

## TRAINING MATERIAL

<b>SK160LC-6E</b>	YM03U0522 ~
<b>ED190 -6E</b>	YL03U0136 ~
<b>SK210LC-6E</b>	YQ08U0969 ~
<b>SK250LC-6E</b>	LL09U0575 ~
<b>SK290LC-6E</b>	LB04U0298 ~
<b>SK330LC-6E</b>	YC07U0623 ~

Certificate No. CERT-02455-99-AQ-HOU-RAB

This is to certify that the Quality System  
of

**KOBELCO CONSTRUCTION MACHINERY AMERICA LLC**

at

501 Richardson Road, Calhoun, GA 30701 USA  
12755 S. Kirkwood, Stafford, TX 77477 USA

Has been found to conform to Quality Standard:

**ISO 9001, 1994**

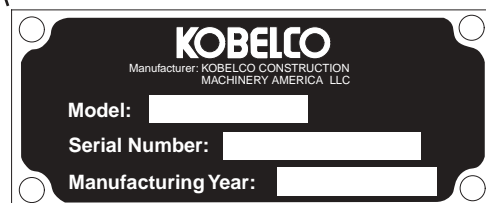
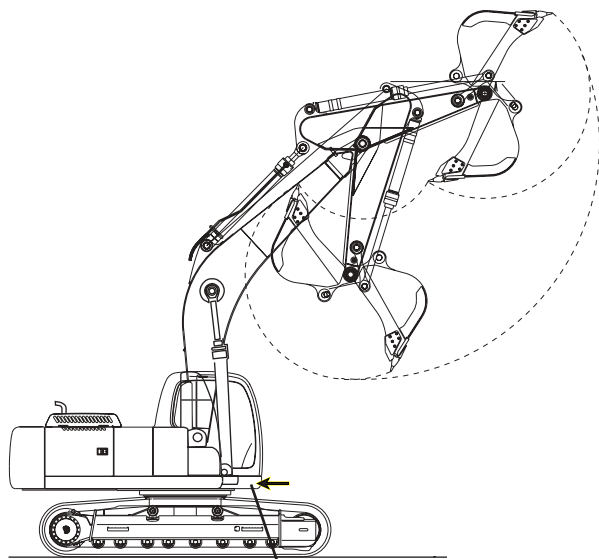
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**THE DESIGN, MANUFACTURE AND DISTRIBUTION OF  
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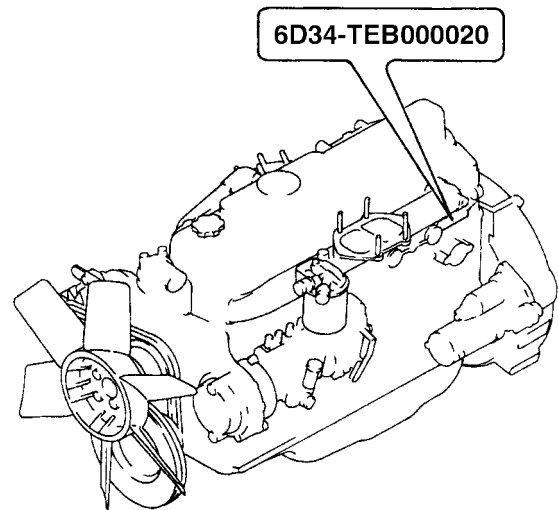
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# MINOR CHANGE TRAINING MANUAL

• LOCATION OF MACHINE'S SERIAL NUMBER



• LOCATION OF ENGINE'S SERIAL NUMBER



**NOTE:** The numbers in the illustrations are for explanation only and differ from actual numbers

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**KOBELCO/MMC WARRANTY STANDARD WARRANTY COVERAGE (ENGINE):**

- One (1) year, unlimited hours.
- Two (2) years, two thousand (2,000) hours, whichever occurs first.
- Three (3) years, ten thousand (10,000) hours, whichever occurs first, for major components (cylinder block, cylinder head, connecting rods, crankshaft, camshaft, and cam gear)

**OWNER'S WARRANTY RESPONSIBILITIES:**

- As the Kobelco excavator owner, you are responsible for the performance of the required maintenance listed in this operator's manual. Kobelco Construction Machinery America Inc., recommends that you retain all receipts covering maintenance on your excavator.
- As the Kobelco excavator owner, you should however be aware that Kobelco Construction Machinery America LLC, may deny you warranty coverage if your machine's engine has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- Your Kobelco excavator's engine is designed to operate on commercially available Diesel fuel only.
- You are responsible for initiating the warranty process. The California Air Resources Board suggests that you present your engine to an authorized Kobelco dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact Kobelco America Inc. at the office shown below:

**Kobelco Construction Machinery America LLC  
12755 South Kirkwood Rd  
Stafford, Texas 77477**

**Tel: (281) 240-4800**

**Fax: (281) 240-5026**

**[www.kobelcoamerica.com](http://www.kobelcoamerica.com)**

## CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT

### **YOUR WARRANTY RIGHT AND OBLIGATIONS:**

The California Air Resources Board and Mitsubishi Motors Corporation (hereinafter referred to as ARB and MMC) is pleased to explain the emission control system warranty on your 1996 and later heavy-duty off-road engines. In California, new heavy duty off-road engines must be designed, built and equipped to meet the State's stringent anti-smog standards. MMC must warrant the emission control system on your engine for the periods of time listed below, provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, MMC will repair your Kobelco excavator's engine at no cost to you including diagnosis, parts and labor.

### **MANUFACTURE'S WARRANTY COVERAGE:**

The 1996 and later heavy-duty off-road engines are warranted for a period of five years or 3,000 hours of operation, whichever occurs first on emission related components. In the absence of a device to measure hours of use, the engine shall be warranted for a period of five years. If any emission-related part on your engine is defective, the part will be repaired or replaced by MMC.

### **OWNER'S WARRANTY RESPONSIBILITIES:**

As the heavy-duty off road engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. MMC recommends that you retain all receipts covering maintenance on your heavy-duty off-road engine.

As the heavy-duty off-road engine owner, you should however be aware that MMC may deny you warranty coverage if your heavy-duty off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

Your engine is designed to operate on commercially available diesel fuel only.

You are responsible for initiating the warranty process. The ARB suggests that you present your heavy-duty off-road engine to a MMC dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact at the office shown below.

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1250 Greenbriar Drive, Suite E  
Addison, Illinois 60101-1065 U.S.A.

Tel. No. : (708) 268-0750  
Fax. No. : (708) 268-9293

or

California Air Resource Board  
9528 Telstar Avenue  
El Monte, CA 91731

Tel. No. : (818) 575-6800  
Fax. No. : (818) 575-6685



## **W A R N I N G**



**READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND PROCEDURES FOUND IN THIS MANUAL BEFORE ATTEMPTING ANY OPERATION, INSPECTION OR MAINTENANCE OF THIS MACHINE, ATTACHMENT OR SYSTEMS OPERATION. KOBELCO CANNOT ANTICIPATE EVERY POSSIBLE CIRCUMSTANCE THAT MIGHT INVOLVE A POTENTIAL HAZARD. THE WARNINGS IN THIS PUBLICATION AND ON THE PRODUCT ARE THEREFORE NOT ALL INCLUSIVE. IF A TOOL, PROCEDURE, WORK METHOD OR OPERATING TECHNIQUE NOT SPECIFICALLY RECOMMENDED BY KOBELCO IS USED, YOU MUST SATISFY YOURSELF THAT IT IS SAFE FOR YOU AND OTHERS. YOU SHOULD ALSO ENSURE THAT THE PRODUCT WILL NOT BE DAMAGED OR MADE UNSAFE BY THE OPERATION, LUBRICATION, MAINTENANCE AND/OR REPAIR PROCEDURES YOU CHOOSE.**

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# Kobelco

## Dynamic Acera



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**Service Support**

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# MACHINE FAMILIARIZATION

## 2.1 FAMILIARIZATION

All operators, service mechanics and personnel responsible for operation, inspection and maintenance of the machine should become thoroughly familiar with the controls and components and their functions before working with or on this equipment.

Study the information in this section to become familiar with the controls and components of this machine.

## 2.2 GENERAL MACHINE NOMENCLATURE

The Nomenclature drawing below (FIGURE 2.2), points out locations of major components of the KOBELCO Dynamic Acera Hydraulic Excavators.

Study these areas and locate these components on the machine. Specific information regarding these components are explained on the following pages of this section.

2

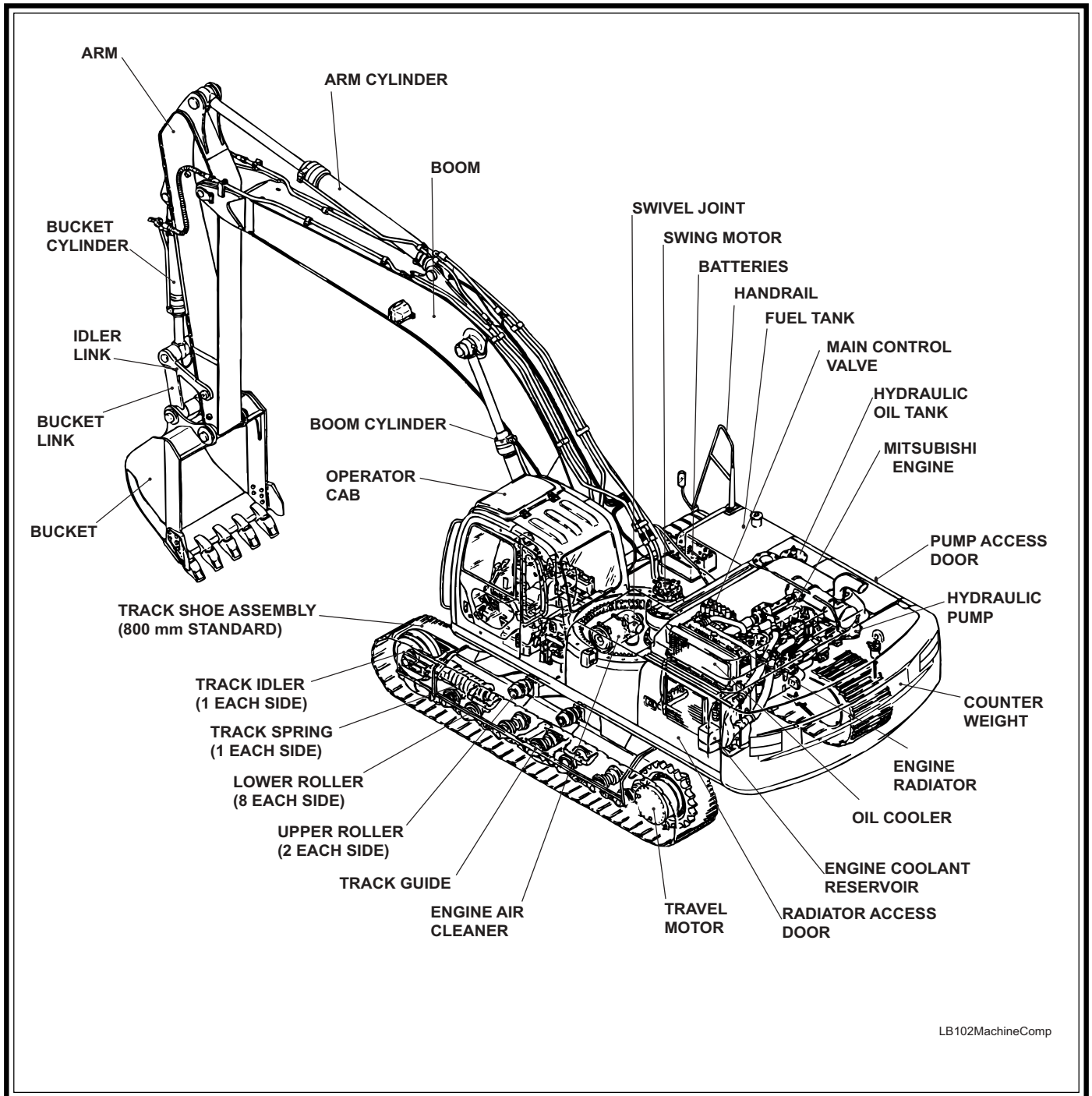


FIGURE 2.2

LB102MachineComp

# MACHINE FAMILIARIZATION

## 2.3 OPERATOR CAB NOMENCLATURE

The operator cab nomenclature (FIGURE 2.3), points out locations of operator controls of the KOBELCO DYNAMIC ACERA Minor Change

hydraulic excavators operator cab. Study these areas and locate these components on the machine. Specific information regarding these components are explained on the following pages of this section.

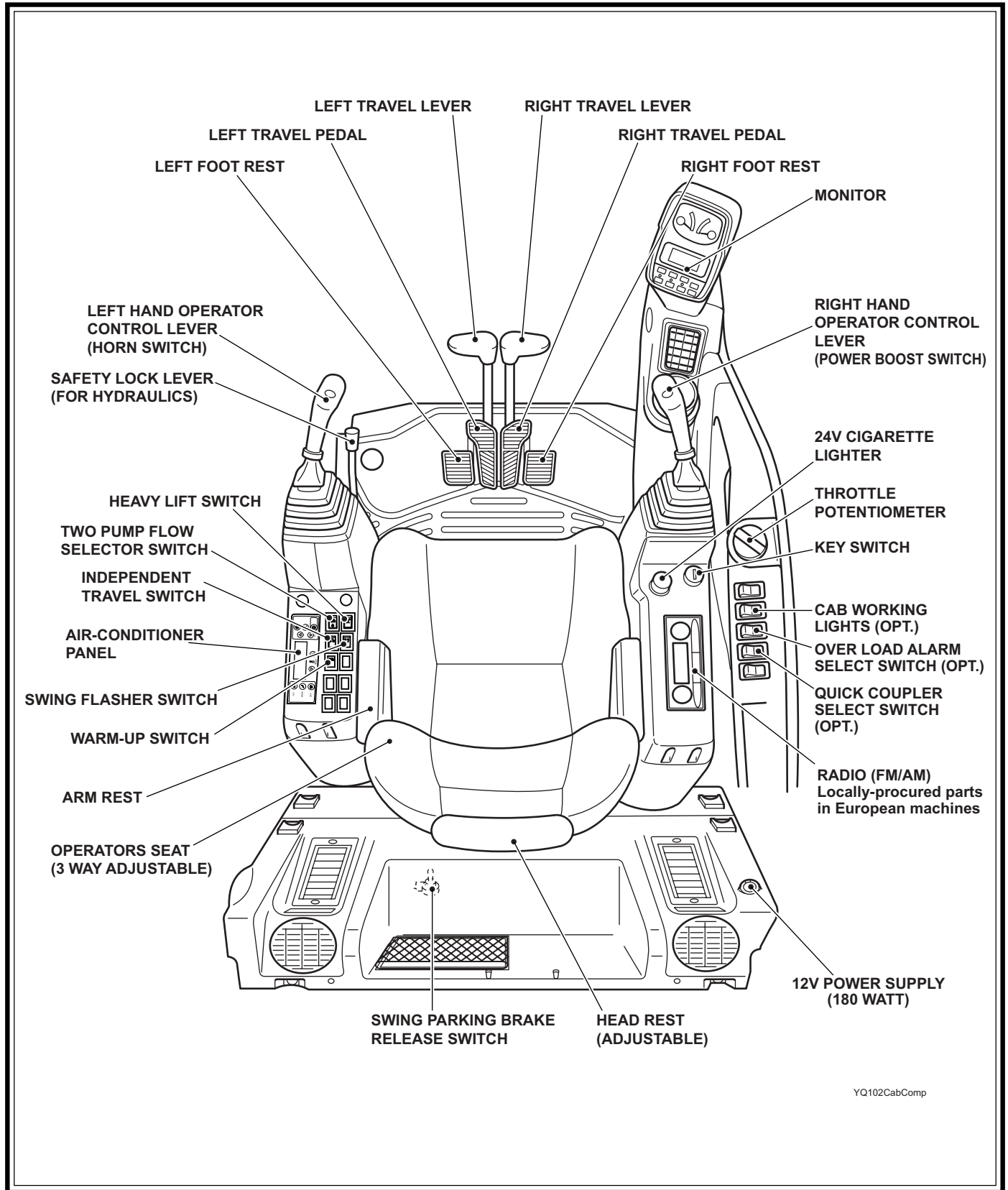


FIGURE 2.3

YQ102CabComp

# MACHINE FAMILIARIZATION

## 2.4 COMPONENT & CONTROLS NOMENCLATURE

The following information provides a brief description and function of the components and controls of the KOBELCO Dynamic Acera Hydraulic Excavators.

All personnel associated with this machine should read and understand this information BEFORE beginning any work with or on this equipment.

### A. RIGHT HAND OPERATOR CONSOLE AND MONITOR

#### A1. Key Switch– FIGURE 2.4A

The Key Switch is located on the right hand operator console and has 5 operating functions.

- a. “HEAT”– This position is used for starting the engine in cold climates. See Section III.
- “OFF”– When Key is turned to this position, the engine stops and electrical power to the machine’s electrical systems is stopped after approximately 4 seconds.
- “ACC”– With key in the “ACC” position only the cigarette lighter, tuner and horn will have power.
- “ON”– When Key is in the ON position, electrical power is supplied to all the machine’s electrical systems.
- “START”– When key is turned to this position electrical power is supplied to the starter solenoid causing the starter to start the engine. After engine starts key should be released to go back to the “ON” position.

#### A2. Throttle Potentiometer– FIGURE 2.4B

The throttle potentiometer is located on the right hand operator console and controls engine RPM. When the throttle potentiometer is rotated to any position it increases or decreases engine rpm and maintains engine at the programmed RPM for that particular position on the dial.

#### NOTE

1. In operation, when the pilot pressure from the hand and pedal control levers does not act for 1 sec, if the position of the throttle potentiometer is higher than 1050 rpm, the auto accel actuates automatically and the engine speed returns to 1050 rpm.
2. When the throttle potentiometer is positioned lower than the auto accel speed, the engine speed is maintained to the throttle potentiometer position.

#### Proportional auto acceleration function:

With the attachment, swing, travel control lever or control pedal operation, the engine speed returns to the accel dial set position gradually according to the respective operating pilot valve movement.

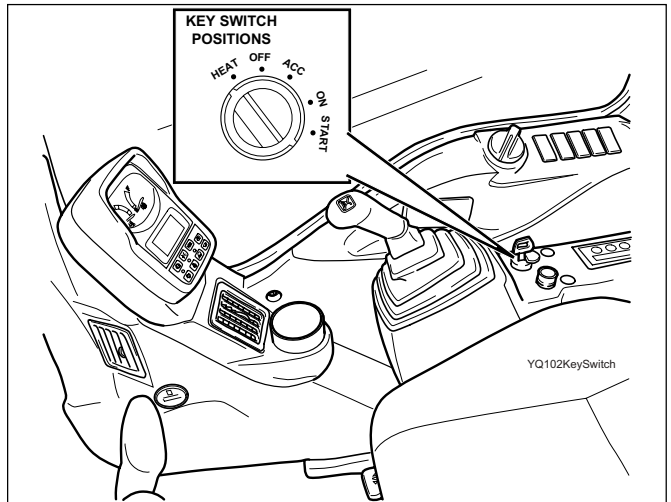


FIGURE 2.4A

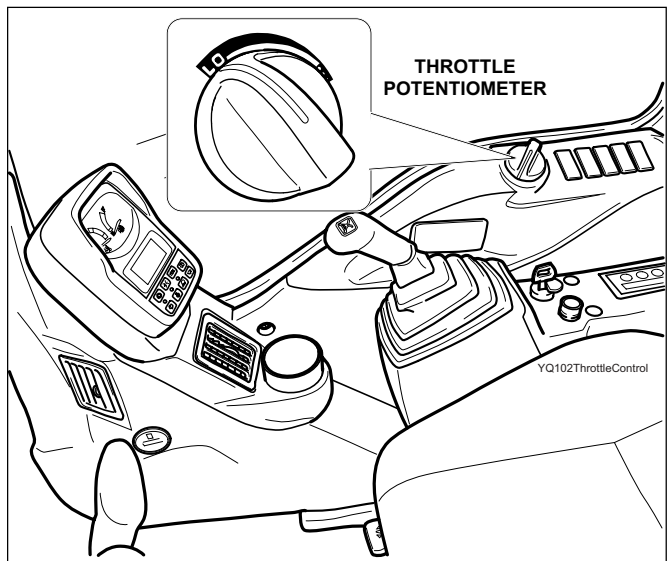

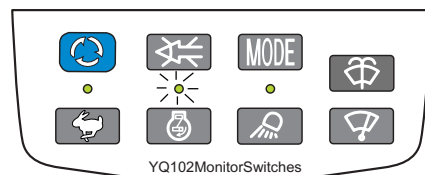


FIGURE 2.4B

#### NOTE

The proportional auto acceleration function can be activated by pressing the auto accel switch (  ) located on the monitor panel. When the proportional auto acceleration function is active, the red light indicator above this switch is turned ON.



Press the auto accel switch to cancel the proportional auto acceleration function and the light indicator will turn OFF.

# MACHINE FAMILIARIZATION

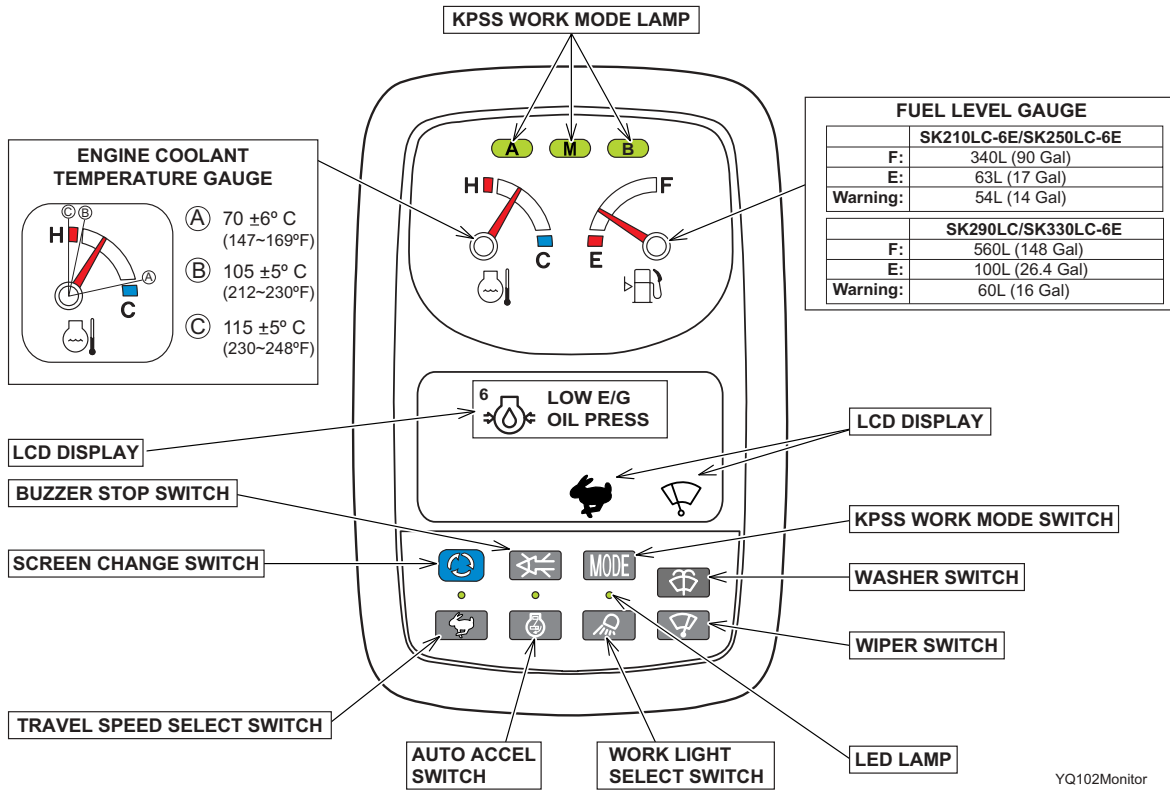


FIGURE 2.5A

### A3. Monitor – FIGURE 2.5A

#### 1. KPSS Mode Switch– FIGURE 2.5B

**MODE**

The KPSS Mode Switch is located on the lower side of the monitor and has 3 operating functions.

After starting the engine, the mode switch defaults to the **M** mode.

Select an effective work mode complying with the working condition and working target from 3 modes.

Each time the work mode switch is pressed, the work mode indicator lamp is switched to **M**, **A** and **B** in order.

**A**

##### a. A (assist) mode

The controller analyzes the operator’s control pattern of joystick lever movement, and uses “fuzzy logic” to set the machine operating mode: digging, leveling, spreading, slope finishing, tamping etc. automatically, and displays the results on the multi display, see Fig. 2.5C. The necessary power and engine speed is automatically set to match the work load. This mode utilizes 90% of the machine’s available power to allow the operator to be more efficient in standard repetitive applications, and obtain better fuel economy.

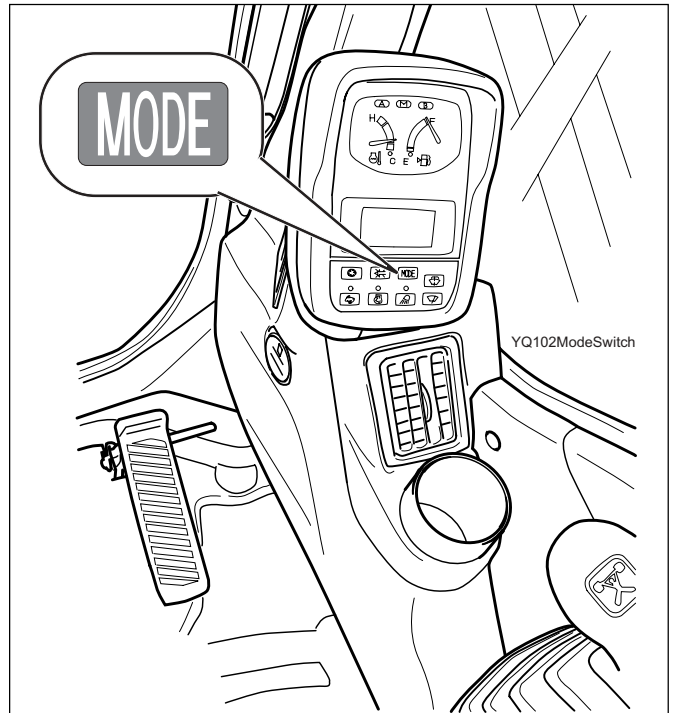


FIGURE 2.5B

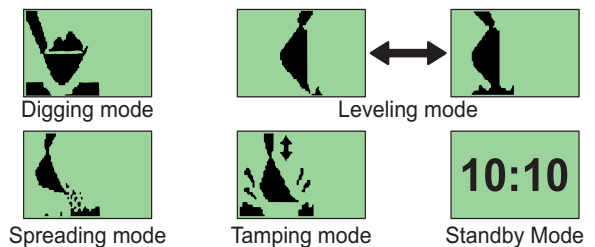


FIGURE 2.5C

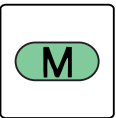
**NOTE**

By default, all Dynamic Acera minor change standard excavators, manufactured by KCMA LLC, start in “M” Mode; and by default, all Dynamic Acera excavators equipped with long reach attachment start in “A” mode.



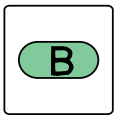
# MACHINE FAMILIARIZATION

2



## b. M (manual) mode

This mode senses the movement of control lever and is suitable for the heavy load digging work giving priority to the work load at high speed. It is selected upon startup by default. While it does engage computer control to obtain maximum pump efficiency, it does not utilize “fuzzy logic” software to switch between working modes. It provides the greatest power and speed that the excavator has to offer.



## c. B (breaker) mode


This mode allows the operator to control the maximum flow rate for the auxiliary attachment (Breaker) only. The arm, boom, swing, etc, get 100% flow regardless of this setting.

### c1. Adjustment of max. flow rate

- Turn ignition key on, **do not start engine.**

- Select the B (Breaker) Mode.

- Press the Screen Change switch

(  ) for 3 ~ 10 sec and release it.

The LCD screen displays the flow rate settings.


### c2. Flow rate display

The last flow rate stored is displayed. Maximum flow rate is displayed as standard value.

- Press the mode switch, see Figure 2.5B, to increase the flow rate setting or press the buzzer stop switch to decrease the flow rate setting.

**Note:** If the switches are depressed for more than 2 sec., the flow rate increases or decreases by 10 Lit/min.

The flow rate can be adjusted from the Maximum up to Minimum range.

Press the switch for screen change again (  ) to store the desired flow rate value, and the adjust mode is canceled.



## Buzzer Stop Switch – FIGURE 2.5C

When the engine coolant temperature is too high, or various sensors of mechatro controller (self-diagnosis) fail, the alarm sounds intermittently. To stop the sound, press the buzzer stop button.

### NOTE

- Buzzer sounding due to engine overheating can not be stopped.
- The buzzer sounding, because the preheat complete and E/G oil pressure are displayed, stops by turning the key switch OFF.

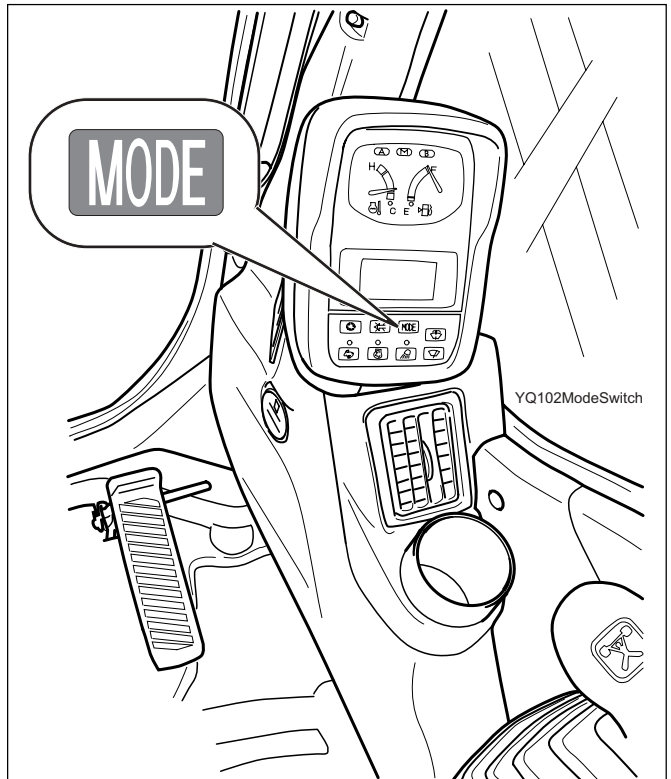


FIGURE 2.5A

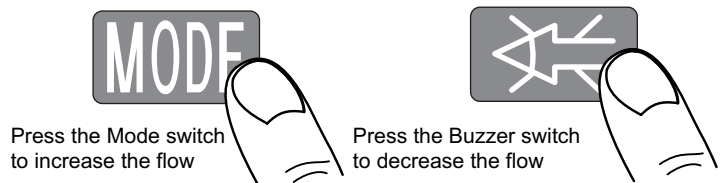


FIGURE 2.5B

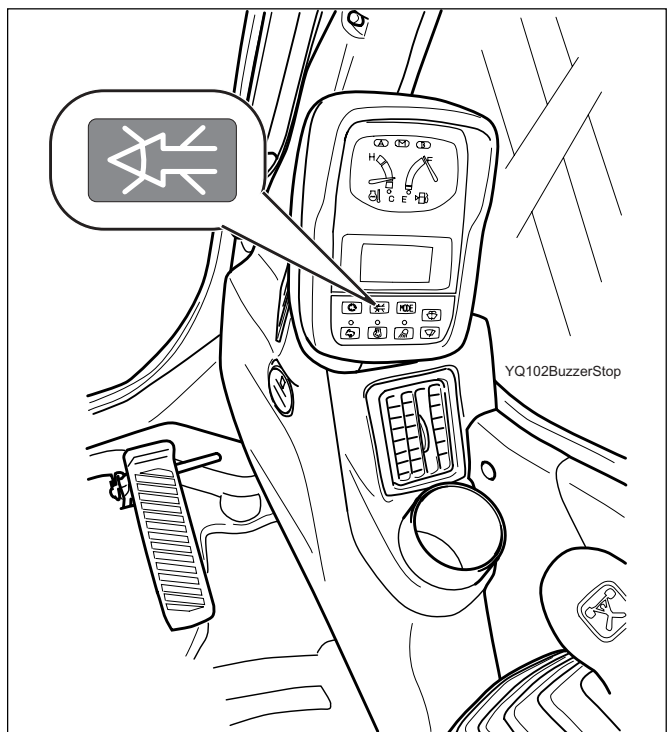


FIGURE 2.5C

# MACHINE FAMILIARIZATION

## 3. Screen Change Switch – FIGURE 2.7A

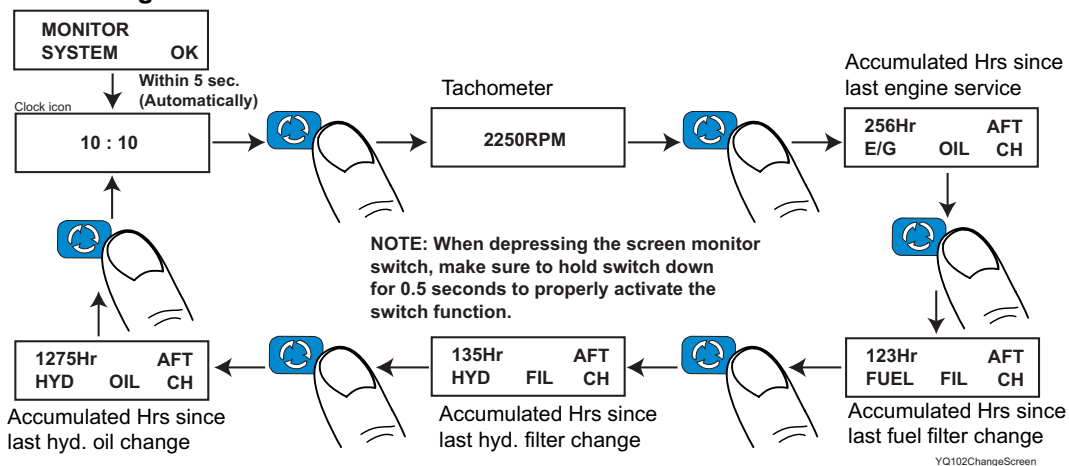


FIGURE 2.7A

## 4. Wiper & Washer Switch– FIGURE 2.7B



- Press it once : Wiper moves intermittently
- Press it again : Wiper moves continuously
- Press it once more : Wiper stops moving



- Press this switch, and washer fluid is sprayed while it is depressed. The washer fluid reservoir is located behind the cab, in the air cleaner compartment. See Figure 2.7C.

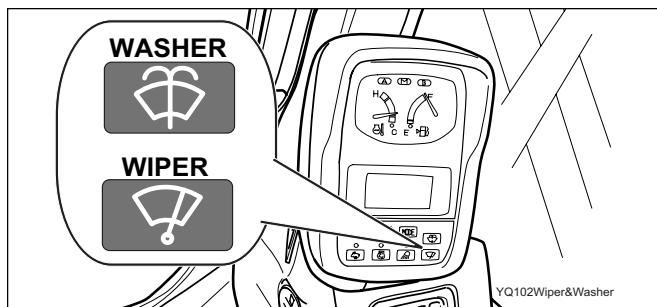


FIGURE 2.7B

## CAUTION

Make certain the Washer reservoir has washer fluid before operating washer.

## 5. Auto Accel Switch– FIGURE 2.7D

This switch is used to activate and cancel the auto accel function.

- Press it once : The proportional auto accel function activates and the light indicator above the switch is turned ON.
- Press it again : The proportional auto accel function is cancelled and the light indicator is turned OFF.

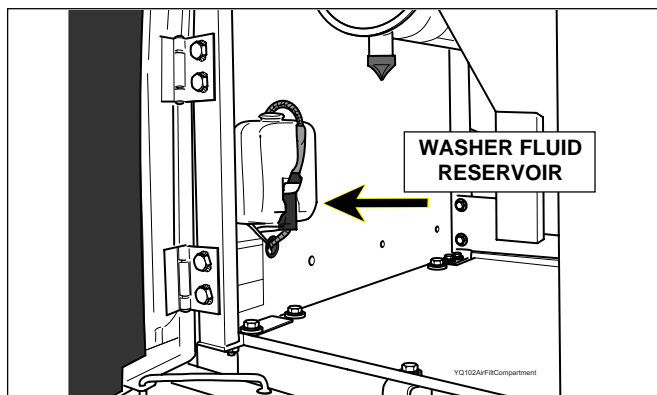


FIGURE 2.7C

## DANGER

NEVER ATTEMPT TO LOAD OR UNLOAD MACHINE WITH THE AUTO ACCELERATION FUNCTION ACTIVATED. SUDDEN CHANGE OF ENGINE SPEED COULD BE EXPERIENCED CAUSING POSSIBLE DAMAGE, SERIOUS INJURY OR DEATH.

## NOTE

All Dynamic Acera minor change excavators will default to the proportional auto acceleration function when the ignition key is turned to the OFF position.

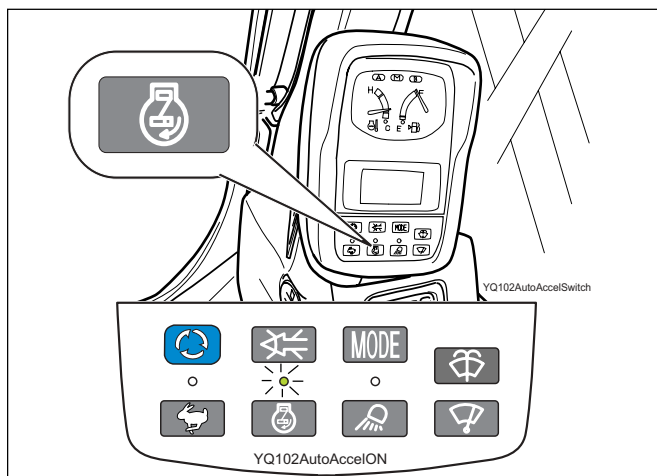


FIGURE 2.7D

## 6. Working Light Selector Switch — FIGURE 2.8A

This light selector switch is located on the lower side of the monitor as shown in Fig. 2-8A.

1. Press the switch once: The frame and boom working lights come on and the symbol “F” with a light icon displays on the lower side of the LCD screen and the light indicator above the switch is turned ON..
2. Press the switch a second time: The rear working lights come on and the symbol “R” with a light icon displays on the lower side of the LCD screen.
3. Press the switch a third time: the frame, boom, the rear working lights, and the light indicator on the monitor panel will turn OFF.

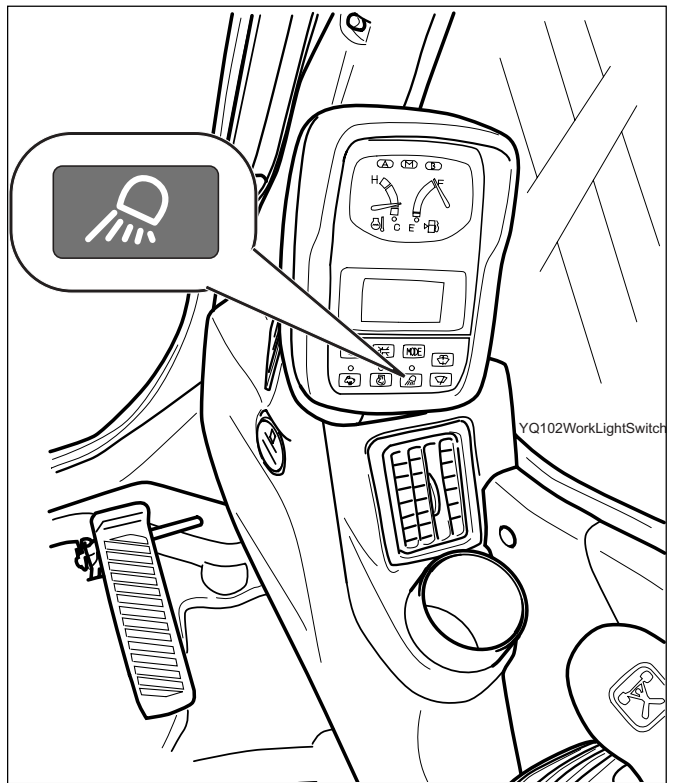


FIGURE 2.8A

## 7. Travel speed select switch – FIGURE 2.8B

The travel speed select switch is located on the gauge cluster switch panel. Each time engine is started, travel speed is automatically set to LOW 1st (🐢) speed. Press the travel speed (🐇) switch on the gauge cluster, the speed is changed to the HIGH 2nd, the fast travel speed icon (🐇) is indicated on the multidisplay, and the light indicator above the switch is turned ON.

🐢 ..... Set to LOW when moving the machine on a rough or soft road, slope, or in a narrow place, or when powerful tractive force is required.

🐇 ..... Set to HIGH when moving the machine on flat, hard ground.

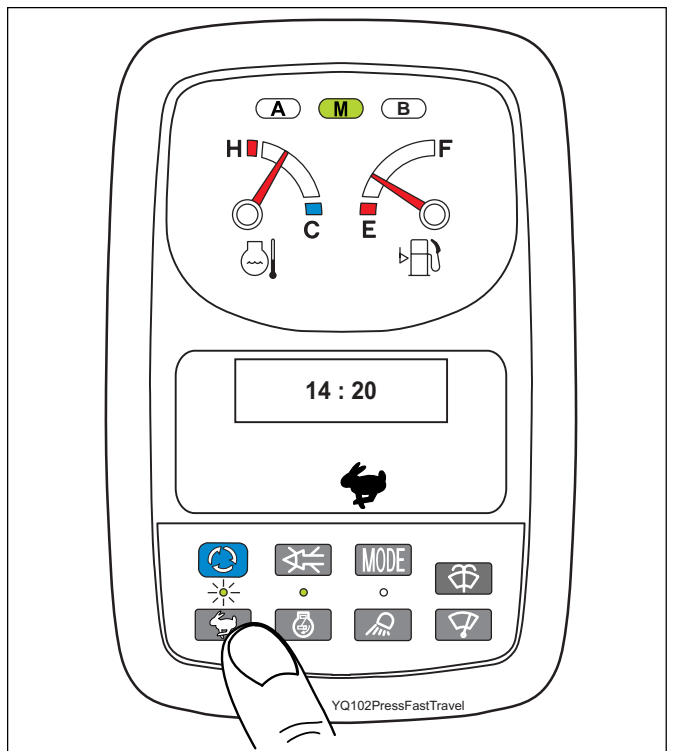


FIGURE 2.8B

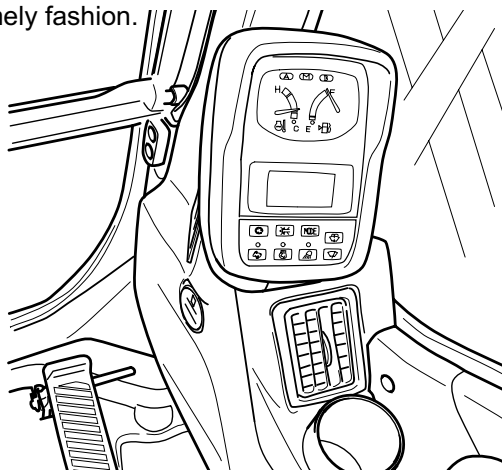
### **! DANGER**

**DO NOT USE HIGH (🐇) SPEED WHEN PERFORMING DELICATE OPERATIONS SUCH AS PIPE LAYING, FINE GRADING OR LOADING MACHINE ONTO A TRAILER.**

**DO NOT CHANGE TRAVEL SPEED WHILE LOADING, MACHINE COULD BECOME UNSTABLE AND CAUSE SERIOUS INJURY, EQUIPMENT DAMAGE AND/OR DEATH.**

**8. L.C.D. Display– FIGURE 2.29**

The L.C.D. Display is illustrated below and will display the Icons listed in this section. Study these icons and their definitions so that possible problems will be quickly recognized and repairs made in a timely fashion.



**FIGURE 2.29**

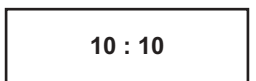
**a. Normal displays**

**a1. SYSTEM STATUS DISPLAY**



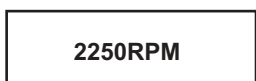
This icon will display after key switch is turned "ON" and all machine systems and components are checked by CPU and found to be in good working order.

**a2. DAY TIME DISPLAY**



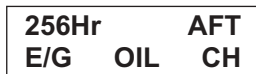
Five seconds after the system status is shown on the LCD, the time will be displayed on the monitor. See "Monitor Time Adjustment" in this section for details on how to set this feature.

**a3. ENGINE R.P.M. DISPLAY**



Actual engine speed. When auto-accel. is deactivated, RPM shown corresponds to the throttle potentiometer position.

**a4. ENGINE LUBRICATION CUMULATIVE TIME**



256 hours have elapsed since the change of engine oil. This icon shows the total cumulative time since the last time the engine oil was changed.

**a5. FUEL FILTER CUMULATIVE TIME**



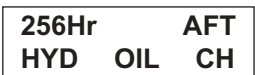
256 hours have elapsed since the change of fuel filter. This icon shows the total cumulative time since the last time the fuel filter was changed.

**a6. HYDRAULIC FILTER CUMULATIVE TIME**



256 hours have elapsed since the change of hydraulic oil filter. This icon shows the total cumulative time since the last time the hydraulic oil filter was changed.

**a7. HYDRAULIC OIL CUMULATIVE TIME**



256 hours have elapsed since the change of hydraulic oil. This icon shows the total cumulative time since the last time the hydraulic oil was changed.

**a8. TRAVEL INDEPENDENT MODE DISPLAY**



This icon will be displayed every time the independent travel mode is activated (Only on Dynamic Acera excavators manufactured by KCMALLC).

**b. Warning Displays**

**WARNING DISPLAYS**

The monitor alarm will sound the instant #2, #5, #6, #7, #10 and #28 warning icons are displayed.

**b1. I.T.C.S. CONTROLLER- CPU DISPLAY**



This icon will display when a problem exists in the I.T.C.S. (Intelligent Total Control System).

Turn Key switch "OFF", wait for 4 seconds until the system shuts down completely, then turn the switch back to "ON" to reset the CPU program. Should this icon remain on display, stop operation, shut down the engine, and refer to part "C1" (Swing parking brake release and hydraulic back up system) in this section for temporary operation. Contact a Kobelco technician for repairs.

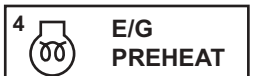
**b2. SWING PARKING BRAKE RELEASE DISPLAY**



Turn the "Slewing Parking Brake Release Switch" on the rear side of operator's seat to the "RELEASE" position, and this warning is displayed.

While this warning is displayed, the swing parking brake does not actuate. This switch should be used only in the event of emergency. Refer to part "C1" (Swing parking brake release and hydraulic back up system) in this section for temporary operation. Contact a Kobelco technician for repairs.

**b3. ENGINE PRE-HEATING DISPLAY**



This symbol is displayed when key switch is turned to heat position and the engine preheat circuit is activated.

This display goes out at completion of pre-heating, at which time FINISH PREHEAT is displayed.

**b4. ENGINE PRE-HEAT COMPLETE DISPLAY**



This icon is displayed when the PRE-HEAT is completed. The monitor alarm will sound continuously.

If alarm can't be cancelled by the buzzer stop switch, turn the ignition key to the OFF position, wait for 4 sec's until the electrical system is turned off completely. Then start the engine. Continuous preheat after this icon is displayed could cause damage to the engine.

**NOTE**

Do not operate the preheat position of the key switch for more than 20 seconds at one time.