# iBeat Diagnostic Tool
# Operation Manual




No. EMS-SP-HG-062197

iBeat® MIKUNI FI SYSTEM

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## Safety Precautions

For safe use of this Tool (hereinafter referred to as iDT), carefully read the “Safety Precautions” prior to operation.

This manual describes the instructions for prevention of injuries to its users other persons and damage to property in order to ensure its safe use. These safety instructions are represented by the following symbols. While reading this manual please keep these symbols in mind.

[Precaution]

Incorrect handling in disregard of the precaution represented by this symbol may result in personal injury or property damage.

[Prohibition]

This symbol indicates prohibited acts.

Prohibited acts are described near the symbol or therein.

[Instructions]

This symbol indicates the instructions that must be followed.

## Arrow of Symbols on pictures

This symbol indicates attention area on a window of software.


This symbol indicates a mouse or keyboard operation point on a window of software.
The part of “#*” Indicate a sequence of operation by ion sequence number.

# 1. Introduction

## 1) Overview of Diagnostic Tool — What This Tool Can Do —

"**iBeat Diagnostic Tool**" is a multifunctional diagnostic tool for Mikuni Engine Control Systems.

The Tool can carry out a variety of functions including display of failure status display and vehicle information analysis and display.

### Features

- Easy-to use Windows application
- Available in six languages (English, Italian, French, German, Spanish and Japanese)
- Simple user interface

### List of Functions

| | |
|---|---|
| - Display of vehicle information | ・Supports 10 display items<br>・Displays numerical values with high level of visibility<br>・Visual dashboard display<br>・Chart monitor display in graph format |
| - Display of error information | ・Supports 13 input/output items<br>・Real time display of failure information<br>・Display of previously failure information<br>・Failure history display |
| - Analysis of vehicle information | ・Saves log data in Windows file format(CSV)<br>・Displays of stored log data |
| - Other functions | ・Sets feedback adjustment value<br>・Sets ID information<br>・Service history<br>・Unit conversion function<br>・Adjusts TPS idle value |

## 2) Subject Systems

The following Diagnostic Tool and ECU systems are covered by this document:

**iBeat Diagnostic Tool :** Version 1. 56. XX onward

**ECU :** Type ECU18X-A

### 3) Description of Vehicle Data Items

The following is a description of vehicle data items handled by the iDT:

**Table 1-3-1**

| Item | Description | Unit |
|---|---|---|
| Air Press.,<br>Atmospheric Pressure,<br>Barometric Pressure | Atmospheric pressure in current position at current altitude.<br>Used to compensate air quantity | kPa |
| Battery,<br>Battery Voltage | Battery voltage.<br>Used to compensate injection pulse width. | V (volt) |
| Gear Pos,<br>Gear Position | Currently selected gear position.<br>Neutral is indicated as "**N**". | --- |
| Man. Air Temp.,<br>Man. Air Temperature,<br>Manifold Air Temperature, | Temperature of air in intake manifold.<br>Used to compensate air quantity | deg.C (Celsius) |
| Manifold Press.,<br>Manifold Pressure | Pressure in intake manifold.<br>Indicates engine load. | kPa |
| Plus width,<br>Injection Plus width | Pulse width of fuel injector, time injector valve is open.<br>Calculated by ECU. | μsec (Microseconds: 1μsec=0. 000001 sec) |
| Spark,<br>Spark Adv.,<br>Spark Advance | Phase of ignition timing from TDC.<br>Calculated by ECU | degCA (Crank angle: angle of crank given that one full turn is 360 degrees) |
| Tachometer | Engine revolutions | rpm (revolutions per minute) |
| Throttle,<br>Throttle position | Throttle opening percentage where full throttle is 100%. When state is Idle, throttle is at rest (=0%). | % |
| TPS Value | Voltage sensed by the Throttle position sensor (TPS). | mV |
| Water Temp.,<br>Water Temperature | Engine coolant temperature.<br>Used to compensate injection pulse width. | degC (Celsius) |

### 4) Glossary

The following are definitions for terms used in this manual :

**Table 1-4-1**

| Terms | Definition |
|---|---|
| Engine No. | Number stamped on engine of vehicle. Unique to each engine. For its stamping location, see vehicle's maintenance manual. |
| EEPROM | A type of nonvolatile memory. Stores ID information and error history. |
| Feedback adjustment | To adjust the O2 feedback adjustment gain. |
| Flash ROM | A type of nonvolatile memory. Location of programs in ECU. |
| Idle | Normal throttle resting state of the engine. |
| Ignition coil | Device that accumulates energy in coil and discharges said energy to ignition plug, acting on drive signal from ECU |
| Log file | File containing vehicle data logged under the iDT. |
| O2 Sensor | A sensor that senses richness or leanness of combustion mixture. Controls purification of exhaust gases. |
| O2 (Sensor) heater | A heater that warms the O2 sensor to a temperature suitable for the sensor to give stable output. |
| Port, communication port | Serial communication port (RS232C) on PC. |
| Sensor source | Unit that supplies power to sensors. |
| Program | ECU's software. |
| Tilt sensor | Senses rollover of vehicle. Upon sensing rollover, it will shut off the power relay. |
| TPS | Throttle Position Sensor. |
| USB serial conversion adapter | Conversion device for serial communication, intended for PCs provided with no serial communication port, such as notebook PCs. |
| VIN (Vehicle Identification Number) | Number stamped on vehicle frame. Unique to each frame. For its stamped location, see vehicle's maintenance manual. |
| Windows XP SP2 | Second version of Windows XP. Security has substantially been improved. |

## 2. Screen Layout

Below you can see the screen layout of the iDT and description of the functions of each section of the screen carries out:

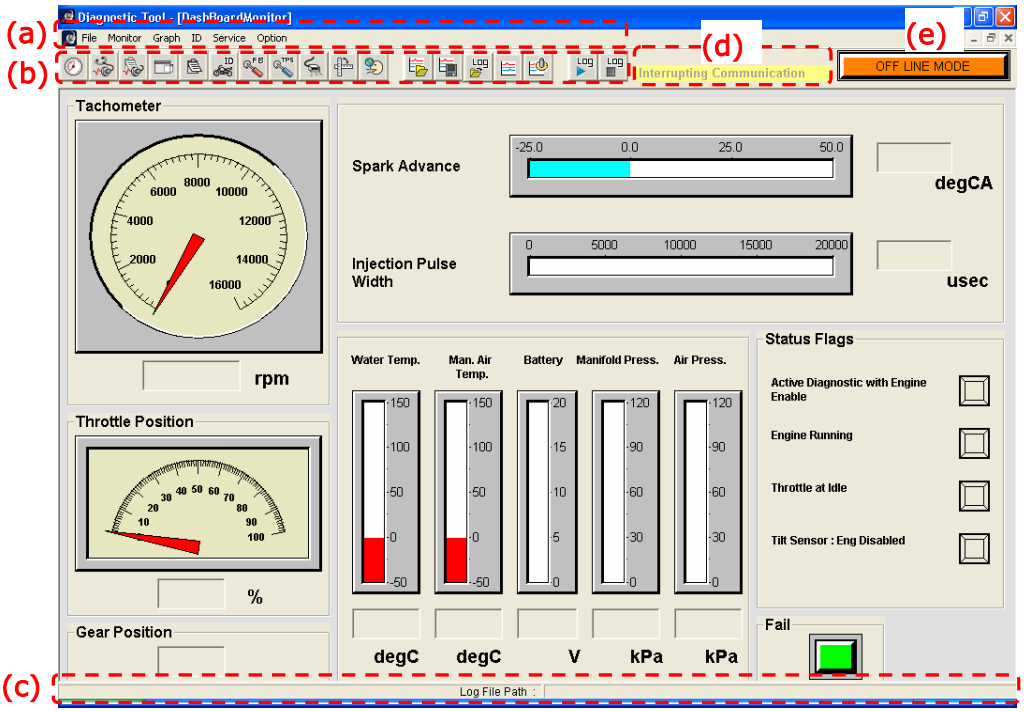



**Fig. 2-1-1**

**Table 2-1-1**

| Code in Fig. 2-1-1 | Name | Description |
|---|---|---|
| (a) | Menu bar | Enables selection of each function by command. |
| (b) | Tool bar | Enables selection of each function by icon. Each function can be performed by clicking on the corresponding icon. |
| (c) | Status bar | Shows name of currently read log file |
| (d) | Status message | Shows the message of communicating and logging state.<br>The messages are following:<br>Start Communication : Indicate communicating with ECU.<br>Interrupting Communication : Indicate non-communicating with ECU.<br>Recording Log Data : Indicate logging the vehicle's data. |
| (e) | Communication mode button | Enables the iDT to communicate with ECU by manual operation.<br>Click OFF LINE MODE button, and then communication will start and it will changes to. ON LINE MODE .<br>Click ON LINE MODE button, and then communication will stop. |

## 3. Outline of Menu Bar/Tool Bar

Functions for each command on the menu bar and each icon on the tool bar are performed by clicking the left button on the mouse. Each command on the menu bar and its corresponding button on the tool bar carry out the exact same function.

The table below gives an explanation for each command and shows the icon used to carry out that command. These functions will be described in detail beginning with in Chapter 5.

**Table 3-1-1 (1/2)**

| Menu bar commands | | Tool bar buttons | Brief description of command | Page for details |
|---|---|---|---|---|
| File | Read Logfile |  | Reads saved log data file and display it in log graph. | 21 |
| | Save Logfile |  | Saves log data acquired from dashboard, large monitor or chart monitor into a file. | 22 |
| | Tool End | None | Ends iDT | 23 |
| Monitor | Dashboard |  | Displays vehicle data on dashboard screen | 10 |
| | Large Monitor Screen |  | Large display screen. Shows vehicle data in a large font. | 12 |
| Graph | Log Graph |  | Displays currently open log file in graph format. | 14 |
| | Chart Monitor |  | Displays current vehicle data in a graph where horizontal axis represents time. | 17 |
| | Channels/ View Mode |  | In chart monitor and log graph, toggles display on/off and scope of display | 19 |
| ID | ID information |  | Displays ID information including frame No. and engine No. | 24 |
| Service | Fail Monitor |  | Displays information on previous and current failures detected. | 25 |
| | Diag History |  | Displays failure history. | 28 |
| | Feedback Adjustment |  | Sets O2 feedback adjustment gain. | 29 |
| | TPS Idle Adjustment |  | Sets TPS for idling. | 32 |
| | Service History |  | Used for service history input and display. | 34 |

**Table 3-1-1 (2/2)**

| Menu bar commands | | Tool bar buttons | Outline of functions | Page for details |
|---|---|---|---|---|
| Option | COM Setup |  | Sets communication port No. of PC. | 41 |
| | Unit Conversions |  | Tool used to convert various units. | 43 |
| | Language Setting |  | Sets display language of iDT. | 44 |
| | Tool Version | None | Displays version information of iDT. | 45 |
| None | |  | Starts logging of vehicle data. | 18 |
| None | |  | Stops logging of vehicle data. | 18 |

## 4. Initial Setup

Use of the iDT requires the setup of the display language and communication port for communication port. The setup procedure is as follows :

1) If a serial communication port is already installed on your PC, check to confirm the name of the serial communication port. The procedure is as follows:

***Windows XP is used as an example for explaining this procedure. For details, see the Help file of your version of Windows.**

i) Right-click on [**My Computer**] either on the desktop or [**Start**] menu.

ii) Select [**Properties**] menu > [**Hardware**] tag > [**Device Manager**].

iii) Open the [**Ports (COM & LPT)**] tree. (Click on  )

iv) Of [**Communications Port (COM*)**] displayed on tree, the "**COM***" portion is the name of the serial communication port.

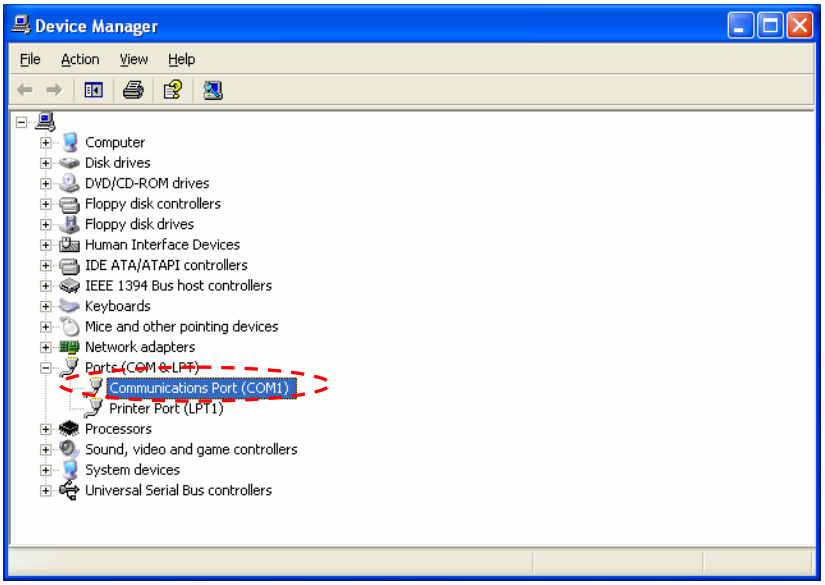



**Fig. 4-1-1**

Initial setup of the iDT's communication port is "**COM1**". If your PC's serial communication port name is "**COM1**", skip step 4 and all steps thereafter.

Upon startup of Diagnostic Tool, this port is automatically connected to the ECU.

2) If your PC does not already have a serial communication port installed, a USB serial conversion adapter is needed. For details, see Appendix 1 "USB Serial Conversion Adapter Setup Method".

3) Start iDT. The screen below will appear. Click on the national flag representing the language you wish to use. The display language will be established and saved to PC.
This setting can also be changed using the language setup command.
For details, see Section 10. 3) Language Setup Command.

Set only to languages that your PC's OS supports.
Failure to follow this procedure can cause wrong display to the items of window.


**Fig. 4-3-1**

4) If the PC's serial communication port name is not "COM1", the message on the right will appear.

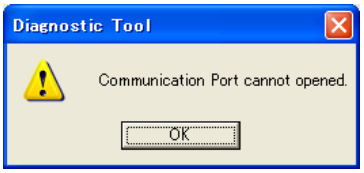



**Fig. 4-4-1**

5) Press the [**OK**] button of the message box and the display communication setup dialog box will appear. Set the communication port name using on this dialog box.
For details of setting, see Section 10. 1) Communication Setup Command.

Be sure to correctly set the port name.
If the port name is not correctly set, a result of error diagnosis can not receive because iDT can not communicate with the ECU.

## 5. Monitor Menu

### 1) Dashboard Command

This command will display the vehicle data in real time using analog meters, bar graphs and other similar displays.

This enables visual confirmation of current vehicle status at a glance.

The following are display items and descriptions of operation procedures:

(1) Select this command from the menu bar and the dashboard screen will appear.
The dashboard screen shows vehicle status and has no buttons to operate.

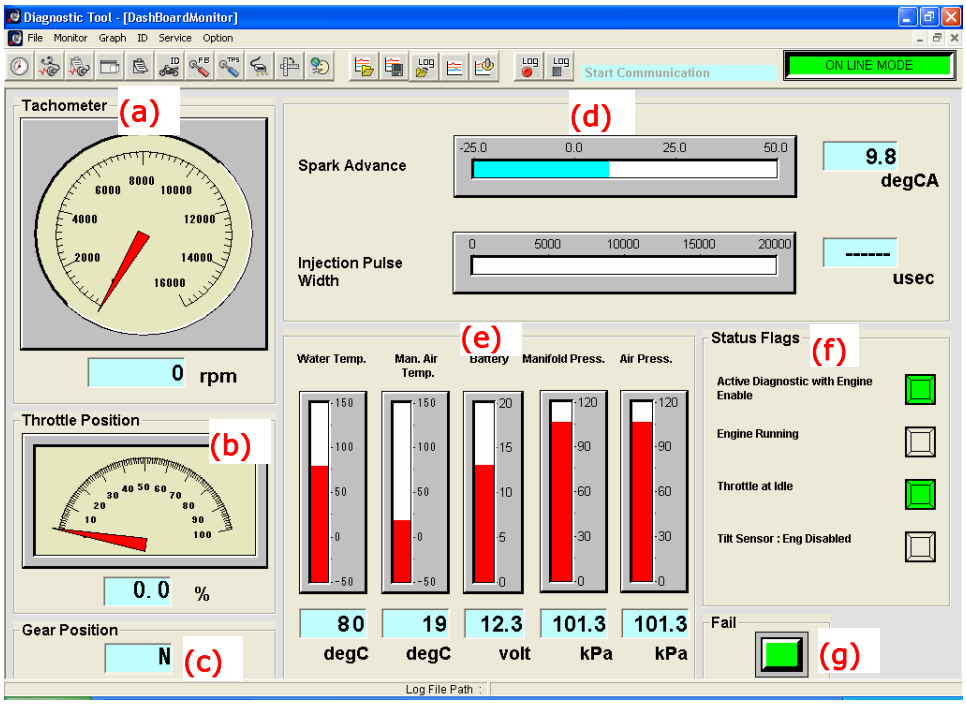



**Fig. 5-1-1**

**NOTE:** When the value of vehicle data is wrong, error exist to the sensor or the device is not driven, display "----" to item on the window.

An explanation of the items shown on the Dashboard Screen is given below for details regarding each display item, see Section 1. 4) Description of Vehicle Data.

**Table 5-1-1**

| Code in Fig. 5-1-1 | Description |
|---|---|
| (a) | Shows engine revolutions in analog meter format. |
| (b) | Shows the degree of throttle opening in analog meter format. |
| (c) | Shows gear position number. * "N" indicates to neutral gear. |
| (d) | Shows ignition timing advance and injector discharge time using bar graphs. |
| (e) | Shows water temperature, intake air temperature, battery voltage, intake manifold pressure and atmospheric pressure using bar graphs. |
| (f) | Shows status of vehicle with using toggle switches.<br>For details of display, see **Table 5-1-2** below |
| (g) | Given an indicator color with blinking, indicates whether failures exist at present.<br>Indicator colors are shown below.<br>If you wish to check the details of failure, click this indicator.<br>Case the indicator color is Yellow or Red, the Diagnostic Monitor will appear.<br>Case the indicator color is green, the no failures message will display.<br>This operation is possible while communicating with ECU.<br>  Green **Not blink** : No failures and no failure history<br>  Yellow **Blinking** : No failures and error history is stored<br>  Red **Blinking** : Failures present |

**Table 5-1-2**

| Indicator / Status |  Green : ON |  No color : OFF |
|---|---|---|
| Active diagnostic with engine enabled | Indicates that communication with ECU is possible. | Indicates that communication with ECU is not possible. see separate material, "User Guide" – Section 5. If Failure is Suspected -. |
| Engine running | Indicates that engine is currently in Operation. | Indicates that engine is not currently in operation. |
| Throttle at Idle | Indicates that engine is in idling state. | Indicates that Shows engine is not in idling state (throttle open). |
| Tilt sensor :<br>Eng disabled | Indicates that a rollover condition has been detected.<br>In this state, engine is stalled. | Indicates that a rollover condition is not detected. |

## 2) Large Monitor Screen Command

This command will show vehicle data in real time and in a large font size.

This function is effective particularly when the PC is distant from the vehicle.

The following are display items and descriptions of operation procedures:

(1) Select this command from the menu bar and the large monitor screen will appear.

For details of each display item, see Section 1. 4) Description of Vehicle Data Items.

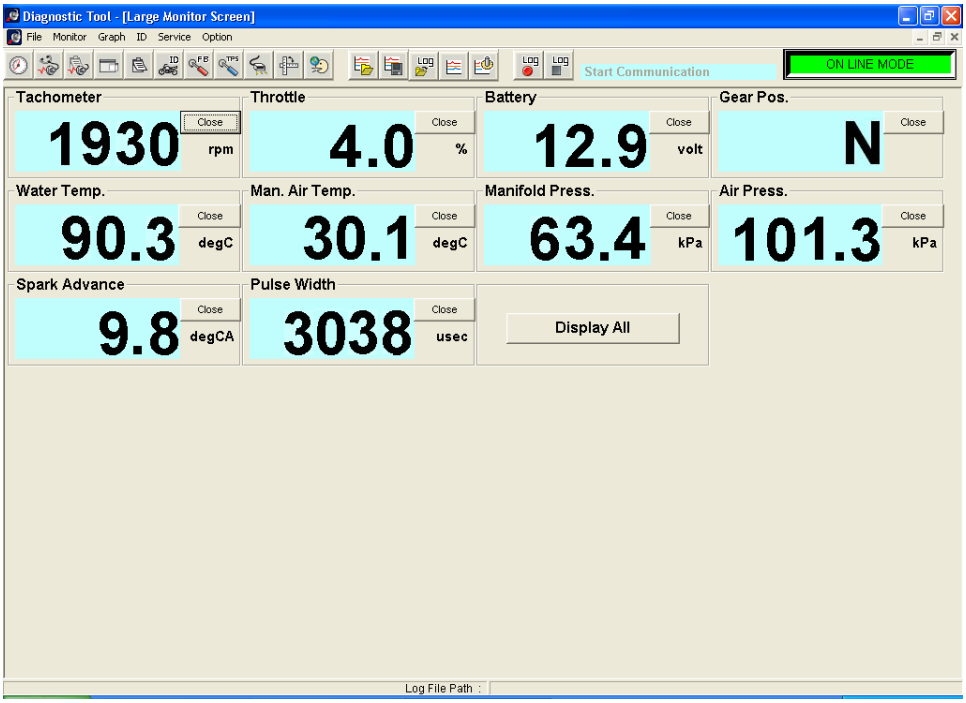



**Fig. 5-2-1**

**NOTE:** When the value of vehicle data is wrong, error exist to the sensor or the device is not driven, display "----" to item on the window.

(2) By pressing the [**Close**] button on the right of any data item, that data item can be toggled off. This gives the user the opportunity to display only the data items that he/she requires. The order of shown displays can not be changed.

Example, This display utilizes only the tachometer, Throttle position, Water temp. , Man. air temp. , Manifold pressure, spark advance and pulse width

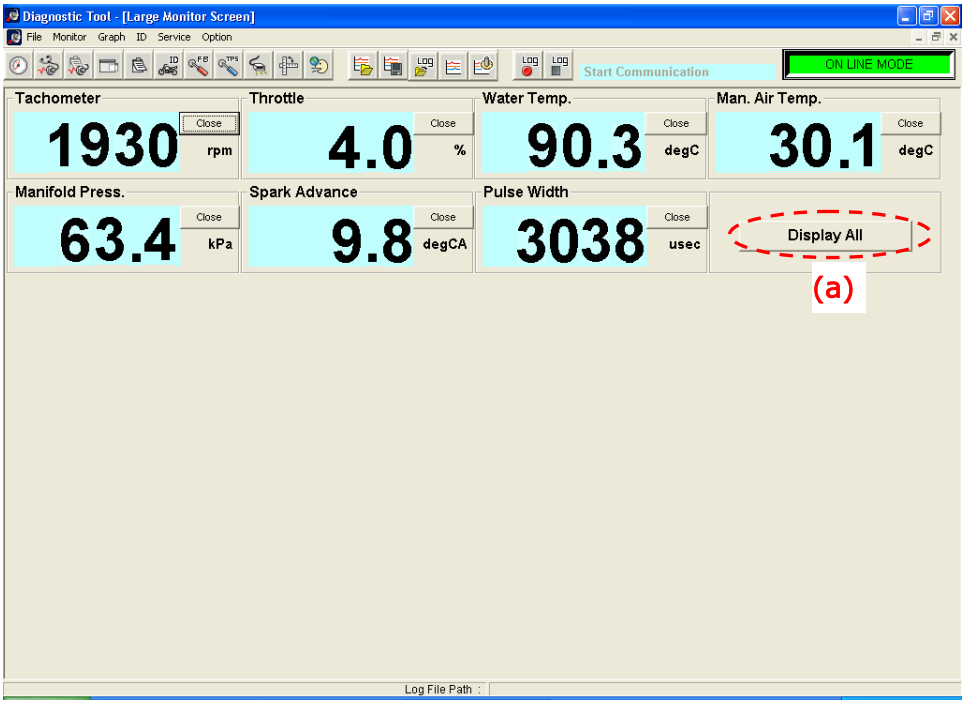



**Fig. 5-2-2**

(3) Pressing the [**Display All**] button (Fig. 5-2-2 (a)) will display all un-displayed data items. Use this command when you wish to see all of the un-displayed items after closing them.

## 6. Graph Menu

### 1) Log Graph Command

This command will display all log files which have been saved using the log file save command. Using this command, analysis of saved log data can also be made.

The following are the display items and operation procedure:

(1) Selecting this command on the menu bar will open the log graph screen.

Item names and color coding on the log graph screen are the same as on the chart monitor screen.

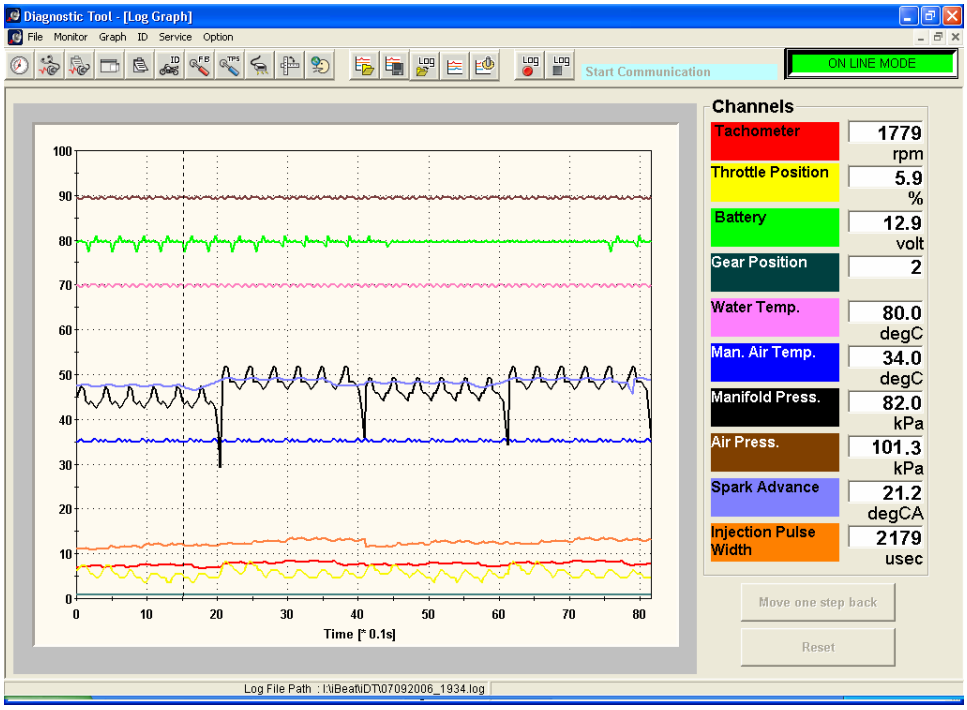



**Fig. 6-1-1**

(2) The screen can be enlarged by clicking the left mouse button and dragging the mouse.
Operation procedure is as follows:

i) On the graph, hold the left button of the mouse at the point from which to enlarge the screen.

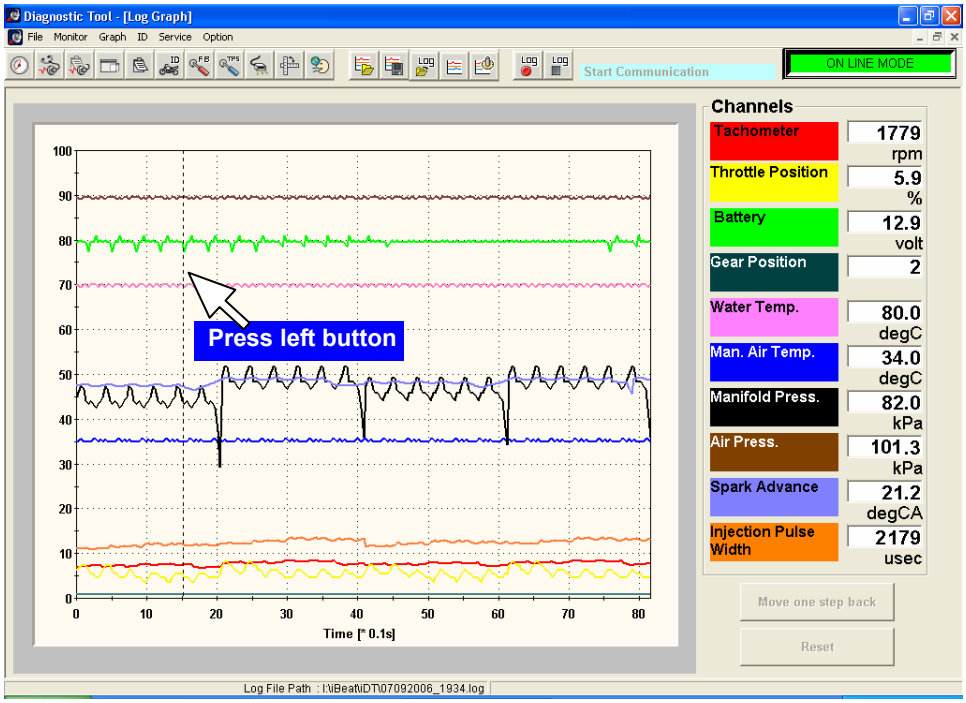



**Fig. 6-1-2**

ii) Dragging the mouse while holding in its left button will highlight the area covered.
The highlighted region will become the new graph view.

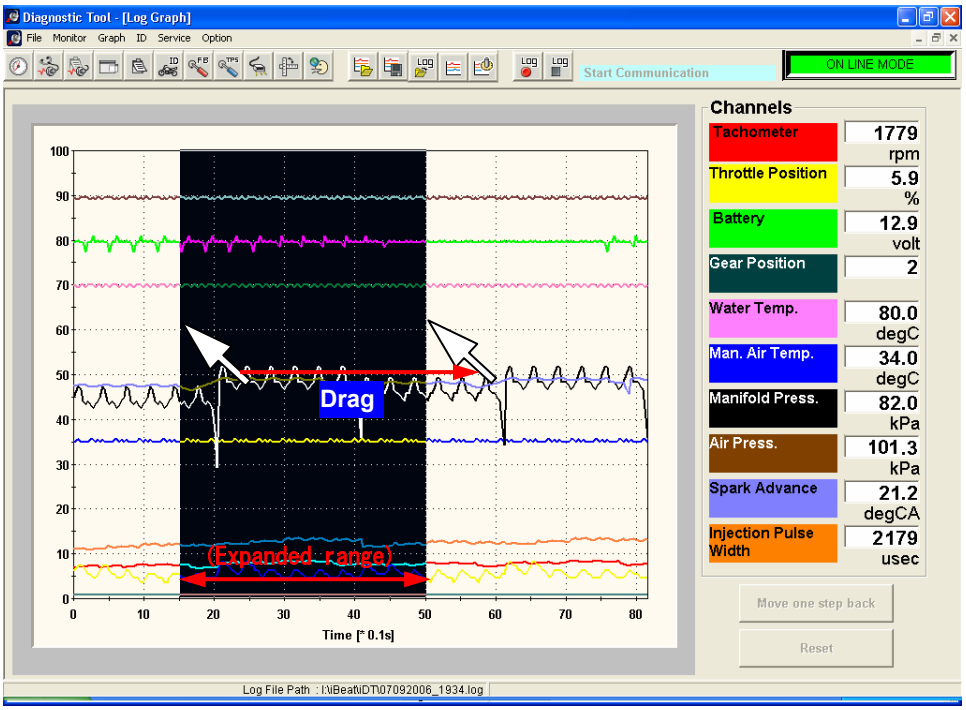



**Fig. 6-1-3**

iii) Release the left button of mouse at opposite boundary from where you clicked.
The graph view will be adjusted to the specified area.

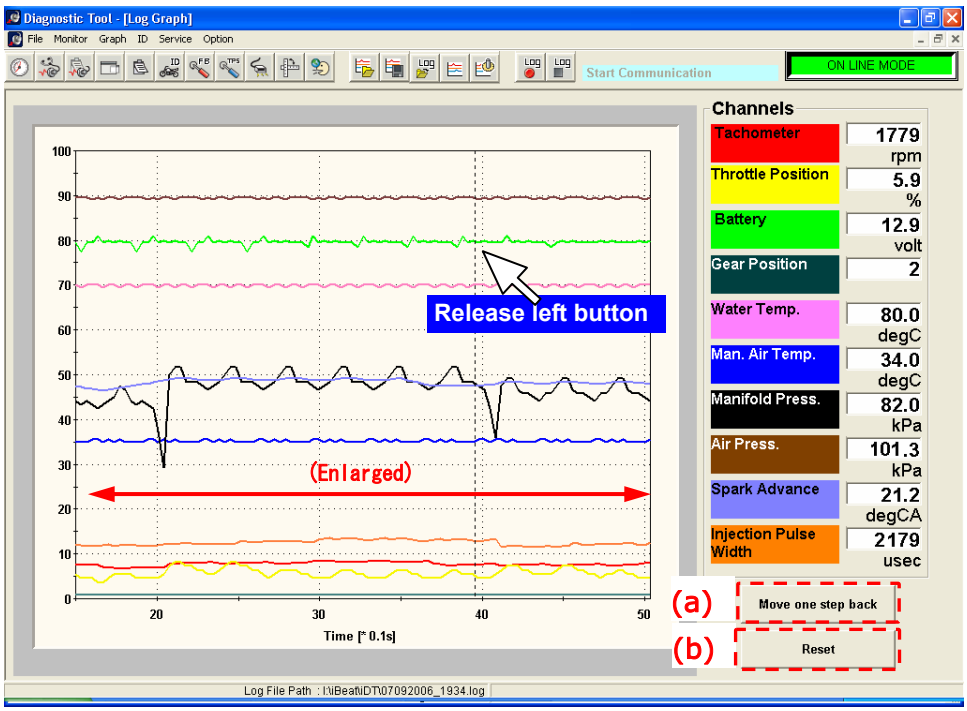



**Fig. 6-1-4**

(3) Pressing the [**Move one step back**] button (Fig. 6-1-4 (a)) will return operation to the state one step prior.

(4) Pressing the [**Reset**] button (Fig. 6-1-4 (b)) returns the graph view to its initial state.

## 2) Chart Monitor Command

This command will display vehicle data in real time using a graph where the horizontal axis represents time. This function is enables the user to examine the vehicle data in graphic form.

The following are display items and descriptions of operation procedures:

(1) Selecting this command from the menu bar will open the chart monitor screen.

Space (a) in the chart shows vehicle data in graphic format.

Data items on the graph are color coded.

Space (b) in the chart shows vehicle data in numerical values.

Space (c) in the chart shows any abnormal vehicle conditions using a simplified format.

For details of each display item, see Section 1. 4) Description of Vehicle Data Items.

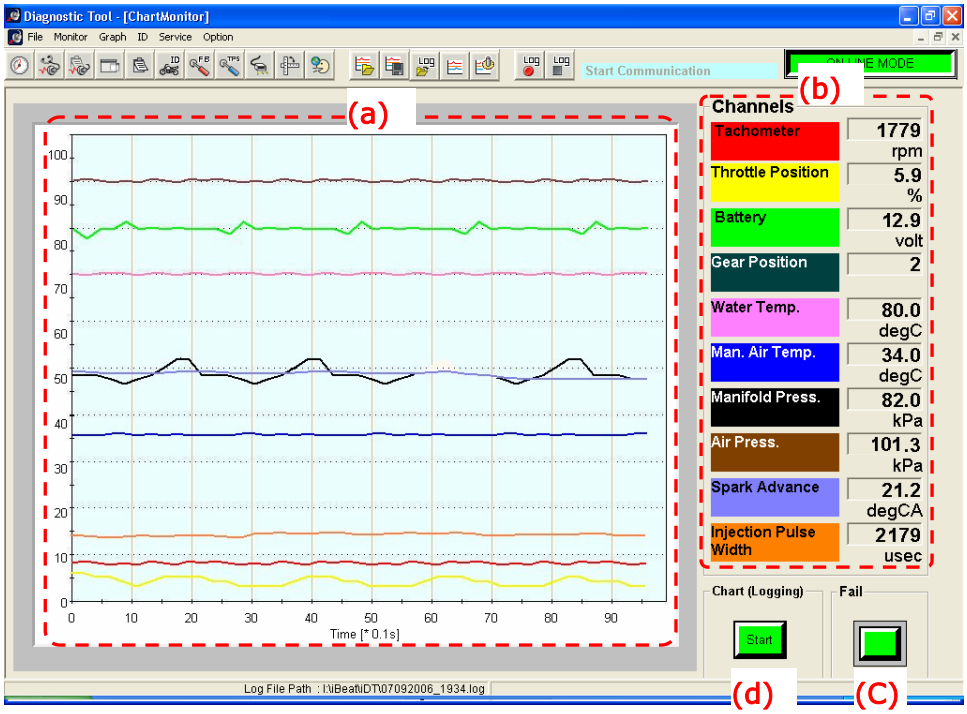



**Fig. 6-2-1**

**NOTE:** When the value of vehicle data is wrong, error exist to the sensor or the device is not drive, display "----" to item on the window.

(2) Each data item is color coded on the graph as shown below.

| | | | |
|---|---|---|---|
| Red | : Tachometer | Blue | : Man. Air temp. |
| Yellow | : Throttle Position | Black | : Intake Press. |
| Light green | : Battery | Brown | : Air Press. |
| Green | : Gear position | Light blue | : Spark Advance |
| Pink | : Water Temp. | Orange | : Injection Plus Width |

(3) The following is description of the abnormal conditions on a vehicle may exhibit (Fig. 6-2-1 (c)).
If you wish to check the details of failure, click this indicator.
Case the indicator color is **Yellow** or **Red**, the Diagnostic Monitor will appear.
Case the indicator color is **green**, the no failures message will display.
This operation is possible while communicating with ECU. In other case a error message dialog box will appear.

| | | |
|---|---|---|
| Green | **Not blink** | : No failures and no failure history |
| Yellow | **Blinking** | : No failures and error history is stored |
| Red | **Blinking** | : Failures present |

(4) Logging operation is performed as follows:

i) Press the [**Start**] button (Fig. 6-2-1 (d)) and logging of vehicle data will begin.
This function is equivalent to clicking the 

Icon on the tool bar.
When logging starts, the button will changes to a [**Stop**] button.

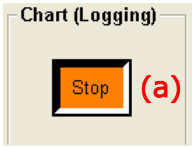



**Fig. 6-2-2**

ii) Press the [**Stop**] button (Fig. 6-2-2 (a)), and vehicle data logging will halt.
This function is equivalent to clicking the 

icon on the tool bar.
When logging stops, the button will switch back to the [**Start**] button.

### 3) Channels / View Mode Command

This command will be used to change display of each channel on the chart monitor and display the range of the vertical axis of the graph. This function is used for displaying only necessary items on the chart or displaying the maximum range of the graph's vertical axis.

The following are the display items and operation procedures:

(1) Selecting this command on the menu bar will open each the channel setup/display mode dialog box. The dialog box shows current settings. For a description of each channel, see Section 6. 3) Chart Monitor Command.

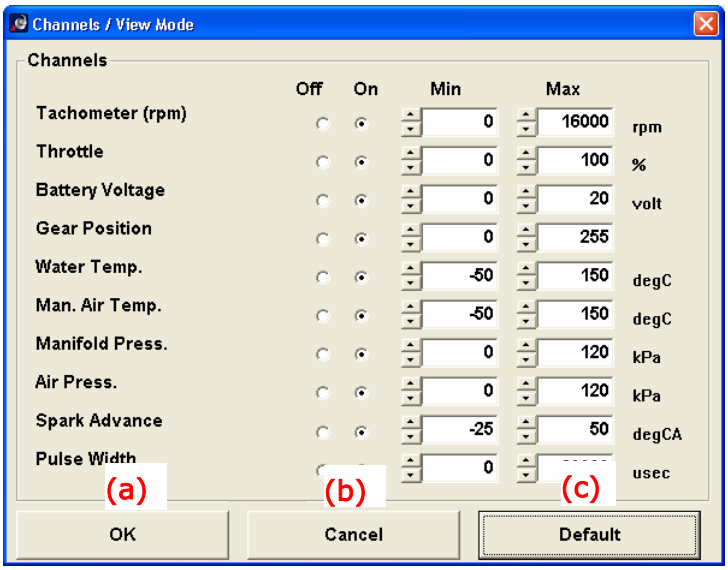



**Fig. 6-3-1**

(2) The following is description of each row of the dialog box.

**Off/On :**  Indicates the channel display is enabled.

 Indicates the channel display is disabled.

**Min :** Shows a numerical value of the item at a bottom point (=0) on the vertical axis.

In the case shown "-10" to "Water temp.", "-10" show "0" on the vertical axis..

**Max :** Shows a numerical value of the item at a bottom point (=100) on the vertical axis.

In the case shown "120" to "Water temp.", "120" show "100" on the vertical axis; The values are shown by the percentage of between [**Min**] to [**Max**].

(3) To toggle the display of each channel, select the corresponding [**On**] or [**Off**] radio button.

(4) To change the display range of the vertical axis of graph for each channel, take any of the following steps:

i) Directly type the numeral value into [**Min**] and/or [**Max**].

ii) Increment or decrement the value by clicking on the corresponding button  next to [**Min**] or [**Max**].

(5) Clicking the [**OK**] button (Fig. 6-3-1 (a)) will complete the setting.

(6) Clicking the [**Cancel**] button (Fig. 6-3-1 (b)) will cancel any changes.

(7) To return the values to their defaults, click the [**Default**] button (Fig. 6-3-1 (c)).
Both [**Min**] and [**Max**] settings will return to their respective initial settings.
Clicking the [**OK]** button will complete initial settings.

## 7. File Menu

### 1) Log File Read Command

Using this command allows the user to read any previously saved data.

One can analyze any previously saved log files with this command.

The following are the display items and description of operation procedure:

(1) Selecting this command on the menu bar will open the file selection dialog box.

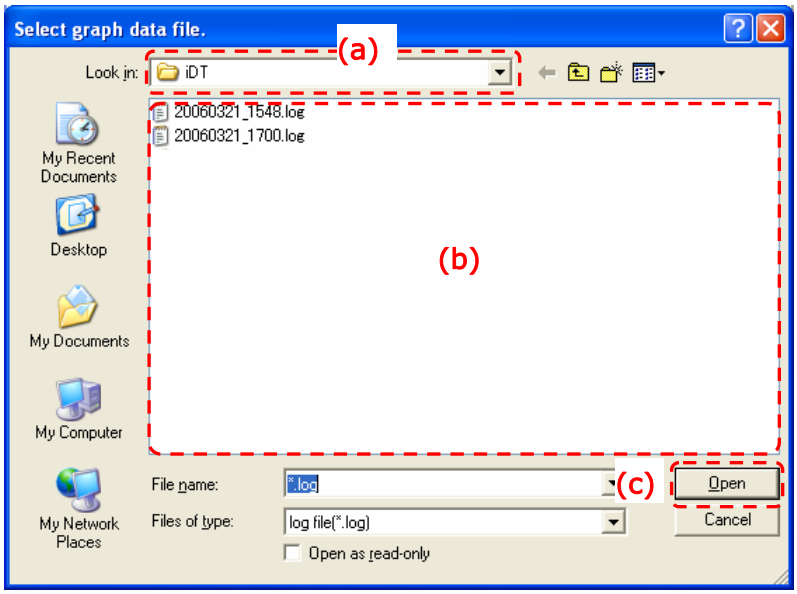



**Fig. 7-1-1**

(2) When displayed, the dialog box defaults to the software's installation folder.
To change folders, use the folder selection drop down box (Fig. 7-1-1 (a)) and select the folder containing the log file you wish to open.

(3) From the file list (Fig. 7-1-1 (b)), select the log file you wish to open.

(4) Press the [**Open**] button (Fig. 7-1-1 (c)).
This will close the file selection dialog box and present the log graph screen.
For details regarding the log graph screen, see Section 6. 1) Log Graph Command.

## 2) Log File Save Command

This command will save the data logged by the chart monitor dashboard and large display screens.
The saved file can be displayed using the log file read command.
This process enables the data to be read again at a later time for analyze.
The following are the display items and descriptions of operation procedures:

(1) Selecting this command from the menu bar will bring up the file save dialog box.

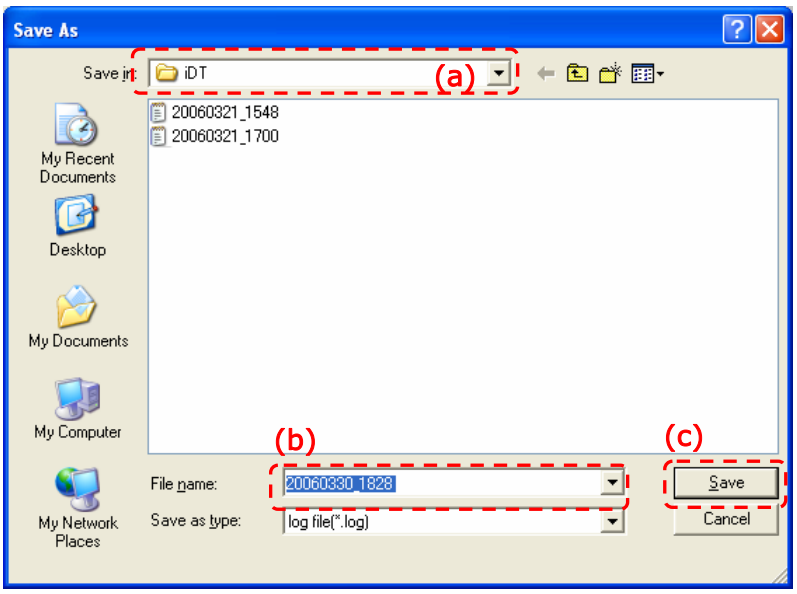



**Fig. 7-2-1**

(2) When displayed, the dialog defaults to the software installation directory.
To change folders, click on the [**Save in**] drop down menu (Fig. 7-2-1 (a)) and select the folder where you wish to store your file.

(3) The filename (Fig. 7-2-1 (b)) is automatically displayed in the following:

Measurement date + "_" + measurement time ". log"

e. g. For a measurement that was made on March 15, 2006, at 07:14 PM:

15032006_1914. log

(4) Press the [**Save**] button (Fig. 7-2-1 (c)), the log file will be saved.
When save is successfully completed, the file save dialog box will close.
The log file is saved in tab delimited format.
The file can now be opened, viewed and analyzed as a spreadsheet.

**NOTE:** Backup the log file every day when finished with work.

### 3) Tool End Command

This command will end the Diagnostic Tool.

The following are the display contents and descriptions of operation procedures:

(1) If there is unsaved data, the dialog box to the right appears.

Select [**Yes**] if you would like to end the iDT without saving said data . The iDT will then end.

To save said data, select [**No**]. Display will return to the original screen without saving.

Then, after saving your data using the log file save command, execute the iDT end command again.


**Fig. 7-3-1**

(2) If there is no unsaved data, the message on the right will appear.

To end the iDT, select [**Yes**] and the iDT will end.

Otherwise, select [**No**]. Display will return to the original screen without ending the iDT.

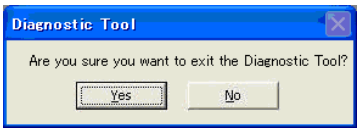



**Fig. 7-3-2**

## 8. ID Menu

### 1) ID Information Command

This command will display the frame number, engine number, operating time, and ECU program version number. The ECU program version number may be needed when making an inquiry. The following are the display items and descriptions of operation procedures:

(1) Select this command from the menu bar, and then the ID information dialog box will appear. The settings of the connecting ECU are displayed (Fig. 8-1-1 (a)).

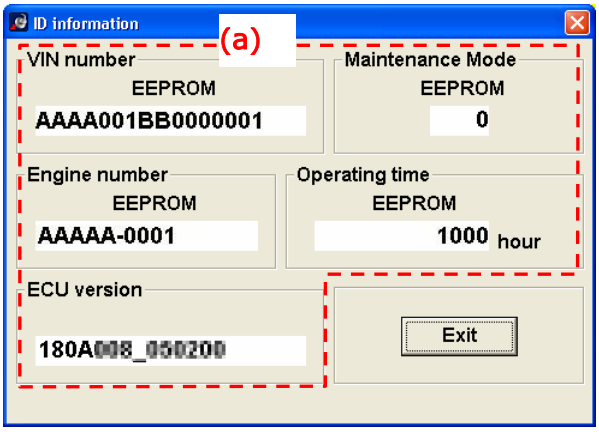



**Fig. 8-1-1**

(2) Description of display items is as follows:

**VIN number :** Displays the frame number of the vehicle. Maximum number of characters is 17.

**Maintenance Mode:** 0 : The vehicle has been not once use the maintenance mode.
1 : The vehicle has been once over use the maintenance mode.

**Engine number:** Displays the engine number of the vehicle. Maximum number of characters is 10.

**Operating time:** Displays the total operated hours of the vehicle.

**ECU version:** Displays the ECU program version.

(3) Press the [**Exit**] button (Fig. 8-1-1 (g)), the ID information dialog box will close.

## 9. Service Menu

### 1) Fail Monitor Command

This command will display current and previous errors detected. They are classified into input, output and ECU failures. This enables quick confirmation of vehicle status. Additionally, spots requiring maintenance can be identified from past failures.

The following are the display items and descriptions of operation procedures:

(1) Selecting this command from the menu bar will present a screen showing a list of failures.
A blank space indicates that no previous failures have been found.
The [**Current**] row (Fig. 9-1-1 (a)) shows details of failure currently has detected.
The [**Historic**] row (Fig. 9-1-1 (b)) shows details of failure that were previously detected.

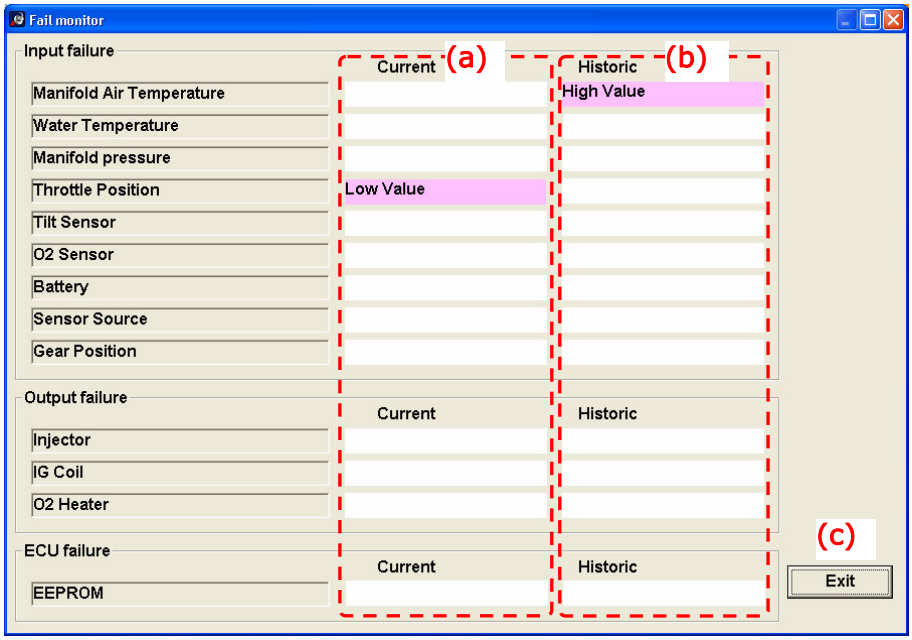



**Fig. 9-1-1**

*1 The example above indicates the voltage of the TPS is below the minimum possible value. It also shows the voltage of the intake manifold temperature sensor previously exceeded its maximum possible value.

*2 For details on the status of past errors, see Section 9. 2) Diag History Command.

(2) Press the [**Exit**] button (Fig. 9-1-1 (c)), the Diagnostic Monitor window will close.

**NOTE:** After recover the failure, keep displaying failure until turn OFF IG Key.

The following are the items displayed on the screen and description of the failures.

i) Input failure items

**Table 9-1-1**

| Item | Message | Failure code | Description |
|---|---|---|---|
| Manifold Air Temperature | High Value | 0780 | Input voltage from the intake manifold air temperature sensor exceeded its maximum possible value. |
| | Low Value | 0740 | Input voltage from the intake air temperature sensor fell below its minimum possible value. |
| Water Temperature | High Value | 0680 | Input voltage from the water Temperature sensor exceeded its maximum possible value. |
| | Low Value | 0640 | Input voltage from the water temperature sensor fell below its minimum possible value. |
| Manifold pressure | High Value | 0080 | Input voltage from the intake manifold pressure sensor exceeded its maximum possible value. |
| | Low Value | 0040 | Input voltage from the intake manifold pressure fell below its minimum possible value. |
| Throttle Position | High Value | 0280 | Input voltage from the TPS exceeded its maximum possible value. |
| | Low Value | 0240 | Input voltage from the TPS fell below its minimum possible value. |
| Tilt sensor | High Value | 0880 | Input voltage from the Tilt sensor exceeded its maximum possible value. |
| | Low Value | 0840 | Input voltage from the Tilt sensor fell below its minimum possible value. |
| O2 sensor | High Value | 0180 | Input voltage from the O2 sensor exceeded its maximum possible value. |
| | Low Value | 0140 | Input voltage from the O2 sensor fell below its minimum possible value. |
| Battery | High Value | 0580 | Battery voltage has exceeded its maximum possible value. |
| | Low Value | 0540 | Battery voltage has fallen below its minimum possible value. |
| Sensor source | High Value | 0380 | The Power supplied voltage to the sensors has exceeded its maximum possible value. |
| | Low Value | 0340 | The Power supplied voltage to the sensors has fallen below its minimum possible value. |
| Gear Position | Low Value | 0440 | Input voltage from the Gear position sensor fell below its minimum possible value. |

ii) Output failure items

**Table 9-1-2**

| Item | Message | Failure code | Description |
|---|---|---|---|
| Injector | Open Circuit | 2080 | Open circuit. |
| | Short Circuit | 2040 | Short circuit. |
| Ignition coil | Open Circuit | 2180 | Open circuit. |
| | Short Circuit | 2140 | Short circuit. |
| O2 heater | Open Circuit | 2280 | Open circuit. |
| | Short Circuit | 2240 | Short circuit. |

iii) ECU failure Items

**Table 9-1-3**

| Item | Message | Failure code | Description |
|---|---|---|---|
| EEPROM | Read Error | 4080 | Error occurred during data read from EEPROM. |
| | Write Error | 4040 | Error occurred during data write to EEPROM. |

## 2) Diag History Command

This command will display the failure history recorded in the ECU. This enables a review of recent errors. Confirmation of error codes can also be made using this command.
The following are the display items and operation procedures:

(1) Select this command from the menu bar and the failure history display dialog box will appear.
Historical failures are arranged in reverse chronological order, with the most recent first.
In other words, the first row in the dialog box shows the most recent error and the last row shows the oldest.
Failure history is stored in the EEPROM of the ECU. Display contents vary according to a vehicle.

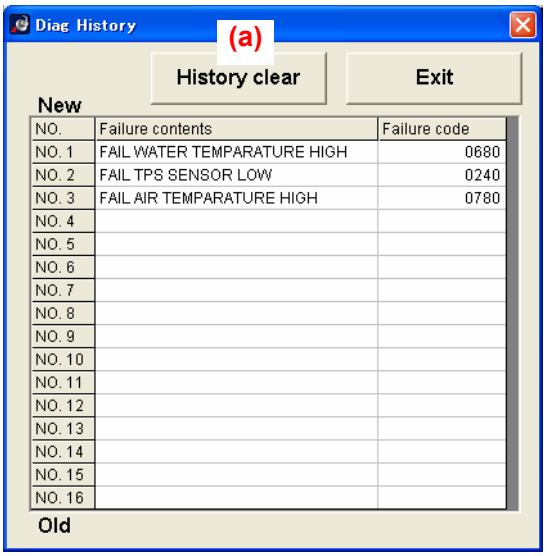



**Fig. 9-2-1**

(2) The following is description of each item in the dialog box:

**NO. :** Shows the sequential number beginning with 1 for the most recent failure.

**Failure contents:** Shows the error spot and a description of the failure.
For details, see Section 9. 1) Error Display Command.

**Failure code:** Gives an failure code representing the failure spot and description of the failure. For details, see Section 9. 1) Error Display Command.

(3) Failure history can be completely erased.

Erase all previous errors when their causes have been eliminated through maintenance. Erasure error history will give the user a better understanding of what spots require maintenance at any given time.

The following are the display items and descriptions of operation procedures:

i) Select the [**History clear**] button (Fig. 9-2-1 (a)). The message on the right will appear.

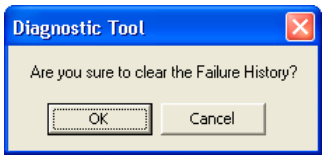



**Fig. 9-2-2**

ii) To continue this operation, select the [**OK**] button. History will be erased.

iii) To cancel, select the [**Cancel**] button. The confirmation prompt message will disappear and the screen will return to the error history display dialog box.

### 3) Feedback Adjustment Command

This command is used to set the O2 feedback adjustment gain. Changing the feedback adjustment value will automatically change the engine control parameters of the ECU which directly affects the emission of the exhaust gas.

The following are the display items and descriptions of operation procedures:

For deciding when to set the feedback adjustment, see the vehicle's WORKSHOP MANUAL. Failure to follow this procedure can cause wrong to the emission of the exhaust gas.

(1) Select this command from the menu bar, the message dialog box appears as the right.

Checks the workshop manual follow the message.

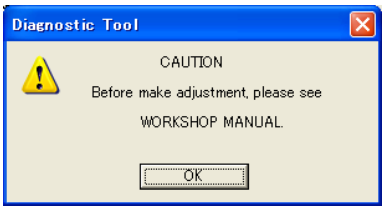



**Fig. 9-3-1**

(2) Press the [**OK**] button on the message (Fig. 9-3-1), the feedback adjustment dialog box will appear. It shows the current settings.

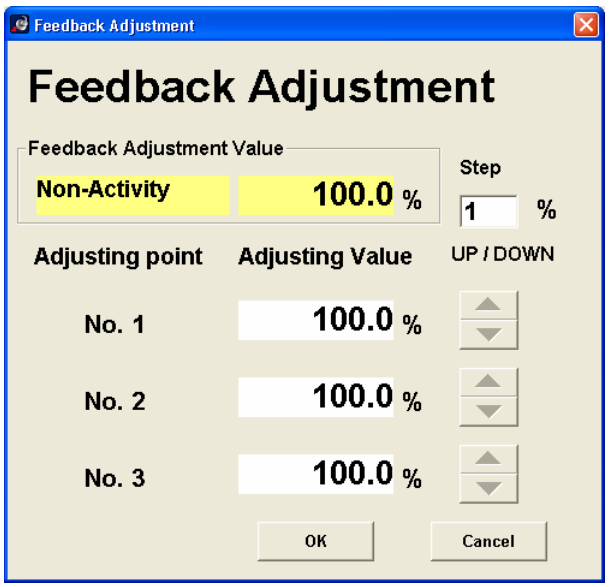



**Fig. 9-3-2**

(3) The following are the dialog items and descriptions of their respective lines:

| | |
|---|---|
| **Feedback Adjustment Value:** | Shows a fuel mixture indicator value for feedback adjustment. You can not adjust the value while "Non-Activity" is displaying. |
| **Step :** | Shows incrementing/decrementing step of adjustment value. |
| **Adjusting point:** | There are 3 throttle opening points for feedback adjustment. These points are indicated by Number. |
| **Adjusting Value:** | Shows adjustment value for each feedback adjustment point. This is given in absolute value with standard value given as 100%. |

For throttle opening points for feedback adjustment, see the vehicle's WORKSHOP MANUAL. Failure to follow this procedure can cause wrong to the emission of the exhaust gas.

(4) Start the engine, .and wait until "Activity" will be displayed to [**Feedback Adjustment Value**] (Fig. 9-3-4 (a) ) for a few minutes.

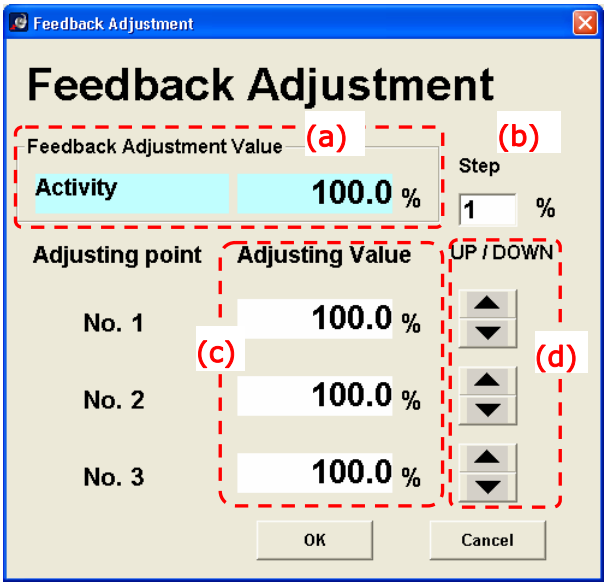



**Fig. 9-3-4**

(5) The following is a description of feedback adjustment procedures:

For throttle operation, see the vehicle's WORKSHOP MANUAL. Failure to follow this procedure can cause wrong to the emission of the exhaust gas.

i) Set a feedback adjustment point [**No.1**] as below.
To stabilize idling and most near the indicator of [**Feedback Adjustment Value**] to a percentage that is written in the WORKSHOP MANUAL, increase or decrease a feedback adjustment value by pressing either the up/down arrow button (Fig. 9-3-4 (b)).

ii) In case an appropriate adjustment value can not be obtained, make adjustments in small increments or decrements.
Using [**Step**] (Fig. 9-3-4 (a)), directly type an increment value that is obtained when the up/down arrow button has been pressed once. The minimum value is 0. 1.
If the adjustment value is out of adjustment range for the ECU, each the text box of adjustment value will be highlighted pink.

iii) Repeat this step for both [**No.2**] and [**No.3**].

(6) To establish the feedback adjustment value, press the [**OK**] button (Fig. 9-3-4 (c)).
The feedback adjustment value will be established and this dialog box will close.

(7) To cancel any changes to the feedback adjustment value, select the [**Cancel**] button (Fig. 9-3-4 (d)).
The feedback adjustment value will return to the setting prior to the display of this screen.
The engine control parameter and feedback adjustment value of the ECU will also return to their prior settings.

## 4) TPS Idle Adjustment Command

This command will adjust the TPS for idling.
The following are the display items and descriptions of operation procedures.
Before make adjustment, please see the WORKSHOP MANUAL.

Before performing this operation, stop the engine and completely close the throttle grip.
Failure to follow this procedure can not adjust the TPS.

For deciding when to set the TPS idle setting, see the vehicle's WORKSHOP MANUAL.

(1) Select this command from the menu bar, the message dialog box appears as the right. Checks the WORKSHOP MANUAL follow the message.

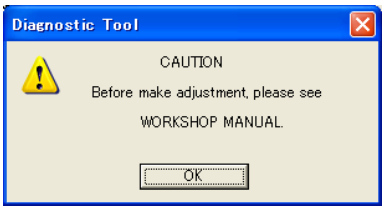



**Fig. 9-4-1**

(2) Select this command from the menu bar and the TPS idle setting dialog box will appear. The second line of dialog box is the information box. (Fig. 9-4-2 (a))

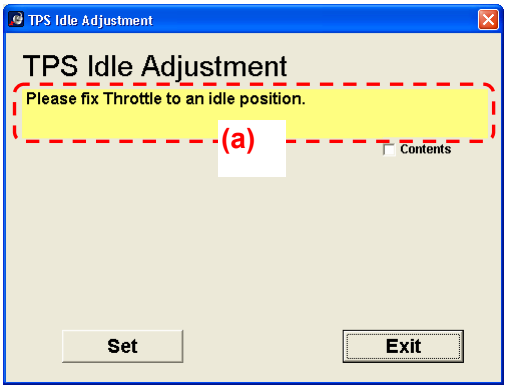



**Fig. 9-4-2**

**NOTE:** When the engine is running, the error message dialog box will appear and you can not set the TPS.

(3) Usually, to adjust the TPS, click the [**Set**] button on the dialog box.
The setting completed, and then the success message will be displayed to the information box.

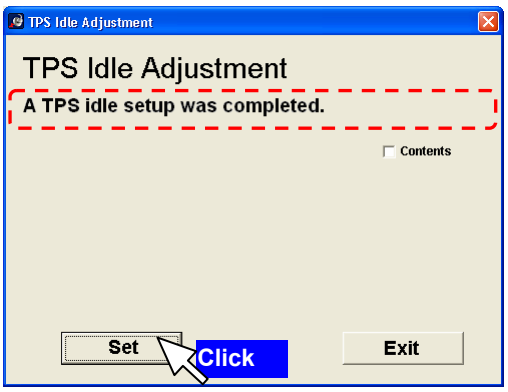



**Fig. 9-4-3**

**NOTE:** When the engine is running, the error message dialog box will appear and you can not set the TPS.

(4) To adjust the TPS as you elaborately check the TPS value of voltage, take following steps:

i) Press the [**Contents]** radio button and the TPS idle setting box will appear. (Fig.9-4-4-1 (a))
It shows the current setting. (Fig.9-4-4-1 (b))

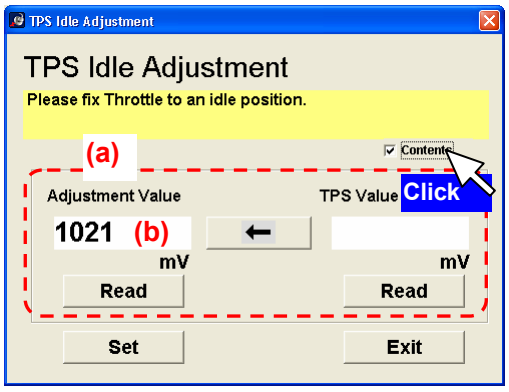



**Fig. 9-4-4-1**

ii) Turn the ignition key to the ON position without starting the engine and press the [**Read**] button. Throttle position at 0% throttle opening will be read.

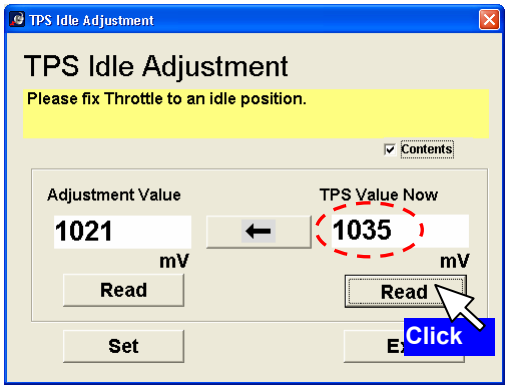



**Fig. 9-4-4-2**

iii) To set the TPS value in the ECU, press the left arrow button.
[**Adjustment Value**] will display the TPS value . The setting completed, and then the success message will be displayed to the information box.

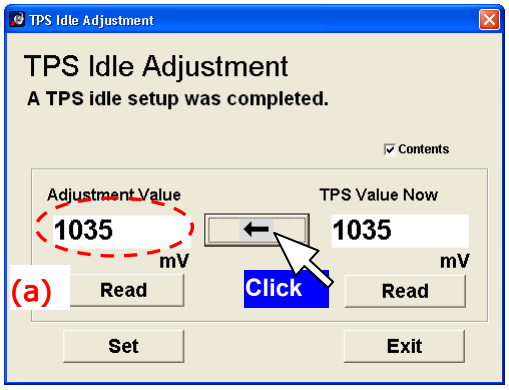



**Fig. 9-4-4-3**

**NOTE:** If the TPS value is lower than the minimum, the error message will be displayed to the information box and you can not set the TPS.

iv) Select the [**Read**] button (Fig. 9-4-4-3 (a)), and the current setting of the ECU will be displayed again.

v) To end the TPS idle setting dialog box, select the [**Exit**] button.

## 5) Service History Command

This command is used to carry out entry and display for service history of vehicle's maintenance.

This function enables the user to record details of maintenance service as data.

Recording a history of maintenance data is useful in determining the timing of parts replacement and identifying the vehicle's vulnerable spots.

The following are the display items and descriptions of operation procedures:

(1) Select this command from the menu bar and the service history will appear.

Fig. 9-5-1 (a) is the space for reading and displaying the ID information out of the ECU.

Fig. 9-5-1 (b) is the space for entering and displaying service information.

Fig. 9-5-1 (c) is the space for entering a search condition.

[**Customer Information**](Fig. 9-5-1 (d)) shows the service history.

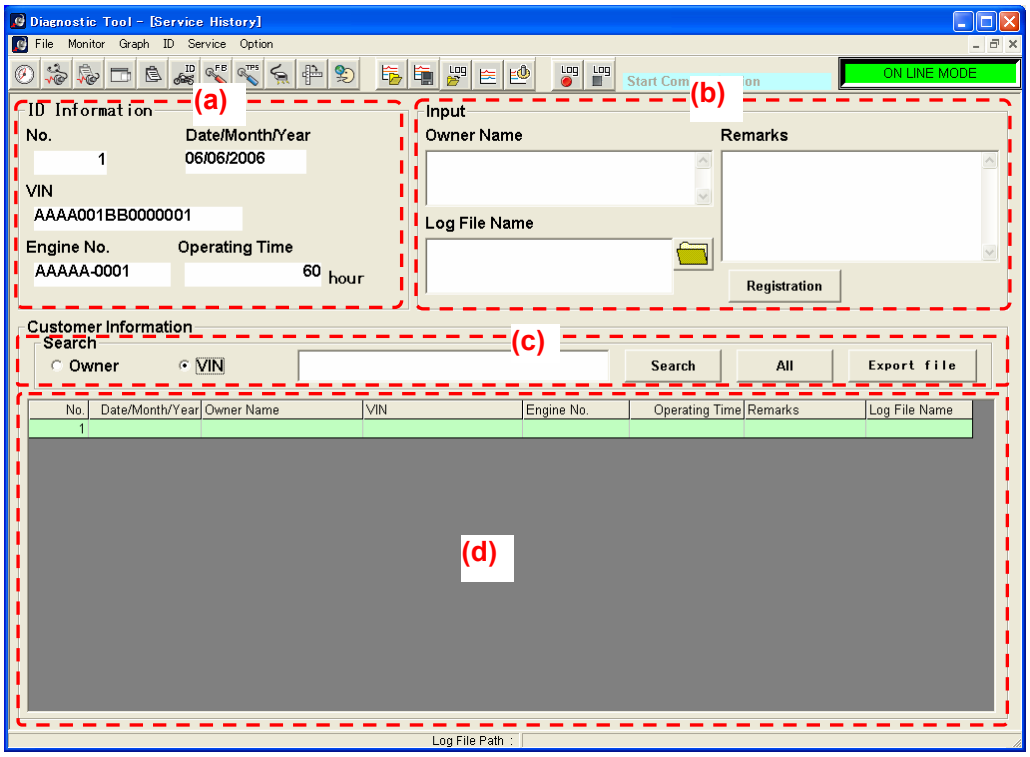



**Fig. 9-5-1**

(2) In case the tool is connected to the ECU, the ID information will be automatically read out of the ECU and displayed. And not case, a space or "ERROR" will be displayed on the ID information's items. The explanation of those items are followings :

**VIN :** Shows a Vehicle Identification No.

**Engine No. :** Shows a vehicle engine No.

**Operating Time :** Shows a total operated hours of the vehicle.

(3) To add to the service history, take the following steps :

i) Enter each item into **[Input]** (Fig. 9-5-1 (b)).

The following is a description of each item and its entry data.

**Owner Name:** Enter customer name.

**Remarks :** Enter contents of service. Maximum number of characters is 162.

**Log File Name :** If log data was saved in a log file at the time of maintenance service, enter its log file name.

*1 [**Data No.**] is automatically displayed.

*2 [**Date/Month/Year**] is automatically displayed.

e. g. )

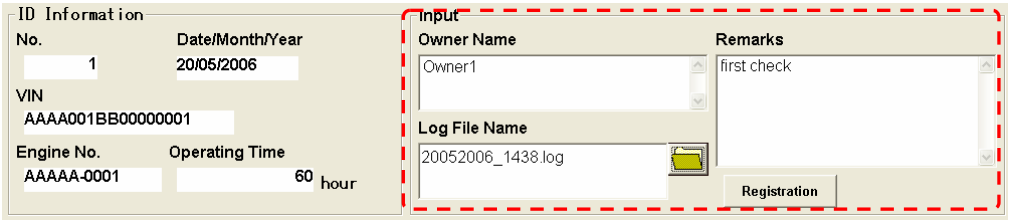



**Fig. 9-5-3-1**

ii) To automatically enter [**Log file name**], click the folder icon button (Fig. 9-5-3-2 (a)).

And then the log file election dialog box (Fig. 9-5-3-2 (b)) will appear.

The operation of log file selection is same as Section 6.1) Log File Read Command.

After the selection completed, the path of log file will be automatically enter to [**Log file name**] (Fig. 9-5-3-2 (c)).

e. g. )

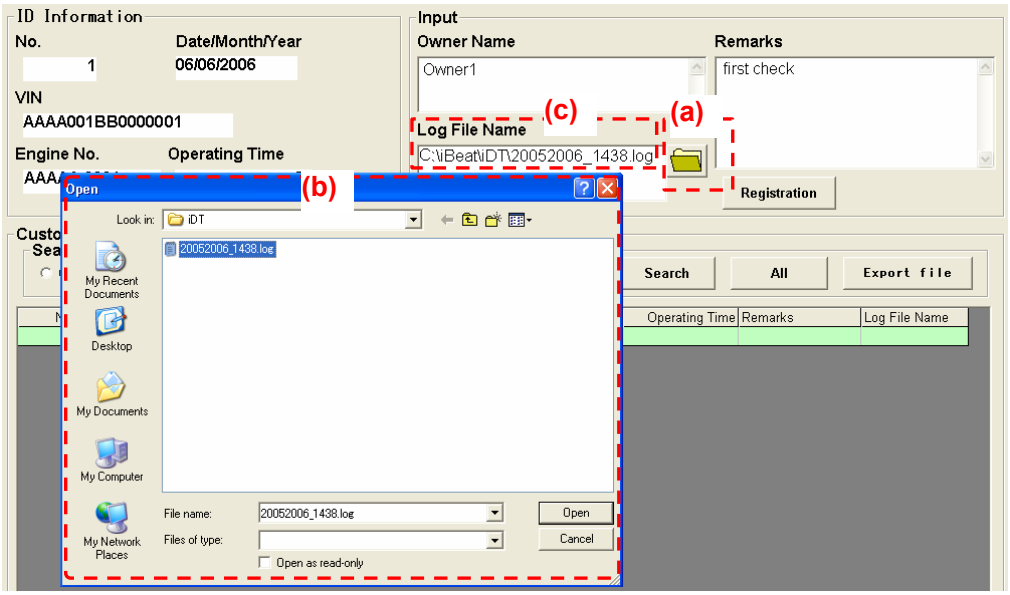



**Fig. 9-5-3-2**

iii) Press the [**Registration**] button (Fig. 9-5-3-3 (a)).
Service history will be added to [**Customer Information**] (Fig. 9-5-3-3 (b)).

e. g. )

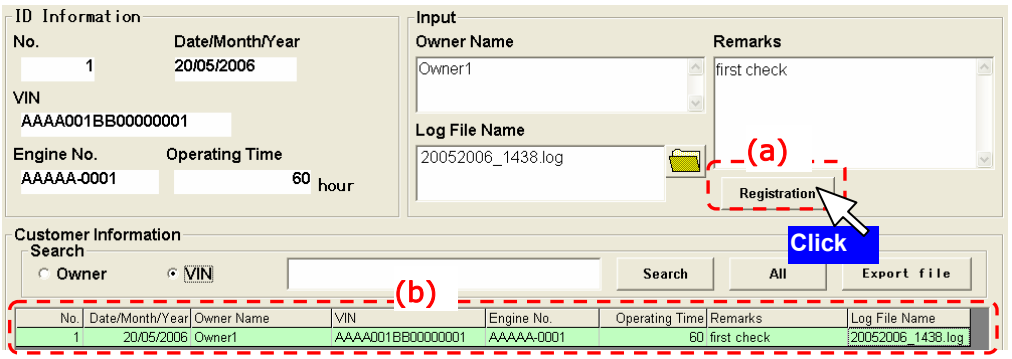



**Fig. 9-5-3-3**

(4) To show the past service history, click a row of [**Customer Information**] that you want.
The detail of a service history will be displayed on [**ID information**] and [**Input**] (Fig. 9-5-4 (a) ).

e. g. )

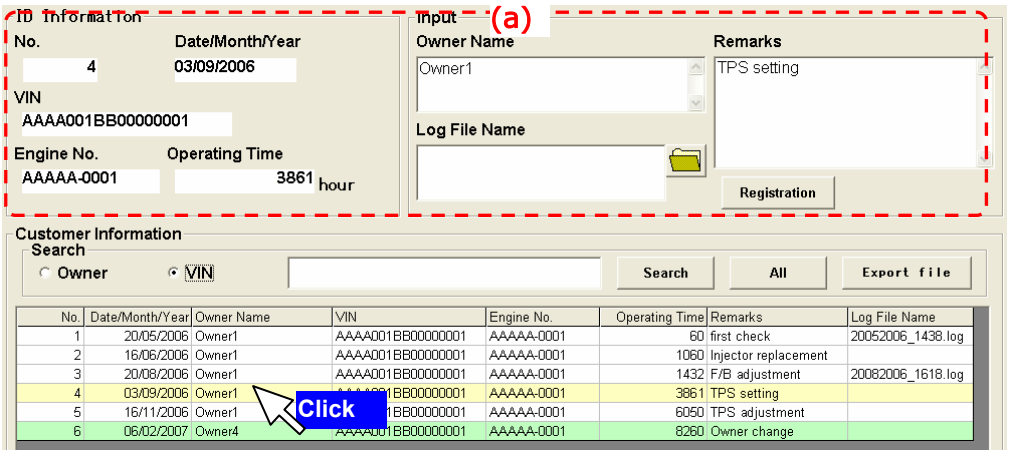



**Fig. 9-5-4**

(5) To search in [**Customer Information**], take the following steps:

i) In case you search by a fully owner name, click the owner check button on the search box. And enter an owner name into the search text box, click the [**Search**] button. The result of a search will display on the [**Customer Information**] (Fig. 9-5-5-1 (a)) .

e. g. )

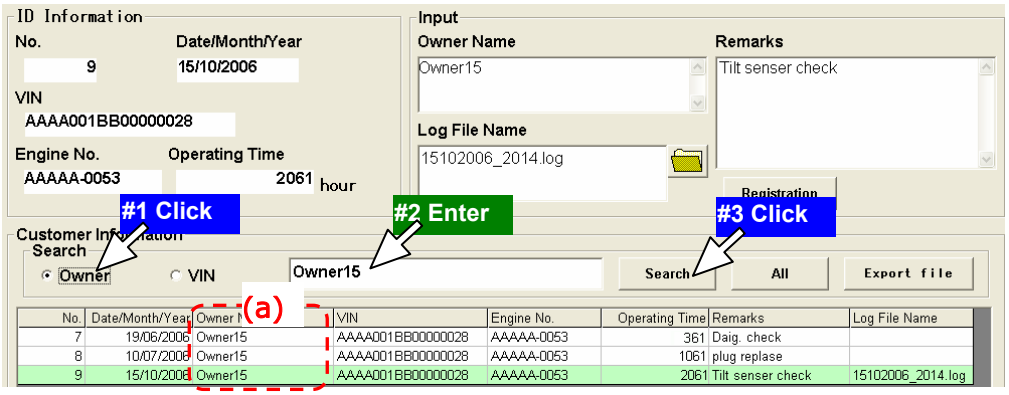



**Fig. 9-5-5-1**

*1 The search text box is automatically entered a word when the grid of [**Customer Information**] will clicked. The case and pattern of input are following:

| Case | Set search text |
|---|---|
| Click the [**Owner**] row | [**Owner**] value of selected row |
| Click the other row | [**VIN**] value of selected row |

*2 The search target item is automatically selected when the service history will displayed. The case and pattern of selection are following:

| Case | Selected search target |
|---|---|
| OFFLINE MODE | [**Owner**] |
| ONLINE MODE | [**VIN**] |

ii) It is possible to search the VIN as same as the owner name.

e. g. )

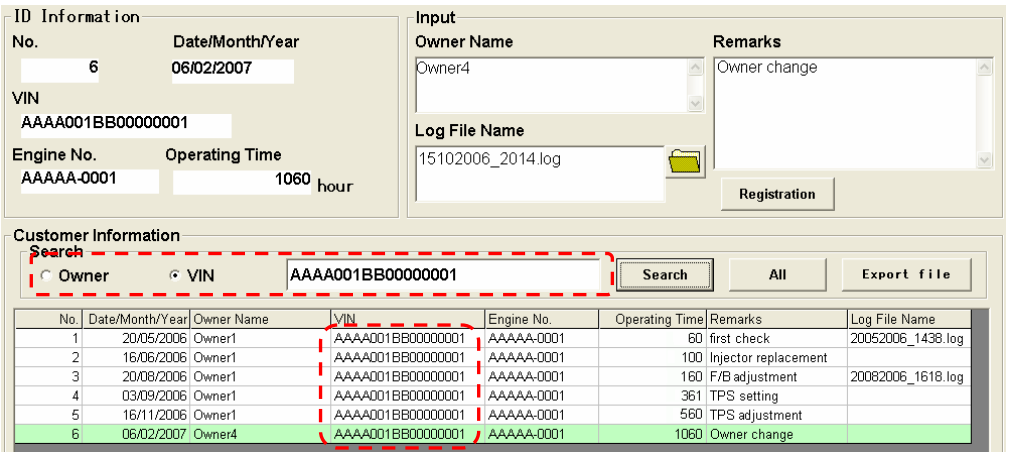



**Fig. 9-5-5-2**

iii) In case you search by a part of the owner name, enter an owner name with the asterisk (*).

The asterisk (*) is wildcard. You can use wildcard pattern is following :

AAAA* : Head match

*AAAA : Tail match

*AAAA* : Mid match

Other operation procedures is same as case of the fully owner name.

e. g. )

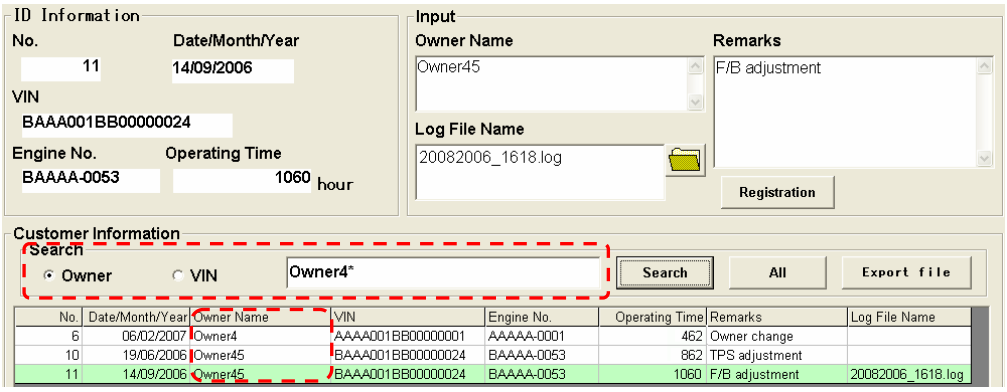



**Fig. 9-5-5-3**

iv) It is possible to search the VIN as same as the owner name.

e. g. )

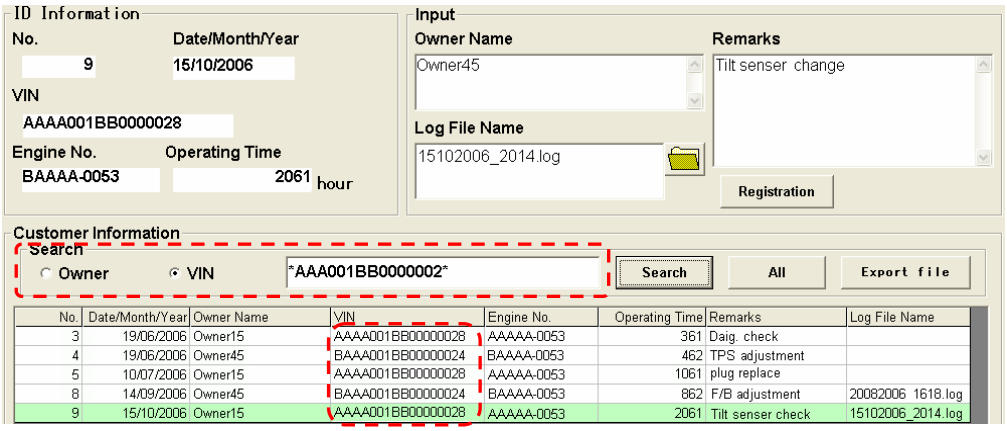



**Fig. 9-5-5-4**

v) Press the [**All**] button, all data will display again.

e. g. )

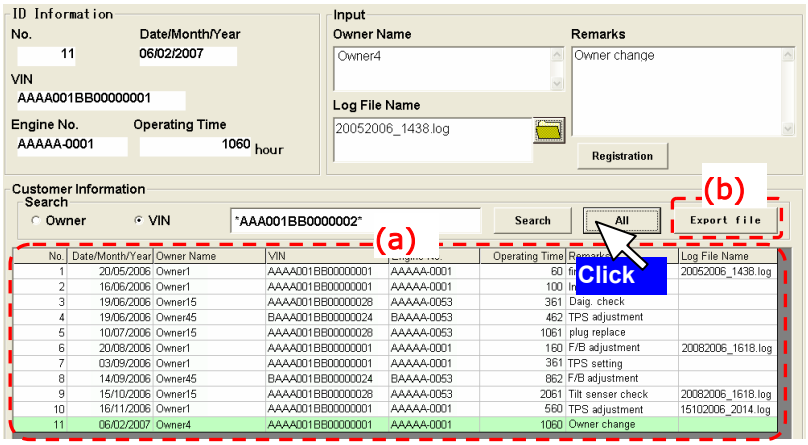
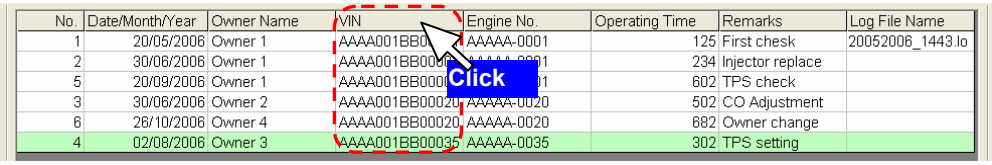



**Fig. 9-5-5-5**

(6) If you wish to sort [**Customer Information**], click any of the headers above each column of it.
In case of once click, sort to ascending order.
In case of twice click, sort to descending order.

e. g. To sort VIN No. )




| No. | Date/Month/Year | Owner Name | VIN | Engine No. | Operating Time | Remarks | Log File Name |
|---|---|---|---|---|---|---|---|
| 1 | 20/05/2006 | Owner 1 | AAAA001BB0 | AAAAA-0001 | 125 | First chesk | 20052006_1443.lo |
| 2 | 30/06/2006 | Owner 1 | AAAA001BB000 | | 234 | Injector replace | |
| 5 | 20/09/2006 | Owner 1 | AAAA001BB000 | | 602 | TPS check | |
| 3 | 30/06/2006 | Owner 2 | AAAA001BB00020 | AAAAA-0020 | 502 | CO Adjustment | |
| 6 | 26/10/2006 | Owner 4 | AAAA001BB00020 | AAAAA-0020 | 682 | Owner change | |
| 4 | 02/08/2006 | Owner 3 | AAAA001BB00035 | AAAAA-0035 | 302 | TPS setting | |

**Fig. 9-5-6**

(7) The tool enables a search result of the service history to save the text file with tab delimited format. The following are descriptions of operation procedures:

i) Press the [**Export file**] button (Fig. 9-5-5-5 (b)), the file save file dialog box will appear.

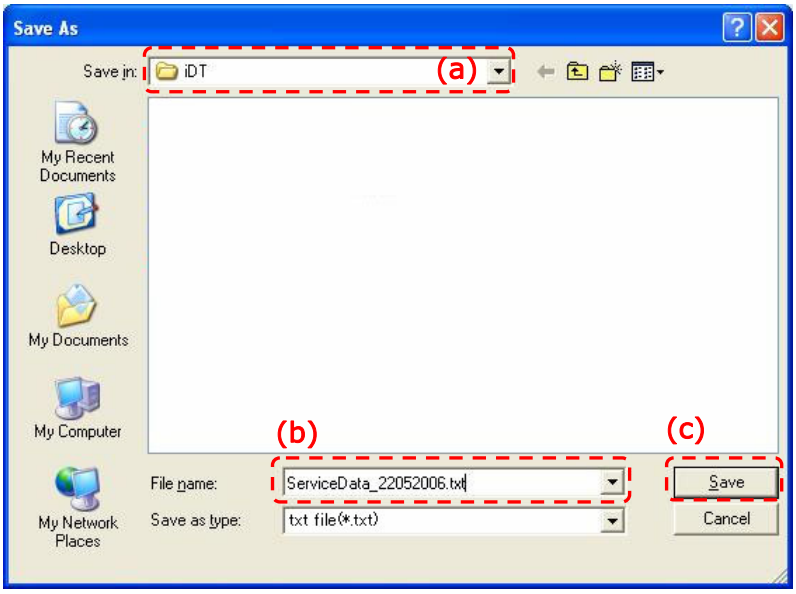



**Fig. 9-7-1**

ii) When displayed, the dialog defaults to the software installation directory.
To change folders, click on the [**Save in**] drop down menu (Fig. 9-7-1 (a)) and select the folder where you wish to store your file.

iii) The filename (Fig. 9-7-1 (b)) is automatically displayed in the following :

"ServiceData_" + present date + ". txt"

e. g. For made on March 15, 2006:

ServiceData_15032006. txt

iv) Press the [**Save**] button, the file is made.

(8) Service history is recorded in the software's installation directory under the file name: "**iDTUserService.dsd**".

e. g) Where the software is installed in "**C:\iBeat\iDT**"

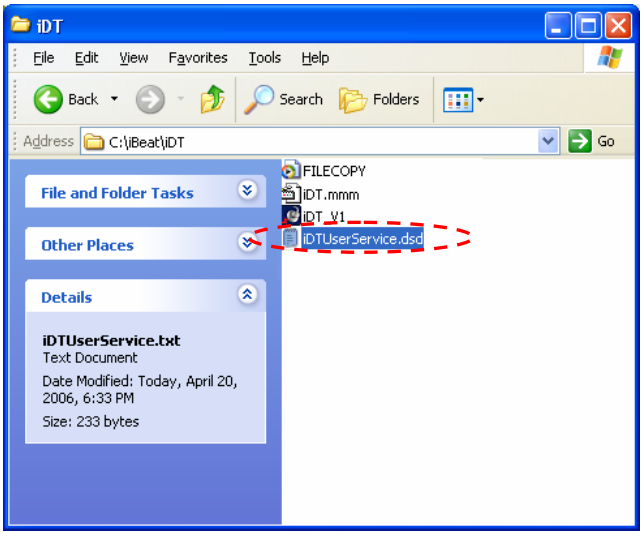



**Fig. 9-5-8**

**NOTE:** Back up this file whenever service has been performed.

## 10. Option Menu

### 1) Communication Setup Command

This command is used to setup the name of the communication port which will be used for communication with the ECU.

Perform this operation during initial setup of the Diagnostic Tool or when the name of the communication port on the PC has been changed.

The following are the display items and descriptions of operation procedures:

(1) Select this command from the menu bar and the communication setup dialog box will appear.
[**Port**] (Fig. 10-1-1 (a)) shows the current communication port name.

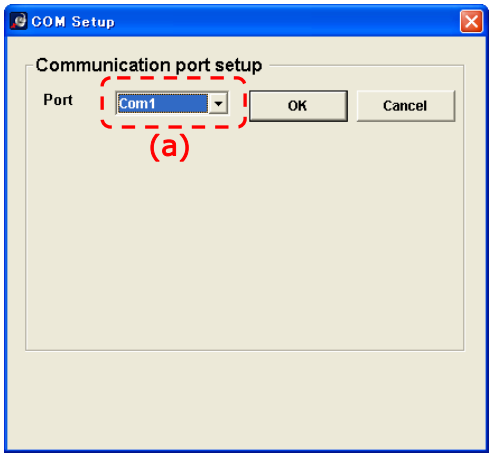



**Fig. 10-1-1**

(2) To setup the [**Port**], take the following steps:

i) Click on the dropdown button of [**Port**] to display the menu.
On this menu, choose a name from "COM1" to "COM30".

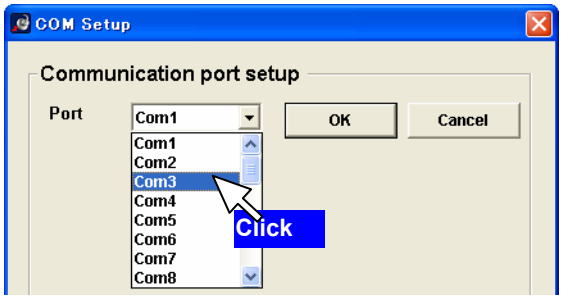



**Fig. 10-1-2**

**NOTE:** If the PC's communication port names exceed "COM30", change Windows settings to allow for selection from "COM1" to "COM30".

***Method for changing the PC's communication port**

**NOTE:** Windows XP is used as an example.
For details, see the Help file of your version of Windows.
This change can not be made with Windows 98SE.

a) Right-click on [**My Computer**] on the Start menu.
b) Select the [**Properties**] menu > [**Hardware**] tag > [**Device Manager**] button.
c) Open the [**Port (COM & LPT)**] tree.
d) Double click on [**Communications Port (COM*)**].
e) Select [**Port Settings**] > [**Advanced. . .** ].
f) From [**COM Port Number:**] in the detailed settings dialog box, select the communication Port name to be changed (#1) and select the [**OK**] button (#2).

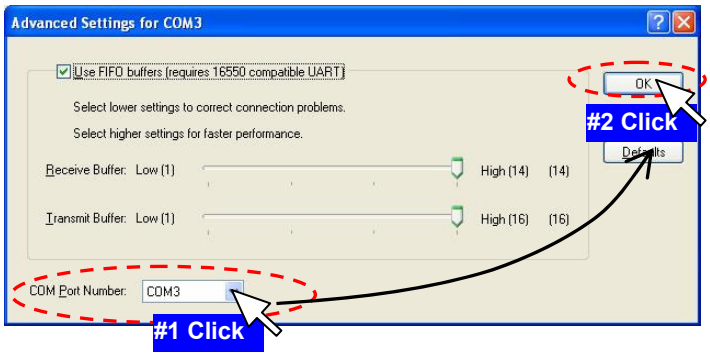



**Fig. 10-1-3**

ii) Select the [**OK**] button. Setup of the communication port will be complete and the message on the right will appear.

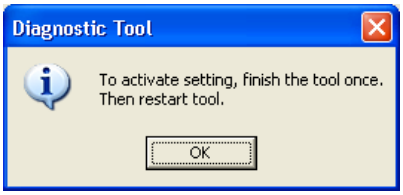



**Fig. 10-1-4**

iii) Close the software once. For boot down method, see Section 7. 3) Tool End Command.

iv) Restart the software. Now the communication port can be used. It is automatically connects to the ECU. If normal communication with the ECU can be made, the dashboard screen will automatically appear.

## 2) Unit Conversion Command

This command is a tool that allows for easy confirmation of conversion values in various units.
This command will not convert units of numerical values displayed under other commands of this Tool.
The following are the display items and operation procedures:

(1) Select this command from the menu bar, and then the unit conversion dialog box will appear.
Numerical values shown on the left of the units are converted values.

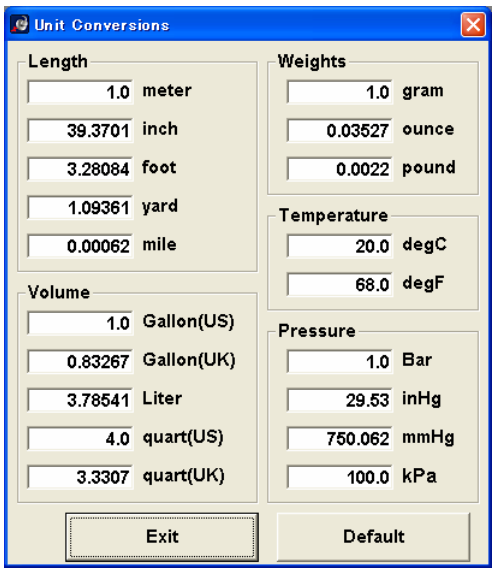



**Fig. 10-2-1**

(2) Basic units of measurement are given below:

| | |
|---|---|
| **Length :** | Meter |
| **Weight :** | Gram |
| **Volume :** | Gallon(US) |
| **Temperature :** | degC |
| **Pressure :** | Bar |

(3) To confirm the converted value, type a value to be converted in the space for the relevant base unit and hit the Enter key.
An example is given below for the conversion of 10 liters to its corresponding units.

i) Type “10” directly in the space for [**Liter**].

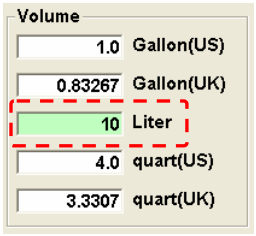



**Fig. 10-2-2**

ii) With the cursor at [**Liter**], hit the Enter key.
The conversion will be performed and the converted values will be given in the spaces for [**Gallon***] and [**quart***].

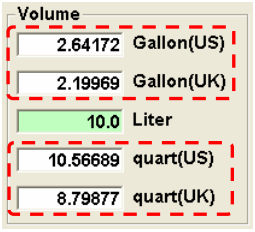



**Fig. 10-2-3**

(4) To clear all conversion results, select the [**Default**] button (Fig. 10-2-1 (b)).
All values will be returned to the initial values shown when the dialog box was opened.

(5) To close the unit conversion dialog box, select the [**Exit**] button (Fig. 10-2-1 (a)).

### 3) Language Setup Command

This command will setup the display language for the iDT.
The following are the display items and descriptions of operation procedures:

(1) Select this command from the menu bar, and then the language setup dialog box will appear.

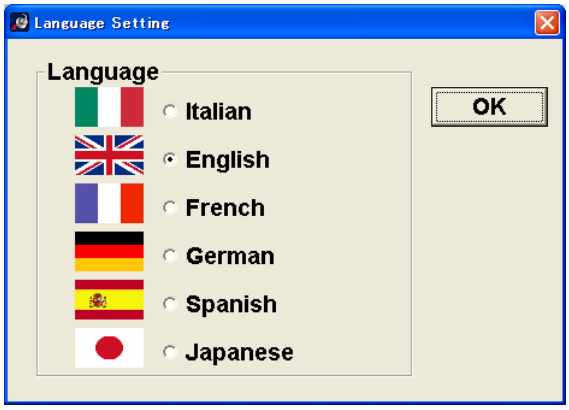



**Fig. 10-3-1**

(2) Select the appropriate language button and press the [**OK**] button, the selected language will be set.

Select only languages that are supported by your OS.
Failure to follow this procedure can cause wrong display to the items of window.

### 4) Version Information Command

This command will display the version information of the iDT.

This command is used when confirmation of its version is required to receive service on the iDT.

The following are the display items and descriptions of operation procedures:

(1) Select this command from the menu bar and the version information dialog box will appear. Press the [**Exit**] button and the version information dialog box will close.


**Fig. 10-4-1**

## Appendix 1 USB Serial Conversion Adapter Setup Method

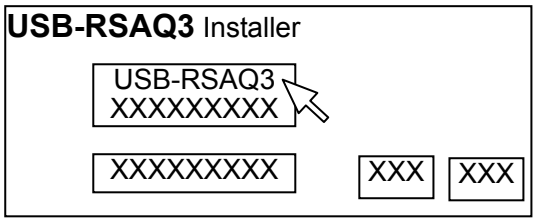
In case your PC is does not have a serial communication port, a USB serial conversion adapter is required. One example of a compatible adaptor is the I-O DATA “USB-RSAQ03”, the device recommended for use with the iDT.

For systems with Windows 2000/XP, setup this adapter logged in with an administrator account. Failure to follow this procedure can not set of the USB serial conversion adapter.

**1) Install driver**

i) Insert the CD-ROM supplied with the ”USB-RSAQ03” into your PC’s CD-ROM drive.

ii) Once the installation dialog box appear. This screen is available only in Japanese. Ignore the Japanese messages and click the part of displayed "**USB-RSAQ3**" on the center of screen as the below figure.




iii) When the next screen appears, select [**Install**] and press the [**OK**] button.

iv) When the message “**Setup has finished installing**” appears, remove the CD-ROM from your PC and press the [**OK**] button.

**2) Setup of Windows to explain, Windows XP is taken for example.**

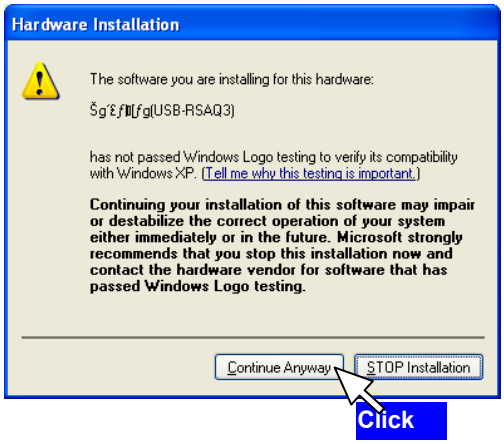
i) Connect to ”USB-RSAQ03” USB cable supplied with ”USB-RSAQ03”.

ii) Connect USB cable to PC.
Do not connect this Tool’s special cable to ”USB-RSAQ03” yet.

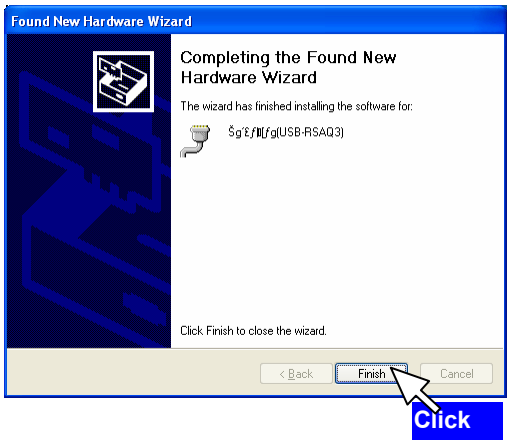
iii) After a short time, the screen on the right will appear. Select [**No. not this time**], and press [**Next >**].
***This screen only appears with Windows XP.**

iv) When the screen on the right appears, select [**Install the software automatically (Recommended)**] and press [**Next >**].


v) When the screen on the right appears, press [**Continue Anyway**].
***This screen only appears with Windows XP.**




vi) When the screen on the right appears, press [**Finish**].



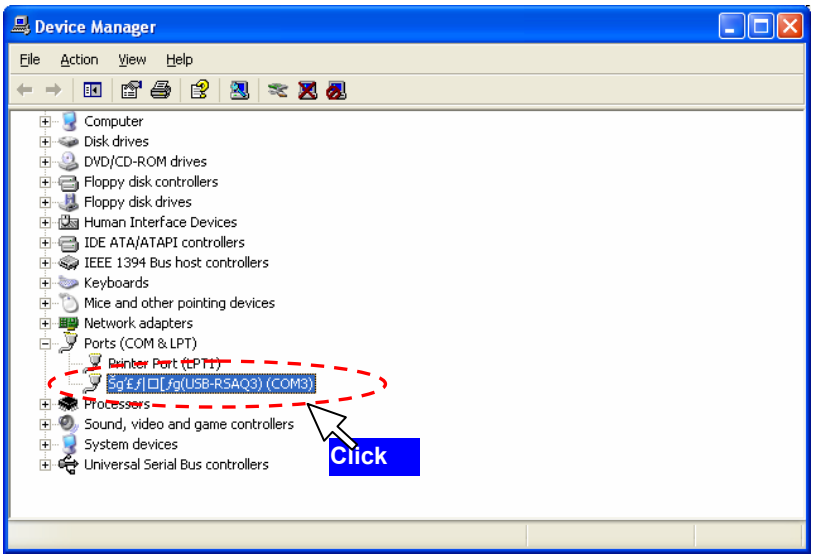

### 3) Confirmation of Communication Port

i) Right-click [**My Computer**] on the desktop or Start menu.

ii) Select [**Properties**] menu > [**Hardware**] > [**Device Manager**].

iii) Open the [**Port (COM & LPT)**] tree. (Click ⊞. )

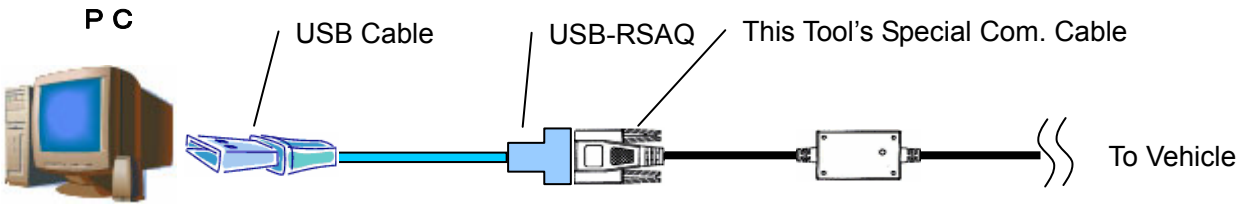
iv) Verify that the tree shows “xxxxxxx (USB-RSAQ03)(COM*)”.
The ”COM*” portion is the communication port name.




**4) Connection with Special Communication Cable**

i) Connect the USB cable to the 9-pin connector side of the iDT’s special communication cable. Do not turn ON the vehicle’s IG key.

ii) Following the instructions in Section 4. 1) -2, attached material ”User Guide", connect the special cable to the vehicle. An illustration of the connection is shown below.




iii) Turn on the vehicle’s ignition-key.

iv) Setup communication port.
For details of setup, see Section 10. 1) Communication Setup Command.