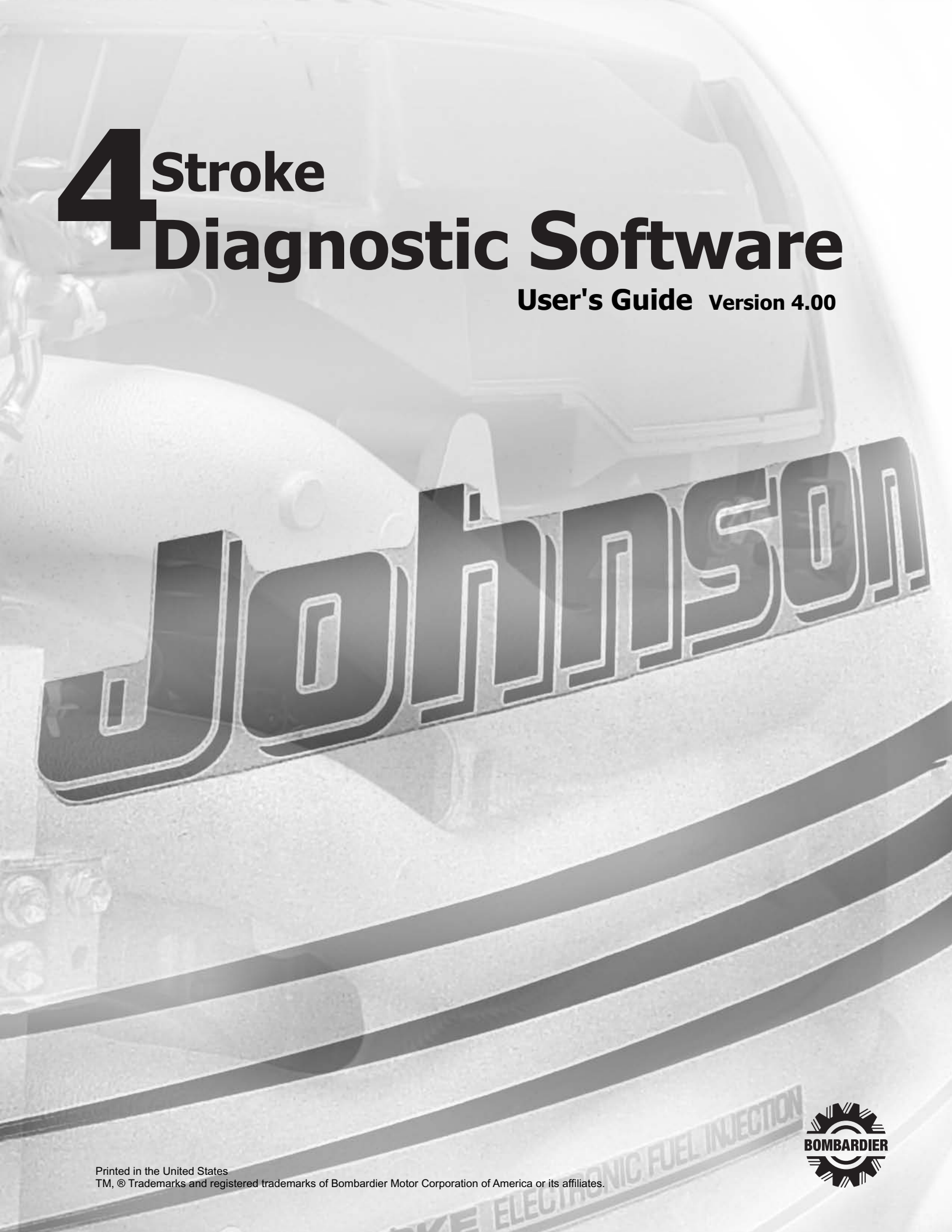
4 Stroke Diagnostic Software

User's Guide Version 4.00



BOMBARDIER

Printed in the United States

This manual contains an introductory description of the 4 Stroke Diagnostic System for inspecting and servicing of Johnson 4 Stroke Outboard Motors.

Read and refer to all sections in this manual for information regarding proper operation.

This manual will help you know the outboard motor better so that you can provide your customers with optimum and quick service.

Description herein is based on the information available at the end of January 2001 and therefore, some may be subject to change in the future.

IMPORTANT: Use this manual with the latest Service Manual of each outboard motor.

TRADEMARK ACKNOWLEDGMENTS

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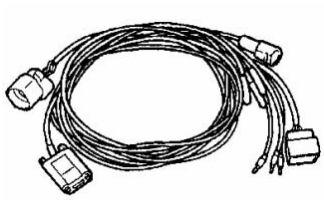
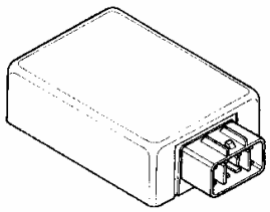
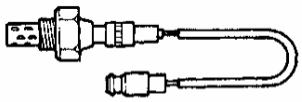
GENERAL INFORMATION

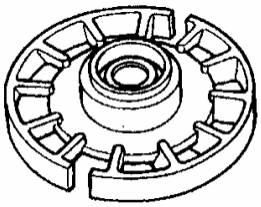
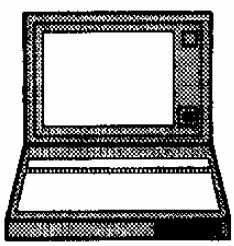
APPLICABLE MODELS AND NECESSARY TOOLS

The applicable models and necessary tools are as follows.

IMPORTANT: Numbers in "Necessary Tool" columns show the illustration number below.

MODEL NAME	MODEL YEAR	NECESSARY TOOL	
			for O2 Feedback
60/70	1998 and later	1, 2, 3, and 5	3 and 4 (A)
40/50	1999 and later		3 and 4 (B)
90/115	2002 and later		3 and 4 (C)
140	2002 and later		3 and 4 (D)

1	2	3
	 	
Compact Disc	**Diagnostic Harness** **Adapter**	
P/N 5033251	**P/N 787053**	**P/N 5000002**
4 Stroke Diagnostic System software V 4.0	**Cable and adapter kit – contains Diagnostic Harness and Adapter**	**O2 Sensor**

4	5
	
P/N 5032458 – 40/50 **P/N 5032478 – 60/70** **P/N 5034161 – 90/115/140**	**Laptop Computer**
Test Wheel	

PC HARDWARE REQUIREMENTS

Make sure that the personal computer meets the following requirements.

Personal computer:	IBM-compatible laptop computer
Operating system:	Microsoft Windows 95, Windows 98, Windows 2000 (English version)
CPU:	Pentium 133MHz or higher
Memory:	Windows 95/98: 32MB or more (recommended 64MB or more)
	Windows 2000: 64MB or more (recommended 128MB or more)
Hard disk:	20MB of free space or more (recommended 40MB or more)
Display:	SVGA (800 x 600 pixels, 65000 or more colors)
Drive:	CD-ROM drive
Interface port:	RS232C (Dsub 9-pin) port
Mouse:	Compatible with the operating system
Printer:	Compatible with the operating system

IMPORTANT:

- Program response and performance depends on the personal computer environment settings.
- The necessary memory capacity and hard disk capacity differ depending on the system environment. Also, running the program when there is very little free space on the hard disk may cause the computer to run out of memory or experience other problems during operation.
- This program automatically tries to establish communication on a current communicable COM port within port 1 and port 2. If necessary, set the serial port as specified in the instruction manual of your computer.

ABBREVIATIONS

The following table shows abbreviations and terms which may be used in this manual.

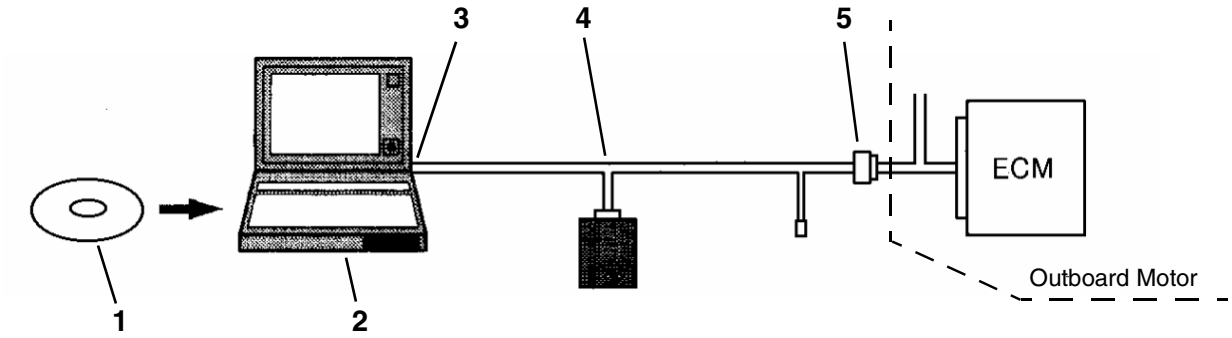
ABBREVIATION	FULL TERM
CKP sensor	Crankshaft Position sensor
CMP sensor	Camshaft Position sensor
CPU	Central Processing Unit
CTP switch	Closed Throttle Position switch
Cyl.	Cylinder
ECM	Engine Control Module
Ex.	Exhaust
HRS	Hour(s)
IAC valve	Idle Air Control valve
IAT sensor	Intake Air Temperature sensor
Info.	Information
INJ	Injection
KB	Kilo-Bytes
MAP sensor	Manifold Absolute Pressure sensor

ABBREVIATION	FULL TERM
MB	Mega-Bytes
CC	Cubic centimeter
MIN.	Minute(s)
NO.	Number
P/N.	Part Number
PORT	Port side
RPM	Revolution Per Minute
4SDS	4 Stroke Diagnostic System
Spec.	Specification
STBD	Starboard side
Sys.	System
Temp.	Temperature
µs	Micro-second

SYSTEM OUTLINE

A computer should be connected to the ECM of the outboard motor using the tools as shown below.

IMPORTANT: The 4SDS program should be installed on the computer's hard drive.



1. *4SDS Software version 4.00 P/N 5033251*
2. *Laptop computer*
3. *COM port*
4. *Cable and adapter kit P/N 787053*
5. *8-Pin coupler*

In this system, communication between the ECM of the outboard motor and personal computer occurs via the diagnostic harness and adapter. The following information is communicated from the ECM to the computer:

- Engine information
- Current service (self-diagnostic) codes
- Real-time display of service data
- Engine operating history
- O2 feedback operation

IMPORTANT:

- Read this user's guide before proceeding.
- Refer to the safety precaution indicated in the service manual.
- This software is designed for use with a battery-powered (DC-type) laptop personal computer. – **Do not use an AC-type personal computer**
- This software may not operate on some personal computers with the operating environment required.
- Always follow the explanations displayed in each screen, window, or dialog box.

INSTALLING THE PROGRAM

INSTALLING THE 4 STROKE DIAGNOSTIC SYSTEM

When installing the 4SDS program under Windows 95, Windows 98, or Windows 2000, refer to the instructions below, based on your computer's operating system.

IMPORTANT: It is strongly recommended that you exit all other programs before running the 4SDS CD. It is not necessary to connect with the ECM when installing the 4SDS program on your computer.

Open Windows 95, Windows 98, or Windows 2000.

Insert the 4SDS software (Compact Disc) into the computer's CD-ROM drive.

The program is designed to launch the installation program automatically, however, if Windows fails to launch the install program, follow these steps to install the program manually:

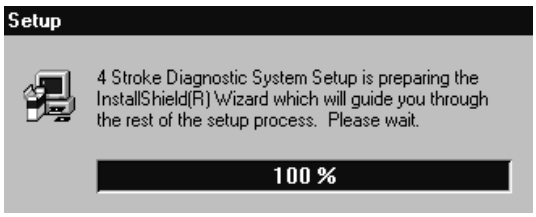
Click on the **Start** button.

Click on the **Run** button.

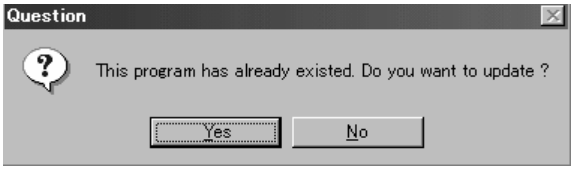
Type “D:\Autorun.exe” in the Open box (assuming D: is your CD ROM drive).

Click on the **OK** button.

Follow the on screen prompt to complete the installation.



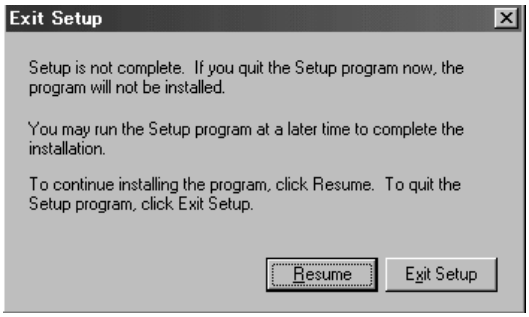
IMPORTANT: If the program already exists on your computer, the following dialog box appears.



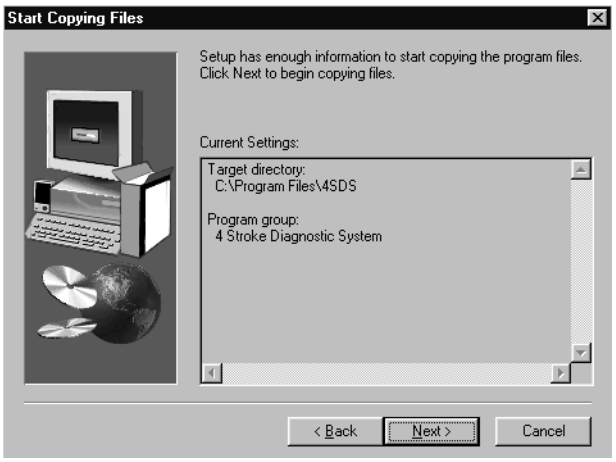
To update the 4SDS program, click the **Yes** button. To quit the installation, click the **No** button.

To continue the installation, click the **Next** button. To quit the installation, click the **Cancel** button.

IMPORTANT: If you click the **Cancel** button, the following dialog box appears. To continue the installation, click the **Resume** button. To quit the installation, click the **Exit Setup** button.

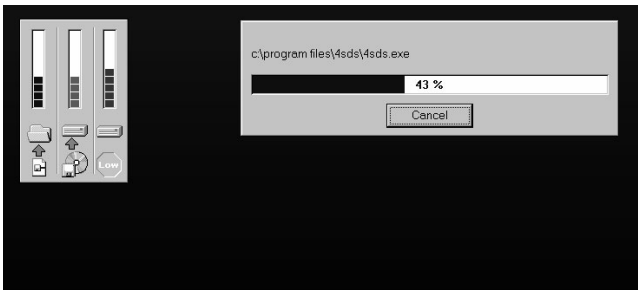


Check the target directory and the program group name. Click the **Next** button to start copying the 4SDS program files.

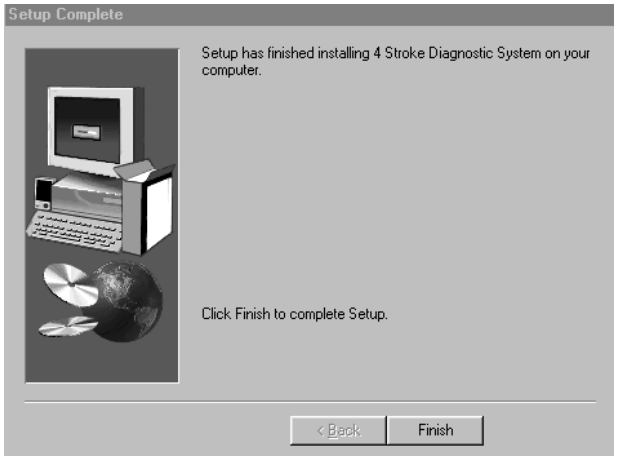


IMPORTANT: To go back to the previous window, click the **Back** button. To quit the installation, click the **Cancel** button.

The program will automatically load to the appropriate folder location on the C: drive.



If the 4SDS installation is successfully finished, the following window appears. Click the **Finish** button.



IMPORTANT: The database files are also installed by installing the 4SDS program.

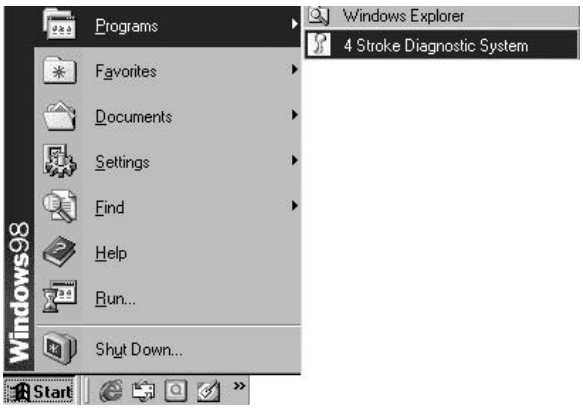
UPDATING THE DATABASE

When updating the database under the 4SDS, adhere to the following instructions.

IMPORTANT:

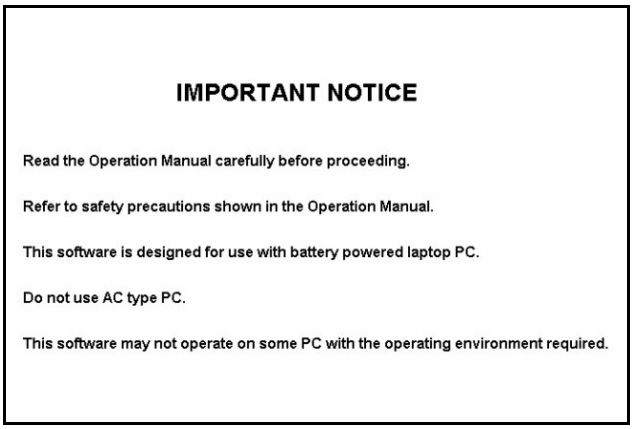
- Before updating the database, make sure that the 4SDS program has already been installed on your computer.
- For updating the database, it is not necessary to communicate with the ECM.

From the taskbar on the computer screen, click the Start button and point to the Programs. Click *4 Stroke Diagnostic System* to run the 4SDS program.

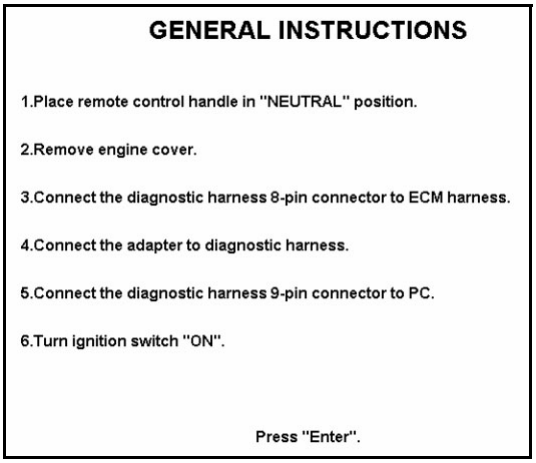


When the introduction screen appears, press the **Enter** key.

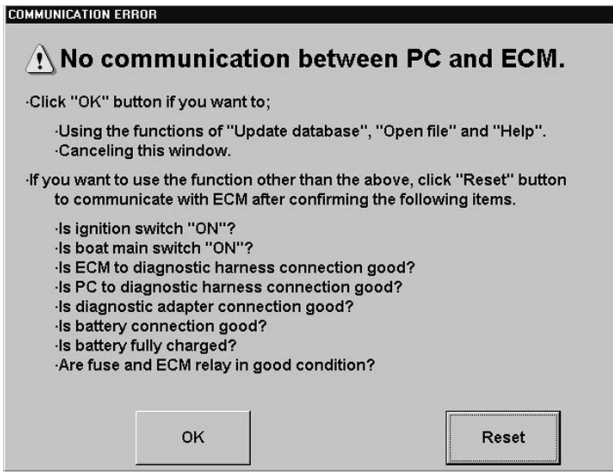
The following screen appears.



Press the **Enter** key to go to the next screen. The following screen appears. Then press the **Enter** key.



If there is no reply from the ECM, the following window appears. Click the **OK** button. (KEYBOARD USERS – Move to the **OK** button using the Up or Down arrow keys, then press the **Enter** key.)

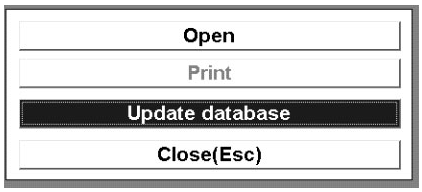


IMPORTANT: If there is a reply from the ECM, the COMMUNICATION ERROR window will not display.

Insert the 4SDS database disc (compact disc) into the computer's CD-ROM drive.

IMPORTANT: All 4SDS database files existed on the computer's hard drive are overwritten from the database disk.

Click on **File (F2)** or press the F2 key. The following menu dialog box appears. Click the dialog box button. (KEYBOARD USERS – Move to the **Update database** button using the Up or Down arrow keys, then press the **Enter** key.)

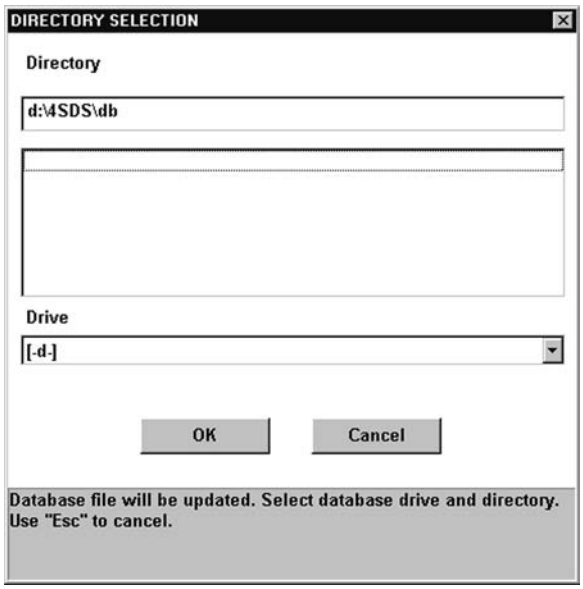


The following dialog box appears. Check if the "Directory" indicates the computer's CD-ROM drive. If not, click the ▼ button in the "Drive" box and select the CD-ROM drive. Select the 4SDS folder, then the db folder.

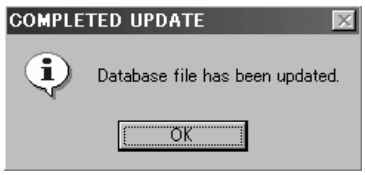
To start overwriting the database files, click the **OK** button.

To cancel overwriting, click the **Cancel** button.

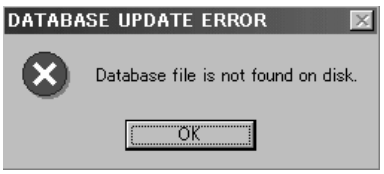
(KEYBOARD USERS – Change the highlighted button using the **Tab** key. To select the item in the box, use the Up or Down arrow keys. Select the button, then press the **Enter** key.)



If the updating database is successfully finished, the following dialog box appears.



IMPORTANT: If there is no database files available on the selected drive and folder, the following dialog box appears. Database files are included on the CD if the manufacturer finds it necessary. Electronic updates will be made available if required by the manufacturer.



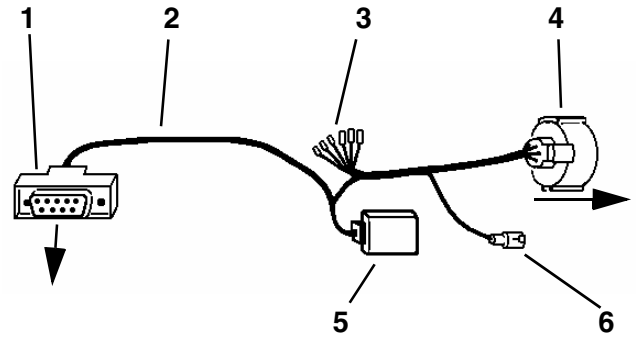
OPERATION

CONNECTING AND STARTING THE PROGRAM

IMPORTANT:

- Make sure the computer is turned off before connecting the diagnostic harness.
- Make sure the battery connected to the outboard motor is properly charged.
- Make sure none of the six single lead wires in the diagnostic harness are connected.

Connect the Cable and Adapter Kit P/N 787053 to the computer's COM port and the ECM communication coupler (round shaped 8-pin type) of the outboard motor.

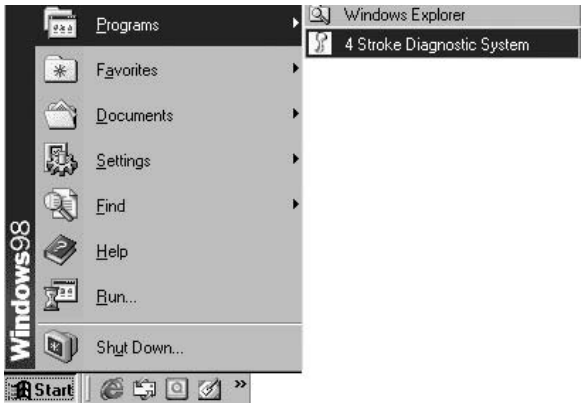


1. *RS232C (To computer's COM port)*
2. *Diagnostic harness*
3. *Six single lead wires*
4. *8-Pin coupler (to ECM communication coupler)*
5. *Adapter*
6. *1-Pin coupler (for O2 sensor)*

Turn the ignition switch of the outboard motor to the ON position, *then* turn on the computer

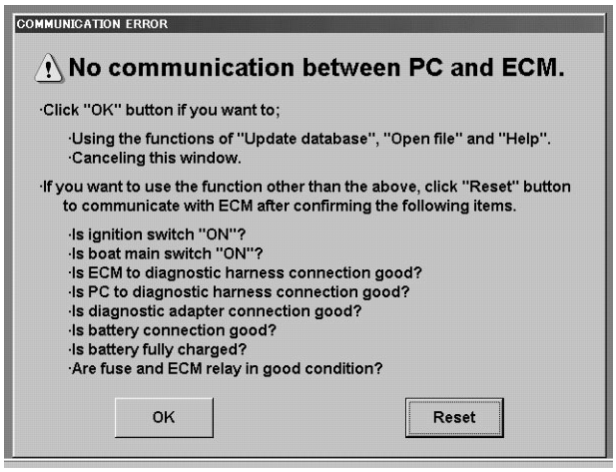
From the Windows taskbar, click the **Start** button and point to the Programs.

Click the ***4 Stroke Diagnostic System*** to start the 4SDS program.

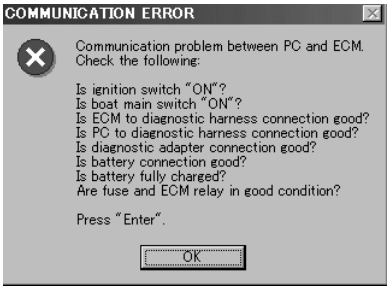


The introduction screen will appear. Press **Enter** key to go to the next screen. The "Important Notice" screen appears. Read and follow the messages as you move through the screens. You will eventually arrive at the first menu screen.

If there is no reply from the ECM, the following window appears. Read and follow the messages, then click the **Reset** button to communicate with the ECM. (KEYBOARD USERS – Move to the **Reset** button using the Up or Down arrow keys, then press the **Enter** key.)

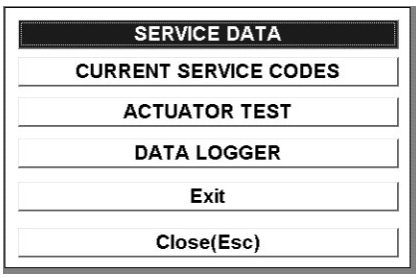


IMPORTANT: Once the first menu screen appears, the following dialog box appears if there communication with the ECM is lost. Read and follow the messages, then click the **OK** button to retry communication with the ECM. (KEYBOARD USERS – Press the **Enter** key.)



MAIN MENU

From the first menu screen, click **Main Menu (F1)** or press the **F1** key. The following menu dialog box appears.



SERVICE DATA
The real-time data and recorded data in relation to the engine control system can be monitored. The monitored service data can be selected at will and can be saved as ".csv" file format (see Saving the Service Data, next page).

CURRENT SERVICE CODES
The self-diagnostic codes (names of the current failed item) can be displayed.

ACTUATOR TEST
The actuators can be cycled while monitoring real-time data. The O2 feedback operation is also executed from here.

DATA LOGGER
Major service data can be displayed as a graph. A maximum of three items can be logged at one time and can be saved as ".csv" file format.

EXIT
The 4SDS program is exited.

CLOSE (ESC)
The menu box is closed.

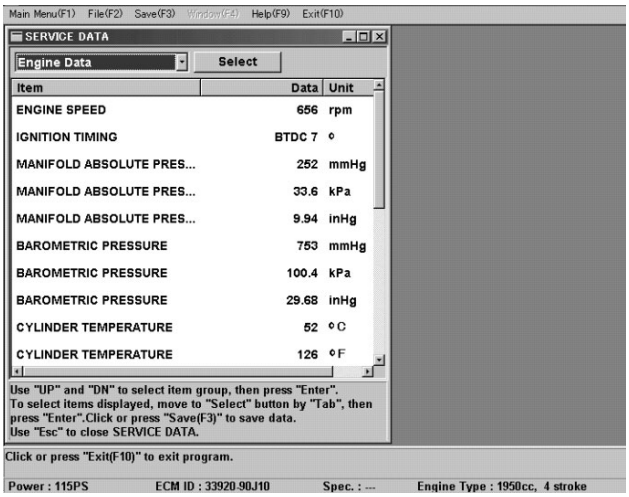
Click the item button from the main menu window. (KEYBOARD USERS – To change the highlighted button, use the Up or Down arrow keys to select the button, then press the **Enter** key.)

IMPORTANT: The SERVICE DATA, CURRENT SERVICE CODES and ACTUATOR TEST windows can be displayed at one time. To change the active window, click **Window (F4)**, or press the **F4** key.

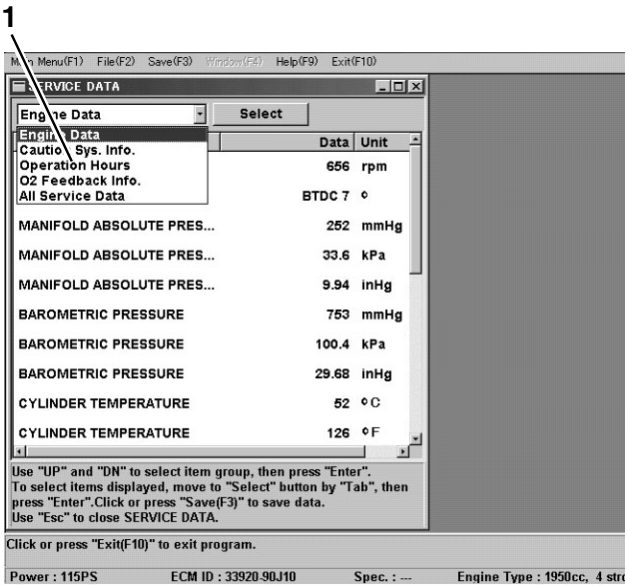
SERVICE DATA

Operation

Click the **SERVICE DATA** button from the main menu window. The following window appears. On this window, the real-time service data is displayed.



The five data item groups (Engine data, Caution sys. info., Operation hours, O2 feedback info., and All service data) can be selected. Click the ▼ button and select the data item group. (KEYBOARD USERS – Open the data item list group using the Up or Down arrow keys. Select the item, then press the **Enter** key.)

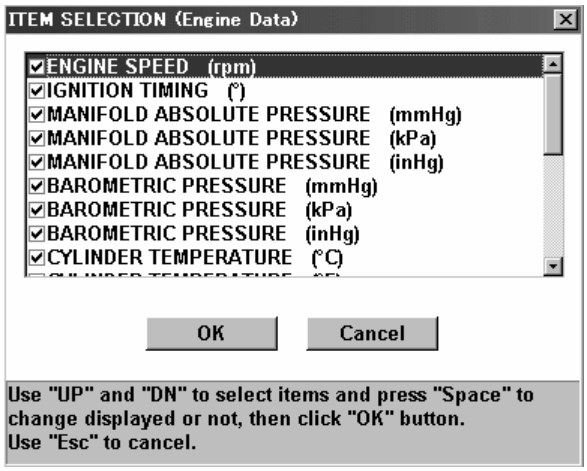


1. Data item group

IMPORTANT: To view the data item groups to which each data item belongs, refer to **Table of Data Item Groups**.

To select the displayed items of each group, click the **Select** button. (KEYBOARD USERS – Move to the **Select** button using the **Tab** key, then press the **Enter** key.)

The following dialog box appears. The items with "√" marks are displayed. To change the status between "displayed" or "not displayed", click the check box of the item, then click the **OK** button. (KEYBOARD USERS – Change the selected item using the Up or Down arrow keys. Use the Space key to change the status between "displayed" or "not displayed". Select the button with the **Tab** key, then press the **Enter** key.)

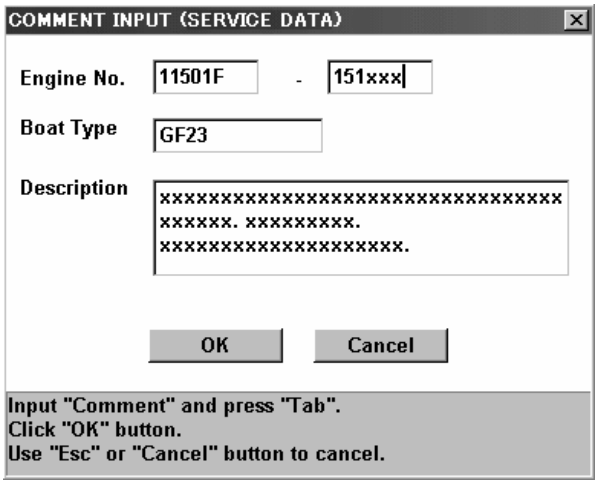


IMPORTANT: Click the **Cancel** button to cancel any changes.

Saving the Service Data

All service data can be saved when the SERVICE DATA window is opened. Files saved in a ".csv" format can be viewed using the 4SDS Program. Other common Windows programs, such as Microsoft Excel, WordPerfect, Windows Write, Microsoft Word, or Microsoft Access, will allow you to view ".csv" files. Refer to the application's user's manual for more information.

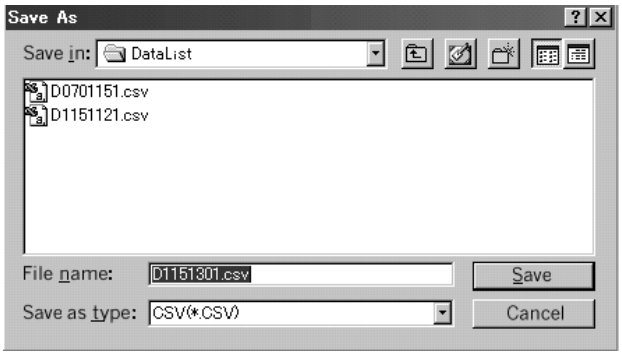
Click **Save (F3)**, or press the **F3** key. The following dialog box appears. Type the correct information into the comment boxes (Engine No., Boat Type, and Description), then click the **OK** button. To cancel saving, click the **Cancel** button. (KEYBOARD USERS – Change the highlighted button using the **Tab** key. Select the button, then press the **Enter** key.)



IMPORTANT:

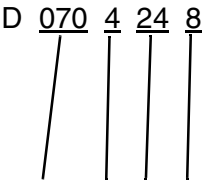
- The comment boxes are displayed when selecting the file on the "Open" dialog box.
- The displayed data in the SERVICE DATA window is fixed to save it when clicking **Save (F3)** or pressing the **F3** key.

Click the **OK** button. The following window appears. This program automatically selects the folder and file name.



IMPORTANT: The "Save As" window is configured during initialization. The target folder and the file name can be changed, if necessary. By default, all service data is saved in the "DataList" folder and named "DXXXXXXX".

Directory:
C:\Program Files\4SDS\DataList\DXXXXXXX.csv

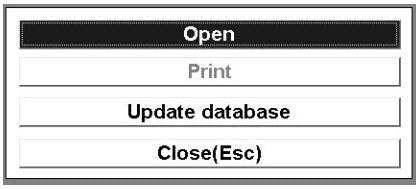


1. Engine Type (*i.e.* "070" means 70 PS engine)
2. Month (1,2,3,4,5,6,7,8,9,X,Y,Z)
3. Date (01 to 31)
4. Number (1 to 9, A to Z)

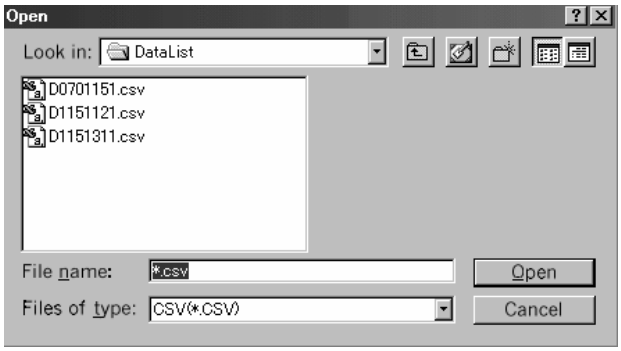
To save all service data, click the **Save** button. To cancel saving, click the **Cancel** button. (KEYBOARD USERS – Change the highlighted button using the **Tab** key. Select the button, then press the **Enter** key.)

Opening Saved Data

Click **File (F2)**, or press the **F2** key. The following menu dialog box appears. Click the **Open** button. (KEYBOARD USERS – Move to the **Open** button using the Up or Down arrow keys, then press the **Enter** key.)



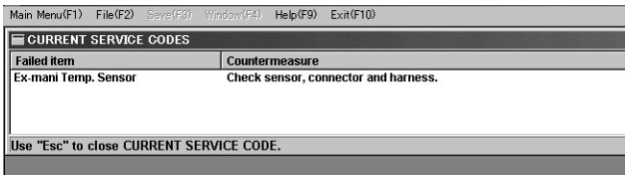
The following window appears. To open the file desired, highlight it, then click the **Open** button. (KEYBOARD USERS – Change the highlighted button using the **Tab** key. Select the item using the Up or Down arrow keys. Select the button, then press the **Enter** key.)



IMPORTANT: If the file has input comments (Engine No., Boat Type, and Description), they are displayed next to the file list box when the file is highlighted.

CURRENT SERVICE CODES

Click the **CURRENT SERVICE CODES** button from the main menu window. The following window appears, displaying any current failed items.



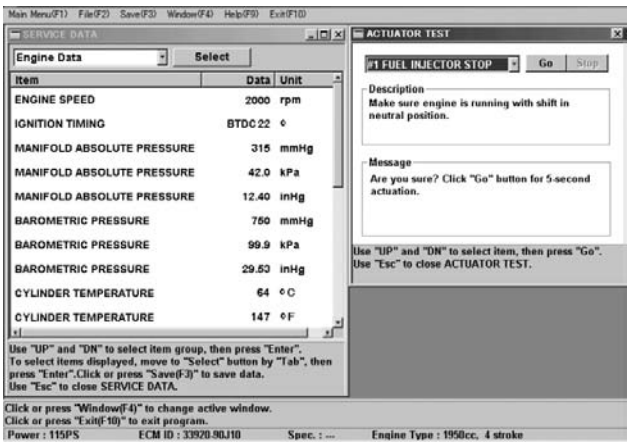
IMPORTANT:

- If there is no failed item (no current service code), "No failure" is displayed in the CURRENT SERVICE CODES window.
- The SERVICE DATA, CURRENT SERVICE CODES and ACTUATOR TEST windows can be displayed at one time. To change the active window, click **Window (F4)**, or press the **F4** key.

ACTUATOR TEST

Operation

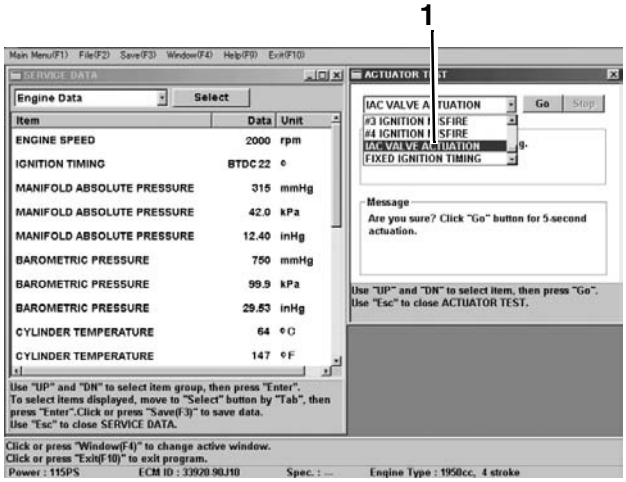
Click the **ACTUATOR TEST** button from the main menu window. The following two windows appear.



IMPORTANT:

- The SERVICE DATA (Engine Data) window is automatically opened when the ACTUATOR TEST window is opened.
- Read and follow the "Description" and "Message" in the ACTUATOR TEST window.
- To change the active window, click the **Window (F4)** or press the **F4** key.

Click the ▼ button in the ACTUATOR TEST window, then select the actuator test item. (KEYBOARD USERS – Open the actuator test list using the Up or Down arrow keys. Select the item, then press the **Enter** key.)



1. Actuator test item

IMPORTANT: Refer to **O2 Feedback Operation** if selecting the "O2 Feedback."

To perform the actuator test selected, click the **Go** button. The test takes approximately 5 seconds to complete. (KEYBOARD USERS – Use the **Tab** key to move to the **Go** button, then press **Enter**.)

IMPORTANT: The performance of "Fixed Ignition Timing" continues until the **Stop** button is clicked or until the **Enter** key is pressed.

Clicking the **Stop** button or pressing the **Enter** key while the test is being performed will interrupt the test.

If there is no response from the ECM during the interruption, the following window appears. Follow the message in this window.

Explanation of Actuator Test Items

IMPORTANT: The following test items may be performed when the engine is not running.

#X FUEL INJECTOR ACTUATION:
Fuel injection for the specified cylinder will actuate for 5 seconds.

FUEL PUMP ACTUATION:
High pressure fuel pump will actuate at 100% duty for 5 seconds.

IAC VALVE ACTUATION:
IAC valve will actuate at 1Hz (1 time a second) for 5 seconds.

IMPORTANT: The following test items may be performed when the engine is running.

#X FUEL INJECTOR STOP:
Fuel injection for the specified cylinder will stop for 5 seconds.

#X IGNITION MISFIRE:
Ignition for the specified cylinder will stop for 5 seconds.

FIXED IGNITION TIMING:
Ignition timing will be fixed at 5° BTDC until the **Stop** button is clicked. This test can be performed when the engine is running. Perform this test for the ignition system troubleshooting when idling. The monitored ignition timing during actuation is a calculated value but not actual one.

O2 FEEDBACK:
Refer to **O2 Feedback Operation.**

O2 Feedback Operation

IMPORTANT: Carefully review the entire O2 Feedback Operation procedure **before** attempting to recalibrate any engine.

After extended usage, the engine components may wear or become deteriorated. This may impact the air/fuel mixture ratio, affecting the exhaust emissions of the engine. To correct the air/fuel mixture ratio, the O2 sensor should be used to measure oxygen in the exhaust gas. The ECM uses the O2 sensor data to correct the compensation coefficient of the fuel injection duration map.

Procedure

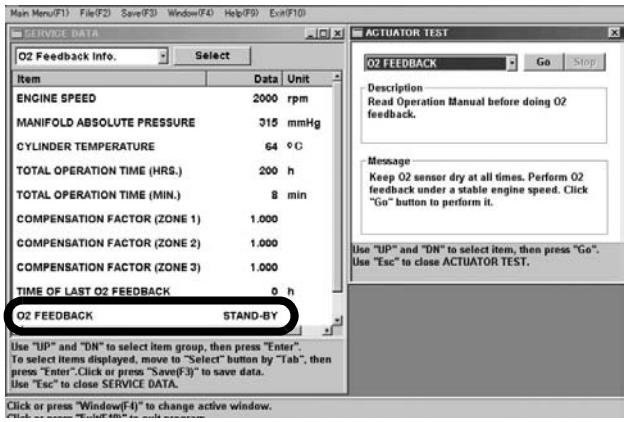
Install the O2 sensor to the engine, then connect the O2 sensor coupler to the diagnostic harness. Install the appropriate test wheel.

- 787053: Cable and Adapter Kit (Includes Diagnostic Harness and Adapter)
- 5000002: O2 sensor
- 5032478: Test wheel (for 60/70)
- 5032458: Test wheel (for 40/50)
- 5034161: Test wheel (for 90/115/140)

Refer to **PERIODIC MAINTENANCE / FUEL MIXTURE CHECK** section in the service manual of each outboard motor.

Start and run the engine at 2000 RPM for at least 5 minutes.

Select **O2 FEEDBACK** in the ACTUATOR TEST window. The following window appears. The data item group in the SERVICE DATA window is automatically changed to **O2 Feedback Info**. Confirm that STAND-BY is displayed in the bottom of the item box (see circled data below).



IMPORTANT: When performing the O2 feedback operation, the following five items should be displayed at one time in the item box of the SERVICE DATA window. Select the displayed items using the **Select** button if necessary.

- ENGINE SPEED
- COMPENSATION FACTOR (ZONE 1)
- COMPENSATION FACTOR (ZONE 2)
- COMPENSATION FACTOR (ZONE 3)
- O2 FEEDBACK (displayed as STAND-BY, ACTION, FIN.OK or FIN.NG in the "Data" column)

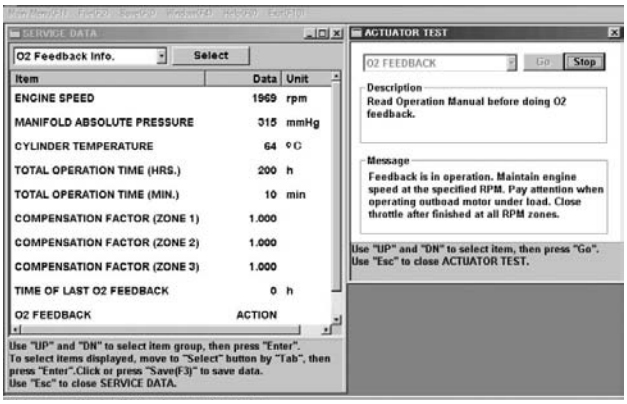
Shift into forward gear.

IMPORTANT:

- The O2 feedback operation must be performed with the engine under load. Do not perform the O2 feedback operation using the warm-up lever (or throttle control grip) without first shifting into forward gear.
- Do not close the throttle fully for more than 10 seconds while the feedback operation is being performed. This will cause the O2 feedback operation to finish with incomplete data.
- Do not allow the engine to be stable at an unnecessary speed range (other than the zone rpm) for more than 10 seconds. This will cause the O2 feedback operation to be completed with incorrect data for that speed range.
- As the zirconia element in the O2 sensor is not conductive below 250°C, the O2 sensor will not function properly until the engine is at normal operating temperature.

Adjust the engine speed at the ZONE1 RPM and click the **Go** button. ACTION mode appears. Hold the engine speed specified for a minimum of 20 seconds.

- When the “Compensation Factor” data has changed, go to the next step. For tiller models, the buzzer will sound for about 2 seconds on step completion.
- If “Compensation Factor” does not change or buzzer does not sound within 2 minutes, the feedback operation at this zone failed. Ignore this zone and proceed to the next step.
- If FIN.NG is displayed or the buzzer sounds with a series of long (about 2 second) beeps, the feedback operation failed. Click the **Stop** button and revert to STAND-BY mode, then go to next step.



ZONE	40/50
1	2500 ± 100 RPM
2	3500 ± 100 RPM
3	4500 ± 100 RPM

ZONE	60/70
1	2000 ± 100 RPM
2	3000 ± 100 RPM
3	4000 ± 100 RPM

ZONE	90/115/140
1	2000 ± 100 RPM
2	3000 ± 100 RPM
3	4000 ± 100 RPM

Repeat the procedure at the ZONE 2 RPM.

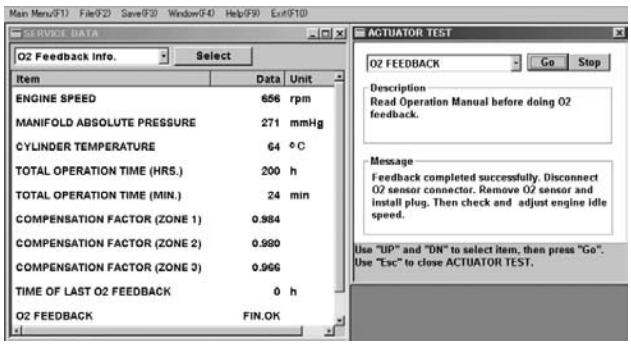
Repeat the procedure at the ZONE 3 RPM.

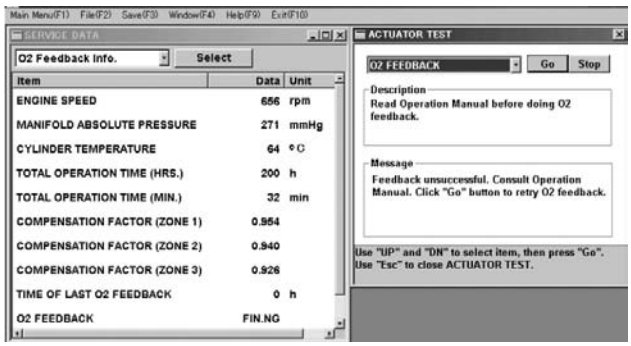
If the feedback operation at any zone failed, repeat the feedback operation at that zone

Return the throttle to a full closed position only after the O2 feedback operation at all zones has been successfully finished.

About 10 seconds after closing the throttle, one of the following will appear:

- FIN.OK is displayed, indicating the total feedback operation was successful. Tiller models will sound the buzzer for 0.5 seconds, indicating success.
- FIN.NG is displayed, indicating the total feedback operation failed. Click the **Stop** button to revert to STAND-BY mode. Tiller models will sound the buzzer with a series of long beeps (2 seconds), indicating failure.





If retrying feedback operation, repeat O2 Feedback procedures.

Click the **Stop** button before closing the ACTUATOR TEST (O2 feedback) window.

IMPORTANT: The following may cause the total feedback operation to fail:

- No feedback operation at any zone before returning the throttle to a full closed position.
- An abnormal compensation factor (coefficient).

IMPORTANT: Repeat the O2 feedback operation with a new O2 sensor if:

- The total feedback operation finished without returning the throttle to a full closed position.
- The total feedback operation failed repeatedly.

LOGGING DATA

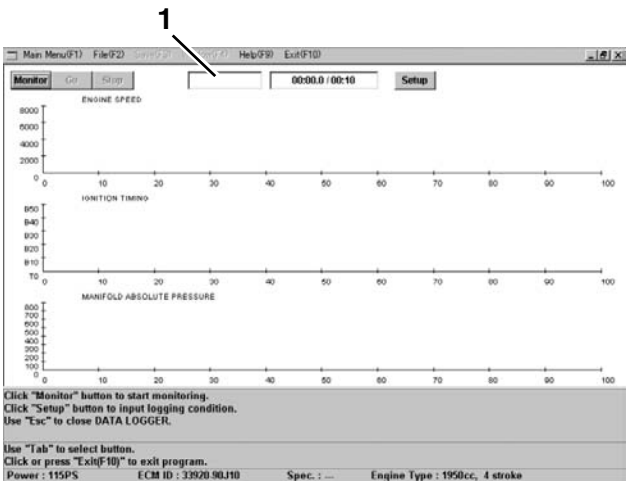
Operation

Click the DATA LOGGER button from the main menu window. The DATA LOGGER window appears.

A maximum of three items can be displayed as a graph at one time.

To select the item and change the sampling condition, click the **Setup** button.

(KEYBOARD USERS – Change the highlighted button using the **Tab** key. Move to the **Setup** button, then press the **Enter** key.



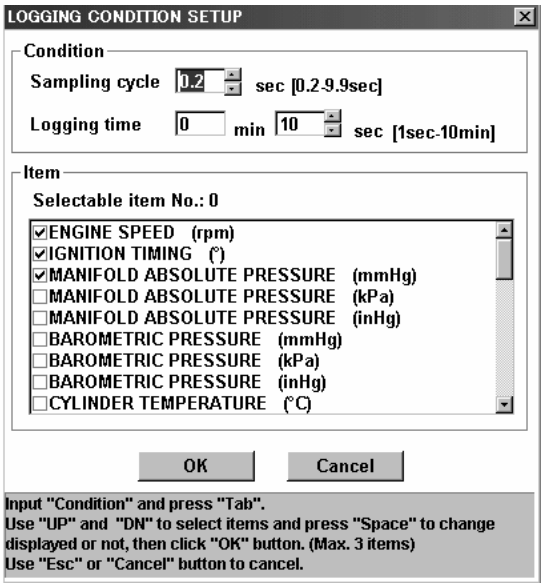
1. Current condition

IMPORTANT: The other window (SERVICE DATA, CURRENT SERVICE CODES, or ACTUATOR TEST) opened on the screen is automatically closed when the DATA LOGGER window is opened.

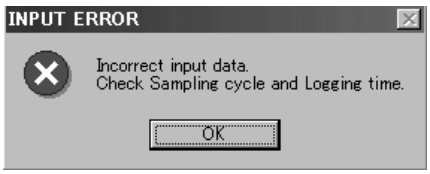
The following dialog box appears.

Input the sampling cycle and the logging time, then select the items. The items with "√" marks are displayed. To change the status between "displayed" or "not displayed", click the check box of the item. Then click the **OK** button.

(KEYBOARD USERS – Change the highlighted button using the **Tab** key. The selected item can be changed using the Up or Down arrow keys. Use the Space key to change the status between "displayed" or "not displayed". Select the button, then press the **Enter** key.



IMPORTANT: If the input condition is incorrect or no item is selected, the following dialog box appears. Click the **OK** button, then repeat the procedure.



To start monitoring the data as a graph, click the **Monitor** button.

To stop monitoring, click the **Stop** button.

(KEYBOARD USERS – Change the highlighted button using the **Tab** key to select the button, then press the **Enter** key.)

IMPORTANT: The Stop button is available only while monitoring or logging the data.

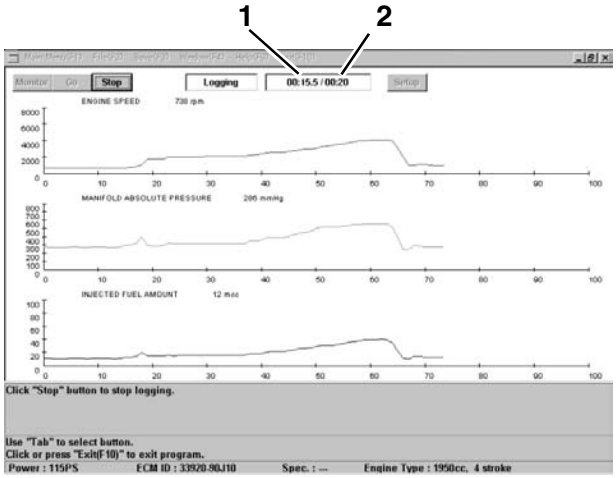
On the graphs for the following fourteen items, the numbers on the vertical axis show the number of times counted since opening the current DATA LOGGER window, but not the total number of times. The number of times is returned to zero (0) every start of logging (or monitoring).

1. NO. OF MAP SENSOR FAILURE
2. NO. OF CKP SENSOR FAILURE
3. NO. OF IAC VALVE FAILURE
4. NO. OF CMP SENSOR FAILURE
5. NO. OF CTP SWITCH FAILURE
6. NO. OF CYL TEMP. SNSR FAILURE
7. NO. OF IAT SENSOR FAILURE
8. NO. OF EX. TEMP. SNSR FAILURE
9. NO. OF FUEL INJECTOR FAILURE
10. NO. OF OVER-REVOLUTION
11. NO. OF LOW BATTERY VOLTAGE
12. NO. OF LOW OIL PRESSURE
13. NO. OF OVERHEAT (GRADIENT)
14. NO. OF OVERHEAT (TEMP.)

To start logging the data, click the **Go** button. The logging is automatically finished in the logging time input.

To stop logging, click the **Stop** button.

(KEYBOARD USERS – Change the highlighted button using the **Tab** key to select the button, then press the **Enter** key.)



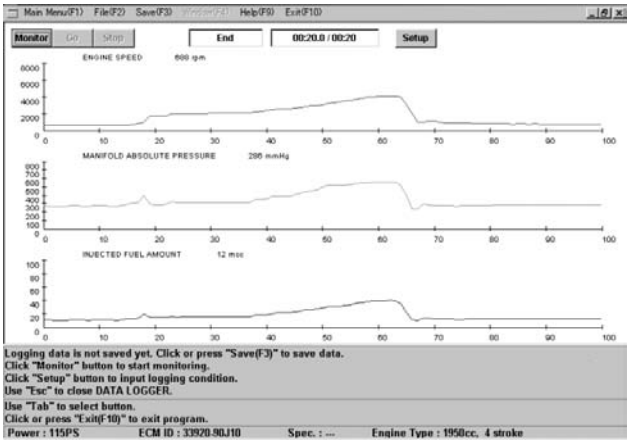
1. Elapsed logging time
2. Total logging time

IMPORTANT:

- The **Go** button is available only while monitoring the data.
- A maximum of most recent 100 points in the graph can be displayed on the screen. The horizontal axis is automatically scrolled to the left if the points of the logging (or monitoring) data over 100 points.
- A point on the horizontal axis means a elapse of logging (or monitoring) time. For example, in case that "0.5 sec" is input as the sampling cycle, 100 points show 50 seconds.

Saving the Data Log

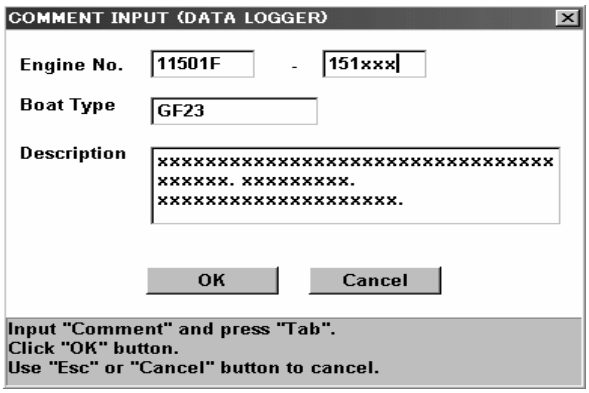
Data can be saved only after the process has completely finished. Files saved in a ".csv" format can be viewed using the 4SDS Program. Other common Windows programs, such as Microsoft Excel, WordPerfect, Windows Write, Microsoft Word, or Microsoft Access, will allow you to view ".csv files. Refer to the application's user's manual for more information.



Click **Save (F3)**, or press the **F3** key. The following dialog box appears.

Fill in the comment boxes (Engine No., Boat Type, and Description), then click the **OK** button. To cancel saving, click the **Cancel** button.

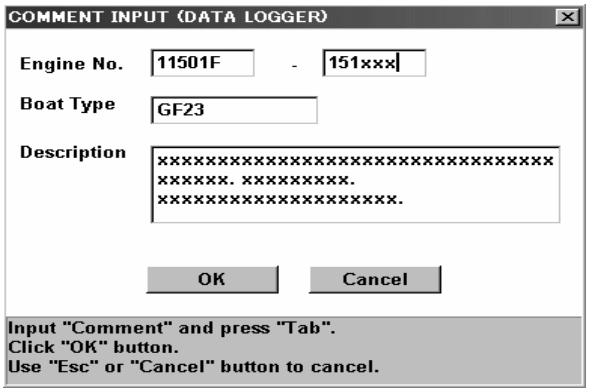
(KEYBOARD USERS – Change the highlighted button using the **Tab** key to select the button, then press the **Enter** key.)



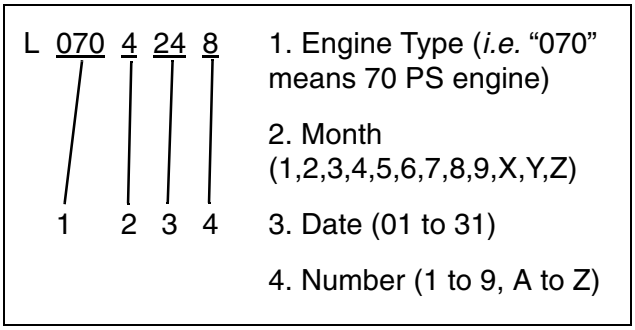
IMPORTANT: These comments are displayed when selecting the file on the "Open" dialog box.

Click the OK button. The following window appears.

The folder where the logging data will be saved and the file name are automatically displayed in the each box.



IMPORTANT: The file of logging data is automatically saved in the "DataGraph" folder and named "LXXXXXXX". At initialization, the following directory is selected to save the file. The target directory and the file name can be changed if necessary.



To save the logging data, click the **Save** button.

To cancel saving, click the **Cancel** button.

(KEYBOARD USERS – Change the highlighted button using the **Tab** key to select the button, then press the **Enter** key.)

IMPORTANT: To open the saved data, click **File (F2)** or press the **F2** key. Refer to **Opening Saved Data.**

Printing the Data Log/Graph

The data graph can be printed when the DATA LOGGER window is opened. A maximum of 100 points in the graph can be printed (same as the range displayed on the screen).

Click **File (F2)** or press the **F2** key. The file menu window appears.

Click the **Print** button.

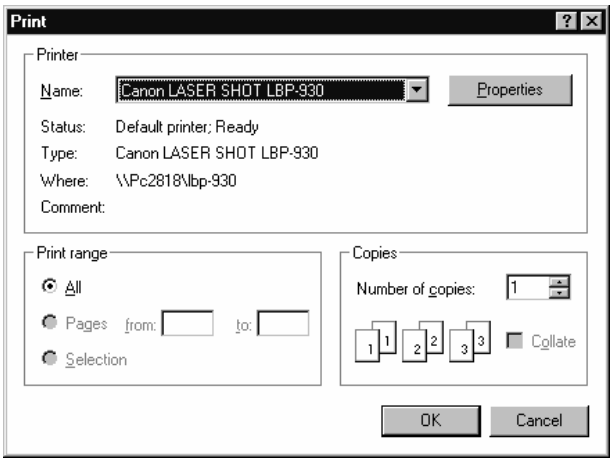
(KEYBOARD USERS – Change the highlighted button using the **Tab** key to select the **Print** button, then press the **Enter** key.)

The following window appears.

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

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

(KEYBOARD USERS – Change the highlighted button using the **Tab** key to select the button, then press the **Enter** key.)



OTHER FUNCTIONS

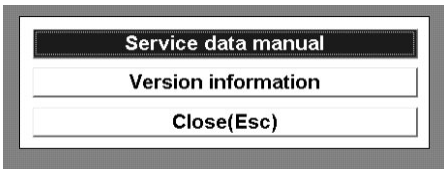
Service Data Manual

Service Manuals can be viewed by clicking the **Service Data Manual** button. Service manuals must be in PDF format for this function. The original release of this program does not include service manual files. This function is included for future use.

Click **Help (F9)**, or press the **F9** key.

The following menu dialog box appears. Click the **Service Data Manual** button.

(KEYBOARD USERS – Move to the **Service Data Manual** button using the Up or Down arrow keys, then press the **Enter** key.)



The following window appears. To open the file desired, click it, then click the **Open** button.

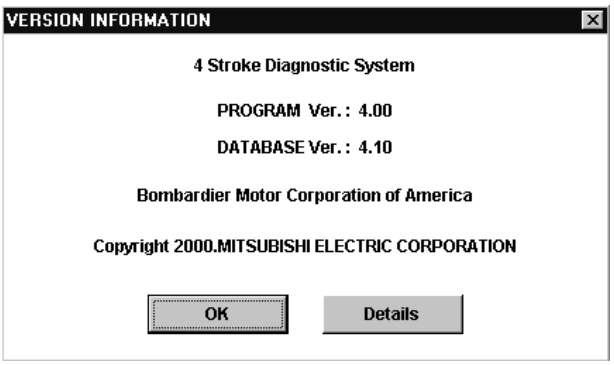
(KEYBOARD USERS – Change the highlighted button using the **Tab** key to select the item, or use the Up or Down arrow keys. Select the button, then press the **Enter** key.)

IMPORTANT: At initialization, the following directory is selected to open (or save) the file. The target directory can be changed if necessary.

Directory:
C:\Program Files\4SDS\Info\XXXXXX.***

Version Information

Click the **Version information** button. The following dialog box appears. When clicking the **Details** button, the following window appears. (KEYBOARD USERS – Change the highlighted button using the **Tab** key to select the button, then press the **Enter** key.)



Viewing the Service Data and Data Log

These documents can be viewed with programs such as Excel, Access, or Write to name a few. Using programs like Excel will allow graphs to be created and manipulated for further diagnosing.

CLOSING THE PROGRAM

To end the 4SDS program, click **Exit (F10)**, or press the **F10** key. The following dialog box appears. To exit the program, click the **OK** button. To cancel exiting, click the **Cancel** button. (KEYBOARD USERS – Change the highlighted button using the **Tab** key to select the button, then press the **Enter** key.)

DATA ITEM GROUPS

Table of Data Item Groups

The following tables shows the groups to which each data item belongs. The items with "X" marks can be displayed and can be selected at will within the items marked "X".

Group No. 1: Engine Data (available items in the "SERVICE DATA" function)
Group No. 2: Caution Sys. Info. (available items in the "SERVICE DATA" function)
Group No. 3: Operation Hours (available items in the "SERVICE DATA" function)
Group No. 4: O2 Feedback Info. (available items in the "SERVICE DATA" function)
Group No. 5: All Service Data (available items in the "SERVICE DATA" function)
Group No. 6: Data Logger (available items in the "DATA LOGGER" function)

DATA ITEM		GROUP NO.					
	Unit	1	2	3	4	5	6
ENGINE SPEED	rpm	X			X	X	X
IGNITION TIMING	°	X				X	X
MANIFOLD ABSOLUTE PRESSURE	mmHg	X			X	X	X
MANIFOLD ABSOLUTE PRESSURE	kPa	X			X	X	X
MANIFOLD ABSOLUTE PRESSURE	inHg	X			X	X	X
BAROMETRIC PRESSURE	mmHg	X				X	X
BAROMETRIC PRESSURE	kPa	X				X	X
BAROMETRIC PRESSURE	inHg	X				X	X
CYLINDER TEMPERATURE	°C	X			X	X	X
CYLINDER TEMPERATURE	°F	X			X	X	X
INTAKE AIR TEMPERATURE	°C	X				X	X
INTAKE AIR TEMPERATURE	°F	X				X	X
BATTERY VOLTAGE	V	X				X	X
FUEL INJ. PULSE WIDTH	µs	X				X	X
INJECTED FUEL AMOUNT	mcc	X				X	X
FUEL PUMP DUTY	%	X				X	X
IAC VALVE DUTY	%	X				X	X
NO. OF MAP SENSOR FAILURE	times		X			X	X
NO. OF CKP SENSOR FAILURE	times		X			X	X
NO. OF IAC VALVE FAILURE	times		X			X	X
NO. OF CMP SENSOR FAILURE	times		X			X	X
NO. OF CTP SWITCH FAILURE	times		X			X	X
NO. OF CYL. TEMP. SNSR FAILURE	times		X			X	X
NO. OF IAT SENSOR FAILURE	times		X			X	X
NO. OF EX. TEMP. SNSR FAILURE	times		X			X	X
NO. OF FUEL INJECTOR FAILURE	times		X			X	X
NO. OF OVER-REVOLUTION	times		X			X	X
NO. OF LOW BATTERY VOLTAGE	times		X			X	X
NO. OF LOW OIL PRESSURE	times		X			X	X
NO. OF OVERHEAT(GRADIENT)	times		X			X	X
NO. OF OVERHEAT(TEMP.)	times		X			X	X
CAUTION SYSTEM NAME (1)			X			X	
ENGINE SPEED (1)	rpm		X			X	
MANIFOLD ABSOLUTE PRESSURE (1)	mmHg		X			X	
MANIFOLD ABSOLUTE PRESSURE (1)	kPa		X			X	
MANIFOLD ABSOLUTE PRESSURE (1)	inHg		X			X	
CYLINDER TEMPERATURE (1)	°C		X			X	
CYLINDER TEMPERATURE (1)	°F		X			X	
INTAKE AIR TEMPERATURE (1)	°C		X			X	
INTAKE AIR TEMPERATURE (1)	°F		X			X	
EX-MANI TEMPERATURE (1)	°C		X			X	
EX-MANI TEMPERATURE (1)	°F		X			X	
FAILURE TIME (1)	h		X			X	
ELAPSE OF TIME (1)	min		X			X	
CAUTION SYSTEM NAME (2)			X			X	
ENGINE SPEED (2)	rpm		X			X	

DATA ITEM		GROUP NO.					
	Unit	1	2	3	4	5	6
MANIFOLD ABSOLUTE PRESSURE (2)	mmHg		X			X	
MANIFOLD ABSOLUTE PRESSURE (2)	kPa		X			X	
MANIFOLD ABSOLUTE PRESSURE (2)	inHg		X			X	
CYLINDER TEMPERATURE (2)	°C		X			X	
CYLINDER TEMPERATURE (2)	°F		X			X	
INTAKE AIR TEMPERATURE (2)	°C		X			X	
INTAKE AIR TEMPERATURE (2)	°F		X			X	
EX-MANI TEMPERATURE (2)	°C		X			X	
EX-MANI TEMPERATURE (2)	°F		X			X	
FAILURE TIME (2)	h		X			X	
ELAPSE OF TIME (2)	min		X			X	
CAUTION SYSTEM NAME (3)			X			X	
ENGINE SPEED (3)	rpm		X			X	
MANIFOLD ABSOLUTE PRESSURE (3)	mmHg		X			X	
MANIFOLD ABSOLUTE PRESSURE (3)	kPa		X			X	
MANIFOLD ABSOLUTE PRESSURE (3)	inHg		X			X	
CYLINDER TEMPERATURE (3)	°C		X			X	
CYLINDER TEMPERATURE (3)	°F		X			X	
INTAKE AIR TEMPERATURE (3)	°C		X			X	
INTAKE AIR TEMPERATURE (3)	°F		X			X	
EX-MANI TEMPERATURE (3)	°C		X			X	
EX-MANI TEMPERATURE (3)	°F		X			X	
FAILURE TIME (3)	h		X			X	
ELAPSE OF TIME (3)	min		X			X	
TOTAL OPERATION TIME (HRS.)	h			X	X	X	
TOTAL OPERATION TIME (MIN.)	min			X	X	X	
0-1000 RPM	min			X		X	
1000-2000 RPM	min			X		X	
2000-3000 RPM	min			X		X	
3000-4000 RPM	min			X		X	
4000-5000 RPM	min			X		X	
5000-6000 RPM (*)	min			X		X	
ABOVE 5000 RPM	min			X		X	
ABOVE 6000 RPM (*)	min			X		X	
ELAPSE TIME FROM REMINDER CANCEL	h			X		X	
NO. OF OIL CHANGE REMINDER	times			X		X	
COMPENSATION FACTOR (ZONE 1)					X	X	
COMPENSATION FACTOR (ZONE 2)					X	X	
COMPENSATION FACTOR (ZONE 3)					X	X	
TIME OF LAST O2 FEEDBACK	h				X	X	
EMERGENCY STOP SWITCH		X				X	X
CTP SWITCH		X				X	X
NEUTRAL SWITCH		X				X	X
O2 FEEDBACK					X		

* These items are available only for the 40/50 and 140.

Explanation of Data Items

FUEL INJ. PULSE WIDTH (micro-second): Injection time duration for each cylinder per 1 time.

INJECTED FUEL AMOUNT (cubic centimeter): Injected fuel amount for each cylinder per 1 time.

FUEL PUMP DUTY (percent): Repeating "ON" time rate within a cycle for fuel pump drive.

IAC VALVE DUTY (percent): Repeating "ON" time rate within a cycle for IAC valve drive.

NO. OF XXXX FAILURE (times): Total number of abnormality in a signal from sensor/switch specified.

NO. OF XXXX (times): Total number of the activation for the CAUTION system specified.

CAUTION SYSTEM NAME (X): Name of the CAUTION system activated. (indicating the latest, 2nd-latest, and 3rd-latest activation except for the "OVER-REVOLUTION) Its following items with the same number (X) are the main data when activating that CAUTION system. The number (X) does not mean the order of system activation. Refer to the "FAILURE TIME (X)" to confirm when the system activation occurred.

CYLINDER TEMPERATURE (X) & INTAKE AIR TEMPERATURE (X): Indicated "-50°C (-58°F)" if there is no record of the CAUTION system activation.

FAILURE TIME (X) (hour): Total motor operating time when activating the CAUTION system.

ELAPSE OF TIME (X) (minute): Elapsed time during the CAUTION system activation.

ELAPSE TIME FROM REMINDER CANCEL (hours): Does not apply to *Evinrude/Johnson* product.

COMPENSATION FACTOR (ZONE X): Current compensation coefficient of the fuel injection duration map for each RPM zone specified. These are initially all "1.000".

TIME OF LAST O2 FEEDBACK (hour): Total motor operating time when performing the latest O2 feedback operation.

XXXX SWITCH: Current condition for the specified switch. ("ON" or "OFF")

O2 FEEDBACK: Current condition for O2 feedback operation. ("STAND-BY", "ACTION", "FIN.OK", or "FIN.NG")

UNINSTALLING THE PROGRAM

When uninstalling the 4SDS program from your computer, refer to the instructions below, based on your computer's operating system.

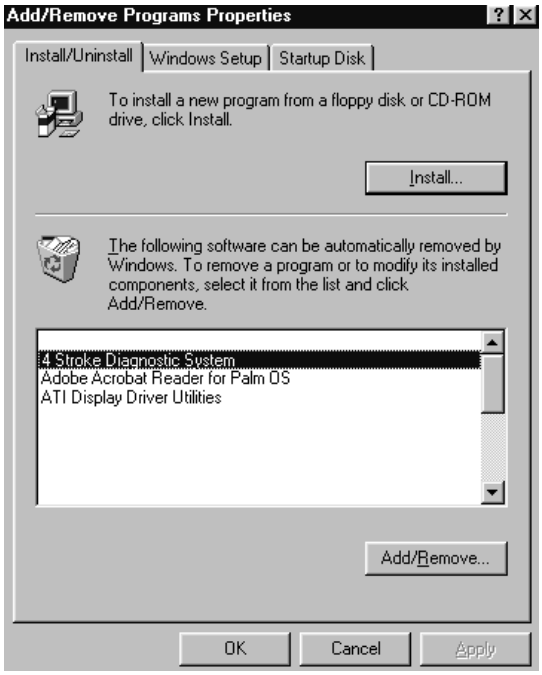
IMPORTANT: It is strongly recommended that you exit all other programs before running the 4SDS uninstaller.

From the taskbar on your computer screen, click the Start button and point to the Setting, then click the Control Panel. The following window appears.

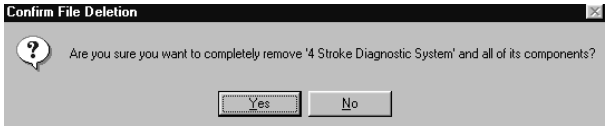
Double-click the Add/Remove Programs icon in the window.

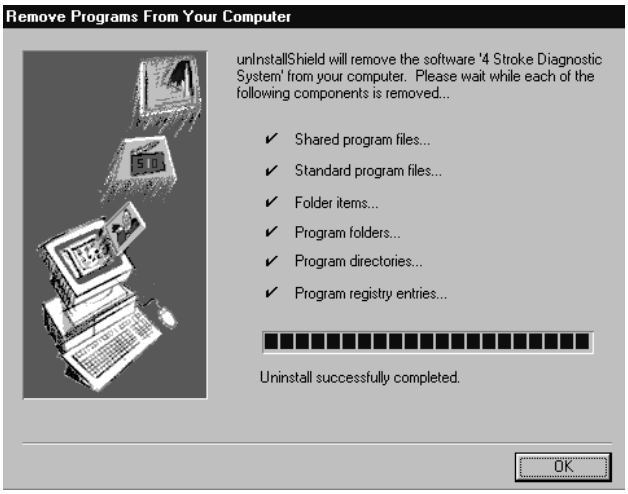
The following window appears.

Select the 4 Stroke Diagnostic System, then click the Add/Remove button.



The following dialog box appears. To uninstall the 4SDS program, click **OK** button. To quit uninstalling, click the **Cancel** button.





Click the **OK** button.

NOTES

4 Stroke Diagnostic Software

User's Guide

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