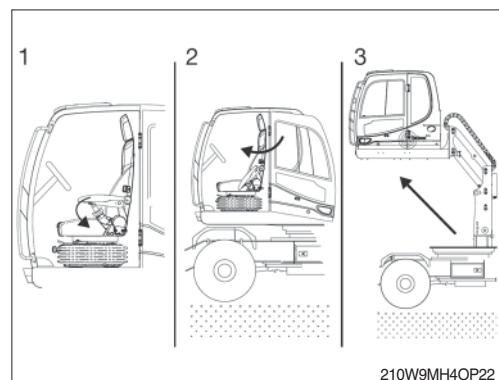
- 2) Make sure that no persons are in the working area of the machine.



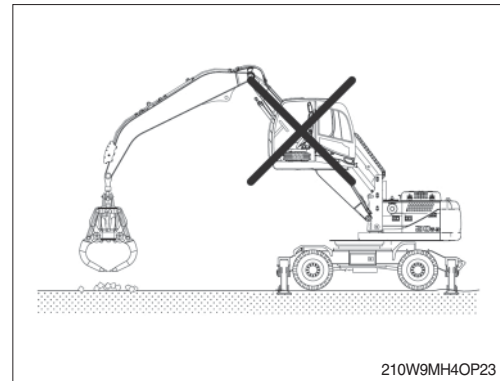
- 3) Before starting operation, please check the function of rising and lowering of cabin.



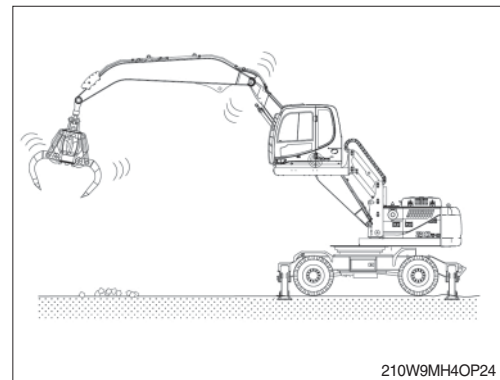
- 4) Optimum performance and visibility is reached by raising the cabin. When cabin is raised, close the door and put the left armrest down.



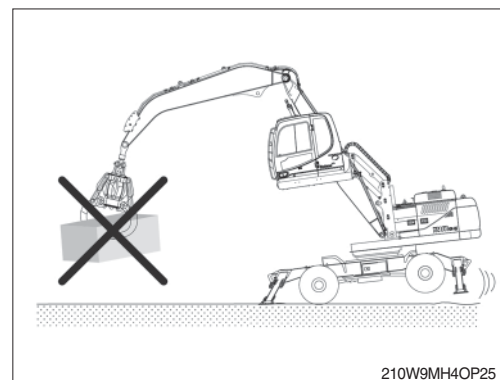
- 5) Operation with open door and high raised cabin is prohibited.



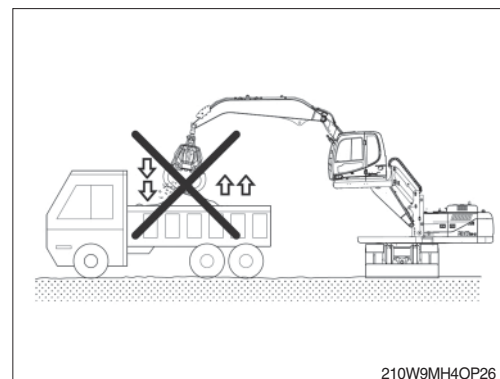
- 6) Do not move the equipment abruptly, the grab can start swinging and can endanger the working environment.



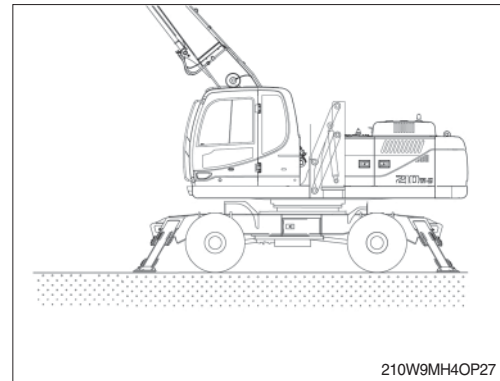
- 7) Never overload the grab, it can unbalance the machine and put the operator in danger. Always refer to the lifting tables of the machine.



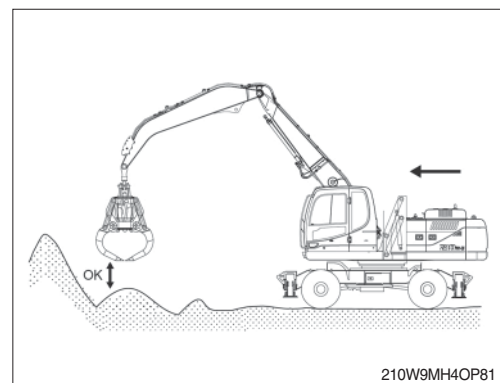
- 8) Never use the grab to compact material. It can harm the attachment, boom and arm of the machine.



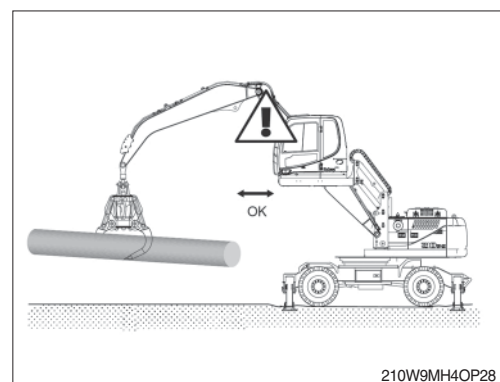
- 9) To have optimum stability, lower the 4 outriggers to ground level. Never put the machine on the four outriggers, it enforces extra tension on the lower frame and can cause lower frame failure.



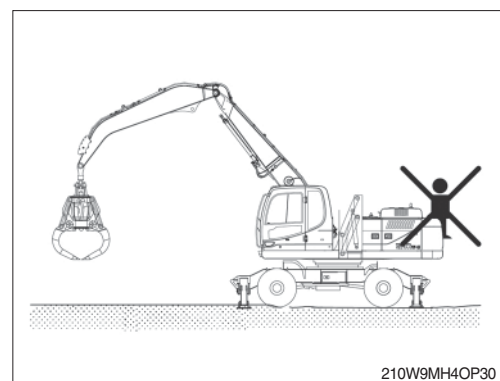
- 10) Lower the cabin, put the 4 outriggers in the upward position, lift the grab slightly above ground level taken the height of obstacles into account, before travel of the machine.



- 11) When handling or loading long objects, move with care. Long material can enter the cabin front window.



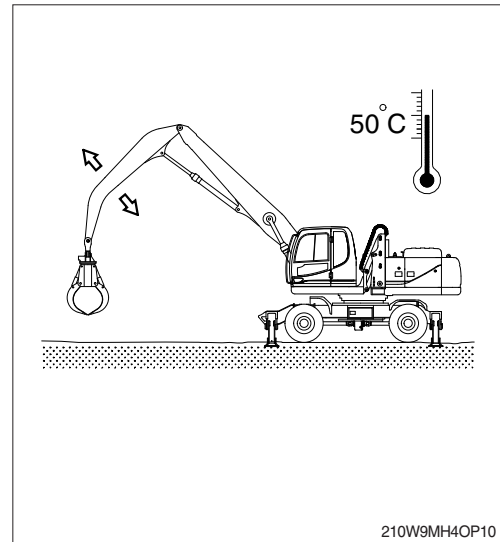
- 12) Never use the machine to lift persons nor let extra persons sit on the machine while travelling.



9. OPERATION IN SPECIAL WORK SITES

1) OPERATION THE MACHINE IN A COLD WEATHER

- (1) Use proper engine oil and fuel for the weather.
- (2) Fill the required amount of antifreeze in the coolant.
- (3) Refer to the starting engine in cold weather.
Start the engine and extend the warming up operation.
- (4) Be sure to open the heater cock when using the heater.
- (5) Always keep the battery completely charged.
※ **Discharged batteries will freeze more easily than fully charged.**
- (6) Clean the machine and park on the wood plates.



2) OPERATION IN SANDY OR DUSTY WORK SITES

- (1) Inspect air cleaner element frequently. Clean or replace element more frequently, if warning lamp comes ON and buzzer sounds simultaneously, regardless of inspection period.
※ **Replace the inner and outer element after 4 times of cleaning.**
- (2) Inspect radiator, oil cooler and condenser frequently, and keep cooling fins clean.
- (3) Prevent sand or dust from getting into fuel tank and hydraulic tank during refilling.
- (4) Prevent sand or dust from penetrating into hydraulic circuit by tightly closing breather cap of hydraulic oil tank. Replace hydraulic oil filter and air breather element frequently. Also, replace the fuel filter frequently.
- (5) Keep all lubricated part, such as pins and bushings, clean at all times.
- (6) If the air conditioner and heater filters clogged, the heating or cooling capacity will drop. Clean or replace the filter element more frequently.
- (7) Clean electrical components, especially the starting motor and alternator to avoid accumulation of dust.

3) SEA SHORE OPERATION

- (1) Prevent ingress of salt by securely tightening plugs, cocks and bolts of each part.
- (2) Wash machine after operation to remove salt residue.
Pay special attention to electrical parts, and hydraulic cylinders to prevent corrosion.
- (3) Inspection and lubrication must be carried out more frequently.
Supply sufficient grease to replace all old grease in bearings which have been submerged in water for a long time.

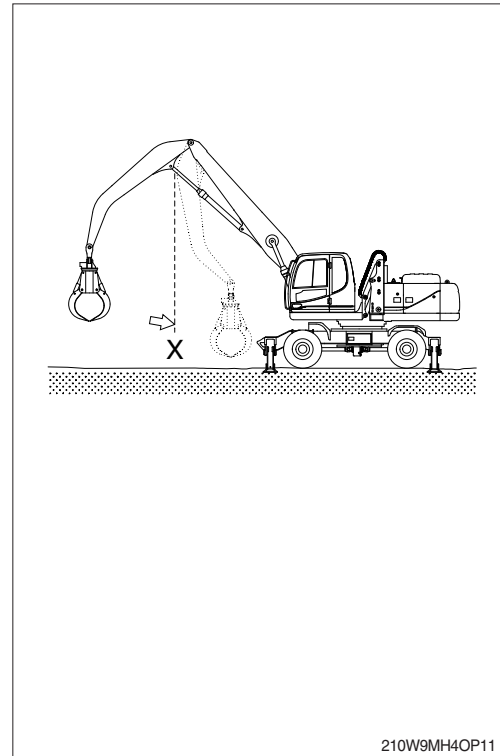
4) OPERATION IN MUD, WATER OR RAIN WORK SITES

- (1) Perform a walk around inspection to check for any loose fittings, obvious damage to the machine or any fluid leakage.
- (2) After completing operations, clean mud, rocks or debris from the machine. Inspect for damage, cracked welds or loosened parts.
- (3) Perform all daily lubrication and service.
- (4) If the operations were in salt water or other corrosive materials, make sure to flush the affected equipment with fresh water.

10. NORMAL OPERATION OF EXCAVATOR

Followings may occur during operation due to the nature of a hydraulic excavator.

- 1) When rolling in the arm, the roll-in movement stop momentary at point **X** in the picture shown, then recovers speed again after passing point **X**.
The reason for this phenomenon is that movement by the arm weight is faster than the speed of oil flow into the cylinder.
- 2) When lowering the boom, one may hear continuous sound.
This is caused by oil flow in the valve.
- 3) Overloaded movement will produce sound caused by the relief valves, which are for the protection of the hydraulic systems.
- 4) When the machine is started swing or stopped, a noise near the swing motor may be heard. The noise is generated when the brake valve relieves.



11. ATTACHMENT LOWERING (When engine is stopped)

1) On machines equipped with an accumulator, for a short time (within 2 minutes) after the engine is stopped, the attachment will lower under its own weight when the attachment control lever is shifted to LOWER. That is happen only starting switch ON position and safety lever UNLOCK position. After the engine is stopped, set the safety lever to the LOCK position.

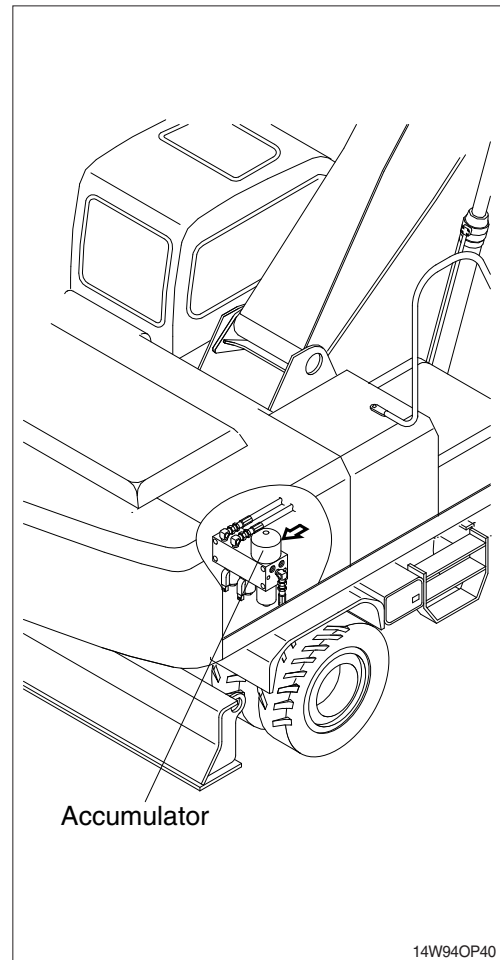
▲ Be sure no one is under or near the attachment before lowering the boom.

2) The accumulator is filled with high-pressure nitrogen gas, and it is extremely dangerous if it is handled in the wrong way. Always observe the following precautions.

▲ Never make any hole in the accumulator expose it to flame or fire.

▲ Do not weld anything to the accumulator.

※ When carrying out disassembly or maintenance of the accumulator, or when disposing of the accumulator, it is necessary to release the gas from the accumulator. A special air bleed valve is necessary for this operation, so please contact your Hyundai distributor.



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12. STORAGE

Maintain the machine taking care of following to prevent the deterioration of machine when storing the machine for a long time, over 1 month.

1) BEFORE STORAGE

(1) Cleaning the machine

Clean the machine and dried.

Grease each lubrication part.

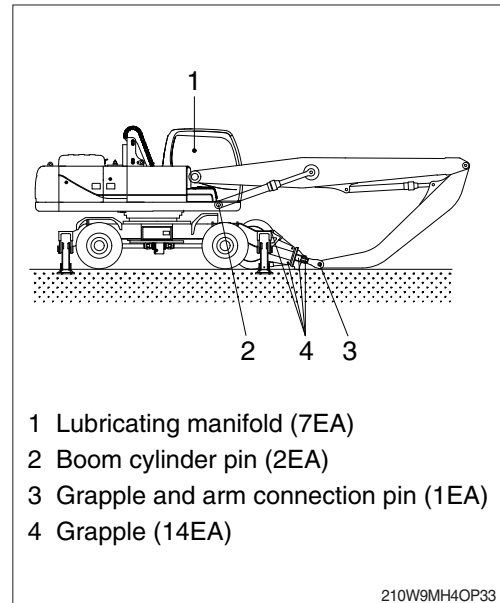
(2) Lubrication position of each part

Change all oil.

- ※ Be particularly careful when you reuse the machine.

As oil can be diluted during storage.

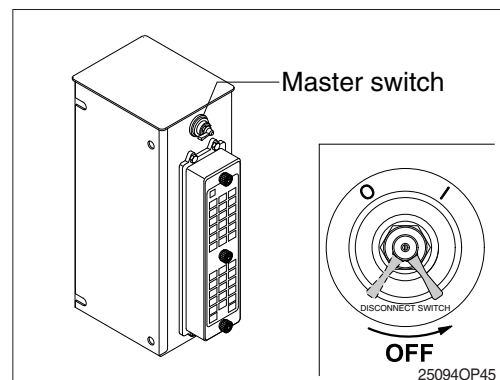
Apply an anticorrosive lubricant on the exposed part of piston rod of cylinder and in places where the machine rusts easily.



(3) Master switch

Turn OFF the master switch mounted electric box and store the machine.

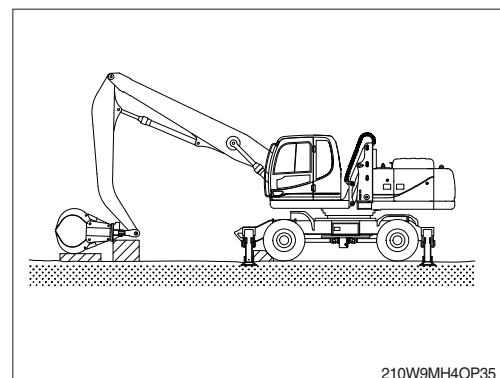
- (4) Be sure to mix anticorrosive antifreezing solution in the radiator.



(5) Prevention of dust and moisture

Keep machine dry. Store the machine setting wood on the ground.

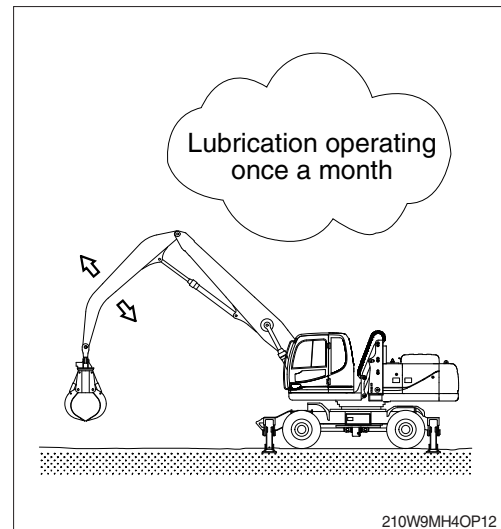
- ※ Cover exposed part of piston rod of cylinder.
- ※ Lower the grapple to the ground.



2) DURING STORAGE

Start engine and move the machine and work equipment once a month and apply lubrication to each part.

- ※ Check the level of engine oil and coolant and fill if required when starting engine.
- ※ Clean the anticorrosive on the piston rod of cylinder.
- ※ Operate the machine such as traveling, swing and work equipment operation to make sure enough lubrication of all functional components.



※ BATTERY

- ① Once a month, start the engine for 15 minutes (or use a charger) to charge the battery.
- ② Every 2 months, check the battery voltage and keep battery voltage over 25.08V.
- ③ If the machine stock period is over 6 months, disconnect the battery negative (-) terminal.

3) AFTER STORAGE

Carry out the following procedure when taking out of a long time storage.

- (1) Wipe off the anticorrosive lubricant on the hydraulic piston rod.
- (2) Completely fill fuel tank, lubricate and add oil.

(3) When storage period is 6 months over

If the machine stock period is over 6 months, carry out the following procedure.

This procedure is to drain condensation water for the **swing reduction gear** durability.

- ※ Remove the drain port plug and drain the water until the gear oil comes out and then tighten the drain plug.
- ※ Refer to the service instruction, section 6 for the drain plug location.
- ※ If the machine is stored without carrying out the monthly lubricating operation, consult your Hyundai dealer for service.