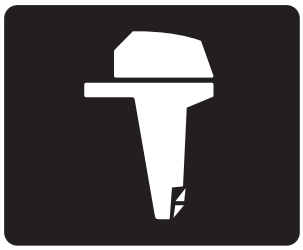
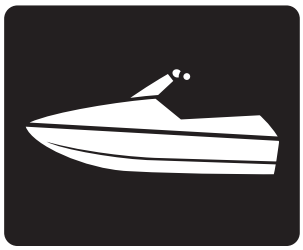
YAMAHA





YAMAHA DIAGNOSTIC SYSTEM VERSION 1.30

INSTRUCTION MANUAL

6AW-2819U-10

PREFACE

This Instruction Manual, written for use by Yamaha Outboard Motor and Watercraft dealers, contains information on using the Yamaha Diagnostic System software and diagnosing problems in an outboard motor or watercraft.

This manual contains information to be used together with basic servicing procedures, and therefore requires that the person performing these procedures have a basic maintenance knowledge and technical skills of outboard motors or watercraft.

Trademark Acknowledgments

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YAMAHA DIAGNOSTIC SYSTEM
VERSION 1.30
INSTRUCTION MANUAL
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IMPORTANT INFORMATION

In this Instruction Manual particularly important information is distinguished in the following ways.

⚠ The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠ WARNING

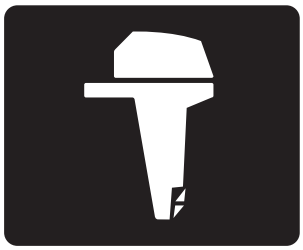
Failure to follow WARNING instructions could result in severe injury or death to the Outboard motor or Watercraft operator, a bystander, or a person inspecting or repairing the outboard motor or watercraft.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the outboard motor or watercraft.

NOTE:

A NOTE provides key information to make procedures easier or clearer.



Outboard motors

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INTRODUCTION

FEATURES

The newly developed Yamaha Diagnostic System provides quicker detection and analysis of engine malfunctions.

By connecting your computer to the ECM (Electronic Control Module) of an outboard motor using the communication cable, this software can be used to display sensor data and data stored in the ECM on a computer's monitor.

If this software is run on Microsoft Windows® 2000 or Windows XP, the information can be displayed in colorful graphics. Also, the software can be operated using either a mouse or a keyboard.

In addition, the data for the main functions (Diagnosis, Diagnosis record, Engine monitor, Data logger, and Record of engine oil exchange) can be saved on a disk or printed out.

Functions

Scan Tool

1. **Diagnosis:** With the engine main switch ON, each sensor's status and each ECM diagnosis code or item is displayed. This enables you to find malfunctioning parts and controls quickly.
2. **Diagnosis record:** Sensors that had been activated and ECM diagnostic codes that have been recorded are displayed. This allows you to check the outboard motor's record of malfunctions.
3. **Engine monitor:** Each sensor's status and the ECM data are displayed while the engine is running. This enables you to find malfunctioning parts quickly. In addition, the data displayed using the Engine Monitor function can be displayed in a graph.
4. **Stationary test:** Operation tests can be performed with the engine off.
5. **Active test:** Operation tests can be performed with the engine running.
6. **Data logger:** From the data stored in the ECM, at least two items of 13 - 20 minutes of recorded data are displayed on a graph. (The time varies depending on the model.) In addition, the operating time as compared to the engine speed and the total operating time are displayed. This allows you to check the operating status of the engine. For some models, you can also save the ECM record data in a file so that you can read and display the graph later.
7. **Some files:** Lets you select and run other applications while continuing to run the diagnostic program.

Special Function

1. **Tilt Limiter Set:** Lets you specify the angle of tilt limiter.
2. **Digital Electronic Control System Reset:** Initializes the identification between the outboard motor and the Digital Electronic Control.

Maintenance Information

1. **Record of Engine Oil Exchange:** Lets you record the history of engine oil change.

CONTENTS

1. CD-ROM (software + instruction manual) (1)
2. Adapter (1)
3. Communication cable (1)



① ② ③

Fig. 1

HARDWARE REQUIREMENTS

Make sure that your computer meets the following requirements before using this software.

Computer:	IBM PC/AT compatible computer
Operating system:	Microsoft Windows 2000 or Windows XP (English version)
CPU:	
Windows 2000:	Pentium, 166 MHz or higher (Pentium 233 MHz or higher recommended)
Windows XP:	Pentium, 300 MHz or higher (Pentium 500 MHz or higher recommended)
Memory:	
Windows 2000:	64 MB or more (128 MB or more recommended)
Windows XP:	128 MB or more (256 MB or more recommended)
Hard disk free space:	20 MB or more (40 MB or more recommended)
Drive:	CD-ROM drive
Display:	VGA (640 × 480 pixels), (SVGA [800 × 600 pixels] or more recommended) 256 or more colors
Mouse:	Compatible with the operating systems mentioned above
Communication port:	RS232C (Dsub-9 pin) port, USB port
Printer:	Compatible with the operating systems mentioned above

NOTE:

- The amount of memory and the amount of free space on the hard disk differs depending on the computer.
- Using this software while there is not enough free space on the hard disk could cause errors and result in insufficient memory.
- This software will not run properly on some computers.
- When starting up this program, do not start other software applications.
- Do not use the screen saver function or the energy saving feature when using this program.
- If the ECM is changed, restart the program.
- Windows XP is a multiuser operating system, therefore, be sure to end this program if the login user is changed.
- This manual uses the screens and explanations from Windows XP. Some operations may be slightly different in other operating systems.

COMPATIBLE MODELS

North American models: Z150, LZ150, VZ150, Z175, VZ175, Z200, LZ200, VZ200, VZ200-2, Z225, VZ225, Z250, LZ250, VZ250, Z300, LZ300, VZ300, F50, T50, F60, T60, F75, F90, F115, LF115, F150, LF150, F200, LF200, F225, LF225, F250, LF250, F350, LF350

Worldwide models: Z150P, LZ150P, Z150Q, Z175G, Z175H, Z200N, LZ200N, Z200P, Z200Q, Z200R, Z225H, Z250D, LZ250D, Z250F, Z300A, LZ300A, Z300B, F50F, FT50G, F60C, FT60D, F75B, F80B, F90B, F100D, F115A, FL115A, F150A, FL150A, F200A, FL200A, F225A, FL225A, F250A, FL250A, F350A, FL350A

INSTALLING THE YAMAHA DIAGNOSTIC SYSTEM

This section provides information on installing the Yamaha Diagnostic System under Windows 2000 or Windows XP.

INSTALLING THE YAMAHA DIAGNOSTIC SYSTEM UNDER Windows 2000 or Windows XP

NOTE:

- Before installing the Yamaha Diagnostic System, check that your computer meets the specified requirements. For detailed information on the system requirements, see page 2.
- It is strongly recommended that you exit all other programs before running the installer.

1. Turn on your computer and start up Windows 2000 or Windows XP.
2. Insert the compact disc into the computer's CD-ROM drive.
3. Double-click the **My Computer** icon, then the **CD-ROM drive** icon, and then double-click the **YDIS_Setup_image** icon to start up the installer.

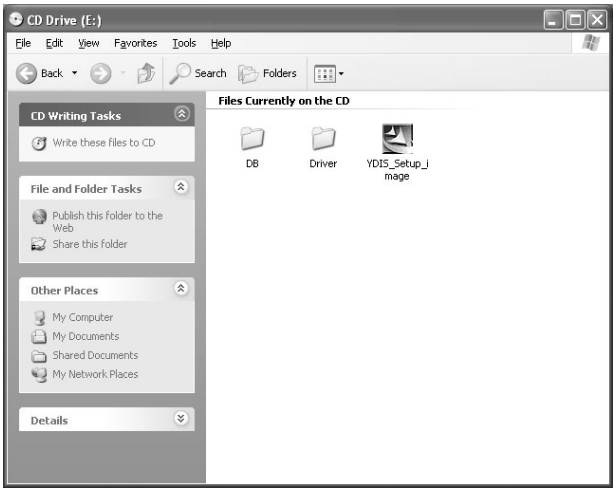


Fig. 2

4. Click the **Next** button to start the installation process.

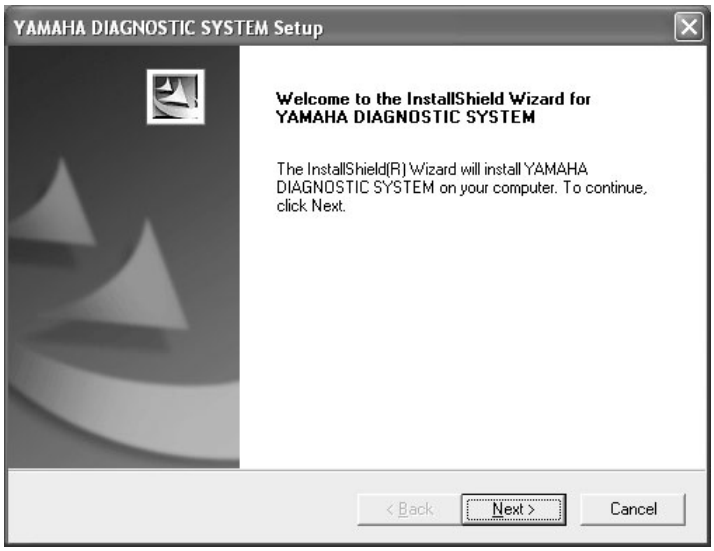


Fig. 3

NOTE:

If the Yamaha Diagnostic System has already been installed onto your computer, the following dialog box appears.
Click the **Yes** button to update this program, or click the **No** button to quit the installation.

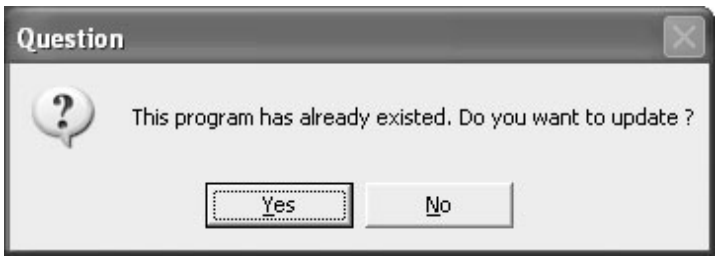


Fig. 4

NOTE:

- To quit the installation, click the **Cancel** button. The following dialog box appears. (See fig. 3)

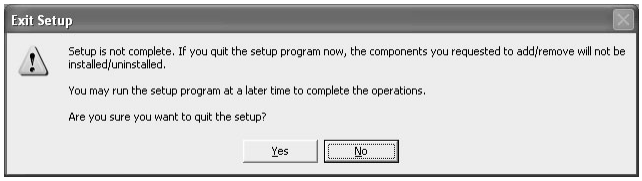


Fig. 5

- To quit the installation program, click the **Yes** button.
- To continue installation, click the **No** button. (Fig. 5)

5. Check the target directory and the program name for the Yamaha Diagnostic System, which are displayed in the dialog box.
Click the **Next** button to start copying the program files.

NOTE:

- To go back to the previous dialog box (step 4), click the **Back** button.
- To quit the installation, click the **Cancel** button.

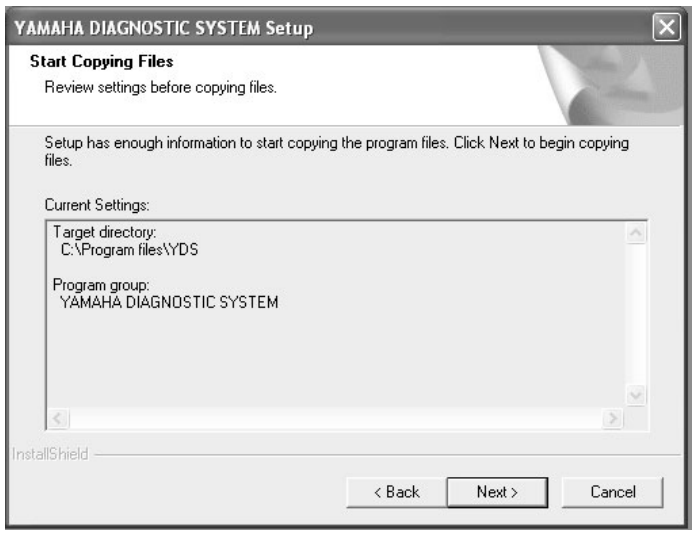


Fig. 6

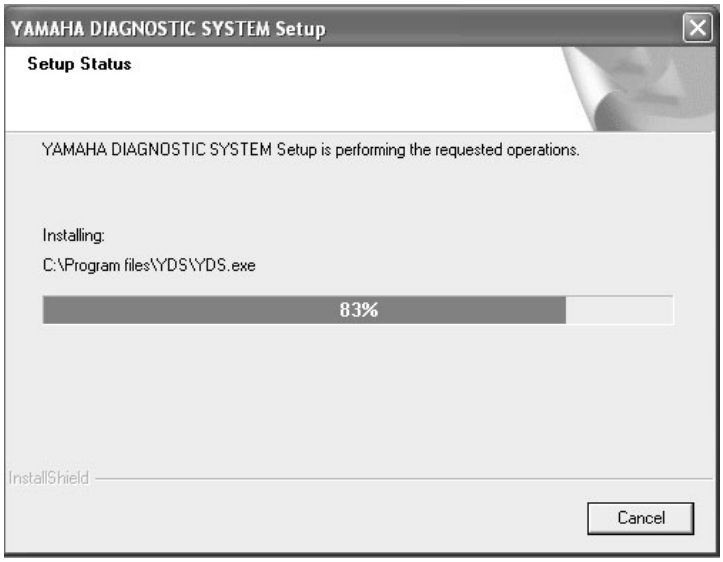


Fig. 7

NOTE:

- To quit the installation, click the **Cancel** button. (See fig. 6) The following dialog box appears.

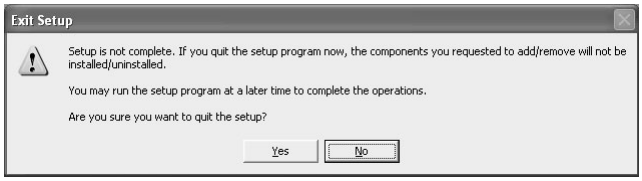


Fig. 8

- To quit the installation program, click the **Yes** button.
- To continue installation, click the **No** button. (Fig. 8)

6. After the installation is completed, the following dialog box appears. Click the **Finish** button to quit the installation program.

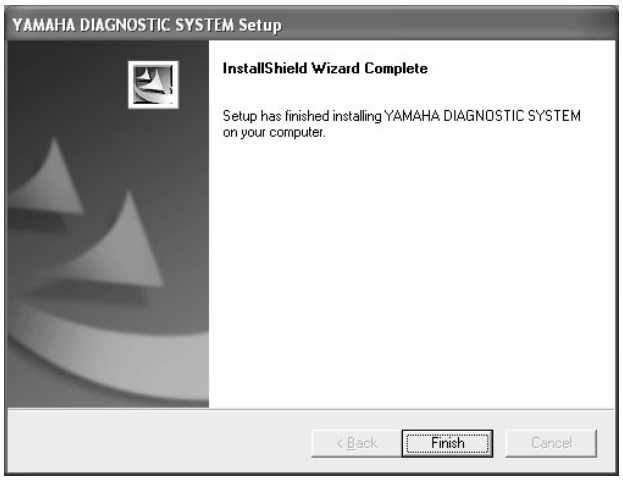


Fig. 9

NOTE:

Install the Database file before using the Yamaha Diagnostic System, otherwise the program will not operate correctly. For installation procedures, refer to “UPDATING THE DATABASE” on the next page.

UPDATING THE DATABASE

NOTE:
When installing the Yamaha Diagnostic System for the first time, be sure to update the database.

1. Turn on your computer and start up Windows 2000 or Windows XP.
2. From the taskbar at the bottom of your computer screen, click the **start** button (fig. 10), point to **All Programs** or **Programs**, and then click **YAMAHA DIAGNOSTIC SYSTEM** to open the Yamaha Diagnostic System window. (See fig. 11)



Fig. 10

3. After about three seconds the display will automatically go to the first menu display, or you can click or press any key to go to the first menu. (See fig. 12)



Fig. 11

4. Click the **Update database [F1]** button or press the F1 key on your keyboard.

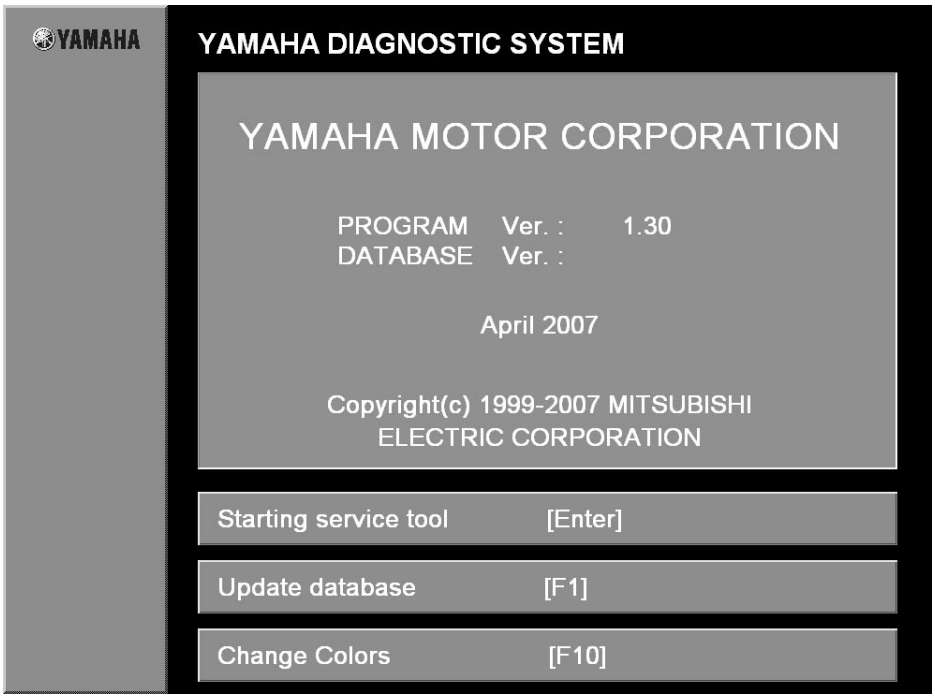


Fig. 12

NOTE:

- Do not click the **Starting service tool [Enter]** button or press the Enter key on your keyboard until the database has been updated, otherwise the program will not operate correctly.
- To quit the update of the database, press the ESC key on your keyboard.

5. Insert the compact disc into the computer's CD-ROM drive.

NOTE:
- All the database files will be copied from the compact disc to the computer's hard drive automatically.
- Any earlier version of the database saved on the hard drive will be overwritten.

6. Click the **OK** button or press the Enter key on your keyboard to start copying the database files.

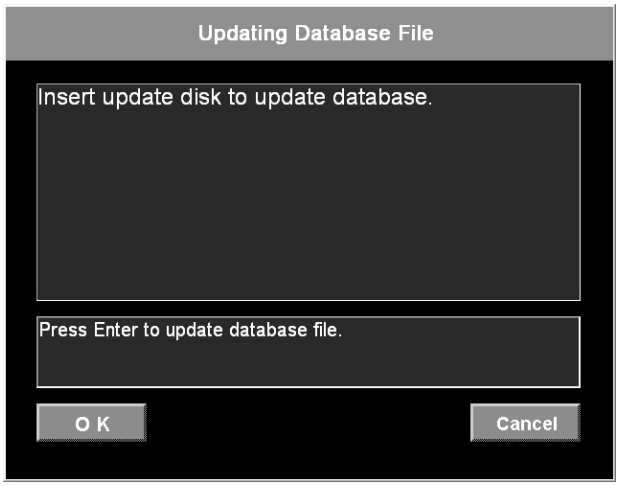


Fig. 13

NOTE:
If an error message appears and the program stops operating, follow the error message.

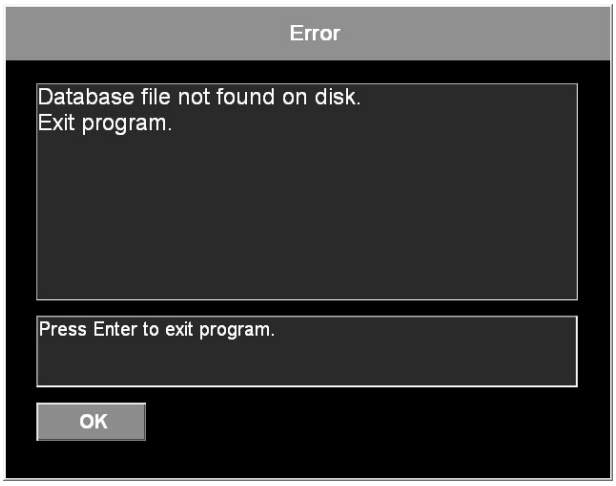


Fig. 14

7. When the database is updated a confirmation screen is displayed.
To quit, click the **OK** button or press the Enter key on your keyboard.
To return to the first menu screen, click the **Cancel** button or press the Esc key on your keyboard.

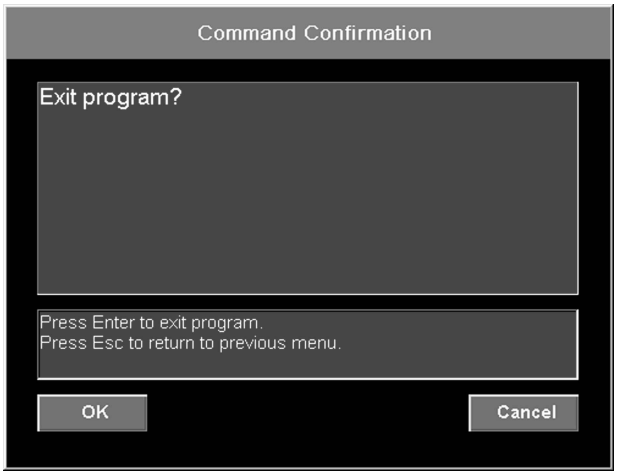


Fig. 15

NOTE:

- Display the program and database information to check version. (Fig. 16)
  To display information, click the title in the first menu screen while pressing the Shift key or press the Enter key while pressing Shift key. (See fig. 12)

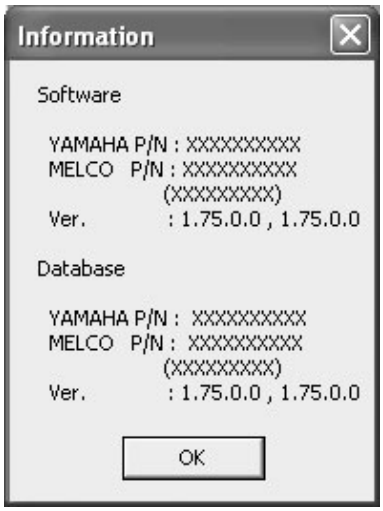


Fig. 16

8. To quit the Yamaha Diagnostic System from the first menu (see fig. 12), press the Esc key on your keyboard.

INSTALLING THE USB DRIVER

1. Connect one end of the USB cable to 3-pin communication coupler on the outboard motor engine. Connect the other end to the included USB adapter, and connect the adapter to the USB port on the computer.

2. Turn the start switch to ON.

The Windows operating system senses the USB connection to the outboard motor and automatically displays the hardware wizard.

3. Select **Yes, now and every time I connect a device**, and then click the **Next** button. (Fig. 17)



Fig. 17

4. Confirm that the compact disc is in the computer's CD-ROM drive, and select **Install the software automatically (Recommended)**, and then click the **Next** button.

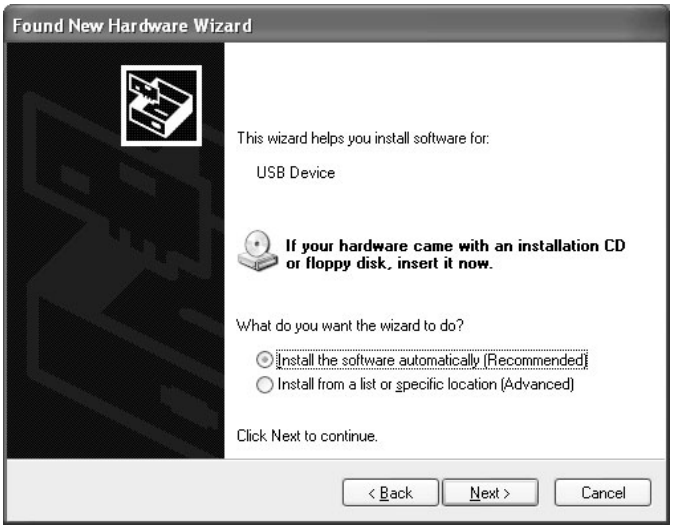


Fig. 18

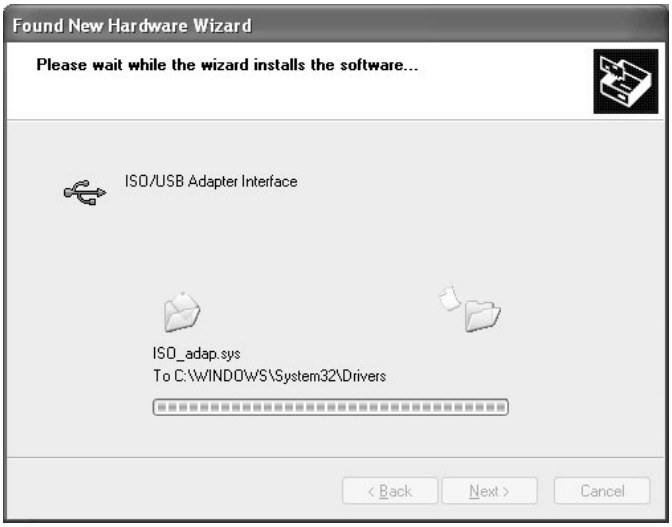


Fig. 19

5. Click the **Finish** button.



Fig. 20

OPERATING

CONNECTING THE COMPUTER TO THE OUTBOARD MOTOR

NOTE:
Be sure to use the enclosed communication cable ① to connect the computer and adapter ② to the outboard motor.

1. Quit any applications that are running, and then turn off the computer.
2. Connect the communication cable to the 3-pin communication coupler of the outboard motor, the adapter, and the communication port of your computer.

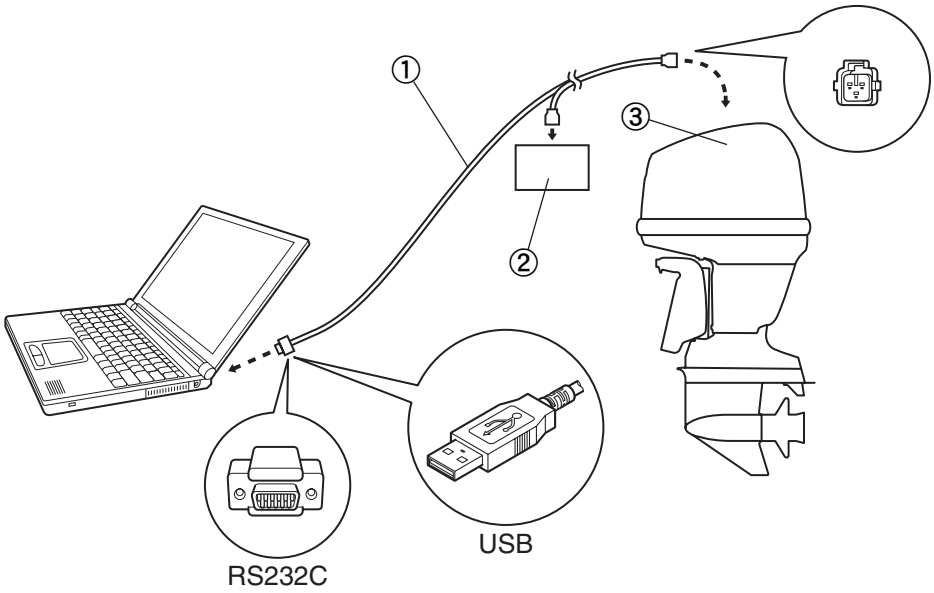


Fig. 21

NOTE:
- Use either the COM1 or COM2 port, and, if necessary, set the serial port as specified in the computer's manual. Set the serial port where the RS232C (Dsub-9 pin) cable is connected to COM1 or COM2.
- For connection between the communication cable and outboard motor ③, see the applicable outboard motor service manual.
- When you finish all the YDIS operations, be sure to remove the communication cable and reattach the coupler cap on the outboard motor.
- If using the USB adapter, be sure that you have installed the USB driver.

3. Connect the remote control to the outboard motor.
4. Connect the 12 V battery to the outboard motor.

NOTE:
The following items should be checked before starting the Yamaha Diagnostic System.
- The battery is properly charged and its specific gravity is within specification.
- There are no incorrect wiring connections.
- Wiring connections are properly secured and are not rusty.
- There are enough fuel and oil in each tank.

STARTING THE YAMAHA DIAGNOSTIC SYSTEM

1. Turn the main switch of the outboard motor to ON.
2. Turn on your computer and start up Windows 2000 or Windows XP.
3. From the taskbar at the bottom of your computer screen, click the **start** button (fig. 22), point to **All Programs** or **Programs**, and then click **YAMAHA DIAGNOSTIC SYSTEM**.



Fig. 22

4. Open the Yamaha Diagnostic System window. (Fig. 23) After about three seconds the display will automatically go to the first menu, or click or press any key to go to the first menu. (Fig. 24)



Fig. 23

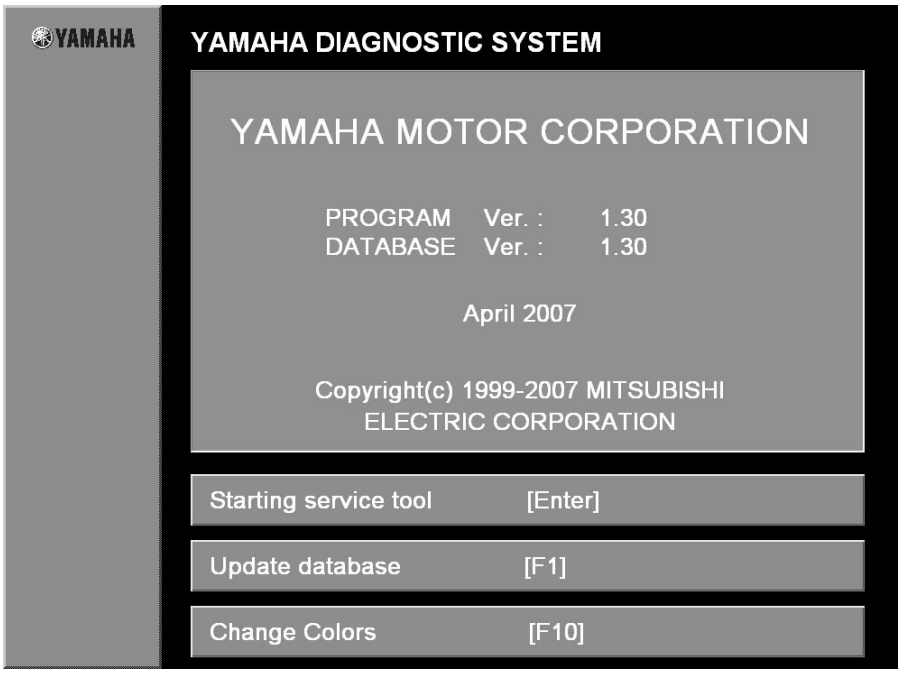


Fig. 24

NOTE:

- If you wish to use the service tools: Click the **Start service tool [ENTER]** button, or press the Enter key.
- If you want to update the database: Click the **Update database [F1]** button, or press the F1 key.
- If you wish to switch between color and monochrome display: Click the **Change Colors [F10]** button, or press the F10 key.

5. Click the **Starting service tool [Enter]** button or press the Enter key on your keyboard.

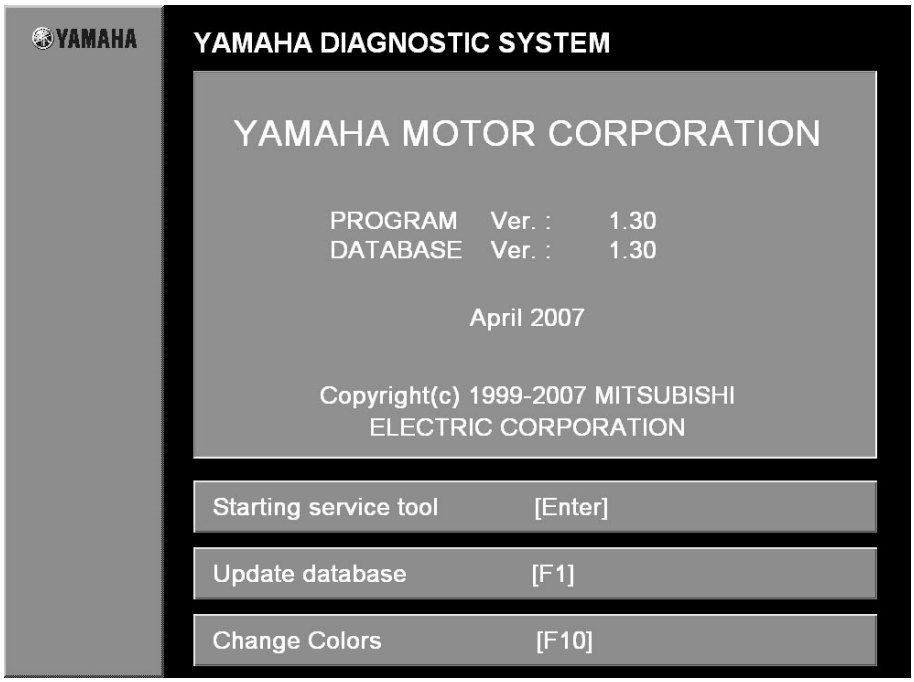


Fig. 25

NOTE:

- If an error message appears and the program stops operating, follow the error messages.
- If the program doesn't start, an error message will explain the problem. If the program doesn't start and an error message is not displayed, the cause of the problem is most likely insufficient computer memory.
- To cancel, press the ESC key on your keyboard.

6. Click or press any key to display the main menu.

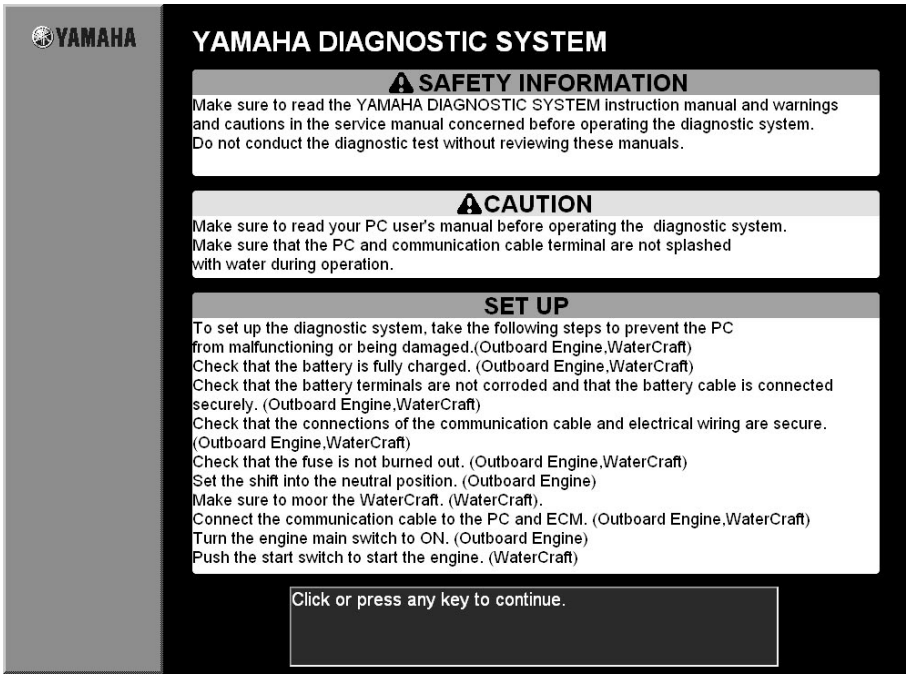


Fig. 26

SELECTING COMMANDS FROM THE MAIN MENU

1. Select a menu from the Main Menu using any of the followings:
- Click the desired menu in the area ①.
- Click the desired menu in the area ②.
- Press the number key (1, 2, 3, or 8) corresponding to the selected menu.
- Select the desired menu by the Up/Down key and press the Enter key.

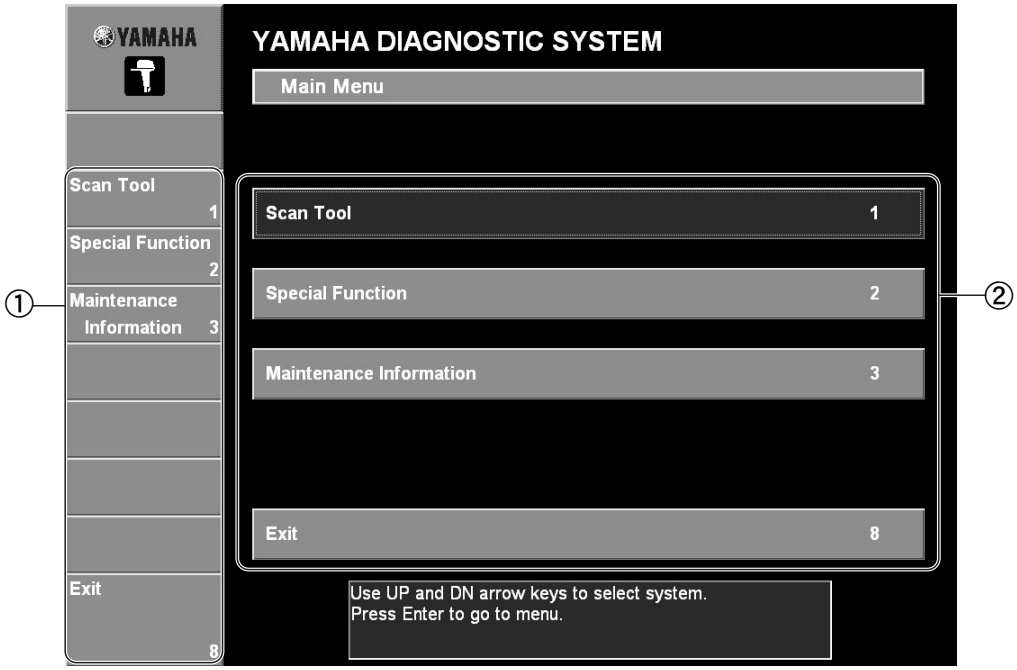


Fig. 27

NOTE:
If a diagnosis record is stored in the ECM, “Diagnosis record available.” appears as a confirmation message before the command selection menu is displayed.



Fig. 28

2. Select a command using any of the followings:
- Click the desired command in the area ①.
- Click the desired command in the area ②.
- Press the number key (1–8) corresponding to the selected command.

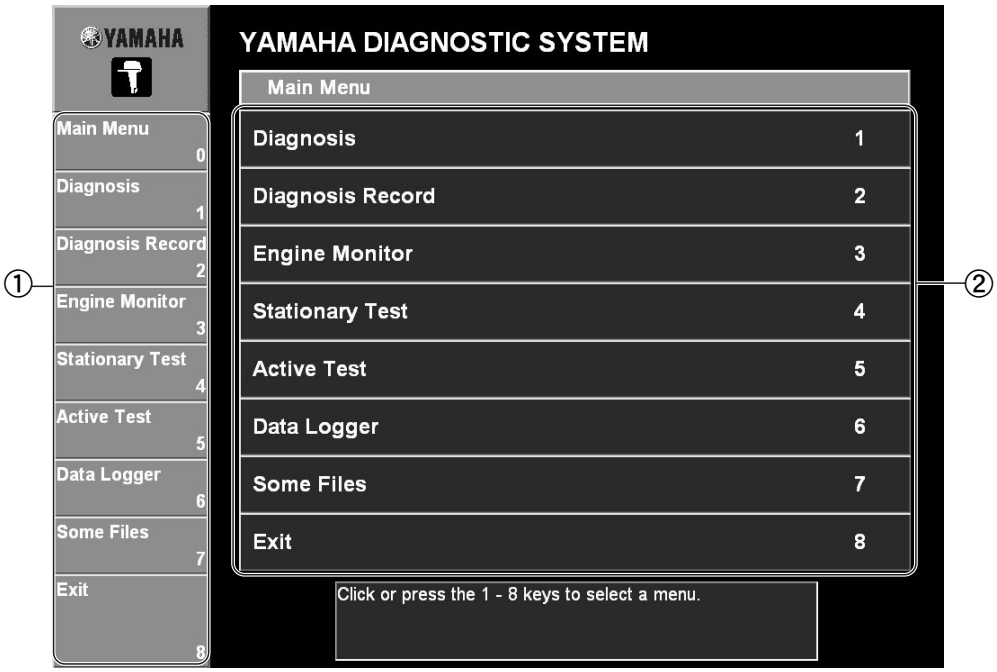


Fig. 29

NOTE:

Some commands may not be available depending on the model of the outboard motor. If the command is not available, “Unavailable” appears to the right of the command.

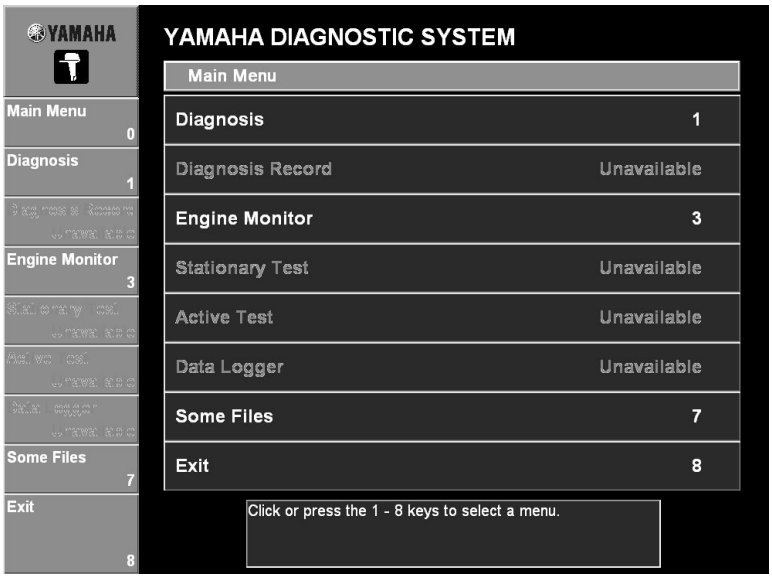


Fig. 30

DIAGNOSIS

The diagnosis codes of malfunctions recorded in the outboard motor's ECM, the diagnosis codes' corresponding part name, the results of the diagnosis, and the condition of the part are listed.

Abnormal items are identified by terms other than "Normal" in the **Result** column and are displayed at the top of the list. The results for those items are highlighted in red.

Eight items can be displayed at one time. To check the other items, scroll the display.

Troubleshooting procedures for the selected code are displayed in the box below the list.

List of diagnosis codes and items

Code	Item
13	Pulser coil
14	Crank position sensor
15*	Water temp sensor
15*	Engine temp sensor
17	Knock sensor
18	Throttle position sensor
19	Battery voltage
22	Atmospheric press sensor
23	Intake temp sensor
24	Cam position sensor (EXH)
25	Fuel press sensor
26	Injector
27	Water in fuel
28	Shift position switch
29	Intake press sensor
37	Intake air passage
39	Oil press sensor
44	Engine stop lanyard switch
45	Shift cut-off switch
46	Overheat thermoswitch
49	Over cooling
59	Memory data

Code	Item
62	Fuel pressure too low
68	Variable cam timing (STBD)
69	Variable cam timing (PORT)
71	Cam position sensor (STBD INT)
72	Cam position sensor (PORT INT)
73	Oil control valve (STBD)
74	Oil control valve (PORT)
83	Trim/tilt sensor
85	ION detection module
112 - 119	Electronic throttle system
121 - 123	Electronic throttle system
124 - 128	Throttle position sensor
129	Electronic throttle system
131 - 135	Accelerator position sensor
136 - 139	Electronic throttle system
141 - 145	Electronic throttle system
146 - 150	Shift position sensor
153 - 155	Shift position sensor
156 - 157	ENG-R.C. communication
160 - 181	Remote control system
183 - 184	Remote control system
186 - 187	Remote control system

* The item varies depending on the model.

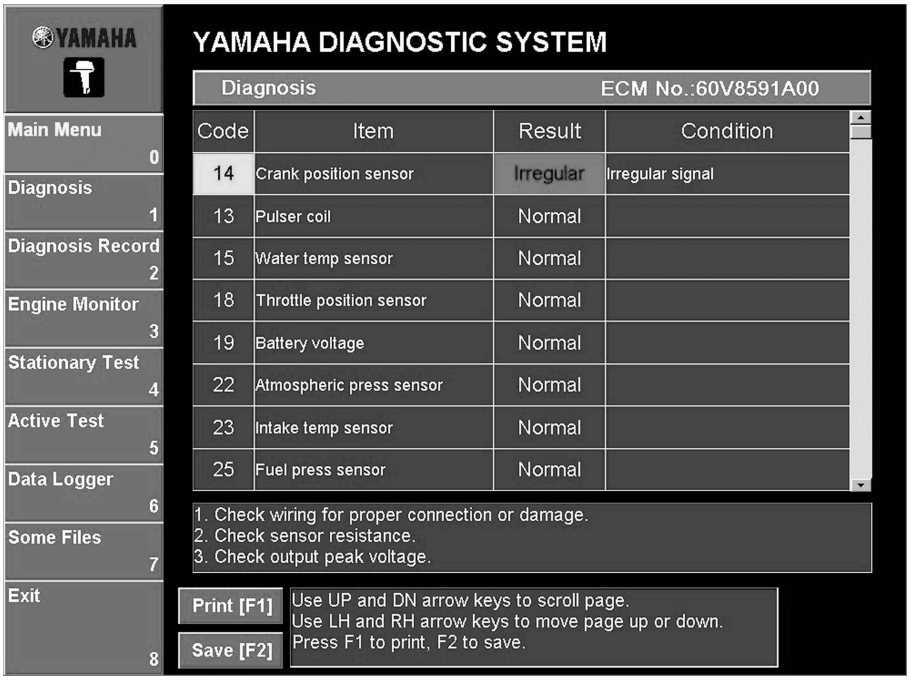


Fig. 31

NOTE:

Some items may not be available depending on the model of the outboard motor. Refer to the corresponding Service Manual for further information.

Operating procedure

Select the code number that you wish to view a diagnosis for by either clicking it or pressing the up or down arrow keys on your keyboard.

To scroll the display and view other items, click ▲ or ▼ in the scroll bar, or press the up or down arrow keys on your keyboard.

NOTE:

- Items where “Normal” does not appear in the **Result** column are displayed at the top of the list. Items with 3-digit code numbers are listed above those with 2-digit code numbers.
- The selected code is highlighted in light blue and its confirmation procedure is displayed below the table.

Print

By selecting the **Print** command in the Diagnosis, Diagnosis record, Engine monitor, Data logger mode, or Record of engine oil exchange, the data from the corresponding window can be printed.

1. Click the **Print [F1]** button or press the F1 key on your keyboard. The **Print** dialog box is displayed.

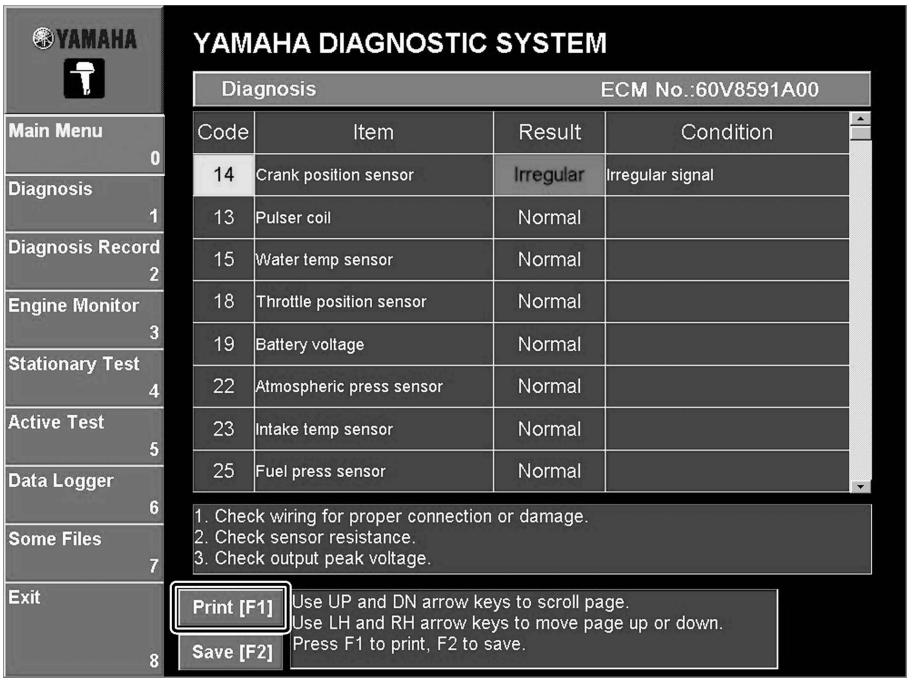


Fig. 32

2. Specify the printer, the printing range, and the number of copies to be printed.

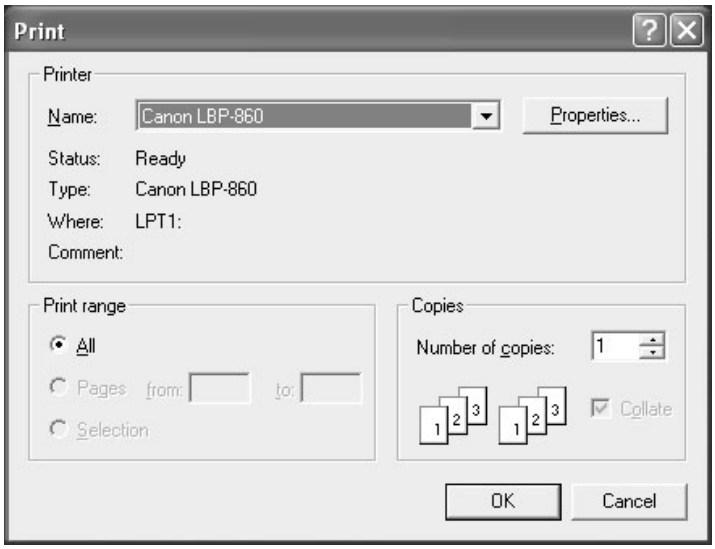


Fig. 33

3. Click the **OK** button to begin printing.
To cancel printing, click the **Cancel** button.

NOTE:
The Print Screen function in Windows cannot be used since scroll data cannot be printed.

Save

By selecting the **Save** command in the Diagnosis, Diagnosis record, Engine monitor, Data logger mode, or Record of engine oil exchange, the corresponding data can be saved on a disk.

Operating procedure:

1. Click the **Save [F2]** button or press the F2 key on your keyboard. The **Save As** dialog box is displayed.

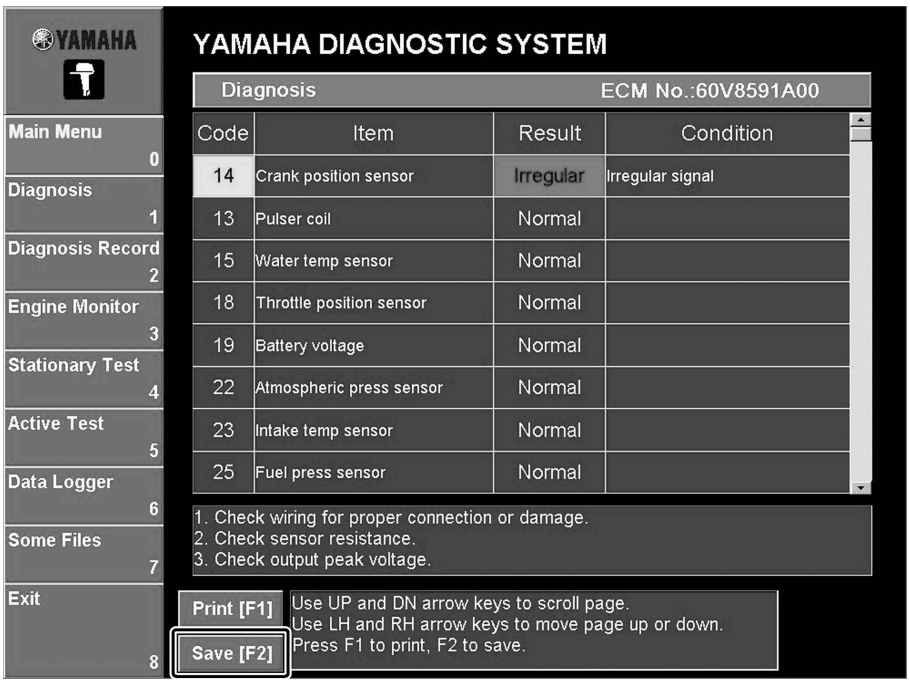


Fig. 34

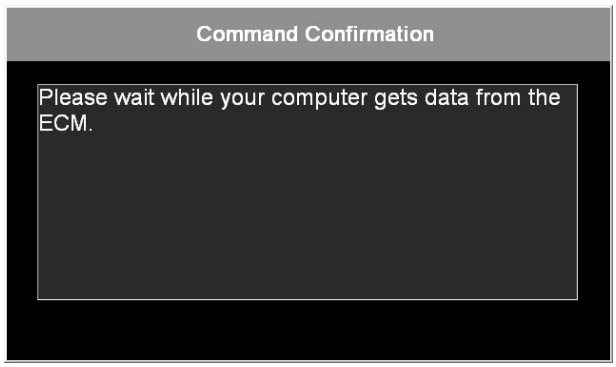


Fig. 35

2. Select the disk and folder where the data will be saved and specify its file name.

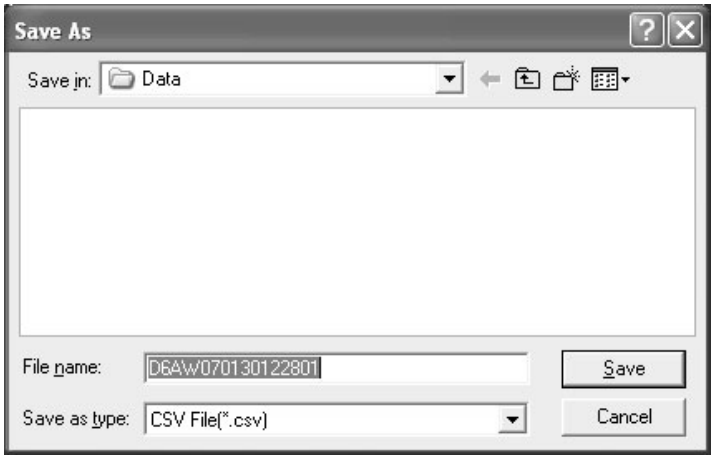


Fig. 36

NOTE:

The default file name is assigned as shown below.

Example: D 6AW 07 01 30 1228 XX .csv

ID code Model Year Month Day Time File serial number

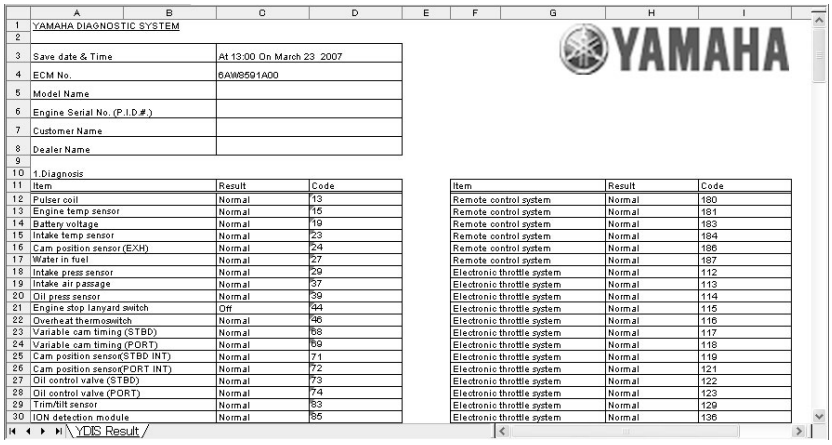
3. Click the **Save** button to save the data. (without Microsoft Office)
To cancel saving, click the **Cancel** button. (See fig. 36)
The data you saved can be viewed in Microsoft Excel. (Fig. 37)

	A	B	C	D	E
1	Save date	March 23 2007			
2	ECM No.:	6AW8591A00			
3					
4	Diagnosis				
5		Code	Item	Result	Condition
6		13	Pulser coil	Normal	
7		15	Engine temp sensor	Normal	
8		19	Battery voltage	Normal	
9		23	Intake temp sensor	Normal	
10		24	Cam position sensor (EXH)	Normal	
11		27	Water in fuel	Normal	
12		29	Intake press sensor	Normal	
13		37	Intake air passage	Normal	
14		39	Oil press sensor	Normal	
15		44	Engine stop lanyard switch	Off	
16		46	Overheat thermoswitch	Normal	
17		68	Variable cam timing (STBD)	Normal	
18		69	Variable cam timing (PORT)	Normal	
19		71	Cam position sensor(STBD INT)	Normal	
20		72	Cam position sensor(PORT INT)	Normal	
21		73	Oil control valve (STBD)	Normal	
22		74	Oil control valve (PORT)	Normal	
23		83	Trim/tilt sensor	Normal	
24		85	ION detection module	Normal	
25					
26	Diagnosis Record				
27		Total hours of operation	5		
28		Code	Item	Occurred	
29		155	Shift position sensor	3.9	
30		124	Throttle position sensor	4.3	
31		128	Throttle position sensor	4.3	
32		147	Shift position sensor	4.6	
33		149	Shift position sensor	4.6	
34		23	Intake temp sensor	4.3	
35		39	Oil press sensor	4.6	
36		27	Water in fuel	2.6	
37					
38	Engine Record				
39		Item	Result	Unit	Occurred
40		Maximum engine speed	4496	r/min	4.3
41		Over rev. count	0	Times	0

Fig. 37

NOTE:

- The program saves the data in both CSV format and Excel format. (with Microsoft Office)
- If Microsoft Excel (version 97 or later) is installed on your computer, you can save the data onto a one-page US Letter-size form as shown below.



YAMAHA DIAGNOSTIC SYSTEM

Save date & Time	At 13:00 On March 23 2007
ECM No.	6AW8591A00
Model Name	
Engine Serial No. (P.I.D.#.)	
Customer Name	
Dealer Name	

1.Diagnosis

Item	Result	Code
Pulser coil	Normal	13
Engine temp sensor	Normal	15
Battery voltage	Normal	19
Intake temp sensor	Normal	23
Cam position sensor (EXH)	Normal	24
Water in fuel	Normal	27
Intake press sensor	Normal	29
Intake air passage	Normal	37
Oil press sensor	Normal	39
Engine stop lanyard switch	Off	44
Overheat thermoswitch	Normal	46
Variable cam timing (STBD)	Normal	68
Variable cam timing (PORT)	Normal	69
Cam position sensor(STBD INT)	Normal	71
Cam position sensor(PORT INT)	Normal	72
Oil control valve (STBD)	Normal	73
Oil control valve (PORT)	Normal	74
Trim/tilt sensor	Normal	83
IGN detection module	Normal	86

Item	Result	Code
Remote control system	Normal	180
Remote control system	Normal	181
Remote control system	Normal	183
Remote control system	Normal	184
Remote control system	Normal	186
Remote control system	Normal	187
Electronic throttle system	Normal	112
Electronic throttle system	Normal	113
Electronic throttle system	Normal	114
Electronic throttle system	Normal	115
Electronic throttle system	Normal	116
Electronic throttle system	Normal	117
Electronic throttle system	Normal	118
Electronic throttle system	Normal	119
Electronic throttle system	Normal	121
Electronic throttle system	Normal	122
Electronic throttle system	Normal	123
Electronic throttle system	Normal	129
Electronic throttle system	Normal	136

YDIS Result

Fig. 38

DIAGNOSIS RECORD

The diagnosis codes of malfunctions that have been recorded in the outboard motor's ECM, the diagnosis codes' corresponding items, and the time when the malfunctions occurred are listed.

In addition, if engine history information exists, a table listing the items and results appears.

The latest occurrence appears on top. In addition, diagnosis codes stored in the ECM can be deleted.

List of diagnosis record codes and items

Code	Item
13	Pulser coil
14	Crank position sensor
15*	Water temp sensor
15*	Engine temp sensor
17	Knock sensor
18	Throttle position sensor
19	Battery voltage
22	Atmospheric press sensor
23	Intake temp sensor
24	Cam position sensor (EXH)
25	Fuel press sensor
26	Injector
27	Water in fuel
28	Shift position switch
29	Intake press sensor
37	Intake air passage
39	Oil press sensor
44	Engine stop lanyard switch
45	Shift cut-off switch
46	Overheat thermoswitch
49	Over cooling
59	Memory data

Code	Item
62	Fuel pressure too low
68	Variable cam timing (STBD)
69	Variable cam timing (PORT)
71	Cam position sensor (STBD INT)
72	Cam position sensor (PORT INT)
73	Oil control valve (STBD)
74	Oil control valve (PORT)
83	Trim/tilt sensor
85	ION detection module
112 - 119	Electronic throttle system
121 - 123	Electronic throttle system
124 - 128	Throttle position sensor
129	Electronic throttle system
131 - 135	Accelerator position sensor
136 - 139	Electronic throttle system
141 - 145	Electronic throttle system
146 - 150	Shift position sensor
153 - 155	Shift position sensor
156 - 157	ENG-R.C. communication
160 - 181	Remote control system
183 - 184	Remote control system
186 - 187	Remote control system

* The item varies depending on the model.

List of engine history information items (displayed only when ECM record data exists)

Item	Description
Maximum engine speed	Indicates all-time peak engine speed (RPM), and time of its occurrence.
Fuel pressure minimum	Indicates all-time minimum recorded fuel-pressure value, and time of occurrence.
Over rev. count	Indicates the number of times that over-rev prevention control has been triggered to date.
Overheat count	Indicates the number of times that the overheat switch has been activated to date.
Low oil pressure count	Indicates the number of times that the oil press sensor has detected the low oil pressure to date.
Knocking control count	Indicates the number of times that the knocking control has been triggered to date.

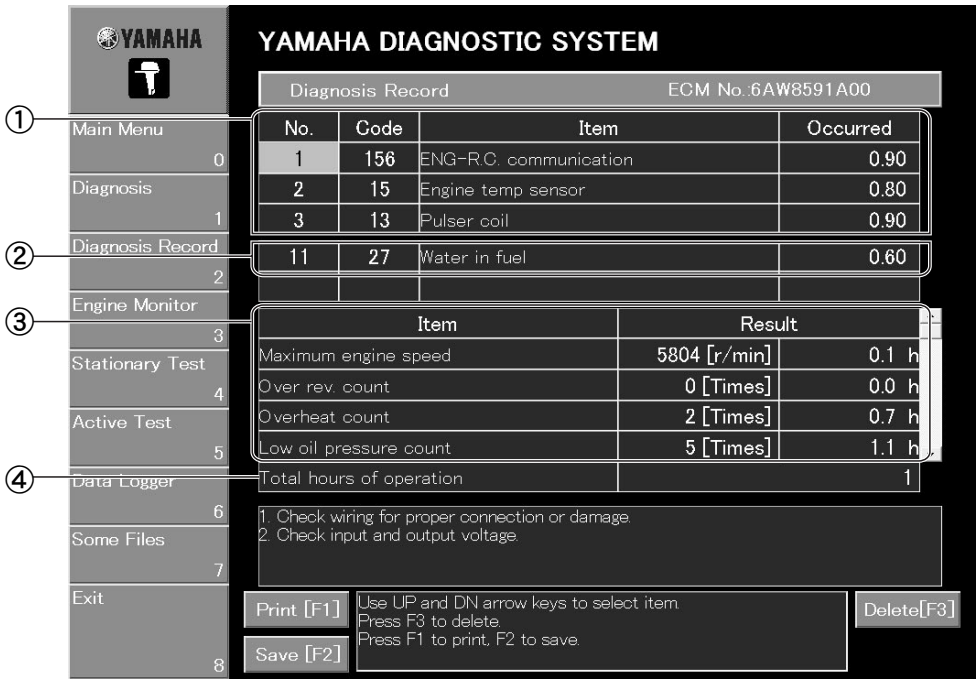


Fig. 39

① Displays diagnosis codes information.

② Display row used for “Water in fuel” diagnosis code only.

③ Displays engine history information. (Fields will be left empty if recorded data does not exist in the ECM.)

④ Shows total hours of operation.

NOTE:

- Please never run the engine with the fuel supply cut off, as doing so may cause inappropriate values to be recorded.
- If you have deleted data from the ECM, the program will reflect only the data recorded following the last reset.
- Some items may not be available depending on the model of the outboard motor.

NOTE:
When a Diagnosis record is not available, “Diagnosis Record is unavailable” is displayed.

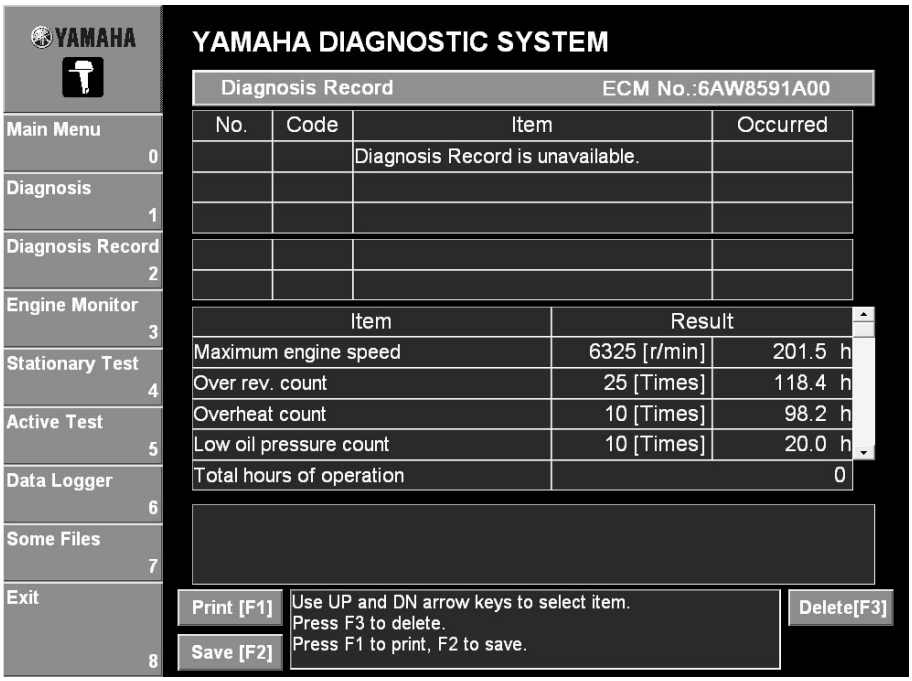


Fig. 40

Deleting diagnosis record in the ECM

1. Select the item that you wish to delete by either clicking it or pressing the up or down arrow keys on your keyboard.

NOTE:

- The selected code is highlighted in light blue.
- Check that the items deleted are normal in the Diagnosis Record. If the items remain irregular, they will appear as irregular in the Diagnosis Record even if you try to delete them.

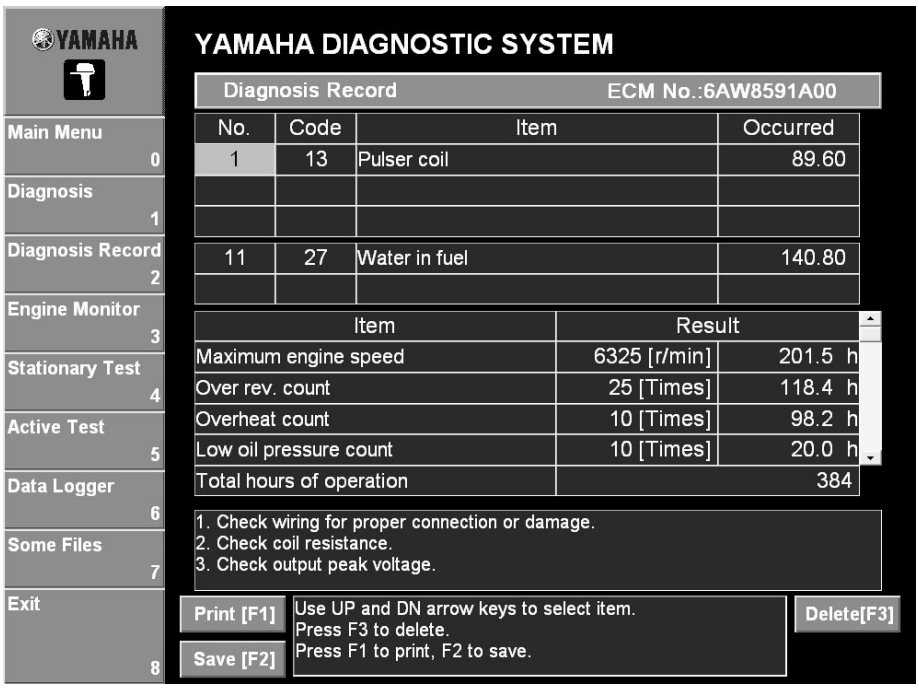


Fig. 41

2. Click the **Delete [F3]** button or press the F3 key on your keyboard. (See fig. 41) A confirmation message appears. (Fig. 42)

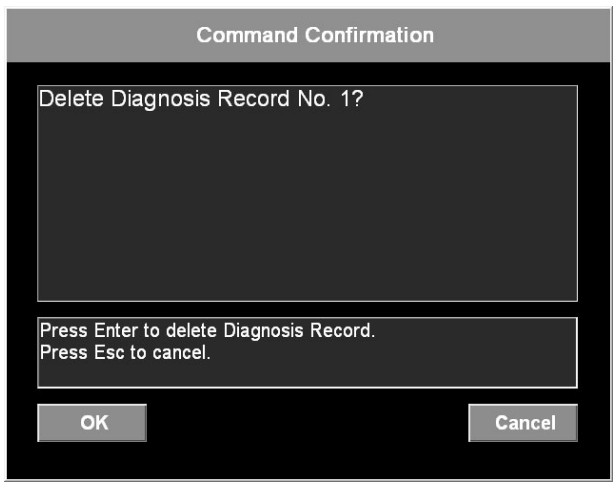


Fig. 42

NOTE:
Engine history information cannot be deleted except for the maximum engine speed.

3. Click the **OK** button or press the Enter key on your keyboard. (See fig. 42) The selected item is deleted. To cancel deleting the item, click the **Cancel** button or press the Esc key on your keyboard.

NOTE:
If an error occurs while an item is being deleted, an error message appears. Follow the instructions that appear in the error message. (Fig. 43)



Fig. 43

ENGINE MONITOR

⚠ WARNING

Do not use the Engine Monitor function to check the engine condition while operating a boat, otherwise you may become distracted, which could result in a collision.

CAUTION:

Be sure to avoid splashing water on the computer, adapter, and communication cable, and to avoid damaging them with strong sudden jolts or vibration.

The data from the ECM of the outboard motor is displayed.

Ten items can be displayed at one time. To view the other items, scroll the display. Displayed items can be changed as necessary.

List of engine monitor items

Monitor item
Active Remote Control *1
Accelerator position sensor (main)
Accelerator position sensor (sub)
Atmospheric pressure
Battery voltage
Dual engine system switch
Electric oil pump
Electronic throttle relay
Engine speed
Engine stop lanyard switch
Engine temperature
Firing of cylinder
Free throttle switch
Fuel injection duration
Fuel pressure
Fuel pump relay
Ignition timing
Intake cam timing (STBD)
Intake cam timing (PORT)
Intake pressure
Intake temperature
ISC valve opening
LPS (main)
LPS (sub)
LPS_PORT (main)
LPS_PORT (sub)
LPS_STBD (main)
LPS_STBD (sub)
Main relay

Monitor item
Main switch
Oil level switch (remote tank)
Oil level switch (engine tank)
Oil pressure
Oil pressure switch
Overheat thermoswitch
Over-rev control release lead
Oxygen sensor voltage
PT/T down switch
PT/T up switch
Shift cut-off switch
Shift position judgement
Shift position sensor (main)
Shift position sensor (sub)
Shift position switch
Shift relay
Shift request *2
Starter switch
Throttle position sensor (main)
Throttle position sensor (sub)
Throttle request *3
Throttle valve opening
TPS voltage
Throttle valve opening
Trim/tilt sensor
Water detection switch
Water temp switch (overheat)
Water temperature

*1: This item monitors which Digital Electronic Control is identified by the outboard motor. The number stands for the steering station, and the alphabet stands for the position. (P: Port, S: Starboard, C: Center)

*2: This item monitors the request value for the shift position sent by the Digital Electronic Control. “100 %” stands for forward position, “0 %” stands for neutral position, and “-100 %” stands for reverse position.

*3: This item monitors the request value for the throttle opening angle sent by the Digital Electronic Control.

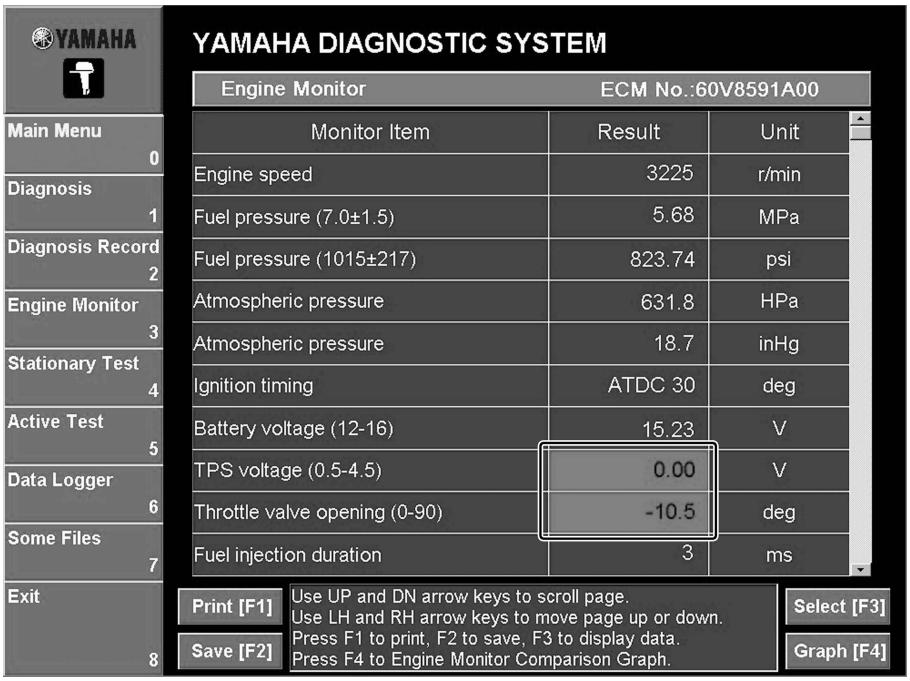


Fig. 44

NOTE:

- In the **Monitor Item** column, the standard value (range) for each item is enclosed in parentheses.
- The diagnosis results displayed in the **Result** column are highlighted in red if they are out of specification. (See fig. 44)
- If the results for a monitor item are highlighted in red, refer to “DIAGNOSIS RECORD”. Refer to the corresponding service manual for the appropriate inspection and adjustment procedures.

Selecting the monitor items

Select the items in the **Monitor Item Selection** window that you wish to display in the **Engine Monitor** window.

1. To change a displayed item, click the **Select [F3]** button or press the F3 key on your keyboard.

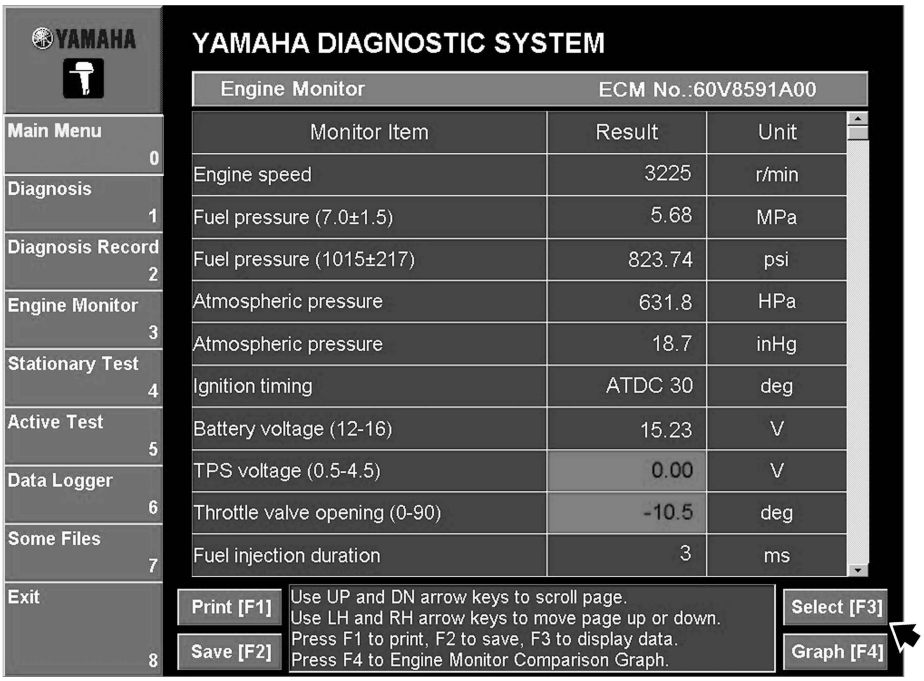


Fig. 45

2. Select an item by either clicking it or pressing the up or down arrow keys on your keyboard, and then press the space bar.

NOTE:

- Selected items ① have a light blue background. Items that are not selected have a blue background.
- At initialization, all items are displayed.

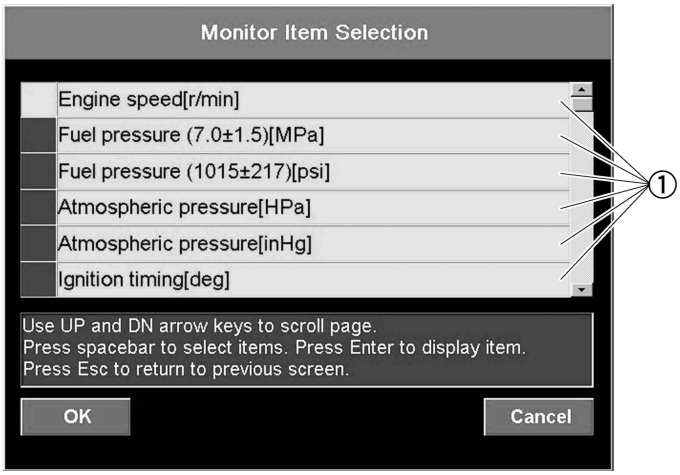


Fig. 46

3. Click the **OK** button or press the Enter key on your keyboard. The **Engine Monitor** window appears. To cancel the monitor, click the **Cancel** button or press the Esc key on your keyboard. (See fig. 46)

Using the graph feature

The graph feature lets you generate a graph from the monitored engine data. The program reads the monitored input signal and generates the graph accordingly. You can also save the monitored signal data to disk so that you can regenerate and review the graphs later.

1. Click the **Graph [F4]** button at the bottom right of engine monitor window, or else press the F4 key.

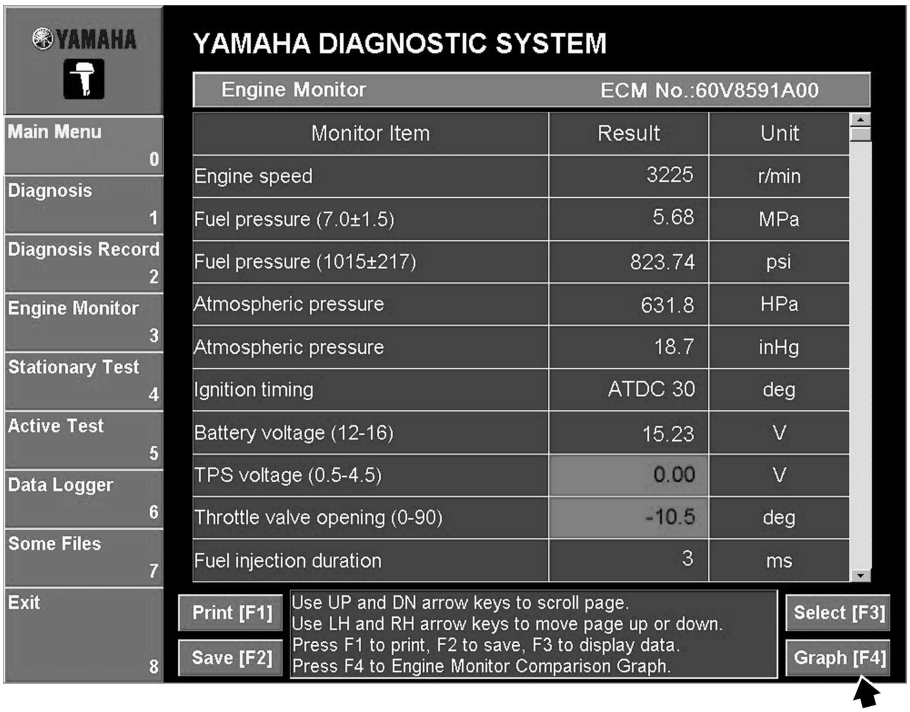


Fig. 47

2. The program displays the comparison graph window.

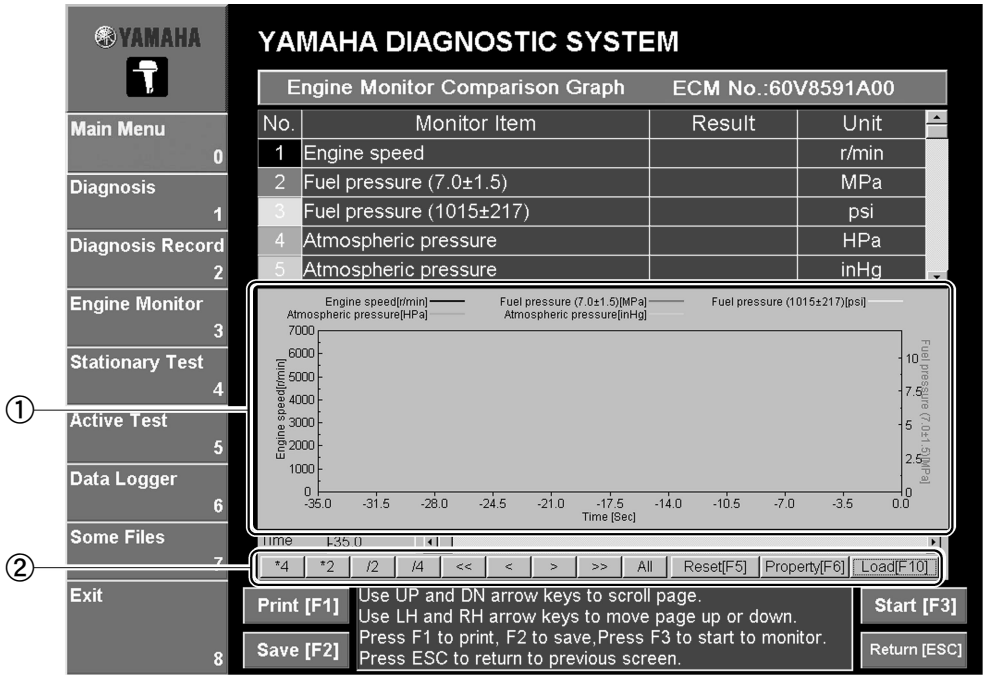


Fig. 48

① Freely select up to five items for display in the graph.

② These are the graph control buttons. These buttons are disabled while monitoring is in progress. For information about how to use these buttons, refer to “Graph window controls (keys and buttons)”.

3. Click the **Property [F6]** button at the bottom of the graph or press the F6 key on your keyboard.

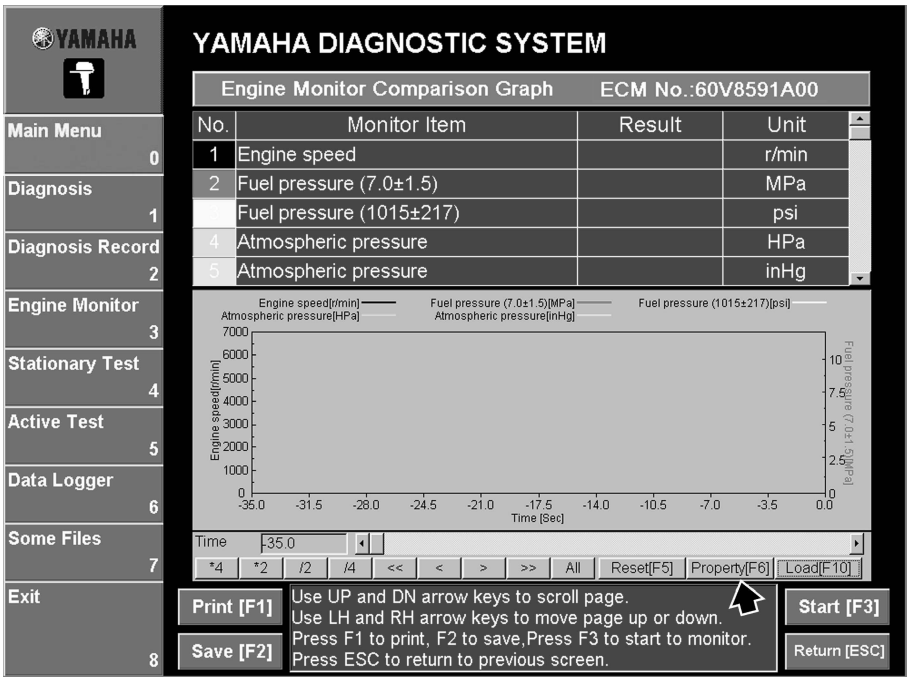


Fig. 49

4. The program displays the **Comparison Graph Property** window. Click the Logging, Graph, and Color tabs and perform the appropriate settings. For detailed information on the graph properties, refer to the graph setting table.

Logging

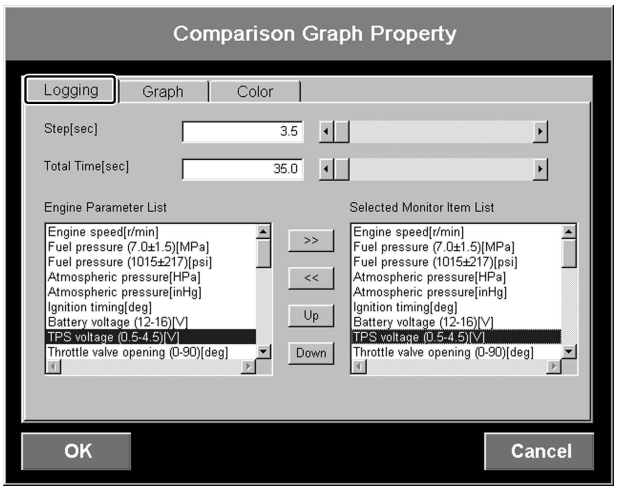


Fig. 50

Graph setting table

Tab	Property	Range
Logging	Step (sec)	Sets the period at which the program reads the signals being monitored. The minimum setting varies according to the number of items you are monitoring: starting at 0.5s for up to five items and then rising 0.5s for each multiple of five that you pass. Example: If one to five items, the available range is 0.5s to 60s. If six to ten items, the available range is 1.0s to 60s. Note: If the program is unable to read data at the exact interval that you select, it will operate at the nearest available interval.
	Total Time (sec)	Sets the total monitoring time. At 0.5s resolution: 5s to 7 hours At 60s resolution: 600s to 840 hours
	Item Display Order	Changes the order of the items on the display.

Graph

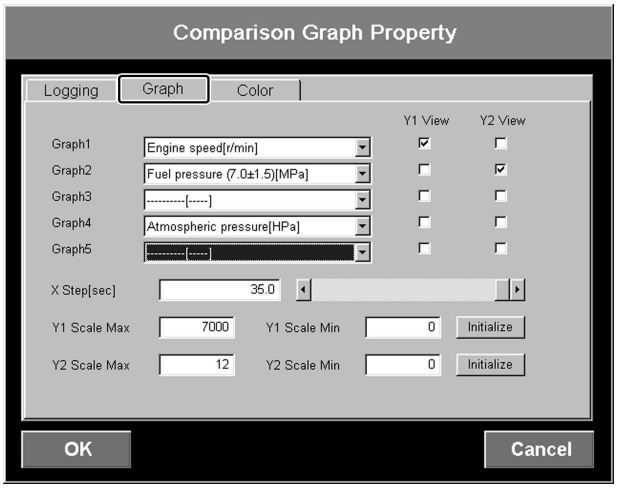


Fig. 51

Graph setting table

Tab	Property	Range
Graph	Selects item to be plotted on graph.	Select up to a maximum of five items for display on the graph.
	Y1 View	If you check the box, the graph plots the corresponding item against the left Y axis.
	Y2 View	If you check the box, the graph plots the corresponding against the right Y axis.
	X Step (sec)	Sets the length (in seconds) for the graph's X axis. The available range is the same as the range for the Total Time setting. Example: If you set the Step setting (on the Logging sheet) to 0.5s and you set X Length to 5s, the resulting graph display will show ten discrete steps.
	Y1 Scale Max	Sets the top value for the left Y axis. The range varies according to the input step setting (the Step setting on the Logging sheet).
	Y1 Scale Min	
	Y2 Scale Max	Sets the top value for the right Y axis. The range varies according to the input step setting (the Step setting on the Logging sheet).
	Y2 Scale Min	

Color

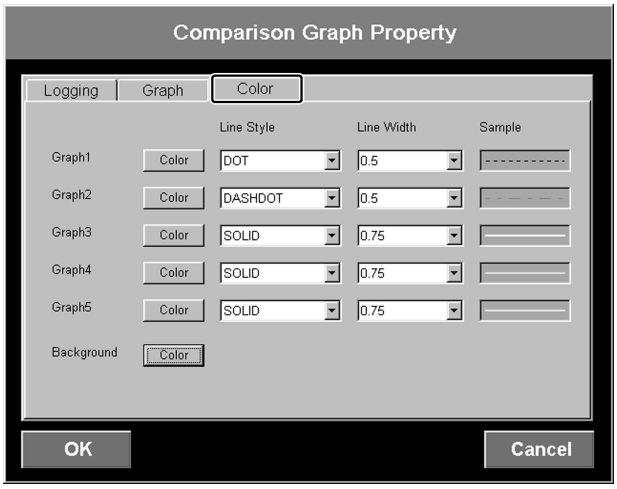


Fig. 52

Graph setting table

Tab	Property	Range
Color	Color	Select any color available on your system.
	Line Style	Select from five styles: SOLID, DASH, DOT, DASHDOT, DASHDOTDOT (DASH, DOT, DASHDOT, and DASHDOTDOT are available only if line width is set to 0.5pt.)
	Line Width	Select from five widths: 0.5pt, 0.75pt, 1pt, 1.5pt, 2pt
	Background	Select any color available on your system.

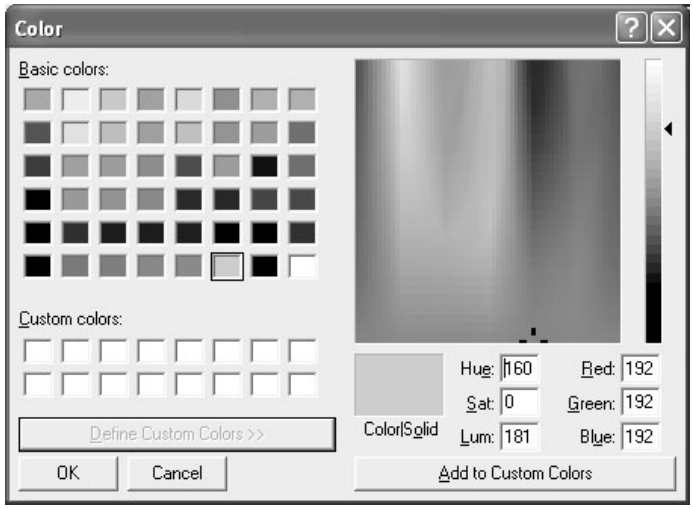


Fig. 53

5. Click the **Start [F3]** button or press the F3 key to begin graphing. Once monitoring has started, the button name changes to **Stop [F3]**. The program automatically stops reading the signal data when the specified time elapses.

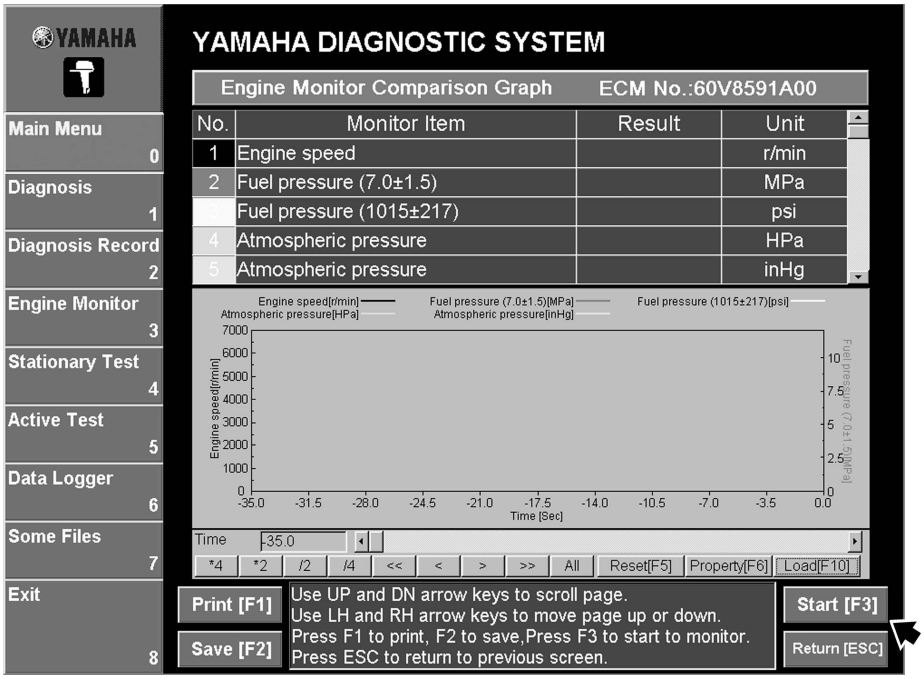


Fig. 54

Graph window controls (keys and buttons)

Keyboard	Button	Operation	Remarks
← →	< >	Moves cursor in indicated direction (by one sample increment).	Disabled when monitoring.
Shift + ← →	<< >>	Moves cursor in indicated direction (by ten sample increments).	Disabled when monitoring.
Ctrl + ← →	None	Moves cursor in indicated direction (by 100 increments).	Disabled when monitoring.
Insert	*2	Zooms in on time axis (2x zoom, centered on cursor).	Disabled when monitoring.
Delete	/2	Zooms out on time axis (1/2 zoom, centered on cursor).	Disabled when monitoring.
PageUp	*4	Zooms in on time axis (4x zoom, centered on cursor).	Disabled when monitoring.
PageDown	/4	Zooms out on time axis (1/4 zoom, centered on cursor).	Disabled when monitoring.
Space	All	Returns graph display settings to their defaults.	Disabled when monitoring.
F5	Reset[F5]	Deletes currently saved data and returns graph display settings to their defaults. (This feature is disabled during offline operation.)	Disabled when monitoring.
F6	Property[F6]	Displays the graph properties window. (Note that the Logging settings are disabled during offline operation.)	Disabled when monitoring.
F10	Load[F10]	Loads recorded data. When the coupler is connected and communication is in progress, this feature can be used to load and display the recorded data corresponding to the engine ECM No. The loaded data can be regraphed using the saved settings.	Disabled when monitoring.

6. Click the **Save [F2]** button or press the [F2] to save the graph.

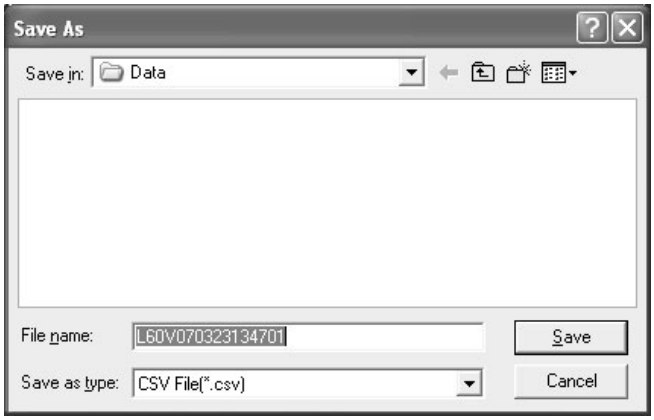


Fig. 55

NOTE:

The default file name is assigned as shown below.

Example: L 60V 07 03 23 1347 XX .csv

ID code Model Year Month Day Time File serial number

7. When you are finished with graphic monitoring, click the **Return [Esc]** button (or press the ESC key). (See fig. 54)

8. If you have not saved the graph, the program displays a confirmation dialog asking whether you are sure you wish to delete previously saved signal and graph data. (Fig. 56) Click the **OK** button (or press the Enter key) to save the new data (overwriting the old data). The graph window will then close.

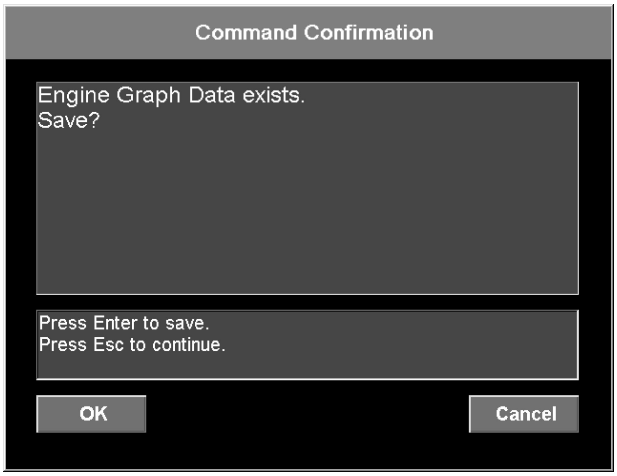


Fig. 56

Viewing saved graphs offline

The program allows you to view saved graph data offline. Once you have saved some graph data, you can recall it and review it with no need to connect to the ECM.

1. With the adapter disconnected, start up the Yamaha Diagnostic System on your computer. Then click the **Starting service tool [Enter]** button, or press the Enter key.

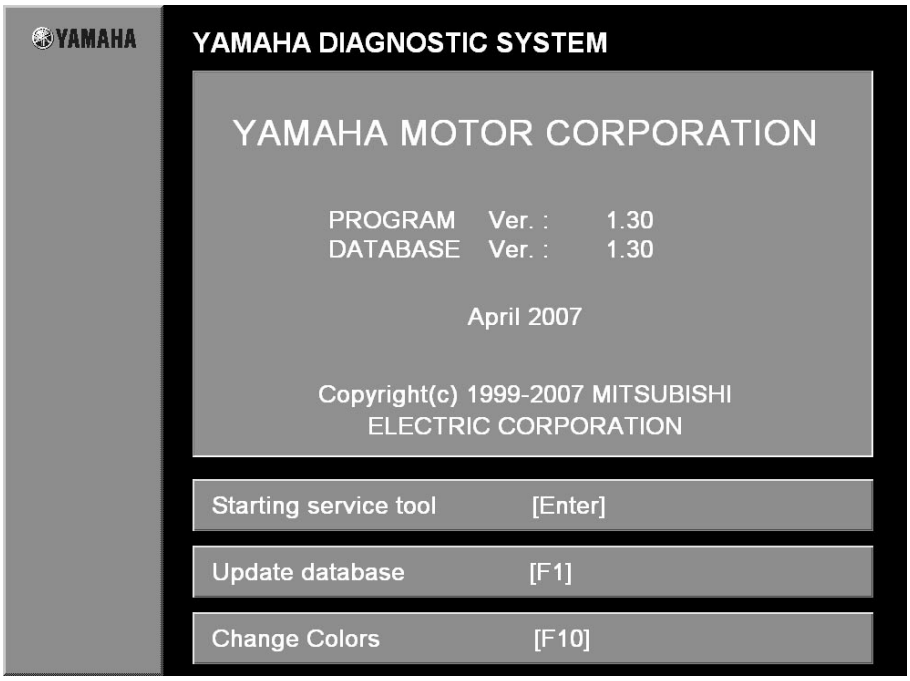


Fig. 57

2. Click or press any key to display the main menu.

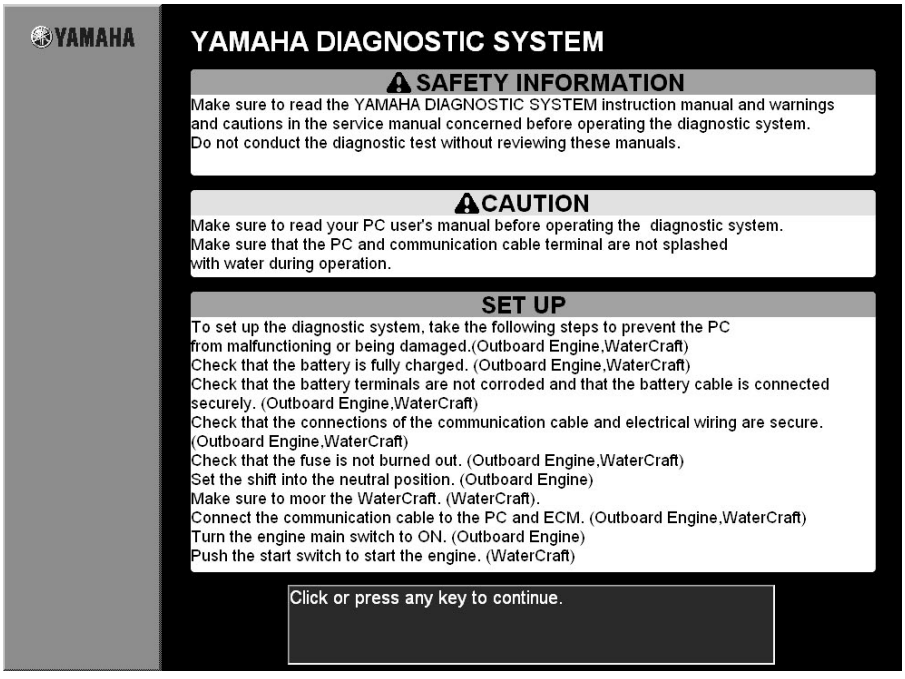


Fig. 58

3. When the “communication error” dialog appears, click the **OffLine** button.



Fig. 59

4. Click the **Scan Tool** menu in the Main Menu or press the number key “1” on your keyboard.

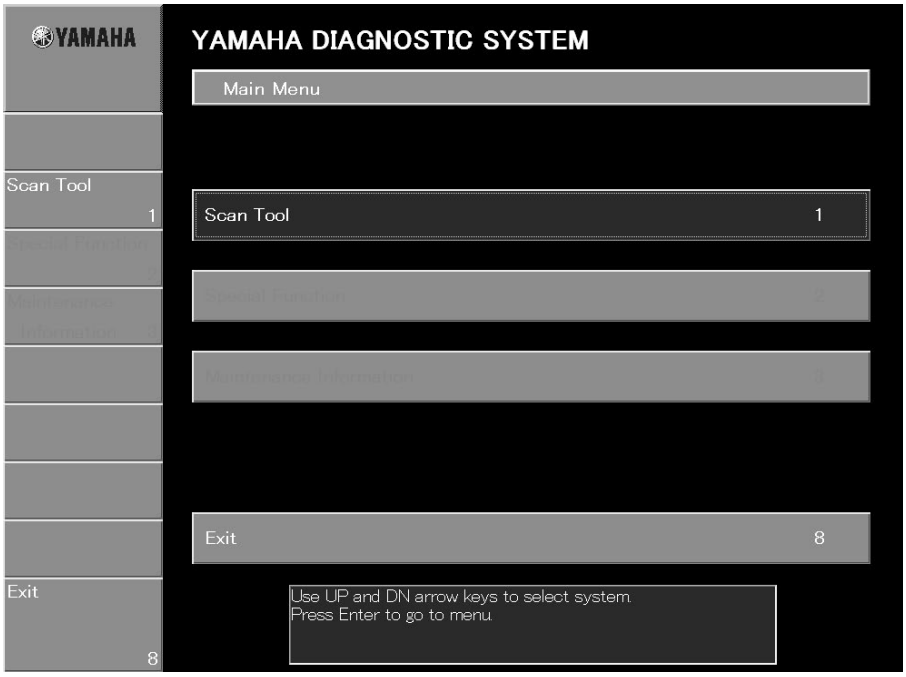


Fig. 60

5. Click the **Engine Monitor** command in the Main Menu or press the number key “3” on your keyboard.

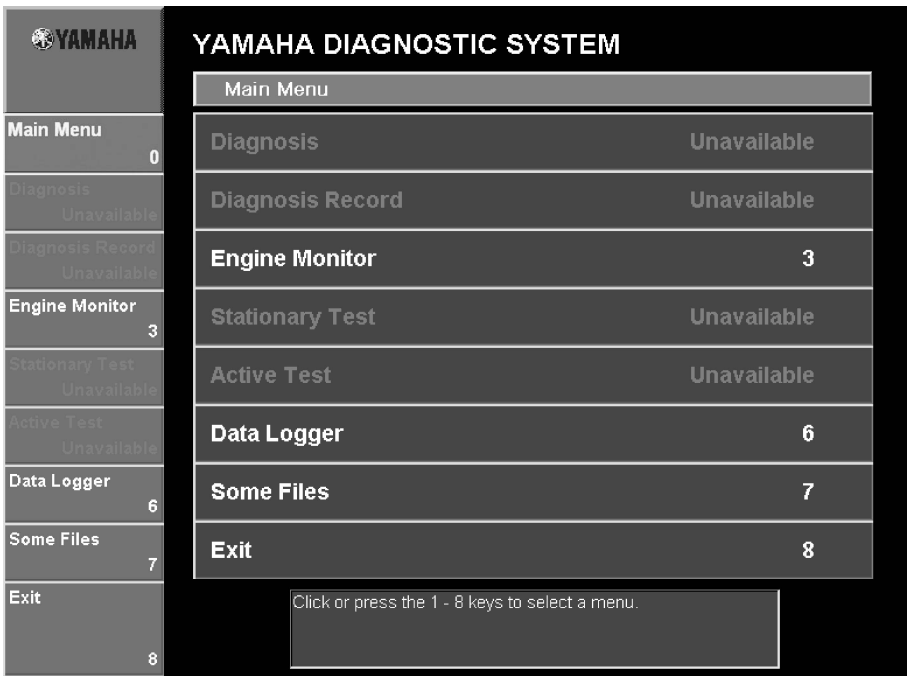


Fig. 61

6. Click the **Load [F10]** button, or press the F10 key.

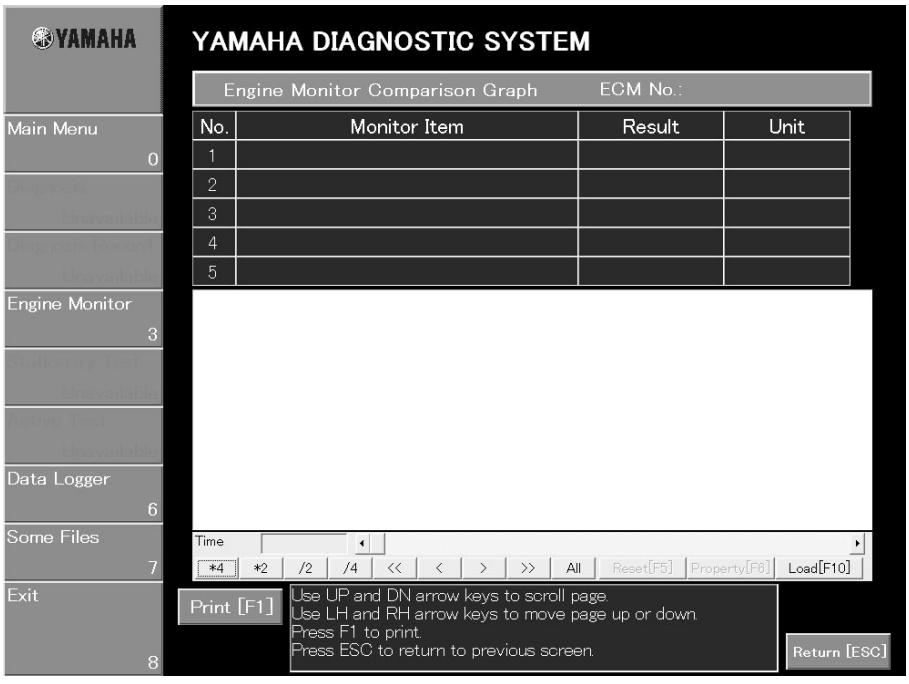


Fig. 62

7. Select the file containing the saved graph data that you want to view, and then click the **Open** button.



Fig. 63

NOTE:
Graph files not saved in the Engine Monitor Comparison Graph mode cannot be opened.

8. The program displays the selected graph data.

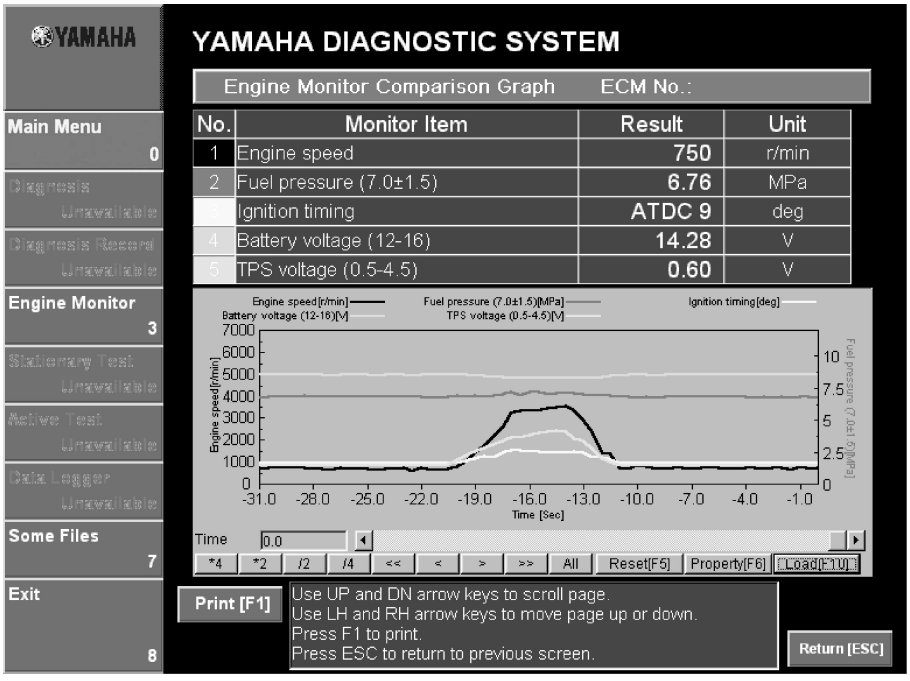


Fig. 64

NOTE:
Remember that you cannot carry out actual monitoring while working offline. Offline graph operation is limited to recalling and viewing saved graph data.

STATIONARY TEST

Selecting this command displays a window where stationary tests can be selected.

List of stationary test items

Item
Ignite ignition coil
Oil ctrl. valve drive (PORT)
Oil ctrl. valve drive (STBD)
Operate elect. fuel feed pump
Operate electric fuel pump

Item
Operate electric oil pump
Operate injector
Operate ISC valve
Spark ignition coil

⚠ WARNING

Avoid clicking the Execute and Cancel buttons repeatedly, otherwise the ECM or PC may not work properly and they may be damaged.

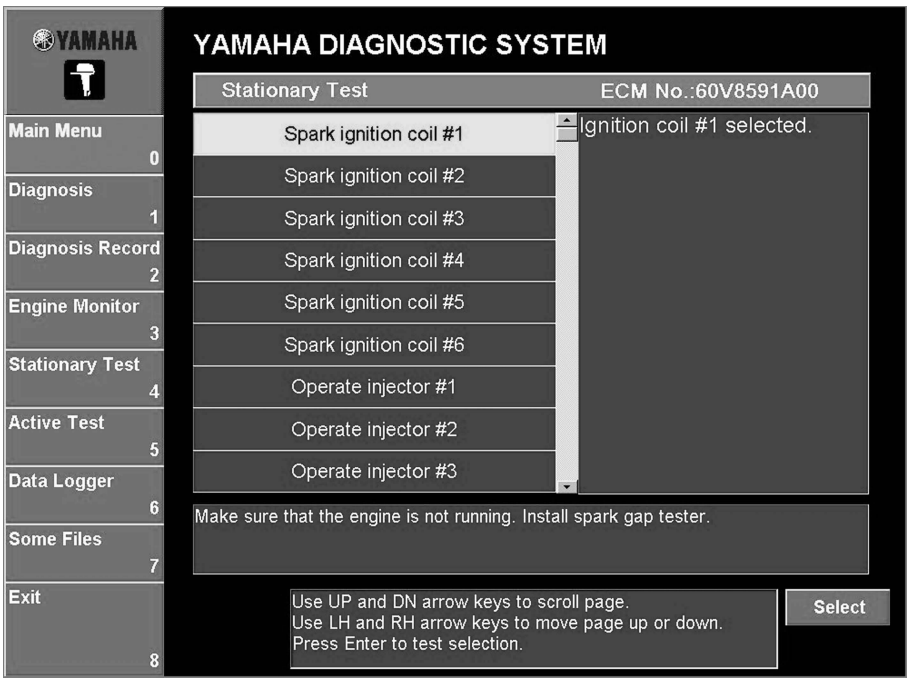


Fig. 65

Sparking ignition coil procedure

A voltage is applied to the ignition coil of the selected cylinder, a spark is created in the spark gap tester, and then the ignition system is checked. Five sparks are created within five seconds.

⚠ WARNING

- **Do not touch any connections of the spark gap tester lead wires.**
- **Do not let sparks leak out of the removed spark plug cap.**
- **Keep flammable gas or liquids away since this test will produce sparks.**

1. Select the test that you wish to perform by either clicking it or pressing the up or down arrow keys on your keyboard. (See fig. 65)

NOTE:

- Make sure that the engine is not running.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.
- A special tool (spark gap tester YM-34487/90890-06754) is needed.

2. Connect the spark plug cap of the cylinder that will be tested to the spark gap tester.
Spark gap tester
A YM-34487 / B 90890-06754

3. Set the spark gap length on the adjusting knob.

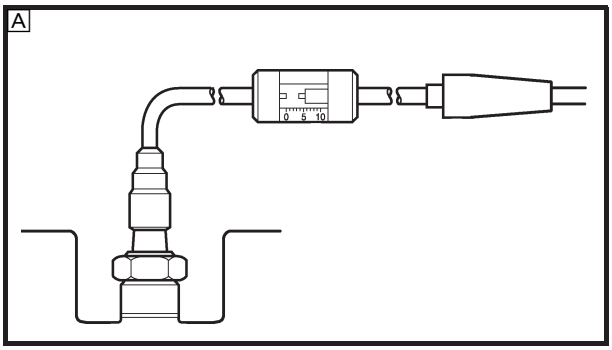


Fig. 66

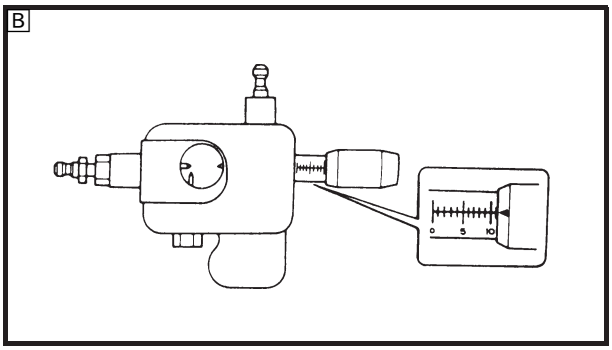


Fig. 67

4. Select the cylinder number where the spark gap tester is connected, and then click the **Select** button or press the Enter key on your keyboard. (See fig. 65)

5. Click the **Execute** button or press the Enter key on your keyboard. (Fig. 68)

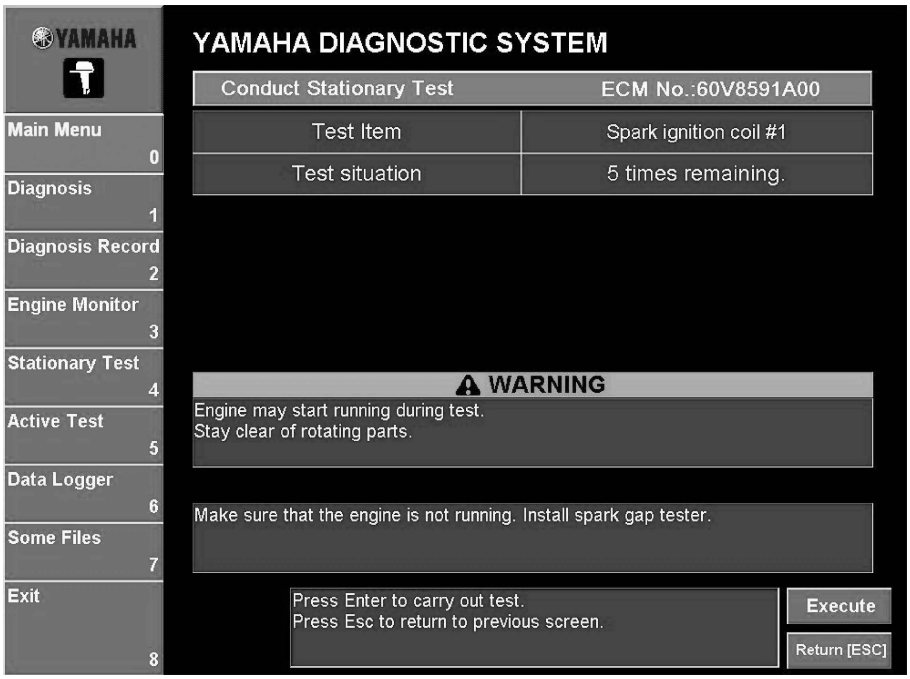


Fig. 68

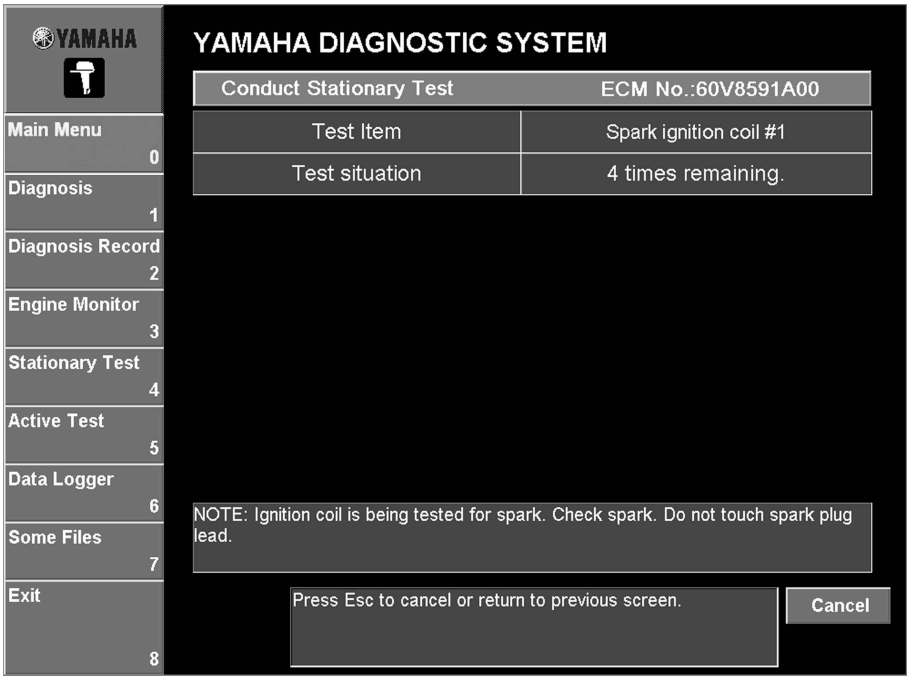


Fig. 69

NOTE:
If the engine is running or not in neutral, an error message is displayed. Follow the instructions that appear.



Fig. 70

6. While checking the information that appears in the **Test situation** column, follow the test instructions in the messages that are displayed. (See fig. 69)

NOTE:
If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear in the error message.

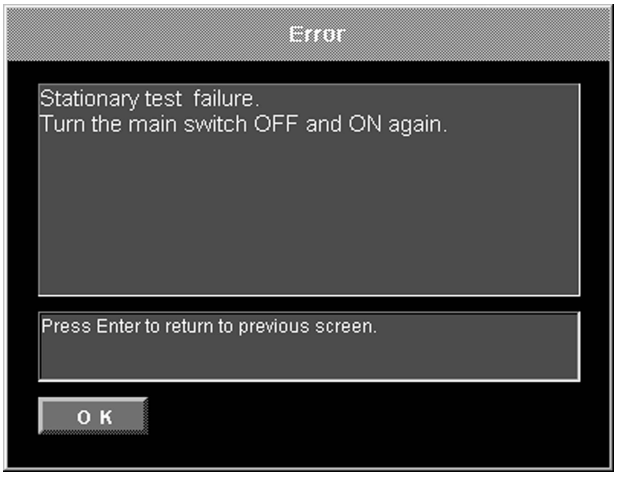


Fig. 71

7. To stop the stationary test, click the **Cancel** button. (See fig. 69)

8. Observe the spark through the discharge window of the spark gap tester.

9. To perform the test again to the same cylinder, click the **Execute** button or press the Enter key on your keyboard. To perform the test on a different cylinder, click the **Return [ESC]** button or press the Esc key on your keyboard to return to main menu where a different test can be selected.

NOTE:

If an error occurs while the test is being performed, the following message is displayed.

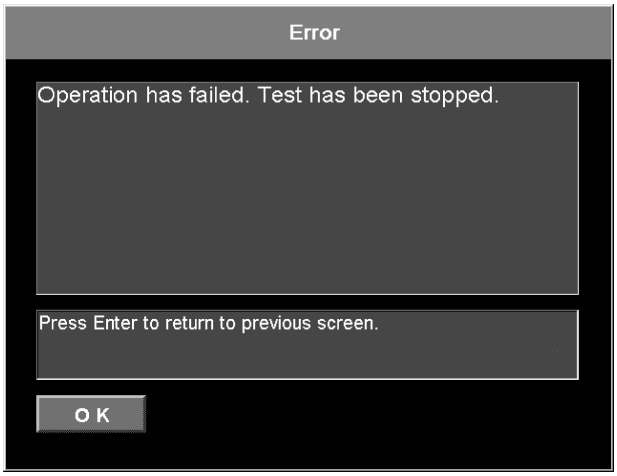


Fig. 72

Operating injector procedure

A voltage is applied to the injector of the selected cylinder, the injector is activated, and then the fuel system is checked. The fuel is injected 20 times within two seconds.

⚠ WARNING

- **Do not perform the test with the injector removed from the cylinder head or with any fuel system parts removed. High-pressure fuel may spurt out.**
- **When performing this operation, keep all sparks, flames, or other sources of ignition away from the testing area. Gasoline is highly flammable.**

NOTE:

Before activating the injector, operate the electric fuel pump for ten seconds in order to build up fuel pressure.

1. Select the test that you wish to perform by either clicking it or pressing the up or down arrow keys on your keyboard.

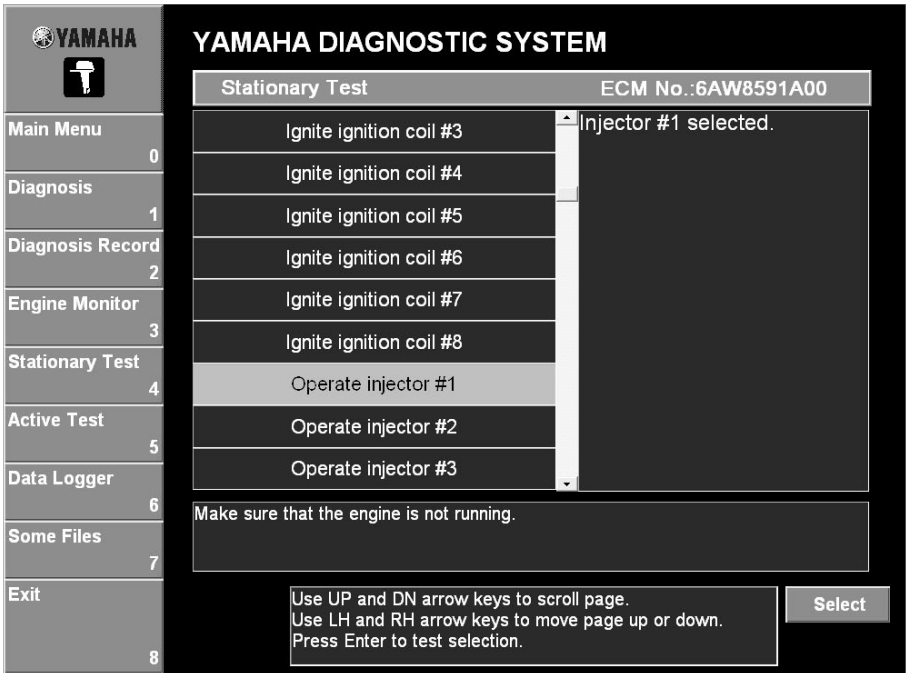


Fig. 73

NOTE:

- Make sure that the engine is not running.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.
- Make sure that there is fuel in the fuel tank, otherwise an error will occur and the test cannot be performed.

2. Select the cylinder to be tested, and then click the **Select** button or press the Enter key on your keyboard. (See fig. 73)

3. Click the **Execute** button or press the Enter key on your keyboard. (Fig. 74)

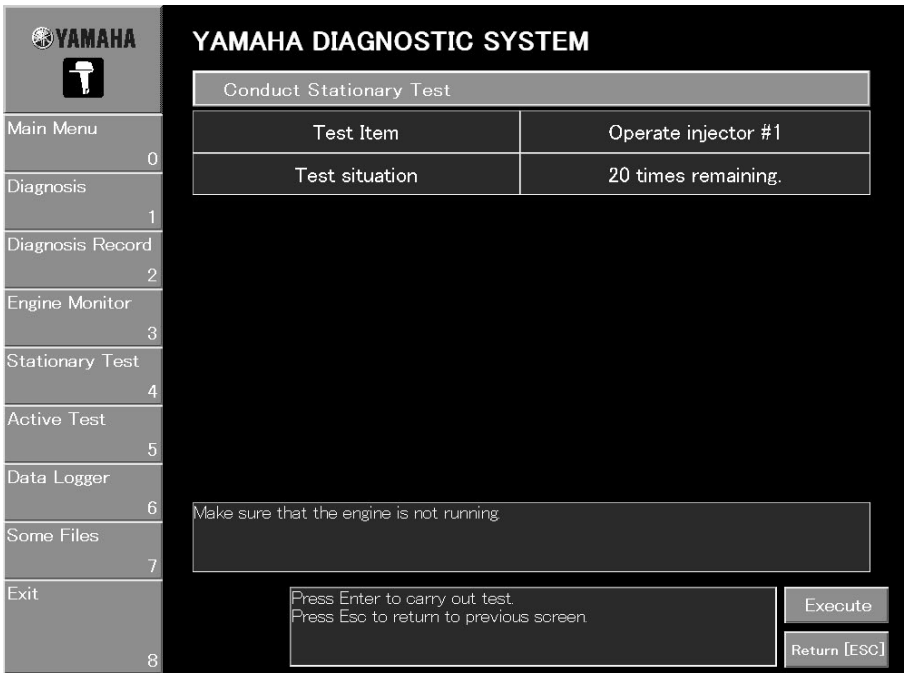


Fig. 74

NOTE:

If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear.

4. Listen to the operating sound of the injector for the cylinder being tested.

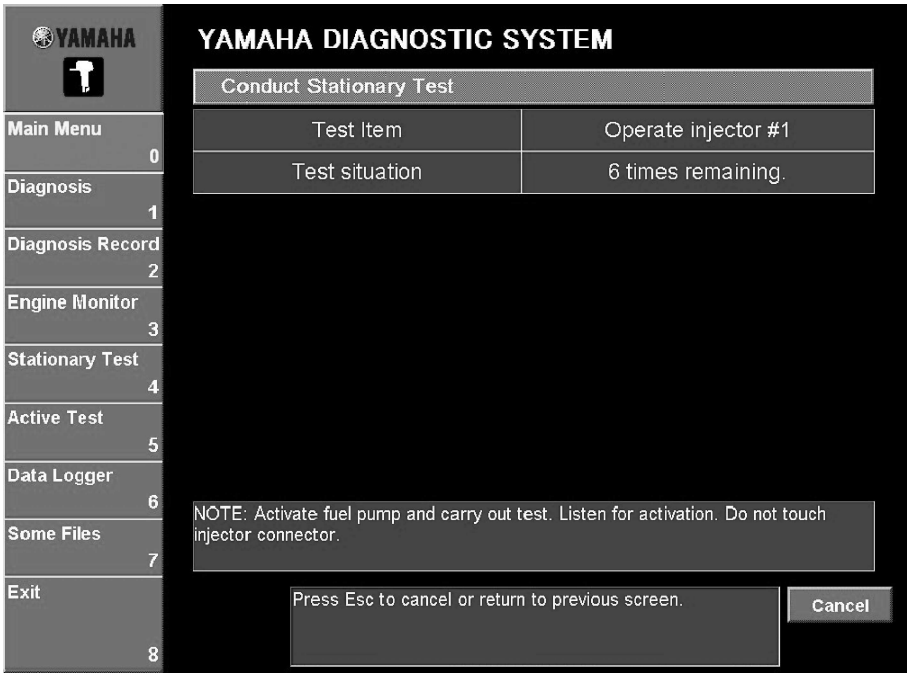


Fig. 75

⚠ WARNING

Do not touch the injector connector.

5. To perform the test again on the same cylinder, click the **Execute** button or press the Enter key on your keyboard. To perform the test on a different cylinder, click the **Return [ESC]** button or press the Esc key on your keyboard to return to the window where a different test can be selected.

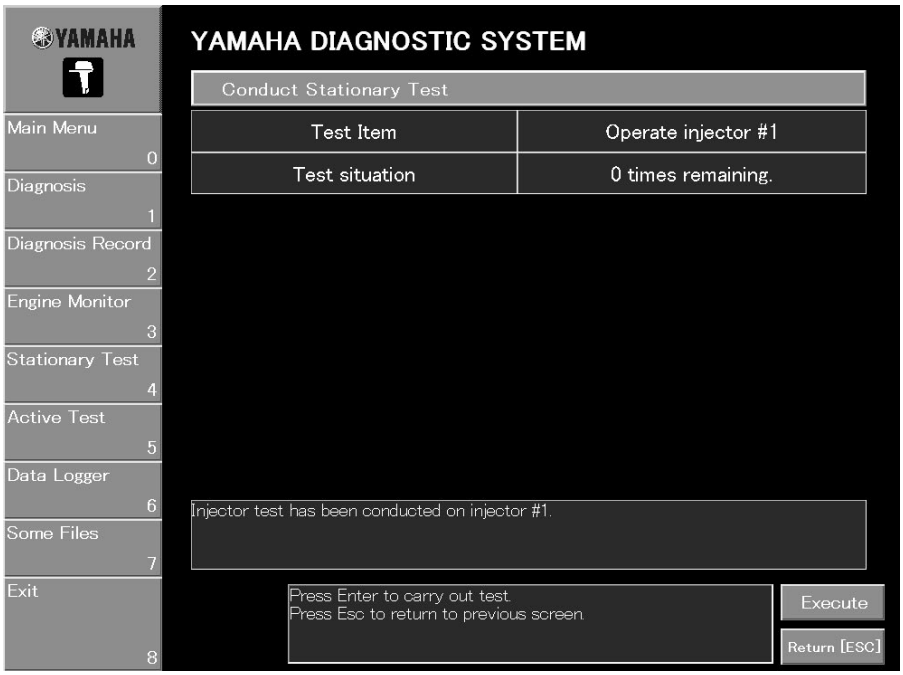


Fig. 76

CAUTION:

Do not test the same cylinder three or more times, otherwise the spark plug insulator may be damaged.

Operating the electric fuel pump

A voltage is applied to the electric fuel pump, the electric fuel pump is operated, and then the fuel system is checked. The electric fuel pump is operated for ten seconds.

⚠ WARNING

- **Do not perform the test with the injector removed from the cylinder head or with any fuel system parts removed. High-pressure fuel may spurt out.**
- **When performing this operation, keep all sparks, flames, or other sources of ignition away from the testing area. Gasoline is highly flammable.**

NOTE:

Make sure that there is fuel in fuel tank, otherwise an error will occur and the test cannot be performed.

1. Select the test to be performed, and then click the **Select** button or press the Enter key on your keyboard.

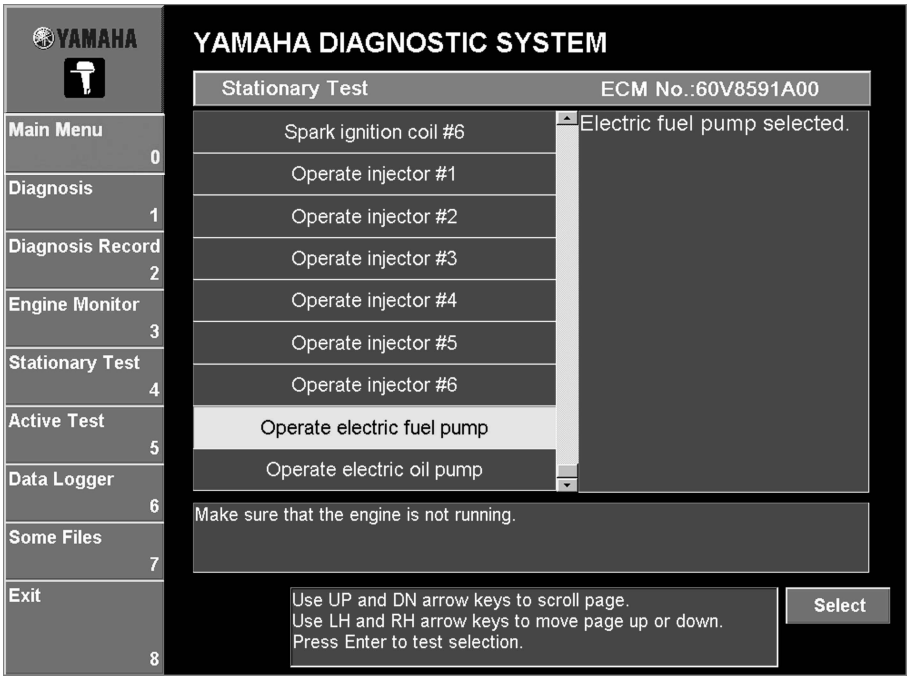


Fig. 77

NOTE:

- Make sure that the engine is not running.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.

2. Click the **Execute** button or press the Enter key on your keyboard.

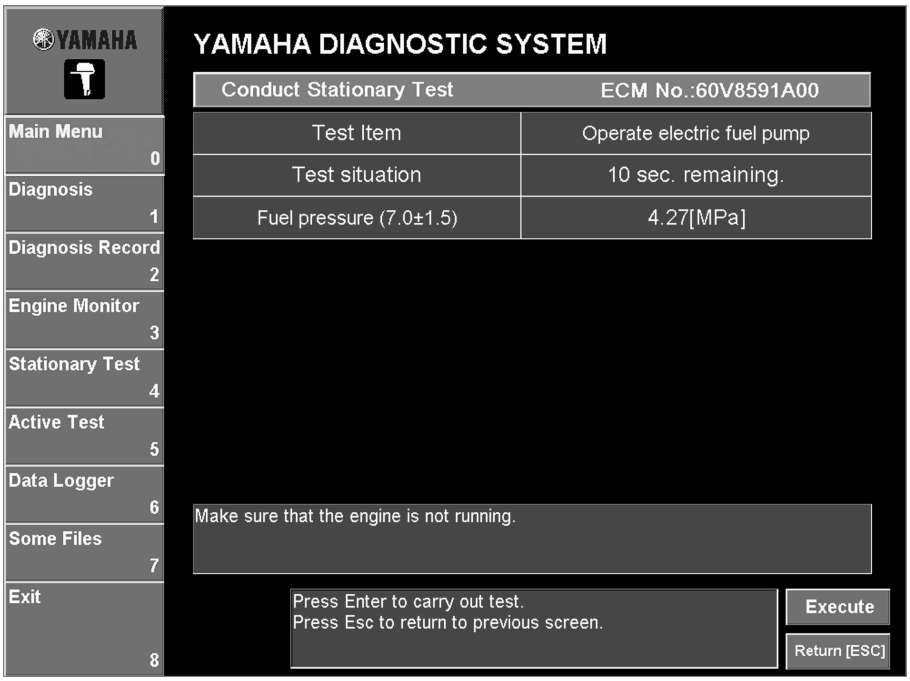


Fig. 78

NOTE:
If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear.

3. Listen to the operating sound of the electric fuel pump.

4. To perform the test again, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return [ESC]** button or press the Esc key on your keyboard to return to the window where a different test can be selected.

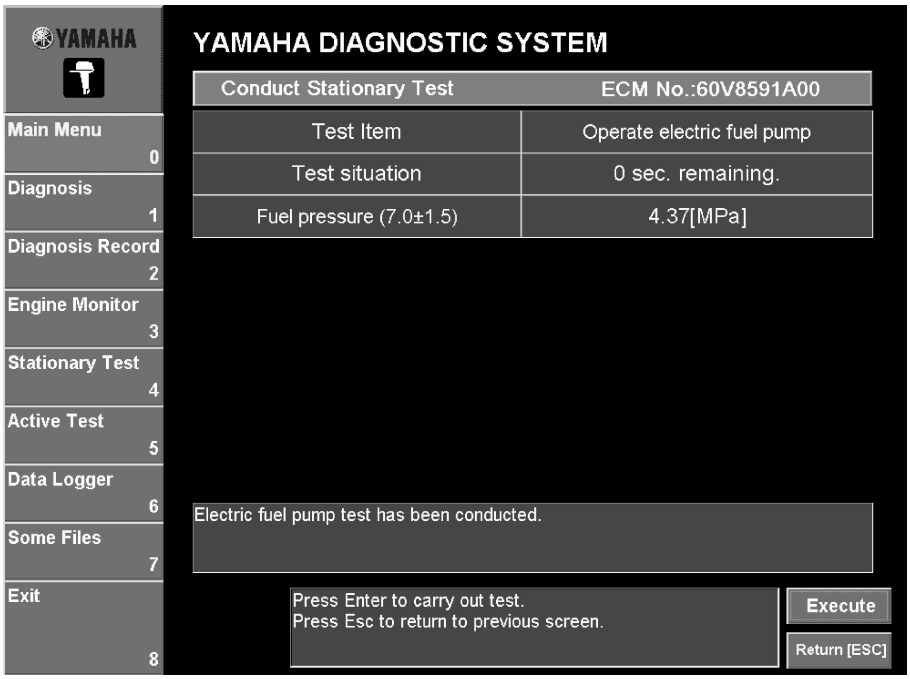


Fig. 79

Operating electric oil pump procedure

The electrical oil pump is operated by a signal sent from the ECM for six seconds. This checks if oil has been spurted out from the electrical oil pump.

1. Select the test to be performed, and then click the **Select** button or press the Enter key on your keyboard.

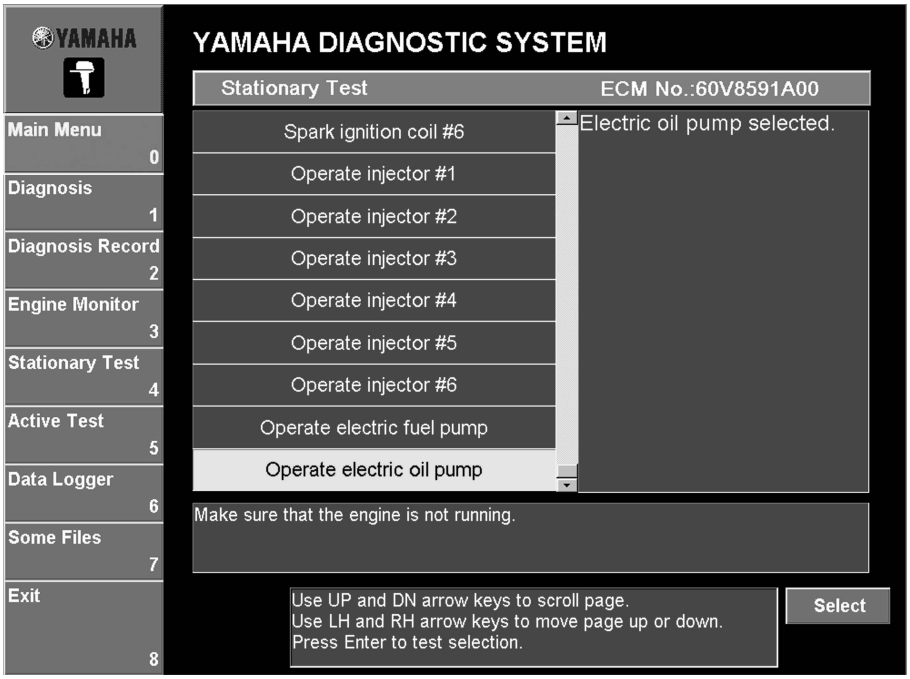


Fig. 80

NOTE:

- Make sure that the engine is not running.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.

2. Remove the oil hose ① from the vapor separator inlet ②.

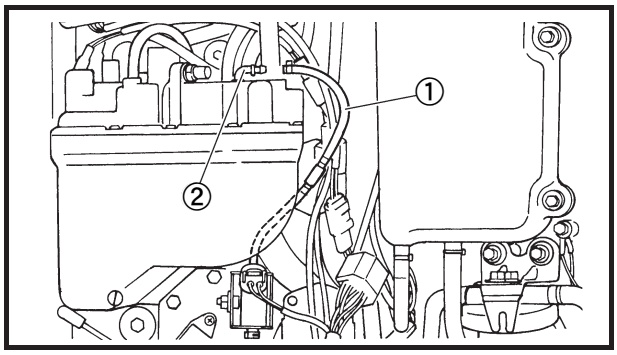


Fig. 81

CAUTION:

Do not allow any air to enter the oil hose during the test.

3. Click the **Execute** button or press the Enter key on your keyboard.

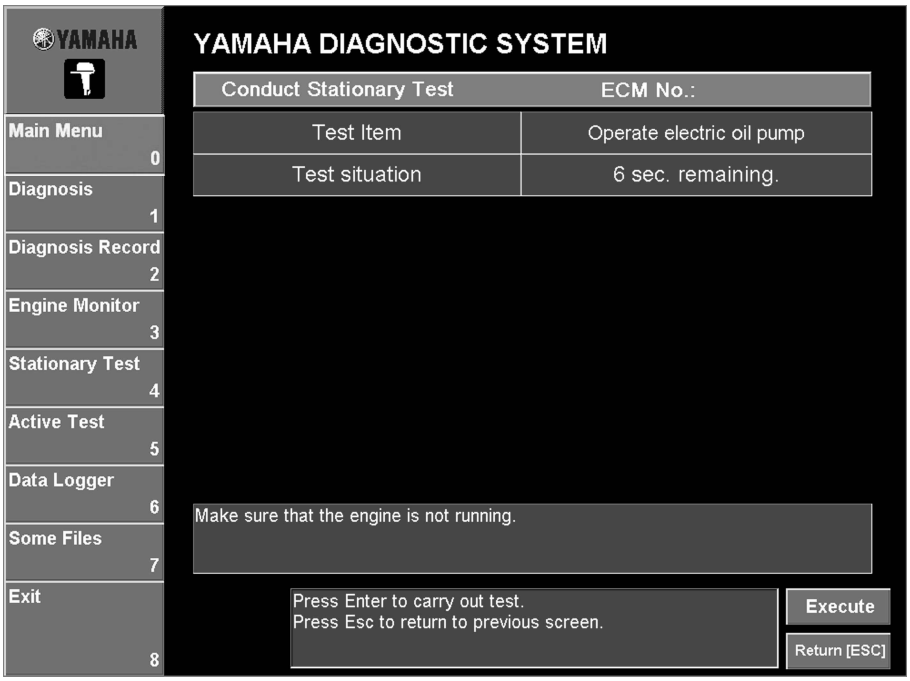


Fig. 82

NOTE:

If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear.

4. Check that oil flows from the electric oil pump hose end.

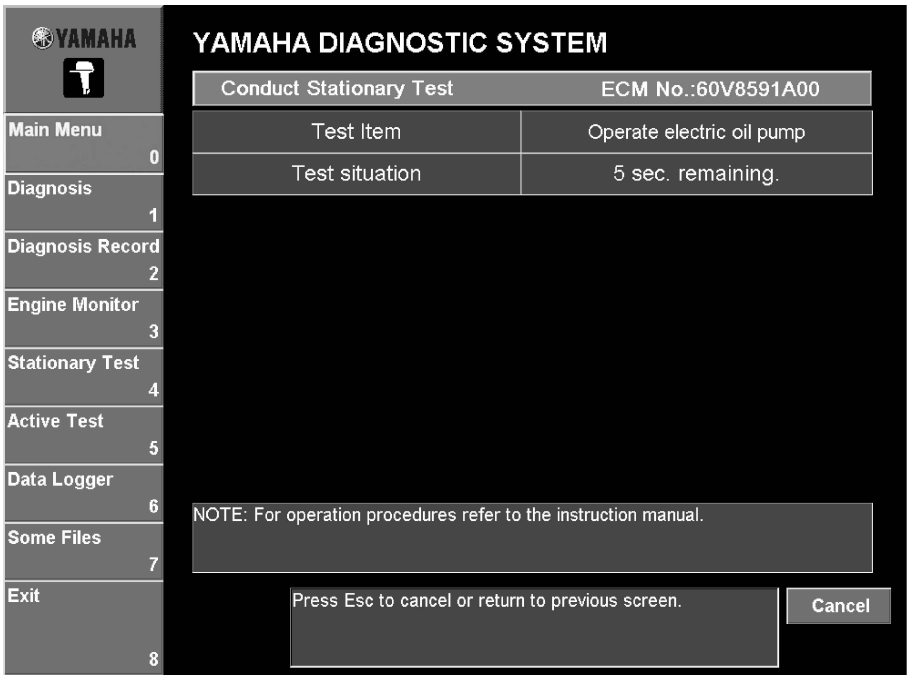


Fig. 83

5. To perform the test again click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return [ESC]** button or press the Esc key on your keyboard to return to the window where a different test can be selected.

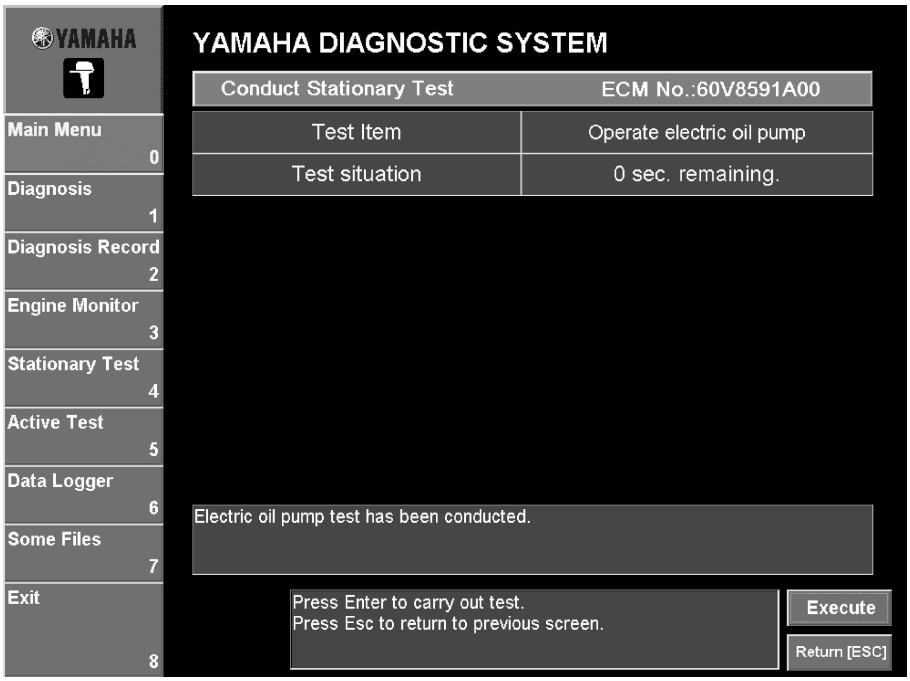


Fig. 84

6. After the test is finished, install the oil hose.

NOTE:
Make sure that there is no air in the oil hose.

Operating the electric fuel feed pump

Operate the fuel feed pump (low-pressure pump) and listen to its operating sound. The operating time is ten seconds.

NOTE:
Carry out this test after priming the engine. If the fuel pump is not supplied with fuel when it is operated, the pump may be burned.

1. Select the test to be performed, and then click the **Select** button or press the Enter key on your keyboard.

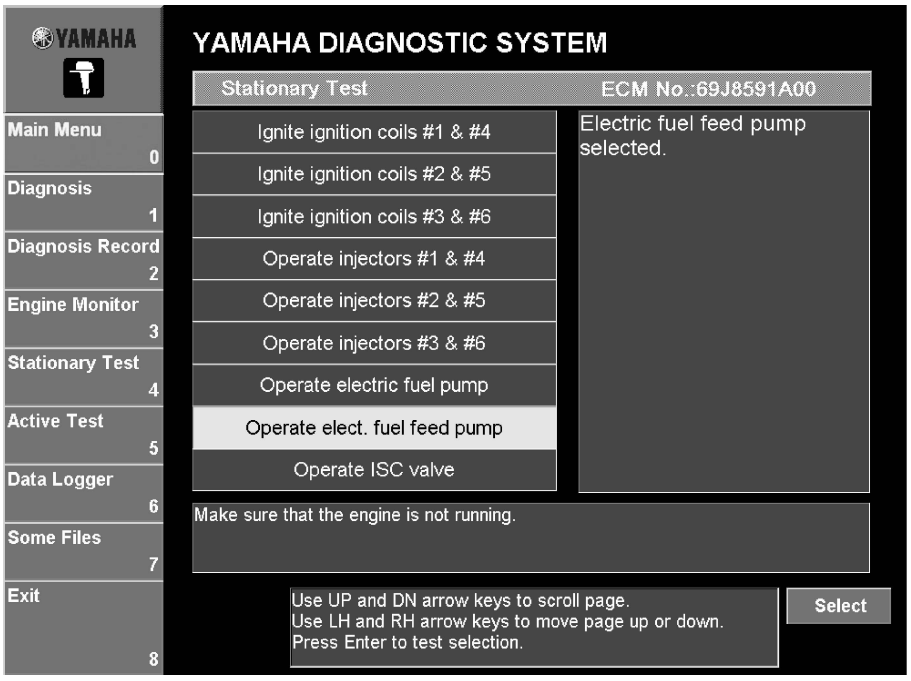


Fig. 85

2. Click the **Execute** button or press the Enter key on your keyboard.

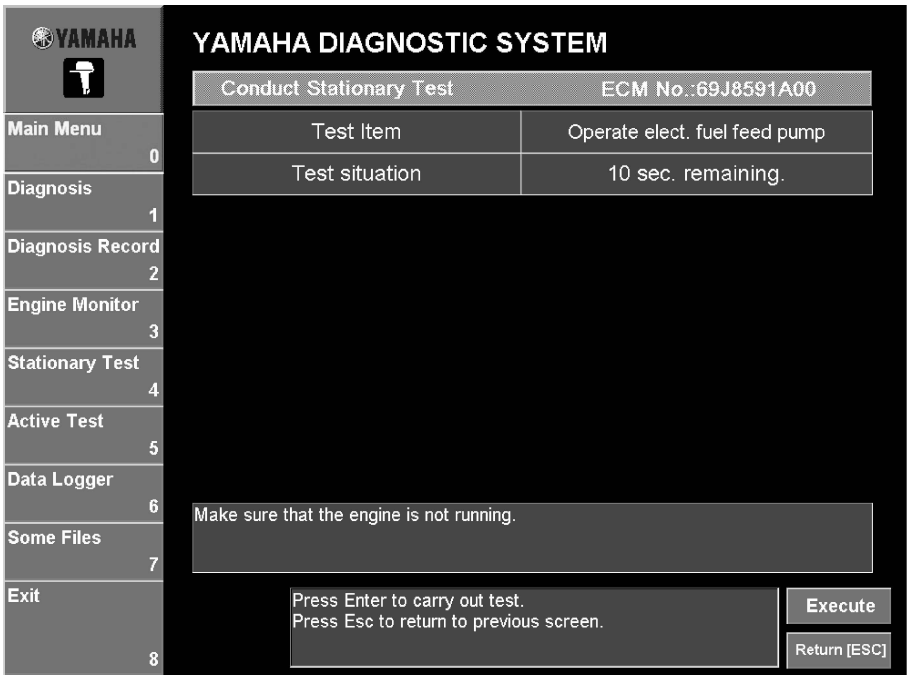


Fig. 86

3. Listen to the operating sound of the fuel feed pump.

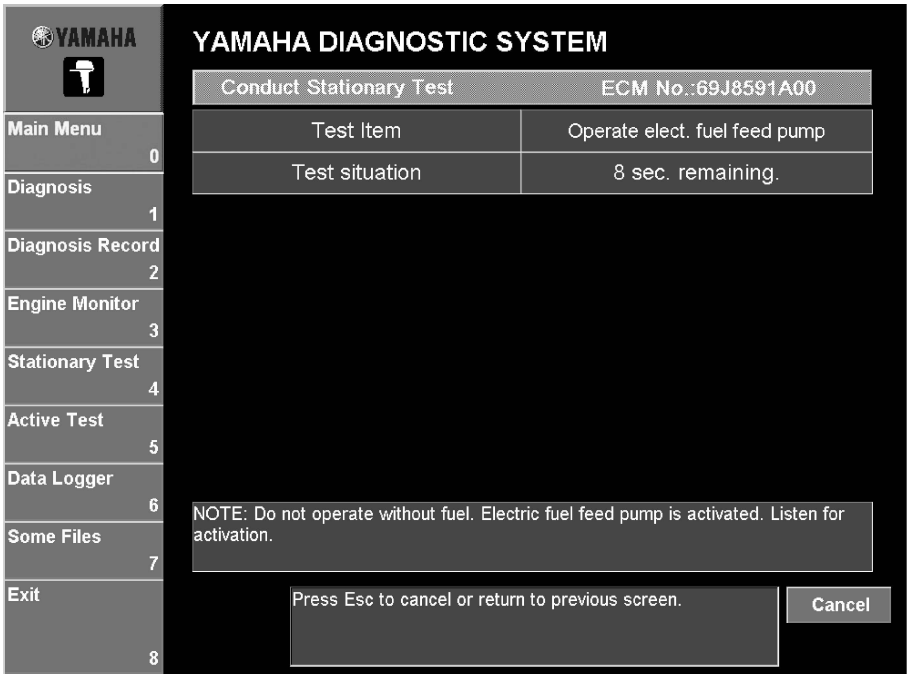


Fig. 87

4. To test again, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return** button or return to the test selection menu or press the Esc key on your keyboard.

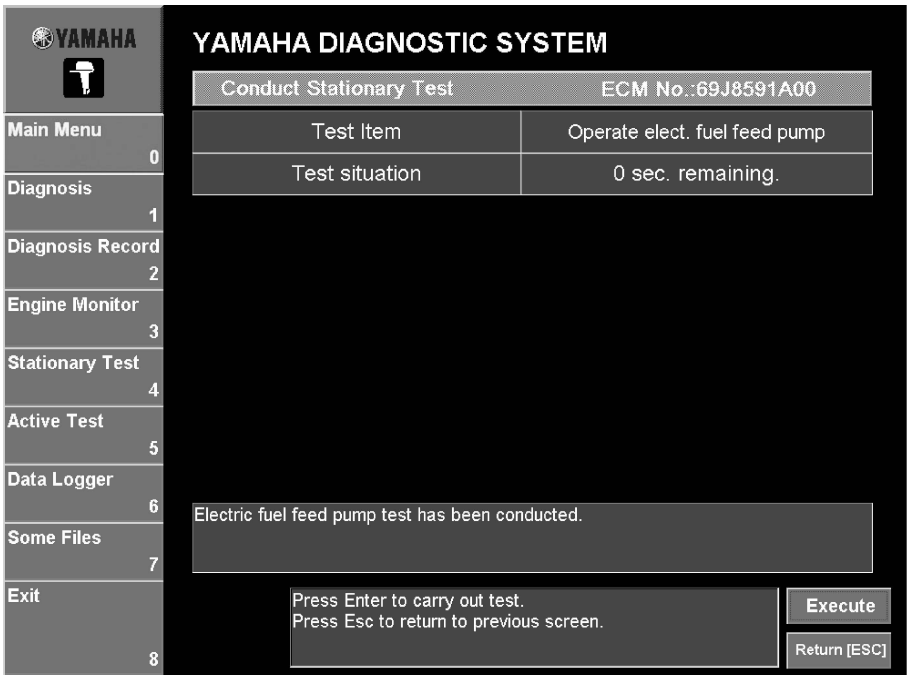


Fig. 88

Operating the ISC valve

Operate the ISC valve and listen to its operating sound. The operating time is three seconds.

1. Select the test to be performed, and then click the **Select** button or press the Enter key on your keyboard.

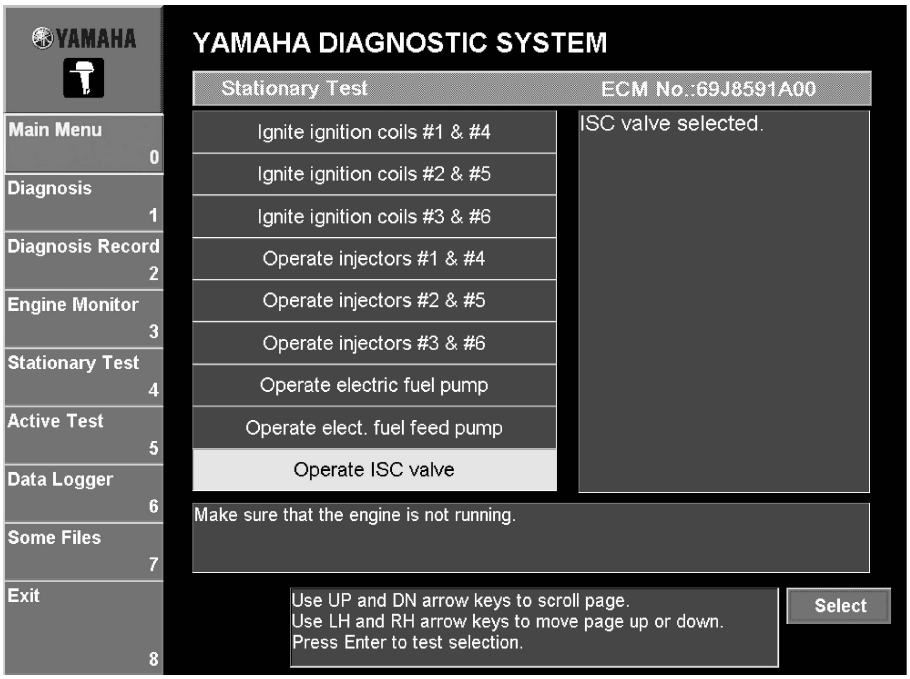


Fig. 89

2. Click the **Execute** button or press the Enter key on your keyboard.

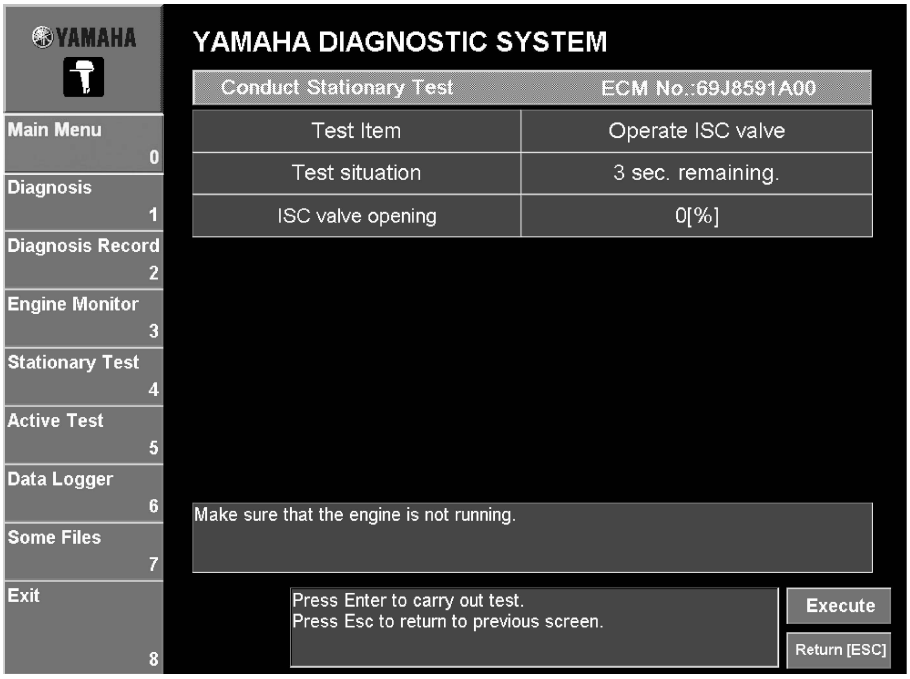


Fig. 90

3. Listen to the operating sound of the ISC valve.

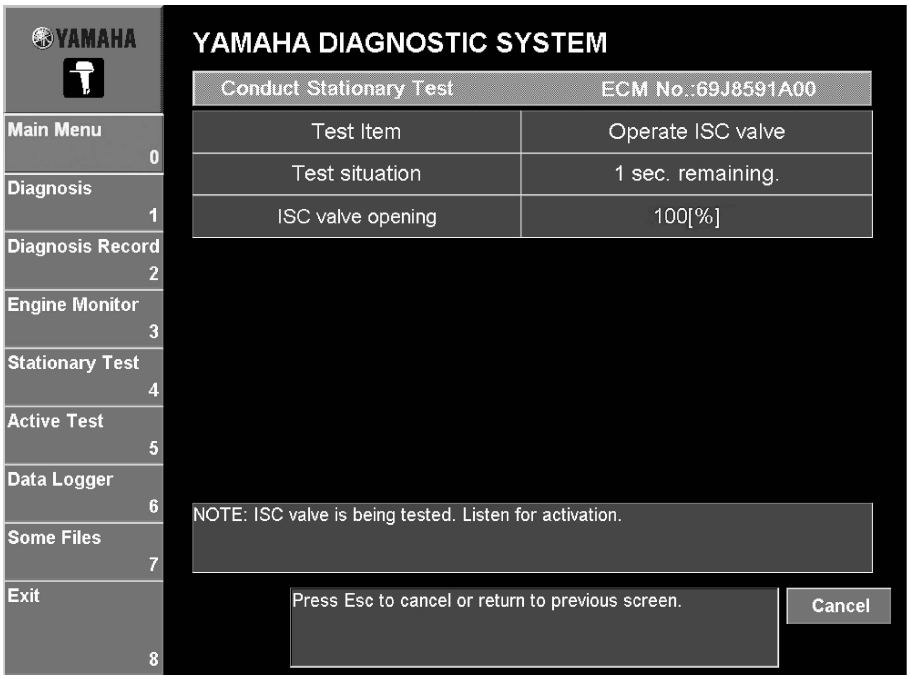


Fig. 91

4. To test again, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return** button to return to the test selection menu or press the Esc key on your keyboard.

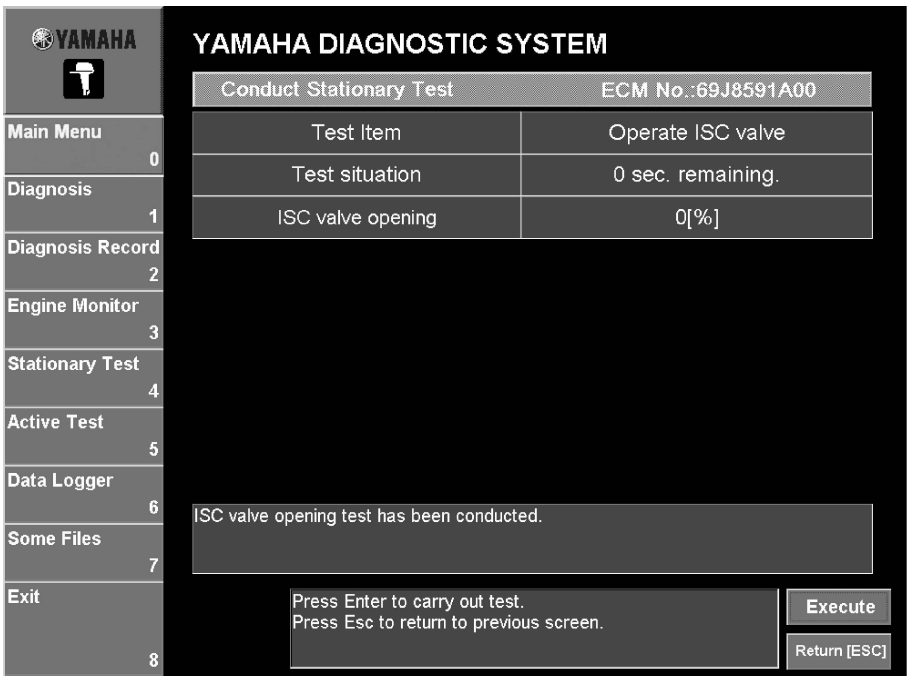


Fig. 92

Operating the oil control valve

Operate the oil control valve and listen to its operating sound. The oil control valve operates ten times.

1. Select the test to carry out, and then click the **Select** button or press the Enter key on your keyboard.

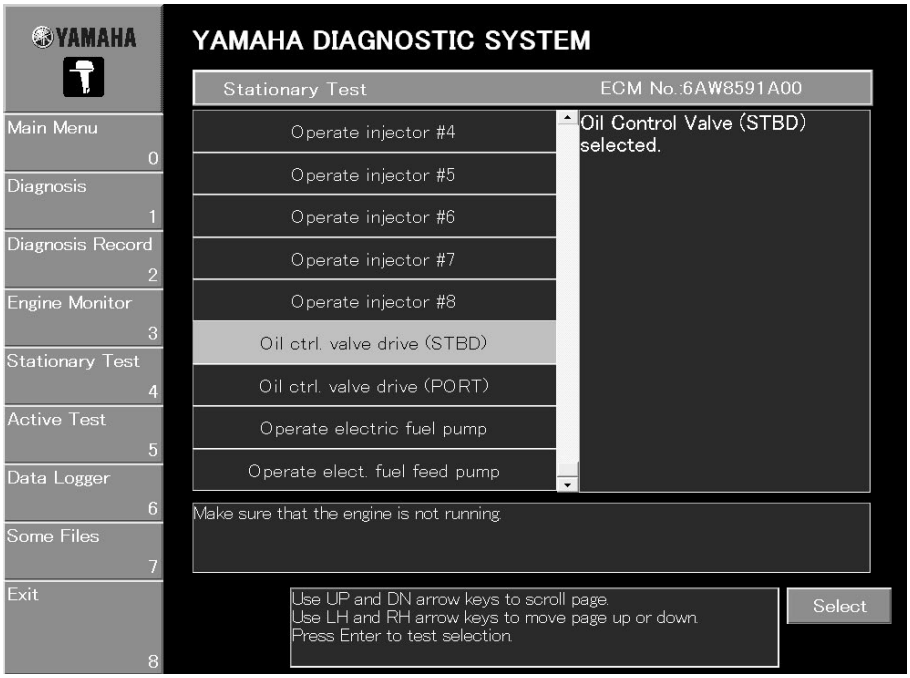


Fig. 93

2. Click the **Execute** button or press the Enter key on your keyboard.

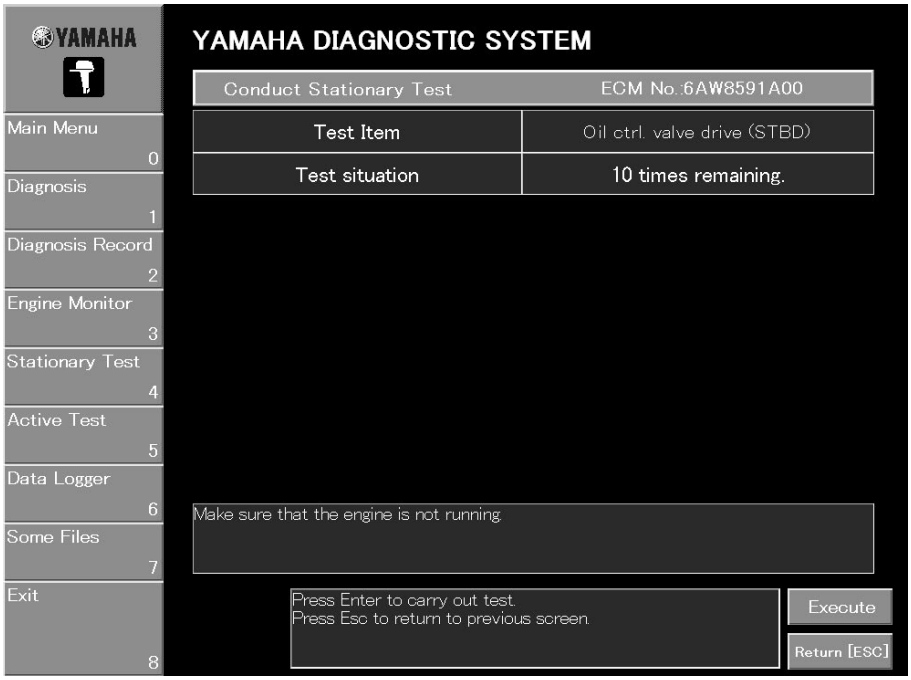


Fig. 94

3. Listen to the operating sound of the oil control valve.

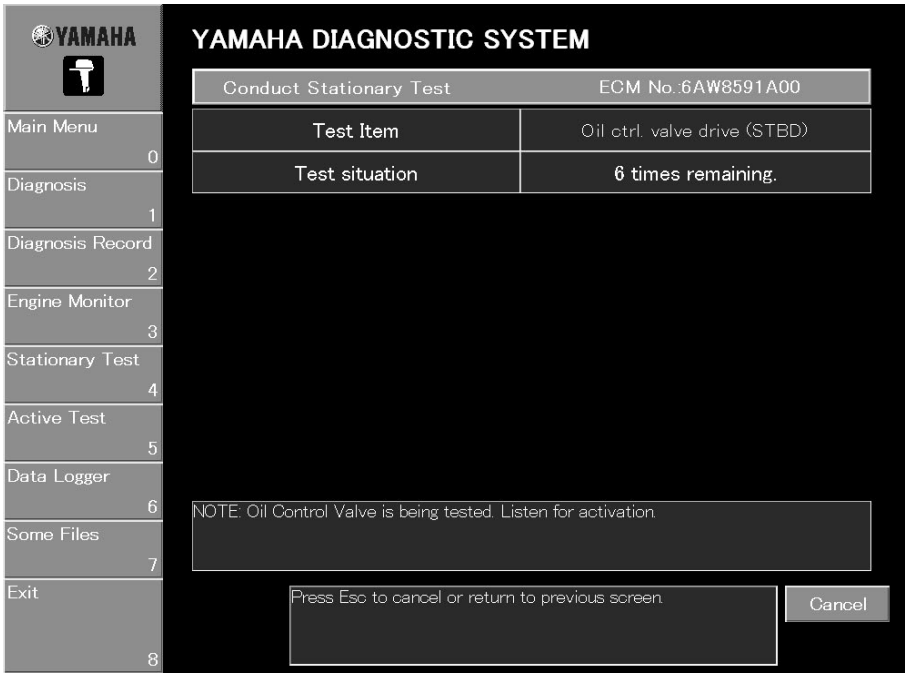


Fig. 95

4. To perform the test again, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return [Esc]** button or press the Esc key on your keyboard to return to the previous menu.

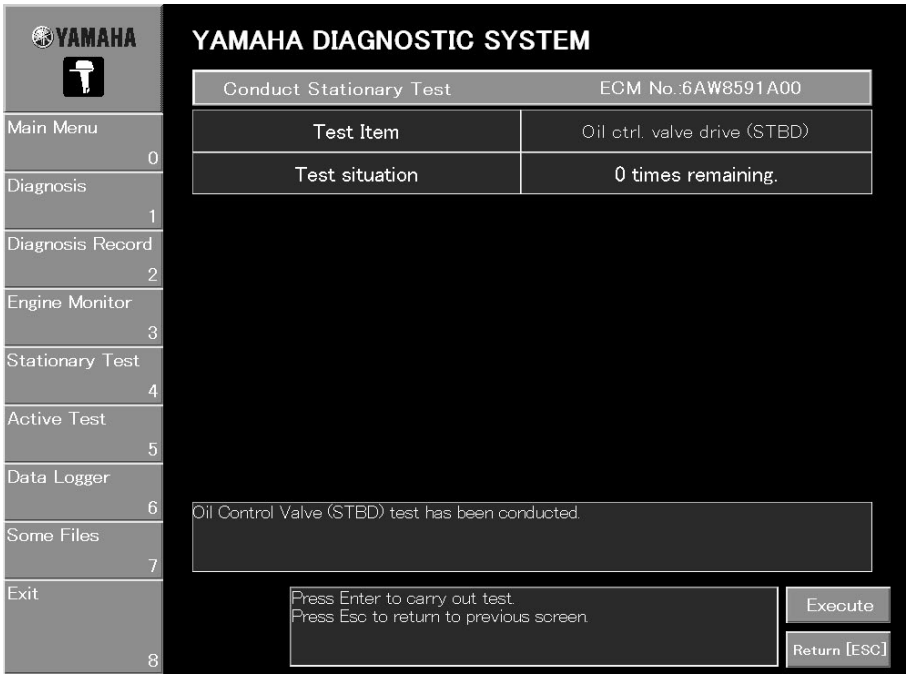


Fig. 96

ACTIVE TEST

Selecting this command displays a window where active tests can be selected.

List of active test items

Item
Angle of ISC valve opening
Drop cylinder
Fully open ISC valve

⚠ WARNING

Avoid clicking the Execute and Cancel buttons repeatedly, otherwise the ECM or PC may not work properly and they may be damaged.

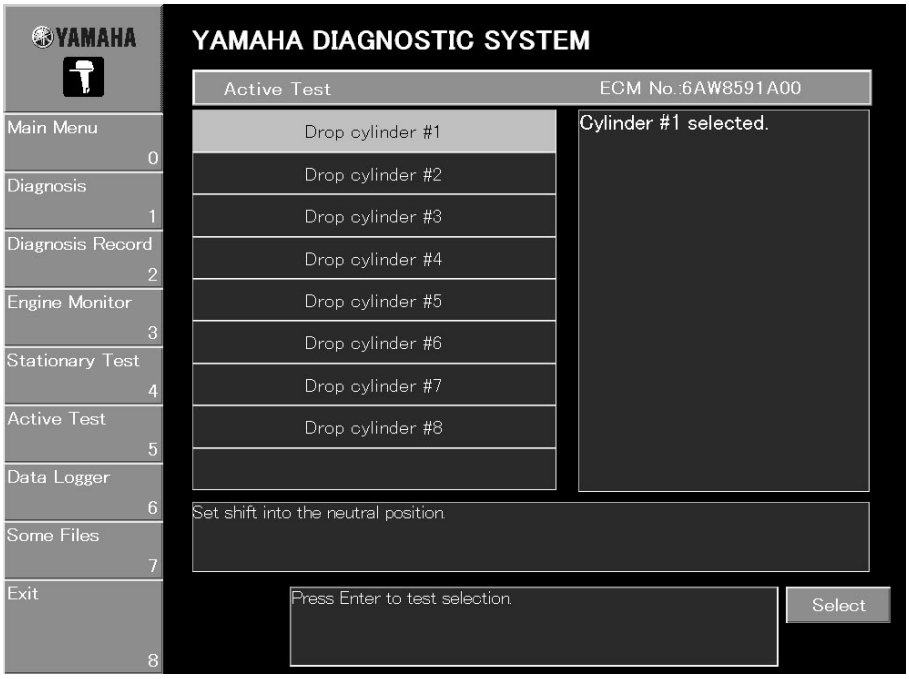


Fig. 97

NOTE:

The test can be carried out while the engine is running and the shift is in the neutral position. It is not possible to carry out the test while the boat is running.

Dropping a cylinder

Start the engine and observe the changes in engine speed for 20 seconds.
For the first ten seconds operate all cylinders, and then stop one cylinder for five seconds. For the last five seconds operate all cylinders.
A screen that allows you to select which ignition and fuel to cut is displayed.

1. Select which ignition and fuel you wish to cut by either clicking it or pressing the up or down arrow keys on your keyboard. (See fig. 97)

NOTE:

- Set the shift into the neutral position.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.

2. Click the **Select** button or press the Enter key on your keyboard. (See fig. 97)

3. Start the engine.

4. Click the **Execute** button or press the Enter key on your keyboard. (Fig. 98)

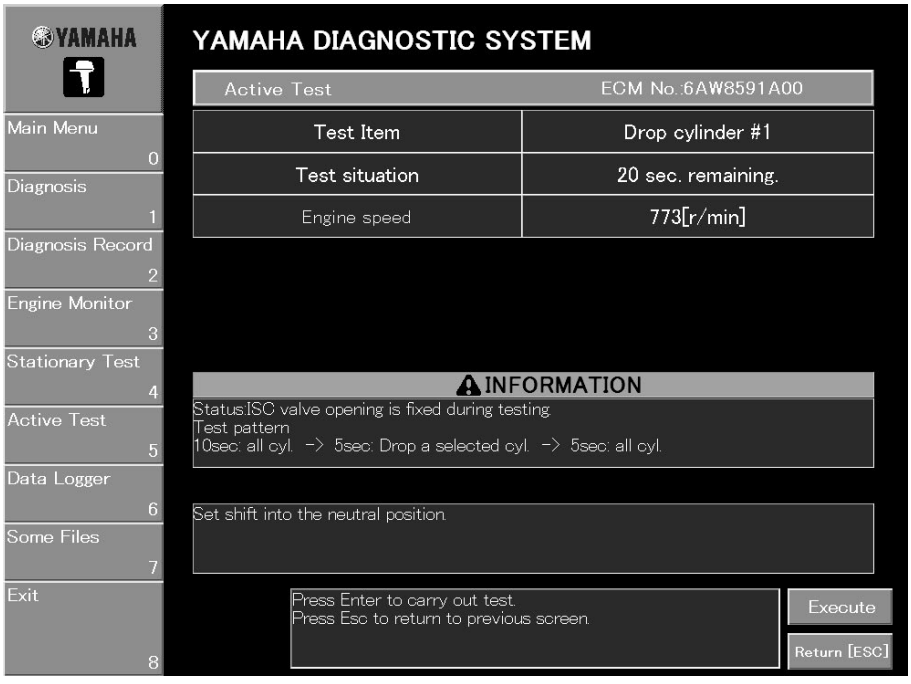


Fig. 98

NOTE:
If the engine is not running, an error message is displayed. Follow the instructions that appear.



Fig. 99

5. While checking the information that appears beside **Test situation** and **Engine Speed**, follow the test instructions in the messages that are displayed. (See fig. 98)

NOTE:
If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear.



Fig. 100

6. To perform the test again on the same cylinder, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return [ESC]** button or press the Esc key on your keyboard to return to the window where a different test can be selected.

Fully opening the ISC valve

When the shift is in the neutral position and the engine is idling, fully open the ISC valve, and then check that the engine speed increases and that the intake valves are normal. The ISC valve operates for two seconds during this test.

⚠ WARNING

When the ISC valve is fully open the engine speed will increase, therefore do not put the shift into gear.

1. Select the test to be performed, and then click the **Select** button or press the Enter key on your keyboard.

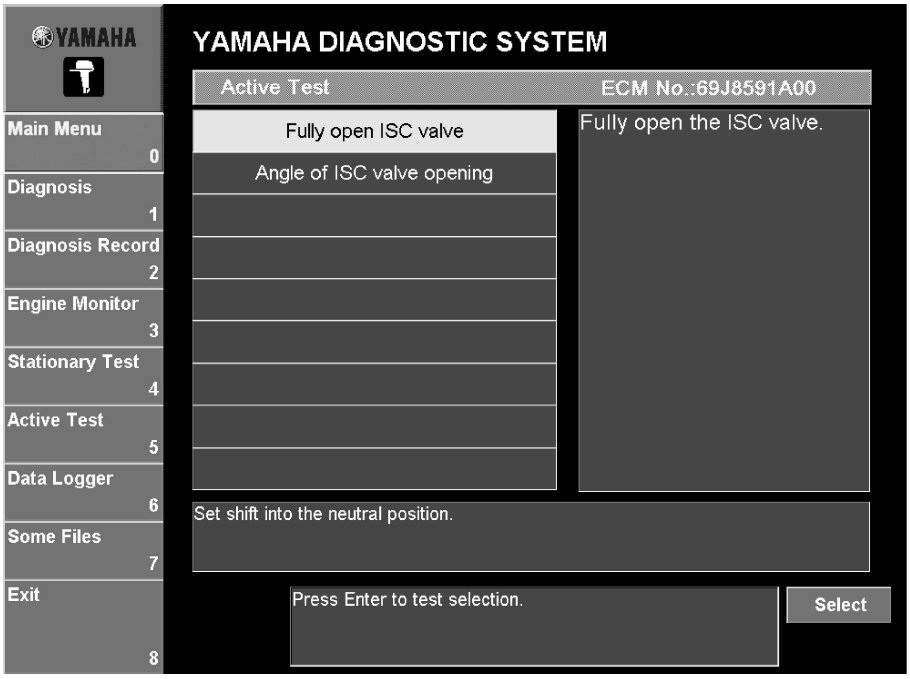


Fig. 101

2. Click the **Execute** button or press the Enter key on your keyboard.

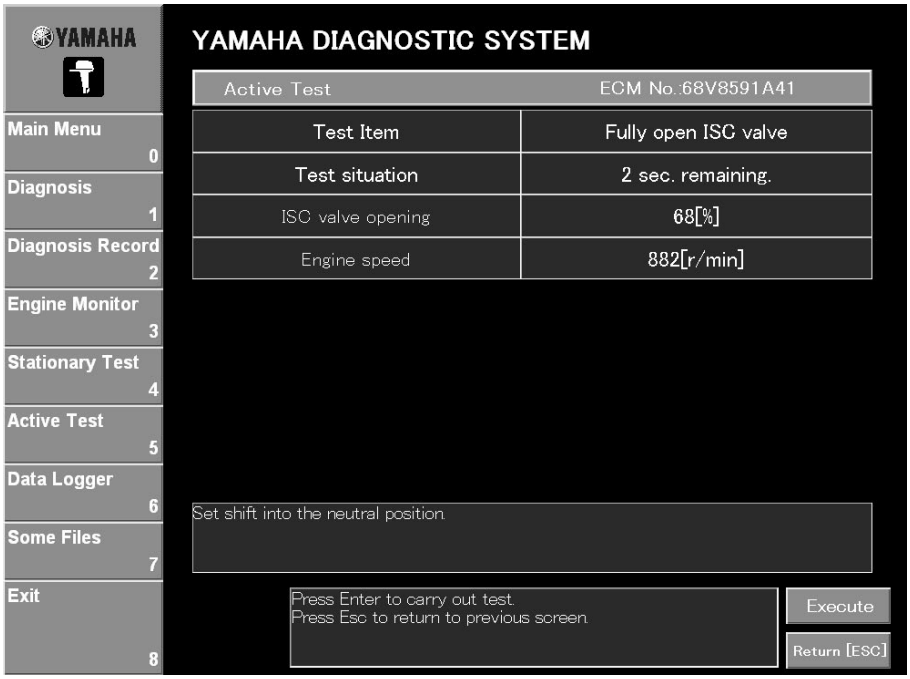


Fig. 102

3. The ISC valve is fully open. Check that the engine speed increases.

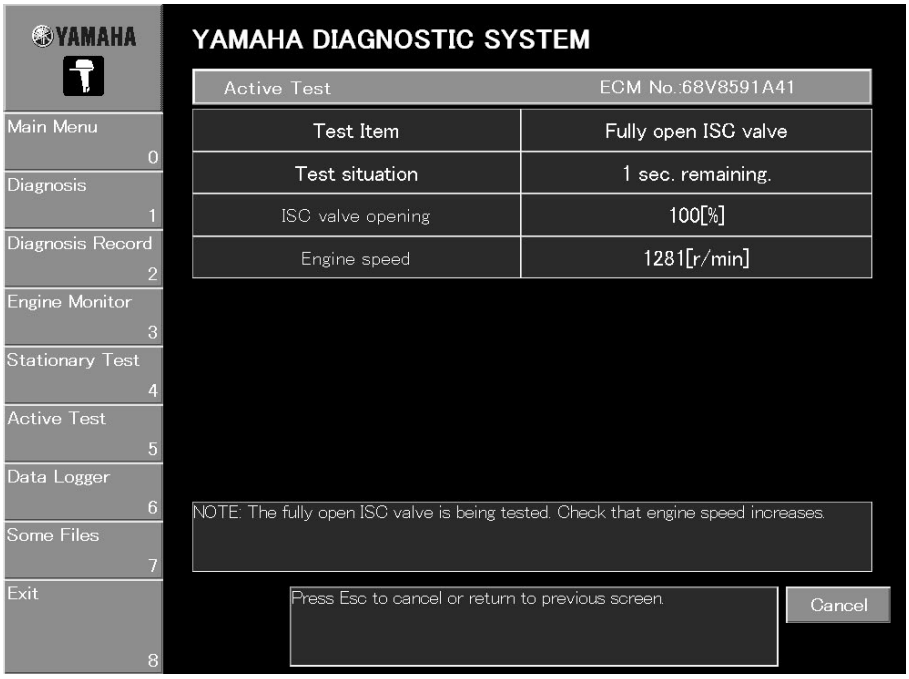


Fig. 103

4. To test again, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return** button to return to the test selection menu or press the Esc key on your keyboard.

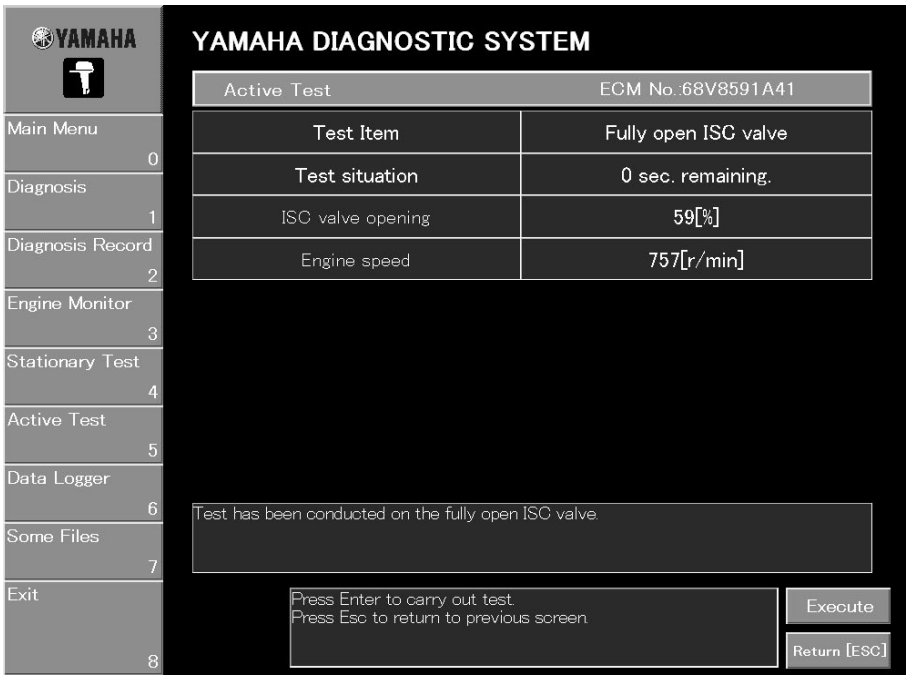


Fig. 104

Opening the ISC valve angle

Set the opening angle of the ISC valve, and adjust the air volume when the engine is idling. The operating time is 30 minutes.

Before testing warm the engine up.

1. Select the test to be performed, and then click the **Select** button or press the Enter key on your keyboard.

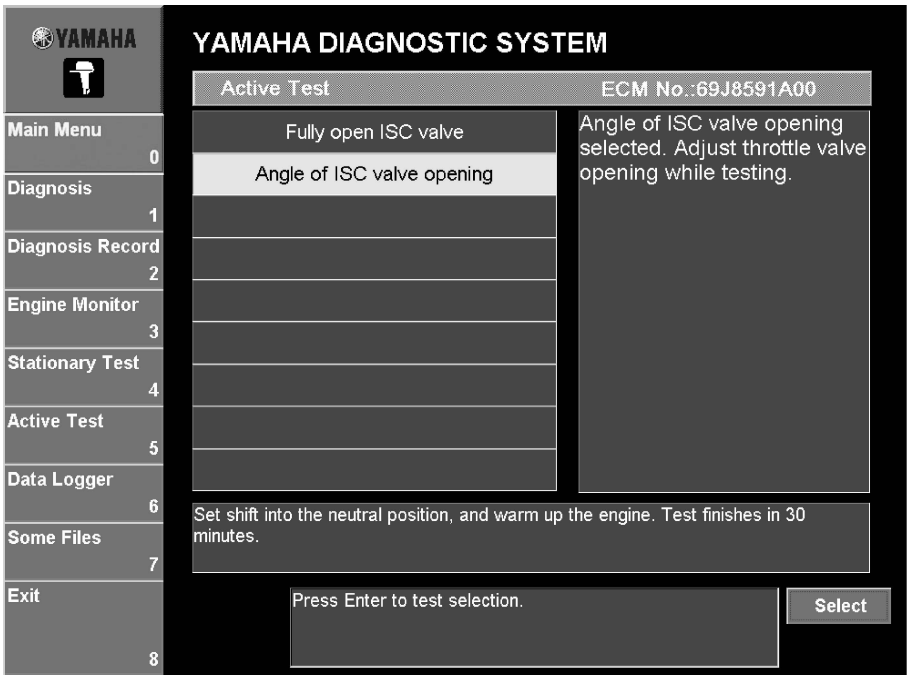


Fig. 105

2. Click the **Execute** button or press the Enter key on your keyboard.

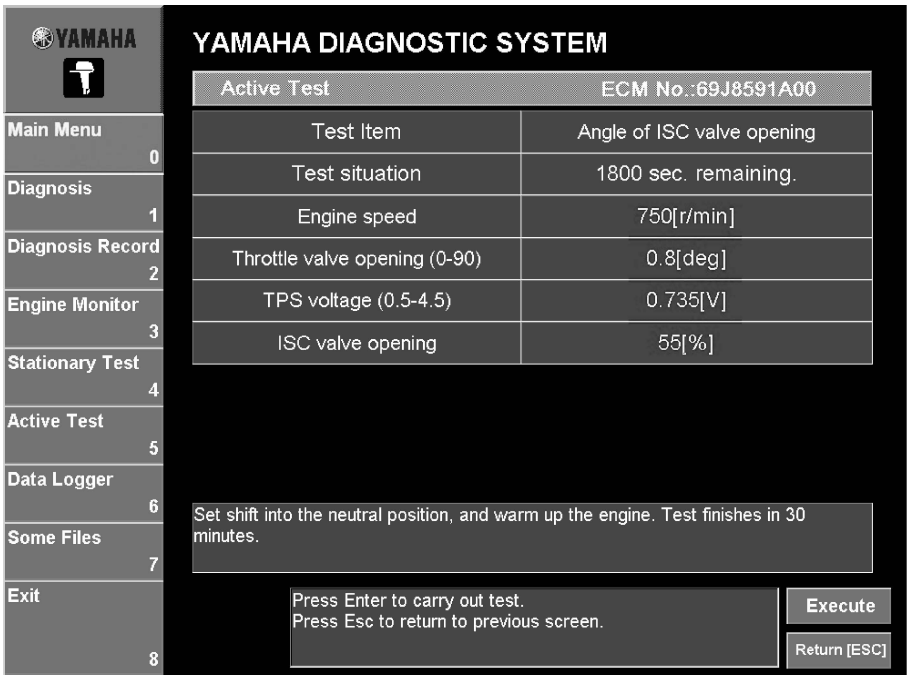


Fig. 106

3. Check the opening angle of the ISC valve is set. Refer to the service manual for adjusting procedures. After 30 minutes have passed, the test will end automatically.

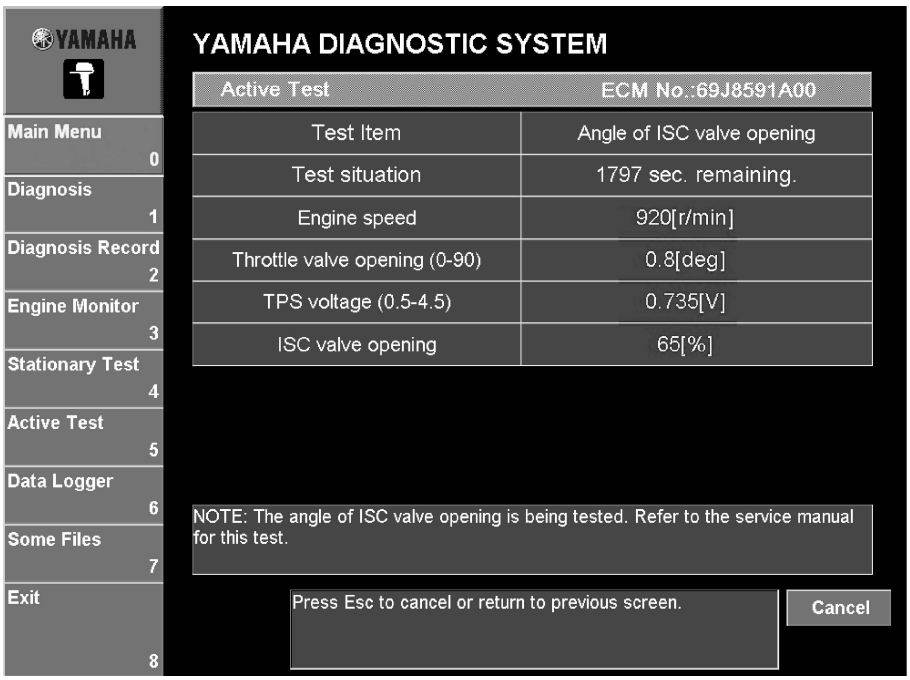


Fig. 107

4. To test again, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return** button to return to the test selection menu or press the Esc key on your keyboard.

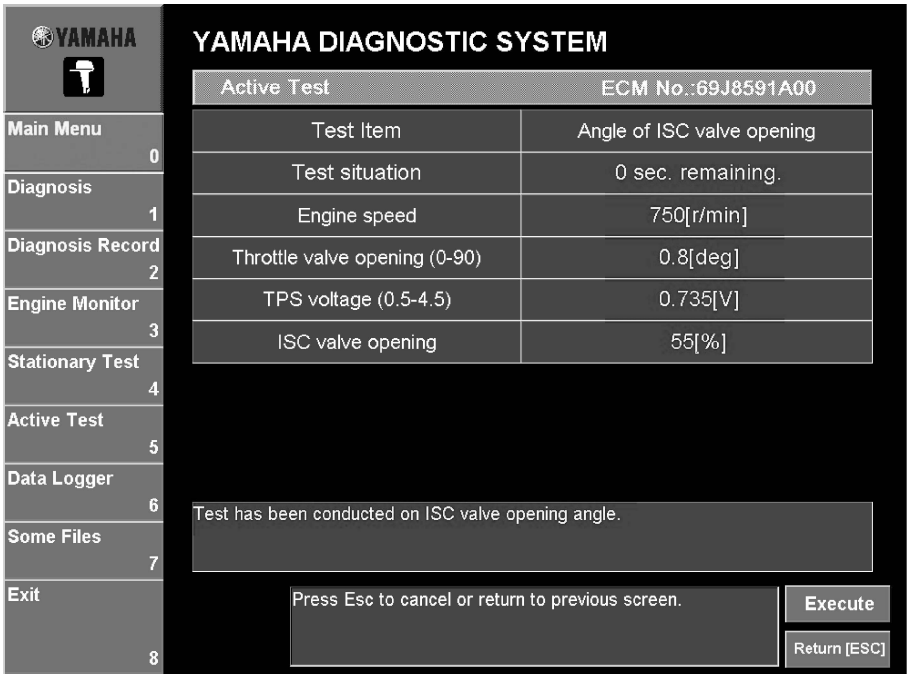


Fig. 108

DATA LOGGER

Data Logger item selection

A window that allows you to select the **Data comparison graph**, **Engine operating hours according to engine speed**, or **ECM record data graph** window appears.

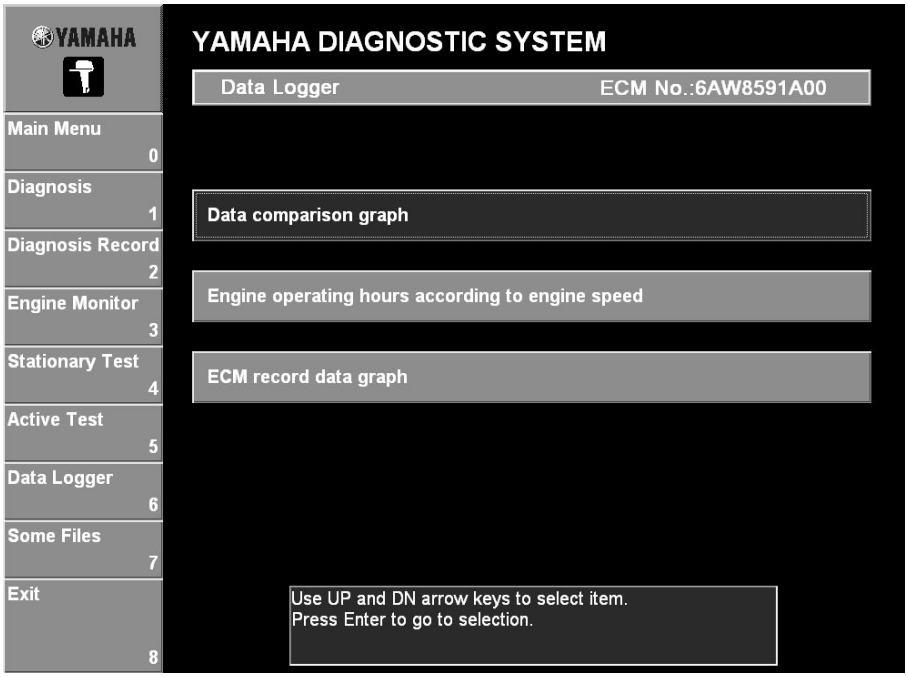


Fig. 109

Data comparison graph

1. Click the **Data comparison graph** button or press the up or down arrow key on your keyboard to select it and press the Enter key. (See fig. 109)

2. Select the desired items by either clicking them or pressing the up or down arrow keys on your keyboard, and then press the space bar. (Fig. 110)

A window appears that allows you to select the items ① to be graphed. No more than two items can be displayed.

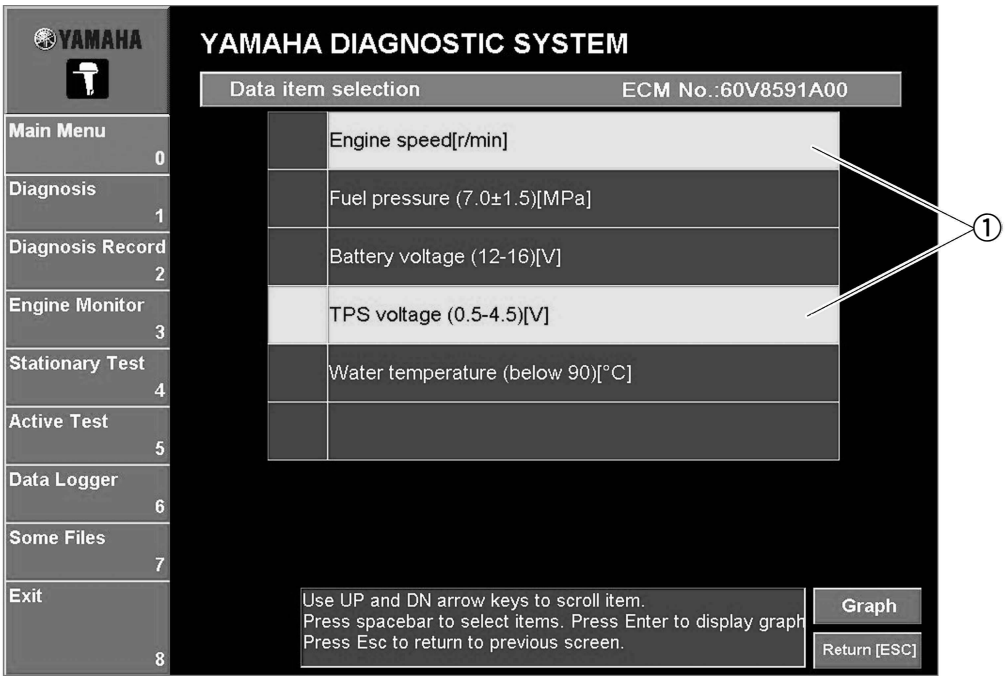


Fig. 110

List of data comparison graph items

Item
Battery voltage
Engine speed
Engine temperature
Fuel pressure
Intake pressure
Oil press switch
Oil pressure

Item
Oxygen sensor voltage
Shift position sensor
Throttle position sensor
Throttle request
TPS voltage
Water temperature

NOTE:

- Selected items have a light blue background. Items that are not selected have a blue background.
- At initialization, **Engine speed [r/min]** is selected.
- Some items may not be available depending on the model of the outboard motor.

3. Click the **Graph** button or press the Enter key on your keyboard. (See fig. 110) The **Data comparison** window is displayed.

NOTE:

A line graph appears with the items selected in the **Data item selection** window on the vertical axes and the **Time before engine stop** on the horizontal axis.

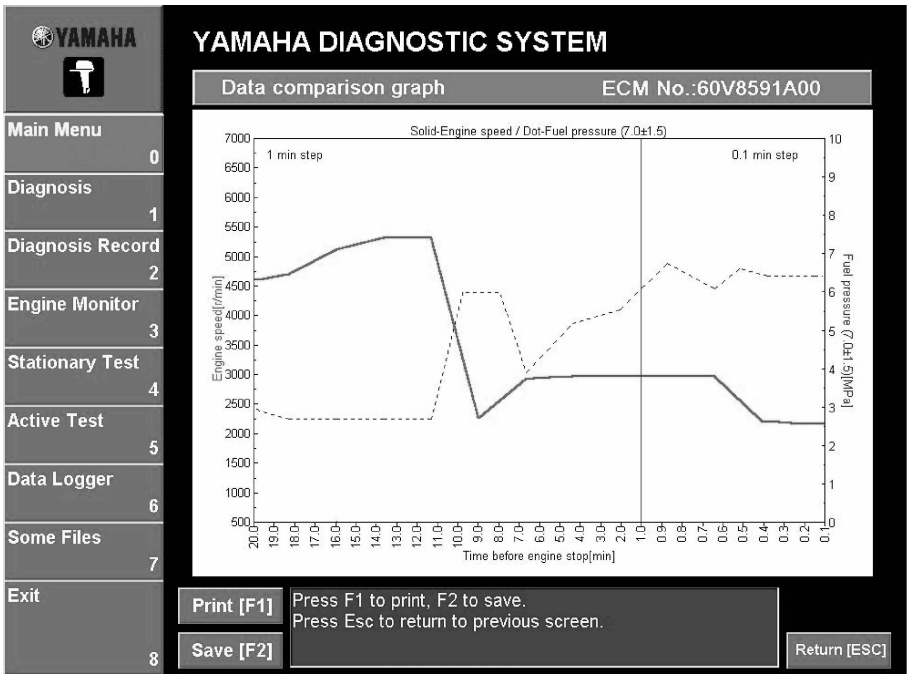


Fig. 111

NOTE:

- The item on the left vertical axis is graphed with a solid line and the item on the right vertical axis is graphed with a dotted line.
- Although the engine is running, the graphed lines do not show the present engine conditions. The graphed lines only display the values recorded up until the time the Enter key on your keyboard was pressed in the **Data Logger item selection**.

Engine operating hours according to engine speed

1. Click the **Engine operating hours according to engine speed** button or press the up or down arrow key on your keyboard to select it and press the Enter key. (See fig. 109)
2. The operating hours as compared to the engine speed and the total operating hours are displayed. (Fig. 112)

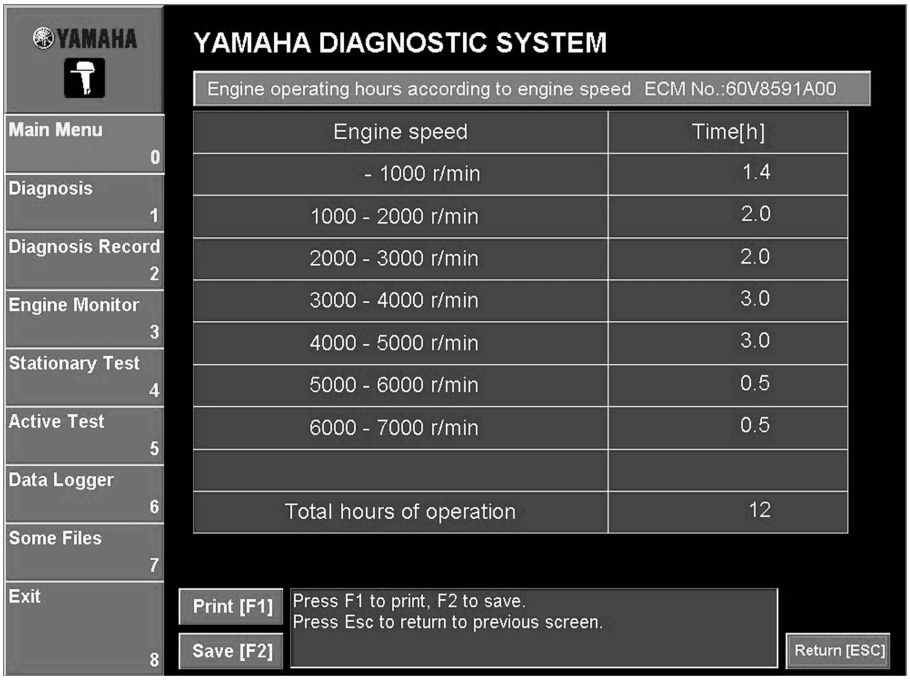


Fig. 112

A window is displayed showing the number of hours that the engine was operated at each engine speed range and the total hours of operation.

NOTE:

- Although the engine is running, the current operating time is not included in the displayed time. The displayed time only shows the total hours until the time the Enter key on your keyboard was pressed in the **Data Logger item selection**.
- The sum of the **Engine operating hours according to engine speed** is not equal to the total hours of operation since the hours are rounded to one decimal.

ECM record data graph

Four seconds of record data stored in the ECM, two seconds before and two seconds after malfunctions occurred, can be displayed in a graph.

ECM record data can be saved and reviewed when the computer is connected to the ECM using the communication cable.

The saved ECM record data can even be recalled and reviewed offline.

NOTE:

This function may not be available depending on the model of the outboard motor.

When **Display pattern 1**, **Display pattern 2**, or **Display pattern 3** is used, the displayed monitor items have been fixed in the software. When **Display item selection** is used, you can select the monitor items that you wish to display.

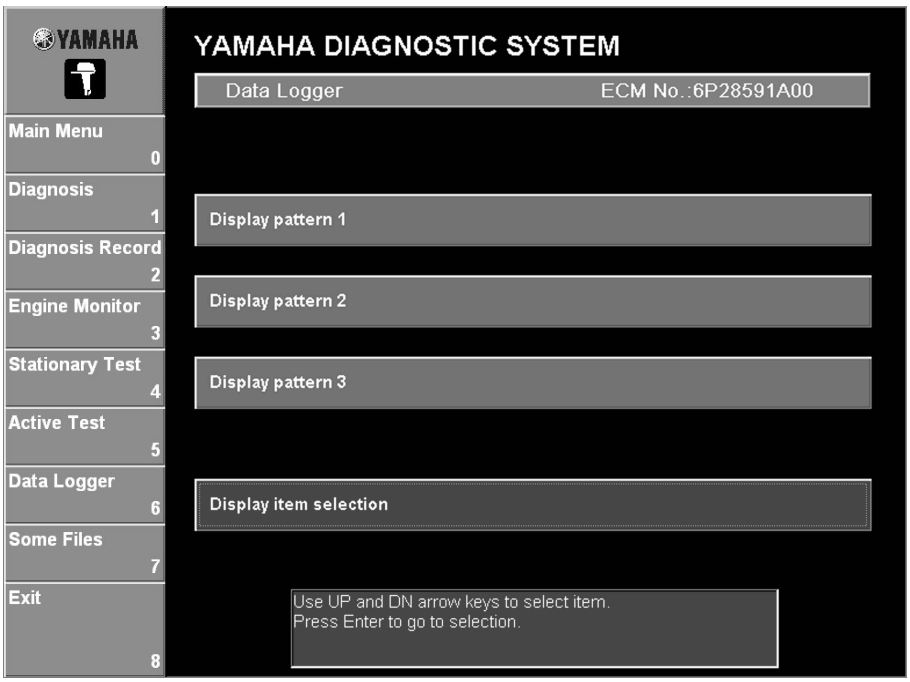


Fig. 113

Items graphed using Display pattern 1

Item
Engine speed
Accelerator position sensor 1
Throttle position sensor 1
Target TPS voltage*1

Items graphed using Display pattern 2

Item
Accelerator position sensor 1
Accelerator position sensor 2
Throttle position sensor 1
Throttle position sensor 2

Items graphed using Display pattern 3

Item
Engine speed
Target TPS voltage*1
Target TPS voltage for ISC*4

Items that can be graphed using Display item selection

Item
Engine speed
Accelerator position sensor 1
Accelerator position sensor 2
Throttle position sensor 1
Throttle position sensor 2
Throttle request
Intake pressure
Battery voltage
Target TPS voltage*1
Ref. TPS voltage*2
Ref. acc. pos. sensor voltage*3

Item
Target TPS voltage for ISC*4
Engine stop mode
Engine start mode
Engine stop mode with SW
Engine stop lanyard switch
Main relay
Electronic throttle relay
Overheat warning
Low oil pressure
Engine hours

*1: “Target TPS voltage” stands for “Target Throttle Position Sensor voltage”. This item shows the target output voltage of TPS. This value means that ECM should control to open throttle valve to get the goal open degree.

*2: “Ref. TPS voltage” stands for “Reference Throttle Position Sensor voltage”. This item shows the criterion output voltage of TPS. This value is used to detect the TPS output voltage during engine operation.

*3: “Ref. acc. pos. sensor voltage” stands for “Reference accelerator position sensor voltage”. This item shows the criterion output voltage of Accelerator position sensor. This value is used to detect the Accelerator position sensor output voltage when the remote control throttle lever opens.

*4: “Target TPS voltage for ISC” stands for “Target Throttle Position Sensor voltage for Idle Speed Control”. ECM controls the engine idle speed by using throttle valve attached TPS. This target voltage is used by ECM to achieve the goal open degree of the throttle valve at idle speed.

Graphing using Display patterns 1, 2, and 3 (when computer is connected to ECM using communication cable)

1. Click the **ECM record data graph** button or press the up or down arrow key on your keyboard to select it and press the Enter key. (See fig. 109)

2. Select the disk and folder where the data will be saved and specify its file name. (Fig. 114)

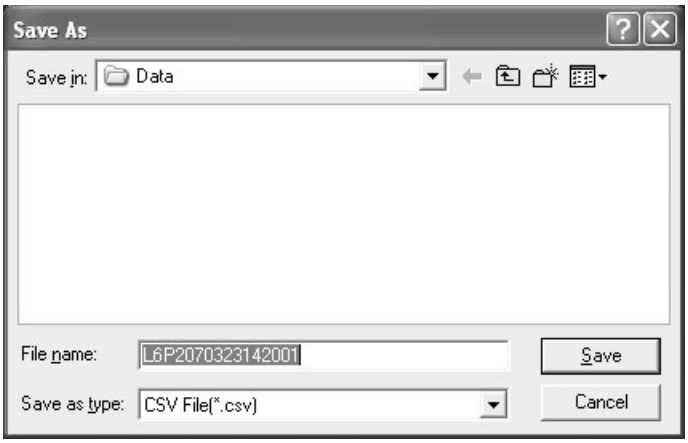


Fig. 114

NOTE:

The default file name is assigned as shown below.

Example: R 6P2 07 03 23 1420 XX .csv

ID code Model Year Month Day Time File serial number

NOTE:

If there is no record data stored in the ECM, the **Command Confirmation** window is displayed. Follow the instructions that appear.



Fig. 115

3. Select the display pattern by either clicking the **Display pattern 1**, **Display pattern 2**, or **Display pattern 3** button or pressing the up or down arrow key on your keyboard and pressing the Enter key.

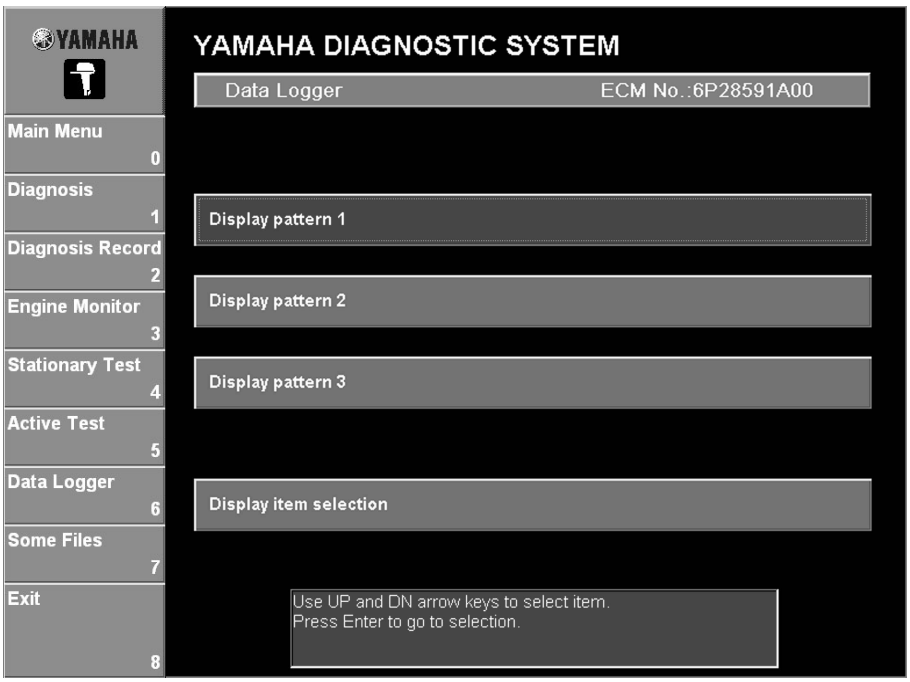


Fig. 116

4. The selected graph data is displayed.

Display pattern 1

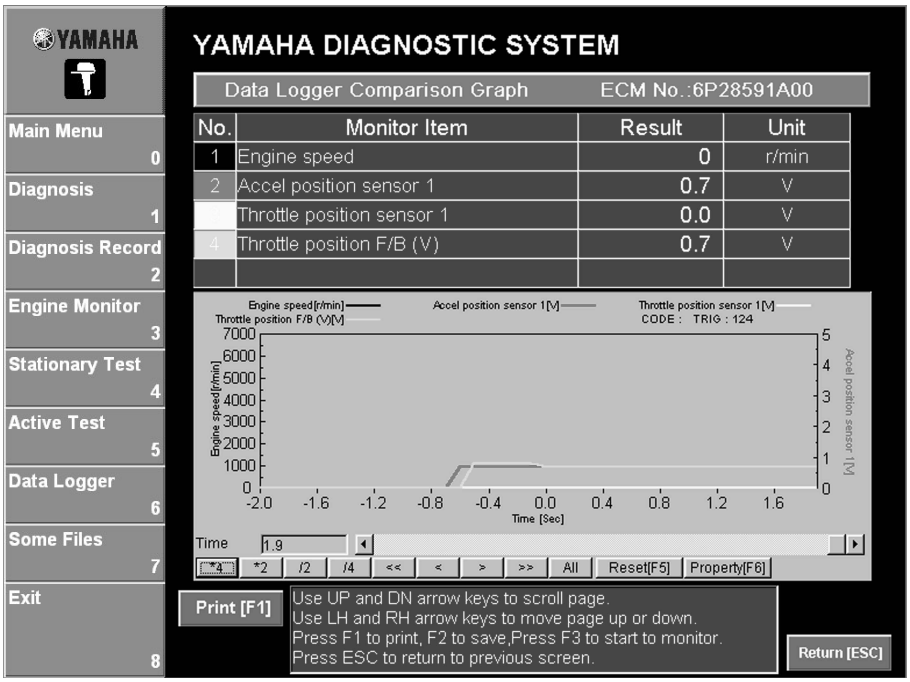


Fig. 117

Display pattern 2

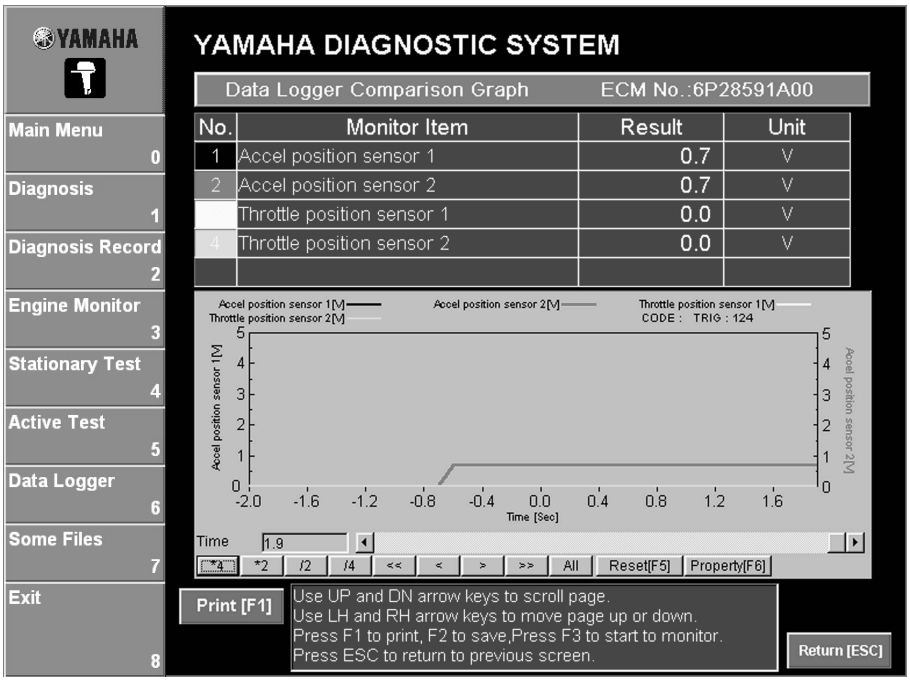


Fig. 118

Display pattern 3

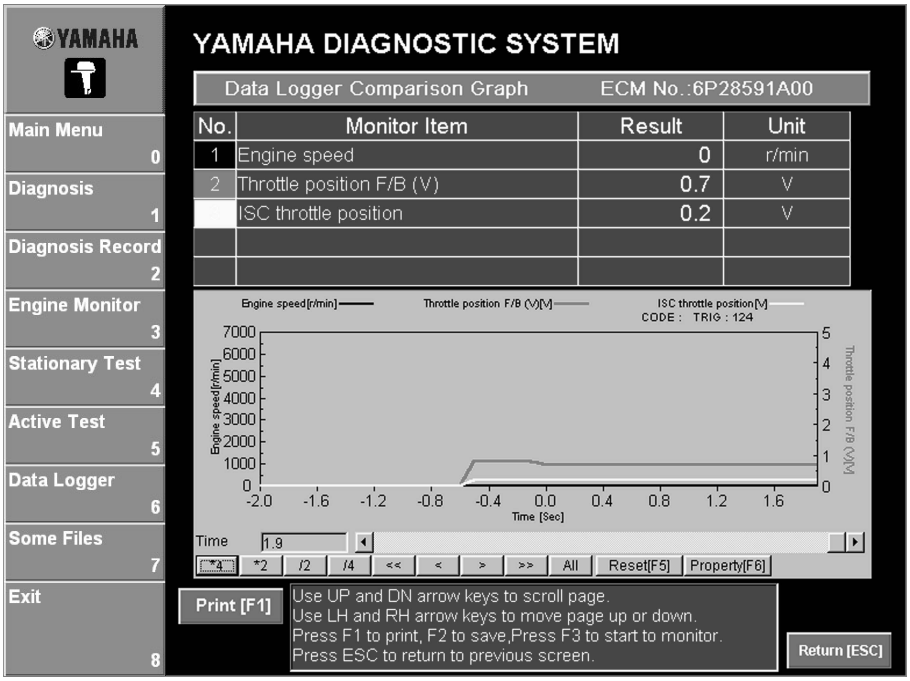


Fig. 119

Graph window controls (keys and buttons)

Keyboard	Button	Operation	Remarks
← →	< >	Moves cursor in indicated direction (by one sample increment).	Disabled when monitoring.
Shift + ← →	<< >>	Moves cursor in indicated direction (by ten sample increments).	Disabled when monitoring.
Ctrl + ← →	None	Moves cursor in indicated direction (by 100 increments).	Disabled when monitoring.
Insert	*2	Zooms in on time axis (2x zoom, centered on cursor).	Disabled when monitoring.
Delete	/2	Zooms out on time axis (1/2 zoom, centered on cursor).	Disabled when monitoring.
PageUp	*4	Zooms in on time axis (4x zoom, centered on cursor).	Disabled when monitoring.
PageDown	/4	Zooms out on time axis (1/4 zoom, centered on cursor).	Disabled when monitoring.
Space	All	Returns graph display settings to their defaults.	Disabled when monitoring.
F5	Reset[F5]	Deletes currently saved data and returns graph display settings to their defaults. (This feature is disabled during offline operation.)	Disabled when monitoring.
F6	Property[F6]	Displays the graph properties window. (Note that the Logging settings are disabled during offline operation.)	Disabled when monitoring.

Graphing using Display item selection (when computer is connected to ECM using communication cable)

1. Click the **ECM record data graph** button or press the up or down arrow key on your keyboard to select it and press the Enter key. (See fig. 109)
2. Select the disk and folder where the data will be saved and specify its file name. (Fig. 120)

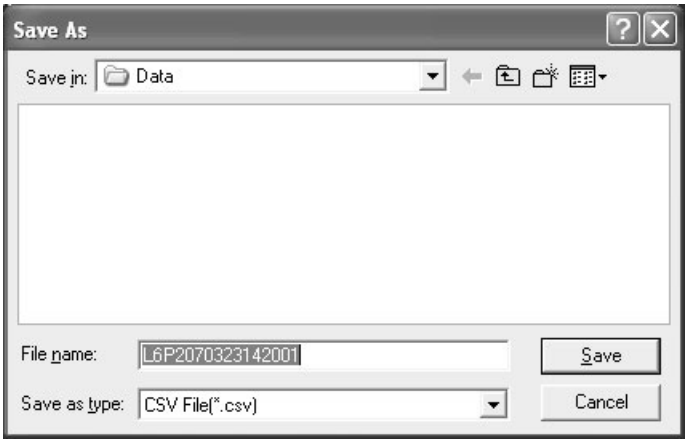


Fig. 120

NOTE:

The default file name is assigned as shown below.

Example: R 6P2 07 03 23 1420 XX .csv

ID code Model Year Month Day Time File serial number

NOTE:

If there is no record data stored in the ECM, the **Command Confirmation** window is displayed. Follow the instructions that appear.



Fig. 121

3. To select the graph items, click the **Display item selection** button or press the up or down arrow key on your keyboard to select it and press the Enter key.

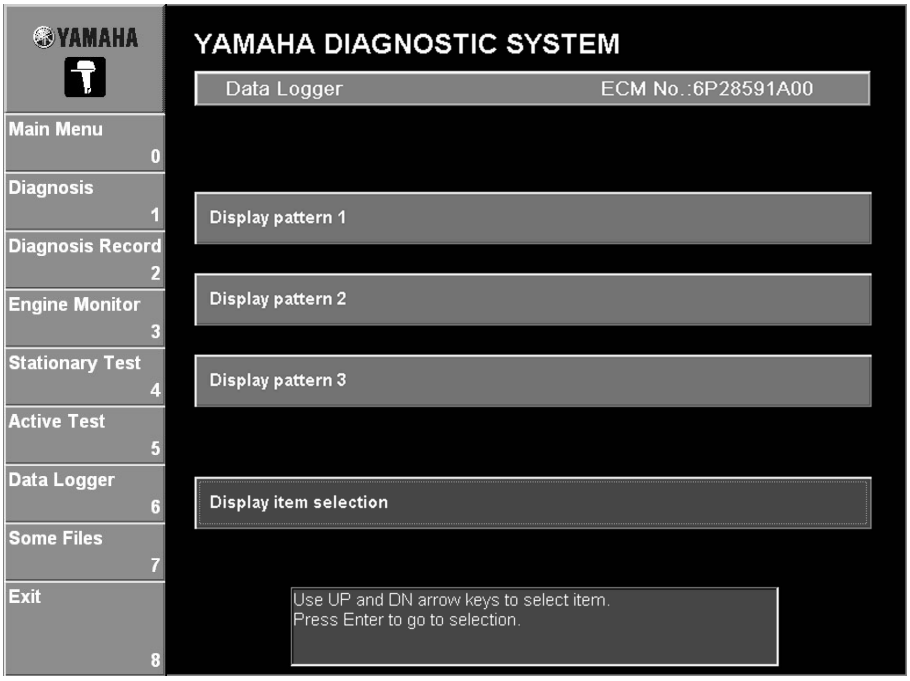


Fig. 122

4. Select an item by either clicking it or pressing the up or down arrow keys on your keyboard, and then press the space bar. (Fig. 123) For a list of the items that can be selected, refer to “Items that can be graphed using Display item selection”.

NOTE:

- Selected items have a light blue background. Items that are not selected have a blue background.
- Up to five items can be selected.

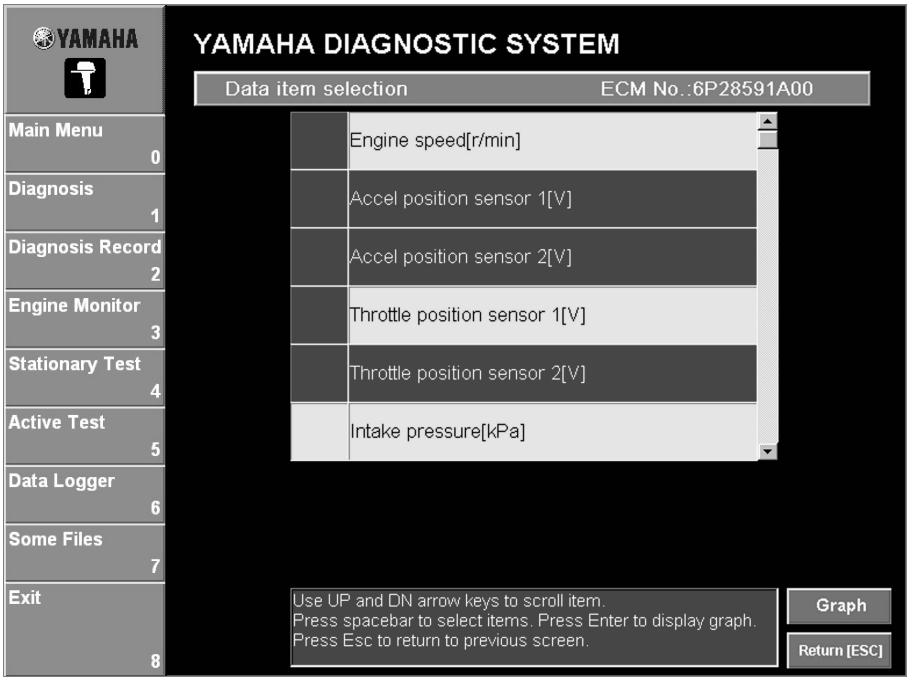


Fig. 123

5. Click the **Graph** button. (See fig. 123) The window is displayed. (Fig. 124) For information on the buttons that appear below the graph, refer to “Graph window controls (keys and buttons)”.

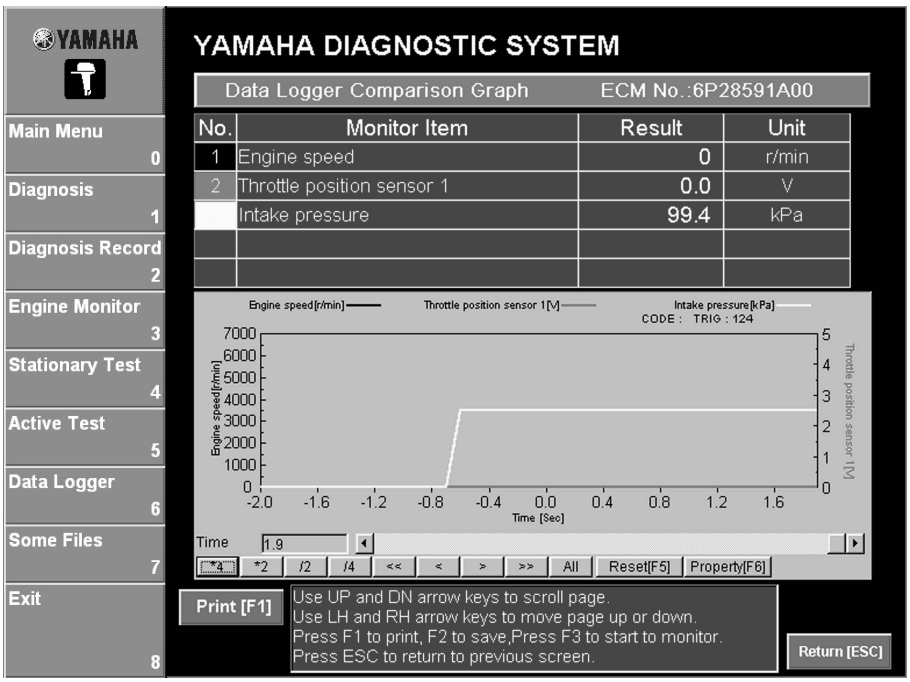


Fig. 124

Graphing (when computer is not connected to ECM)

1. With the adapter disconnected, start up the Yamaha Diagnostic System on your computer. Then click the **Starting service tool [Enter]** button, or press the Enter key.

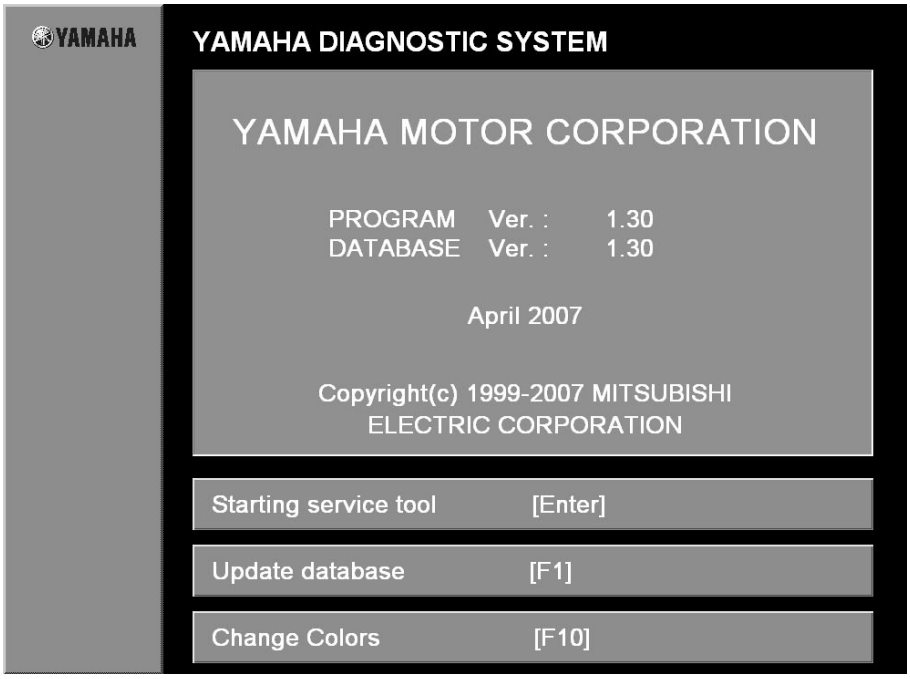


Fig. 125

2. Click or press any key to display the main menu.

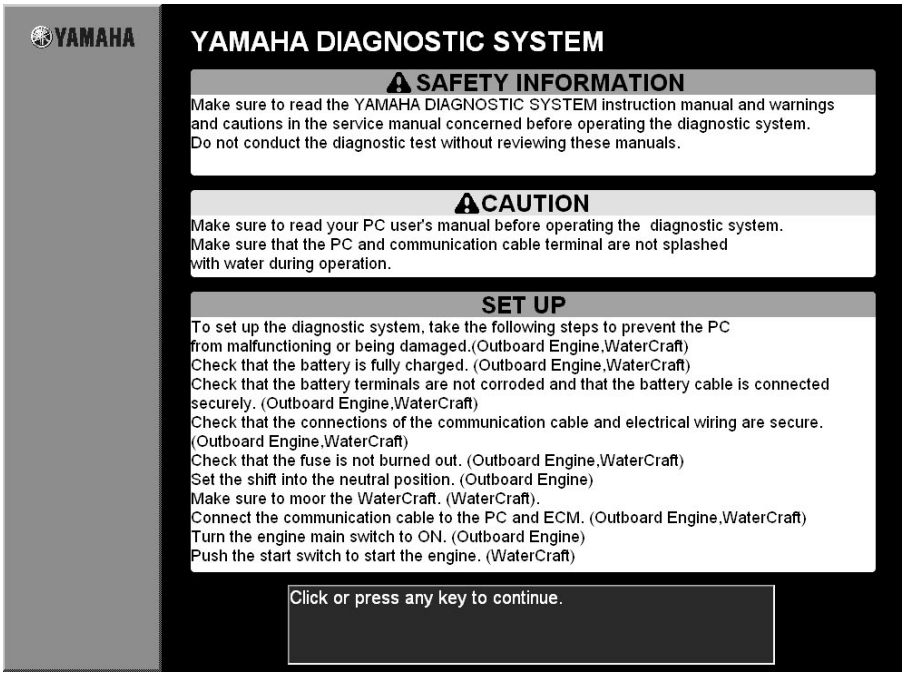


Fig. 126

3. When the “communication error” dialog appears, click the **OffLine** button.



Fig. 127

4. Click the **Scan Tool** menu in the Main Menu or press the number key “1” on your keyboard.

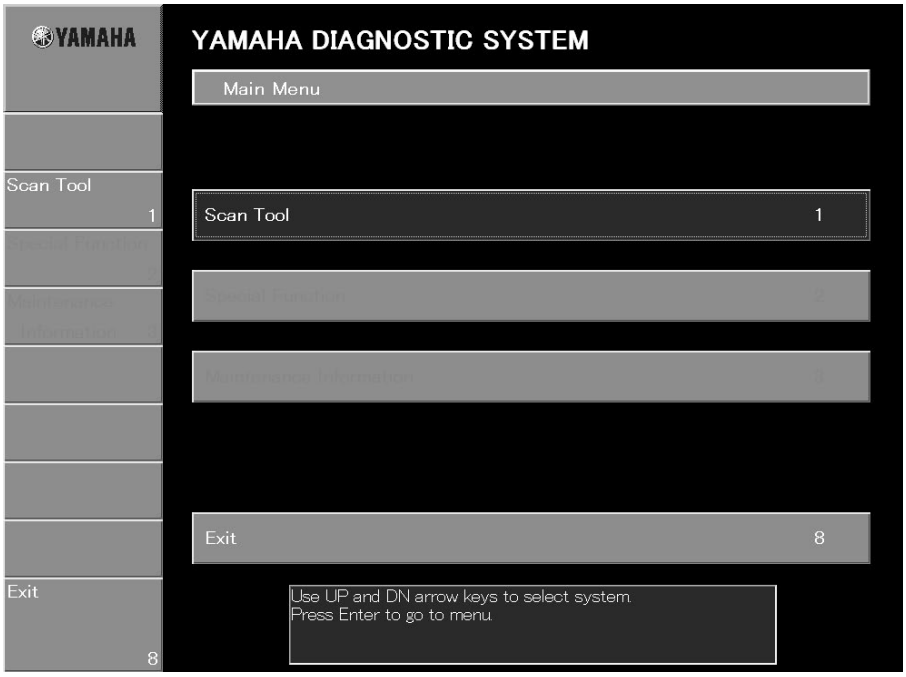


Fig. 128

5. Click the **Data Logger** command in the Main Menu or press the number key “3” on your keyboard.

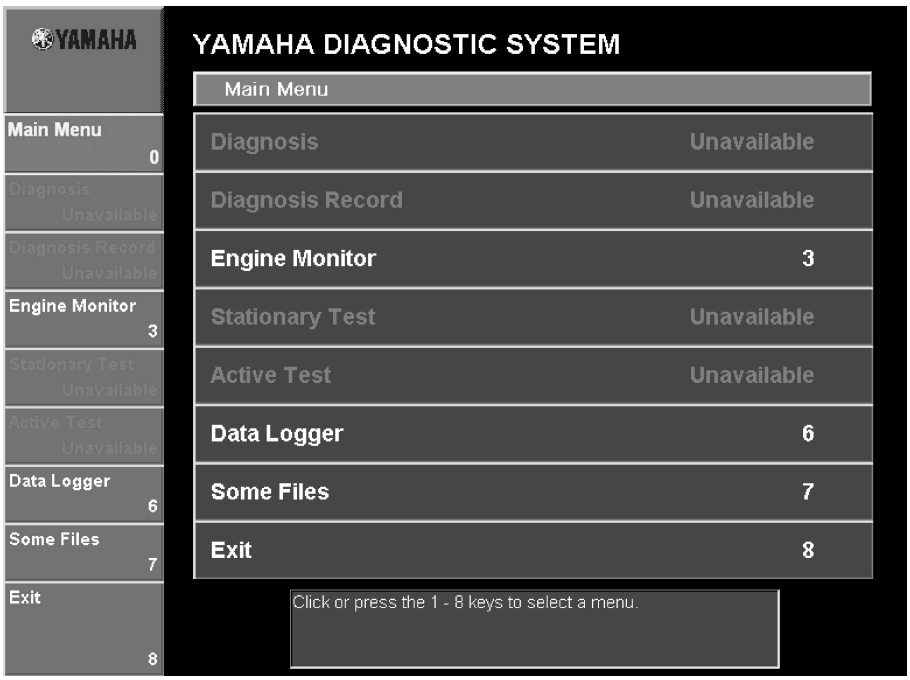


Fig. 129

6. Click the **ECM record data graph** button or press the up or down arrow key on your keyboard to select it and press the Enter key.

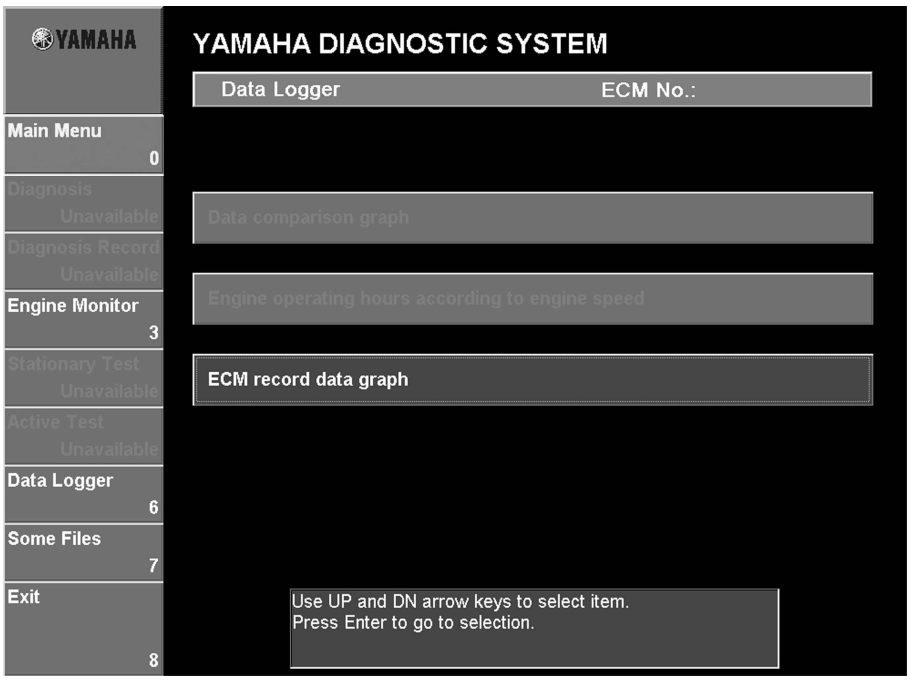


Fig. 130

7. Select the file containing the saved graph data that you want to view, and then click the **Open** button.

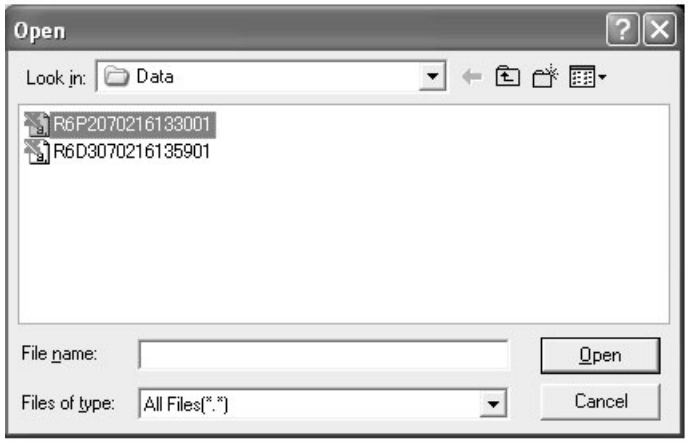


Fig. 131

8. The following window is displayed. (Fig. 132) Proceed to step 3 in the applicable graphing procedures.

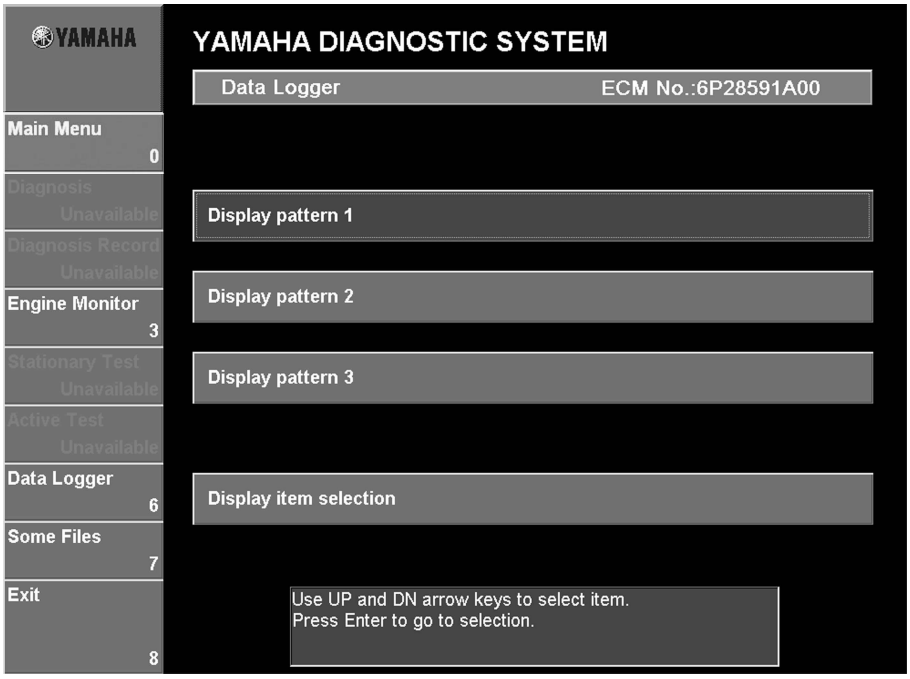


Fig. 132

NOTE:

- For **Display pattern 1**, **Display pattern 2**, and **Display pattern 3**, proceed to step 3 in "Graphing using Display patterns 1, 2, and 3 (when computer is connected to ECM using communication cable)".
- For **Display item selection**, proceed to step 3 in "Graphing using Display item selection (when computer is connected to ECM using communication cable)".

SOME FILES

This feature lets you select and run other applications while continuing to run the diagnostic system.



Fig. 133

NOTE:

This program may not work correctly on some computer configurations (on some OS/hardware combinations).

EXIT

The program is exited.

Operating procedure

1. Click the **Exit** button.

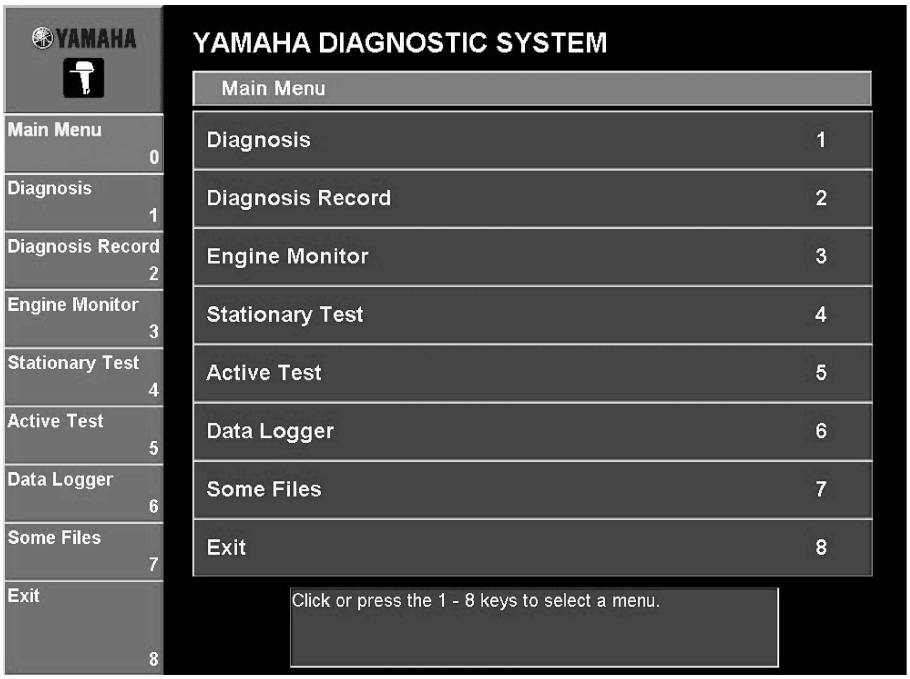


Fig. 134

2. Click the **OK** button or press the Enter key on your keyboard to exit the program. To cancel exiting the program, click the **Cancel** button or press the Esc key on your keyboard.

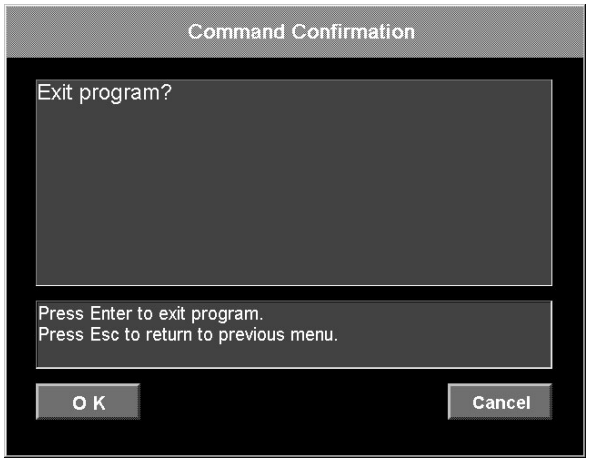


Fig. 135

TILT LIMITER SET

You can specify the tilt limiter angle by this command.

NOTE:

If an error occurs when selecting this command, an error message appears. Follow the instructions that appear in the error message.

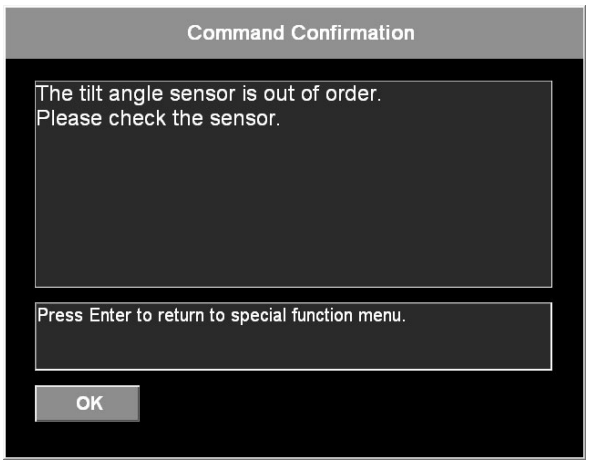


Fig. 136

Setting the tilt limiter

CAUTION:

- **Make sure the proper Outboard Motor mounting as referred to in the Rigging Guide or Service Manual.**
- **When mounting twin or triple motors, make sure the motor has the enough clearance to provide full movement between each motor as well as during trim/tilt functions.**

1. Make sure that the engine is stopped, and the main switch is turned to ON.
2. Set the outboard motor at the fully tilted down position.

3. Click the **Next** button or press the Enter key on your keyboard.

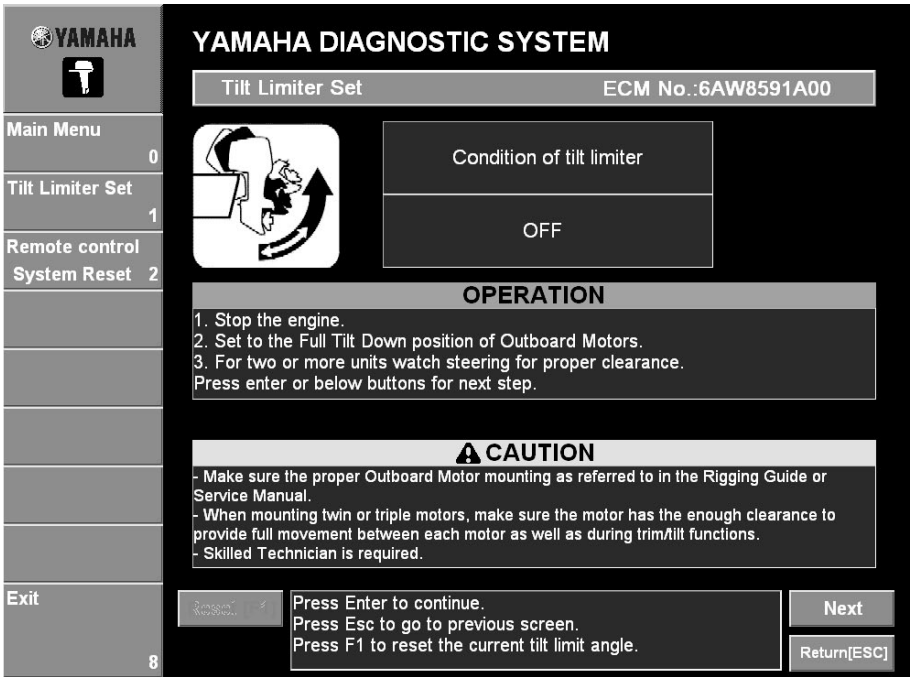


Fig. 137

4. Tilt up the outboard motor by using the PTT switch on the bottom cowling to decide the position where the tilt limiter is activated.

NOTE:

- Be sure to keep at least 2 inches of clearance between the outboard motor and the motor well.
- The outboard motor actually stops at the position slightly lower than the corresponding tilt limiter setting angle. Chose the setting angle so that adequate clearance is ensured for the tilt support lever engagement.
- Always disengage the tilt support lever before setting the tilt limiter. The tilt support lever cannot be released after setting at certain angles.

CAUTION:

To prevent contact of motor well and cowling, do not use the PTT switch on the Digital Electronic Control.

5. Click the **Set** button or press the Enter key on your keyboard.

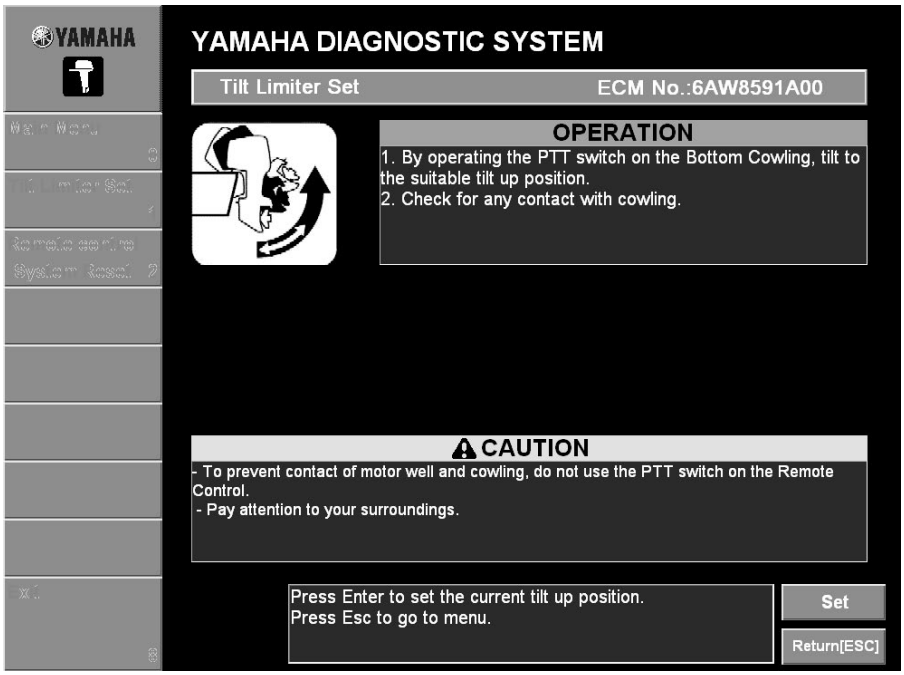


Fig. 138

6. Click the **OK** button or press the Enter key on your keyboard.

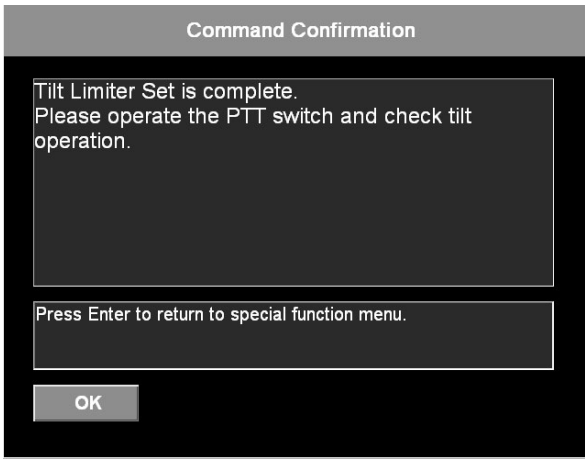


Fig. 139

NOTE:

If an error occurs, an error message is displayed. Follow the instructions that appear in the error message.

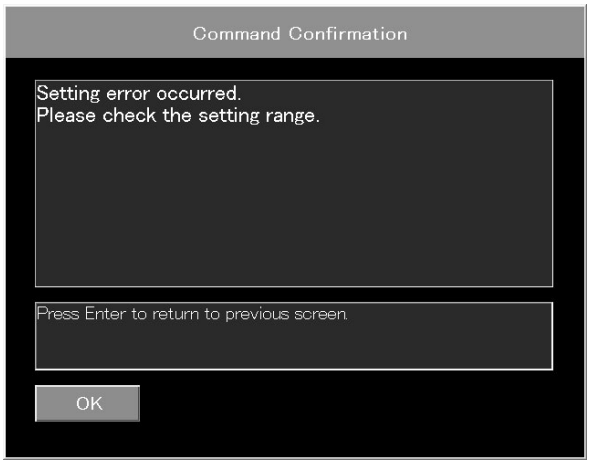


Fig. 140

7. Check the proper operation of the tilt limiter and the effective engagement of the tilt support lever.

NOTE:

Clear the tilt limiter setting and then reset it, if the proper operation can not be obtained, or the tilt limiter position is to be changed again.

Clear the tilt limiter

1. Make sure that the engine is stopped, and the main switch is turned to ON.
2. Set the outboard motor at the fully tilted down position.
3. Click the **Reset** button or press the F1 key on your keyboard. (Fig. 141)

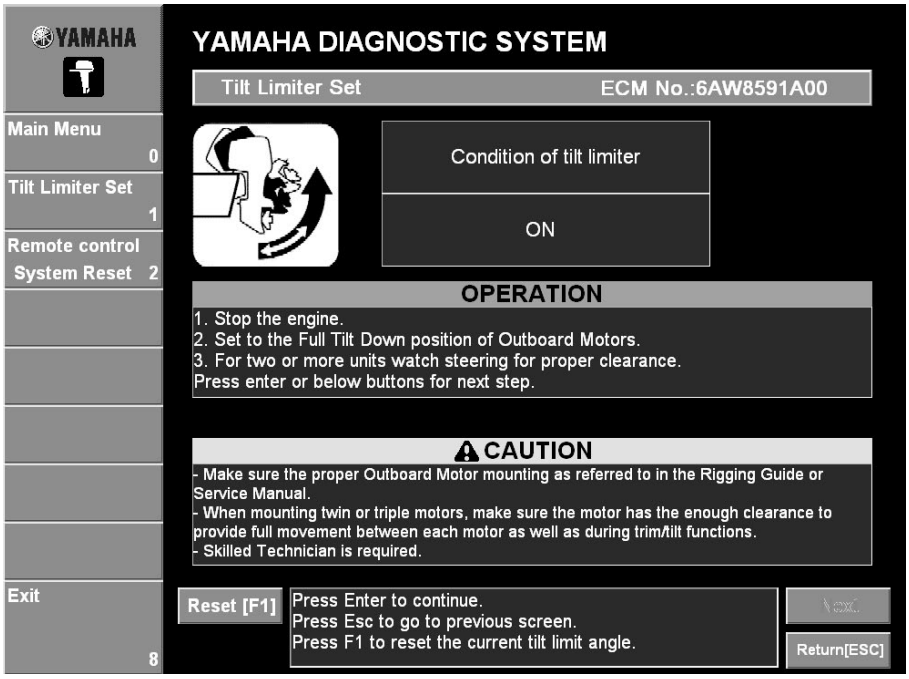


Fig. 141

4. Click the **OK** button or press the Enter key on your keyboard.



Fig. 142

5. Click the **OK** button or press the Enter key on your keyboard.



Fig. 143

DIGITAL ELECTRONIC CONTROL SYSTEM RESET

Identification between the outboard motor and the Digital Electronic Control is initialized by this command.

1. Click the **Next** button or press the Enter key on your keyboard.

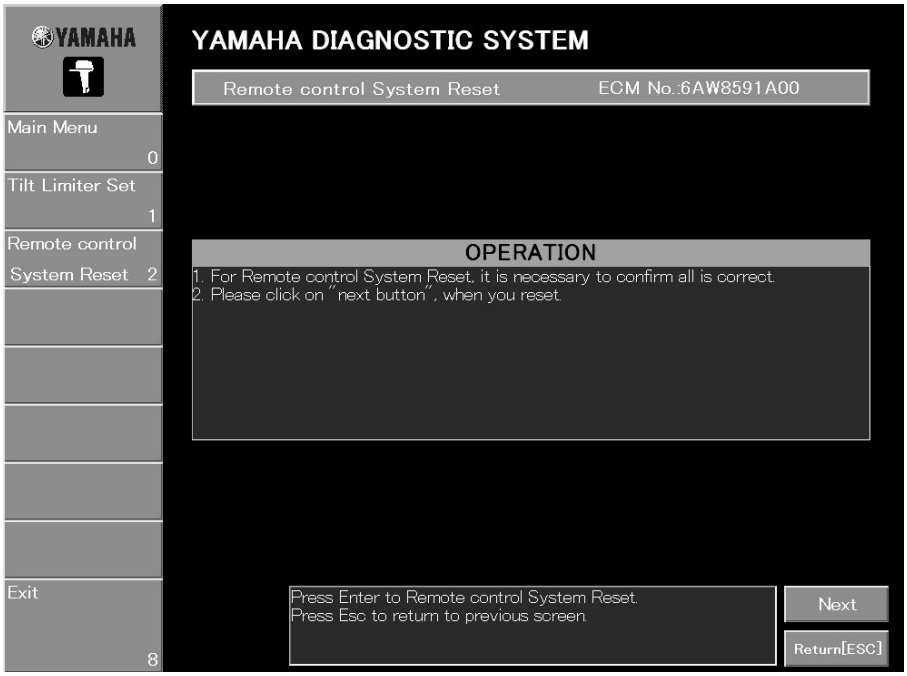


Fig. 144

2. Click the **OK** button or press the Enter key on your keyboard.

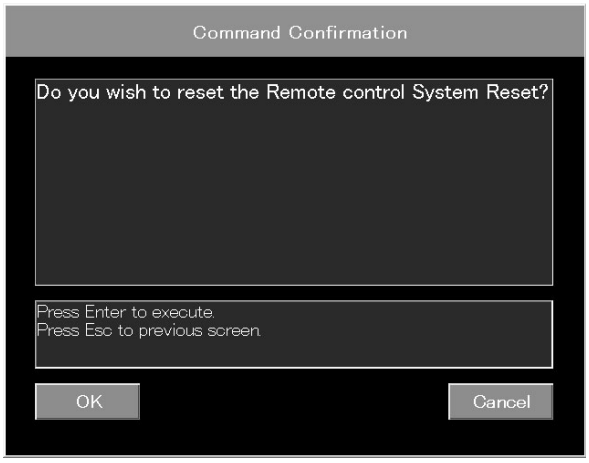


Fig. 145

3. Click the **OK** button or press the Enter key on your keyboard.

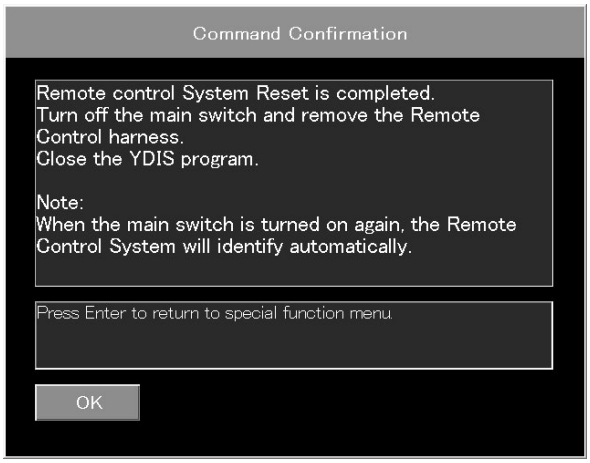


Fig. 146

4. Turn off the main switch of the outboard motor, and then remove the control harness of the Digital Electronic Control.

When the control harness is attached and main switch is turned on again, the outboard motor will identify the newly connected Digital Electronic Control automatically.

RECORD OF ENGINE OIL EXCHANGE

You can keep records of oil change by this command.

1. When you changed engine oil, click the **Set** button or press the Enter key on your keyboard to record the current time.

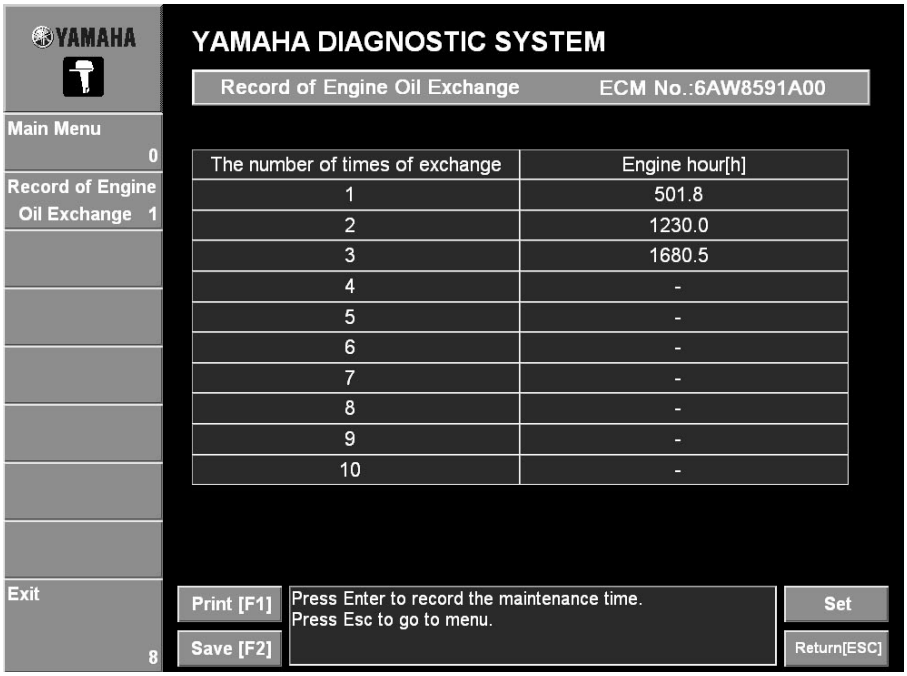


Fig. 147

2. Click the **OK** button or press the Enter key on your keyboard.

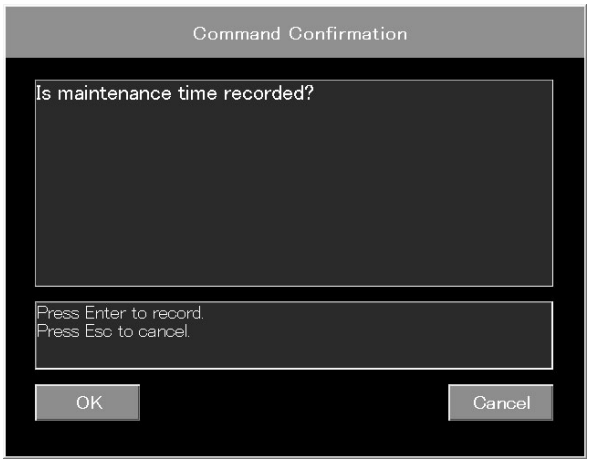


Fig. 148

NOTE:

If an error occurs when selecting this command, an error message appears. Follow the instructions that appear in the error message.

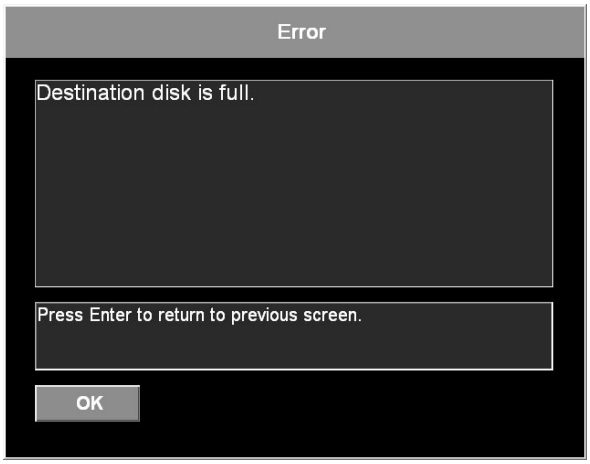


Fig. 149

TROUBLESHOOTING

Error content	Cause	Action
Communication cable related error occurs	Main switch is turned OFF.	Turn the main switch to ON.
	Communication cable is disconnected.	Connect communication cable between the computer's communication port and 3-pin communication coupler of the outboard motor.
	Battery is disconnected from the outboard motor.	Connect battery to outboard motor.
	The battery voltage is below 12 V.	Connect battery of 12 V or higher.
	The USB driver has not been installed.	Install the USB driver.
Application does not start	The hardware does not meet the requirements to operate this application.	Use a computer that meets the specified hardware requirements.
	YDS.exe is not installed in application directory.	If YDS.exe is not found in the application directory, install the application again.
	Other application (Service tool) is already in operation.	Quit the application in operation, since two applications (Service tool) cannot be operated simultaneously.
Application related error occurs	Error message "Program file or Database file is not installed properly. Please install again." is displayed.	Install program file or database file again.
Database related error occurs	Error message "Database files are not installed properly. Please update again." is displayed.	Update database again.
	Error message "System file not found ######.###." is displayed.	The database is not applicable to communication with ECM. Update database to correspond to ECM.
Incorrect fonts on screen	The computer language does not correspond to the application.	Use a computer that operates the required operating system.
When executing the stationary test or active test the test cannot be ended even if the Cancel is clicked.	Execute and Cancel buttons have been clicked more than necessary, and the ECM or PC does not operate properly.	Turn off your PC. Turn the main switch to OFF and reset the ECM.

APPENDIX

SETTING THE DESKTOP AREA

Use the following procedure to set the Yamaha Diagnostic System desktop area.

Compatible with SVGA (800 × 600 pixels) or more

1. From the taskbar at the bottom of your computer screen, click the **start** button, and then click the **Control Panel**.
2. In the Control Panel, click **Appearance and Themes**. (Fig. 150)



Fig. 150

3. Click **Display**.

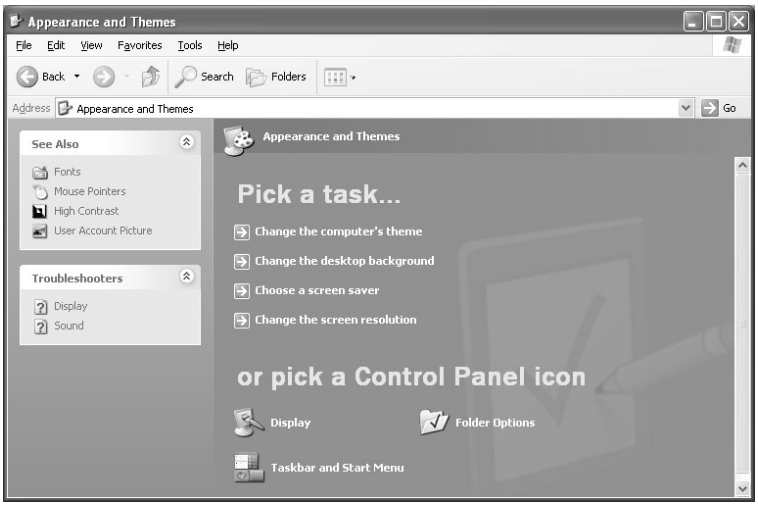


Fig. 151

4. Select **Settings** and slide the Screen resolution slider ①.

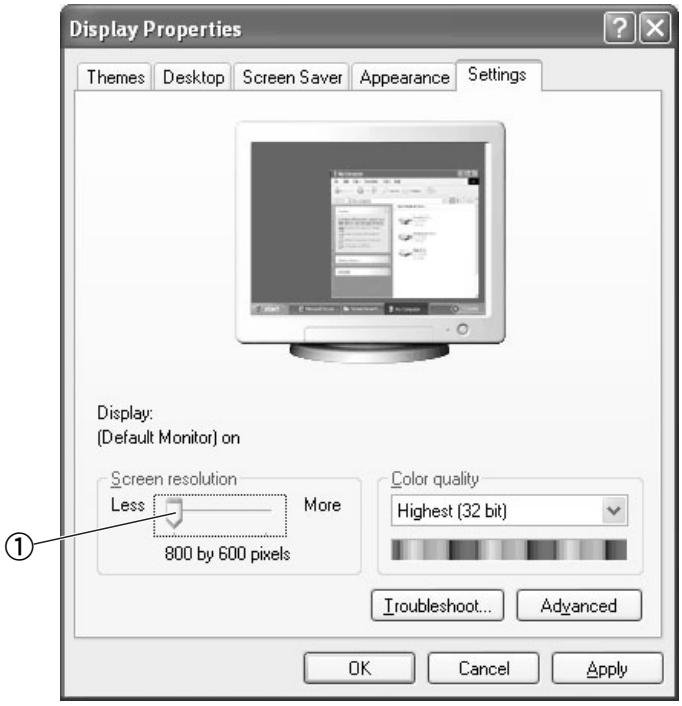


Fig. 152

5. Click the **Yes** button in the confirmation window to set the display area. To cancel, click the **No** button.



Fig. 153

UNINSTALLING THE YAMAHA DIAGNOSTIC SYSTEM

Use the following procedure to uninstall the Yamaha Diagnostic System.

1. Exit all programs before running the uninstaller.
2. From the taskbar at the bottom of your computer screen, click the **start** button, and then click the **Control Panel**.
3. In the Control Panel dialog box, click **Add or Remove Programs**. (Fig. 154)

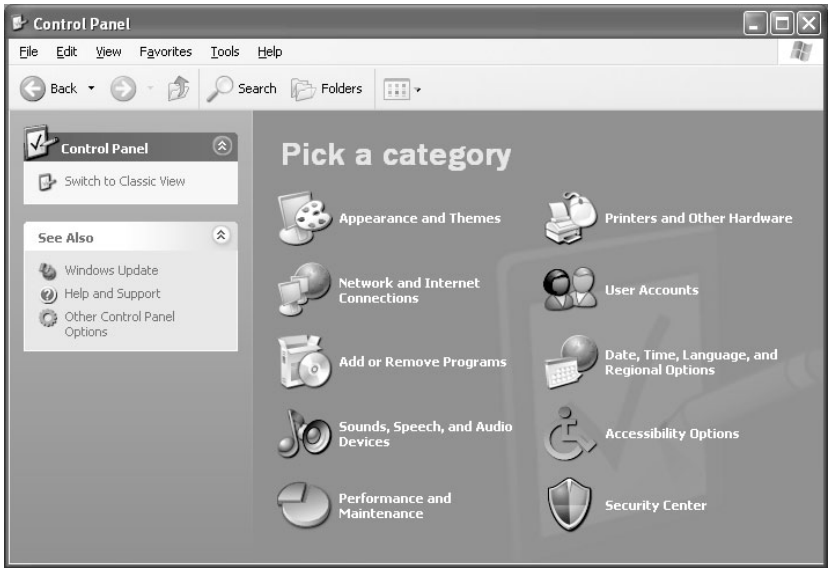


Fig. 154

4. Select **YAMAHA DIAGNOSTIC SYSTEM** and click the **Change/Remove** button.

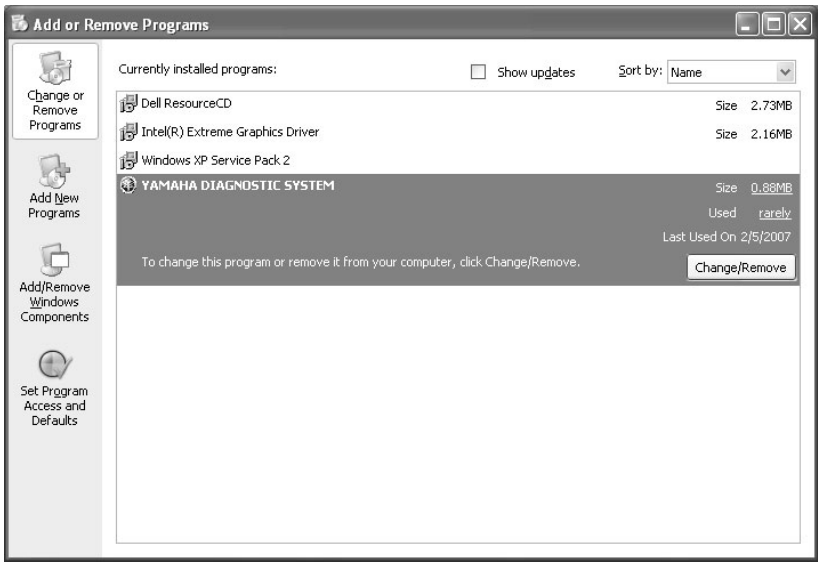


Fig. 155

NOTE:

To cancel the uninstall operation of the utility software, click the **Cancel** button.

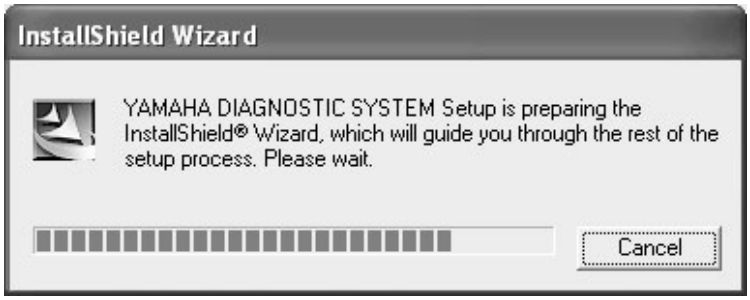


Fig. 156

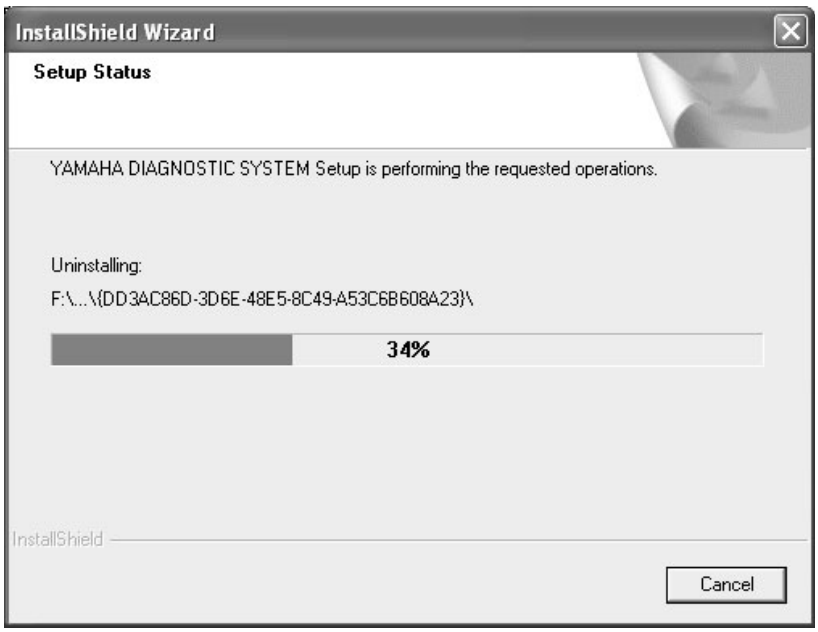


Fig. 157

5. After the uninstall operation is completed, the following dialog box appears. Click the **Finish** button.

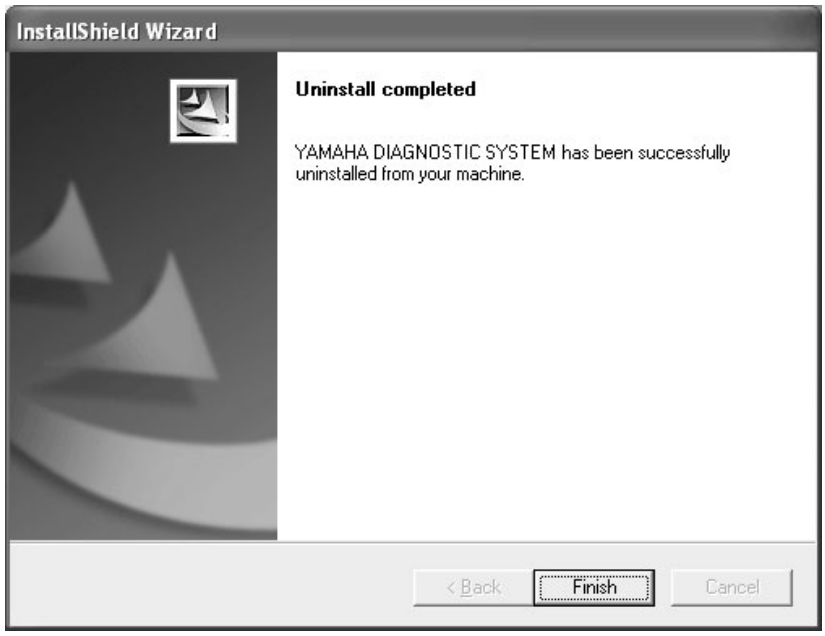


Fig. 158

ABBREVIATIONS

The following abbreviations are used in this instruction manual.

Angle of ISC valve opening
: Angle of Idle Speed Control valve opening

Atmospheric press sensor
: Atmospheric pressure sensor

Cam position sensor (EXH)
: Cam position sensor (EXHAUST)

Cam position sensor (PORT INT)
: Cam position sensor (PORT INTAKE)

Cam position sensor (STBD INT)
: Cam position sensor (STARBOARD INTAKE)

Engine-R.C. communication
: Engine-Remote Control communication

Fuel press sensor
: Fuel pressure sensor

Fully open ISC valve
: Fully open Idle Speed Control valve

Intake cam timing (STBD)
: Intake cam timing (STARBOARD)

Intake press sensor
: Intake pressure sensor

ISC valve opening
: Idle Speed Control valve opening

LPS (main)
: Lever Position Sensor (main)

LPS (sub)
: Lever Position Sensor (sub)

LPS_PORT (main)
: Lever Position Sensor_PORT (main)

LPS_PORT (sub)
: Lever Position Sensor_PORT (sub)

LPS_STBD (main)
: Lever Position Sensor_STARBOARD (main)

LPS_STBD (sub)
: Lever Position Sensor_STARBOARD (sub)

Oil control valve (STBD)
: Oil control valve (STARBOARD)

Oil ctrl. valve drive (PORT)
: Oil control valve drive (PORT)

Oil ctrl. valve drive (STBD)
: Oil control valve drive (STARBOARD)

Oil press sensor
: Oil pressure sensor

Oil press switch
: Oil pressure switch

Operate elect. fuel feed pump
: Operate electric fuel feed pump

Operate ISC valve
: Operate Idle Speed Control valve

Over-rev control release lead
: Over revolution control release lead

Ref. acc. pos. sensor voltage
: Reference accelerator position sensor voltage

Ref. TPS voltage
: Reference Throttle Position Sensor voltage

rpm
: Revolution per minute

RS232C
: Recommended Standard 232 version C

Target TPS voltage
: Target Throttle Position Sensor voltage

Target TPS voltage for ISC
: Target Throttle Position Sensor voltage for Idle Speed Control

TPS voltage
: Throttle Position Sensor voltage

USB
: Universal Serial Bus

Variable Cam Timing (STBD)
: Variable Cam Timing (STARBOARD)



Watercraft

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INTRODUCTION

FEATURES

The newly developed Yamaha Diagnostic System provides quicker detection and analysis of engine malfunctions.

By connecting your computer to the ECM (Electronic Control Module) of a watercraft using the communication cable, this software can be used to display sensor data and data stored in the ECM on a computer's monitor.

If this software is run on Microsoft Windows® 2000 or Windows XP, the information can be displayed in colorful graphics. Also, the software can be operated using either a mouse or a keyboard.

In addition, the data for the main functions (Diagnosis, Diagnosis record, Engine monitor, and Data logger) can be saved on a disk or printed out.

Functions

1. **Diagnosis:** Each sensor's status and each ECM diagnosis code or item is displayed. This enables you to find malfunctioning parts and controls quickly.
2. **Diagnosis record:** Sensors that had been activated and ECM diagnostic codes that have been recorded are displayed. This allows you to check the watercraft's record of malfunctions.
3. **Engine monitor:** Each sensor's status and the ECM data are displayed. This enables you to find malfunctioning parts quickly. In addition, the data displayed using the Engine Monitor function can be displayed in a graph.
4. **Stationary test:** Operation tests can be performed with the engine off.
5. **Active test:** Operation tests can be performed with the engine running.
6. **Data logger:** From the data stored in the ECM, at least two items of 78 seconds of recorded data are displayed on a graph. In addition, the operating time as compared to the engine speed and the total operating time are displayed. This allows you to check the operating status of the engine. For some models, you can also save the ECM record data in a file so that you can read and display the graph later.
7. **Some files:** Lets you select and run other applications while continuing to run the diagnostic program.

CONTENTS

1. CD-ROM (software + instruction manual) (1)
2. Adapter (1)
3. Communication cable (1)



Fig. 1

HARDWARE REQUIREMENTS

Make sure that your computer meets the following requirements before using this software.

Computer:	IBM PC/AT compatible computer
Operating system:	Microsoft Windows 2000 or Windows XP (English version)
CPU:	
Windows 2000:	Pentium, 166 MHz or higher (Pentium 233 MHz or higher recommended)
Windows XP:	Pentium, 300 MHz or higher (Pentium 500 MHz or higher recommended)
Memory:	
Windows 2000:	64 MB or more (128 MB or more recommended)
Windows XP:	128 MB or more (256 MB or more recommended)
Hard disk free space:	20 MB or more (40 MB or more recommended)
Drive:	CD-ROM drive
Display:	VGA (640 × 480 pixels), (SVGA [800 × 600 pixels] or more recommended) 256 or more colors
Mouse:	Compatible with the operating systems mentioned above
Communication port:	RS232C (Dsub-9 pin) port, USB port
Printer:	Compatible with the operating systems mentioned above

NOTE:

- The amount of memory and the amount of free space on the hard disk differs depending on the computer.
- Using this software while there is not enough free space on the hard disk could cause errors and result in insufficient memory.
- This software will not run properly on some computers.
- When starting up this program, do not start other software applications.
- Do not use the screen saver function or the energy saving feature when using this program.
- If the ECM is changed, restart the program.
- Windows XP is a multiuser operating system, therefore, be sure to end this program if the login user is changed.
- This manual uses the screens and explanations from Windows XP. Some operations may be slightly different in other operating systems.

COMPATIBLE MODELS

GP1300R, VX, VX Cruiser, VX Deluxe, VX Sport, FX, FX Cruiser, FX High Output, FX Cruiser High Output

INSTALLING THE YAMAHA DIAGNOSTIC SYSTEM

This section provides information on installing the Yamaha Diagnostic System under Windows 2000 or Windows XP.

INSTALLING THE YAMAHA DIAGNOSTIC SYSTEM UNDER Windows 2000 or Windows XP

NOTE:

- Before installing the Yamaha Diagnostic System, check that your computer meets the specified requirements. For detailed information on the system requirements, see page 2.
- It is strongly recommended that you exit all other programs before running the installer.

1. Turn on your computer and start up Windows 2000 or Windows XP.
2. Insert the compact disc into the computer's CD-ROM drive.
3. Double-click the **My Computer** icon, then the **CD-ROM drive** icon, and then double-click the **YDIS_Setup_image** icon to start up the installer.

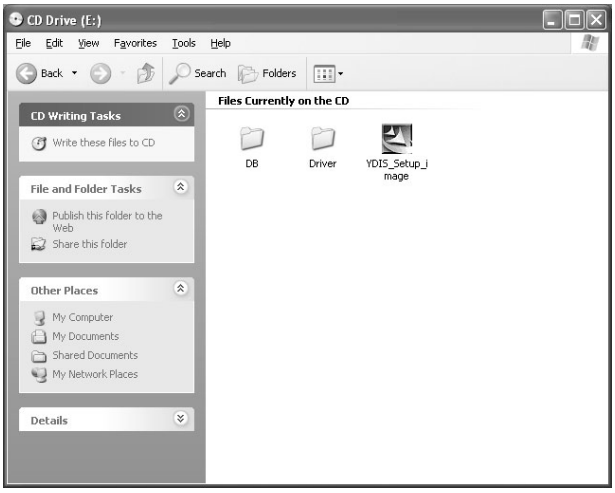


Fig. 2

4. Click the **Next** button to start the installation process.

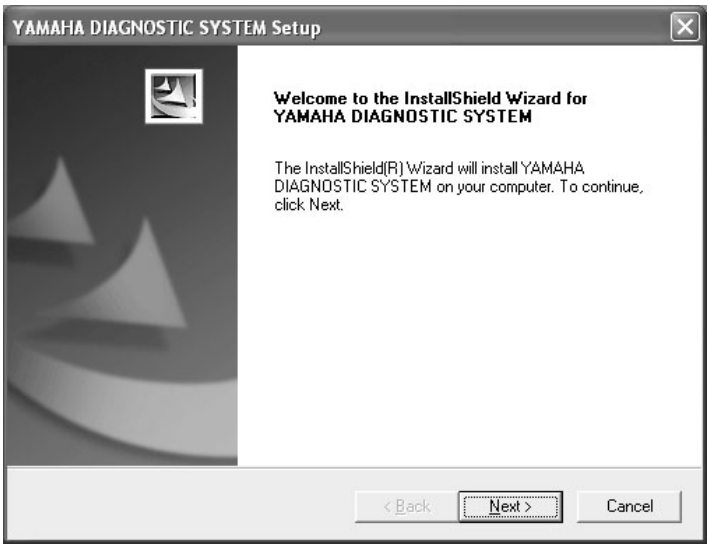


Fig. 3

NOTE:

If the Yamaha Diagnostic System has already been installed onto your computer, the following dialog box appears.
Click the **Yes** button to update this program, or click the **No** button to quit the installation.

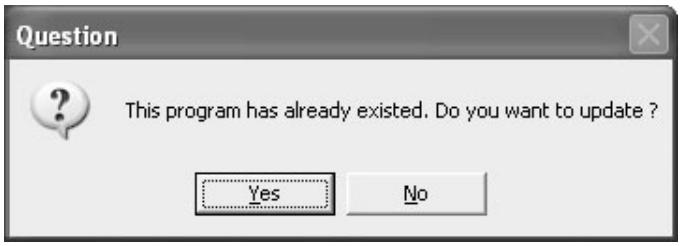


Fig. 4

NOTE:

- To quit the installation, click the **Cancel** button. The following dialog box appears. (See fig. 3)

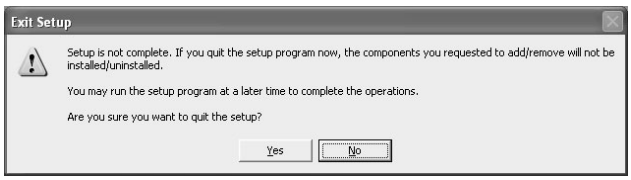


Fig. 5

- To quit the installation program, click the **Yes** button.
- To continue installation, click the **No** button. (Fig. 5)

5. Check the target directory and the program name for the Yamaha Diagnostic System, which are displayed in the dialog box.
Click the **Next** button to start copying the program files.

NOTE:
- To go back to the previous dialog box (step 4), click the **Back** button.
- To quit the installation, click the **Cancel** button.

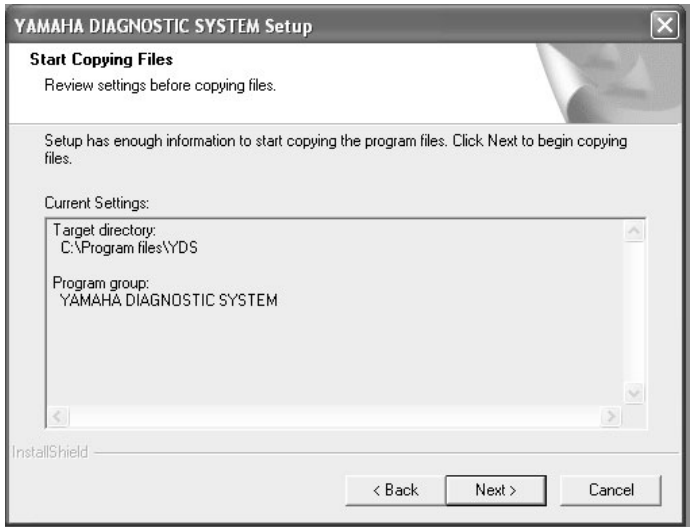


Fig. 6

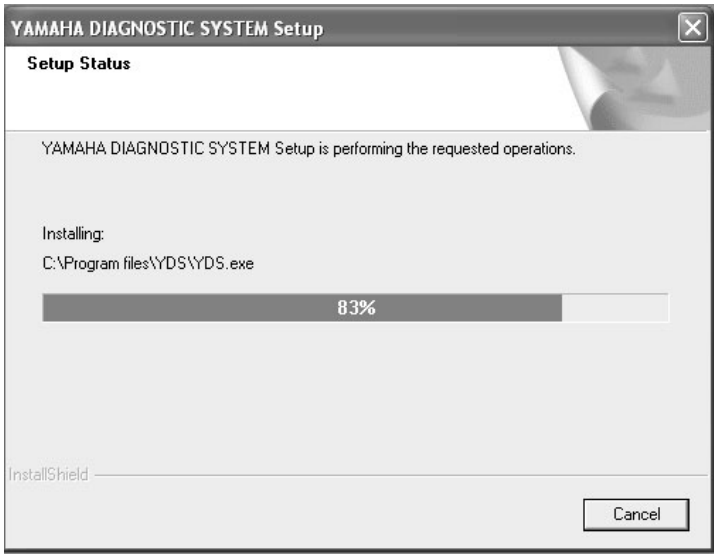


Fig. 7

NOTE:

- To quit the installation, click the **Cancel** button. (See fig. 6) The following dialog box appears.

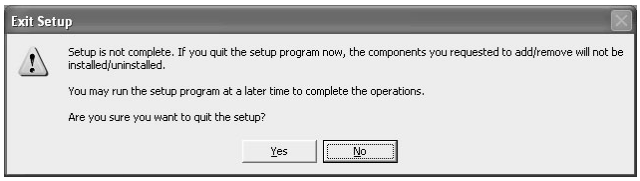


Fig. 8

- To quit the installation program, click the **Yes** button.
- To continue installation, click the **No** button. (Fig. 8)

6. After the installation is completed, the following dialog box appears. Click the **Finish** button to quit the installation program.

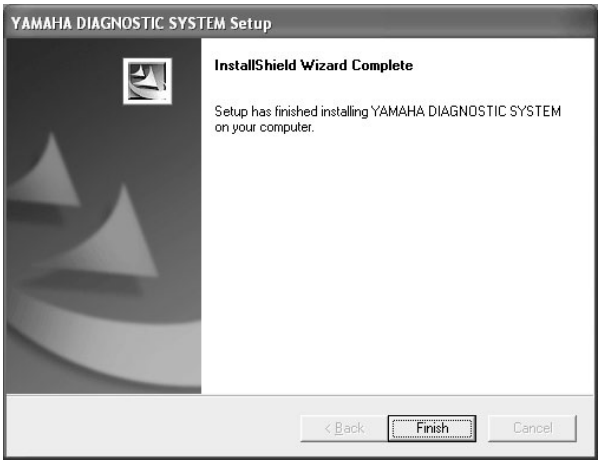


Fig. 9

NOTE:

Install the Database file before using the Yamaha Diagnostic System, otherwise the program will not operate correctly. For installation procedures, refer to “UPDATING THE DATABASE” on the next page.

UPDATING THE DATABASE

NOTE:
When installing the Yamaha Diagnostic System for the first time, be sure to update the database.

1. Turn on your computer and start up Windows 2000 or Windows XP.
2. From the taskbar at the bottom of your computer screen, click the **start** button (fig. 10), point to **All Programs** or **Programs**, and then click **YAMAHA DIAGNOSTIC SYSTEM** to open the Yamaha Diagnostic System window. (See fig. 11)



Fig. 10

3. After about three seconds the display will automatically go to the first menu display, or you can click or press any key to go to the first menu. (See fig. 12)



Fig. 11

4. Click the **Update database [F1]** button or press the F1 key on your keyboard.

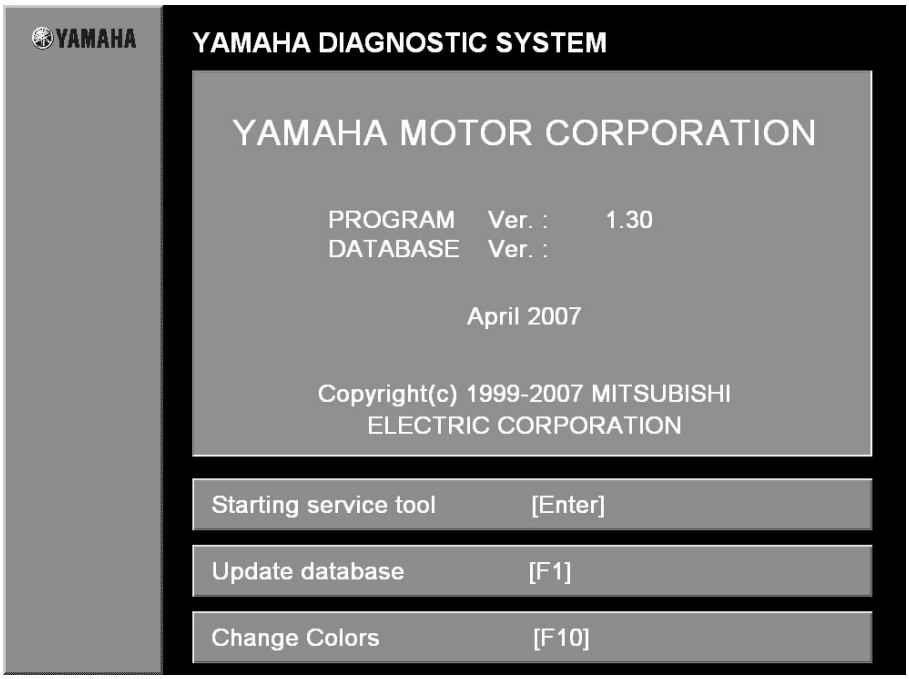


Fig. 12

NOTE:

- Do not click the **Starting service tool [Enter]** button or press the Enter key on your keyboard until the database has been updated, otherwise the program will not operate correctly.
- To quit the update of the database, press the ESC key on your keyboard.

5. Insert the compact disc into the computer's CD-ROM drive.

NOTE:
- All the database files will be copied from the compact disc to the computer's hard drive automatically.
- Any earlier version of the database saved on the hard drive will be overwritten.

6. Click the **OK** button or press the Enter key on your keyboard to start copying the database files.

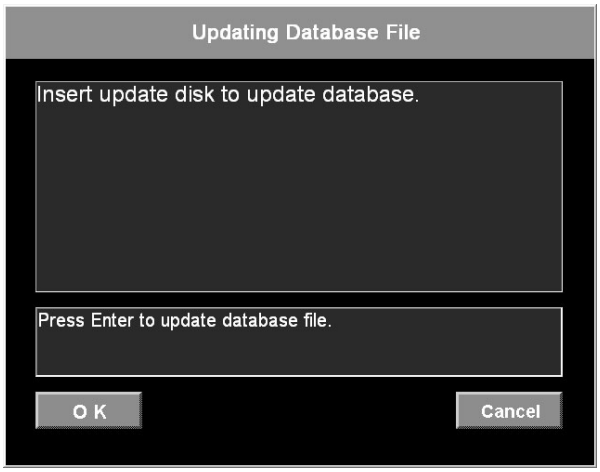


Fig. 13

NOTE:
If an error message appears and the program stops operating, follow the error message.

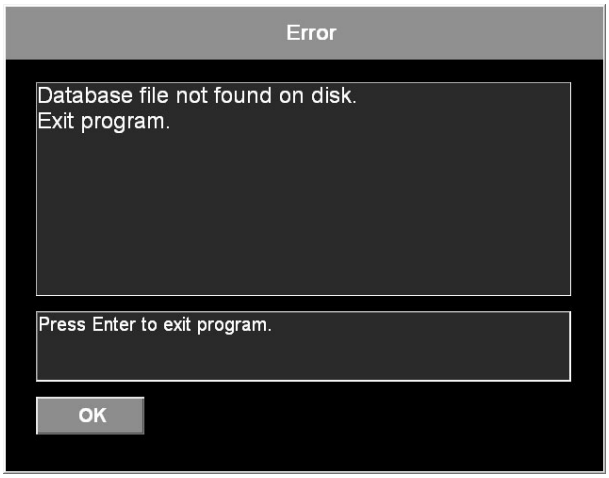


Fig. 14

7. When the database is updated a confirmation screen is displayed.
To quit, click the **OK** button or press the Enter key on your keyboard.
To return to the first menu screen, click the **Cancel** button or press the Esc key on your keyboard.

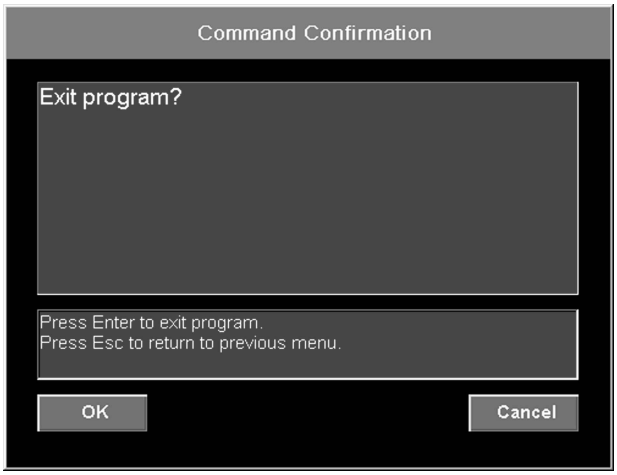


Fig. 15

NOTE:

- Display the program and database information to check version. (Fig. 16)
  To display information, click the title in the first menu screen while pressing the Shift key or press the Enter key while pressing Shift key. (See fig. 12)

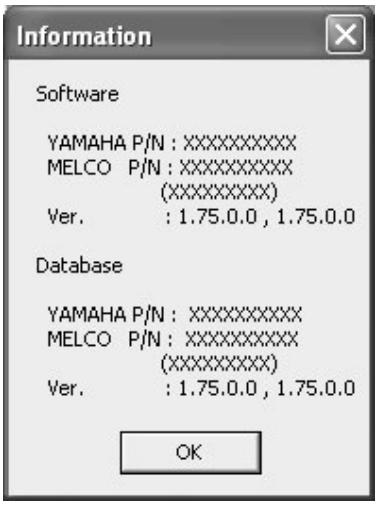


Fig. 16

8. To quit the Yamaha Diagnostic System from the first menu (see fig. 12), press the Esc key on your keyboard.

INSTALLING THE USB DRIVER

1. Connect one end of the USB cable to 3-pin communication coupler on the watercraft engine. Connect the other end to the included USB adapter, and connect the adapter to the USB port on the computer.
2. Push the start switch to start the engine.

CAUTION:

Do not run the engine for more than 15 seconds without supplying water, otherwise the engine may overheat.

The Windows operating system senses the USB connection to the watercraft and automatically displays the hardware wizard.

3. Select **Yes, now and every time I connect a device**, and then click the **Next** button. (Fig. 17)



Fig. 17

4. Confirm that the compact disc is in the computer's CD-ROM drive, and select **Install the software automatically (Recommended)**, and then click the **Next** button.

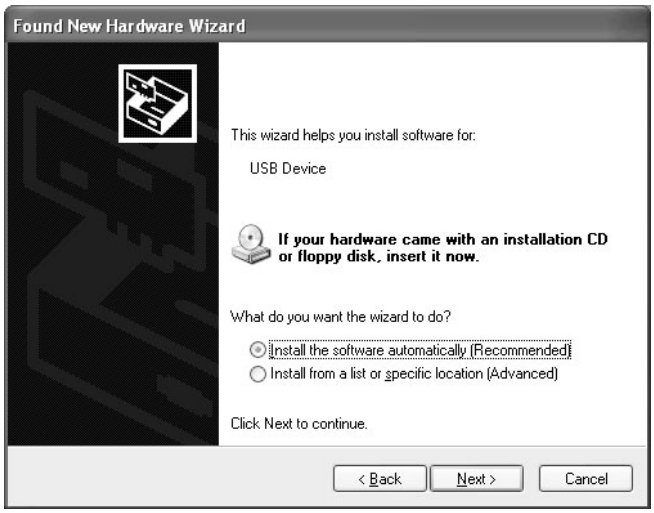


Fig. 18

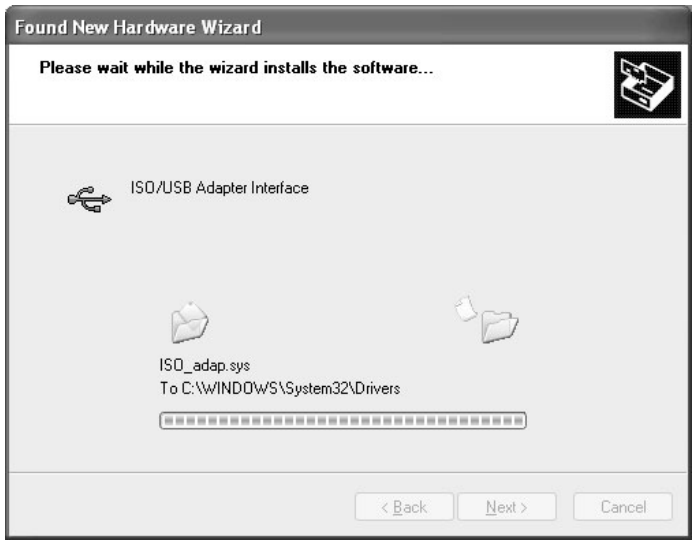


Fig. 19

5. Click the **Finish** button.



Fig. 20

OPERATING

CONNECTING THE COMPUTER TO THE WATERCRAFT

NOTE:
Be sure to use the enclosed communication cable ① to connect the computer and adapter ② to the watercraft.

1. Quit any applications that are running, and then turn off the computer.

2. Connect the communication cable to the 3-pin communication coupler of the watercraft, the adapter, and the communication port of your computer.

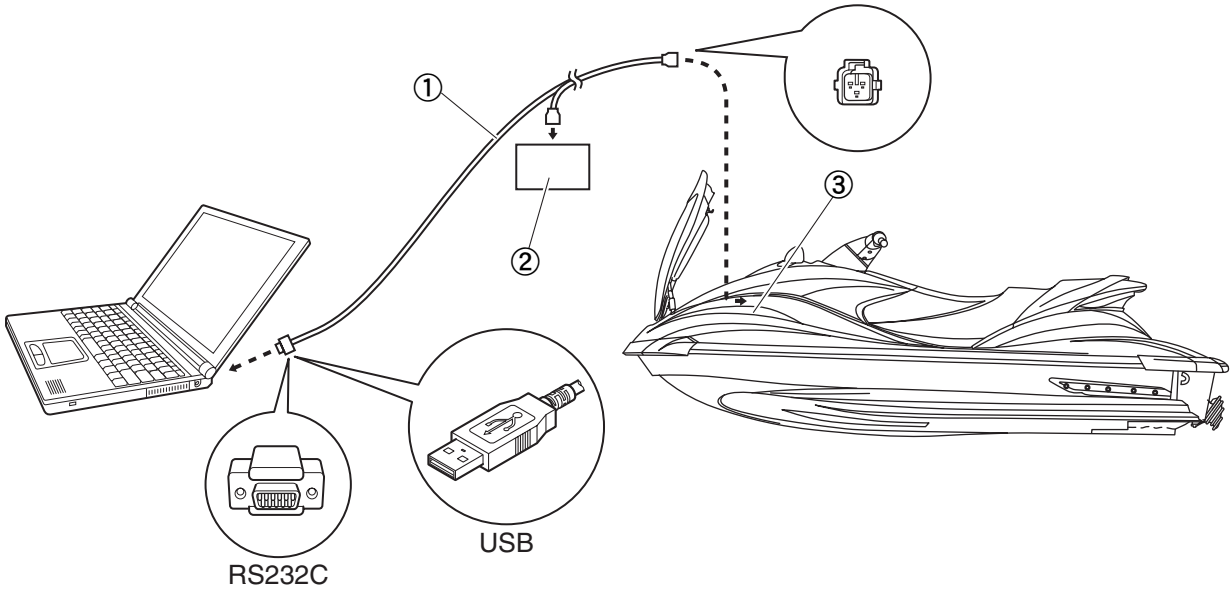


Fig. 21

NOTE:
- Use either the COM1 or COM2 port, and, if necessary, set the serial port as specified in the computer's manual. Set the serial port where the RS232C (Dsub-9 pin) cable is connected to COM1 or COM2.
- For connection between the communication cable and watercraft ③, see the applicable watercraft service manual.
- When you finish all the YDIS operations, be sure to remove the communication cable and restore the cable connection.
- If using the USB adapter, be sure that you have installed the USB driver.

3. Connect the 12 V battery to the watercraft.

NOTE:
The following items should be checked before starting the Yamaha Diagnostic System.
- The battery is properly charged and its specific gravity is within specification.
- There are no incorrect wiring connections.
- Wiring connections are properly secured and are not rusty.
- There are enough fuel and oil in each tank.

STARTING THE YAMAHA DIAGNOSTIC SYSTEM

1. Push the start switch to start or crank the engine.
2. Turn on your computer and start up Windows 2000 or Windows XP.
3. From the taskbar at the bottom of your computer screen, click the **start** button (fig. 22), point to **All Programs** or **Programs**, and then click **YAMAHA DIAGNOSTIC SYSTEM**.



Fig. 22

4. Open the Yamaha Diagnostic System window. (Fig. 23) After about three seconds the display will automatically go to the first menu, or click or press any key to go to the first menu. (Fig. 24)



Fig. 23

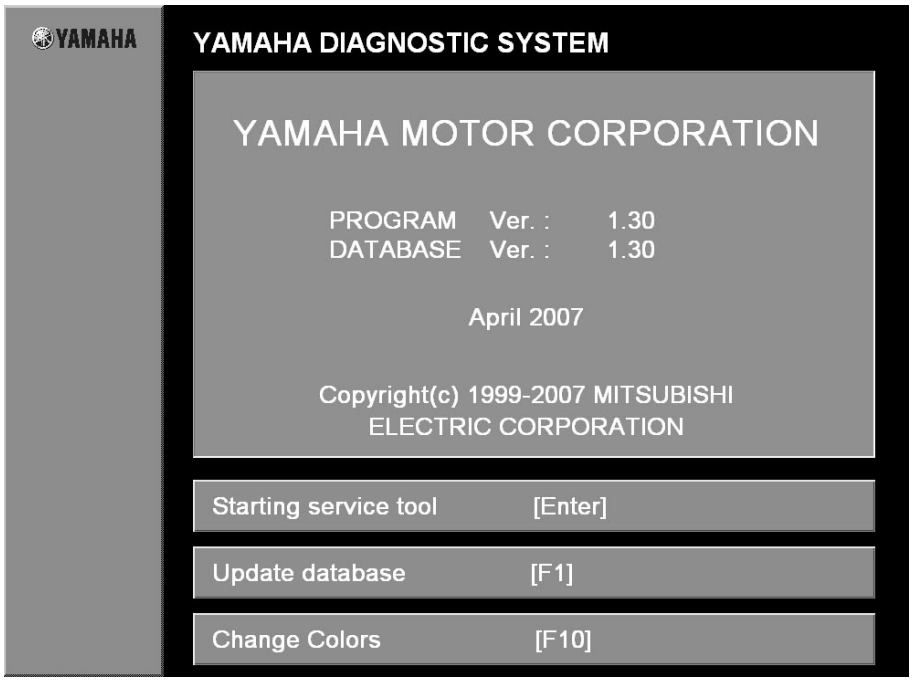


Fig. 24

NOTE:

- If you wish to use the service tools: Click the **Start service tool [ENTER]** button, or press the Enter key.
- If you want to update the database: Click the **Update database [F1]** button, or press the F1 key.
- If you wish to switch between color and monochrome display: Click the **Change Colors [F10]** button, or press the F10 key.

5. Click the **Starting service tool [Enter]** button or press the Enter key on your keyboard.

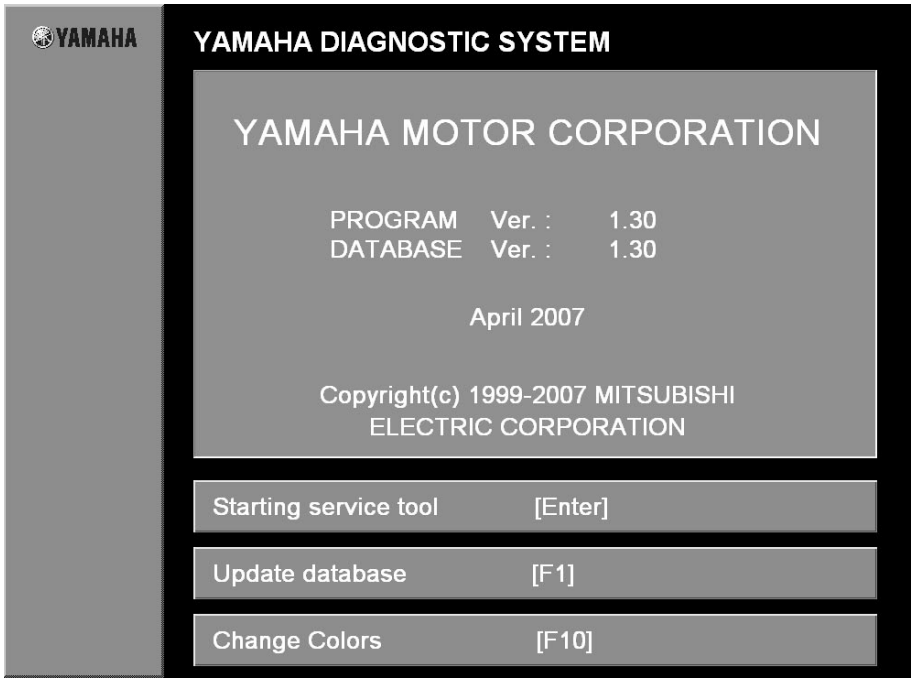


Fig. 25

NOTE:

- If an error message appears and the program stops operating, follow the error messages.
- If the program doesn't start, an error message will explain the problem. If the program doesn't start and an error message is not displayed, the cause of the problem is most likely insufficient computer memory.
- To cancel, press the ESC key on your keyboard.

6. Click or press any key to display the main menu.

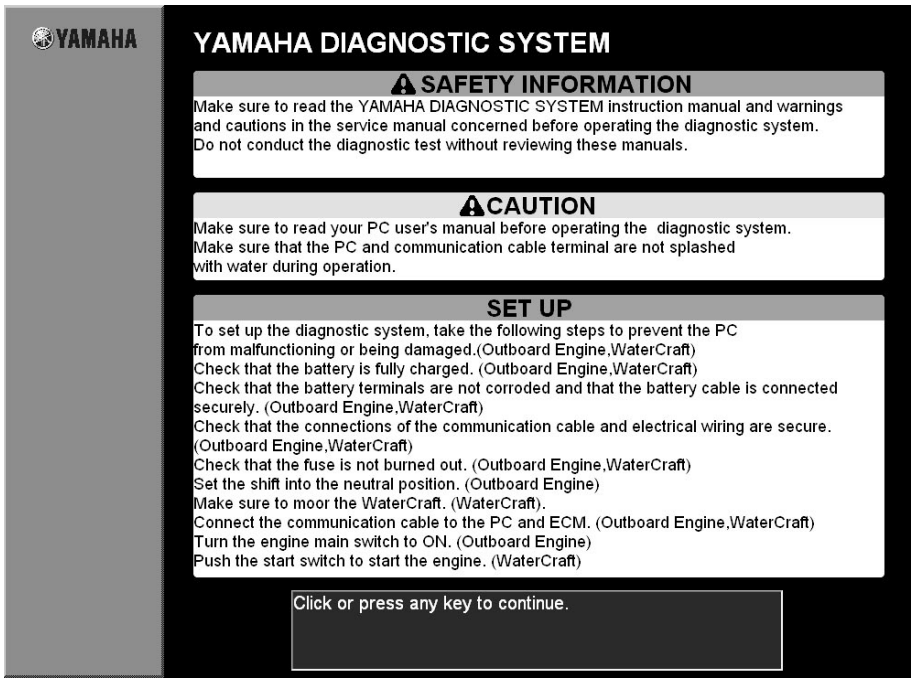


Fig. 26

SELECTING COMMANDS FROM THE MAIN MENU

1. Select **Scan Tool** from the Main Menu by clicking the Scan Tool menu (①/②), by pressing the number key “1”, or by pressing the Enter key.

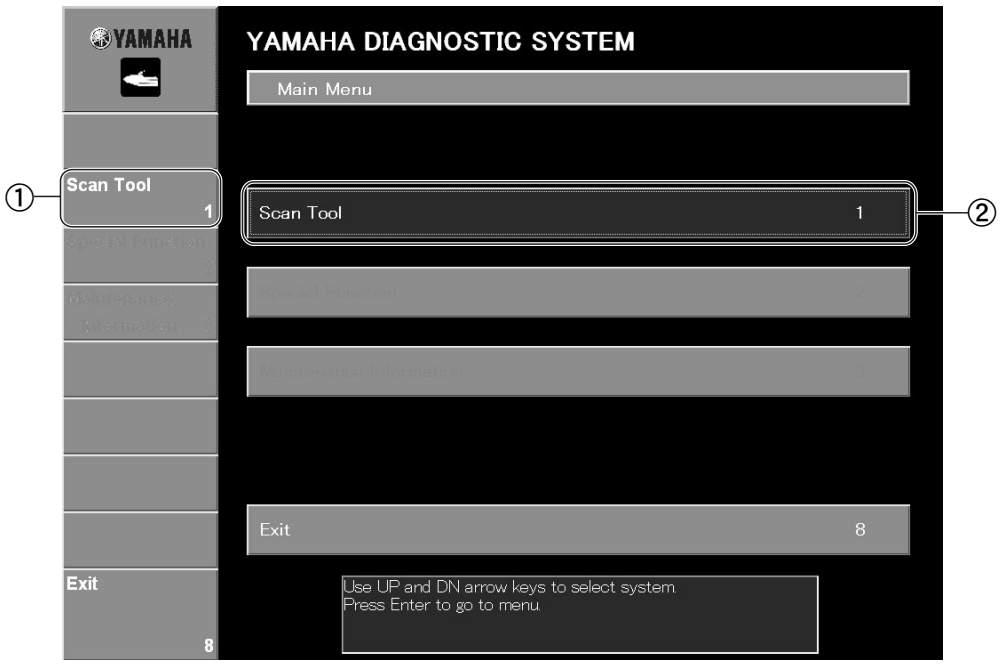


Fig. 27

NOTE:

If a diagnosis record is stored in the ECM, “Diagnosis record available.” appears as a confirmation message before the command selection menu is displayed.



Fig. 28

2. Select a command using any of the followings:
- Click the desired command in the area ①.
- Click the desired command in the area ②.
- Press the number key (1–8) corresponding to the selected command.

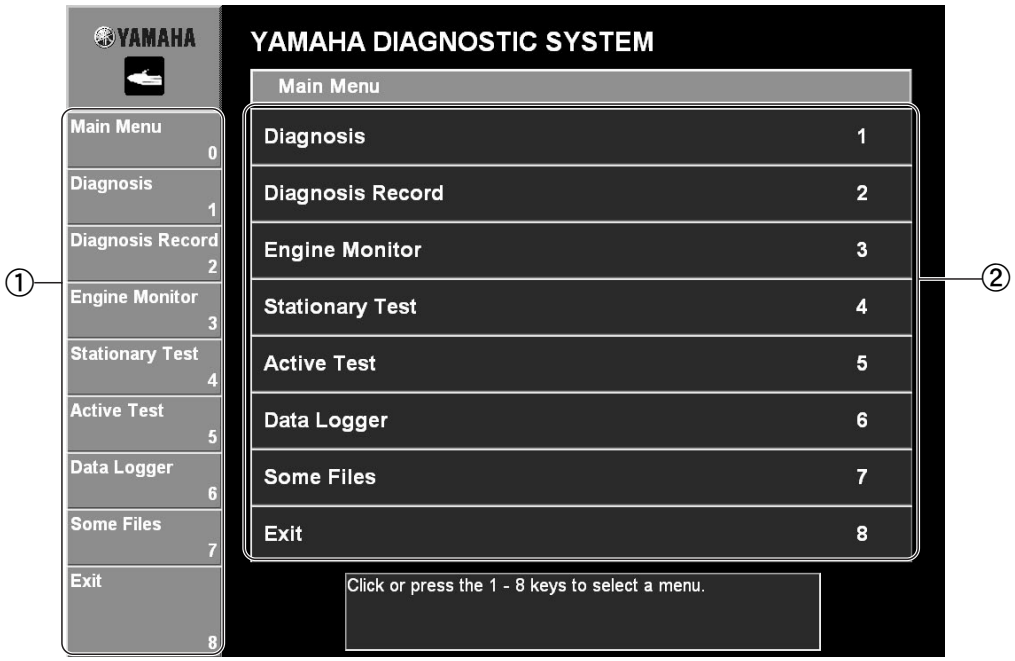


Fig. 29

NOTE:
Some commands may not be available depending on the model of the watercraft. If the command is not available, “Unavailable” appears to the right of the command.

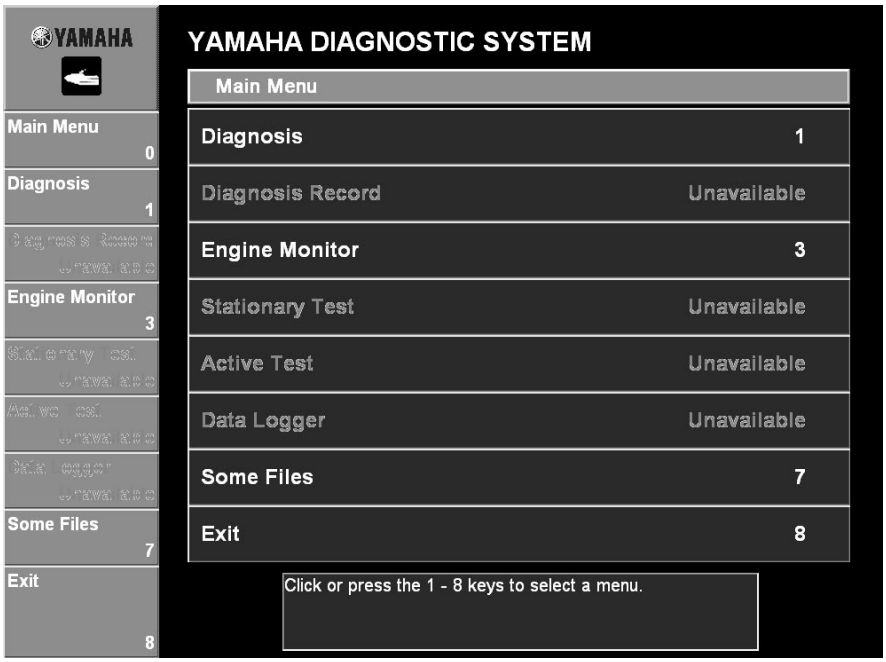


Fig. 30

DIAGNOSIS

The diagnosis codes of malfunctions recorded in the watercraft's ECM, the diagnosis codes' corresponding part name, the results of the diagnosis, and the condition of the part are listed.

Abnormal items are identified by terms other than "Normal" in the **Result** column and are displayed at the top of the list. The results for those items are highlighted in red.

Eight items can be displayed at one time.

Troubleshooting procedures for the selected code are displayed in the box below the list.

List of diagnosis codes and items

Code	Item
13*	Pulser coil
13*	Pulser coils
15	Engine temp sensor
18	Throttle position sensor
19	Battery voltage
22	Atmosphere pressure sensor
23	Intake temp sensor
24	Cam position sensor
29	Intake press sensor
47	Slant detection switch
53	Exhaust manifold temp sensor
54*	Bypass valve motor
54*	Stepping motor
55*	Steering switch
55*	Steering sensor
63	Throttle body
64	YPVS
65	Ex. manifold water temp. sensor
66	Stepping motor operation 1
67	Stepping motor operation 2
112	Electronic throttle system
113	Electronic throttle system
114	Electronic throttle system
115	Electronic throttle system
116	Electronic throttle system
117	Electronic throttle system

Code	Item
118	Electronic throttle system
119	Electronic throttle system
121	Electronic throttle system
122	Electronic throttle system
123	Electronic throttle system
124	Throttle position sensor
125	Throttle position sensor
126	Throttle position sensor
127	Throttle position sensor
128	Throttle position sensor
129	Electronic throttle system
131	Accelerator position sensor
132	Accelerator position sensor
133	Accelerator position sensor
134	Accelerator position sensor
135	Accelerator position sensor
136	Electronic throttle system
137	Electronic throttle system
138	Electronic throttle system
139	Electronic throttle system
141	Electronic throttle system
142	Electronic throttle system
143	Electronic throttle system
144	Electronic throttle system
145	Electronic throttle system

* The item varies depending on the model.

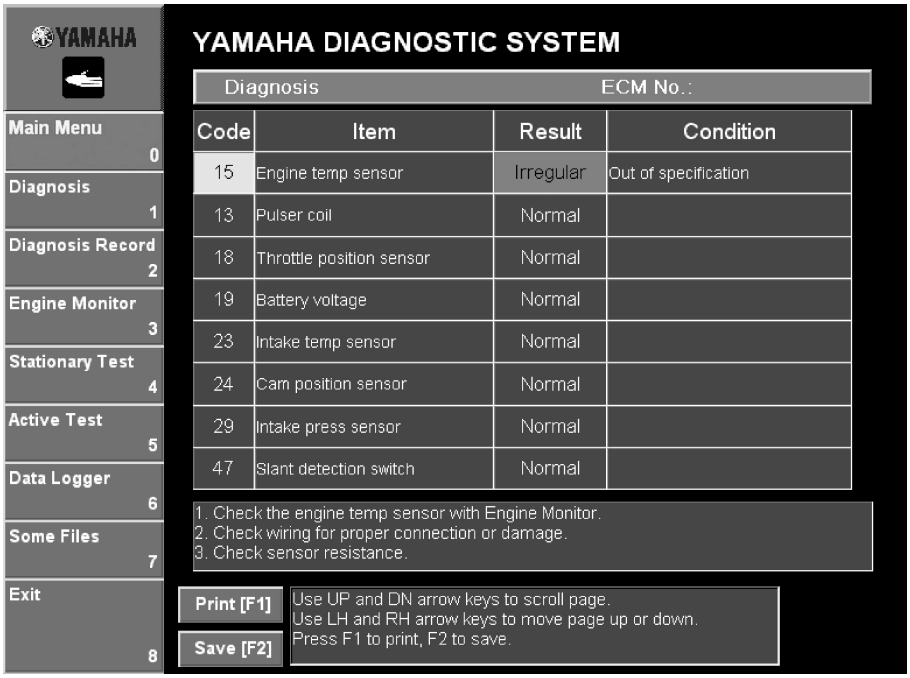


Fig. 31

NOTE:

Some items may not be available depending on the model of the watercraft. Refer to the corresponding Service Manual for further information.

Operating procedure

Select the code number that you wish to view a diagnosis for by either clicking it or pressing the up or down arrow keys on your keyboard.

NOTE:

- Items where “Normal” does not appear in the **Result** column are displayed at the top of the list. Items with 3-digit code numbers are listed above those with 2-digit code numbers.
- The selected code is highlighted in light blue and its confirmation procedure is displayed below the table.

Print

By selecting the **Print** command in the Diagnosis, Diagnosis record, Engine monitor, or Data logger mode, the data from the corresponding window can be printed.

1. Click the **Print [F1]** button or press the F1 key on your keyboard. The **Print** dialog box is displayed.

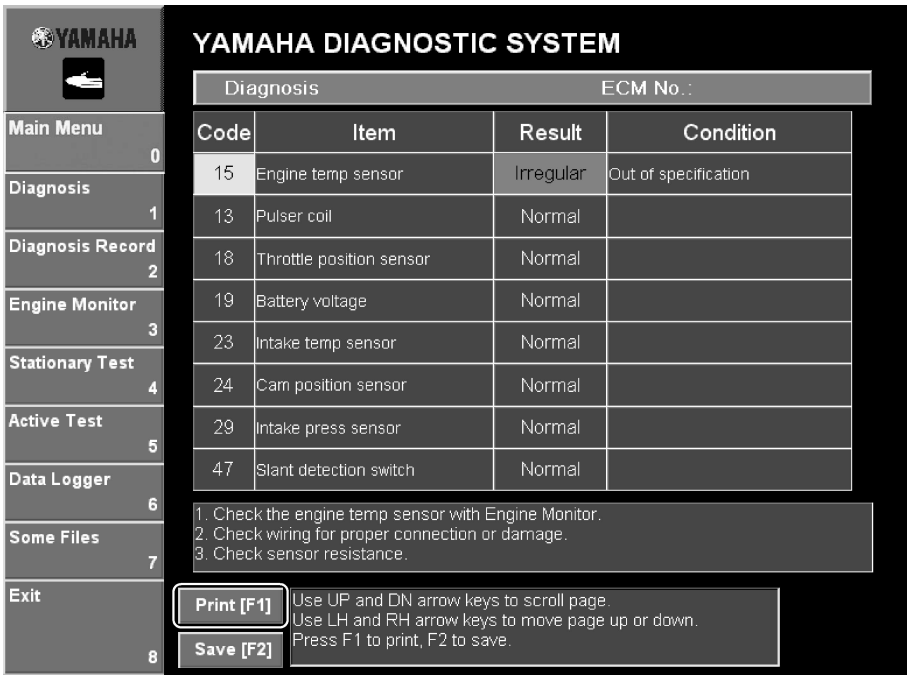


Fig. 32

2. Specify the printer, the printing range, and the number of copies to be printed.

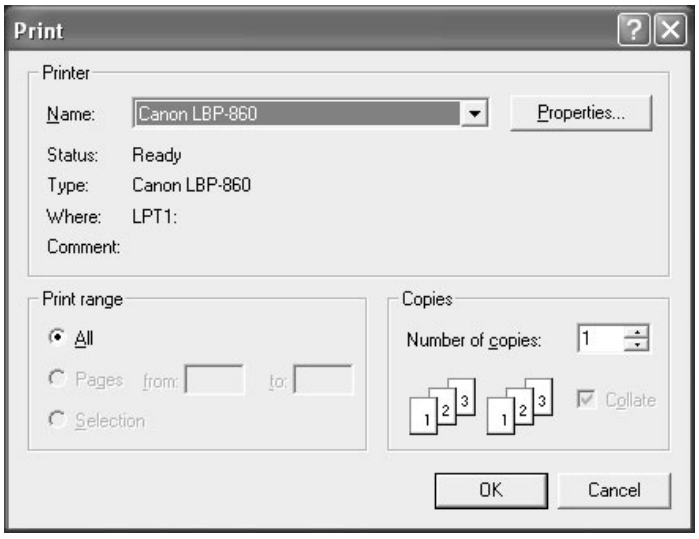


Fig. 33

3. Click the **OK** button to begin printing.
To cancel printing, click the **Cancel** button.

NOTE:
The Print Screen function in Windows cannot be used since scroll data cannot be printed.

Save

By selecting the **Save** command in the Diagnosis, Diagnosis record, Engine monitor, or Data logger mode, the corresponding data can be saved on a disk.

Operating procedure:

1. Click the **Save [F2]** button or press the F2 key on your keyboard. The **Save As** dialog box is displayed.

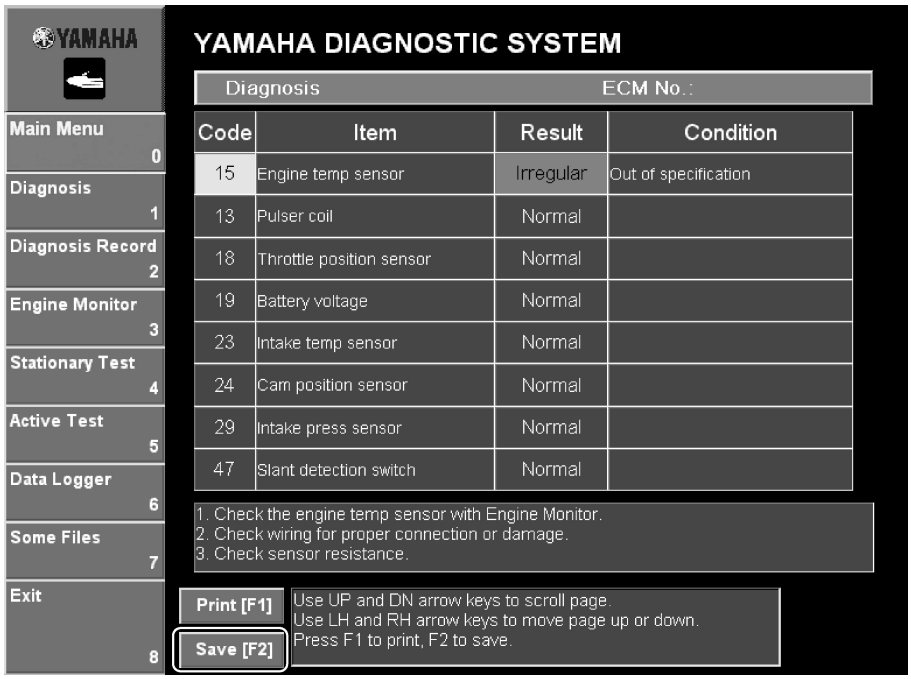


Fig. 34

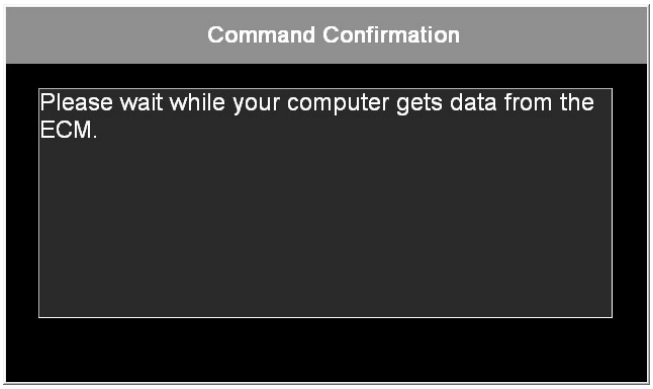


Fig. 35

2. Select the disk and folder where the data will be saved and specify its file name.

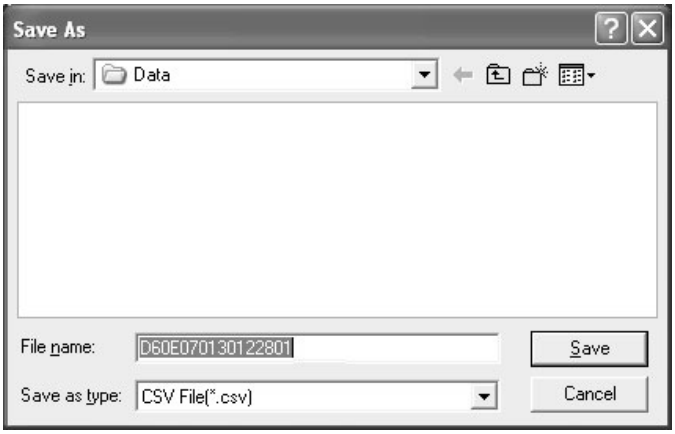


Fig. 36

NOTE:

The default file name is assigned as shown below.

Example: D 60E 07 01 30 1228 XX .csv

ID code Model Year Month Day Time File serial number

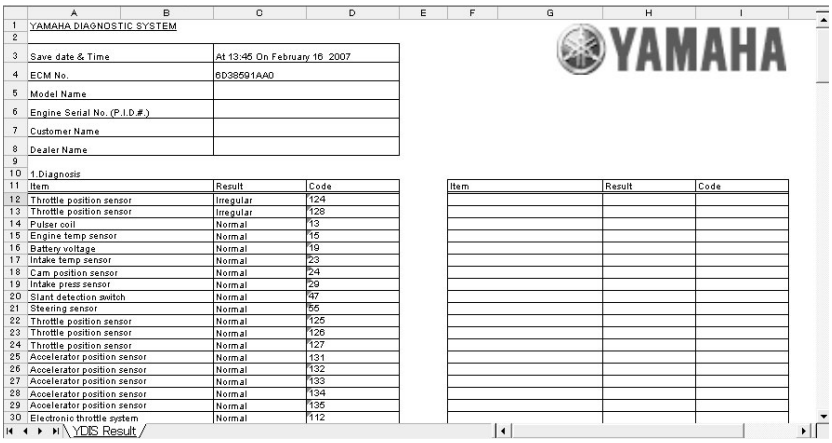
3. Click the **Save** button to save the data. (without Microsoft Office)
To cancel saving, click the **Cancel** button. (See fig. 36)
The data you saved can be viewed in Microsoft Excel. (Fig. 37)

	A	B	C	D	E
1	Save date	March 23 2007			
2	ECM No.:	60E8591A00			
3					
4	Diagnosis				
5		Code	Item	Result	Condition
6		15	Engine temp sensor	Irregular	Out of specification
7		13	Pulser coil	Normal	
8		18	Throttle position sensor	Normal	
9		19	Battery Voltage	Normal	
10		23	Intake temp sensor	Normal	
11		24	Cam position sensor	Normal	
12		29	Intake press sensor	Normal	
13		47	Slant detection switch	Normal	
14					
15	Diagnosis Record				
16		Total hours of operation	5		
17		Code	Item	Occurred	
18			Low oil pressure warning	0.05	
19		15	Engine temp sensor	0.05	
20					
21	Engine Monitor				
22		Monitor Item	Result	Unit	
23		Engine speed	0	r/min	
24		Intake pressure	101.61	kPa	
25		Intake pressure	30.08	inHg	
26		Atmospheric pressure	1016.1	hPa	
27		Atmospheric pressure	30.1	inHg	
28		Ignition timing	–	deg	
29		Battery Voltage (12-16)	12.23	V	
30		TPS voltage (0.5-4.5)	0.762	V	
31		Throttle valve opening (0-90)	1.5	deg	
32		Fuel injection duration			
33		Engine temperature (below 120)	34	-C	
34		Engine temperature (below 248)	93.2	-F	
35		Intake temperature (below 70)	21	-C	
36		Intake temperature (below 158)	69.8	-F	
37		Engine stop lanyard switch	OFF		
38		Overheat thermoswitch	OFF		
39		Slant detection switch	OFF		
40		Oil press switch	ON		
41					

Fig. 37

NOTE:

- The program saves the data in both CSV format and Excel format. (with Microsoft Office)
- If Microsoft Excel (version 97 or later) is installed on your computer, you can save the data onto a one-page US Letter–size form as shown below.



YAMAHA DIAGNOSTIC SYSTEM

Save date & Time	At 13:45 On February 16, 2007
ECM No.	6D38591AA0
Model Name	
Engine Serial No. (P.I.D.#.)	
Customer Name	
Dealer Name	

1.Diagnosis

Item	Result	Code
Throttle position sensor	Irregular	124
Throttle position sensor	Irregular	128
Pulser coil	Normal	13
Engine temp sensor	Normal	15
Battery voltage	Normal	19
Intake temp sensor	Normal	23
Cam position sensor	Normal	24
Intake press sensor	Normal	29
Slant detection switch	Normal	47
Steering sensor	Normal	55
Throttle position sensor	Normal	125
Throttle position sensor	Normal	126
Throttle position sensor	Normal	127
Accelerator position sensor	Normal	131
Accelerator position sensor	Normal	132
Accelerator position sensor	Normal	133
Accelerator position sensor	Normal	134
Accelerator position sensor	Normal	135
Electronic throttle system	Normal	112

Item	Result	Code

YDIS Result

Fig. 38

DIAGNOSIS RECORD

The diagnosis codes of malfunctions that have been recorded in the watercraft's ECM, the diagnosis codes' corresponding items, and the time when the malfunctions occurred are listed.

The latest occurrence appears on top. In addition, diagnosis codes stored in the ECM can be deleted.

List of diagnosis record codes and items

Code	Item
13*	Pulser coil
13*	Pulser coils
15	Engine temp sensor
18	Throttle position sensor
19	Battery voltage
22	Atmosphere pressure sensor
23	Intake temp sensor
24	Cam position sensor
29	Intake press sensor
47	Slant detection switch
53	Exhaust manifold temp sensor
54*	Bypass valve motor
54*	Stepping motor
55*	Steering switch
55*	Steering sensor
59	Memory data
63	Throttle body
64	YPVS
65	Ex. manifold water temp. sensor
66	Stepping motor operation 1
67	Stepping motor operation 2
112	Electronic throttle system
113	Electronic throttle system
114	Electronic throttle system
115	Electronic throttle system
116	Electronic throttle system
117	Electronic throttle system

Code	Item
118	Electronic throttle system
119	Electronic throttle system
121	Electronic throttle system
122	Electronic throttle system
123	Electronic throttle system
124	Throttle position sensor
125	Throttle position sensor
126	Throttle position sensor
127	Throttle position sensor
128	Throttle position sensor
129	Electronic throttle system
131	Accelerator position sensor
132	Accelerator position sensor
133	Accelerator position sensor
134	Accelerator position sensor
135	Accelerator position sensor
136	Electronic throttle system
137	Electronic throttle system
138	Electronic throttle system
139	Electronic throttle system
141	Electronic throttle system
142	Electronic throttle system
143	Electronic throttle system
144	Electronic throttle system
145	Electronic throttle system
FC	Overheat warning
FD	Low oil pressure warning

* The item varies depending on the model.

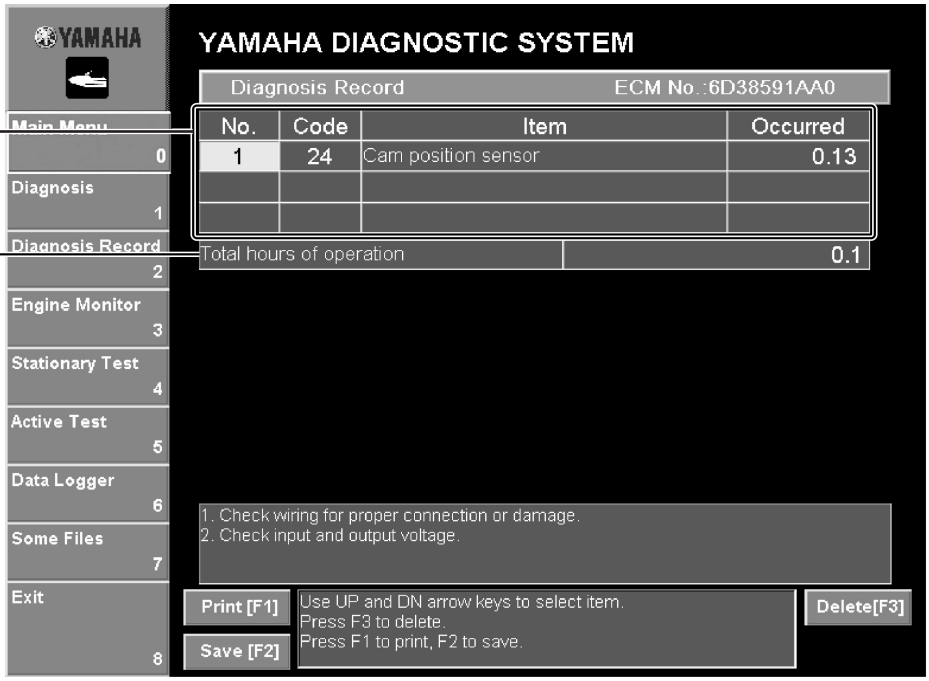


Fig. 39

① Displays diagnosis codes information.

② Shows total hours of operation.

NOTE:

Some items may not be available depending on the model of the watercraft.

NOTE:

When a Diagnosis record is not available, “Diagnosis Record is unavailable” is displayed.

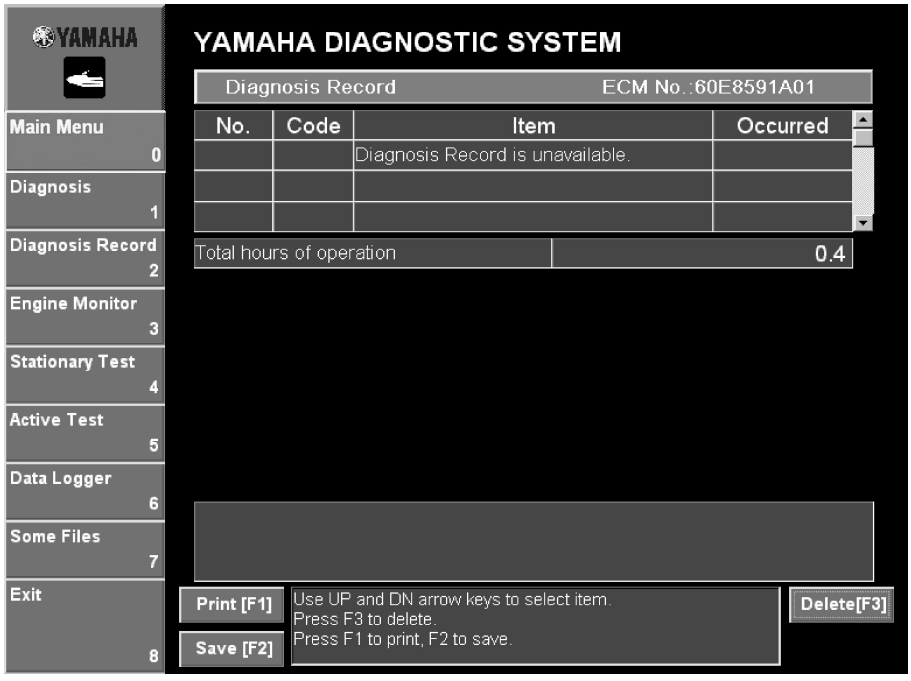


Fig. 40

Deleting diagnosis record in the ECM

1. Select the item that you wish to delete by either clicking it or pressing the up or down arrow keys on your keyboard.

NOTE:

- The selected code is highlighted in light blue.
- Check that the items deleted are normal in the Diagnosis Record. If the items remain irregular, they will appear as irregular in the Diagnosis Record even if you try to delete them.

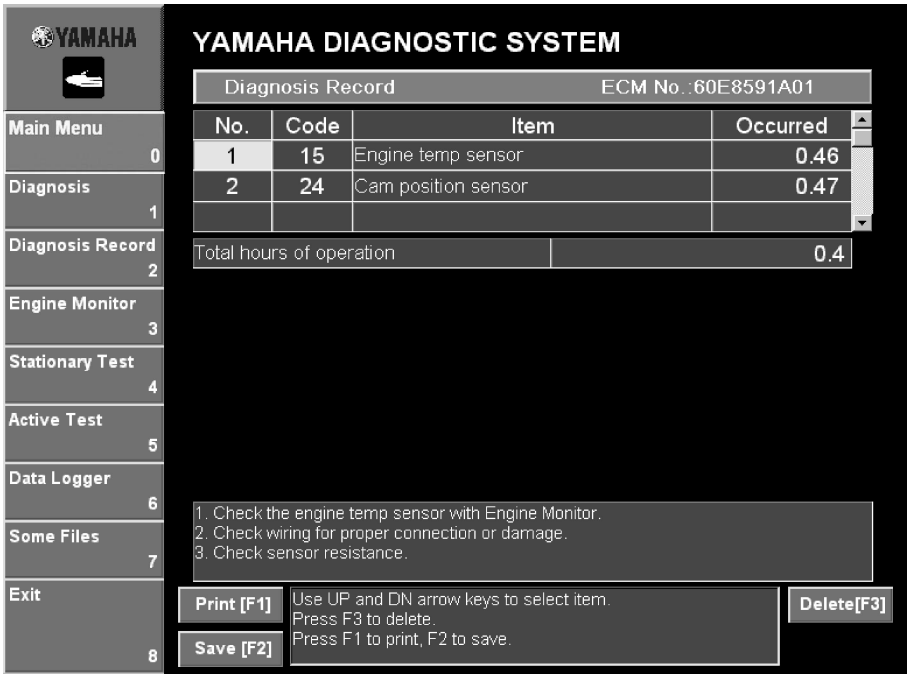


Fig. 41

2. Click the **Delete [F3]** button or press the F3 key on your keyboard. (See fig. 41) A confirmation message appears. (Fig. 42)

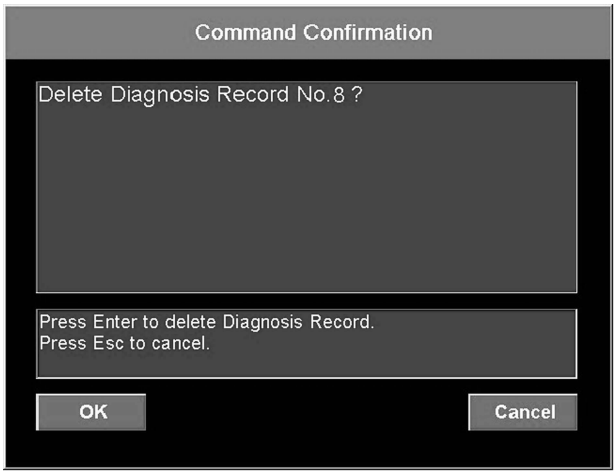


Fig. 42

3. Click the **OK** button or press the Enter key on your keyboard. (See fig. 42) The selected item is deleted. To cancel deleting the item, click the **Cancel** button or press the Esc key on your keyboard.

NOTE:

If an error occurs while an item is being deleted, an error message appears. Follow the instructions that appear in the error message. (Fig. 43)



Fig. 43

ENGINE MONITOR

⚠ WARNING

Do not use the Engine Monitor function to check the engine condition while operating a watercraft, otherwise you may become distracted, which could result in a collision.

CAUTION:

Be sure to avoid splashing water on the computer, adapter, and communication cable, and to avoid damaging them with strong sudden jolts or vibration.

The data from the ECM of the watercraft is displayed.

Ten items can be displayed at one time. To view the other items, scroll the display. Displayed items can be changed as necessary.

List of engine monitor items

Monitor item
Accelerator position sensor 1
Accelerator position sensor 2
Atmospheric pressure
Battery voltage
Bypass valve motor
Engine speed
Engine start switch
Engine stop lanyard switch
Engine temperature
ETV relay
Ex. manifold water temp. sensor
Exhaust manifold temp sensor
Fuel injection duration
Fuel pump relay
Ignition timing

Monitor item
Intake pressure
Intake temperature
Main relay
Oil press switch
Overheat thermoswitch
Slant detection switch
Steering sensor
Steering switch
Stepping motor
Throttle position sensor 1
Throttle position sensor 2
Throttle switch
Throttle valve opening
TPS voltage
YPVS

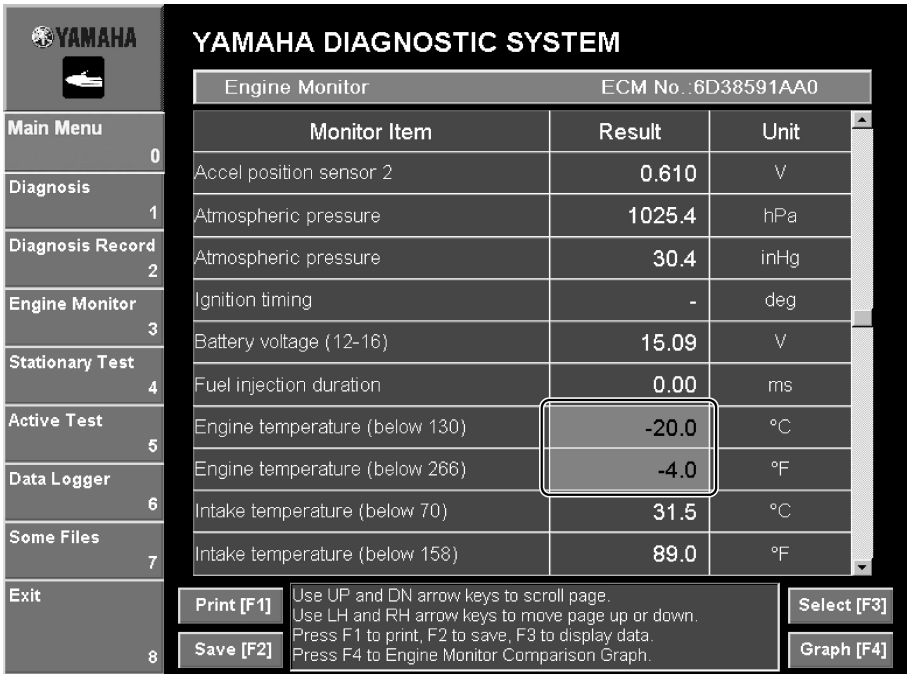


Fig. 44

NOTE:

- In the **Monitor Item** column, the standard value (range) for each item is enclosed in parentheses.
- The diagnosis results displayed in the **Result** column are highlighted in red if they are out of specification. (See fig. 44)
- If the results for a monitor item are highlighted in red, refer to “DIAGNOSIS RECORD”. Refer to the corresponding service manual for the appropriate inspection and adjustment procedures.

Selecting the monitor items

Select the items in the **Monitor Item Selection** window that you wish to display in the **Engine Monitor** window.

1. To change a displayed item, click the **Select [F3]** button or press the F3 key on your keyboard.

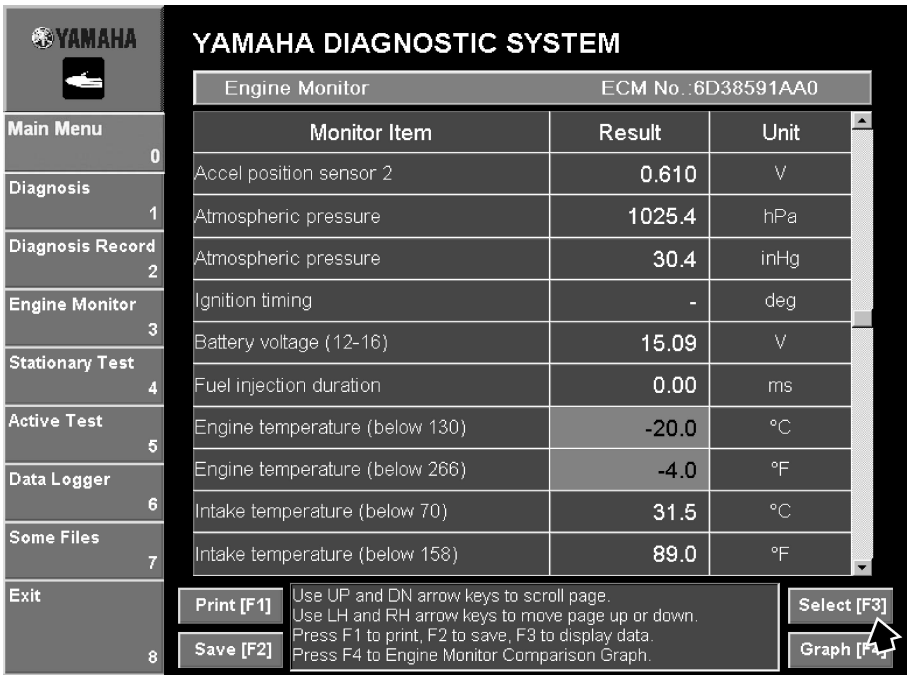


Fig. 45

2. Select an item by either clicking it or pressing the up or down arrow keys on your keyboard, and then press the space bar.

NOTE:

- Selected items ① have a light blue background. Items that are not selected have a blue background.
- At initialization, all items are displayed.

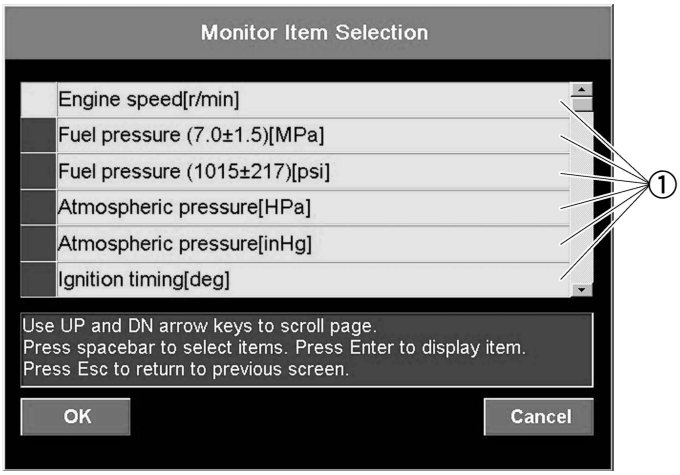


Fig. 46

3. Click the **OK** button or press the Enter key on your keyboard. The **Engine Monitor** window appears. To cancel the monitor, click the **Cancel** button or press the Esc key on your keyboard. (See fig. 46)

Using the graph feature

The graph feature lets you generate a graph from the monitored engine data. The program reads the monitored input signal and generates the graph accordingly. You can also save the monitored signal data to disk so that you can regenerate and review the graphs later.

1. Click the **Graph [F4]** button at the bottom right of engine monitor window, or else press the F4 key.

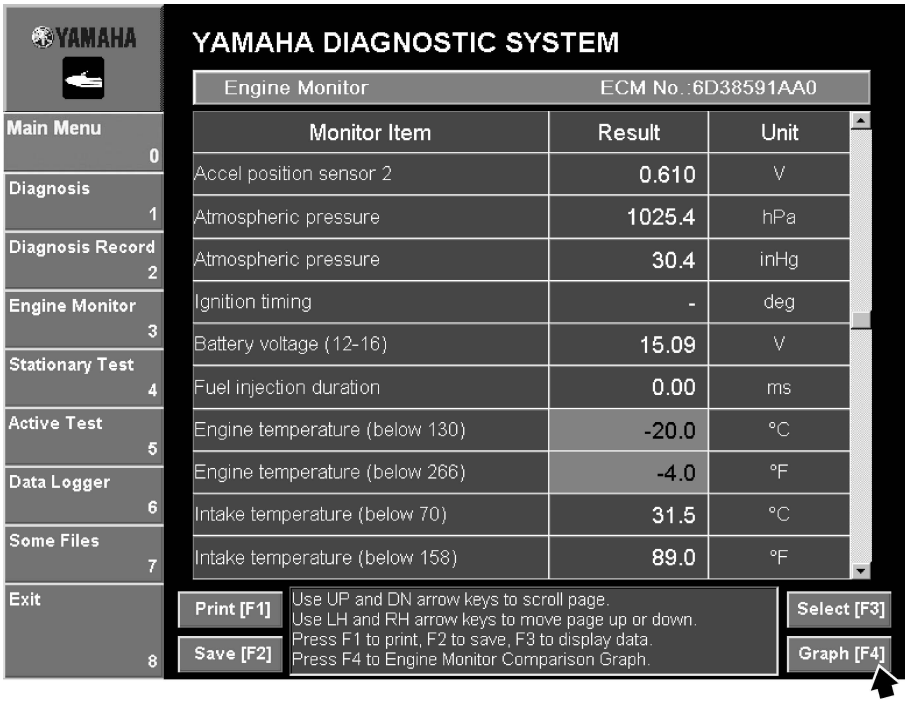


Fig. 47

2. The program displays the comparison graph window.

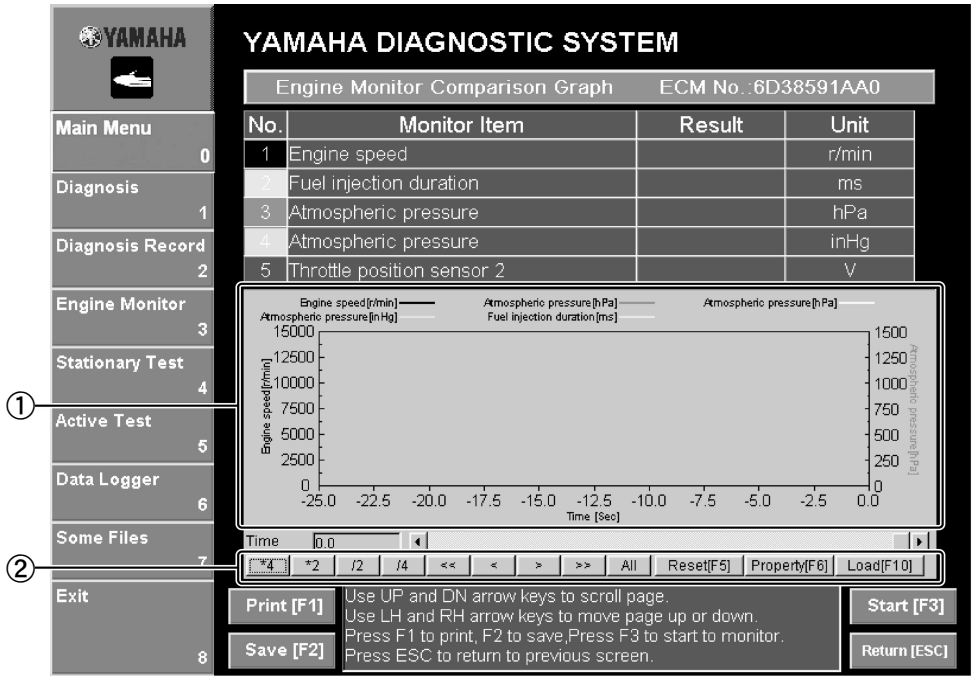


Fig. 48

① Freely select up to five items for display in the graph.

② These are the graph control buttons. These buttons are disabled while monitoring is in progress. For information about how to use these buttons, refer to “Graph window controls (keys and buttons)”.

3. Click the **Property [F6]** button at the bottom of the graph or press the F6 key on your keyboard.

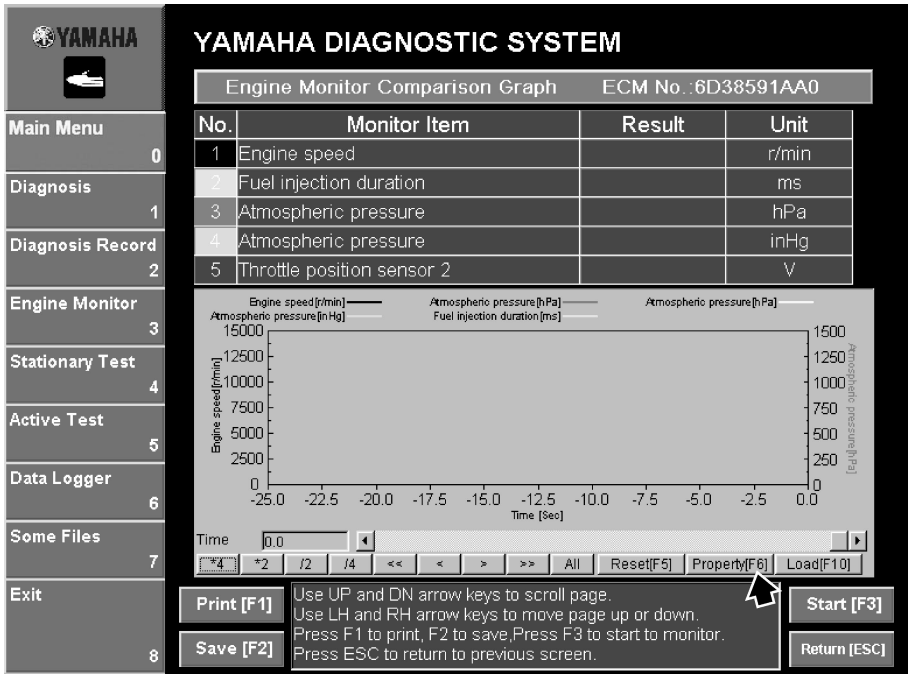


Fig. 49

4. The program displays the **Comparison Graph Property** window. Click the Logging, Graph, and Color tabs and perform the appropriate settings. For detailed information on the graph properties, refer to the graph setting table.

Logging

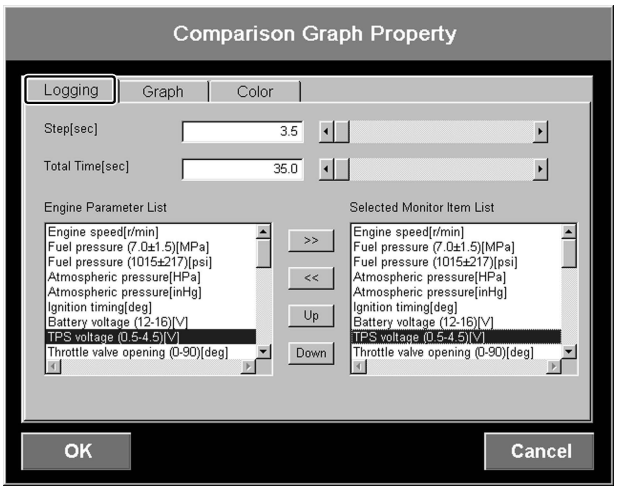


Fig. 50

Graph setting table

Tab	Property	Range
Logging	Step (sec)	Sets the period at which the program reads the signals being monitored. The minimum setting varies according to the number of items you are monitoring: starting at 0.5s for up to five items and then rising 0.5s for each multiple of five that you pass. Example: If one to five items, the available range is 0.5s to 60s. If six to ten items, the available range is 1.0s to 60s. Note: If the program is unable to read data at the exact interval that you select, it will operate at the nearest available interval.
	Total Time (sec)	Sets the total monitoring time. At 0.5s resolution: 5s to 7 hours At 60s resolution: 600s to 840 hours
	Item Display Order	Changes the order of the items on the display.

Graph

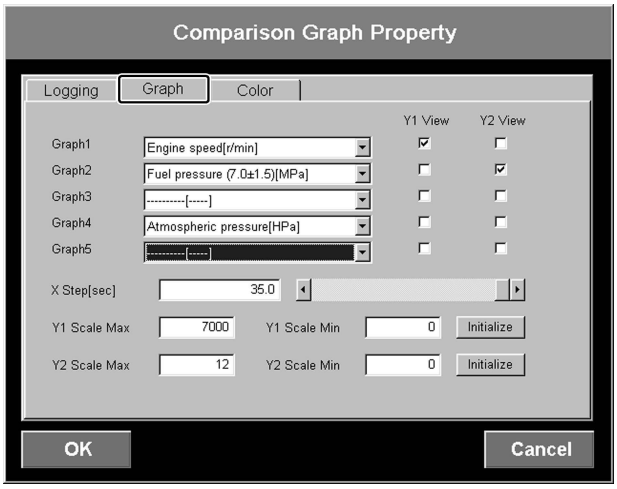


Fig. 51

Graph setting table

Tab	Property	Range
Graph	Selects item to be plotted on graph.	Select up to a maximum of five items for display on the graph.
	Y1 View	If you check the box, the graph plots the corresponding item against the left Y axis.
	Y2 View	If you check the box, the graph plots the corresponding against the right Y axis.
	X Step (sec)	Sets the length (in seconds) for the graph's X axis. The available range is the same as the range for the Total Time setting. Example: If you set the Step setting (on the Logging sheet) to 0.5s and you set X Length to 5s, the resulting graph display will show ten discrete steps.
	Y1 Scale Max	Sets the top value for the left Y axis. The range varies according to the input step setting (the Step setting on the Logging sheet).
	Y1 Scale Min	
	Y2 Scale Max	Sets the top value for the right Y axis. The range varies according to the input step setting (the Step setting on the Logging sheet).
	Y2 Scale Min	

Color

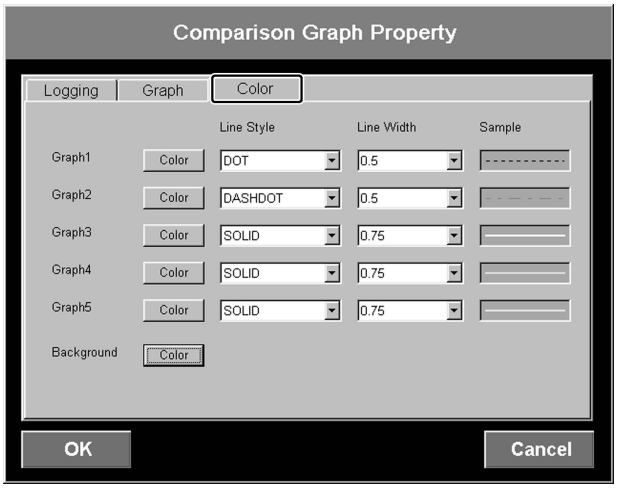


Fig. 52

Graph setting table

Tab	Property	Range
Color	Color	Select any color available on your system.
	Line Style	Select from five styles: SOLID, DASH, DOT, DASHDOT, DASHDOTDOT (DASH, DOT, DASHDOT, and DASHDOTDOT are available only if line width is set to 0.5pt.)
	Line Width	Select from five widths: 0.5pt, 0.75pt, 1pt, 1.5pt, 2pt
	Background	Select any color available on your system.

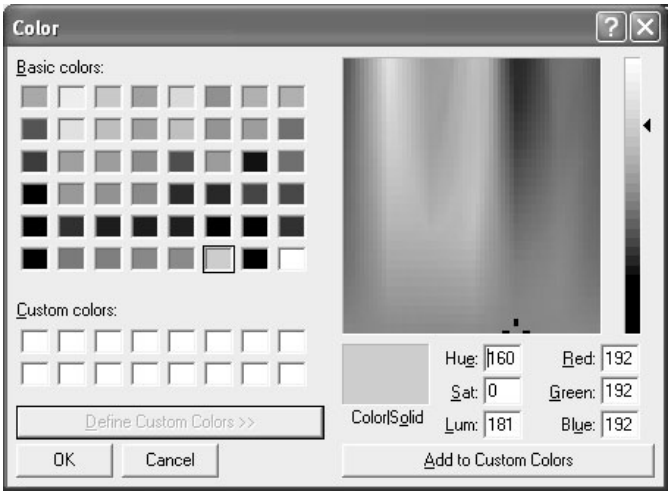


Fig. 53

5. Click the **Start [F3]** button or press the F3 key to begin graphing. Once monitoring has started, the button name changes to **Stop [F3]**. The program automatically stops reading the signal data when the specified time elapses.

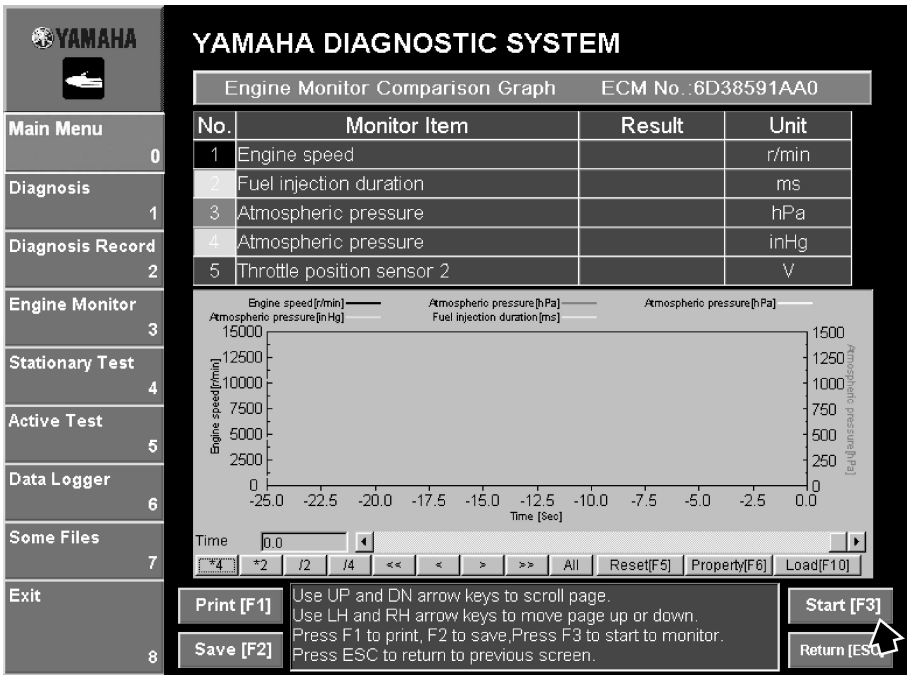


Fig. 54

Graph window controls (keys and buttons)

Keyboard	Button	Operation	Remarks
← →	< >	Moves cursor in indicated direction (by one sample increment).	Disabled when monitoring.
Shift + ← →	<< >>	Moves cursor in indicated direction (by ten sample increments).	Disabled when monitoring.
Ctrl + ← →	None	Moves cursor in indicated direction (by 100 increments).	Disabled when monitoring.
Insert	*2	Zooms in on time axis (2x zoom, centered on cursor).	Disabled when monitoring.
Delete	/2	Zooms out on time axis (1/2 zoom, centered on cursor).	Disabled when monitoring.
PageUp	*4	Zooms in on time axis (4x zoom, centered on cursor).	Disabled when monitoring.
PageDown	/4	Zooms out on time axis (1/4 zoom, centered on cursor).	Disabled when monitoring.
Space	All	Returns graph display settings to their defaults.	Disabled when monitoring.
F5	Reset[F5]	Deletes currently saved data and returns graph display settings to their defaults. (This feature is disabled during offline operation.)	Disabled when monitoring.
F6	Property[F6]	Displays the graph properties window. (Note that the Logging settings are disabled during offline operation.)	Disabled when monitoring.
F10	Load[F10]	Loads recorded data. When the coupler is connected and communication is in progress, this feature can be used to load and display the recorded data corresponding to the engine ECM No. The loaded data can be regraphed using the saved settings.	Disabled when monitoring.

6. Click the **Save [F2]** button or press the [F2] to save the graph.

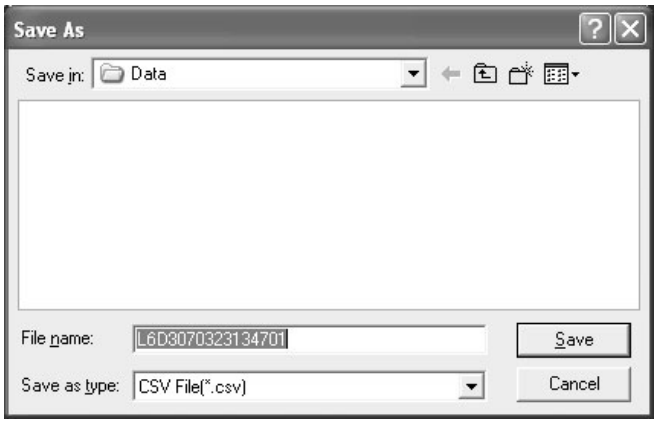


Fig. 55

NOTE:
The default file name is assigned as shown below.
Example: L 6D3 07 03 23 1347 XX .csv
ID code Model Year Month Day Time File serial number

7. When you are finished with graphic monitoring, click the **Return [Esc]** button (or press the ESC key). (See fig. 54)

8. If you have not saved the graph, the program displays a confirmation dialog asking whether you are sure you wish to delete previously saved signal and graph data. (Fig. 56) Click the **OK** button (or press the Enter key) to save the new data (overwriting the old data). The graph window will then close.

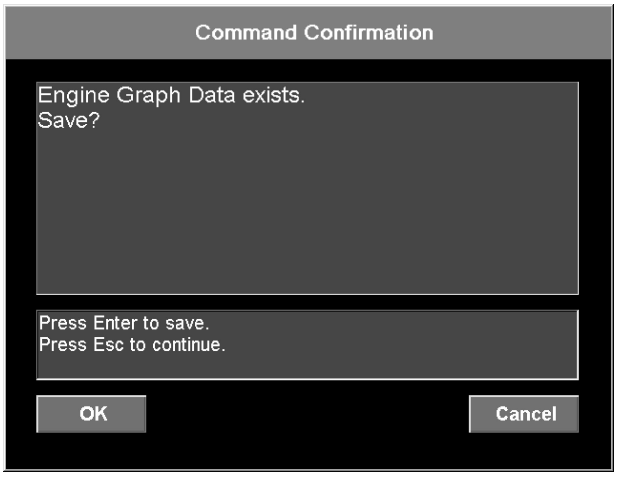


Fig. 56

Viewing saved graphs offline

The program allows you to view saved graph data offline. Once you have saved some graph data, you can recall it and review it with no need to connect to the ECM.

1. With the adapter disconnected, start up the Yamaha Diagnostic System on your computer. Then click the **Starting service tool [Enter]** button, or press the Enter key.

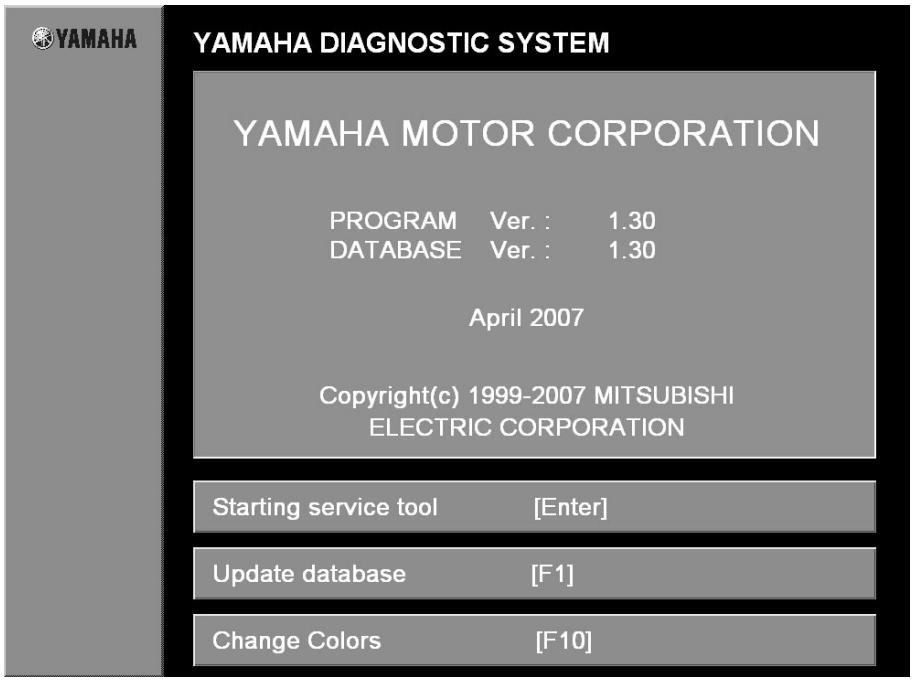


Fig. 57

2. Click or press any key to display the main menu.

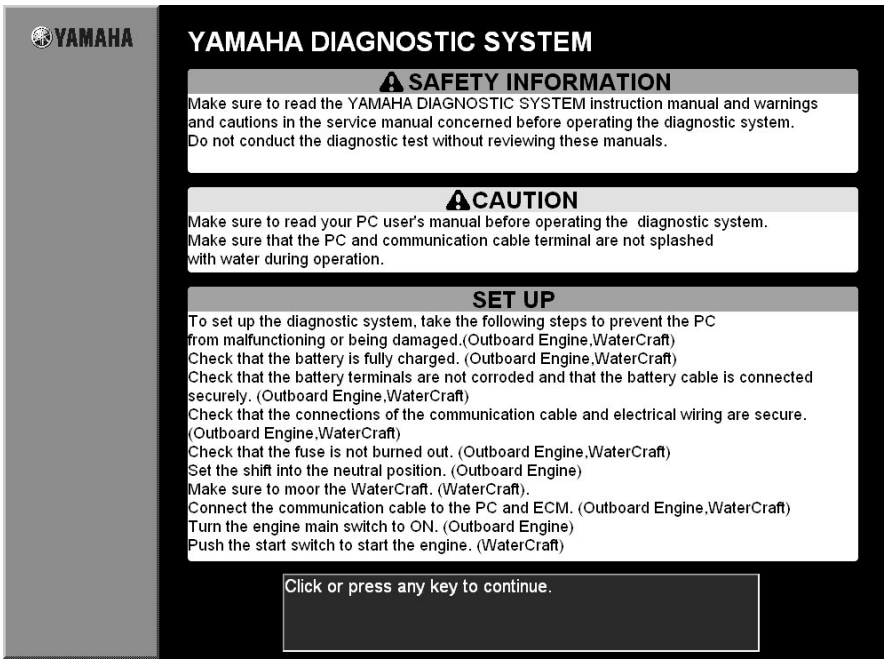


Fig. 58

3. When the “communication error” dialog appears, click the **OffLine** button.



Fig. 59

4. Click the **Scan Tool** menu in the Main Menu or press the number key “1” on your keyboard.

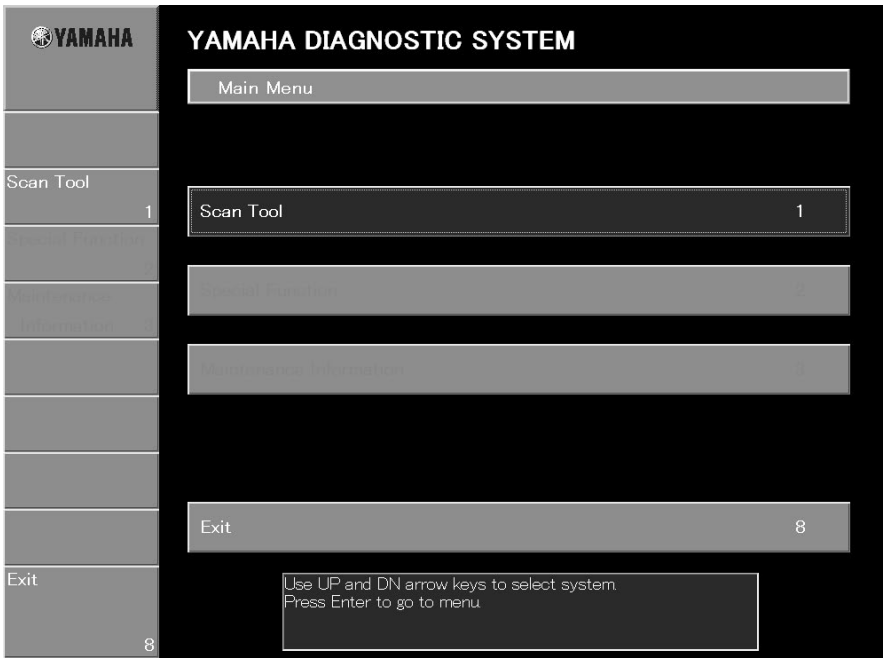


Fig. 60

5. Click the **Engine Monitor** command in the Main Menu or press the number key “3” on your keyboard.

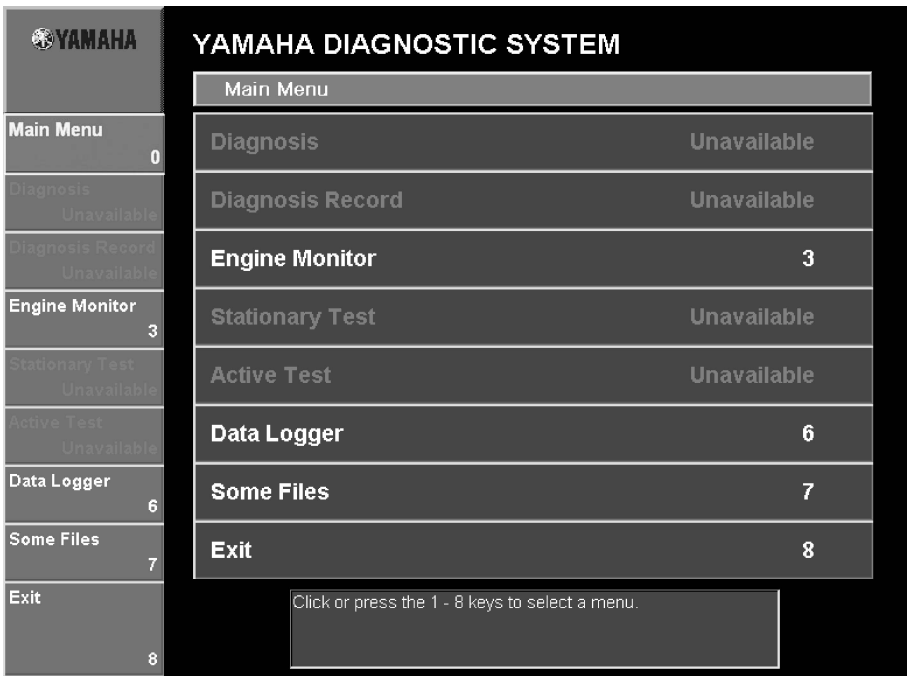


Fig. 61

6. Click the **Load [F10]** button, or press the F10 key.

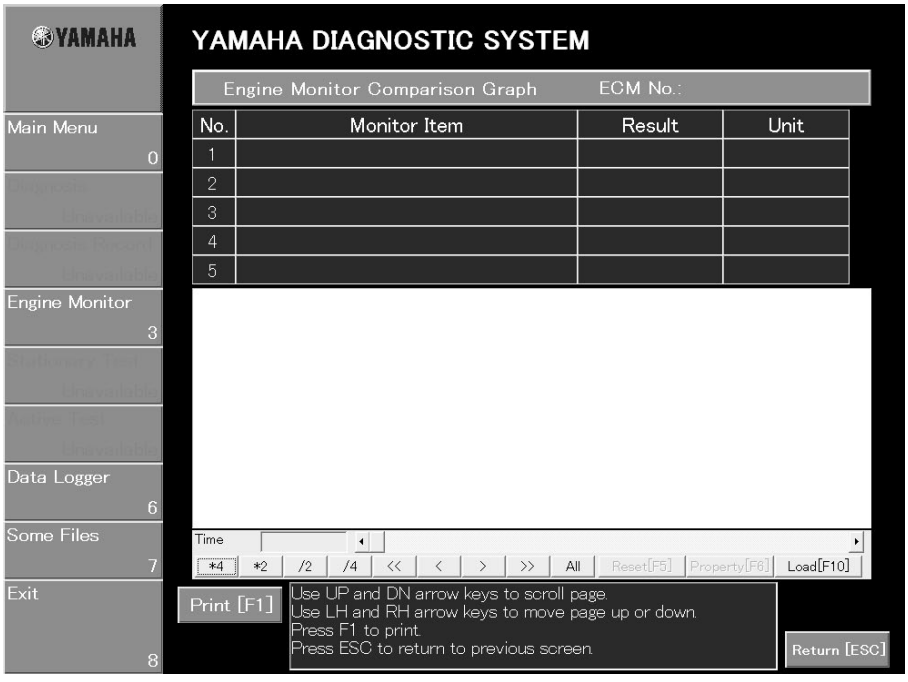


Fig. 62

7. Select the file containing the saved graph data that you want to view, and then click the **Open** button.



Fig. 63

NOTE:
Graph files not saved in the Engine Monitor Comparison Graph mode cannot be opened.

8. The program displays the selected graph data.

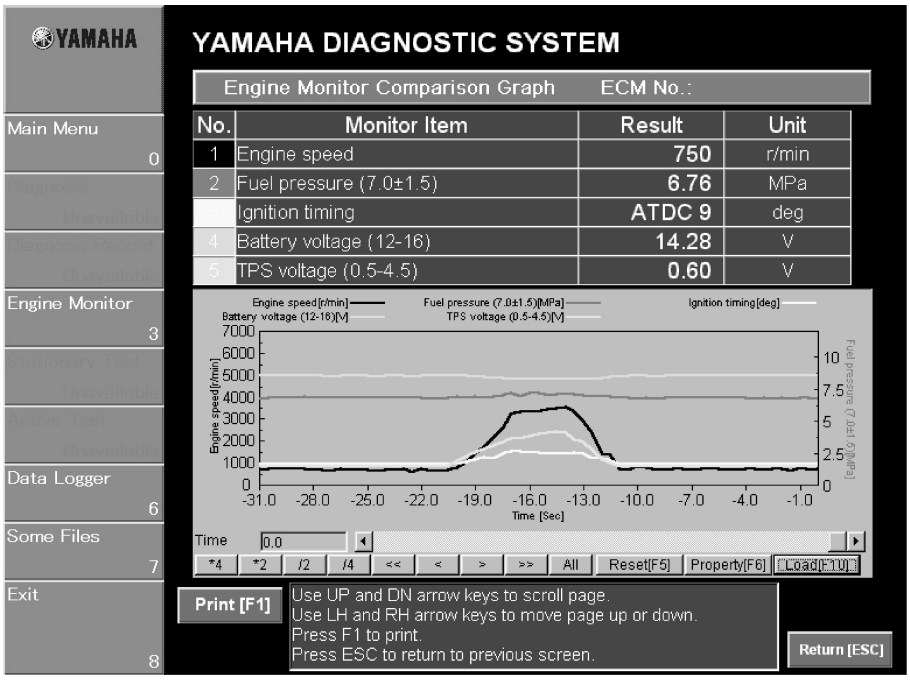


Fig. 64

NOTE:
Remember that you cannot carry out actual monitoring while working offline. Offline graph operation is limited to recalling and viewing saved graph data.

STATIONARY TEST

Selecting this command displays a window where stationary tests can be selected.

List of stationary test items

Item
Ignite ignition coil
Operate Bypassvalvemotor
Operate electric fuel pump

Item
Operate injector
Operate stepping motor
YPVS

⚠ WARNING

Avoid clicking the Execute and Cancel buttons repeatedly, otherwise the ECM or PC may not work properly and they may be damaged.

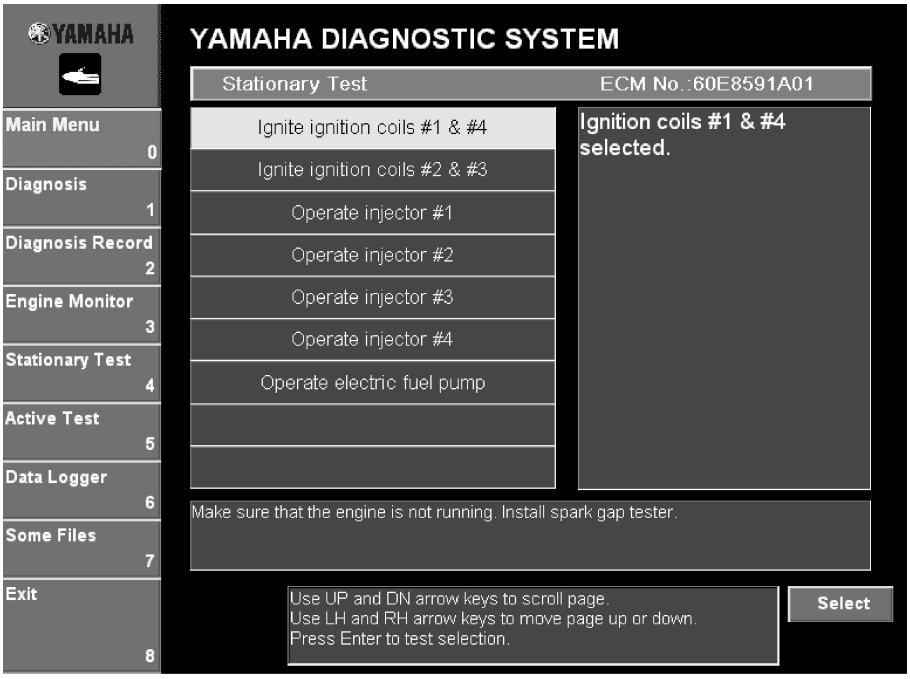


Fig. 65

Sparking ignition coil procedure

A voltage is applied to the ignition coil of the selected cylinder, a spark is created in the spark gap tester, and then the ignition system is checked. Five sparks are created within five seconds.

⚠ WARNING

- **Do not touch any connections of the spark gap tester lead wires.**
- **Do not let sparks leak out of the removed spark plug cap.**
- **Keep flammable gas or liquids away since this test will produce sparks.**

1. Select the test that you wish to perform by either clicking it or pressing the up or down arrow keys on your keyboard. (See fig. 65)

NOTE:

- Make sure that the engine is not running.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.
- A special tool (spark gap tester YM-34487/90890-06754) is needed.

2. Connect the spark plug cap of the cylinder that will be tested to the spark gap tester.
Spark gap tester
A YM-34487 / B 90890-06754

3. Set the spark gap length on the adjusting knob.

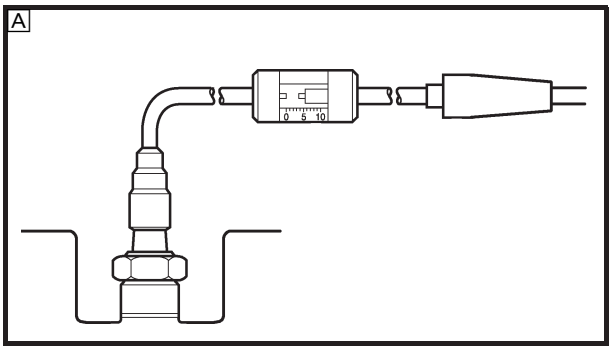


Fig. 66

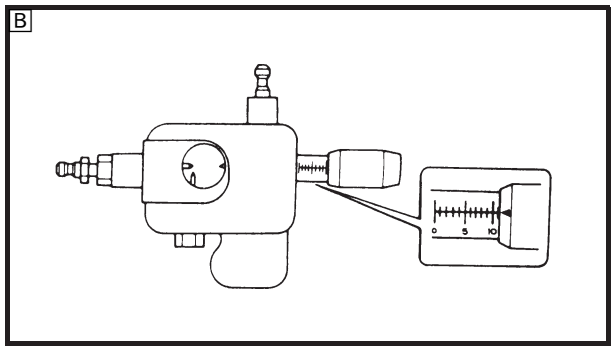


Fig. 67

4. Select the cylinder number where the spark gap tester is connected, and then click the **Select** button or press the Enter key on your keyboard. (See fig. 65)

5. Click the **Execute** button or press the Enter key on your keyboard. (Fig. 68)

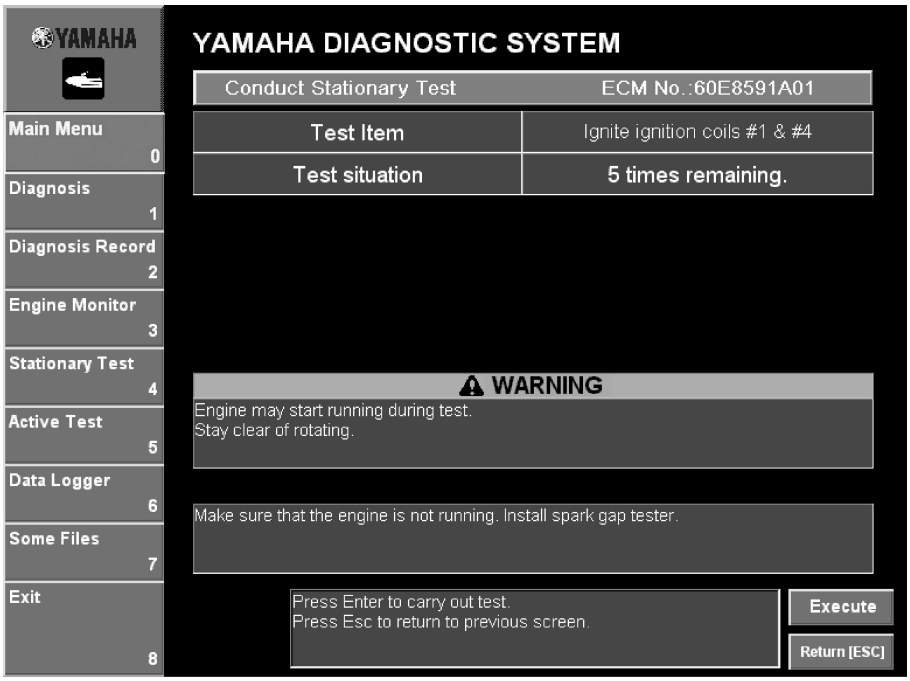


Fig. 68

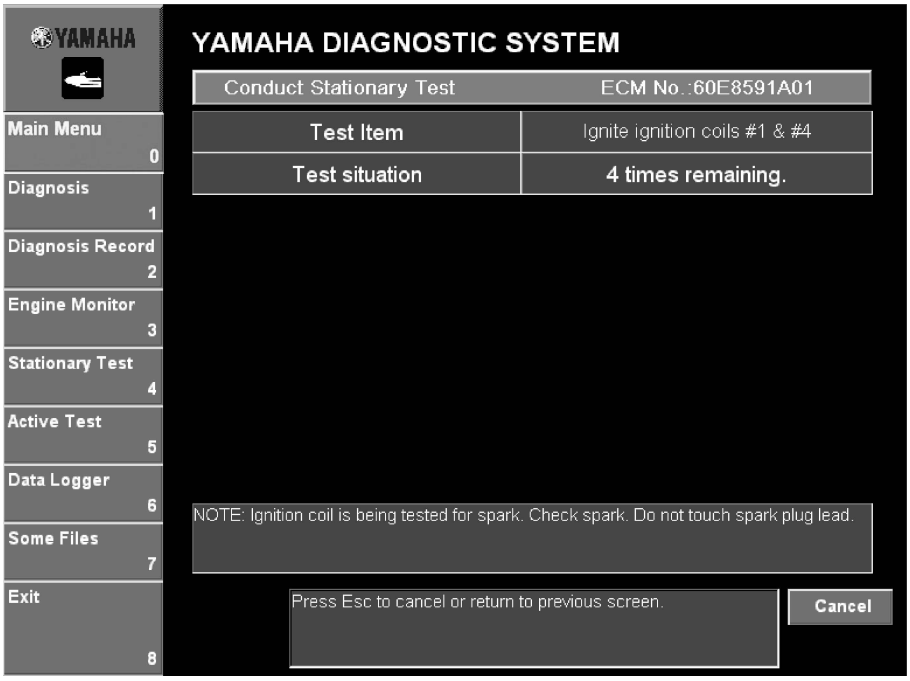


Fig. 69

NOTE:
If the engine is running, an error message is displayed. Follow the instructions that appear.

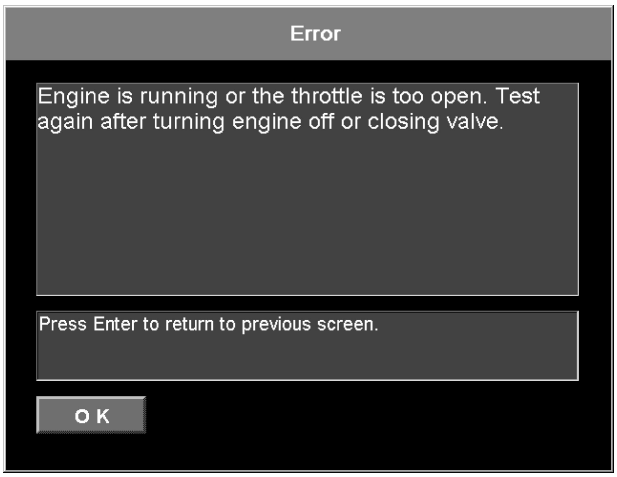


Fig. 70

6. While checking the information that appears in the **Test situation** column, follow the test instructions in the messages that are displayed. (See fig. 69)

NOTE:
If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear in the error message.

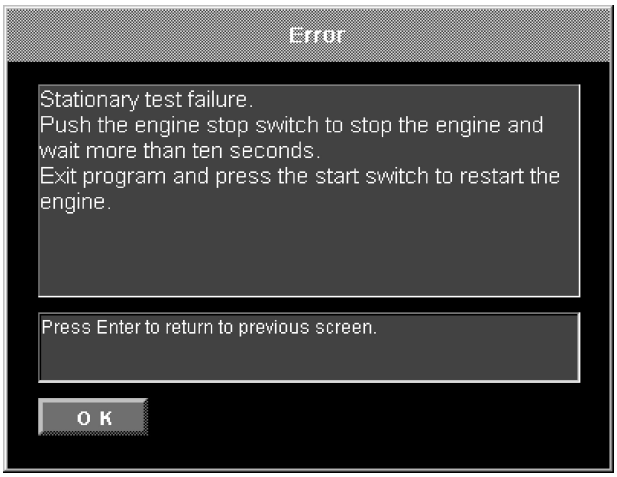


Fig. 71

7. To stop the stationary test, click the **Cancel** button. (See fig. 69)

8. Observe the spark through the discharge window of the spark gap tester.

9. To perform the test again to the same cylinder, click the **Execute** button or press the Enter key on your keyboard. To perform the test on a different cylinder, click the **Return [ESC]** button or press the Esc key on your keyboard to return to main menu where a different test can be selected.

NOTE:

If an error occurs while the test is being performed, the following message is displayed.

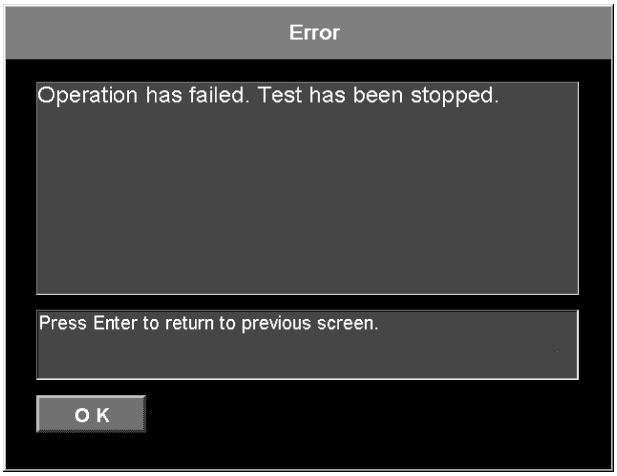


Fig. 72

Operating injector procedure

A voltage is applied to the injector of the selected cylinder, the injector is activated, and then the fuel system is checked. The fuel is injected 20 times within two seconds.

⚠ WARNING

- **Do not perform the test with the injector removed from the throttle body or with any fuel system parts removed. High-pressure fuel may spurt out.**
- **When performing this operation, keep all sparks, flames, or other sources of ignition away from the testing area. Gasoline is highly flammable.**

NOTE:

Before activating the injector, operate the electric fuel pump for ten seconds in order to build up fuel pressure.

1. Select the test that you wish to perform by either clicking it or pressing the up or down arrow keys on your keyboard.

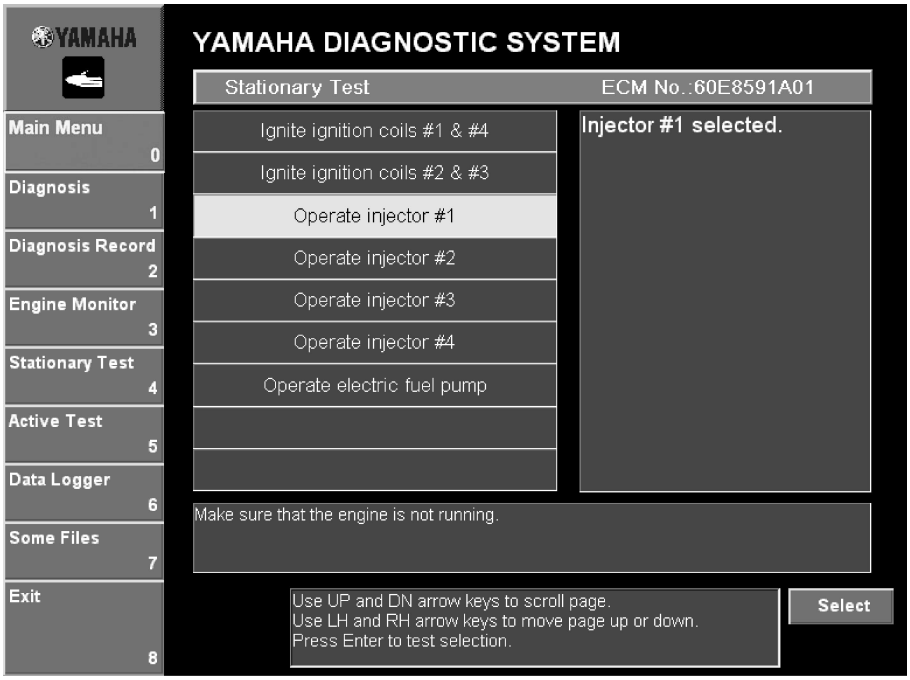


Fig. 73

NOTE:

- Make sure that the engine is not running.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.
- Make sure that there is fuel in the fuel tank, otherwise an error will occur and the test cannot be performed.

2. Select the cylinder to be tested, and then click the **Select** button or press the Enter key on your keyboard. (See fig. 73)

3. Click the **Execute** button or press the Enter key on your keyboard. (Fig. 74)

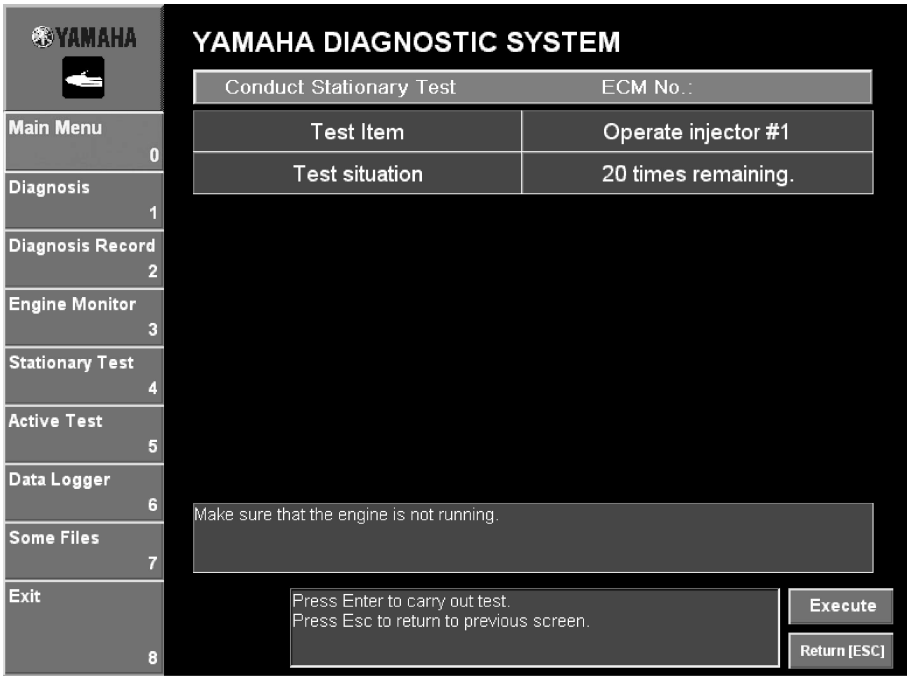


Fig. 74

NOTE:

If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear.

4. Listen to the operating sound of the injector for the cylinder being tested.

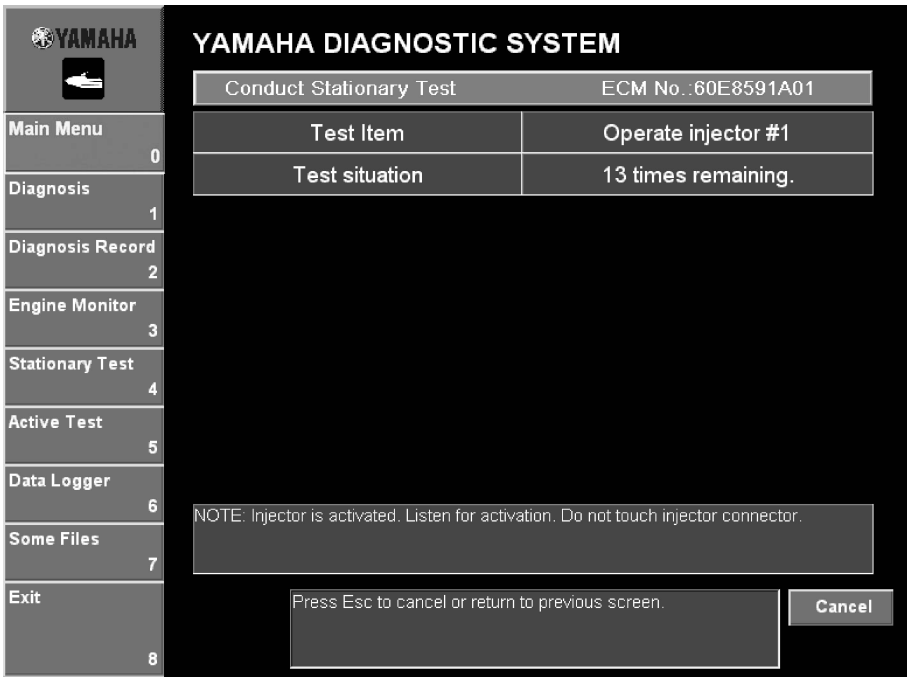


Fig. 75

⚠ WARNING

Do not touch the injector connector.

5. To perform the test again on the same cylinder, click the **Execute** button or press the Enter key on your keyboard. To perform the test on a different cylinder, click the **Return [ESC]** button or press the Esc key on your keyboard to return to the window where a different test can be selected.

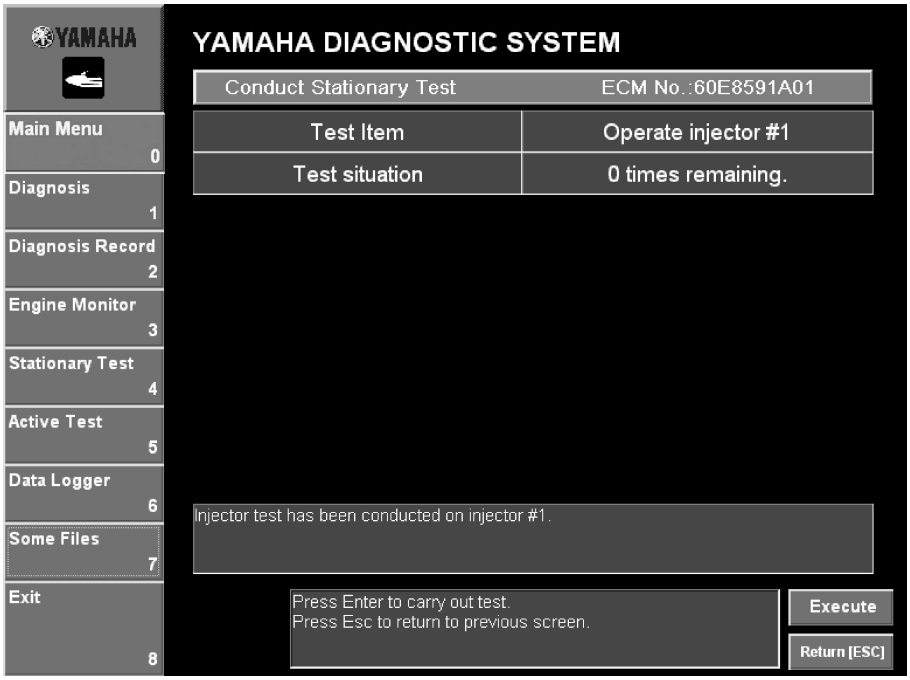


Fig. 76

CAUTION:

Do not test the same cylinder three or more times, otherwise the spark plug insulator could be damaged.

Operating the stepping motor

A voltage is applied to the stepping motor, the stepping motor is operated, and then the stepping motor is checked. The stepping motor is operated for seven seconds.

1. Select the test to be performed, and then click the **Select** button or press the Enter key on your keyboard.

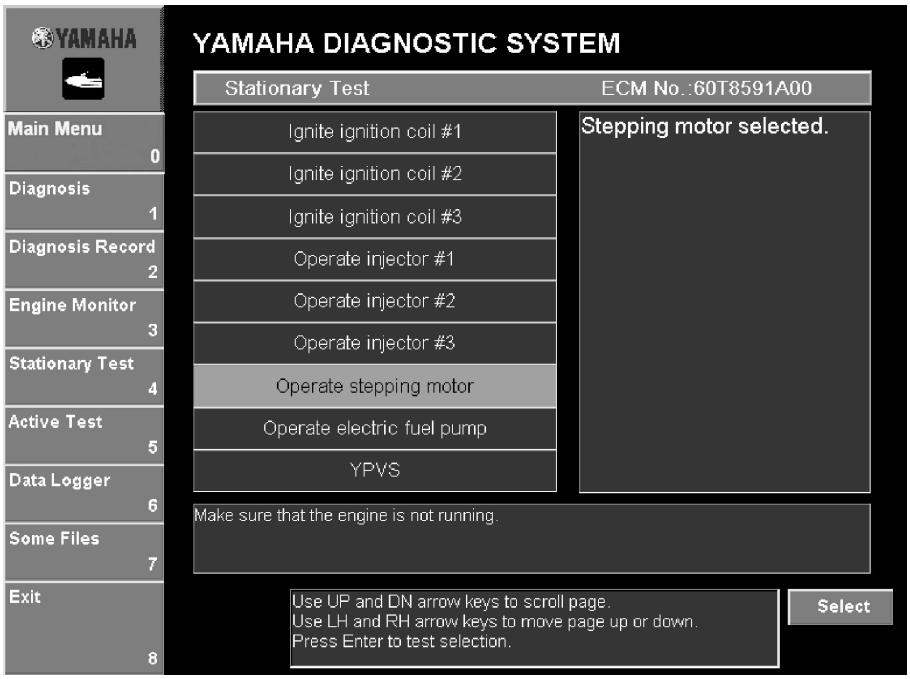


Fig. 77

NOTE:

- Make sure that the engine is not running.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.

2. Click the **Execute** button or press the Enter key on your keyboard.

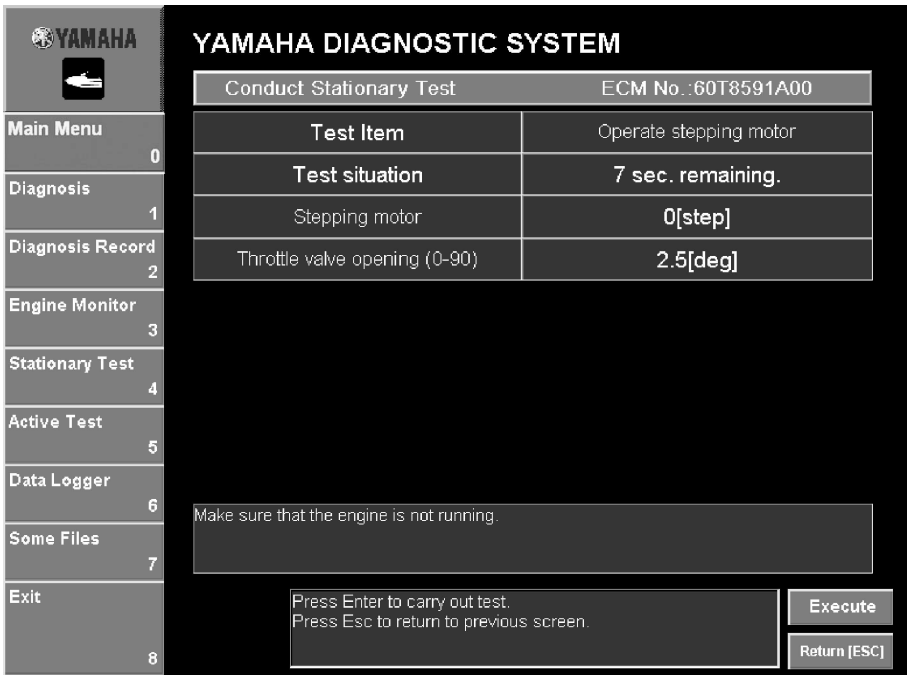


Fig. 78

NOTE:
If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear.

3. Listen to the operating sound of the stepping motor.

4. To perform the test again, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return [ESC]** button or press the Esc key on your keyboard to return to the window where a different test can be selected.

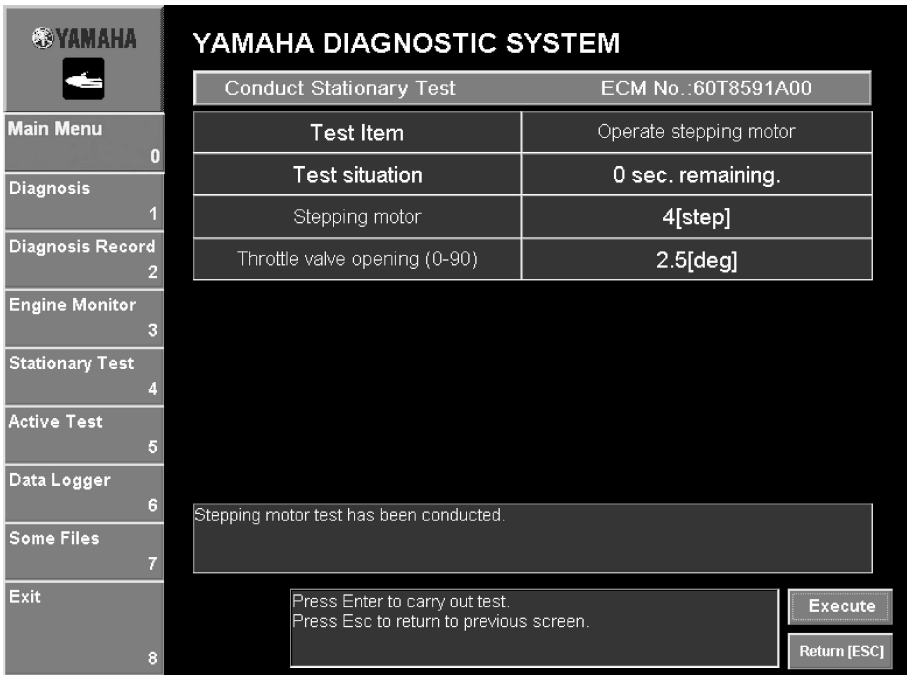


Fig. 79

Operating the electric fuel pump

A voltage is applied to the electric fuel pump, the electric fuel pump is operated, and then the electric fuel pump is checked. The electric fuel pump is operated for ten seconds.

⚠ WARNING

- **Do not perform the test with the injector removed from the throttle body or with any fuel system parts removed. High-pressure fuel may spurt out.**
- **When performing this operation, keep all sparks, flames, or other sources of ignition away from the testing area. Gasoline is highly flammable.**

NOTE:

Make sure that there is fuel in fuel tank, otherwise an error will occur and the test cannot be performed.

1. Select the test to be performed, and then click the **Select** button or press the Enter key on your keyboard.

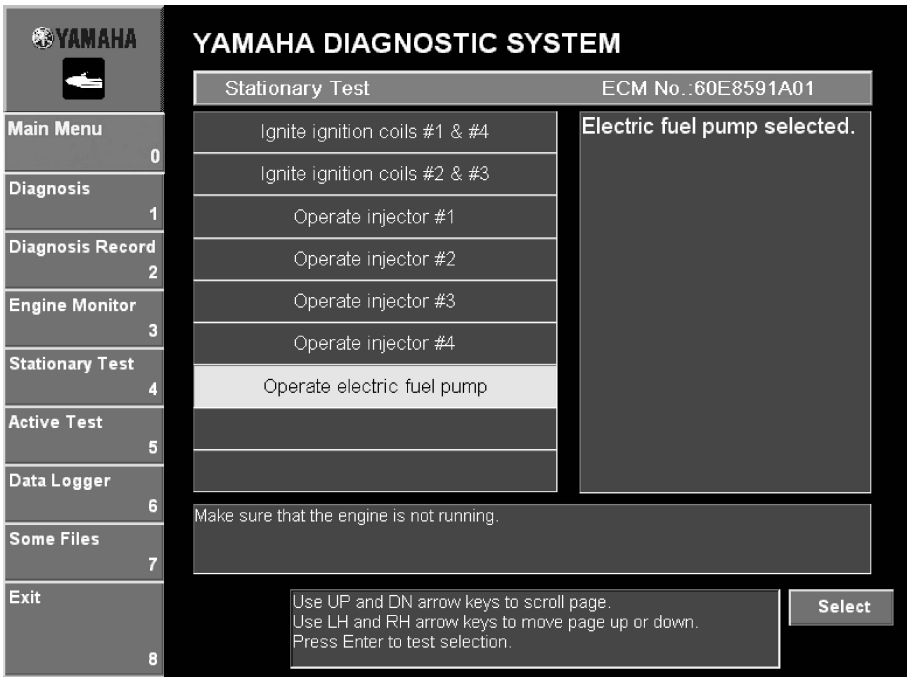


Fig. 80

NOTE:

- Make sure that the engine is not running.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.

2. Click the **Execute** button or press the Enter key on your keyboard.

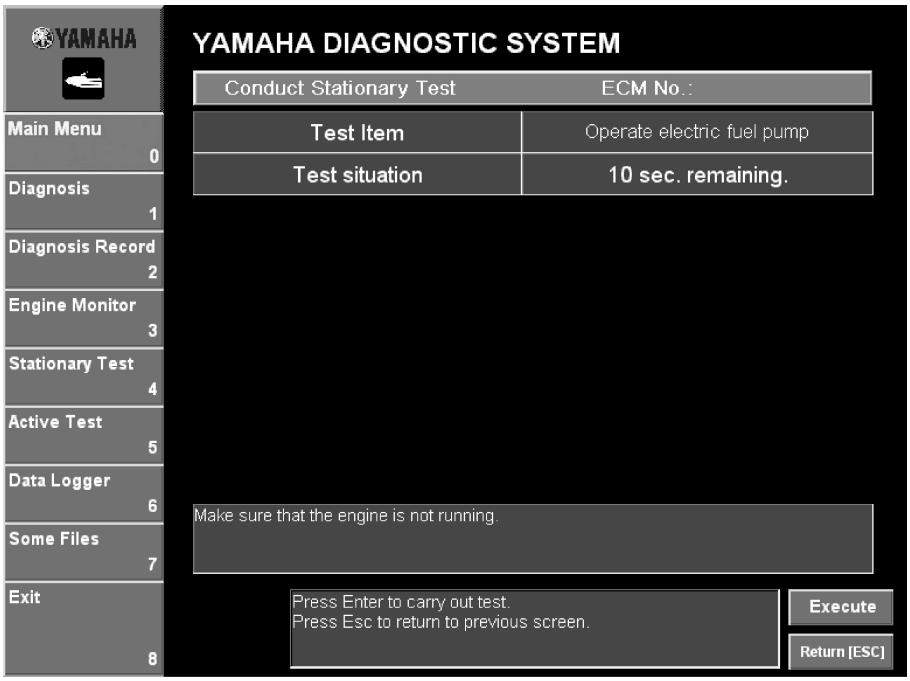


Fig. 81

NOTE:
If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear.

3. Listen to the operating sound of the electric fuel pump.

4. To perform the test again, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return [ESC]** button or press the Esc key on your keyboard to return to the window where a different test can be selected.

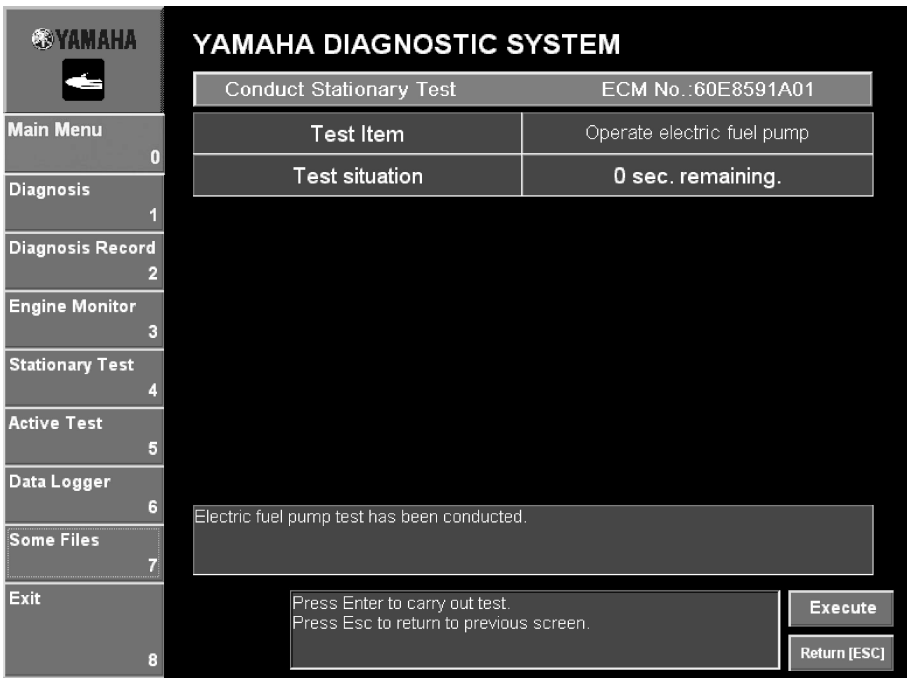


Fig. 82

Operating the YPVS

A voltage is applied to the YPVS, the YPVS is operated, and then the YPVS is checked. The YPVS is operated for two seconds.

1. Select the test to be performed, and then click the **Select** button or press the Enter key on your keyboard.

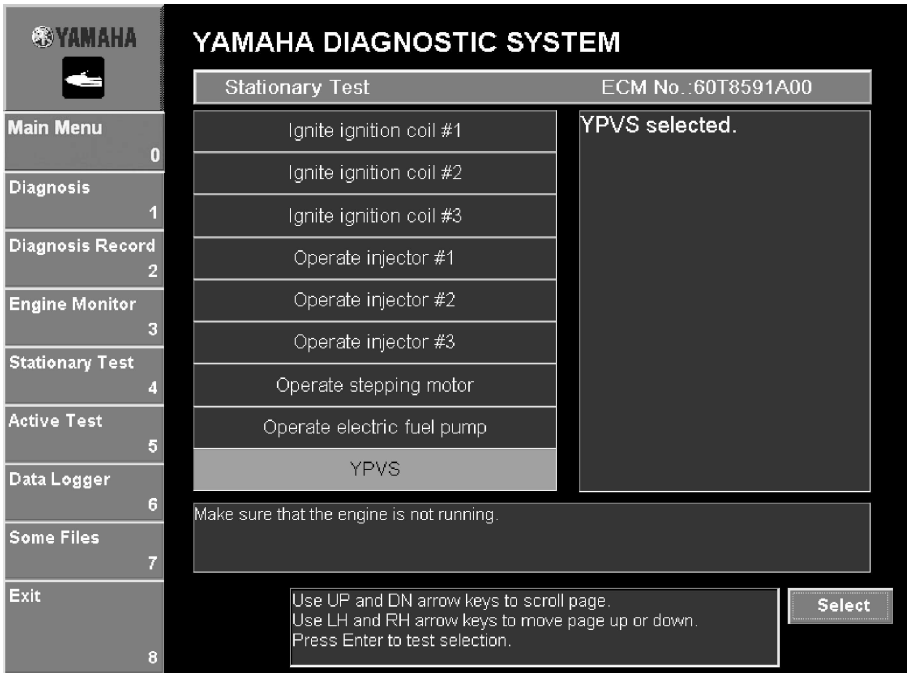


Fig. 83

NOTE:

- Make sure that the engine is not running.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.

2. Click the **Execute** button or press the Enter key on your keyboard.

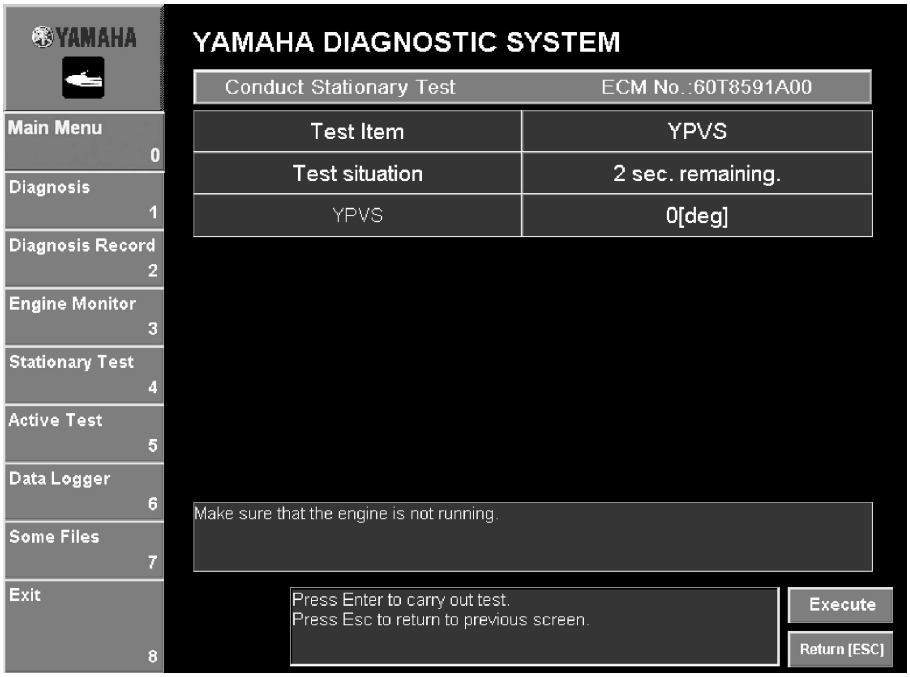


Fig. 84

NOTE:
If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear.

3. Listen to the operating sound of the YPVS.

4. To perform the test again, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return [ESC]** button or press the Esc key on your keyboard to return to the window where a different test can be selected.

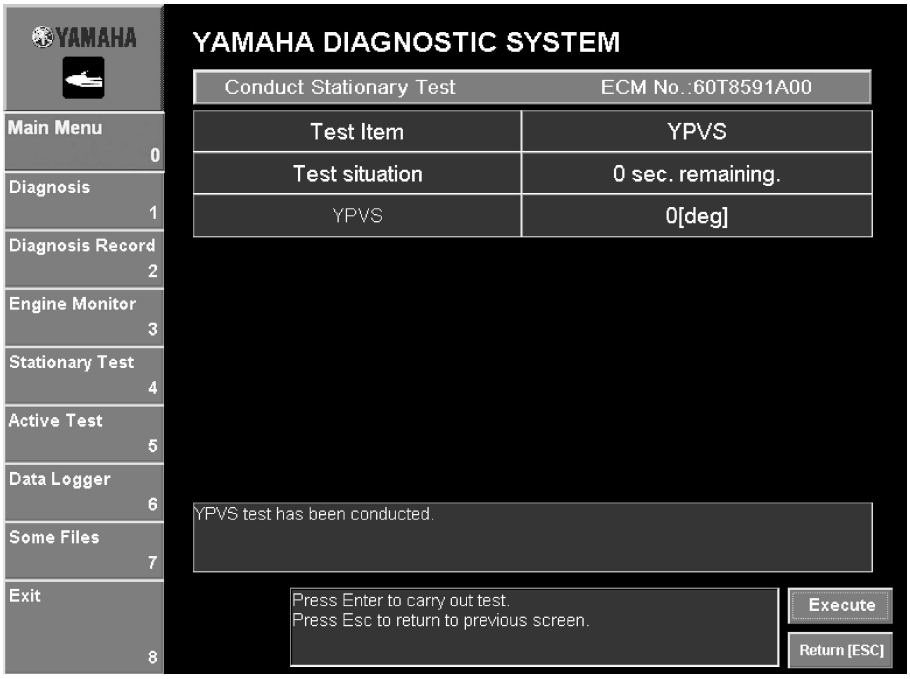


Fig. 85

Operating the bypass valve motor

A voltage is applied to the bypass valve motor, the bypass valve motor is operated, and then the bypass valve motor is checked. The bypass valve motor is operated for seven seconds.

1. Select the test to be performed, and then click the **Select** button or press the Enter key on your keyboard.

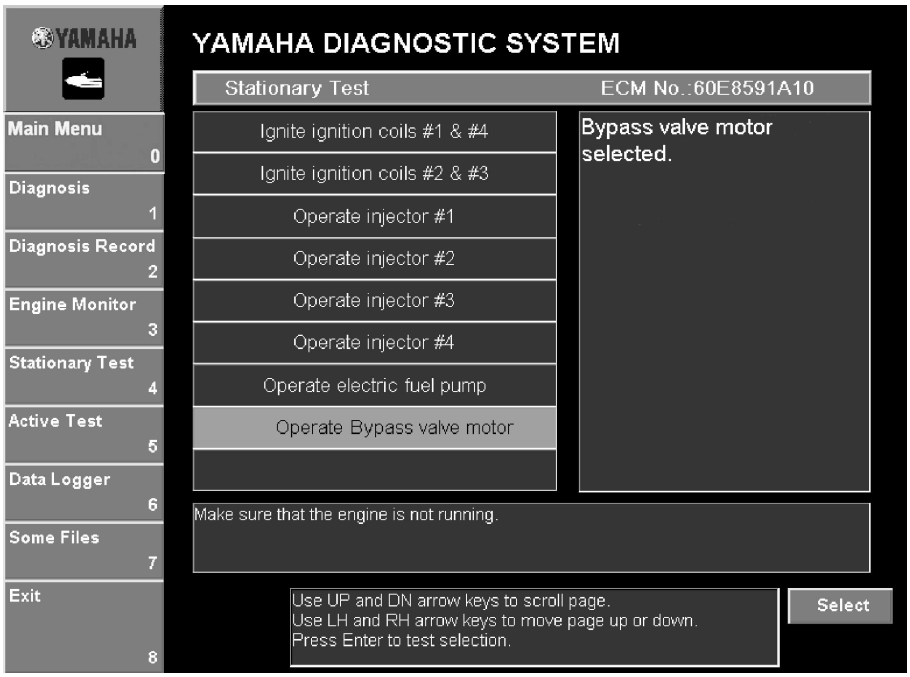


Fig. 86

NOTE:

- Make sure that the engine is not running.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.

2. Click the **Execute** button or press the Enter key on your keyboard.

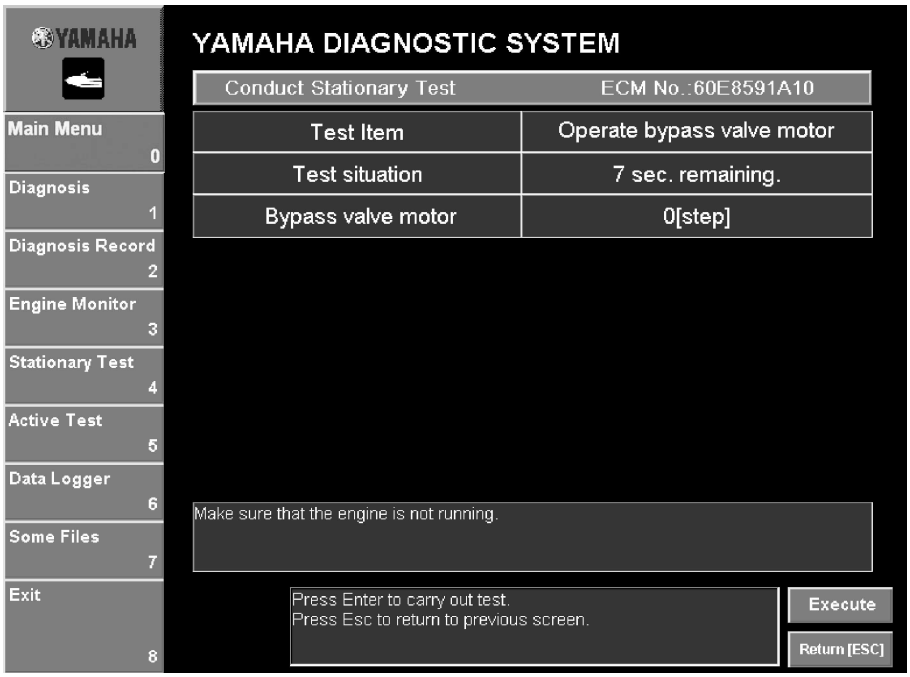


Fig. 87

NOTE:
If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear.

3. Listen to the operating sound of the bypass valve motor.

4. To perform the test again, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return [ESC]** button or press the Esc key on your keyboard to return to the window where a different test can be selected.

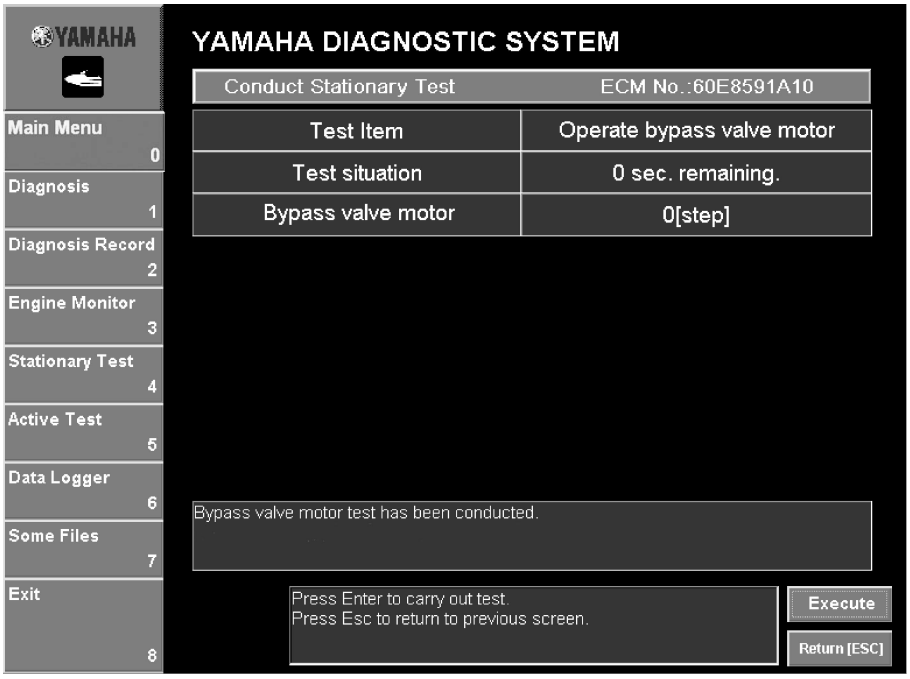


Fig. 88

ACTIVE TEST

Selecting this command displays a window where active tests can be selected.

List of active test items

Item
Drop cylinder

⚠ WARNING

Avoid clicking the Execute and Cancel buttons repeatedly, otherwise the ECM or PC may not work properly and they may be damaged.

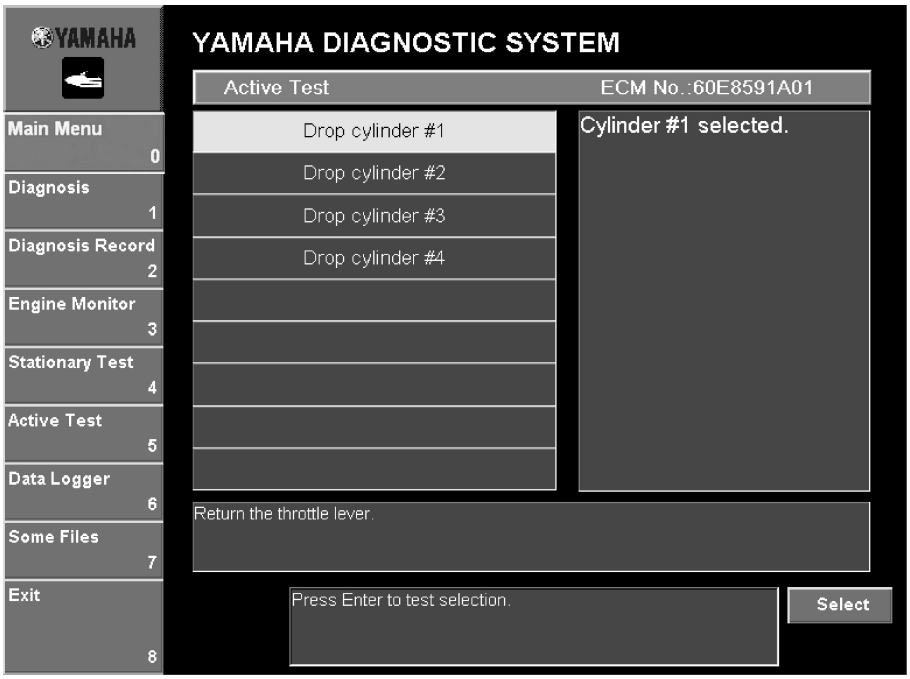


Fig. 89

NOTE:

The test can be carried out while the engine is running. It is not possible to carry out the test while the watercraft is running.

Dropping a cylinder

Start the engine and observe the changes in engine speed for 20 seconds.
For the first ten seconds operate all cylinders, and then stop one cylinder for five seconds. For the last five seconds operate all cylinders.
A screen that allows you to select which ignition and fuel to cut is displayed.

1. Select which ignition and fuel you wish to cut by either clicking it or pressing the up or down arrow keys on your keyboard. (See fig. 89)

NOTE:

- Release the throttle lever.
- The selected item is highlighted in light blue.
- The details of the selected test are displayed in the column on the right, and the items that must be either checked or performed before the test can start are displayed below the table.
- Only one item can be selected at one time.

2. Click the **Select** button or press the Enter key on your keyboard. (See fig. 89)
3. Start the engine.
4. Click the **Execute** button or press the Enter key on your keyboard. (Fig. 90)

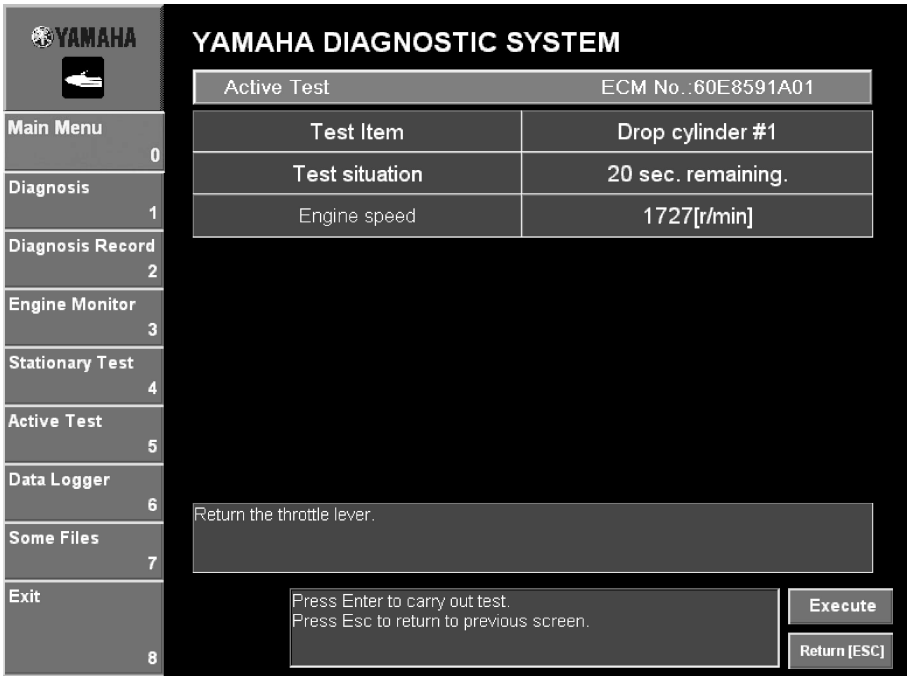


Fig. 90

NOTE:
If the engine is not running, an error message is displayed. Follow the instructions that appear.



Fig. 91

5. While checking the information that appears beside **Test situation** and **Engine Speed**, follow the test instructions in the messages that are displayed. (See fig. 90)

NOTE:
If an error occurs while the test is being performed, an error message is displayed. Follow the instructions that appear.

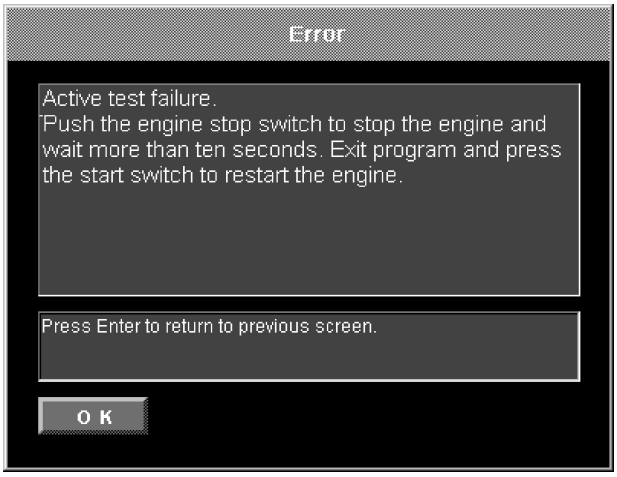


Fig. 92

6. To perform the test again on the same cylinder, click the **Execute** button or press the Enter key on your keyboard. To perform a different test, click the **Return [ESC]** button or press the Esc key on your keyboard to return to the window where a different test can be selected.

DATA LOGGER

Data Logger item selection

A window that allows you to select the **Data comparison graph**, **Engine operating hours according to engine speed**, or **ECM record data graph** window appears.

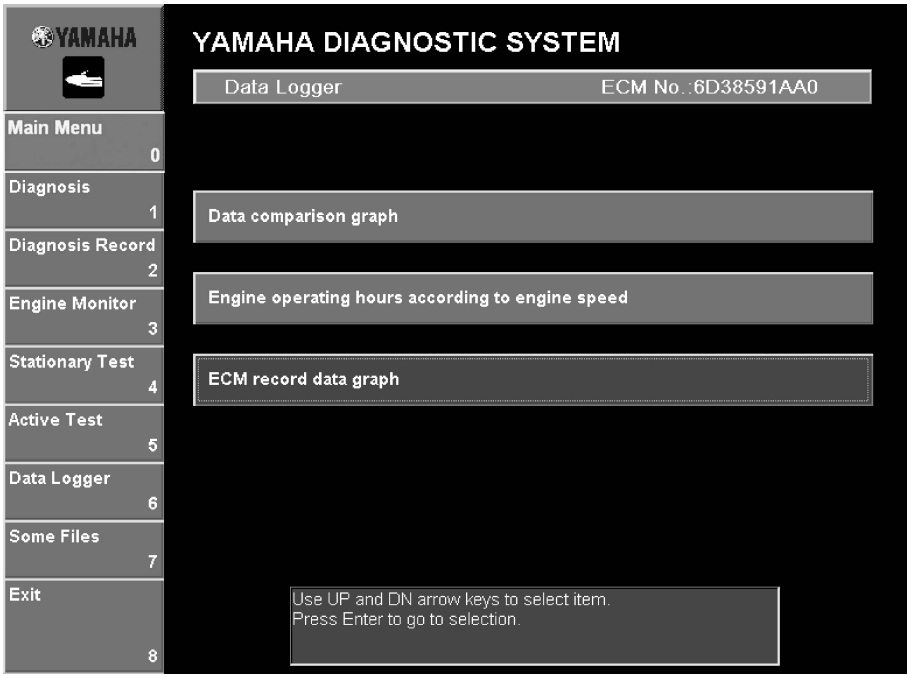


Fig. 93

Data comparison graph

1. Click the **Data comparison graph** button or press the up or down arrow key on your keyboard to select it and press the Enter key. (See fig. 93)

2. Select the desired items by either clicking them or pressing the up or down arrow keys on your keyboard, and then press the space bar. (Fig. 94)

A window appears that allows you to select the items ① to be graphed. No more than two items can be displayed.

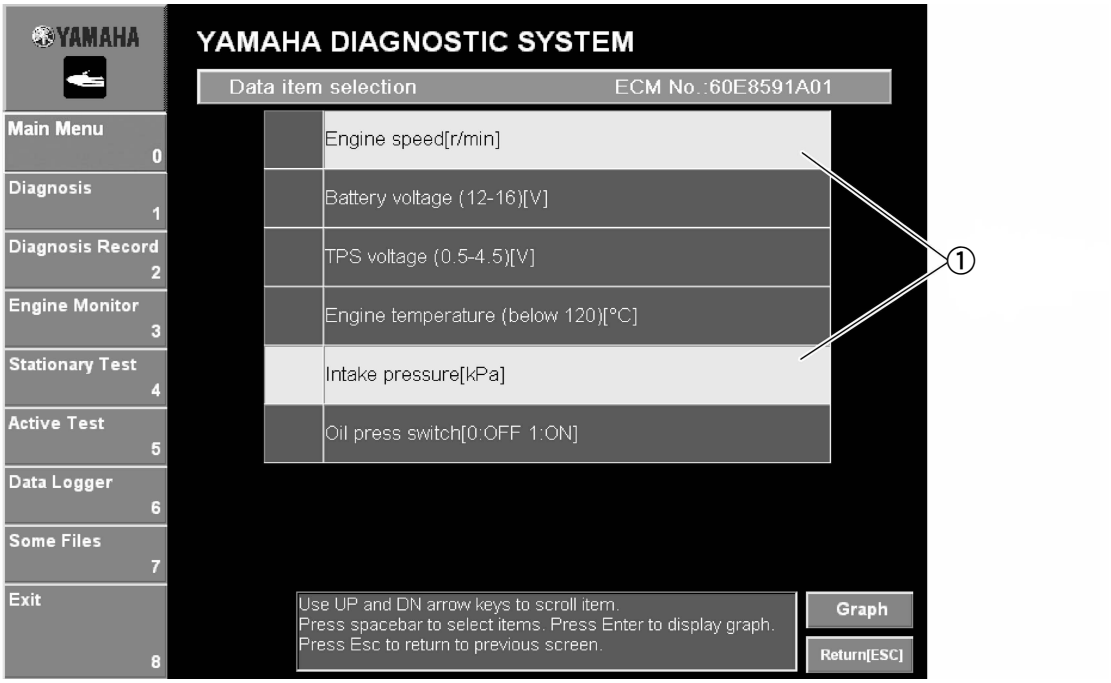


Fig. 94

List of data comparison graph items

Item
Battery voltage
Engine speed
Engine temperature
Ex. manifold water temp. sensor
Intake pressure

Item
Oil press switch
Stepping motor
Throttle position sensor
TPS voltage

NOTE:

- Selected items have a light blue background. Items that are not selected have a blue background.
- At initialization, **Engine speed [r/min]** is selected.
- Some items may not be available depending on the model of the watercraft.

3. Click the **Graph** button or press the Enter key on your keyboard. (See fig. 94) The **Data comparison** window is displayed. (Fig. 95)

NOTE:

A line graph appears with the items selected in the **Data item selection** window on the vertical axes and the **Time before engine stop** on the horizontal axis. (Fig. 95)

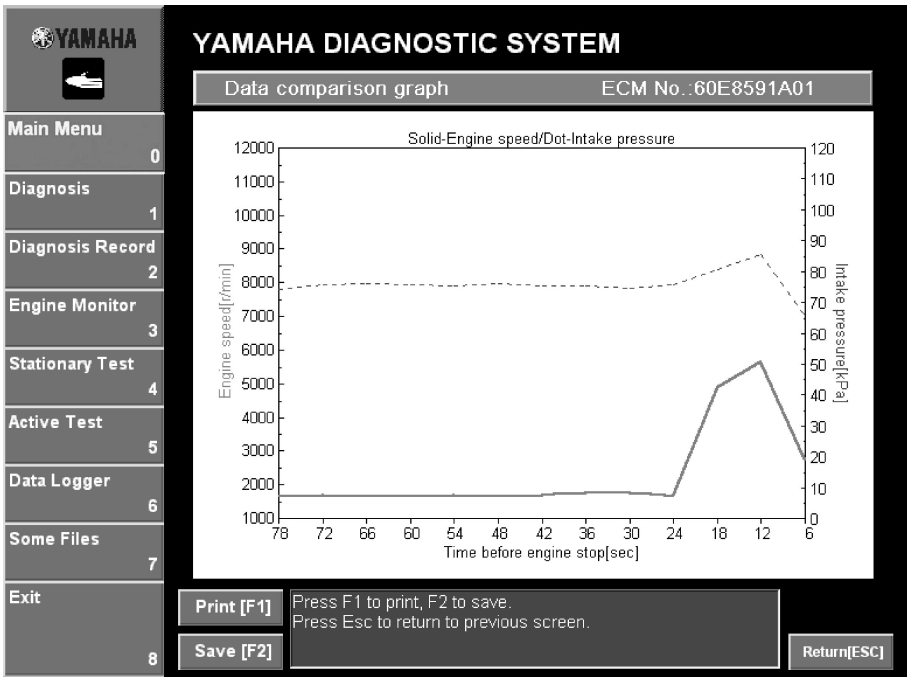


Fig. 95

NOTE:

- The item on the left vertical axis is graphed with a solid line and the item on the right vertical axis is graphed with a dotted line.
- Although the engine is running, the graphed lines do not show the present engine conditions. The graphed lines only display the values recorded up until the time the Enter key on your keyboard was pressed in the **Data Logger item selection**.

Engine operating hours according to engine speed

1. Click the **Engine operating hours according to engine speed** button or press the up or down arrow key on your keyboard to select it and press the Enter key. (See fig. 93)
2. The operating hours as compared to the engine speed and the total operating hours are displayed. (Fig. 96)

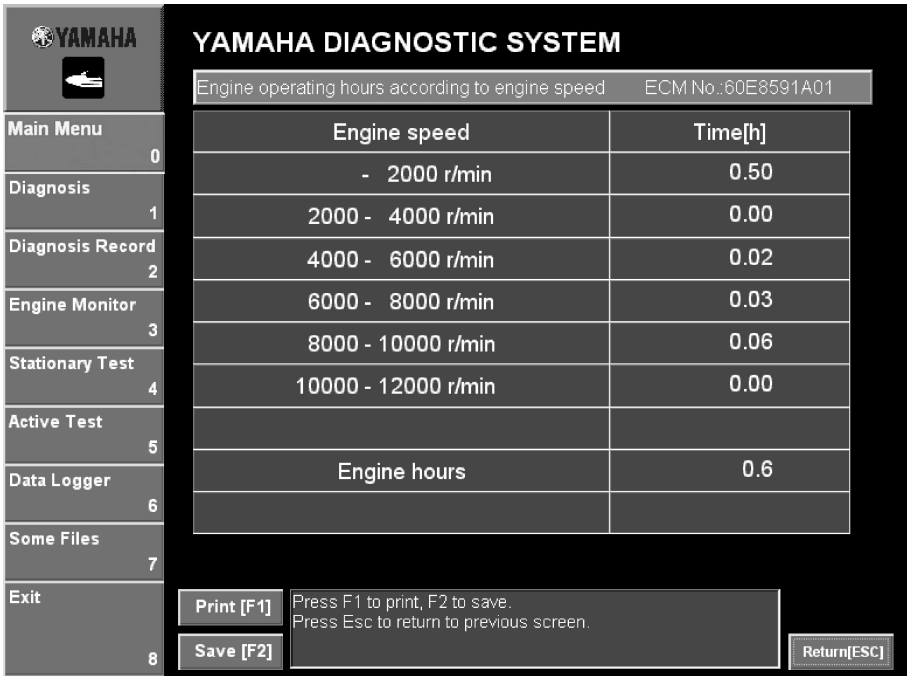


Fig. 96

A window is displayed showing the number of hours that the engine was operated at each engine speed range and the total hours of operation.

NOTE:

- Although the engine is running, the current operating time is not included in the displayed time. The displayed time only shows the total hours until the time the Enter key on your keyboard was pressed in the **Data Logger item selection**.
- The sum of the **Engine operating hours according to engine speed** is not equal to the total hours of operation since the hours are rounded to two decimals.

ECM record data graph

Four seconds of record data stored in the ECM, two seconds before and two seconds after malfunctions occurred, can be displayed in a graph.

ECM record data can be saved and reviewed when the computer is connected to the ECM using the communication cable.

The saved ECM record data can even be recalled and reviewed offline.

NOTE:

This function may not be available depending on the model of the watercraft.

When **Display pattern 1**, **Display pattern 2**, or **Display pattern 3** is used, the displayed monitor items have been fixed in the software. When **Display item selection** is used, you can select the monitor items that you wish to display.

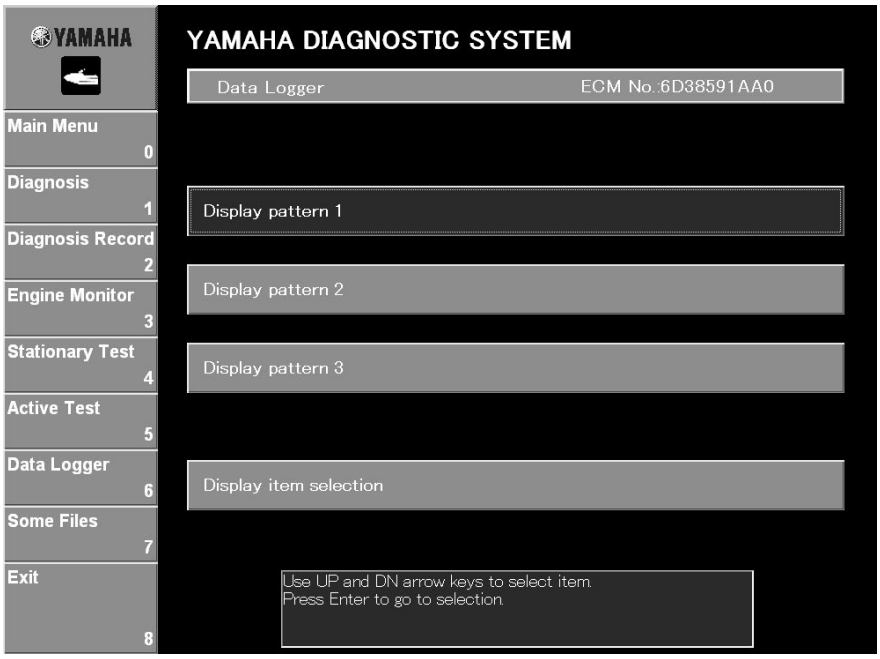


Fig. 97

Items graphed using Display pattern 1

Item
Engine speed
Accelerator position sensor 1
Throttle position sensor 1
Target TPS voltage[*1]

Items graphed using Display pattern 2

Item
Accelerator position sensor 1
Accelerator position sensor 2
Throttle position sensor 1
Throttle position sensor 2

Items graphed using Display pattern 3

Item
Engine speed
Steering sensor
Target TPS voltage[*1]
Target TPS voltage for ISC[*4]

Items that can be graphed using Display item selection

Item
Engine speed
Accelerator position sensor 1
Accelerator position sensor 2
Steering sensor
Throttle position sensor 1
Throttle position sensor 2
Intake pressure
Battery voltage
Target TPS voltage*1
Ref. TPS voltage*2
Ref. acc. pos. sensor voltage*3

Item
Target TPS voltage for ISC*4
Engine stop mode
Engine start mode
Engine stop mode with SW
Engine stop lanyard switch
Main relay
ETV relay
Overheat thermoswitch
Oil press switch
Engine hours

*1: “Target TPS voltage” stands for “Target Throttle Position Sensor voltage”. This item shows the target output voltage of TPS. This value means that ECM should control to open throttle valve to get the goal open degree.

*2: “Ref. TPS voltage” stands for “Reference Throttle Position Sensor voltage”. This item shows the criterion output voltage of TPS. This value is used to detect the TPS output voltage during engine operation.

*3: “Ref. acc. pos. sensor voltage” stands for “Reference accelerator position sensor voltage”. This item shows the criterion output voltage of Accelerator position sensor. This value is used to detect the Accelerator position sensor output voltage when the remote control throttle lever opens.

*4: “Target TPS voltage for ISC” stands for “Target Throttle Position Sensor voltage for Idle Speed Control”. ECM controls the engine idle speed by using throttle valve attached TPS. This target voltage is used by ECM to achieve the goal open degree of the throttle valve at idle speed.

Graphing using Display patterns 1, 2, and 3 (when computer is connected to ECM using communication cable)

1. Click the **ECM record data graph** button or press the up or down arrow key on your keyboard to select it and press the Enter key.

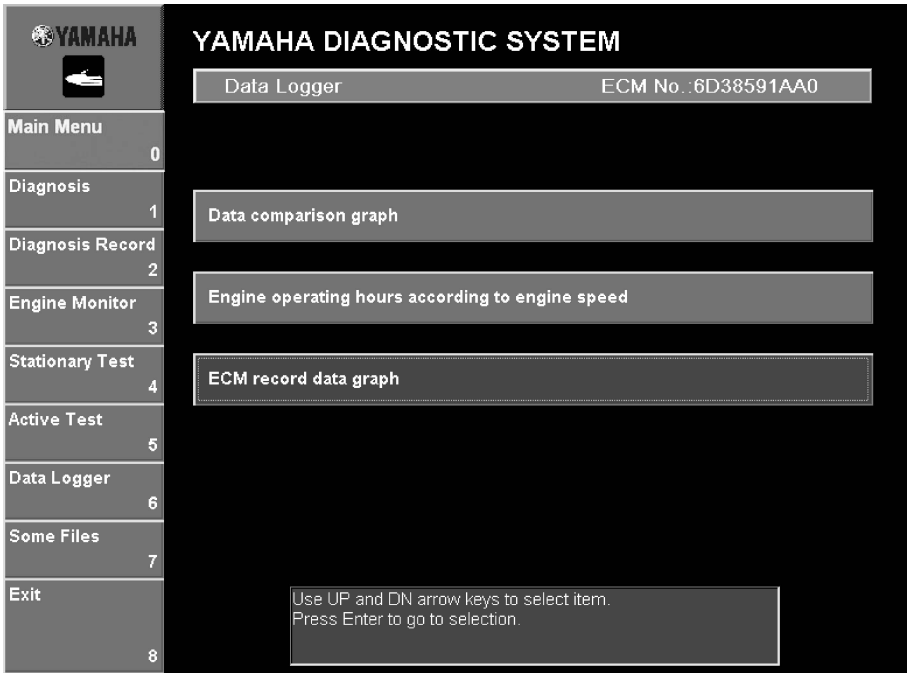


Fig. 98

2. Select the disk and folder where the data will be saved and specify its file name.

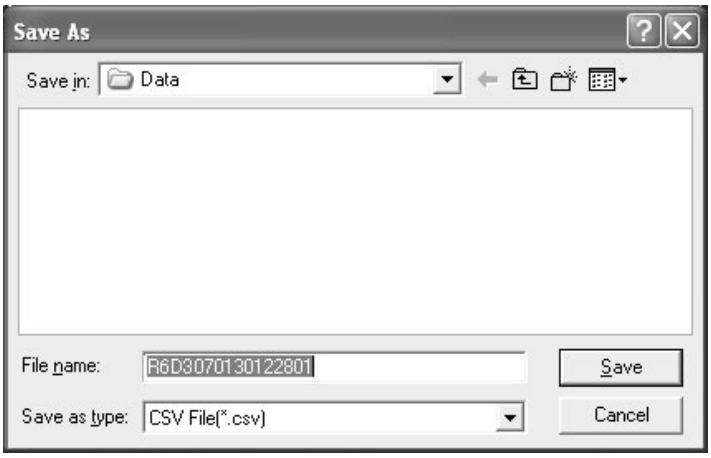


Fig. 99

NOTE:

The default file name is assigned as shown below.

Example: R 6D3 07 01 30 1228 XX .csv

ID code Model Year Month Day Time File serial number

NOTE:

If there is no record data stored in the ECM, the **Command Confirmation** window is displayed. Follow the instructions that appear.



Fig. 100

3. Select the display pattern by either clicking the **Display pattern 1**, **Display pattern 2**, or **Display pattern 3** button or pressing the up or down arrow key on your keyboard and pressing the Enter key.

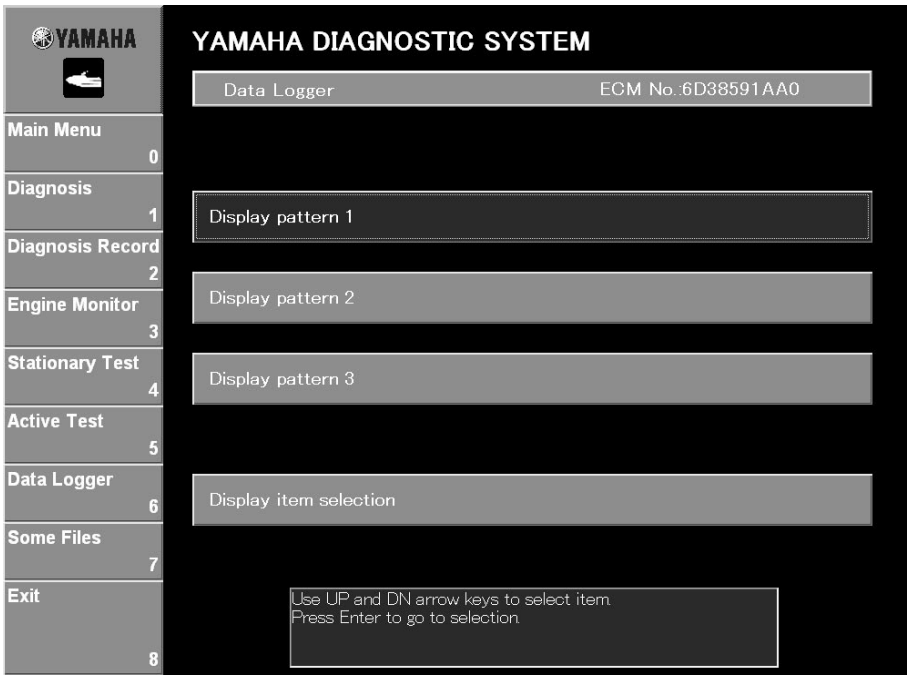


Fig. 101

4. The selected graph data is displayed.

Display pattern 1

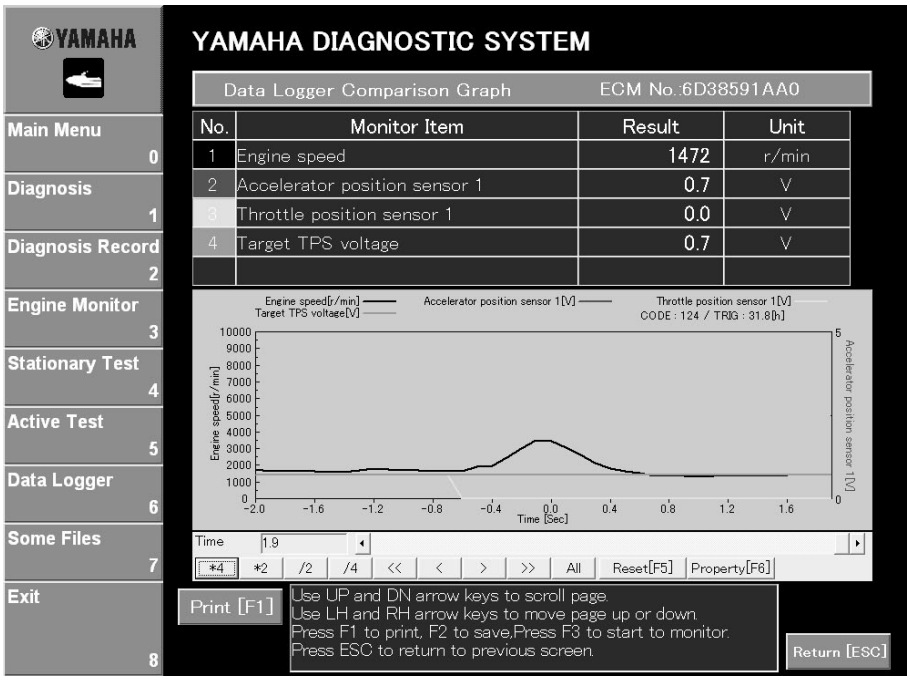


Fig. 102

Display pattern 2

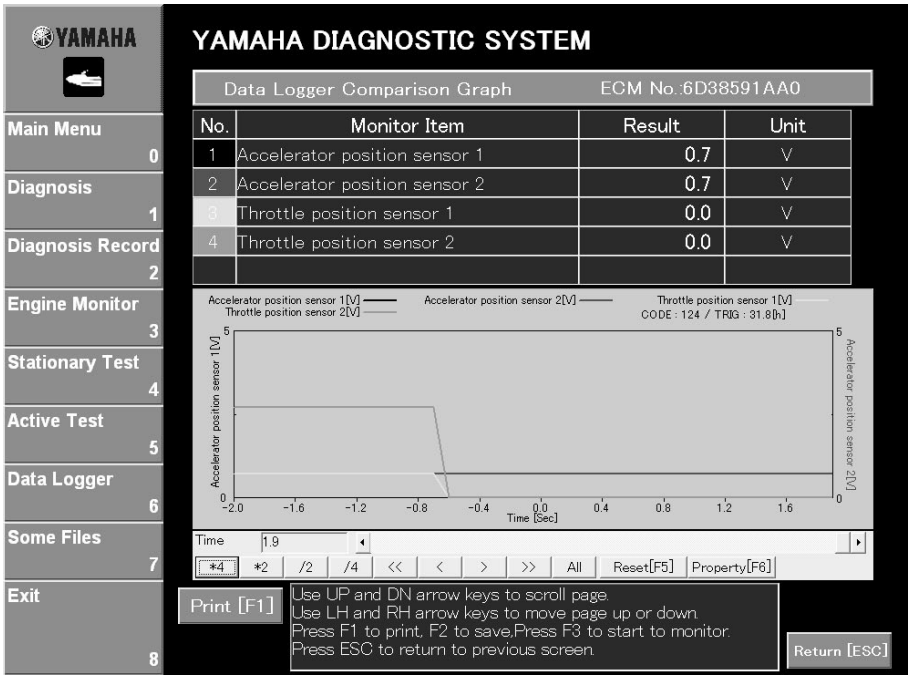


Fig. 103

Display pattern 3

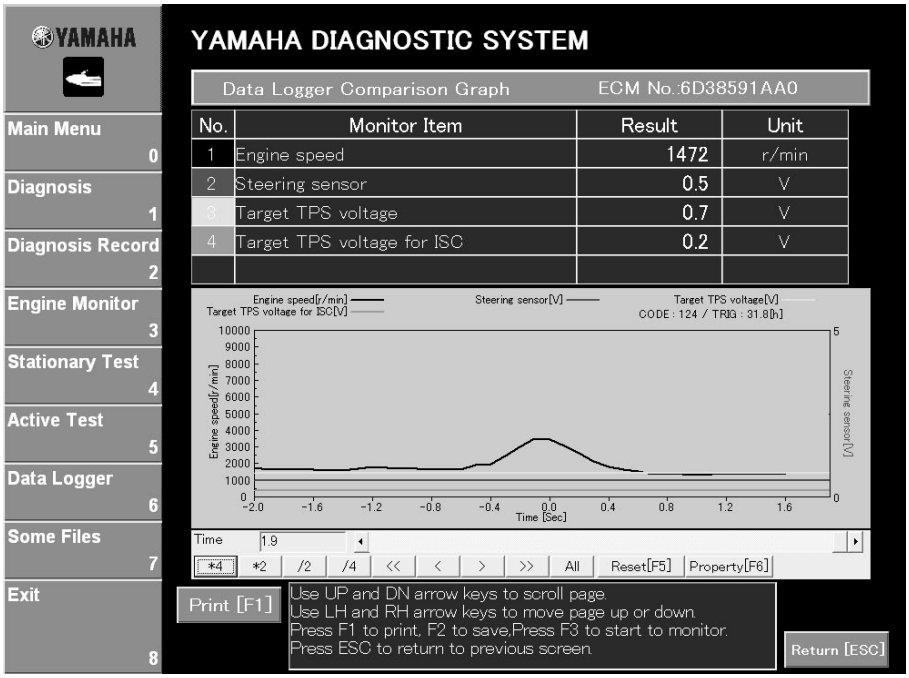


Fig. 104

Graph window controls (keys and buttons)

Keyboard	Button	Operation	Remarks
← →	< >	Moves cursor in indicated direction (by one sample increment).	Disabled when monitoring.
Shift + ← →	<< >>	Moves cursor in indicated direction (by ten sample increments).	Disabled when monitoring.
Ctrl + ← →	None	Moves cursor in indicated direction (by 100 increments).	Disabled when monitoring.
Insert	*2	Zooms in on time axis (2x zoom, centered on cursor).	Disabled when monitoring.
Delete	/2	Zooms out on time axis (1/2 zoom, centered on cursor).	Disabled when monitoring.
PageUp	*4	Zooms in on time axis (4x zoom, centered on cursor).	Disabled when monitoring.
PageDown	/4	Zooms out on time axis (1/4 zoom, centered on cursor).	Disabled when monitoring.
Space	All	Returns graph display settings to their defaults.	Disabled when monitoring.
F5	Reset[F5]	Deletes currently saved data and returns graph display settings to their defaults. (This feature is disabled during offline operation.)	Disabled when monitoring.
F6	Property[F6]	Displays the graph properties window. (Note that the Logging settings are disabled during offline operation.)	Disabled when monitoring.

Graphing using Display item selection (when computer is connected to ECM using communication cable)

1. Click the **ECM record data graph** button or press the up or down arrow key on your keyboard to select it and press the Enter key. (See fig. 98)
2. Select the disk and folder where the data will be saved and specify its file name. (Fig. 105)

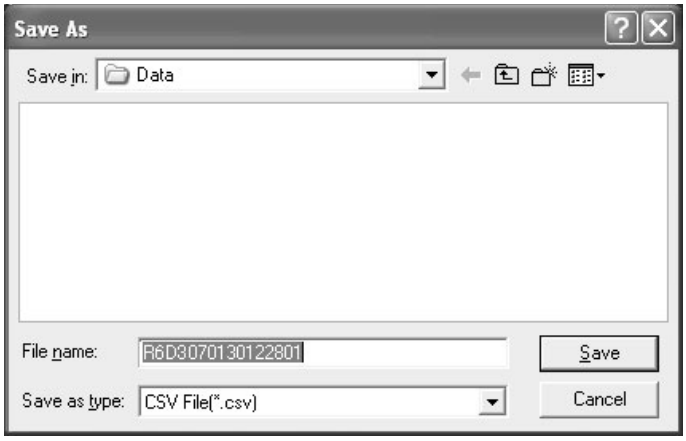


Fig. 105

NOTE:

The default file name is assigned as shown below.

Example: R 6D3 07 01 30 1228 XX .csv

ID code Model Year Month Day Time File serial number

NOTE:

If there is no record data stored in the ECM, the **Command Confirmation** window is displayed. Follow the instructions that appear.



Fig. 106

3. To select the graph items, click the **Display item selection** button or press the up or down arrow key on your keyboard to select it and press the Enter key.

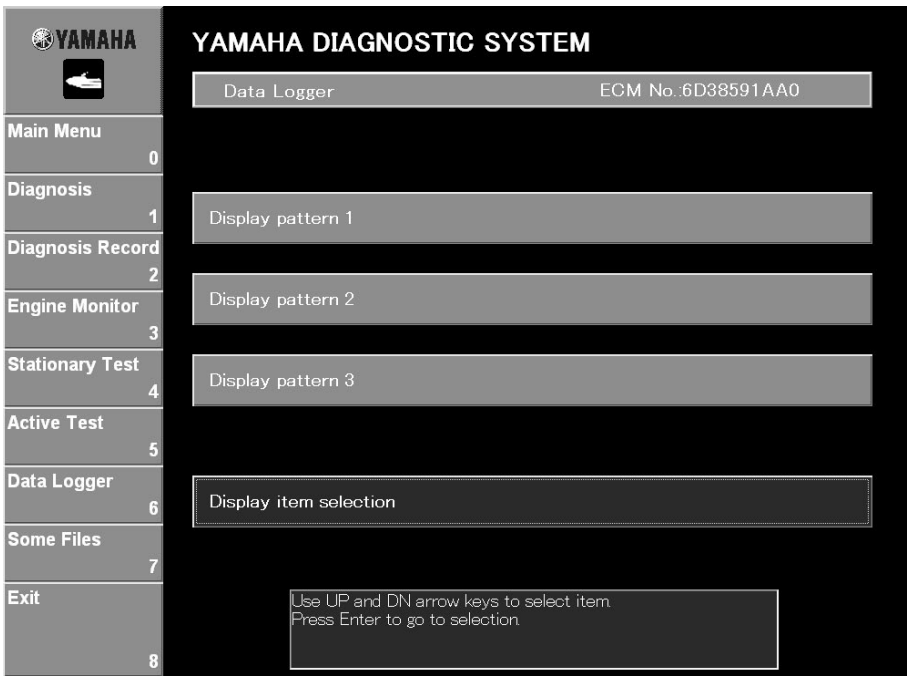


Fig. 107

4. Select an item by either clicking it or pressing the up or down arrow keys on your keyboard, and then press the space bar. (Fig. 108) For a list of the items that can be selected, refer to “Items that can be graphed using Display item selection”.

NOTE:

- Selected items have a light blue background. Items that are not selected have a blue background.
- Up to five items can be selected.

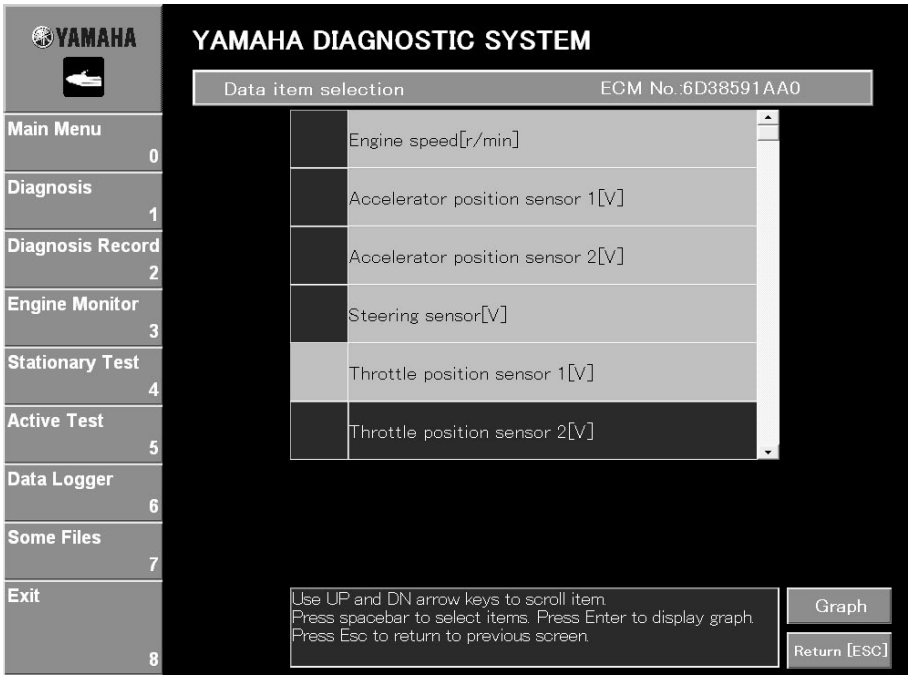


Fig. 108

5. Click the **Graph** button. (See fig. 108) The window is displayed. (Fig. 109) For information on the buttons that appear below the graph, refer to “Graph window controls (keys and buttons)”.

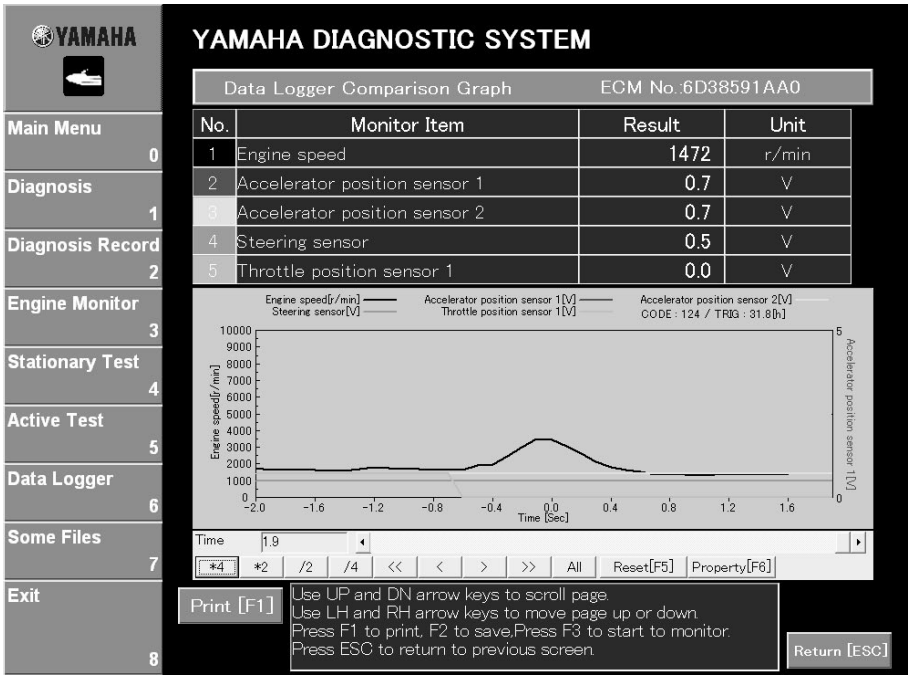


Fig. 109

Graphing (when computer is not connected to ECM)

1. With the adapter disconnected, start up the Yamaha Diagnostic System on your computer. Then click the **Starting service tool [Enter]** button, or press the Enter key.

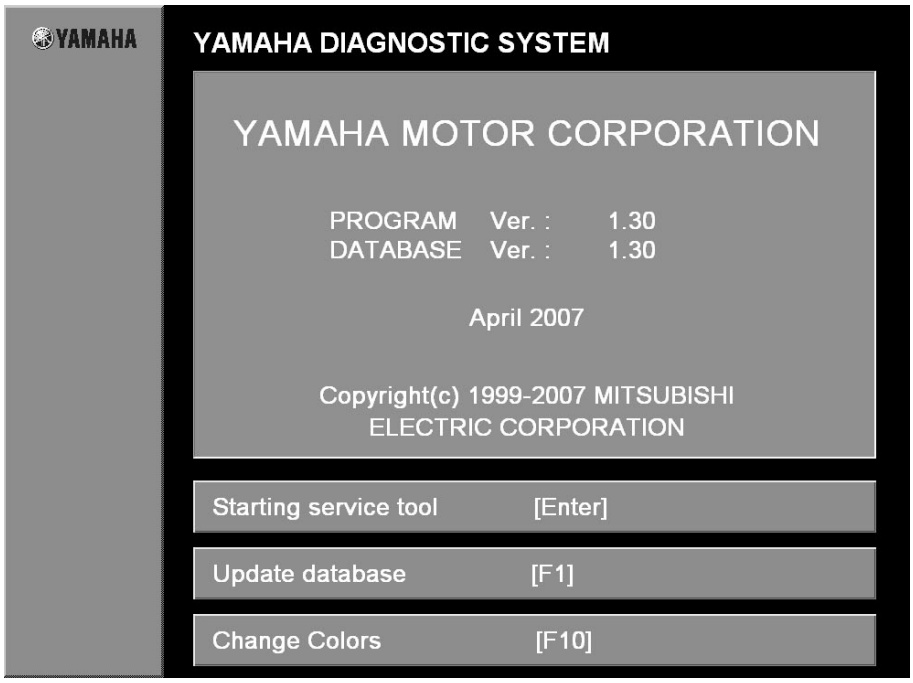


Fig. 110

2. Click or press any key to display the main menu.

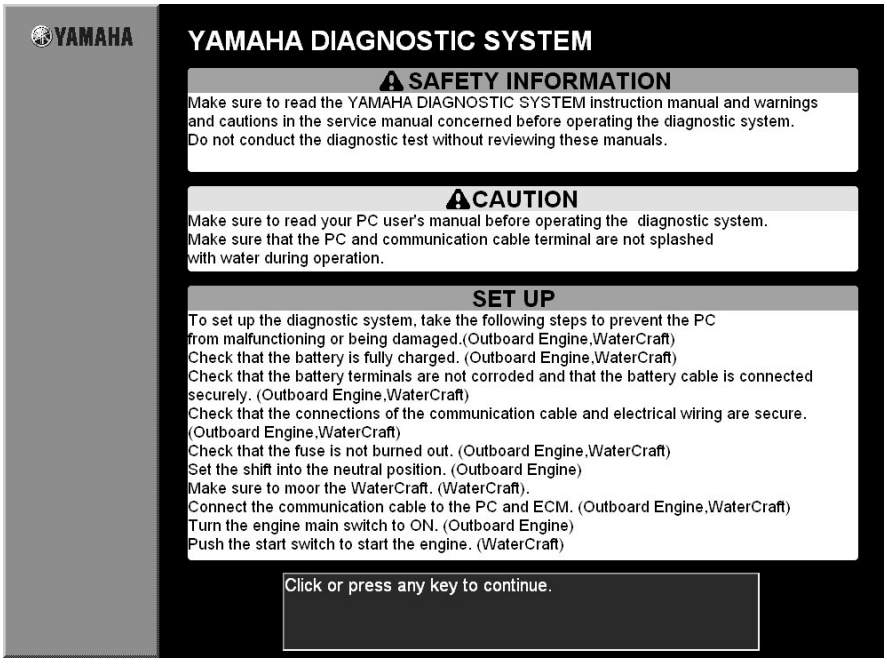


Fig. 111

3. When the “communication error” dialog appears, click the **OffLine** button.



Fig. 112

4. Click the **Scan Tool** menu in the Main Menu or press the number key “1” on your keyboard.

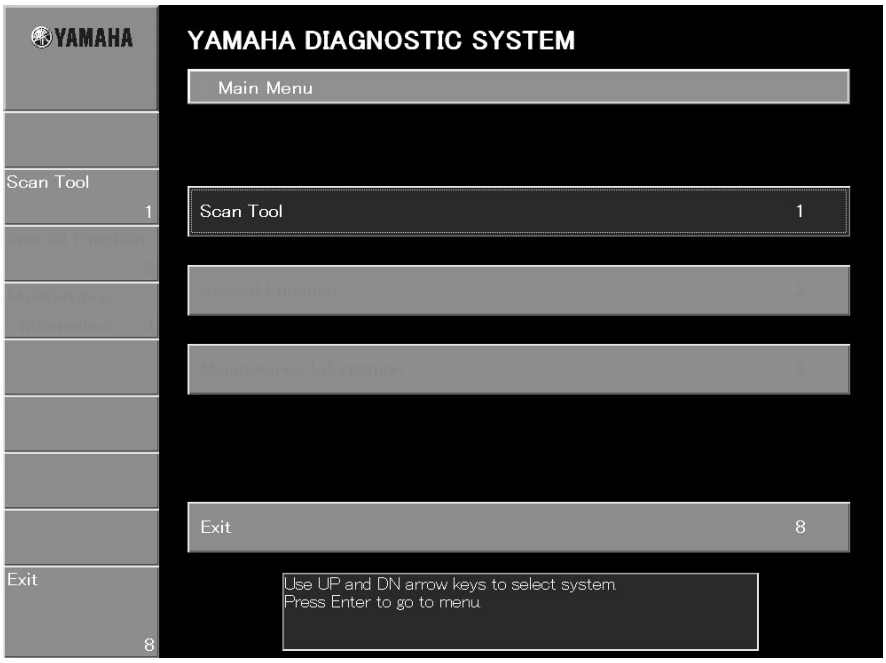


Fig. 113

5. Click the **Data Logger** command in the Main Menu or press the number key “3” on your keyboard.

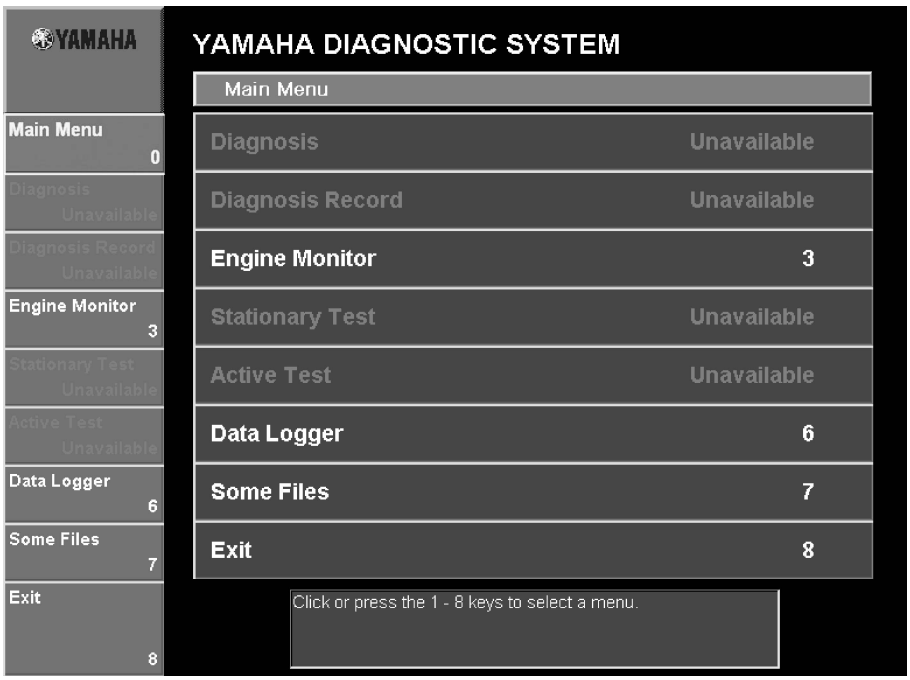


Fig. 114

6. Click the **ECM record data graph** button or press the up or down arrow key on your keyboard to select it and press the Enter key.

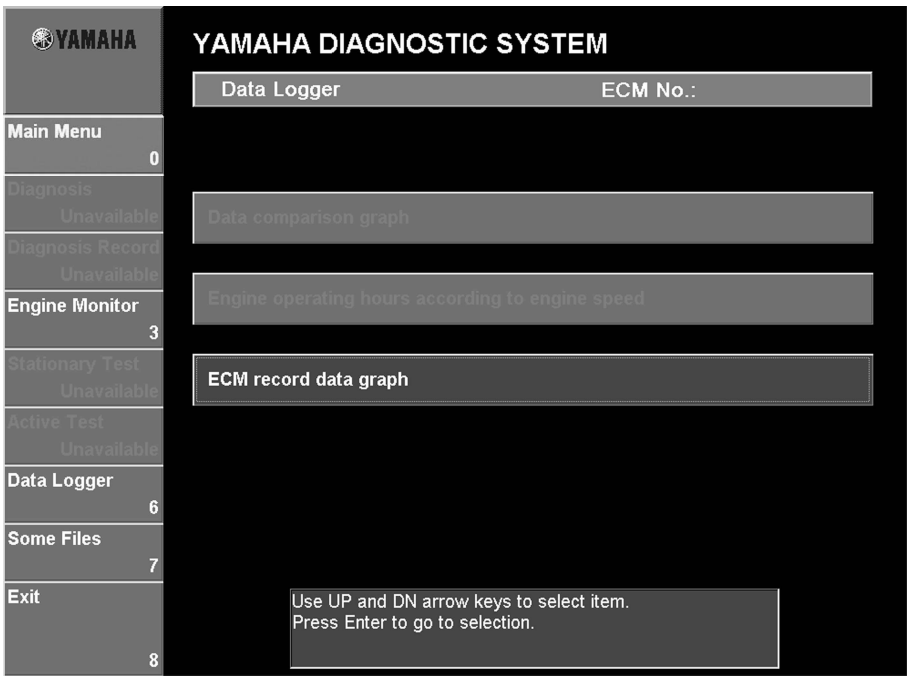


Fig. 115

7. Select the file containing the saved graph data that you want to view, and then click the **Open** button.

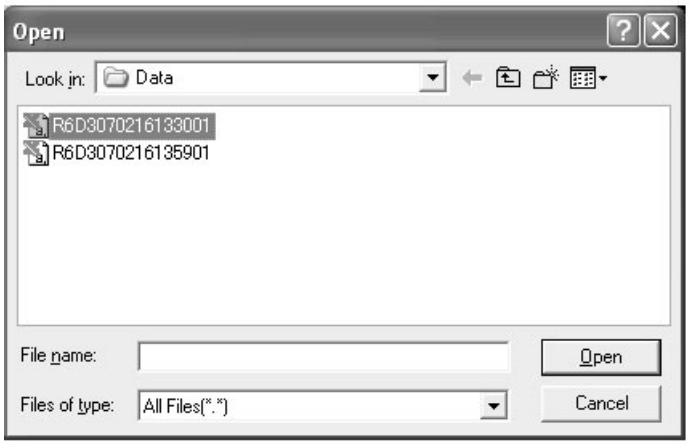


Fig. 116

8. The following window is displayed. (Fig. 117) Proceed to step 3 in the applicable graphing procedures.

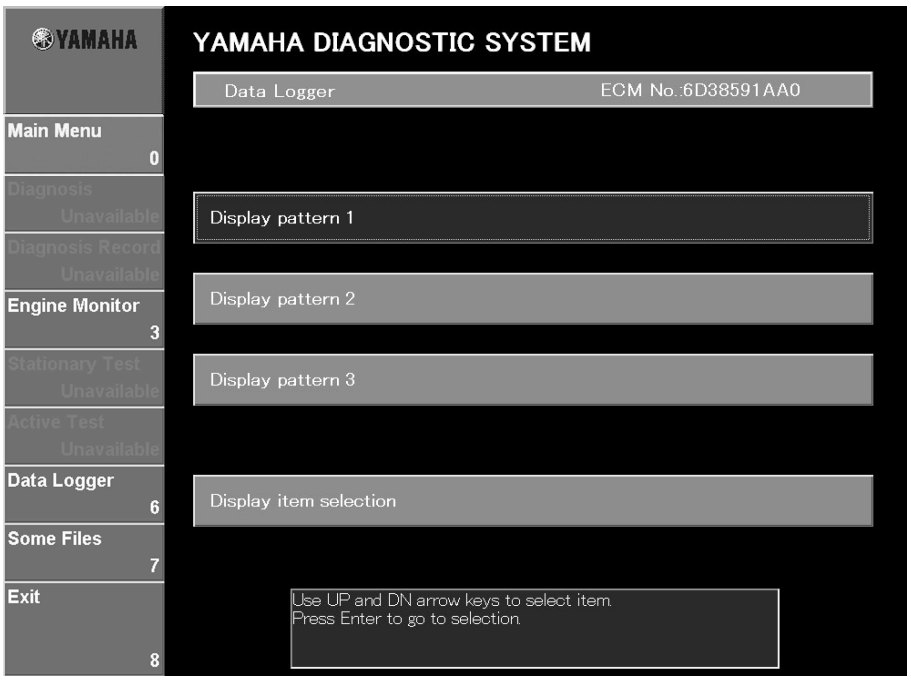


Fig. 117

NOTE:

- For **Display pattern 1**, **Display pattern 2**, and **Display pattern 3**, proceed to step 3 in "Graphing using Display patterns 1, 2, and 3 (when computer is connected to ECM using communication cable)".
- For **Display item selection**, proceed to step 3 in "Graphing using Display item selection (when computer is connected to ECM using communication cable)".

SOME FILES

This feature lets you select and run other applications while continuing to run the diagnostic system.



Fig. 118

NOTE:

This program may not work correctly on some computer configurations (on some OS/hardware combinations).

EXIT

The program is exited.

Operating procedure

1. Click the **Exit** button.

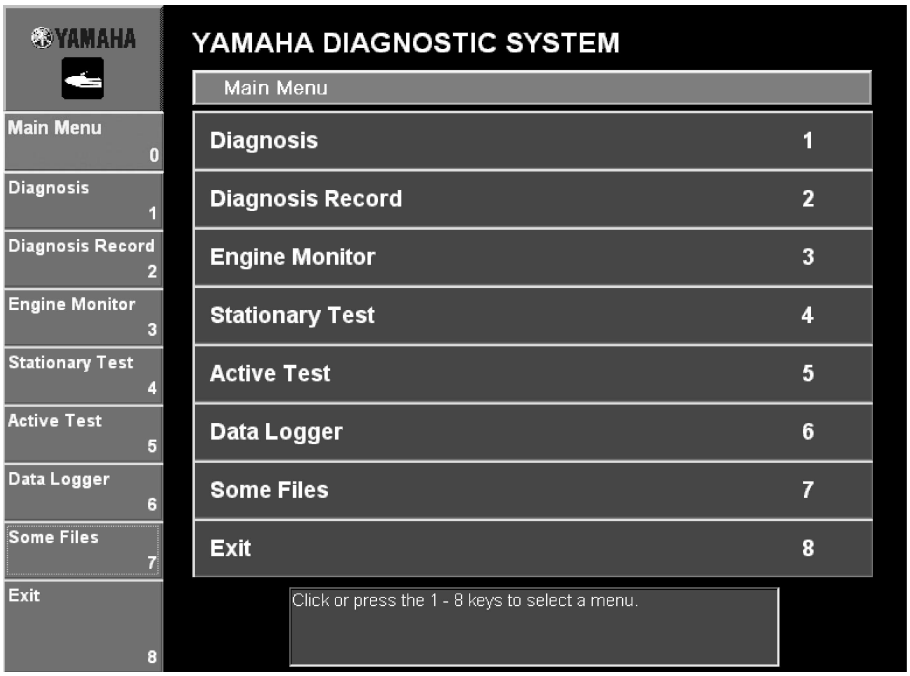


Fig. 119

2. Click the **OK** button or press the Enter key on your keyboard to exit the program. To cancel exiting the program, click the **Cancel** button or press the Esc key on your keyboard.

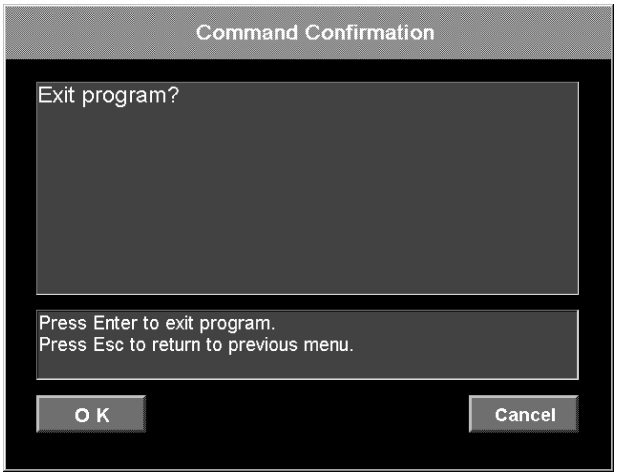


Fig. 120

TROUBLESHOOTING

Error content	Cause	Action
Communication cable related error occurs	Communication cable is disconnected.	Connect communication cable between the computer's communication port and 3-pin communication coupler of the watercraft.
	Battery is disconnected from the watercraft.	Connect battery to watercraft.
	The battery voltage is below 12 V.	Connect battery of 12 V or higher.
	The USB driver has not been installed.	Install the USB driver.
Application does not start	The hardware does not meet the requirements to operate this application.	Use a computer that meets the specified hardware requirements.
	YDS.exe is not installed in application directory.	If YDS.exe is not found in the application directory, install the application again.
	Other application (Service tool) is already in operation.	Quit the application in operation, since two applications (Service tool) cannot be operated simultaneously.
Application related error occurs	Error message "Program file or Database file is not installed properly. Please install again." is displayed.	Install program file or database file again.
Database related error occurs	Error message "Database files are not installed properly. Please update again." is displayed.	Update database again.
	Error message "System file not found ######.###." is displayed.	The database is not applicable to communication with ECM. Update database to correspond to ECM.
Incorrect fonts on screen	The computer language does not correspond to the application.	Use a computer that operates the required operating system.
When executing the stationary test or active test the test cannot be ended even if the Cancel is clicked.	Execute and Cancel buttons have been clicked more than necessary, and the ECM or PC does not operate properly.	Turn off your PC. Push the engine stop switch and reset the ECM.

APPENDIX

SETTING THE DESKTOP AREA

Use the following procedure to set the Yamaha Diagnostic System desktop area.

Compatible with VGA (640 × 480 pixels) or SVGA (800 × 600 pixels) or more recommended

1. From the taskbar at the bottom of your computer screen, click the **start** button, and then click the **Control Panel**.
2. In the Control Panel, click **Appearance and Themes**. (Fig. 121)



Fig. 121

3. Click **Display**.

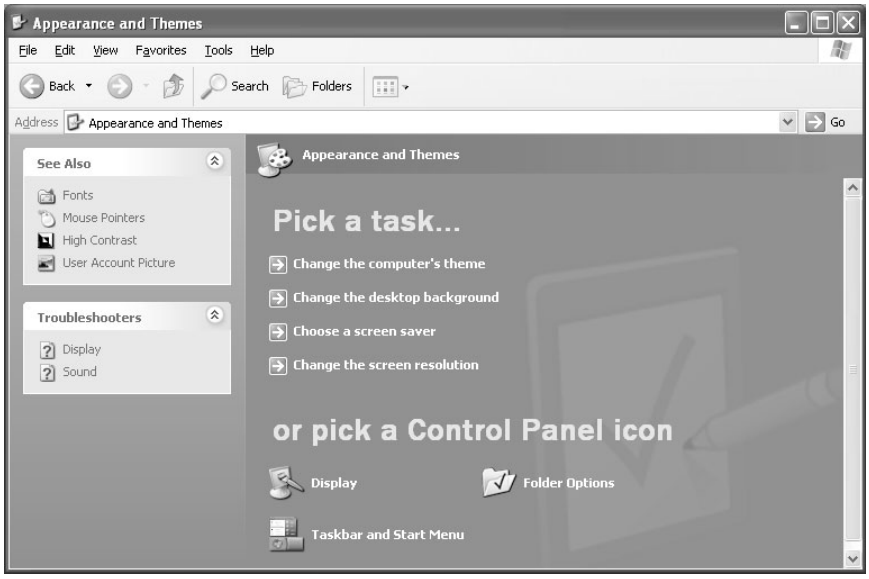


Fig. 122

4. Select **Settings** and slide the Screen resolution slider ①.

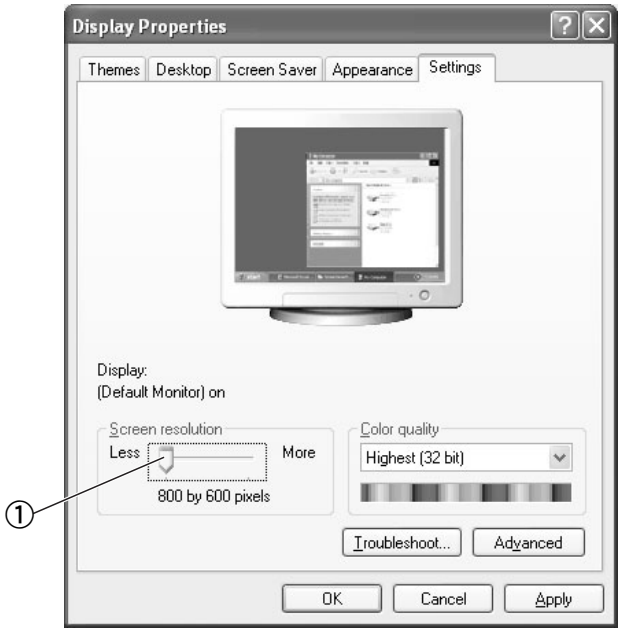


Fig. 123

5. Click the **Yes** button in the confirmation window to set the display area. To cancel, click the **No** button.



Fig. 124

UNINSTALLING THE YAMAHA DIAGNOSTIC SYSTEM

Use the following procedure to uninstall the Yamaha Diagnostic System.

1. Exit all programs before running the uninstaller.

2. From the taskbar at the bottom of your computer screen, click the **start** button, and then click the **Control Panel**.

3. In the Control Panel dialog box, click **Add or Remove Programs**.

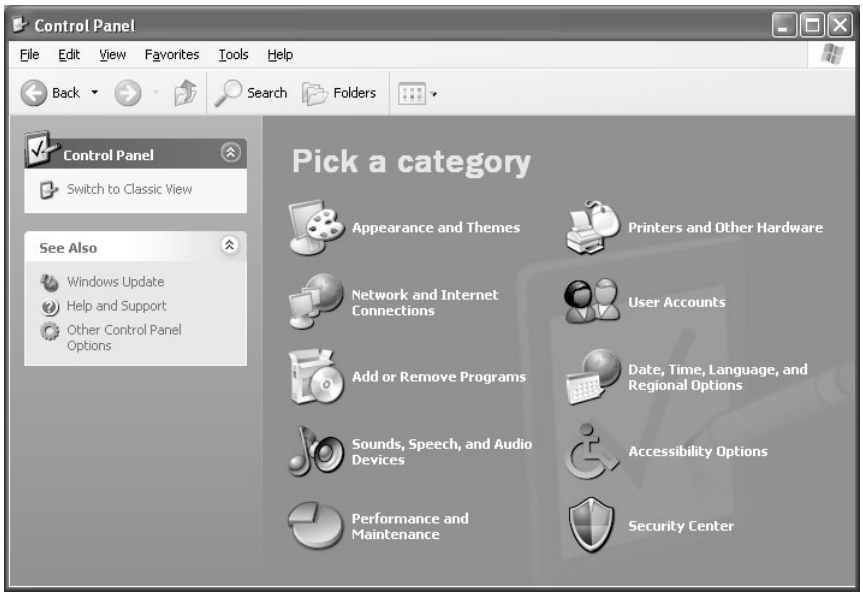


Fig. 125

4. Select **YAMAHA DIAGNOSTIC SYSTEM** and click the **Change/Remove** button.

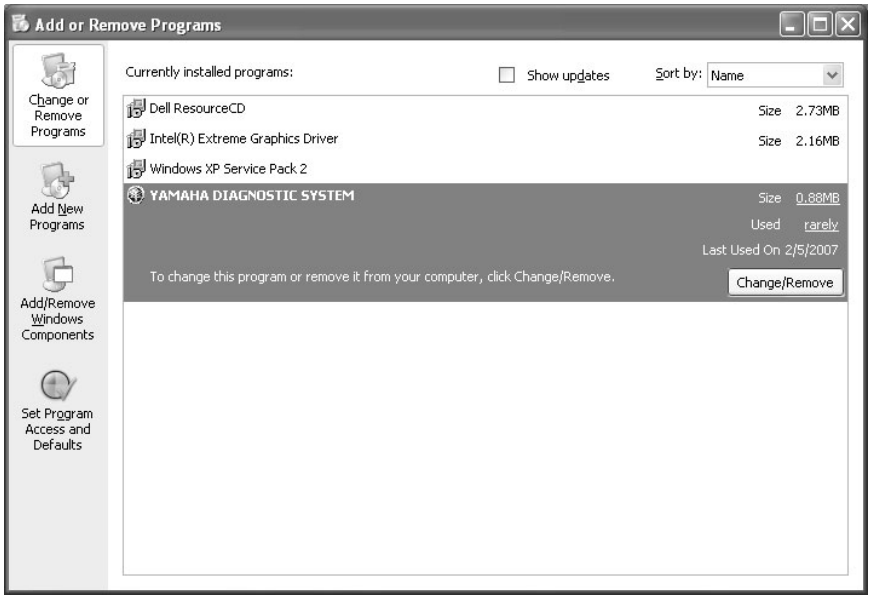


Fig. 126

NOTE:

To cancel the uninstall operation of the utility software, click the **Cancel** button.

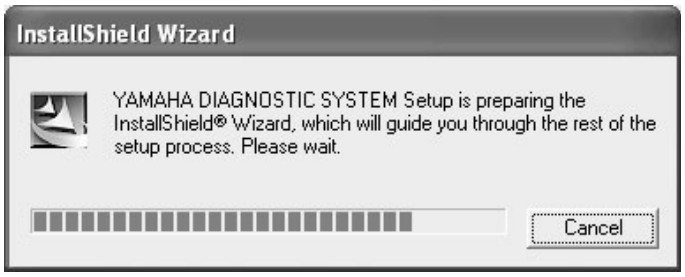


Fig. 127

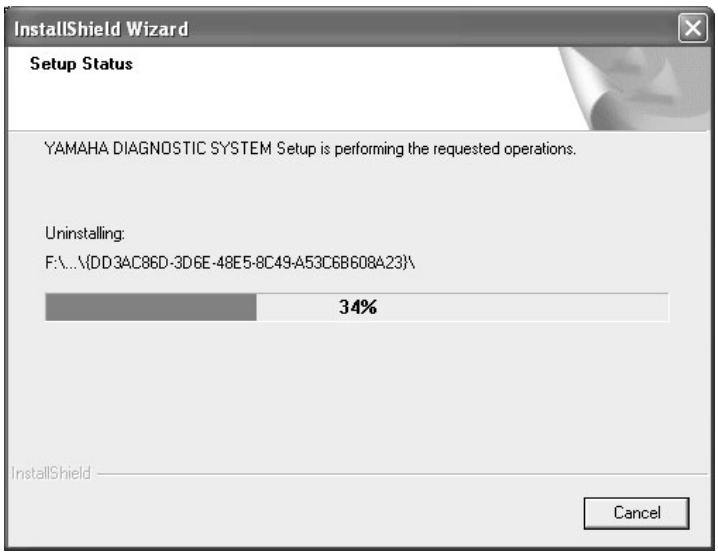


Fig. 128

5. After the uninstall operation is completed, the following dialog box appears. Click the **Finish** button.

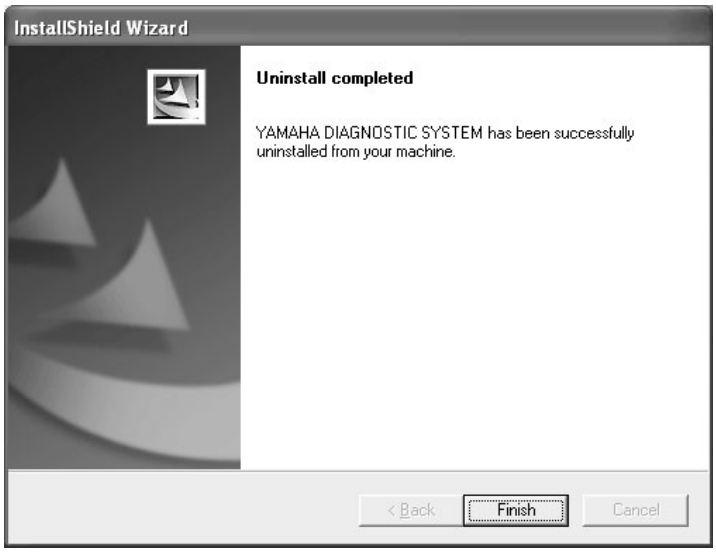


Fig. 129

ABBREVIATIONS

The following abbreviations are used in this instruction manual.

Engine stop mode with SW
: Engine stop mode with Switch

Engine temp sensor
: Engine temperature sensor

ETV relay
: Electronic Throttle Valve relay

Ex. manifold water temp. sensor
: Exhaust manifold water temperature sensor

Exhaust manifold temp sensor
: Exhaust manifold temperature sensor

Intake press sensor
: Intake pressure sensor

Intake temp sensor
: Intake temperature sensor

Oil press switch
: Oil pressure switch

Ref. acc. pos. sensor voltage
: Reference accelerator position sensor voltage

Ref. TPS voltage
: Reference Throttle Position Sensor voltage

rpm
: Revolution per minute

RS232C
: Recommended Standard 232 version C

Target TPS voltage
: Target Throttle Position Sensor voltage

Target TPS voltage for ISC
: Target Throttle Position Sensor voltage for Idle Speed Control

TPS voltage
: Throttle Position Sensor voltage

USB
: Universal Serial Bus

YPVS
: Yamaha Power Valve System



YAMAHA MOTOR CO., LTD.

Apr. 2007– ABE
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