

Service Letter

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Bulletin: 40004
Date: 07 April 2009 Revised (10-12)
Product: Compressors
Subject: Yanmar Diagnostic Tool

COMPRESSORS AFFECTED:

MODELS

7-51 / 7-71 / 12-56

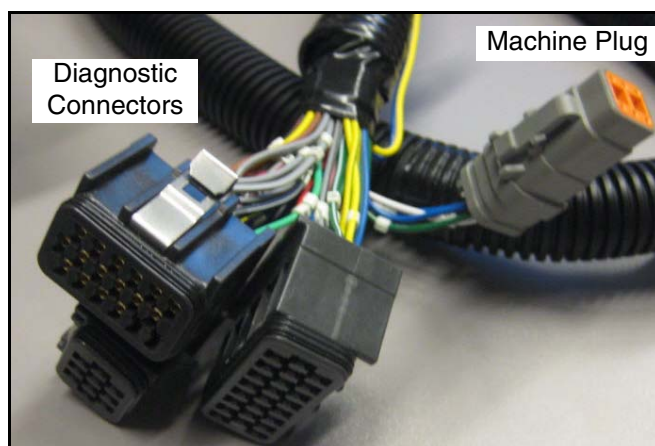
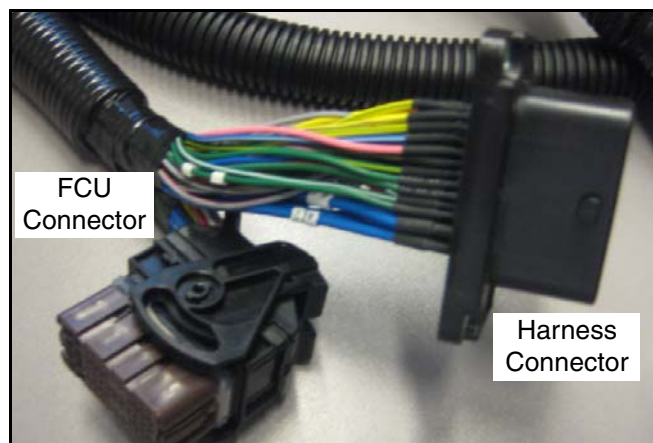
GENERAL INFORMATION:

This release concerns the diagnostic tool and checker harness for the Yanmar electronic engines.

PARTS:

DiagnosticTool 46518064 Hardware + CD-rom



**INSTRUCTION:**

This Diagnostic tool can be used to check engine configuration and faultcodes and to write data to ecm when replacing that ecm – pump or injectors.

Without the diagnostic tool some engine repairs or troubleshooting will be beyond your capabilities and the local Yanmar dealer will have to be consulted.

The checker harness is used when uploading new software to a ecm without that ecm connected to a compressor. It is also meant to be used as a troubleshooting tool since it will temporarily be installed between the ecm and the engine wiring harness, measurements can be carried out on the connectors present in the checker harness to determine fault location.

NOTE:

Consult the supplied instruction to install the diagnostic software on your laptop and as a reference for diagnostic tool use.



Doosan Infracore

YTD

(Yanmar Diagnostic Tool)



Doosan Infracore
Portable Power

TABLE OF CONTENT

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- II. INSTALL THE SOFTWARE
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Doosan Infracore
Portable Power

DEFINITIONS

- YDT: Yanmar Diagnostic Tool (same as « Insite » of Cummins & « e-Doctor » of Doosan).
- E-ECU: Electronic - Engine Control Unit
- FIP / FOP: 'Fuel Injection Pump' also called 'Fuel (Diesel) Oil Pump'
- DATA STRUCTURE IN ECU: Control software + MAP + TRIM DATA
- MAP: Tables of fuel injection quantity belonging to t° , load, ...
- TRIM DATA: Data recorded in the ECU and related to a specific FIP
- DTC: Diagnostic (errors) Tool Code (not the same as a flash lamp codes)
- FFD: Freeze Frame Data



INSTALL THE SOFTWARE

- INSTALL THE SOFTWARE

1. Serial Number – Written on cd box decal
2. License Number – Written on cd box decal

NOTICE THAT CAPITALS & SMALL LETTER ARE USED (case sensitive)

ENTER A USER ID & Password – your choice, these are not pre determined

- A TYPICAL WORK SESSION STARTS:

1. Log in with the chosen ID & Password : see a login session welcome screen

A screenshot of a "Log In" dialog box for the Yanmar Diagnostic Tool. The dialog has a blue title bar with the text "Log In". Below the title bar, the text "YANMAR Diagnostic Tool" is displayed. There are two input fields: "User ID" and "Password". At the bottom of the dialog, there are two buttons: "Login" and "Cancel".

Log In

YANMAR Diagnostic Tool

User ID

Password

Login Cancel



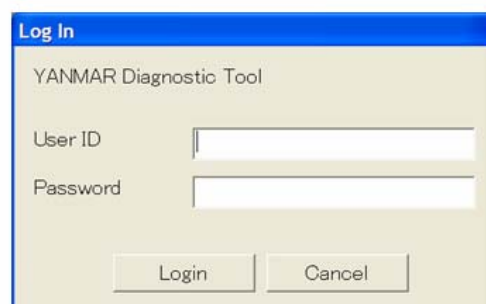
USE OF THE SOFTWARE

- See the welcome screen
- Select button « INDUSTRIAL ENGINES »
- Only 'English' is available. No other language currently.



USE OF THE SOFTWARE

- Key In the ID & Password
- Expert Mode can be accessed when connected to a machine through a gateway module (install the USB driver before first connection-see Yanmar user manual)
- Speed rate shall be 500K & address shall be engine
- Training Mode shall be used for software operation when not connected to an ECU
- Flash-ROM is for up-load of ZIP files in « service ECU »



TRAINING MODE

- File:

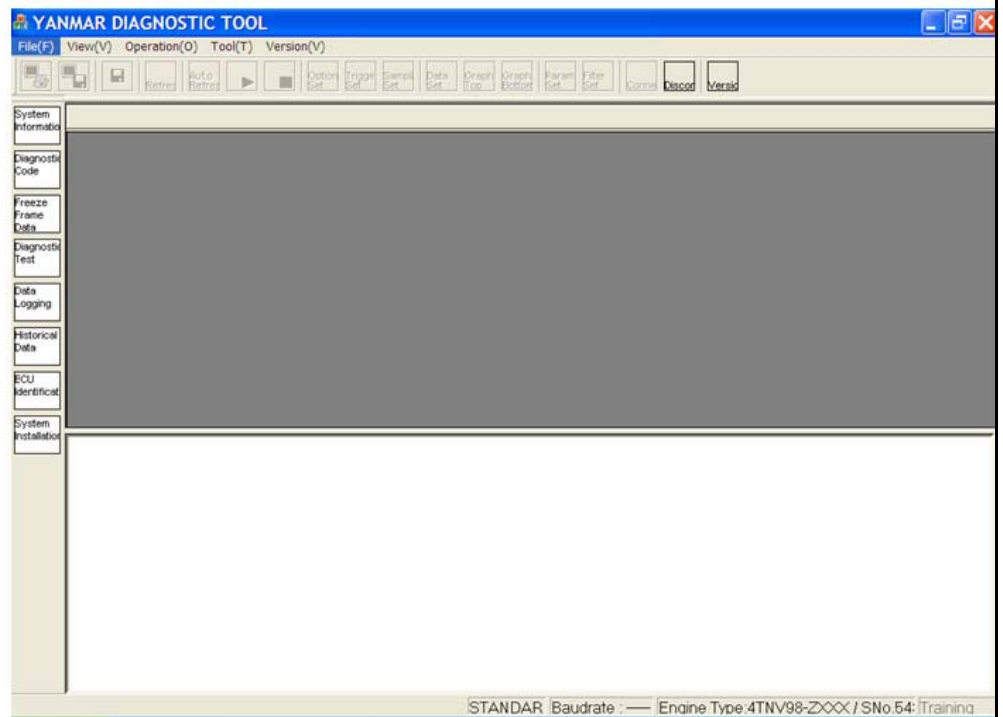
1. Exit : stop session
2. Menu: Back to former screen

- View:

1. Shows the 8 menus also available from the left side screen menu (system information, ...)
2. Development mode: not used

- Operation:

1. Gives access to the top bar menu. Varies for each menu selected with « View »



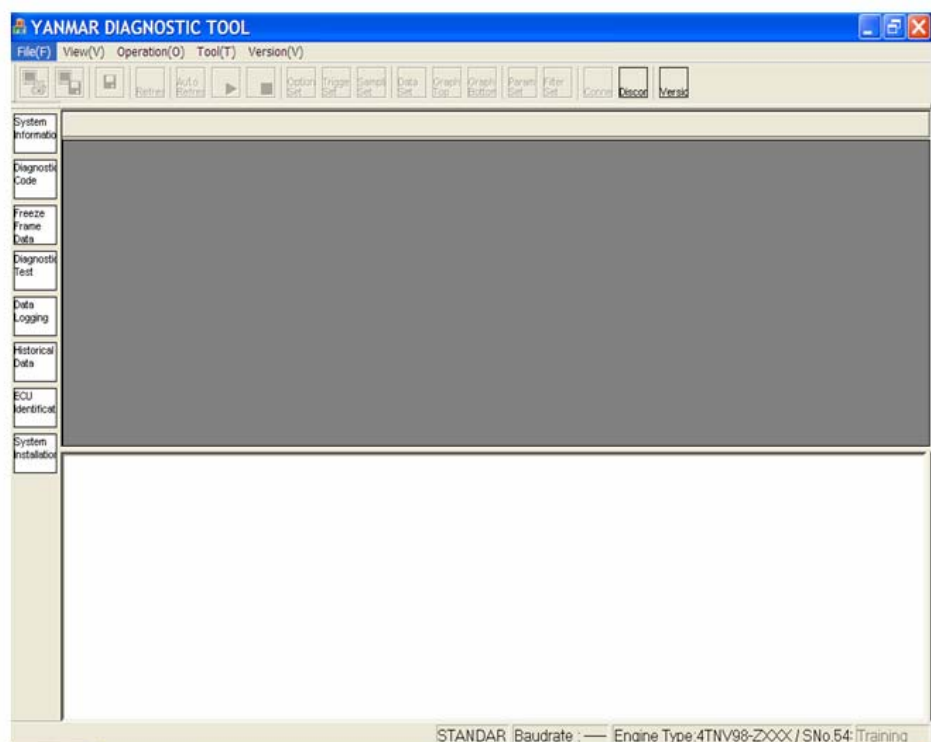
TRAINING MODE

- Tool:

1. System settings: do not modify
2. User set: add more user name with own priority level, ID & Password
3. Option: Select units. Choose « TNV » in section « **Training Mode** Set up »

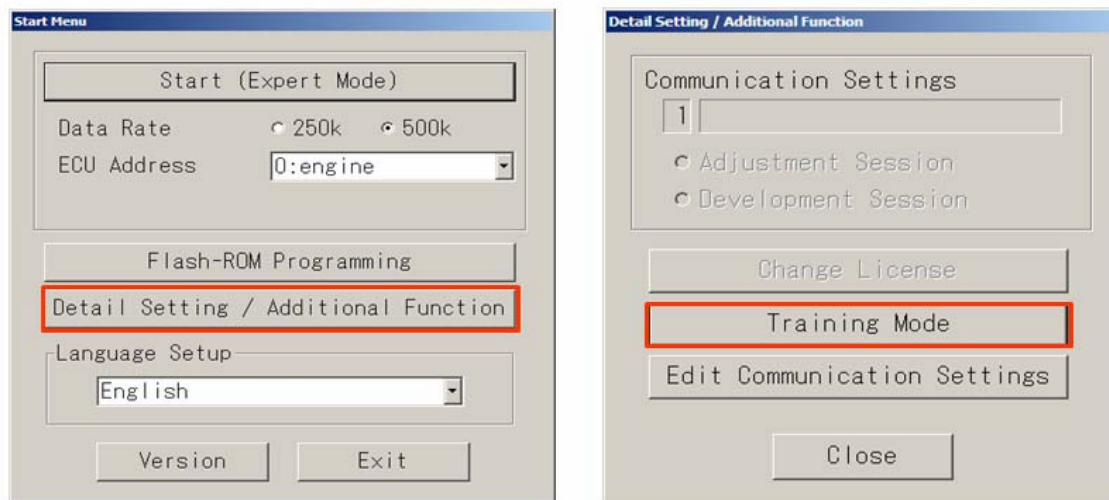
- Version:

1. Gives the software version



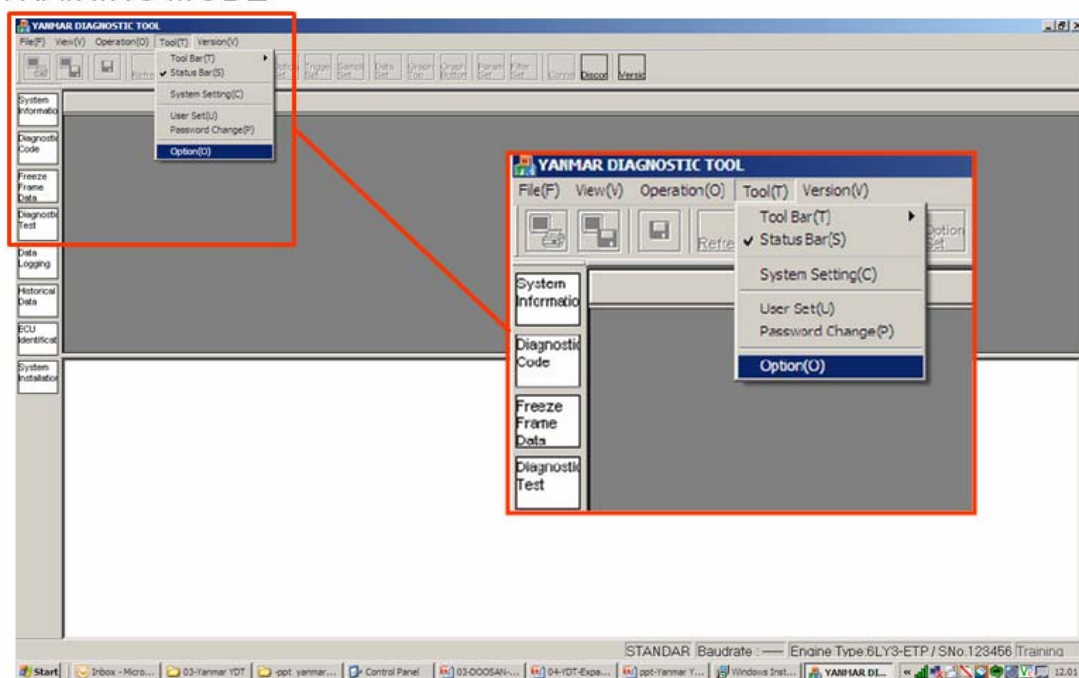
TRAINING MODE

- TRAINING MODE



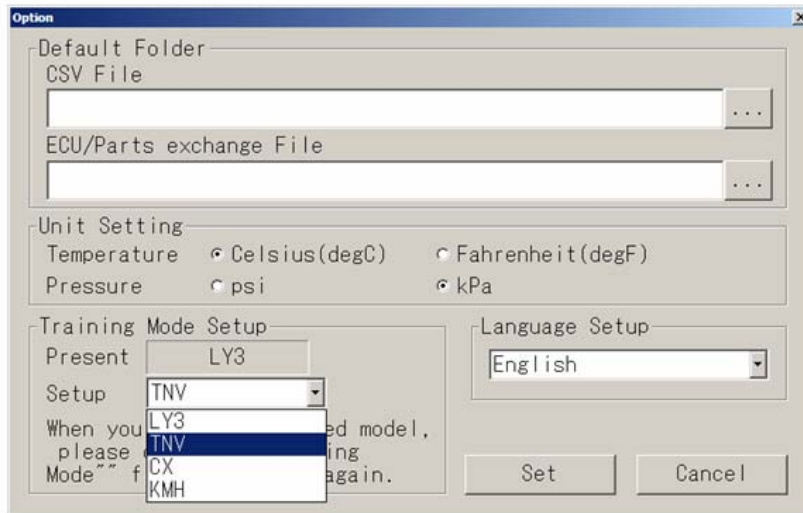
TRAINING MODE

- TRAINING MODE



TRAINING MODE

- TRAINING MODE



TRAINING MODE-System Information

- Gives info loaded in ECU memory:

1. ECU P/N & S/N
2. FOP P/N & S/N
3. Engine Type

- DTC:

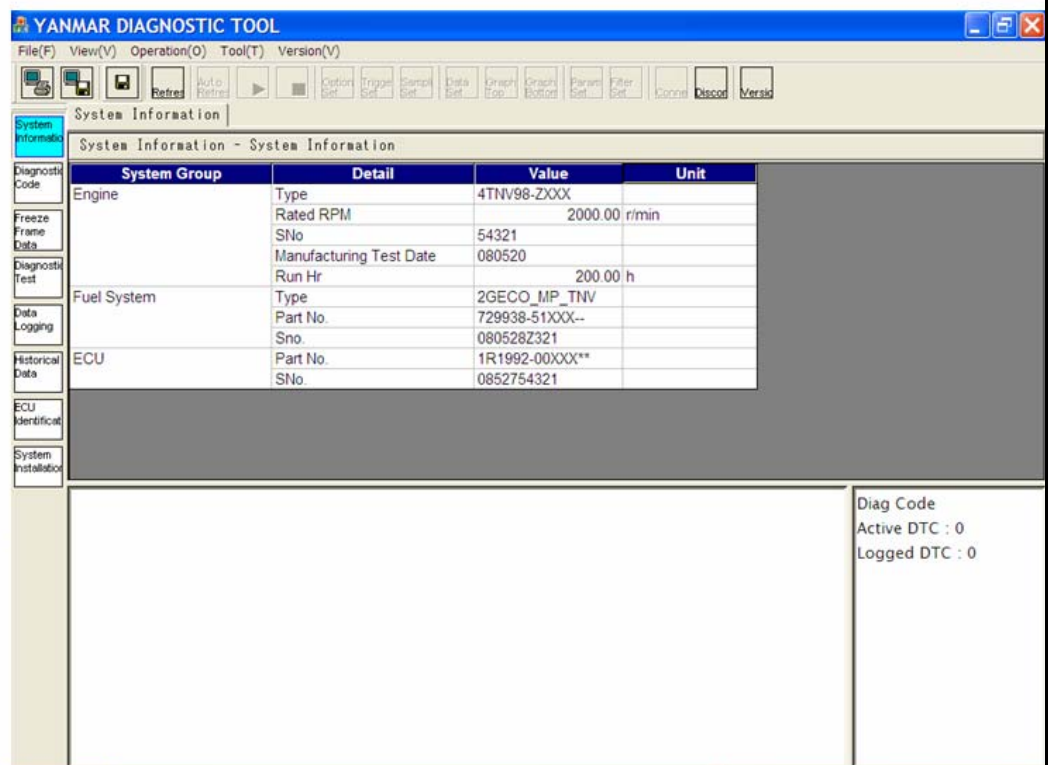
1. Active code: unresolved errors
2. Logged code: is resolved errors

- File save:

Save numerical data in a file

- Screen BMP save:

It is a print screen



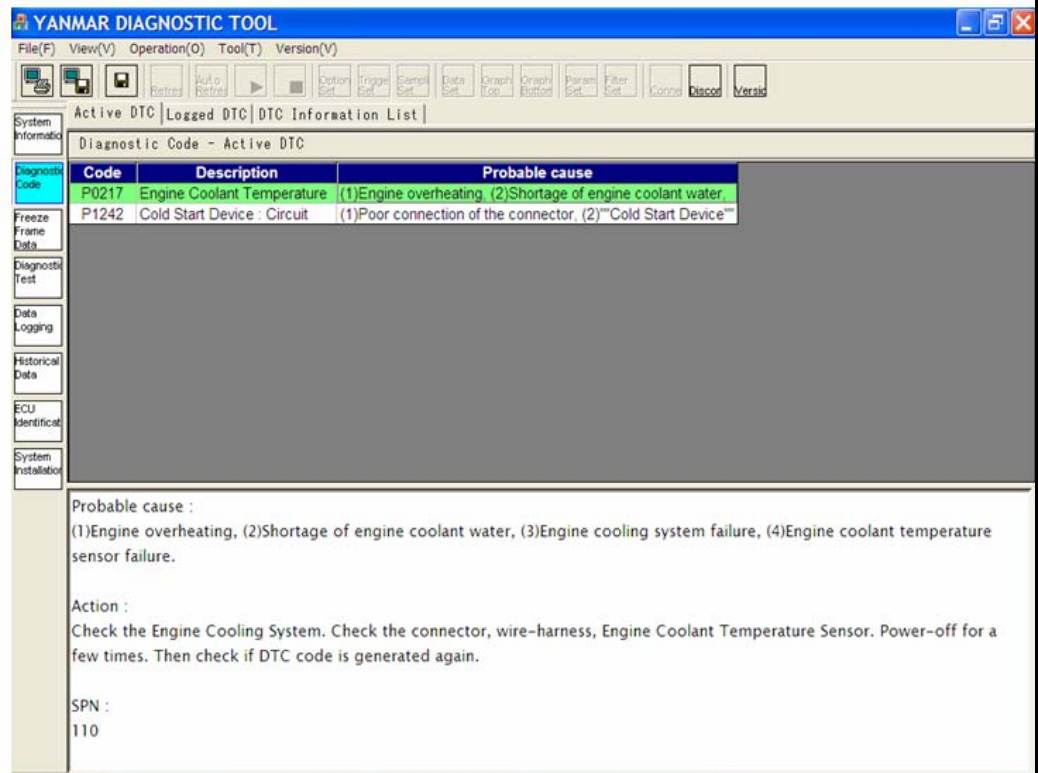
TRAINING MODE-Diagnostic Codes

- Active DTC cluster:

1. Informs on current errors
2. Provides action guidance

- Logged cluster:

1. Gather both active & resolved errors (red buttons for actives errors)
2. Provides action guidance

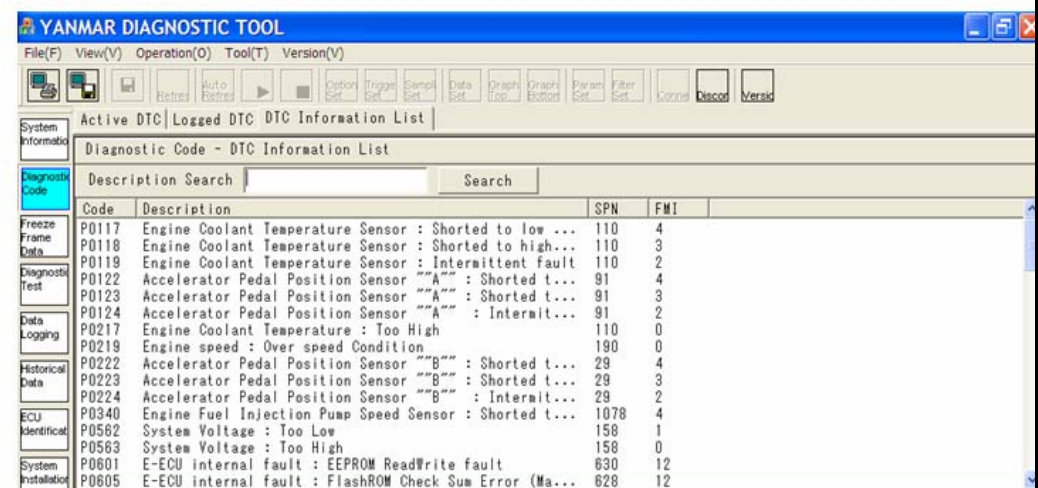


TRAINING MODE-Diagnostic Codes

- DTC information cluster:

1. SPN of no use for Doosan
2. FMI of no use for Doosan
3. Search function: works with strings not numbers of errors

- Search i.e: could give information on all errors affecting « accelerator »



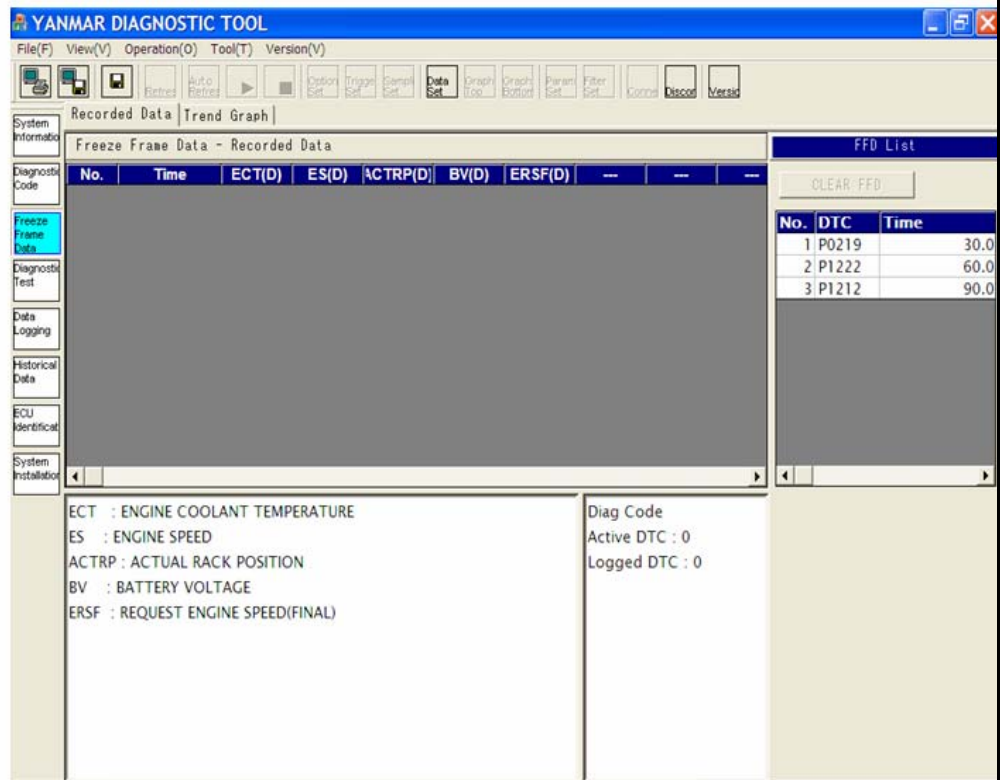
TRAINING MODE-Freeze Frame Data

- FFD is usefull when an ECU fails and causes the engine to stop (3 cases):

1. Speed sensor error
2. Over speed
3. Rack actuator

- Recorded Data cluster:

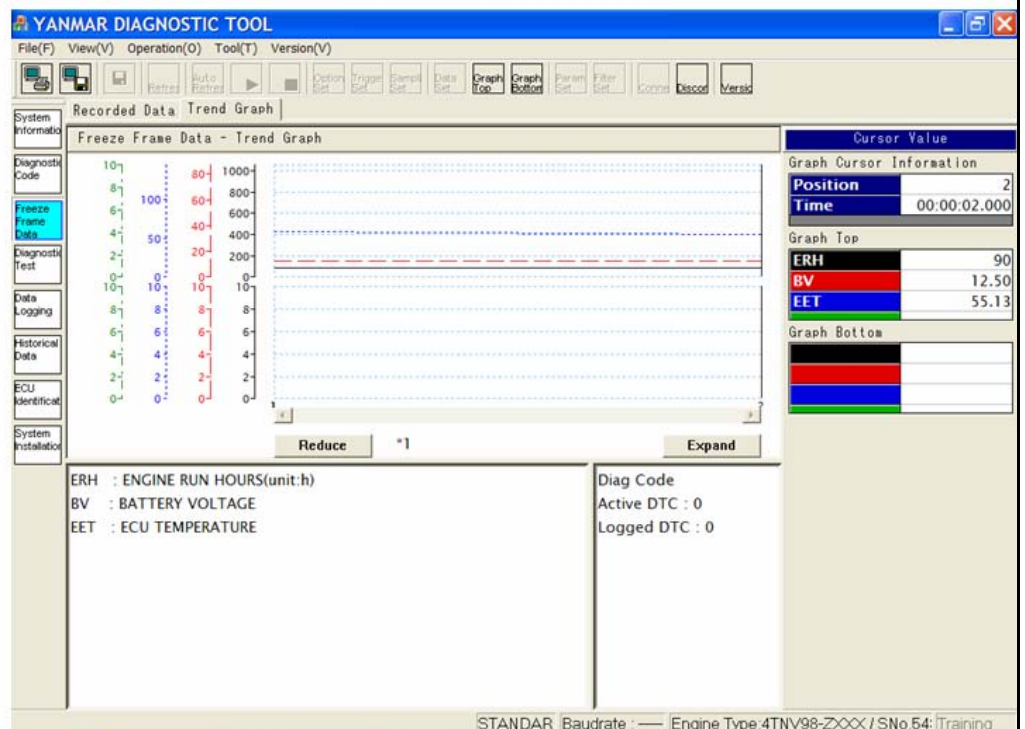
1. Select data where information are needed by pressing « Data set » button on top bar menu (Makes table header)
2. Click on a DTC number to see values BEFORE failure occurs (sec)



TRAINING MODE-Freeze Frame Data

- Trend Graph cluster:

1. Select up to 4 parameters as well as top & bottom graph scales by pressing « Graph Top » button on top bar menu
2. Select up to 4 parameters as well as top & bottom graph scales by pressing « Graph bottom » button on top bar menu
3. Click on GRAPH itself to see real recorded values in top right side of the screen under title « cursor Value »



TRAINING MODE-Diagnostic Test

- D test

- is usefull for making 'Remote control', detect seized 'Rack actuator' by graph, get values of parameters, ...

- Pulse/Analog cluster:

1. Press 'Refresh' or 'Auto Refresh' to get updated data for the parameters
2. Click on the black square from top bar menu to stop records

The screenshot shows the YANMAR DIAGNOSTIC TOOL interface. The 'Diagnostic Test' tab is selected, displaying a table of parameters for the 'Pulse/Analog etc' cluster. The table includes columns for Description, Value, Unit, Raw Data, and Notes. The status bar at the bottom indicates 'STANDAR Baudrate: — Engine Type:4TNV98-ZXXX / SNo.54:ITraining'.

Description	Value	Unit	Raw Data	Notes
ENGINE SPEED	1450	r/min	1450	Parameter
AUXILIARY ROTATION SPEED SENSO	1450	r/min	1450	
LOADER REQUEST ROTATION SPEE	1448	r/min	1448	
REQUEST ENGINE SPEED	1448	r/min	1448	Parameter
CAMSHAFT ROTATION SPEED	725	r/min	725	Pulse Input
RACK ACTUATOR OUTPUT DUTY	96		96	PWM Output
ENGINE LOAD MONITOR	62	%	62	
ACTUAL EGR VALVE CONTROL VALUI	32		32	Parameter
RACK POSITION SENSOR VOLTAGE	307		307	A/I
ACCELERATOR PEDAL Position	40.4	%	101	
RACK ACTUATOR CURRENT	3.20	A	64	
ECU TEMPERATURE	47.00	degC	10240	A/I
BATTERY VOLTAGE	12.25	V	245	
SENSOR SOURCE VOLTAGE	5.00	V	100	A/I

Diag Code
Active DTC : 0
Logged DTC : 0

TRAINING MODE-Diagnostic Test

Digital IN cluster:

1. It gives the switch activation or de-activation status recorded by design in the ECU
2. Switches can not be modified.
3. It allows to better understand the machine behavior

The screenshot shows the YANMAR DIAGNOSTIC TOOL interface. The 'Diagnostic Test' tab is selected, displaying a table of parameters for the 'Digital (ON/OFF) INPUT Bit Status, Control Flag' cluster. The table includes columns for Description, On/Off, and Notes. The status bar at the bottom indicates 'STANDAR Baudrate: — Engine Type:4TNV98-ZXXX / SNo.54:ITraining'.

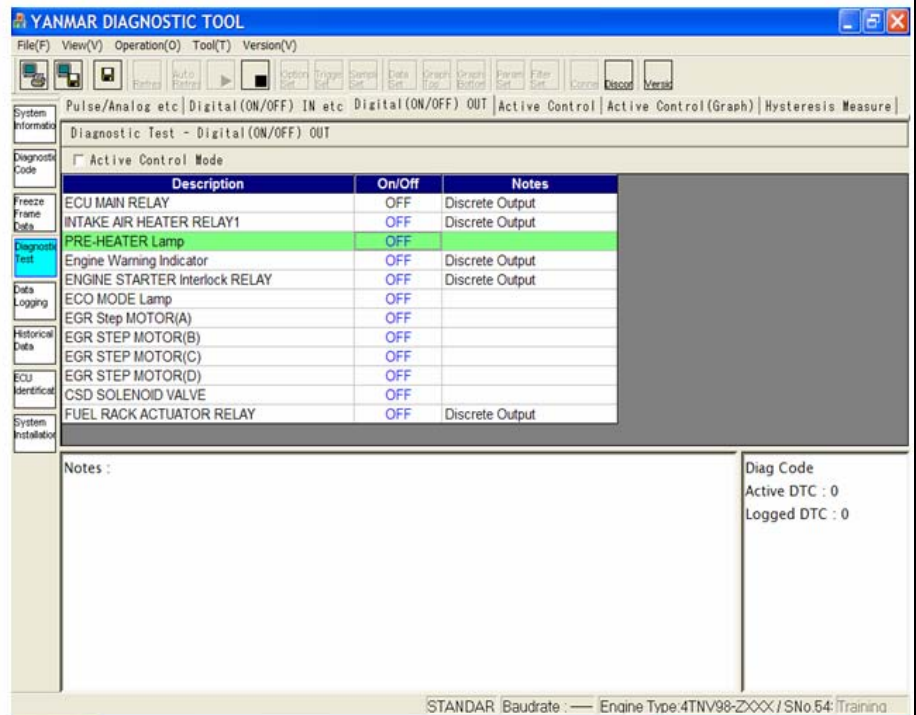
Description	On/Off	Notes
DROOP MODE SW	OFF	
RMAX SELECT SW1	OFF	
EMERGENCY STOP SW	OFF	Discrete Input
RMAX SELECT SW2	OFF	
ENGINE SPEED SELECT 1	OFF	
ENGINE SPEED SELECT 2	OFF	
REVERSE DROOP MODE SW	OFF	
ENGINE SPEED SELECT PERMISSION	OFF	
IGNITION SW1	OFF	Discrete Input
ENGINE STARTER	OFF	Discrete Input
Engine Start State Status	OFF	Parameter

Diag Code
Active DTC : 0
Logged DTC : 0

TRAINING MODE-Diagnostic Test

Digital OUT cluster:

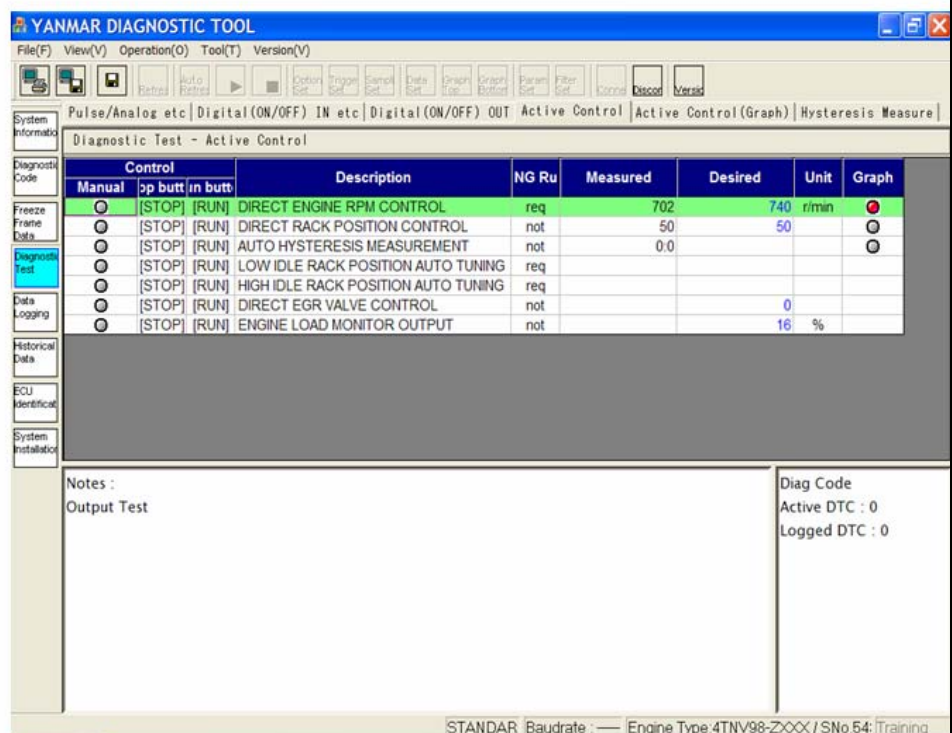
1. It gives the switch activation or de-activation status recorded in ECU as a result of current machine state (pre-heat completed or not, ...)
2. Switches can be modified for making REMOTE CONTROL (force machine behavior) by clicking in 'On/Off' column
3. Changes are validated by entering your ID & Password



TRAINING MODE-Diagnostic Test

- Active Control cluster:

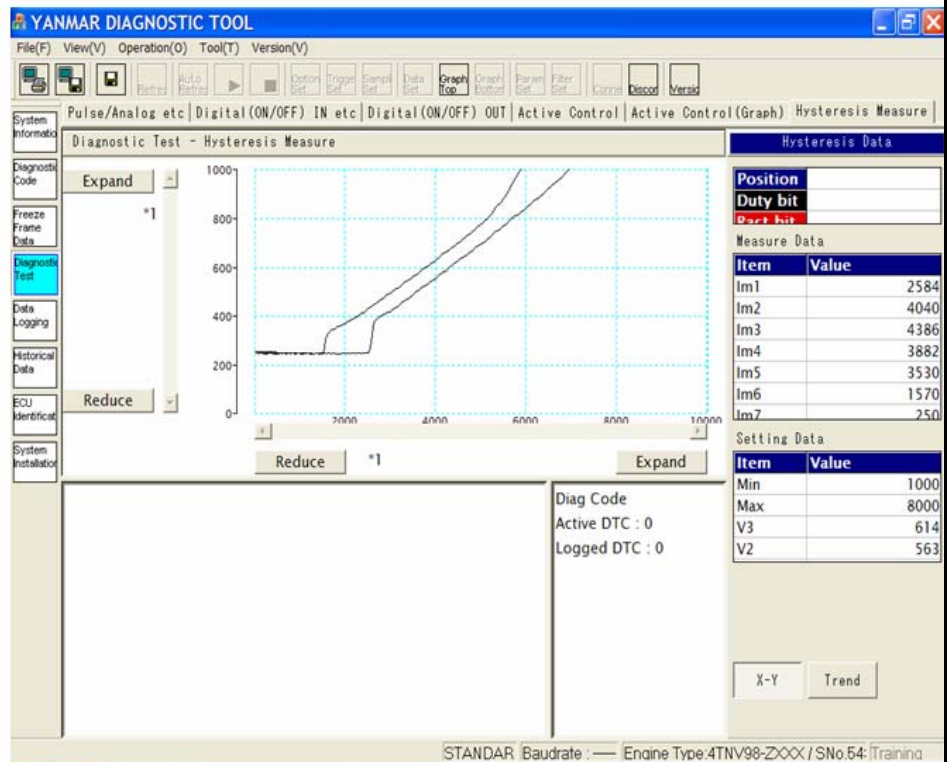
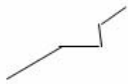
1. It allows to remote control the machine by forcing numerical values (i.e. engine RPM, ...)
2. Press 'RUN' to start the remote control of a parameter
3. Should a graph record be selected, the graph shall be available to see with 'Active Control Graph' cluster. The button is red in 'Graph' column.
4. Line 3 allow to see seized rack behavior on 'Hyst. Meas.' cluster



TRAINING MODE-Diagnostic Test

- Hysteresis cluster:

1. X-Y is the one to select
2. Y is 'Rack bit': Rack proportional valve position
3. X is 'Duty bit': current signal given to the proportional valve
4. The curve must be smooth as shown because the position is proportional to the input signal.
5. Failure is shown by:

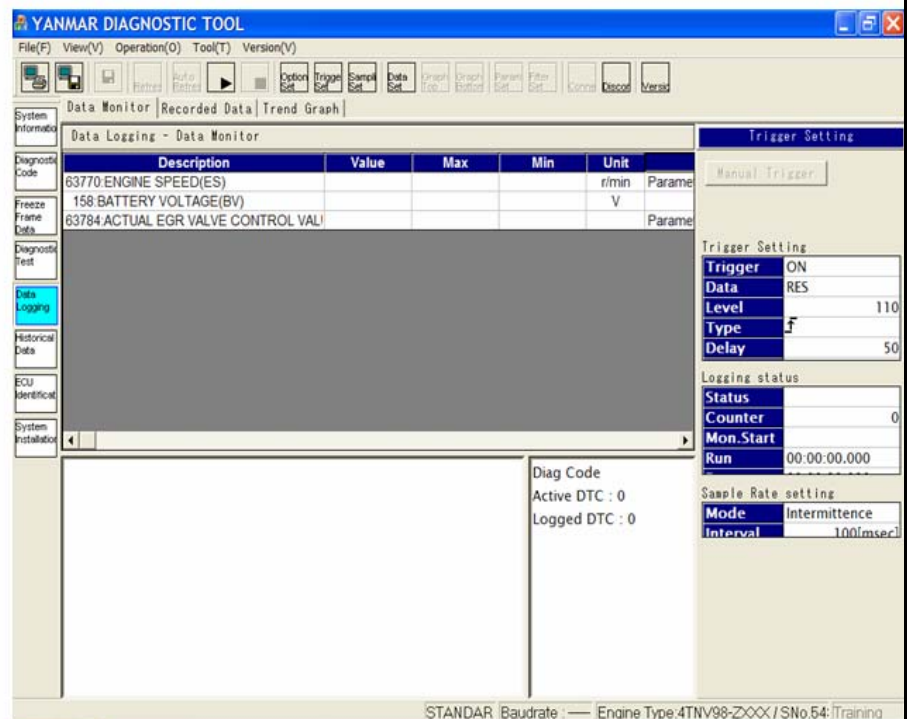


TRAINING MODE-Data Logging

- DLogging is useful for recording data on a running machine (Freeze Frame is when machine cannot start)

- Data Monitor cluster:

1. Press 'Data set' for selecting data to be recorded
2. Press 'Sampling set' to select sampling rate (default is 100ms)
3. Press 'Trigger set' to select the parameter generating a record (Delay: qty records before trig, storage: full qty of records-including delay !!!)



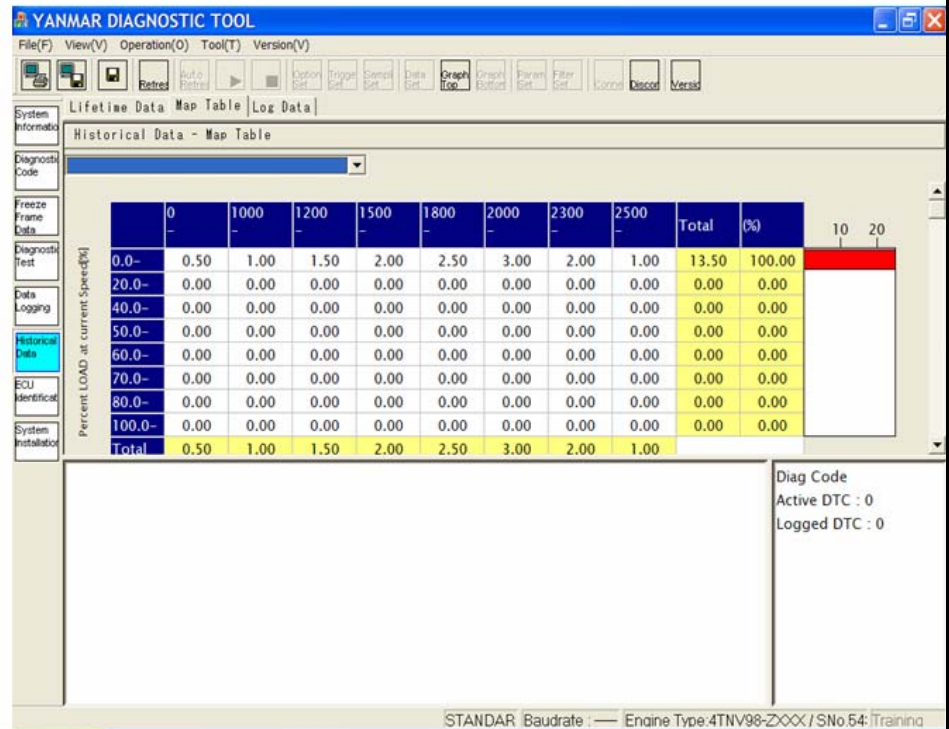
TRAINING MODE-Historical Data

- Historical Data

shall be used for investigating operating condition of the engine (time vs load over full life)

Map Table cluster:

1. It is the most interesting cluster because user friendly
2. Use the map in case to much fuel consumption to identify excessive IDLE condition of operators



TRAINING MODE-ECU identification

- **ECU Identification:** gives same data as 'System Information' but with much more details

- All clusters:

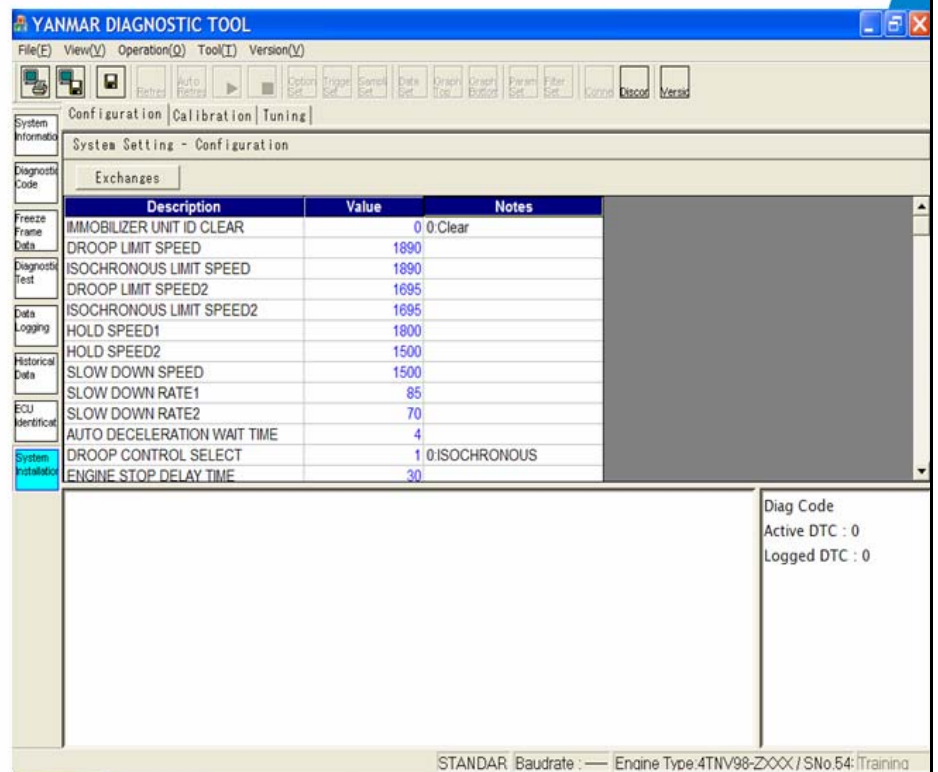
1. Analog channels shows for each parameter the range of allowed values, units zero value (offset), sensor precision (resolution)
2. ECU ID Information gives P/N information
3. ECU data Saved: gives engine & pump Trim Data (CS: check sum for correct input of Trim [power comp.])

LID	CID	Description	Acronym	Size	Resolution	Offset	Unit	Range
25	63619	RACK POSITION SENSOR V	RPSV	2	1	0		0 to 1023
26	91	ACCELERATOR PEDAL Pos	APP	1	0.4	0.0	%	0 to 100
2B	63618	RACK ACTUATOR CURREN	RAC	2	0.05	0.00	A	-1600 to 1612.75
2C	1136	ECU TEMPERATURE	EET	2	0.03	-273.00	degC	-273 to 1,735
2D	158	BATTERY VOLTAGE	BV	2	0.05	0.00	V	0 to 3212.75
2E	63617	SENSOR SOURCE VOLTAGE	SSV	2	0.05	0.00	V	0 to 3212.75
30	63744	REQUEST RACK POSITION	REQRP	2	1	0		0 to 1023
31	63779	Engine Stop Warning Status	ESWS	2	1	0		0 to 65,535
32	63786	ENGINE MODE	EM	1	1	0		0 to 255
27	110	ENGINE COOLANT TEMPER	ECT	1	1	-40	degC	-40 to 210
36	63787	Starter Restraint Status	SRS	1	1	0		0 to 255
37	63788	Starter Restraint Factor	SRF	2	1	0		0 to 65,535



TRAINING MODE-ECU identification

- **System Installation:** gives the possibility to enter TRIM DATA, when a FIP or ECU should be replaced by a new one.
- **All clusters:**
 1. Press the 'Exchanges' button
 2. Choose FIP or ECU
 3. When replacing FIP: select Manual (enter 9 codes) or insert the 'ZIP file' provided by Bobcat
 4. If change ECU: transfer ECU to PC or PC to ECU



Training Material

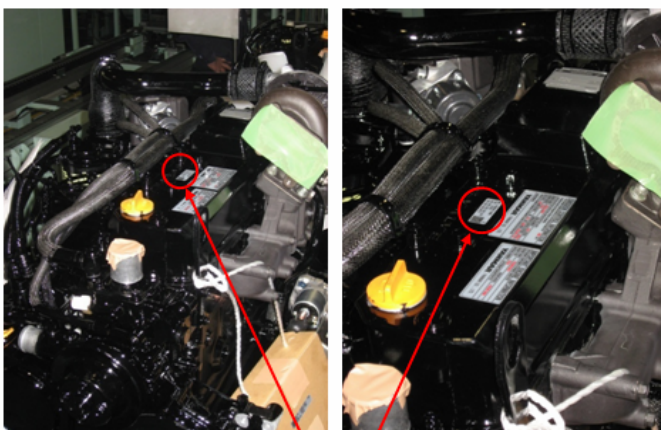
Yanmar Engines
Write pump compensation data to ECU



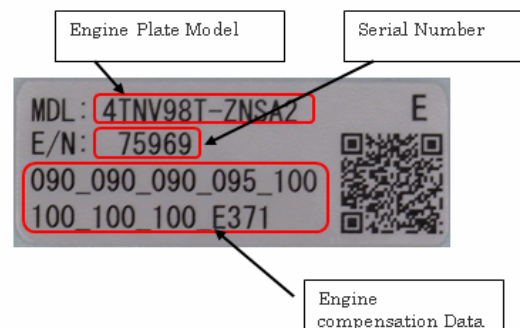
Date: January 2009
Department: Service



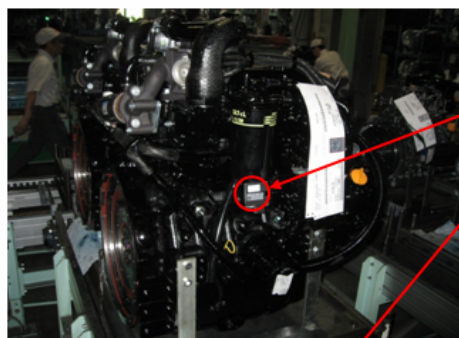
Engine Data



Engine compensation data label



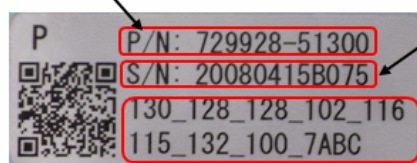
Pump Data



Pump compensation data label

Pump Parts Number

Pump Serial Number



Pump compensation Data

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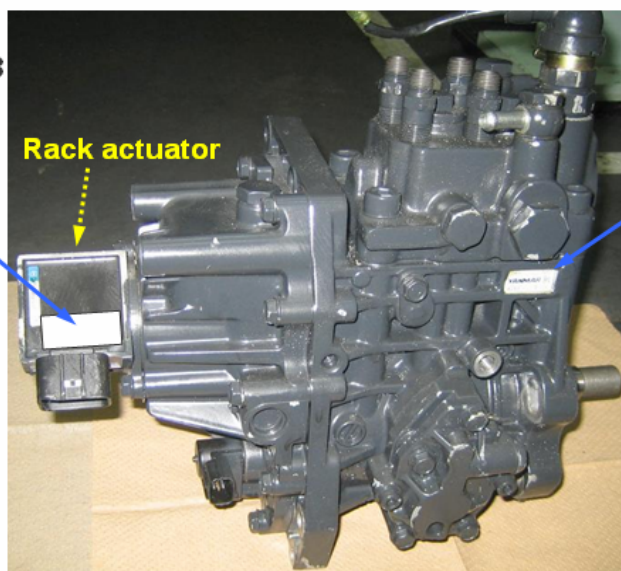
Pump Data

If pump has been exchanged, pump compensation data must be re-entered in ecu. Correct pump compensation data is printed on the label attached to rack actuator.

Compensation Data Label

S/# 20070225DB01
103_092_101_102_098
099_100_102_048B

Rack actuator



FIP Label

20070225
DB06 XS20
YANMAR
72990651360 E006

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Write process

At first, click "Exchange" button and select "FIP exchange"

The screenshot shows the YANMAR DIAGNOSTIC TOOL interface. The 'Configuration' tab is selected in the top menu. In the 'System Setting - Configuration' window, the 'Exchanges' button is highlighted with a red circle and labeled ①. The 'System Installation' button in the left sidebar is highlighted with a red circle and labeled ②. The 'Exchanges' button in the main window is highlighted with a red circle and labeled ③. A table of system settings is visible in the background.

Description	Value	Notes
IMMOBILIZER UNIT ID CLEAR	0	0:Clear
DROOP LIMIT SPEED	1890	
ISOCHRONOUS LIMIT SPEED	1890	
DROOP LIMIT SPEED2	1695	
ISOCHRONOUS LIMIT SPEED2	1695	
HOLD SPEED1	1800	
HOLD SPEED2	1500	
SLOW DOWN SPEED	1500	
SLOW DOWN RATE1	85	
SLOW DOWN RATE2	70	
AUTO DECELERATION WAIT TIME	4	
DROOP CONTROL SELECT	1	0:
ENGINE STOP DELAY TIME	30	

① Click "System Installation"

② Select "Configuration" tab

③ Click "Exchanges" Button

Diag Code
Active DTC : 10
Logged DTC : 0

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Write process – Fuel Inj. Pump exchange

Click "FIP Exchange"

The screenshot shows the YANMAR DIAGNOSTIC TOOL interface with the 'Exchanges' dialog box open. The 'FIP EXCHANGE' option is selected in the list, highlighted with a red circle and labeled ①. The 'Select' button at the bottom of the dialog box is highlighted with a red circle and labeled ②. The background shows the same system settings table as the previous screenshot.

① Click "FIP Exchange"

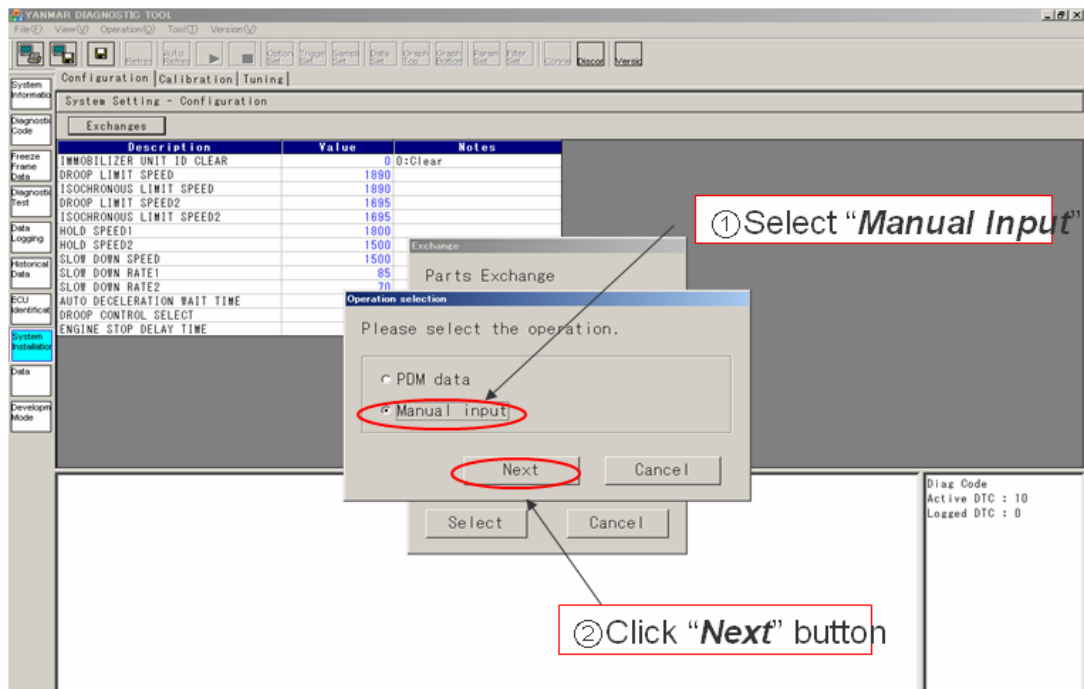
② Click "Select" button

Diag Code
Active DTC : 10
Logged DTC : 0

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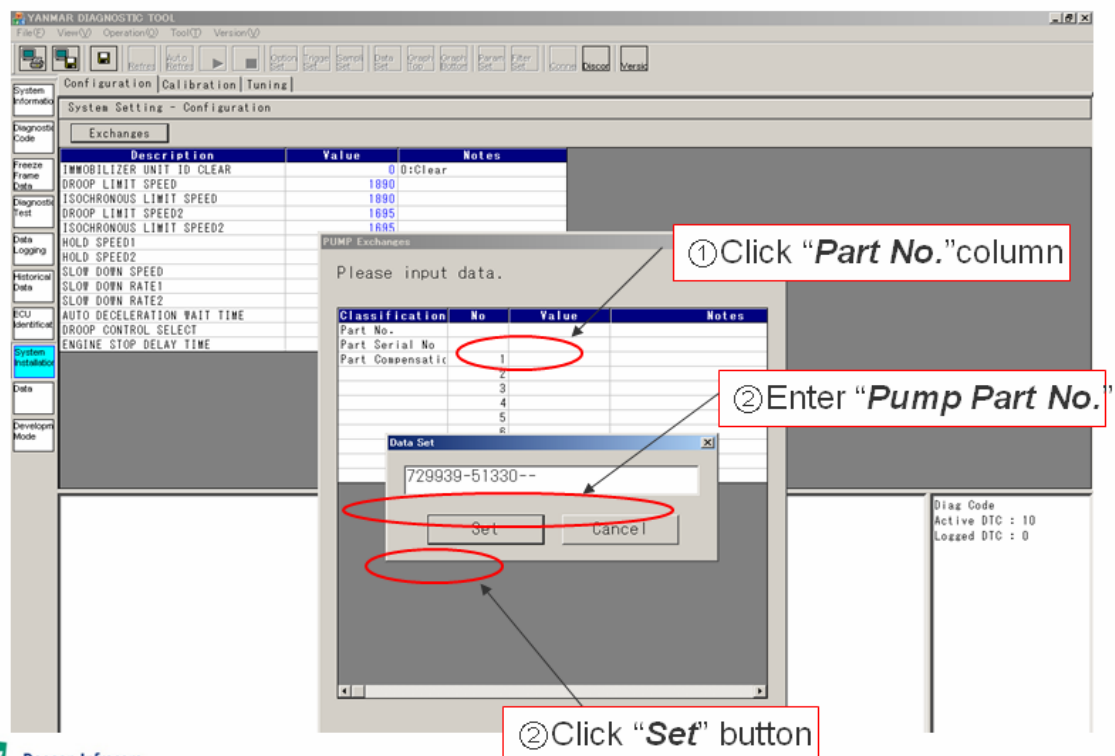
Write process – Fuel Inj. Pump exchange

After exchange of the FIP, write compensation data.



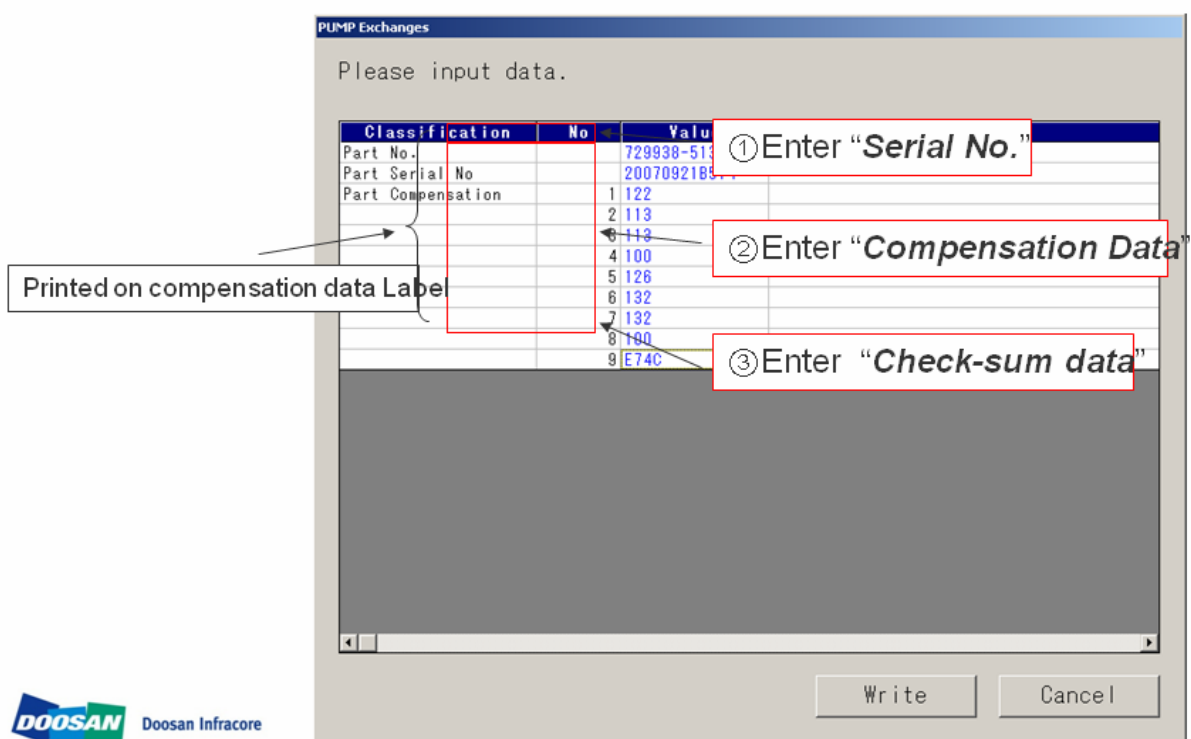
Write process – Fuel Inj. Pump exchange

Enter the Pump Part No. (Printed on Pump Compensation Data Label)



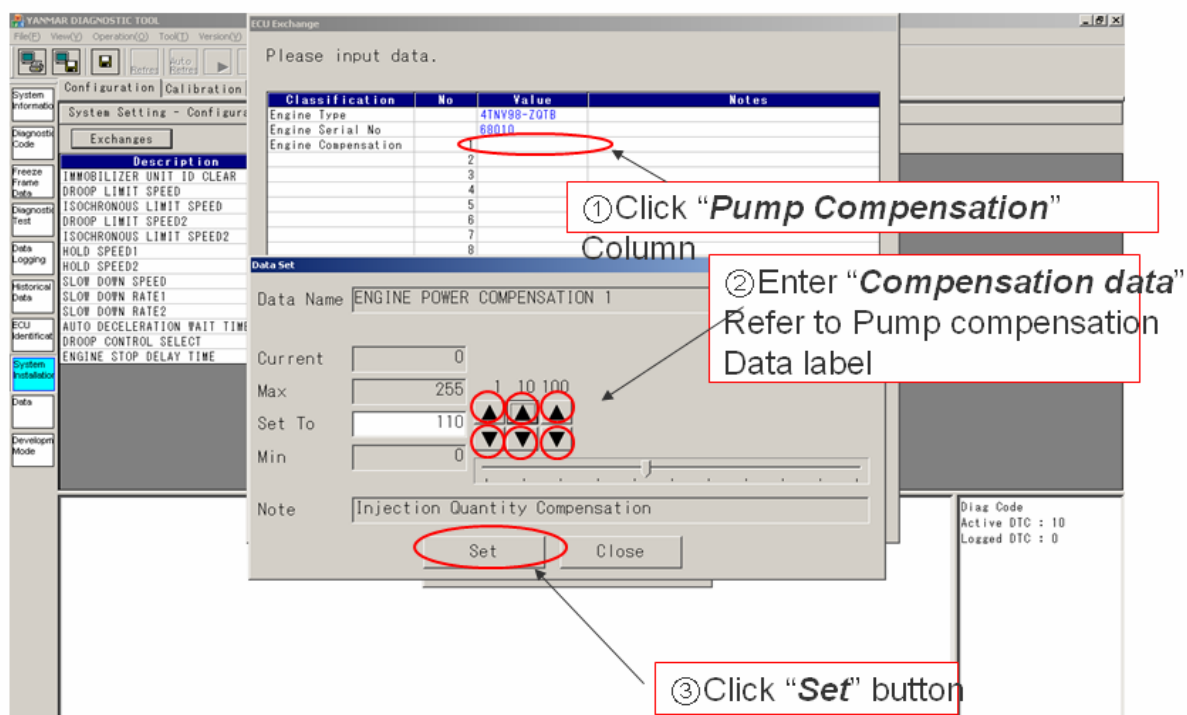
Write process – Fuel Inj. Pump exchange

Enter the Pump Serial No., Pump compensation data and check-sum data.
(Printed on Pump compensation data Label) . Apply "Write" button.



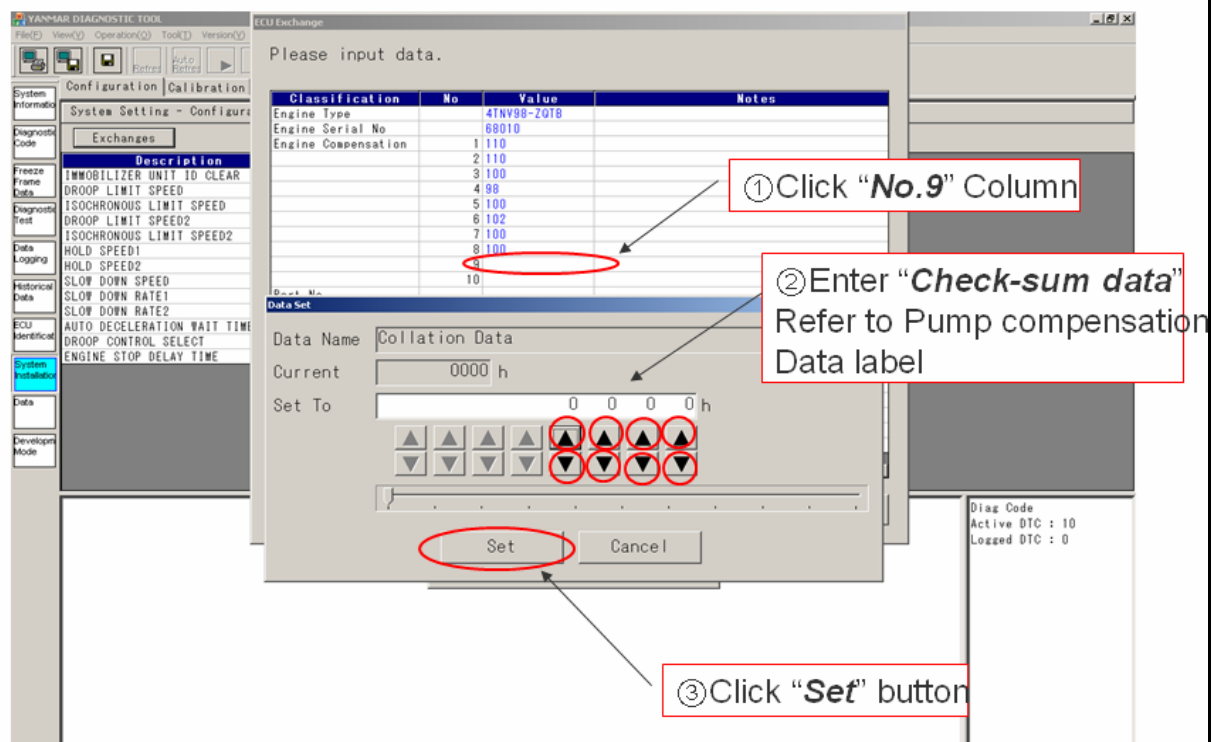
Write process – Fuel Inj. Pump exchange

Enter the Pump Compensation data



Write process – Fuel Inj. Pump exchange

Enter the Pump Check-sum data



Write process – Fuel Inj. Pump exchange

Security check. Enter User Password and click "Set" button.

