

4. MODE SELECTION SYSTEM

1) STRUCTURE OF CAPO SYSTEM

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

(1) Work mode

3 work modes can be selected for the optimal work speed of the machine operation.

Heavy duty work mode

The boom priority solenoid is activated to make the boom operation speed faster.

General work mode

When key switch is turned ON, this mode is selected automatically and swing operation speed is faster than heavy duty work mode.

Breaker operation mode

It sets the pump flow to the optimal operation of breaker by activating the max flow cut-off solenoid.

(2) Power mode

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

- H mode : High power
- S mode : Standard power

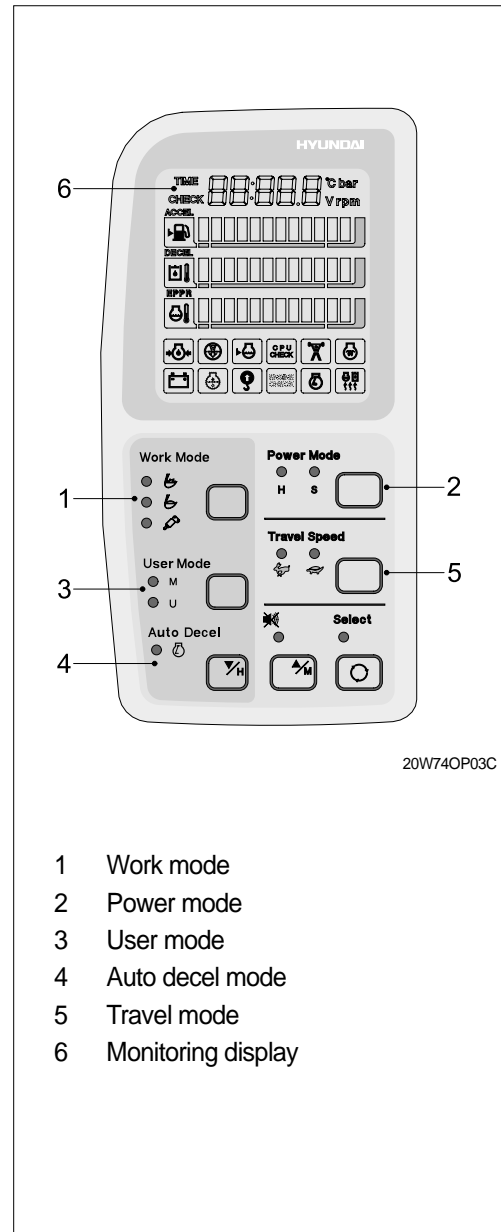
(3) User mode

- M : Maximum power
- U : You can change the engine and pump power and memorize it for your preference.

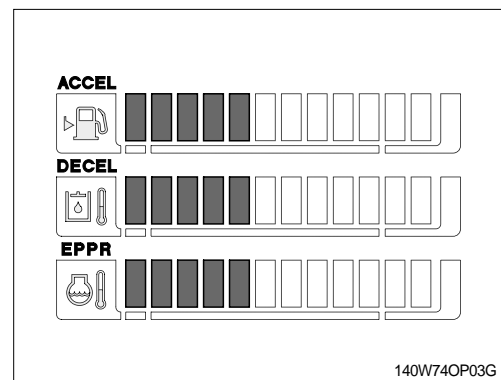
How to modulate the memory set

Each memory mode has a initial set which are mid-range of max engine speed, auto decel rpm, and EPPR valve input current.

When you select U, cluster LCD displays.



- 1 Work mode
- 2 Power mode
- 3 User mode
- 4 Auto decel mode
- 5 Travel mode
- 6 Monitoring display



To change the engine high idle speed, press the USER mode switch and SELECT switch at the same time and then ACCEL blinks at 0.5 seconds interval.

- By pressing ▲ or ▼ switch, █ will increase or decrease.

To change DECEL rpm, press the USER mode switch and SELECT switch once more and then DECEL blinks at 0.5 seconds interval.

- By pressing ▲ or ▼ switch, █ will increase or decrease.

To change EPPR current, press the USER mode switch and SELECT switch one more and then EPPR blinks at 0.5 seconds interval.

- By pressing ▲ or ▼ switch, █ will increase or decrease.

· LCD segment vs parameter setting

| Segment (█) | ACCEL (rpm) | DECEL (rpm) | EPPR (mA) |
|-------------|---------------|-----------------|-----------|
| 1 | High idle-900 | Low idle(950) | 150 |
| 2 | High idle-800 | 1050 | 200 |
| 3 | High idle-700 | 1150 | 250 |
| 4 | High idle-600 | Decel rpm(1200) | 300 |
| 5 | High idle-500 | 1250 | 350 |
| 6 | High idle-400 | 1300 | 400 |
| 7 | High idle-300 | 1350 | 450 |
| 8 | High idle-200 | 1400 | 500 |
| 9 | High idle-100 | 1450 | 550 |
| 10 | High idle | 1500 | 600 |


To memorize the final setting, press the USER mode switch and SELECT switch one more time.

(4) Auto decel mode

Engine quick deceleration.

(5) Travel mode

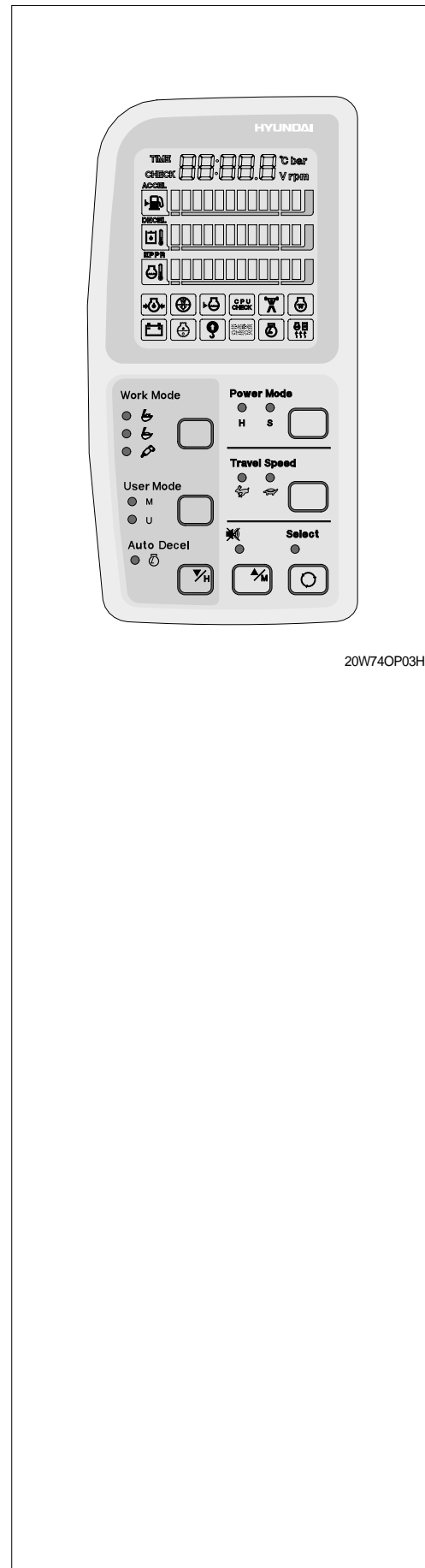
 : Low speed traveling.

 : High speed traveling.

(6) Monitoring system

Information of machine performance as monitored by the CPU controller can be displayed on the **monitoring display**.

Refer to 4-12 page for details.



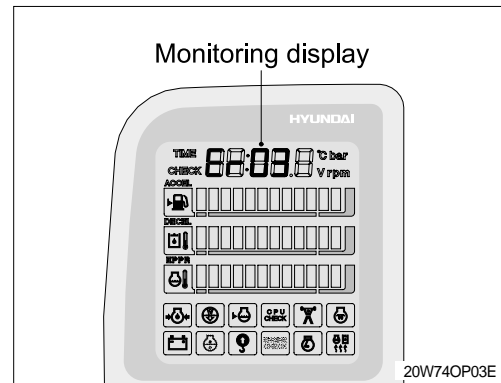
20W740P03H

(7) Self diagnostic system

The CPU controller diagnoses problems in the CAPO system caused by electric parts' malfunction and by open or short circuit, which are displayed on the **monitoring display** as error codes.

(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 is turned ON

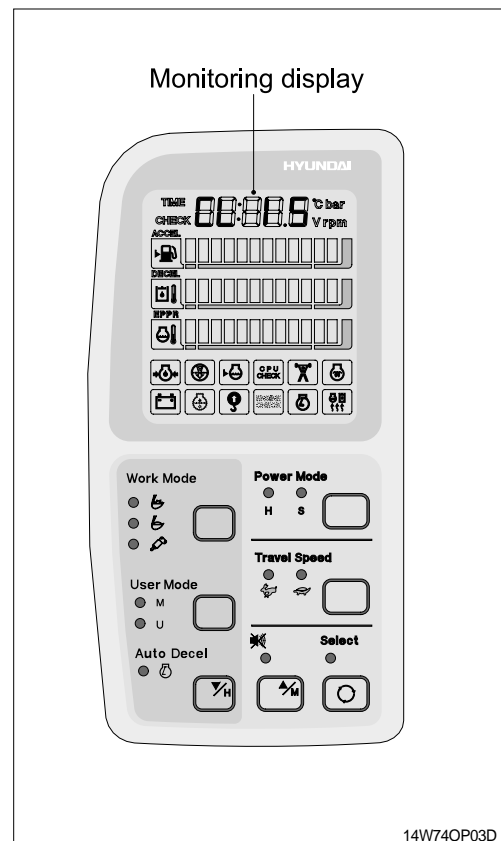
When start key is turned ON, all illumination lamps are ON and all lamps are OFF automatically after 5 seconds. But a battery charging warning lamp and an engine oil pressure warning lamp keep turned ON until engine starting.

After lamp check **CL : 1.5**, the version of cluster program, is displayed on **Monitoring display** for 2 seconds.

After the version of program is displayed, the cluster returns to default. Exactly engine rpm, battery charging warning lamp and engine oil pressure warning lamp are turned ON and S mode, auto decel, low travel speed(Turtle mark) are displayed.

In default condition self-diagnostic function including trouble detecting of electric system can be carried out.

Refer to 4-12 page for details.

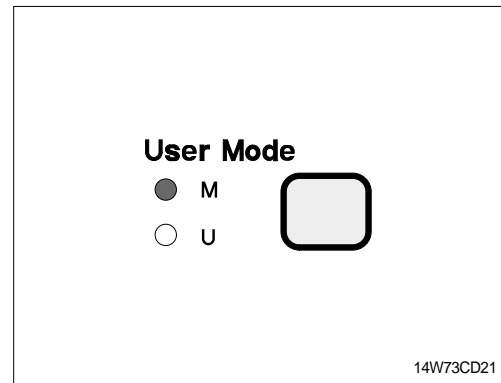


(3) M mode

When the accel dial is at setting 10 and auto decel mode is cancelled and M mode is selected.

| Engine rpm | Effect |
|------------|---|
| 2350 ± 50 | Approximately 110% of power and speed available than non mode type machine or S mode. |

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



4) MONITORING DISPLAY

Information of machine performance as monitored by the CPU controller can be displayed on the cluster when the operator selects a display mode by touching **SELECT** switch alone or with **BUZZER STOP** switch on the cluster as below.

| Display group | How to select display mode | | Name | Display on the cluster | |
|---|---|---|---|------------------------|-------------|
| | Group selection | Display mode selection | | | |
| Group 0 (Default) | Way 1 Key switch ON or START Way 2 Touch AUTO DECEL switch while pressing BUZZER STOP at group 1~4. | Initial | Engine rpm | 950 rpm | |
| | | Touch SELECT 1 time | Time | TIME 12:30 | |
| | | Touch SECLET 2 times | Power shift pressure (EPPR valve) | EP: 10 bar | |
| | | Touch SELECT 3 times | CPU model & version | 0401.0 | |
| | | Touch SELECT 4 times | Option (Only when a pressure sensor is installed) | Front pump pressure | P1: 100 bar |
| | | Touch SELECT 5 times | | Rear pump pressure | P2: 200 bar |
| | | Touch SELECT 6 times | | Pilot pressure | P3: 40 bar |
| Group 1 (Volt, temp, EPPR press, version) | Touch SELECT switch once while pressing BUZZER STOP . In this group SELECT LED ON | Default | Battery voltage(V) | b: 24.8 v | |
| | | Touch SELECT 1 time | Potentiometer voltage(V) | Pa: 2.5 v | |
| | | Touch SELECT 2 times | Accel dial voltage(V) | dL: 3.8 v | |
| | | Touch SELECT 3 times | Hydraulic oil temperature(°C) | Hd: 50 °C | |
| | | Touch SELECT 4 times | Coolant temperature(°C) | Ct: 85 °C | |
| Group 2 (Error code) | Touch SELECT switch twice while pressing BUZZER STOP . In this group BUZZER STOP LED blinks | Default | Current error | CHECK Er: 03 | |
| | | Touch SELECT 1 time | Recorded error (Only key switch ON) | TIME Er: 03 | |
| | | Press down(▼) & SELECT at the same time | Recorded error deletion (Only key switch ON) | TIME Er: 00 | |
| Group 3 (Switch input) | Touch SELECT switch 3 times while pressing BUZZER STOP . In this group SELECT LED blinks at 0.5sec interval | Default | Pump prolix switch | PP: on or off | |
| | | Touch SELECT 1 time | Auto decel pressure switch | dP: on or off | |
| | | Touch SELECT 2 times | Power boost switch | Pb: on or off | |
| | | Touch SELECT 3 times | Travel oil pressure switch | oP: on or off | |
| | | Touch SELECT 4 times | One touch decel switch | od: on or off | |
| | | Touch SELECT 5 times | Travel alarm switch | br: on or off | |
| | | Touch SELECT 6 times | Preheat switch | PH: on or off | |

| Display group | How to select display mode | | Name | Display on the cluster |
|----------------------------|--|-----------------------------|---|---------------------------|
| | Group selection | Display mode selection | | |
| Group 4 (Output) | Touch SELECT switch 4 times while pressing BUZZER STOP . In this group SELECT LED blinks at 1sec interval | Default | Hourmeter | H ₀ :on or OFF |
| | | Touch SELECT 1 time | Neutral relay (Anti-restart relay) | nr:on or OFF |
| | | Touch SELECT 2 times | Travel speed solenoid | tS:on or OFF |
| | | Touch SELECT 3 times | Power boost solenoid (2-stage relief solenoid) | PS:on or OFF |
| | | Touch SELECT 4 times | Boom priority solenoid | bS:on or OFF |
| | | Touch SELECT 5 times | Travel alarm | AL:on or OFF |
| | | Touch SELECT 6 times | Max flow cut off solenoid | FS:on or OFF |
| | | Touch SELECT 7 times | Preheat relay | PR:on or OFF |

By touching **SELECT** switch once while pressing **BUZZER STOP**, display group shifts.

Example : Group 0 → 1 → 2 → 3 → 4 → 0