

VFDSoft User Manual

(English Version)

This software only supports VFD-B, VFD-F, VFD-M, VFD-S, VFD-E, VFD-L(0.25HP-2HP) and VFD-VE, its function to support other VFD models is under development

Table of contents

Chapter 1 General Introduction	1-1
1.1 Guide of installation	1-1
1.2 Starting preparation.....	1-1
1.2.1 System configuration.....	1-1
1.2.2 Applicable VFD models	1-1
1.2.3 Other required equipments	1-1
1.2.4 Installation	1-1
1.2.5 Uninstalling the software	1-5
Chapter 2 Functions	2-1
2.1 How to start VFDSOft	2-1
2.1.1 Opening the software	2-2
2.1.2 You can select your preference language interface	2-2
2.2 Software functions summary.....	2-3
2.2.1 Functions table	2-3
2.2.2 Tools introduction	2-4
2.2.3 History message.....	2-5
2.3 Connecting communication cable.....	2-6
2.4 Quick setup	2-9
2.5 Parameters management	2-12
2.6 Online keypad	2-18
2.7 Trend record.....	2-20
2.7.1 Start trend record.....	2-20
2.7.2 Page of data status	2-22
2.8 Instant monitoring	2-23
2.9 Advanced functions.....	2-24
2.9.1 Page A.....	2-24
2.9.2 Page B.....	2-26
2.10 Other functions.....	2-27
2.10.1 PID controlling	2-27
2.10.2 Automatically measuring of motor parameters.....	2-27

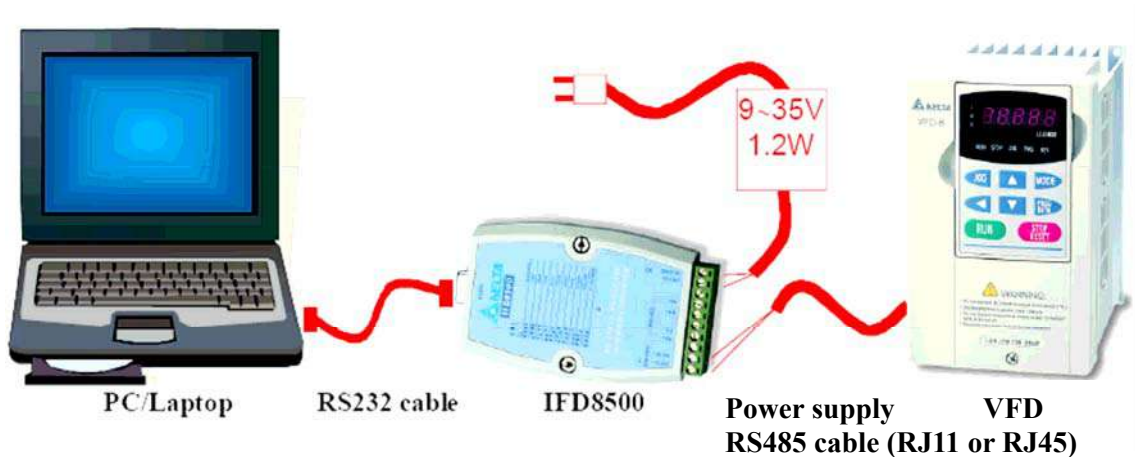
Chapter 1 General Introduction

1.1 Guide of installation

Before using this software for a VFD, please prepare well for the following equipments: a Delta's VFD, a converting interface for RS485/232/USB, an RS485 connecting cable (RJ11 or RJ45) and an RS232 or USB connecting cable.

1.2 Starting preparation

1.2.1 System configuration



1.2.2 Applicable VFD models

VFD-B, VFD-F, VFD-M, VFD-S, VFD-E, VFD-L (0.25HP-2HP) and VFD-VE

1.2.3 Other required equipments

Please use RJ11 connector for the models of VFD-B, VFD-F, VFD-M, VFD-S, VFD-L (0.25HP-2HP) and VFD-VE, and use RJ45 connector for the model of VFD-E.

RJ45	<p>8 ← 1</p> <p>RJ45</p>	<p>1: reserved 2: reserved 3: GND 4: SG- 5: SG+ 6: reserved 7: reserved 8: reserved</p>
RJ11	<p>6 ← 1</p> <p>RJ11</p>	<p>1: reserved 2: GND 3: SG- 4: SG+ 5: reserved 6: reserved</p>

Or you can select to link a PC's USB through a communication converter which is generally used to link RS485 to USB.

1.2.4 Installation

Step 1. Please download the installation file from web site: <http://www.delta.com.tw/>



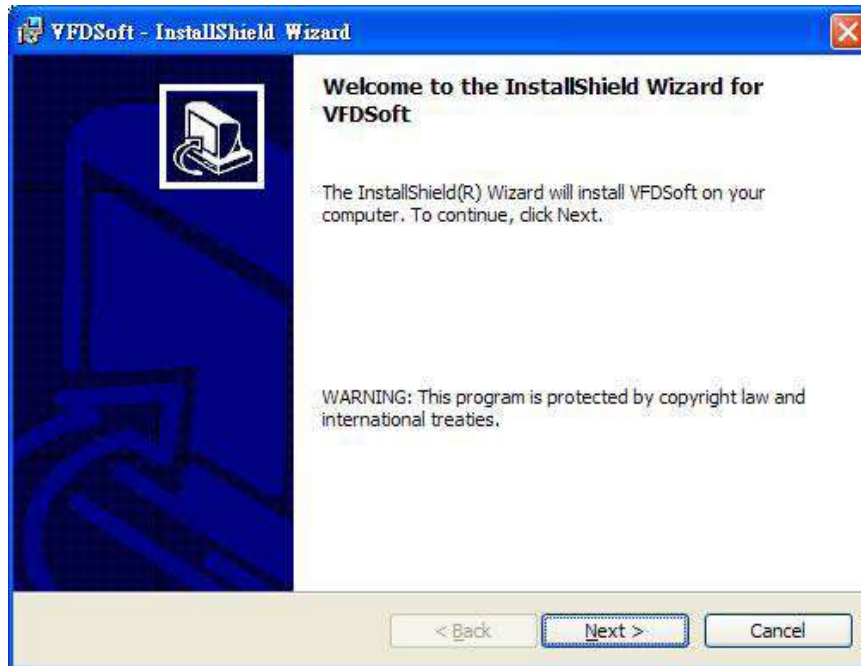
Step 2. Please execute installation file

setup.exe

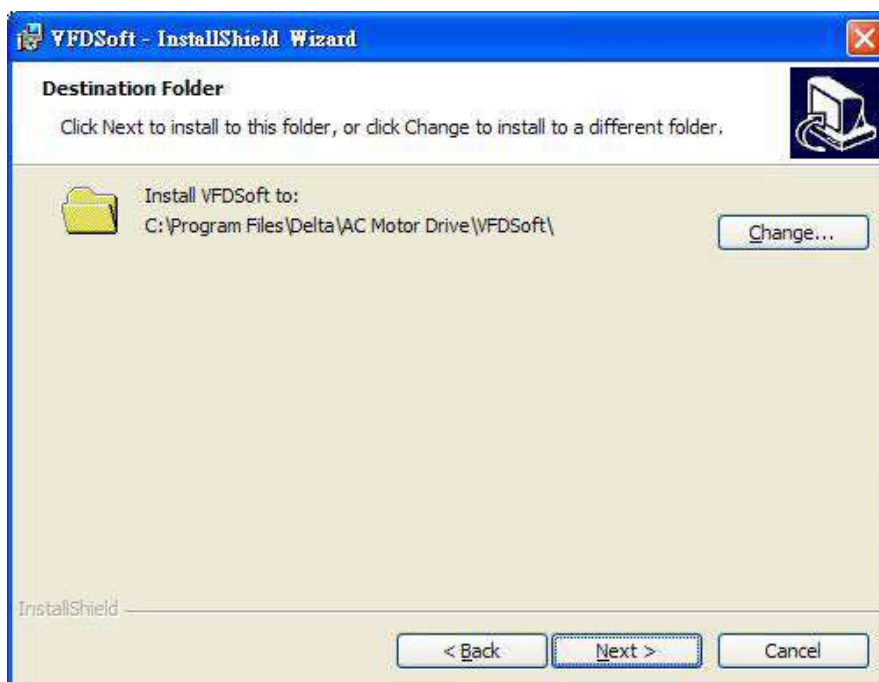
Step 3. Detecting system information



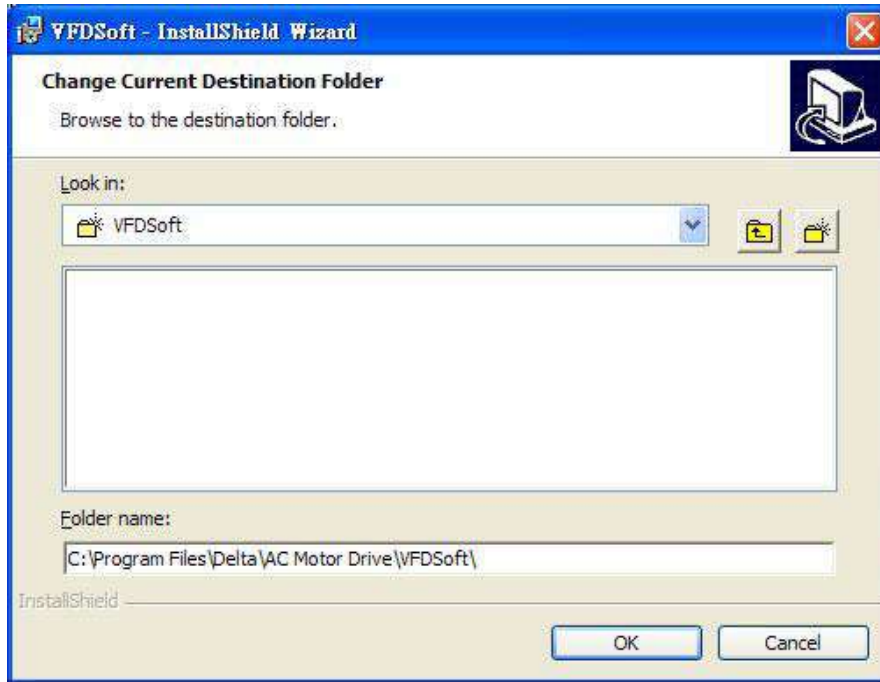
Step 4. This is a welcome dialogue box; please click to continue this installing process



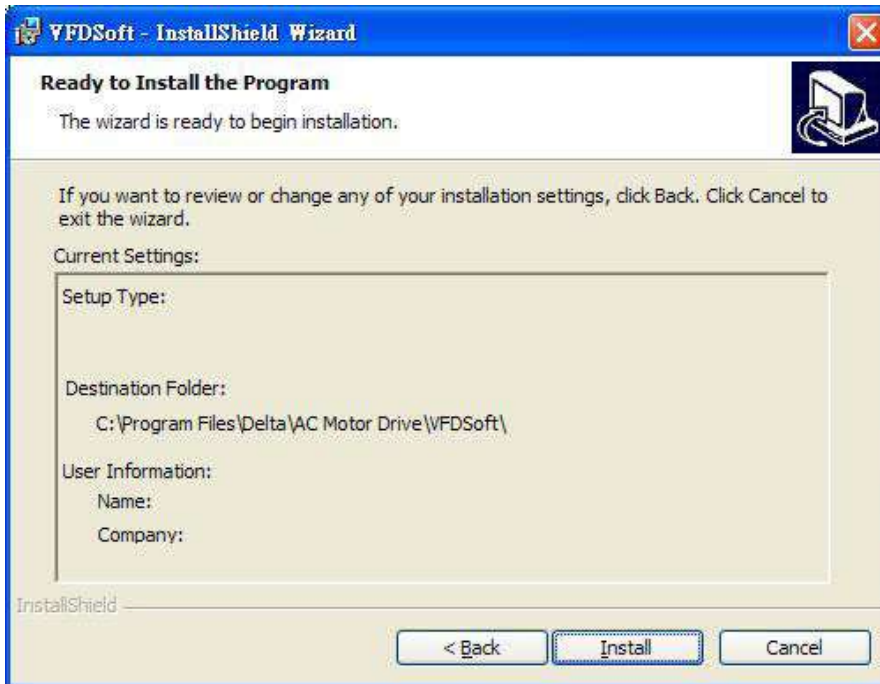
Step 5. If you wish to change the folder's installing destination, please click and move to step 6; or receive default value then click and jump to step 7.



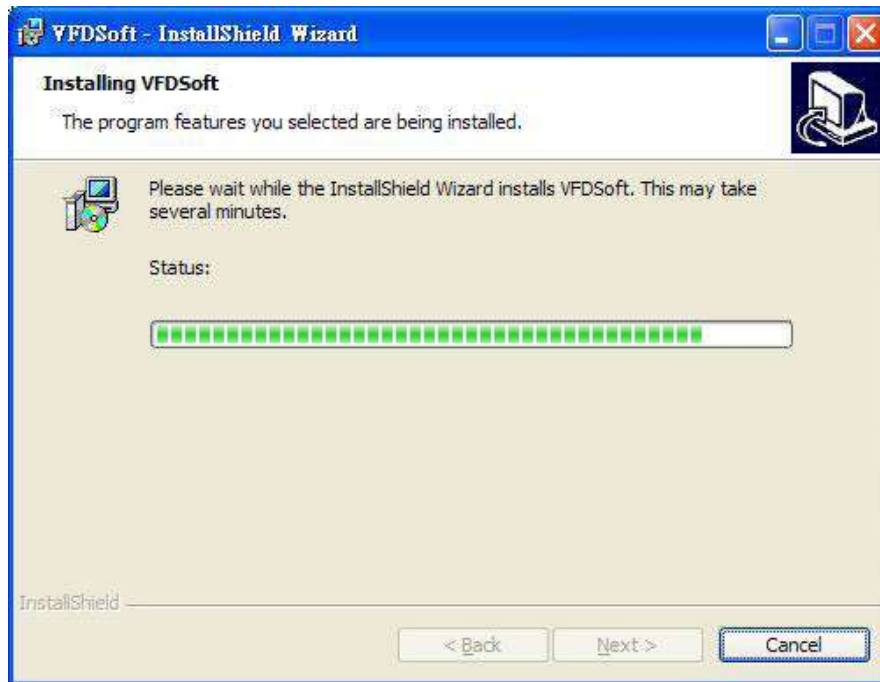
Step 6. Please select a destination folder according to your preference



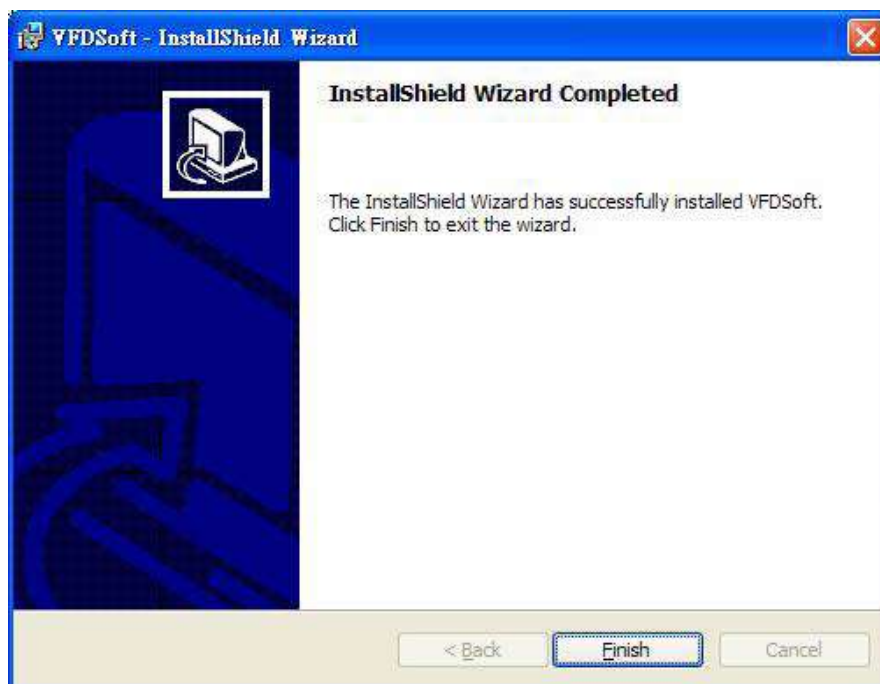
Step 7. Ready to install, please click  to continue if all settings are OK



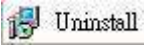
Step 8. Installing

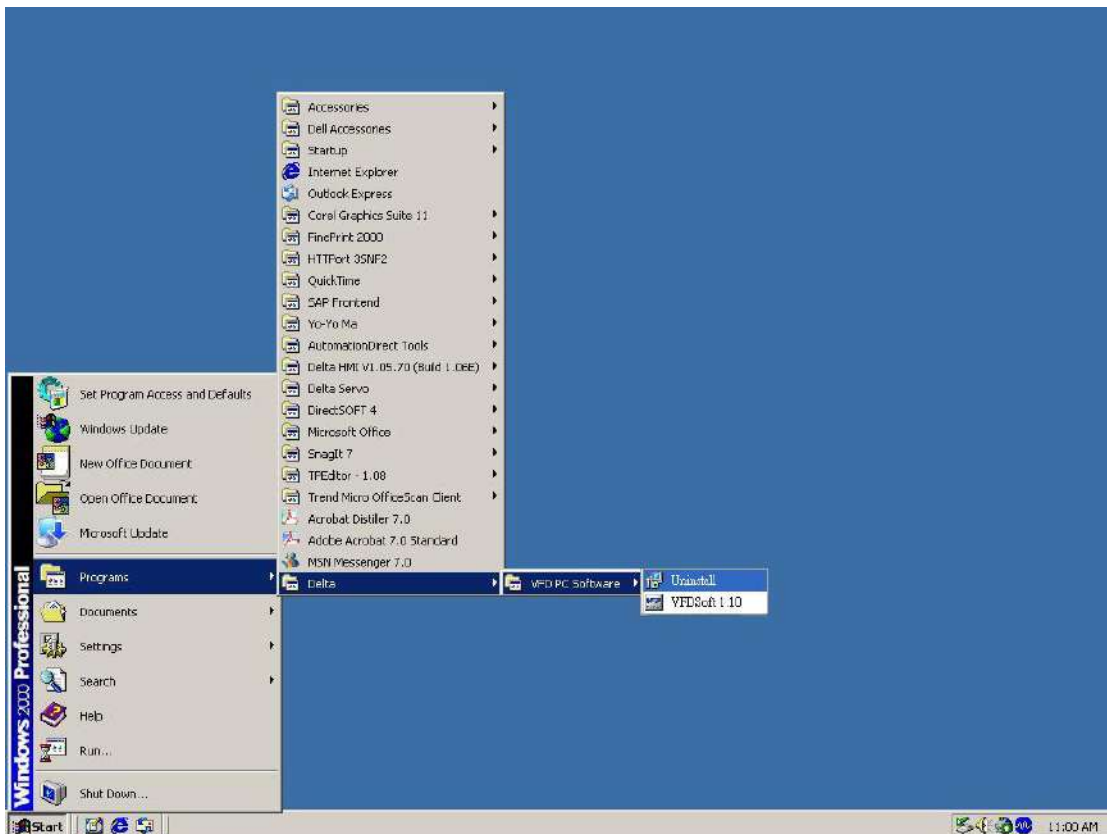


Step 9. Installing completed, please click  to end this program

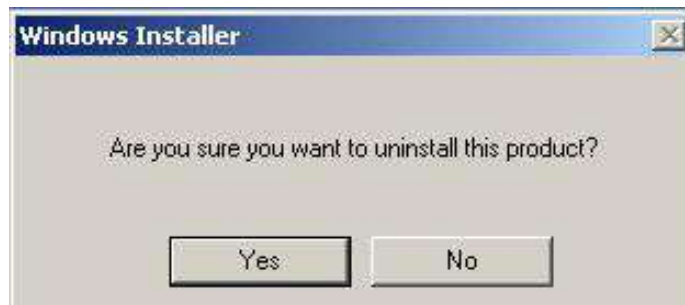
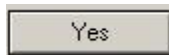


1.2.5 Uninstalling the software

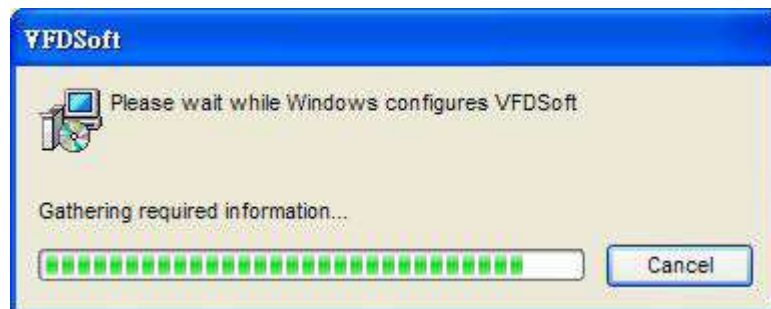
1. Open executable file 



2. If you really wish to uninstall please click



3. Uninstalling



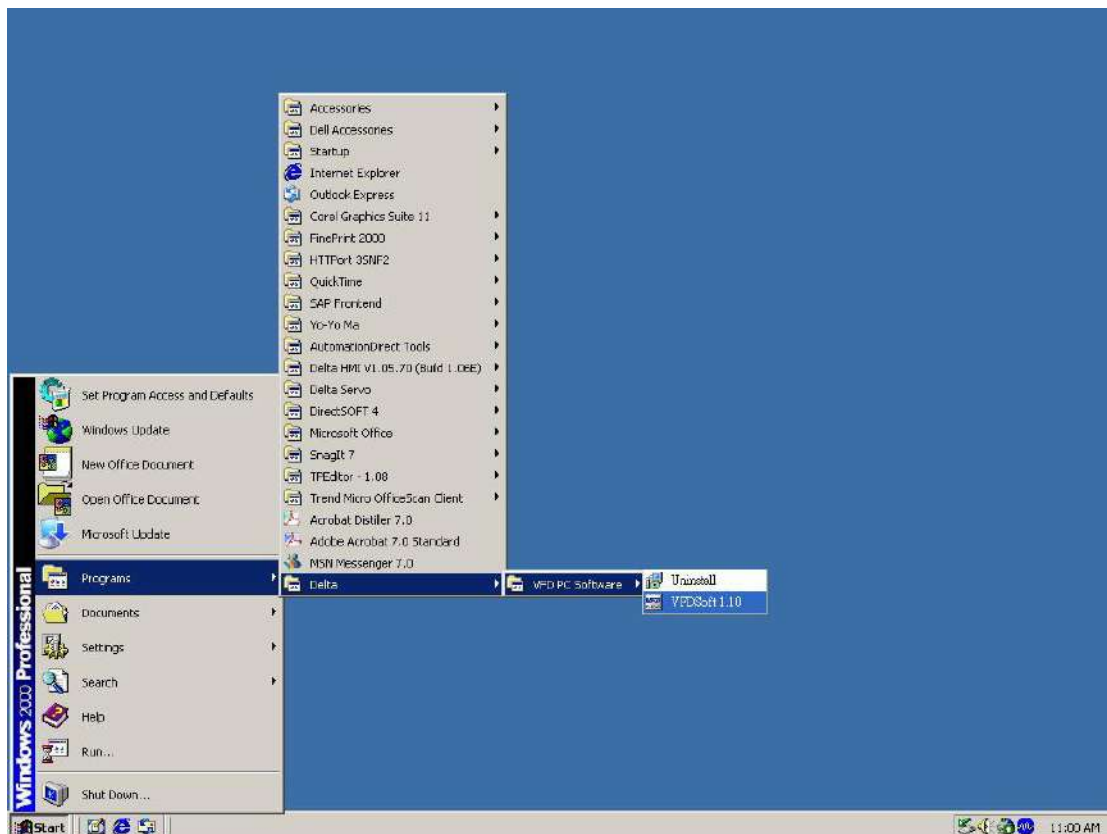
This page intentionally left blank

2.1 How to start VFDSOft

Please double click the executable file on desktop to start



Or start from the lower left menu of the system

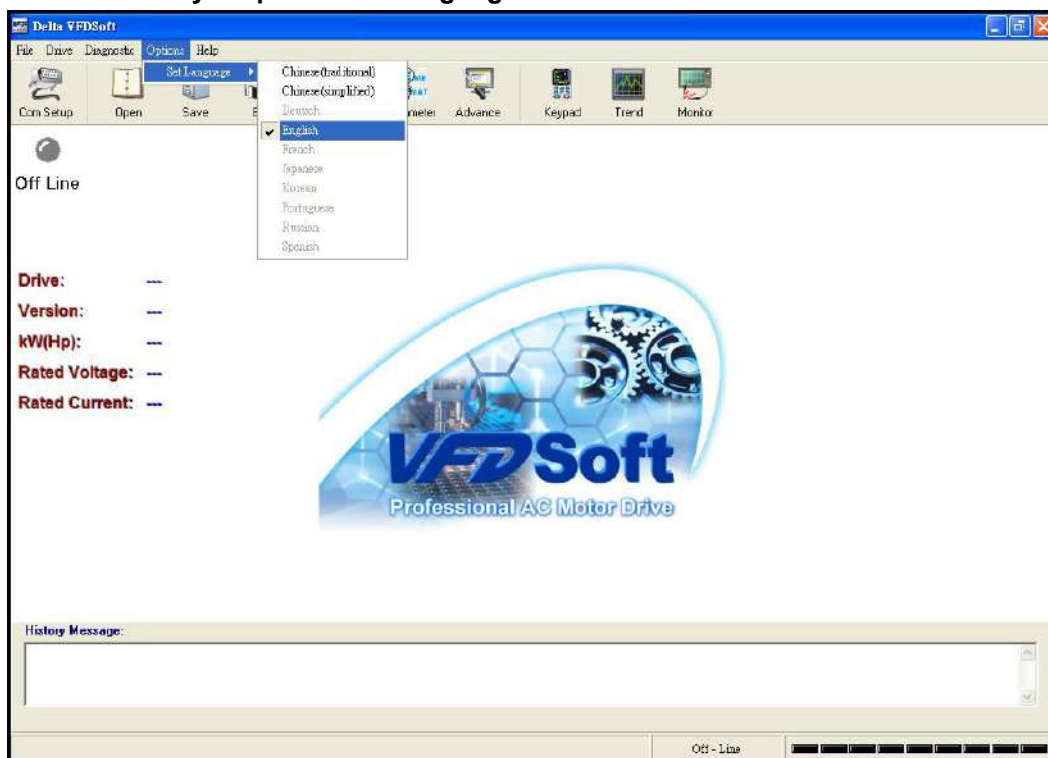


2.1.1 Opening the software

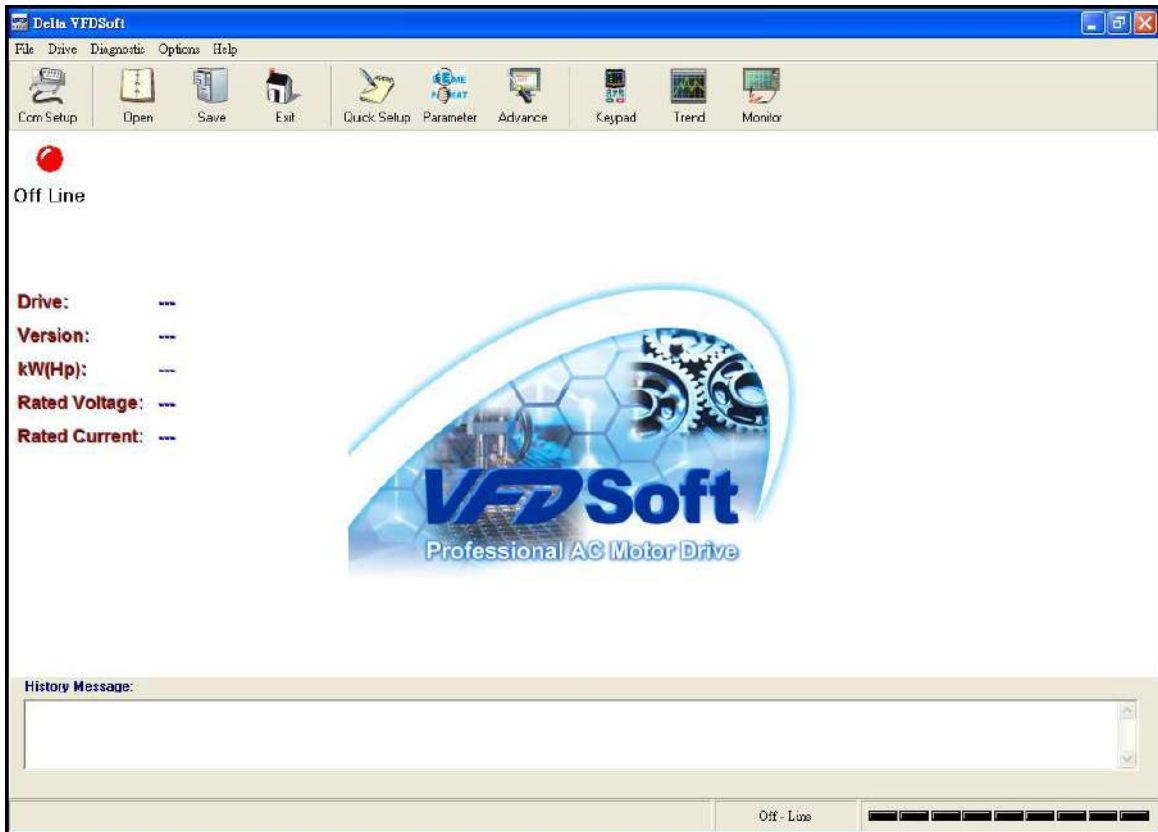
Entering the initialization file after clicking the executable file



2.1.2 You can select your preference language interface



2.2 Software functions summary



2.2.1 Functions table

File	Drive	Diagnostic	Options	Help
------	-------	------------	---------	------

File: here you can save the operating environment



Drive: it can be used for communication settings, parameter controlling, quick setup and other advanced functions



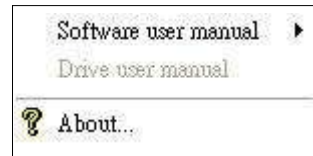
Diagnostics: it has the functions of online keypad, trend records, instant monitoring, PID controlling and automatically measuring of motor's parameters



Options: multi-language settings



Help: it will help you to get information about software manual, VFD manual and software announcement



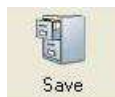
2.2.2 Tools introduction



: For PC to set VFD's communication connecting



: Open project file



: Save project file



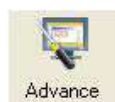
: Exit this software



: Set some basic functions for VFD



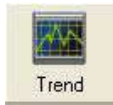
: Can write in and read out VFD parameters



: Has advanced functions of communicating



: Has the function of online digital operating



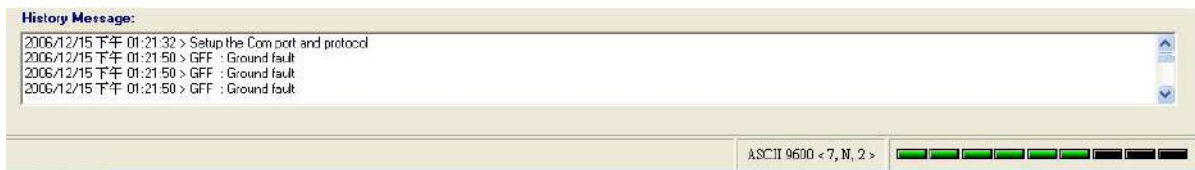
: Can monitor and record VFD's different working status



: To monitor VFD's working status in the form of meter

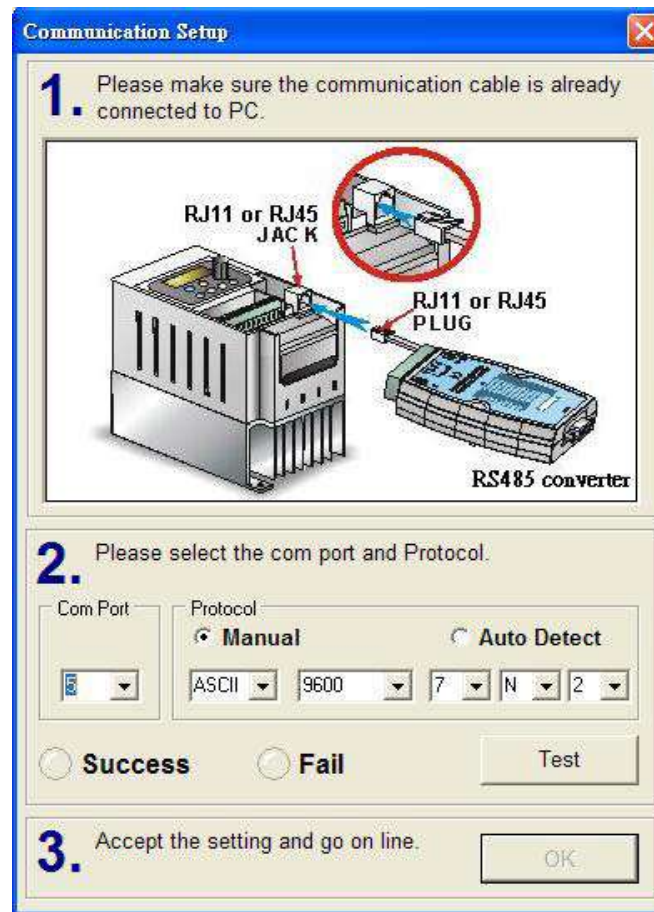
2.2.3 History message

To display history message of software and VFD's status



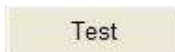
2.3 Connecting communication cable

Step 1, Double click the icon  or  to enter communication setup dialogue box



Step 2, To set according to the indication showed in the dialogue box

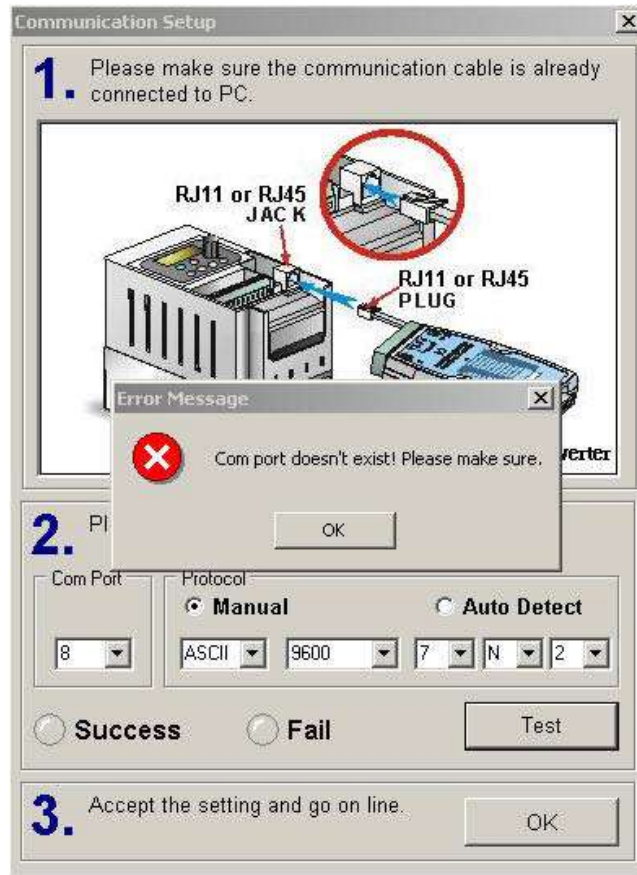
Step 3, You can select manual way or auto-detect way to set communication parameters, and then click



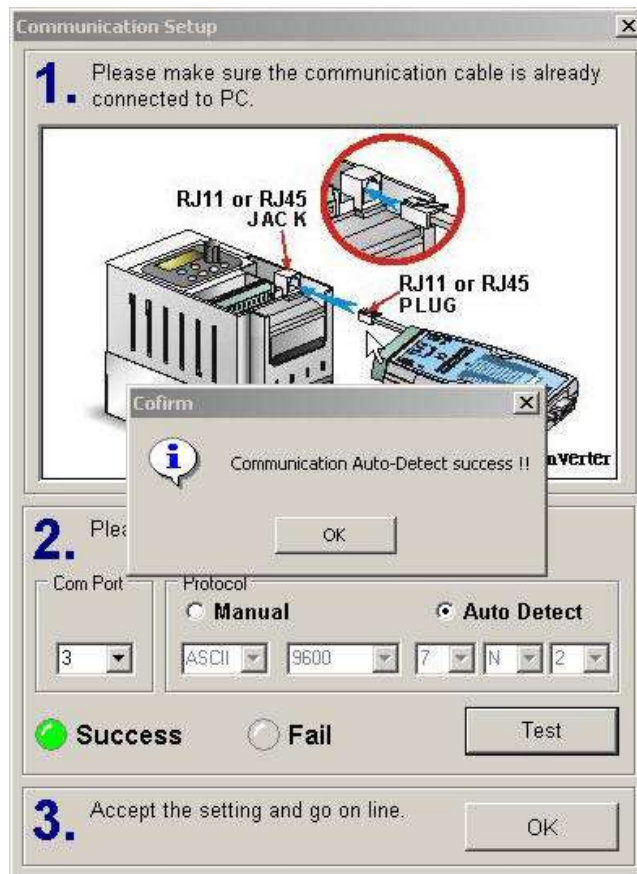
- a. If you select manual way it will do connecting cable test only on the indicated communication parameters
- b. If you select auto-detect then it will do communication test as bellowing



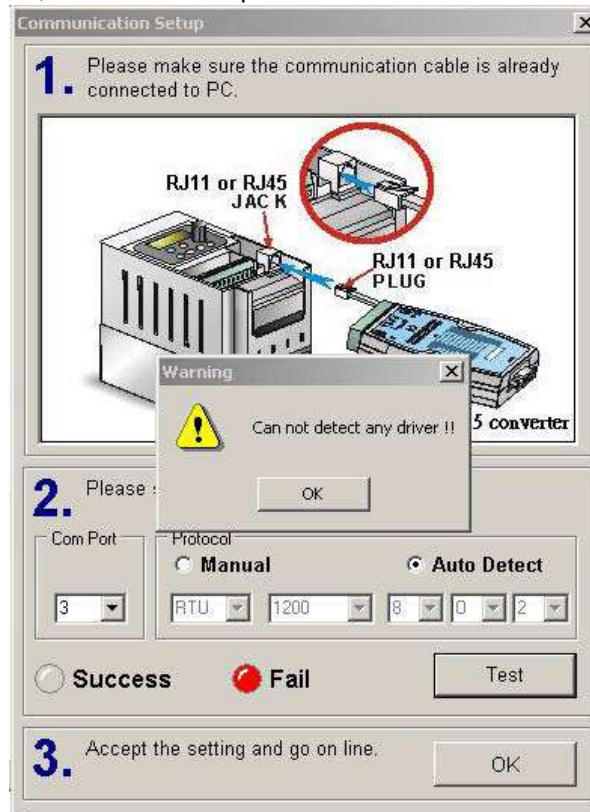
Step 4, Please select the right computer communication port. If your selection is wrong, it will appear the following false message

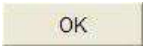


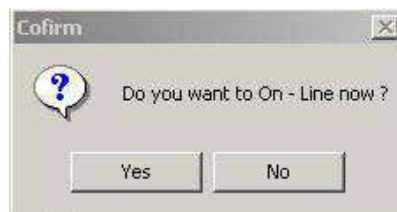
Step 5, If communication connecting succeeds, it will appear the following message




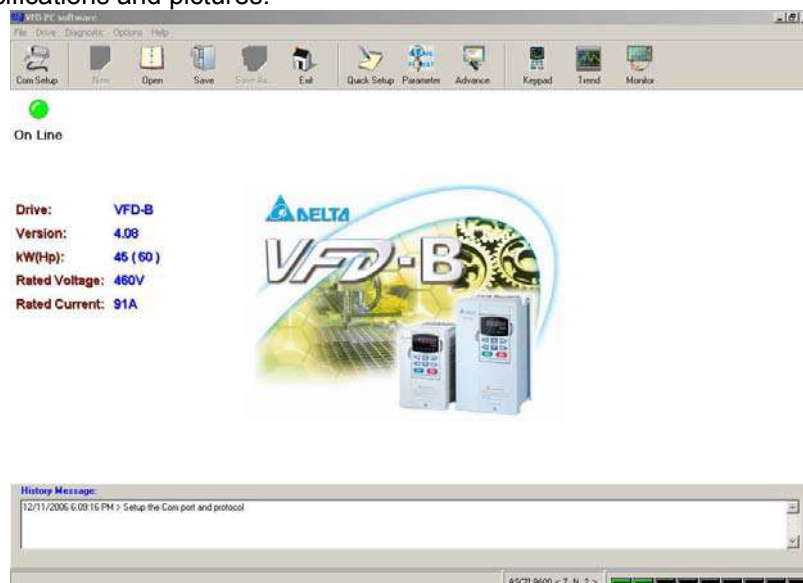
Step 6, If communication connecting fails, it will appear the following message. Then please check if the communication port, communication parameters and hardware connecting are all right.



Step 7, When connecting succeeds please move to step 3. Click  it will appear a dialogue box like this



Step 8, Select Yes to enter the connecting window. Then you will see the upper left light  On Line , VFD's basic specifications and pictures.

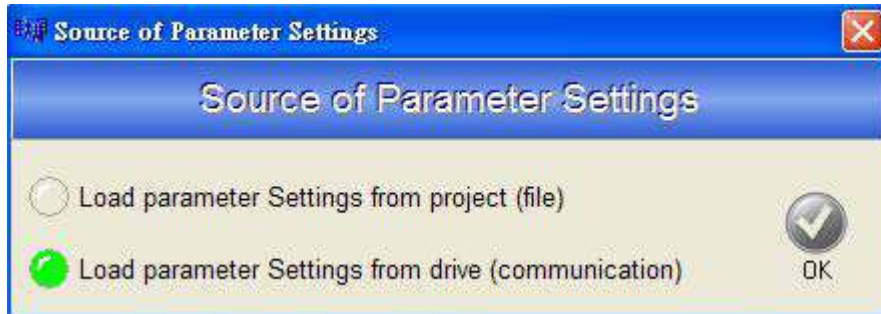


2.4 Quick setup

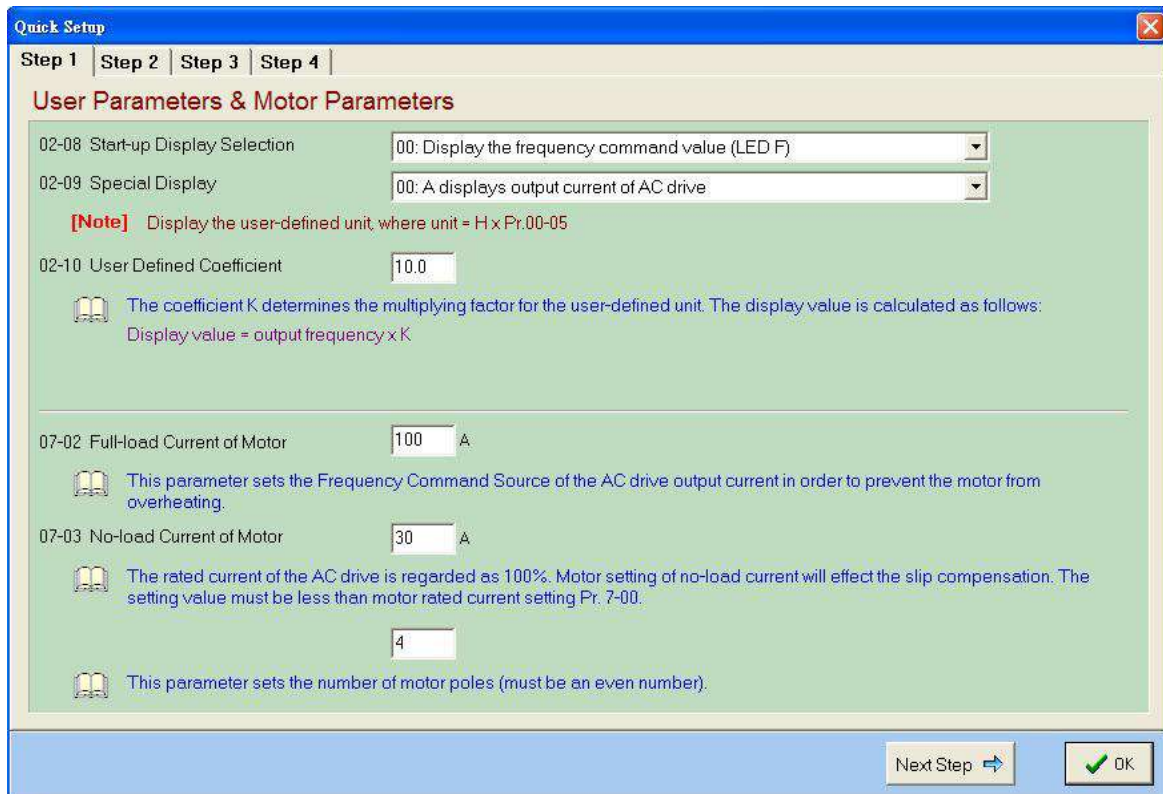
Please select Quick setup to set VFD's basic parameters



1. Please select the way of loading parameters either from file or from communication. We advise you first to select the latter.



2. Please do basic settings according to Step 1, Step 2, Step 3 and Step 4



Quick Setup Step 1 | Step 2 | Step 3 | Step 4

Basic Parameters

01-00 Maximum Output Frequency: 60.00 Hz
 01-01 Maximum Voltage Frequency: 60.00 Hz
 01-02 Maximum Output Voltage: 220.0 V
 01-03 Mid-Point Frequency: 1.50 Hz
 01-04 Mid-Point Voltage: 5.5 V
 01-05 Minimum Output Frequency: 1.50 Hz
 01-06 Minimum Output Voltage: 5.5 V
 01-07 Upper Bound of Output Freq.: 60.00 %
 01-08 Lower Bound of Output Freq.: 0.00 %

The Upper/Lower Limits are to prevent operation errors and machine damage.

01-09 Acceleration Time1 (Taccel 1): 10.0 sec
 01-10 Deceleration Time1 (Tdecel 1): 10.0 sec

V/F Curve 0.00 % 60.00 %

The graph shows a linear relationship between voltage and frequency up to the base frequency (60.00 Hz), after which the voltage remains constant. The y-axis represents Voltage (5.5 V to 220.0 V) and the x-axis represents Frequency (1.50 Hz to 60.00 Hz).

Back Step | Next Step | OK

Quick Setup Step 1 | Step 2 | Step 3 | Step 4

Operation Method Parameters

02-00 Source of Frequency Command: 00: via keypad
This parameter sets the Frequency Command Source of the AC drive.

02-01 Source of Operation Command: 00: Controlled by digital keypad
When the AC drive is controlled by an external source, please refer to parameter group4 for detailed explanations on related parameter settings.

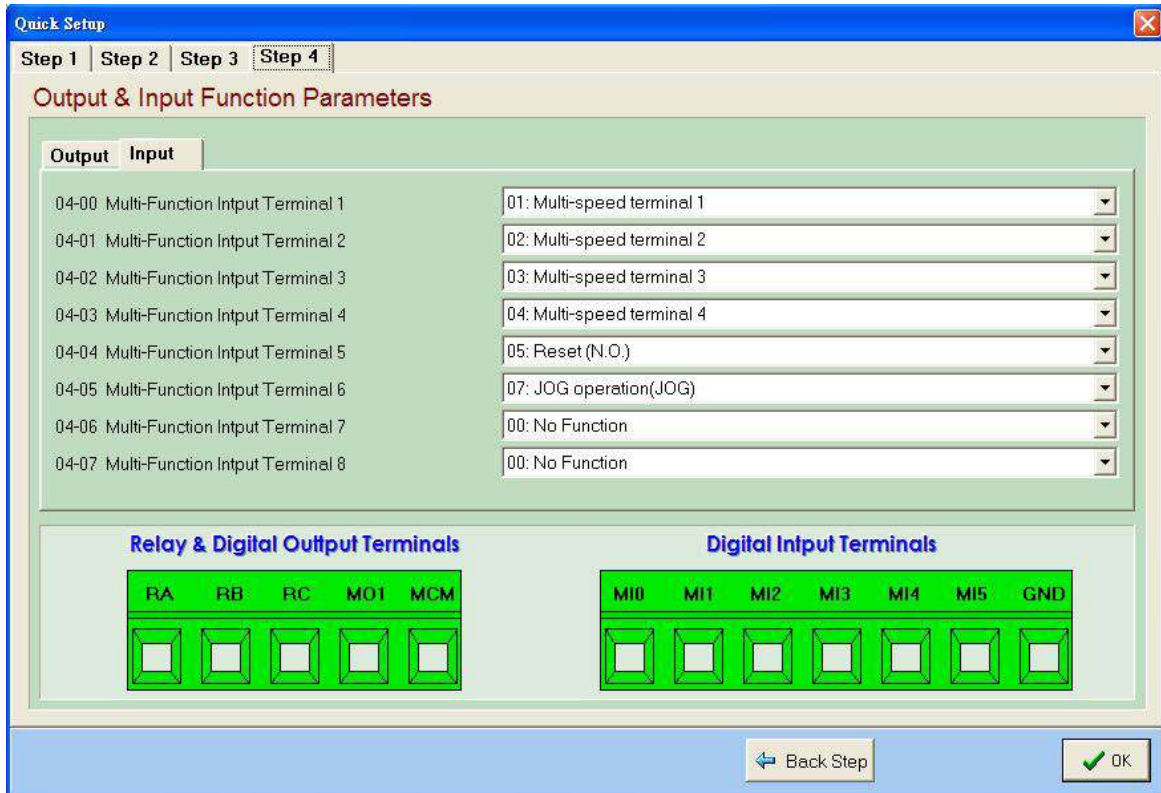
02-02 Stop Method: 00: STOP:ramp to stop; E.F.:coast to stop

The parameter determines how the motor is stopped when the AC drive receives a valid stop command.

[Note]
 The motor stop method is usually determined by the characteristics of the motor load and frequency of stops.

The graphs illustrate the difference between 'ramp to stop' (where frequency and speed both ramp down) and 'free run to stop' (where frequency remains constant while speed ramps down).

Back Step | Next Step | OK



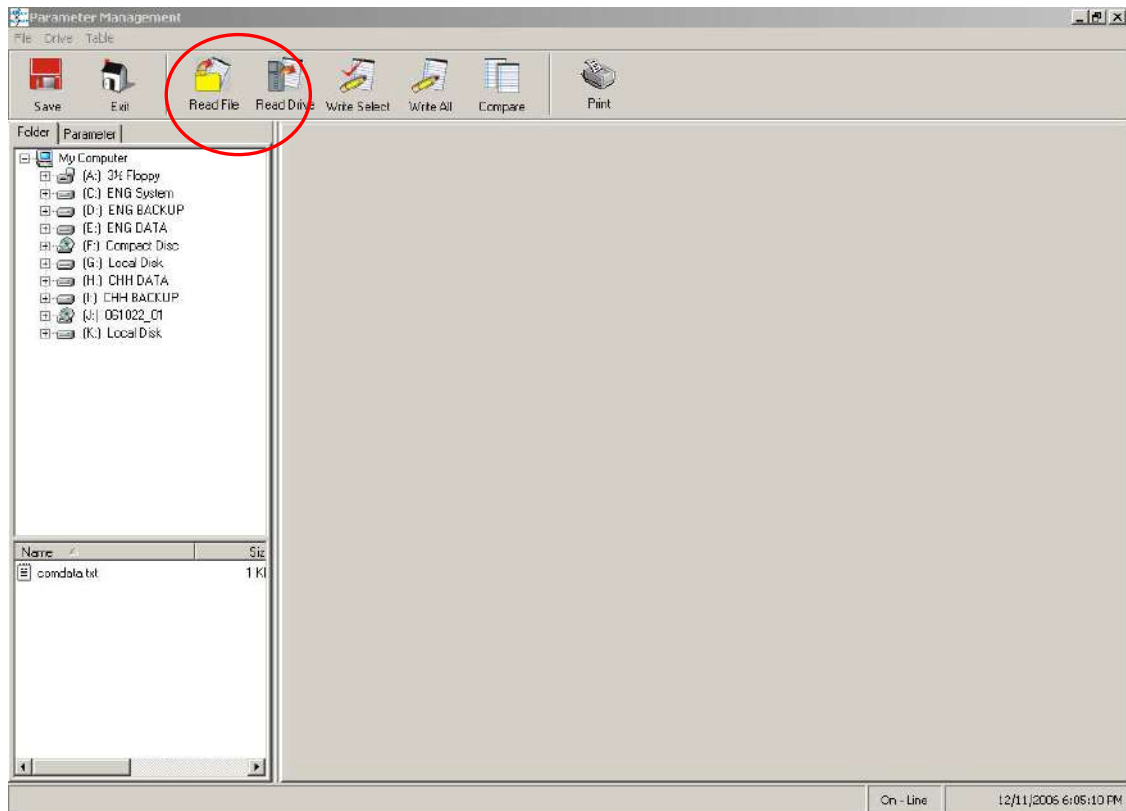
3. When all settings completed click  to write in parameters.



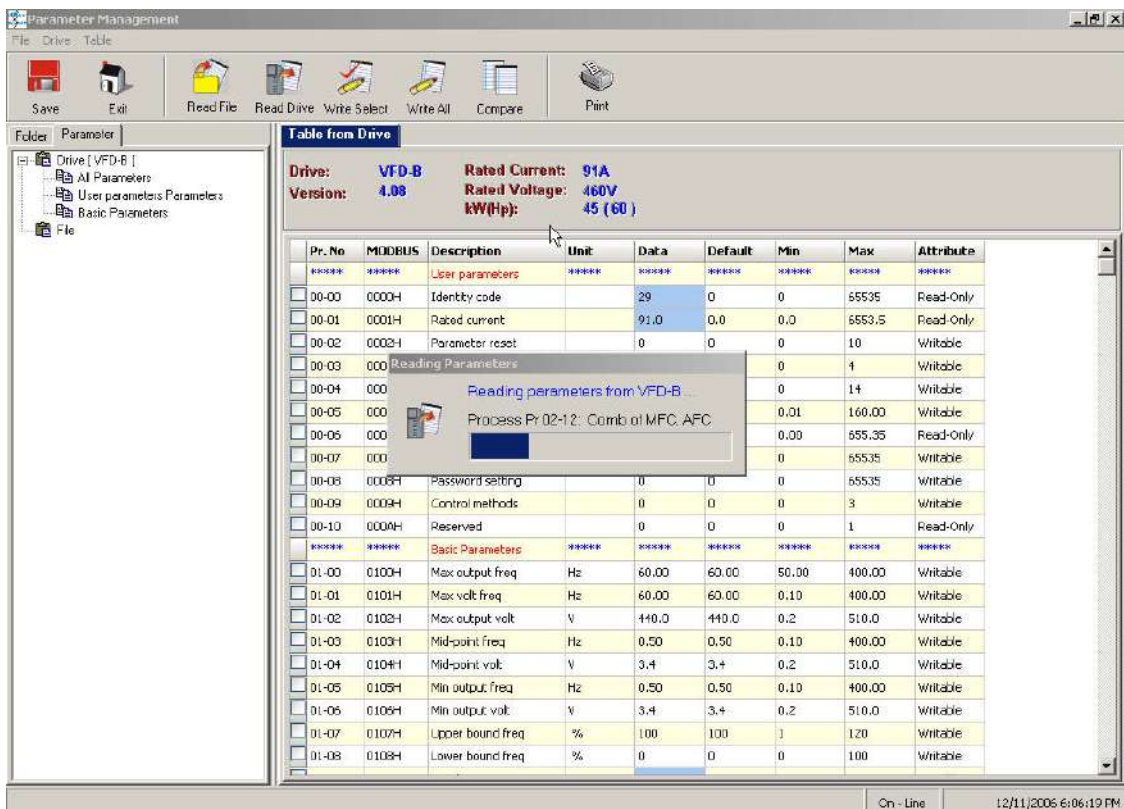
2.5 Parameters management



1. Please select the way of loading parameters for VFD either from file or from communication.



2. Following is the window of reading parameters when loading from communication.



- When reading completed it will appear the following window. Parameters are classified according to different parameter groups which displayed on the left of the window. Their details are displayed on right.

Note: All VFD series have parameter group classification except VFD-M.

The screenshot shows the 'Parameter Management' window. On the left is a tree view of parameter groups. The main area displays a table of parameters. Callouts point to the following fields in the table:

- Parameter communication address (MODBUS)
- Parameters No. (Pr. No.)
- Parameter name (Description)
- Unit
- Current data (Data)
- Default value (Default)
- Minimum scope (Min)
- Maximum scope (Max)
- Whether can read or write (Attribute)

Pr. No	MODBUS	Description	Unit	Data	Default	Min	Max	Attribute
User Parameters								
00-00	0000H	Identity code		29	0	0	65535	Read-Only
00-01	0001H	Rated current		91.0	0.0	0.0	6553.5	Read-Only
00-02	0002H	Parameter reset		0	0	0	10	Writable
00-03	0003H	Start-up display		0	0	0	4	Writable
00-04	0004H	Multi-Func displ		0	0	0	14	Writable
00-05	0005H	User-defined K		1.00	1.00	0.01	160.00	Writable
00-06	0006H	Software version		4.08	4.08	0.00	655.35	Read-Only
00-07	0007H	Password decode		0	0	0	65535	Writable
00-08	0008H	Password setting		0	0	0	65535	Writable
00-09	0009H	Control methods		0	0	0	3	Writable
00-10	000AH	Reserved		0	0	0	1	Read-Only
Basic Parameters								
01-00	0100H	Max output freq	Hz	50.00	60.00	50.00	400.00	Writable
01-01	0101H	Max volt freq	Hz	50.00	60.00	0.10	400.00	Writable
01-02	0102H	Max output volt	V	440.0	440.0	0.2	510.0	Writable
01-03	0103H	Mid-point freq	Hz	0.50	0.50	0.10	400.00	Writable
01-04	0104H	Mid-point volt	V	3.4	3.4	0.2	510.0	Writable
01-05	0105H	Min output freq	Hz	0.50	0.50	0.10	400.00	Writable
01-06	0106H	Min output volt	V	3.4	3.4	0.2	510.0	Writable
01-07	0107H	Upper bound freq	%	100	100	1	120	Writable
01-08	0108H	Lower bound freq	%	0	0	0	100	Writable

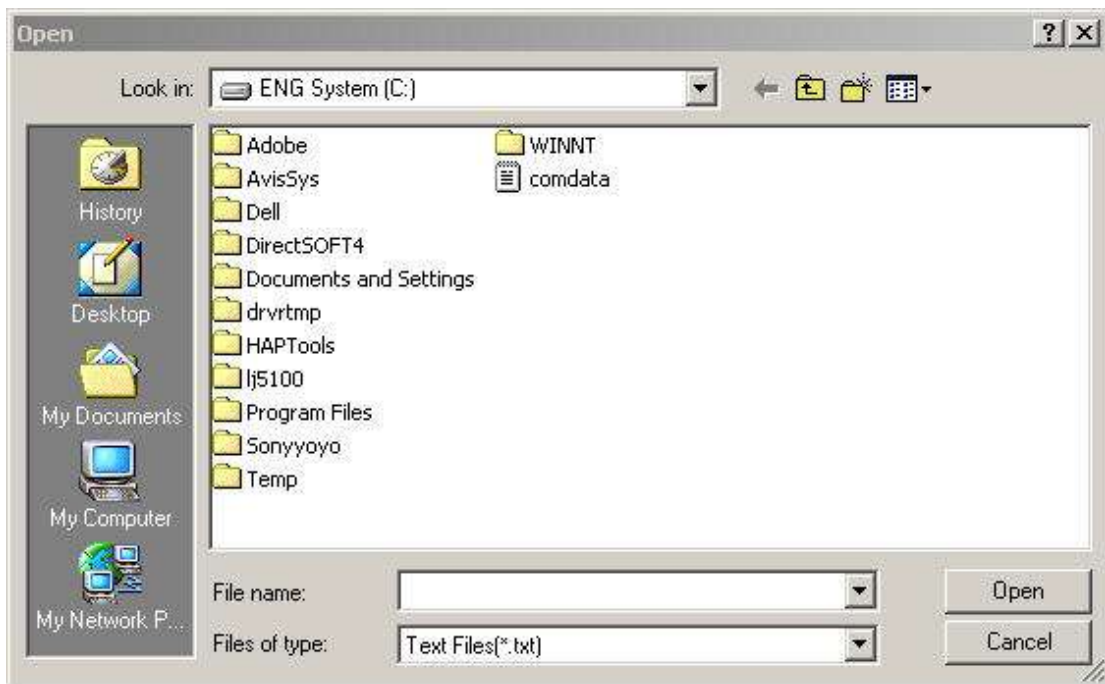
- Select one group from the left then only appropriate parameters will be listed as following.

The screenshot shows the 'Parameter Management' window with the 'Table from Drive' view selected. The left tree view shows 'Drive [VFD-B]' selected. The main area displays a table of parameters for that drive, along with drive-specific information.

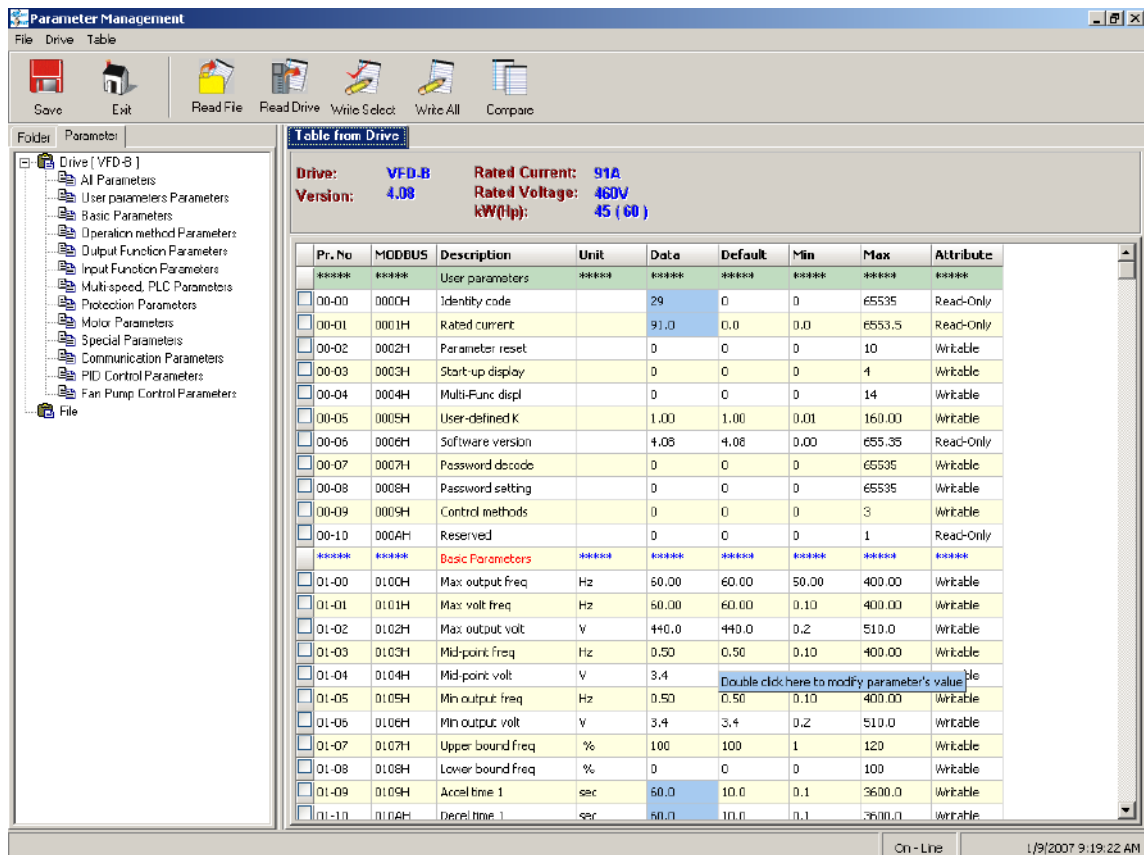
Drive: VFD-B Rated Current: 91A
 Version: 4.08 Rated Voltage: 460V
 kW(Hp): 45 (60)

Pr. No	MODBUS	Description	Unit	Data	Default	Min	Max	Attribute
00-00	0000H	Identity code		29	0	0	65535	Read-Only
00-01	0001H	Rated current		91.0	0.0	0.0	6553.5	Read-Only
00-02	0002H	Parameter reset		0	0	0	10	Writable
00-03	0003H	Start-up display		0	0	0	4	Writable
00-04	0004H	Multi-Func displ		0	0	0	14	Writable
00-05	0005H	User-defined K		1.00	1.00	0.01	160.00	Writable
00-06	0006H	Software version		4.08	4.08	0.00	655.35	Read-Only
00-07	0007H	Password decode		0	0	0	65535	Writable
00-08	0008H	Password setting		0	0	0	65535	Writable
00-09	0009H	Control methods		0	0	0	3	Writable
00-10	000AH	Reserved		0	0	0	1	Read-Only

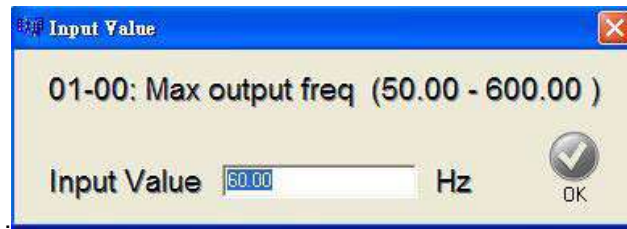
- Please select .txt or.xls file if parameters loaded from files. We advise you to load them from communication if it is the first time to use no parameter file.



The following window shows that parameters are loaded from file. So its way of displaying is different with loaded from communication on the right part of the window.



6. If you want to modify parameters please double click the parameters that listed on the left of the diagram



When modifying finished, the left square frame will be ticked. Now parameters are not really written into VFD.

<input checked="" type="checkbox"/>	01-00	0100H	Max output freq	Hz	60.00	60.00	50.00	400.00	Writable
-------------------------------------	-------	-------	-----------------	----	-------	-------	-------	--------	----------



Write Select

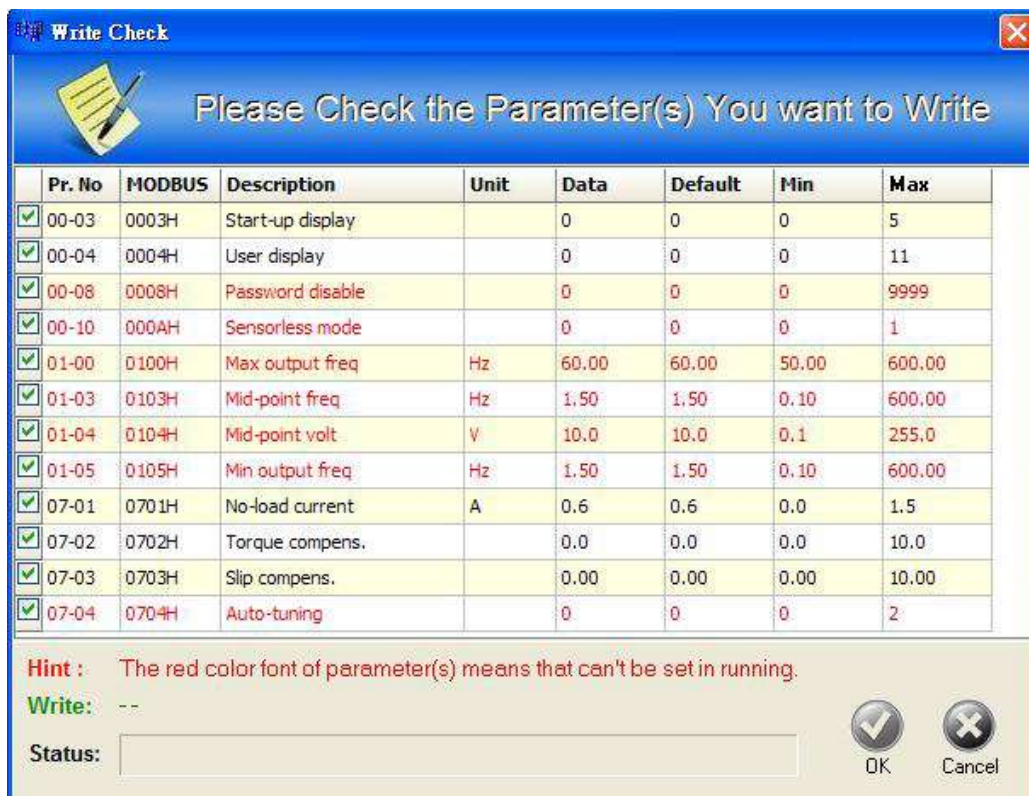
or



Write All

If you wish to write the modified parameters into VFD please select the icon

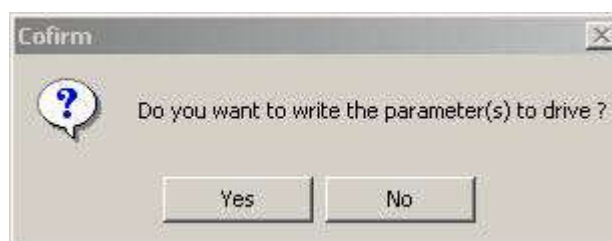
- a. If you select *write select* it will only write in the modified parameters



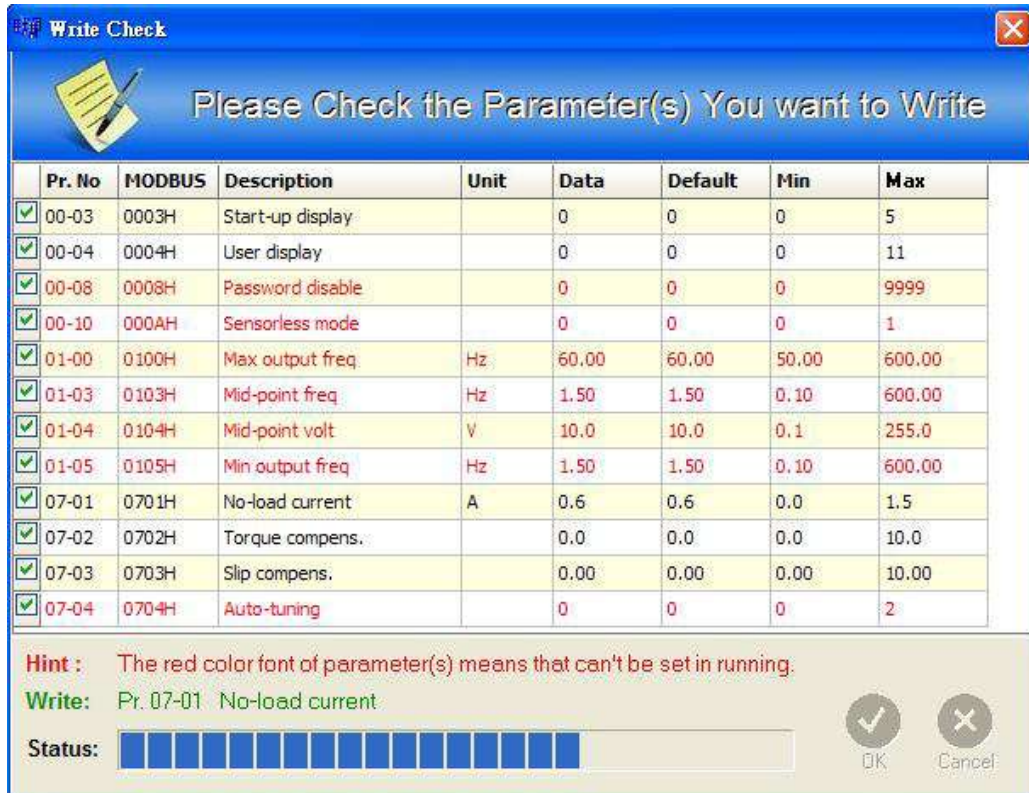
- b. If you select *write all*, all parameters will be written into VFD, no matter whether they have any change or not.



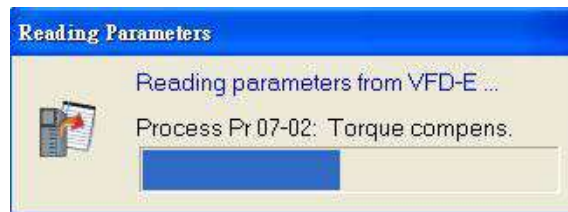
Click  to confirm.



Writing status looks like this

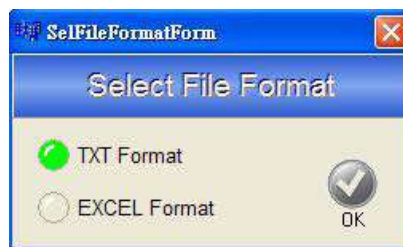


Reading parameters again so as to update the parameters content that showed in the window



7. Saving files

It can be saved as either Text format or Excel format



It needs a transferring progress as bellowing if it is to be saved as Excel format.

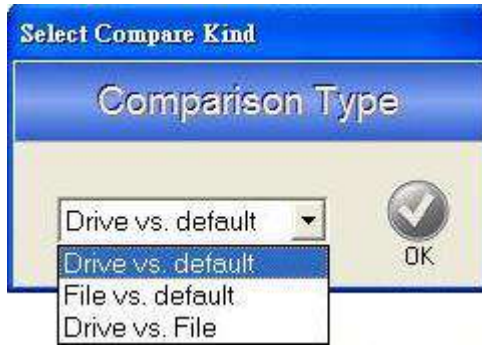


It can be rectified and edited directly after being saved, no matter in Text format or Excel format.

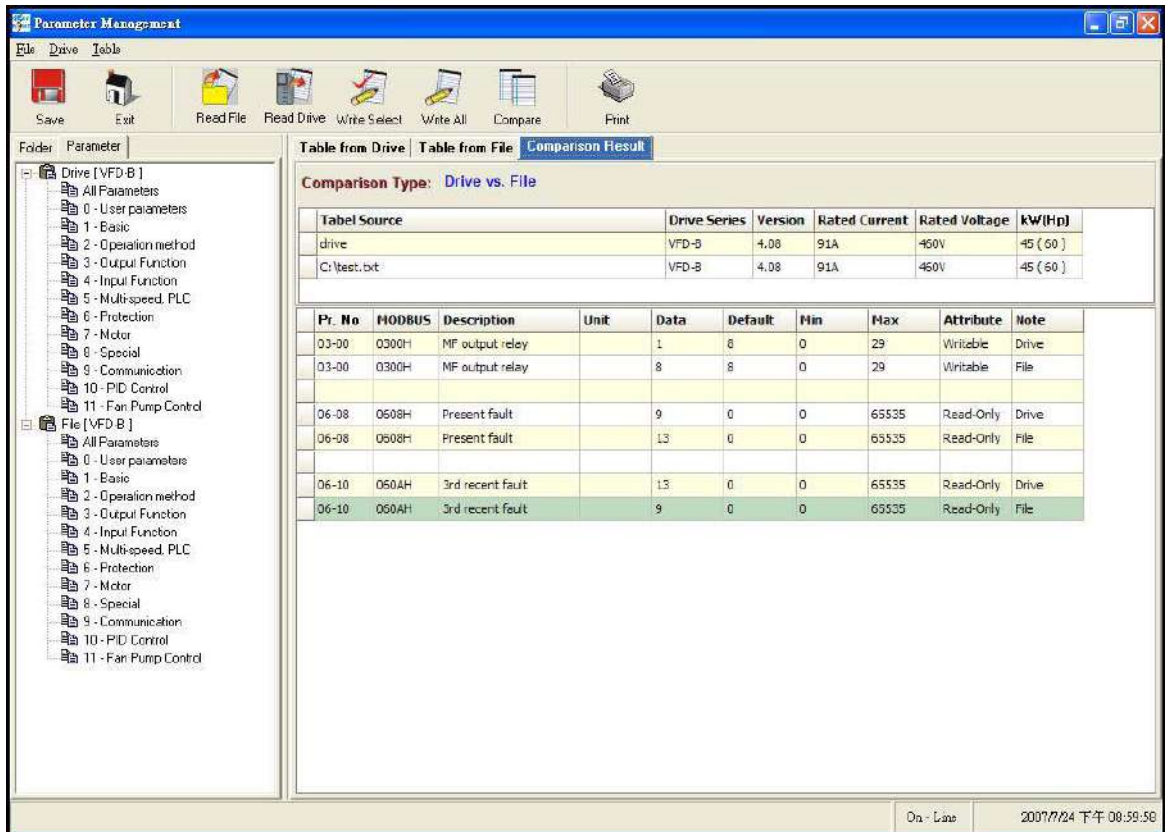
8. Function of parameter comparing

No matter comparing a file to another one or comparing a drive to a file, it will finally list out the parameters that have different setting values.

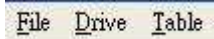
a. Select comparing kind



b. Comparing result



9. Or you can also execute the functions from the above element drop down menu



2.6 Online keypad



You can use online keypad to control the drive, adjust its speed, monitor its status and write in or read out parameters. If you wish to use online keypad to adjust drive's speed and to start or stop it, then please set the parameters of frequency command source and operating command source to be controlled by communication.

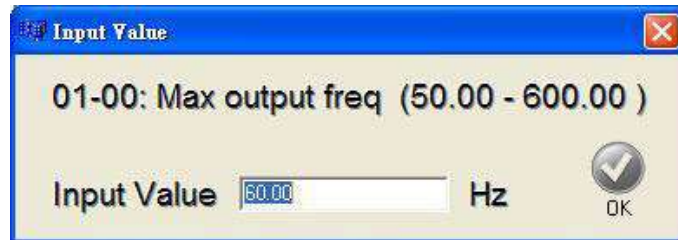
VFD series	Frequency Command Source	Operating Command Source
VFD-B	02-00=04 or 05	02-01=03 or 04
VFD-F	02-00=04	02-01=03 or 04
VFD-S	2-00=04 or 05	2-01=03 or 04
VFD-M	P00=03	P01=03 or 04
VFD-E	02.00=03	02.01=03 or 04
VFD-VE	00-20=1	00-21=2



Press PROG/DATA to set parameters

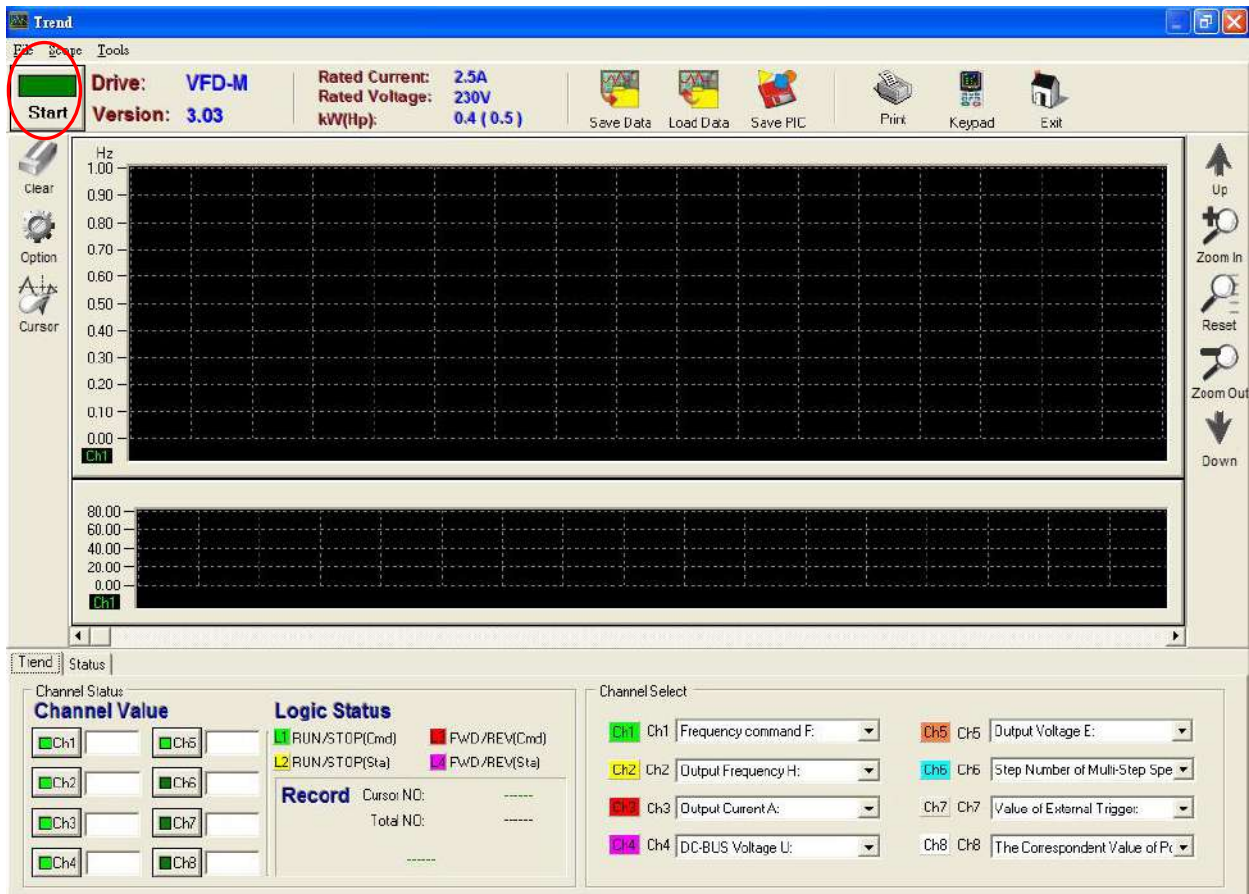


After the selection of a parameter double click its value, and then you can modify it.



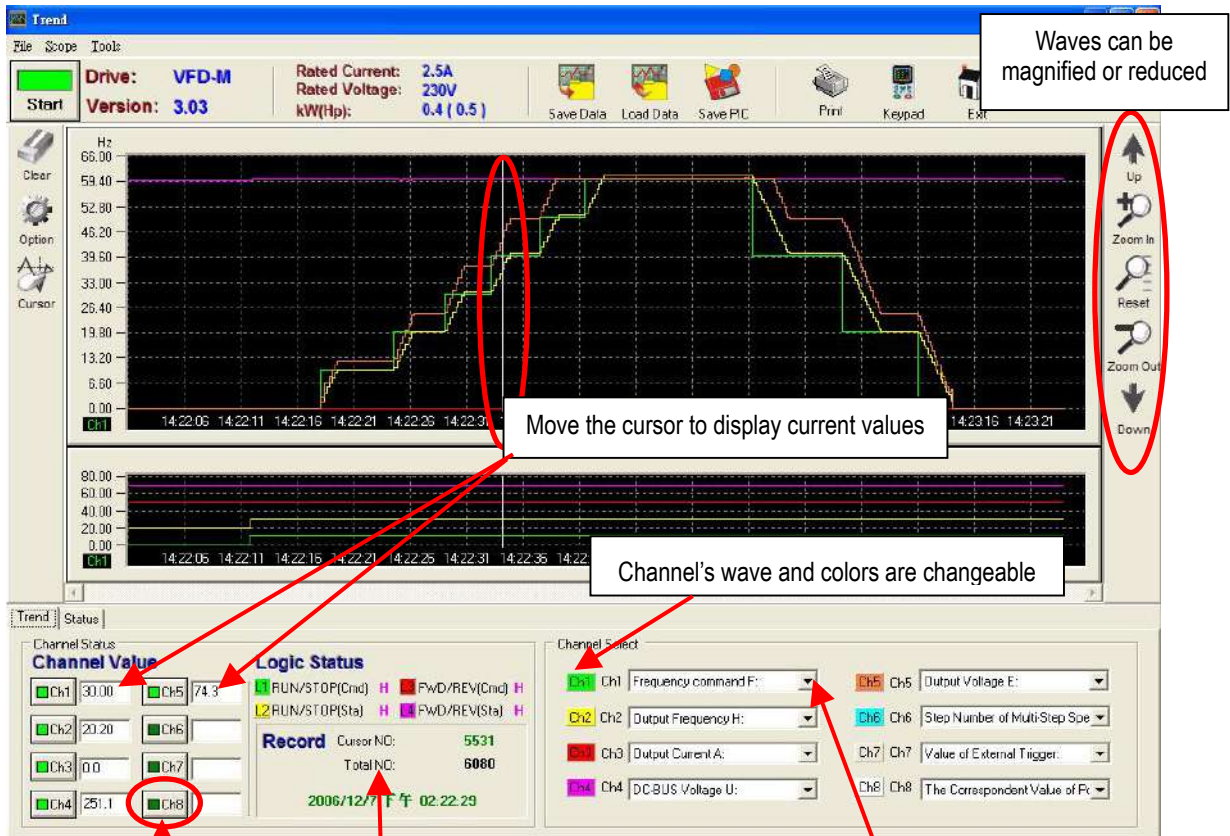
2.7 Trend record

2.7.1 Start trend record



You need to click  so as to start data trend record.


Following displays actual recording status

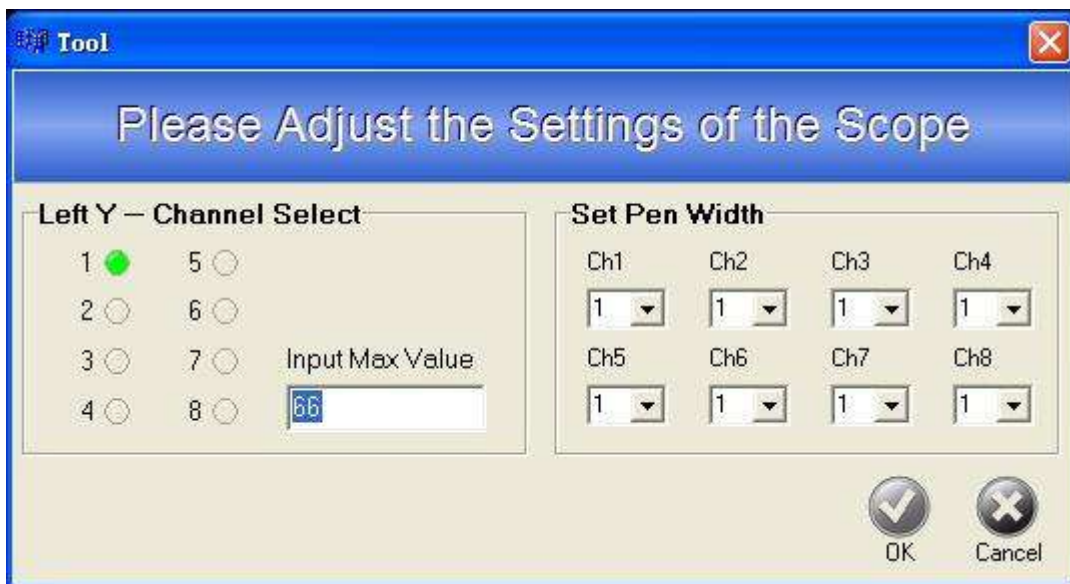




Here can select the needed channel, with a maximum selection of 8 channels


Above displays current data number and bellowing displays total number.


Here can select the monitored data's type

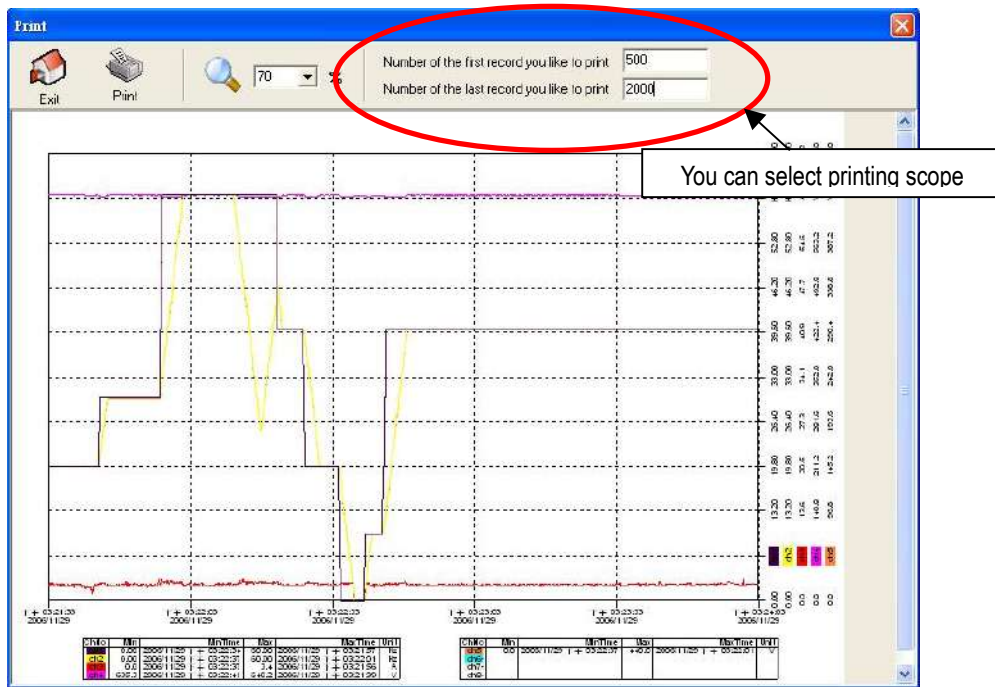
1. Select  on the left it will appear the following frame. Then you can change the wave's thickness degree and each channel's maximum value.




2. You can select   from top of the upper window to save or load trend record wave (*.trd)

3. You can select  from top of upper window to save current page as picture format (*.bmpor*.jpg)

4. You can select  from top of the upper window to print out waves as bellowing



5. You can select  Keypad from top of upper window to use online operating tool (Please refer to3-3)

6. You also can select to execute these functions by menu items **File Scope Tools** on upper left

2.7.2 Page of data status

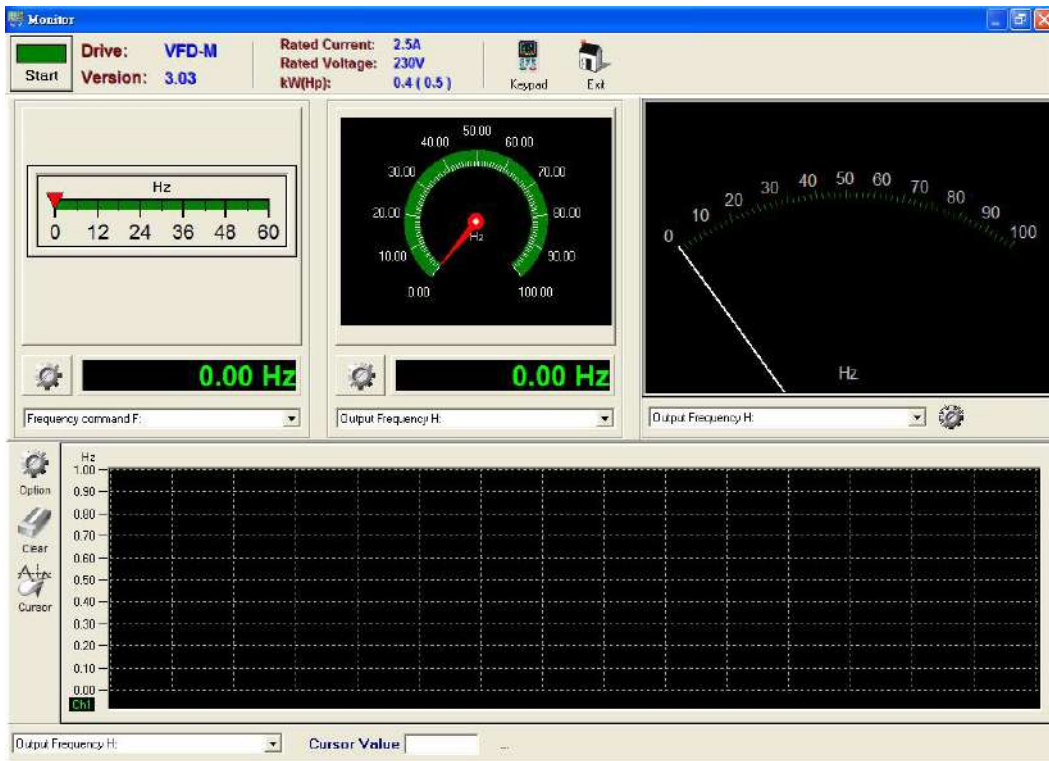
It can display the information of each data's current value, VFD status and error code


Name	Data	Unit	Name	Data	Unit
Frequency command F:	0.00	Hz	Value of External Trigger:	0	
Output Frequency H:	0.00	Hz	The Correspondent Value of Power Factor:	0.0	
Output Current A:	0.0	A	Pr.65 X Low word of H:	0.00	
DC-BUS Voltage U:	250.3	V	Pr.65 X High word of H:	0	
Output Voltage E:	0.0	V	AC Drive Temperature:	30.1	
Step Number of Multi-Step Speed Operation:	0		PID Feedback Signal:	0.00	Hz
Time of PLC Operation:	0		PID Target Value:	0.00	Hz

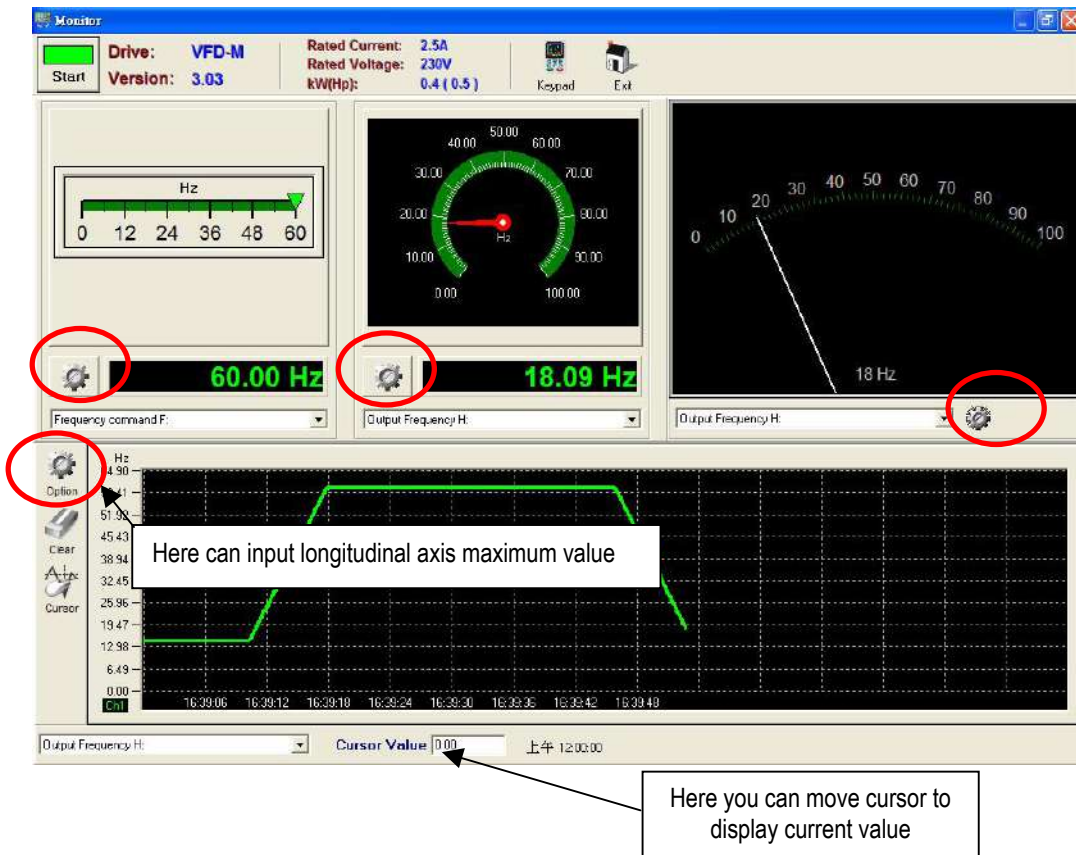
Click here it will appear error history message as bellowing:

	Error Code	Error Description	Time
1	2	ou : Over-voltage	1/9/2007 9:19:50 AM
2	1	oc : Over-current	1/9/2007 9:20:03 AM
3	13	GFF : Ground fault	1/9/2007 9:20:11 AM
4	2	ou : Over-voltage	1/9/2007 9:20:24 AM
5	1	oc : Over-current	1/9/2007 9:20:39 AM
6	13	GFF : Ground fault	1/9/2007 9:21:03 AM

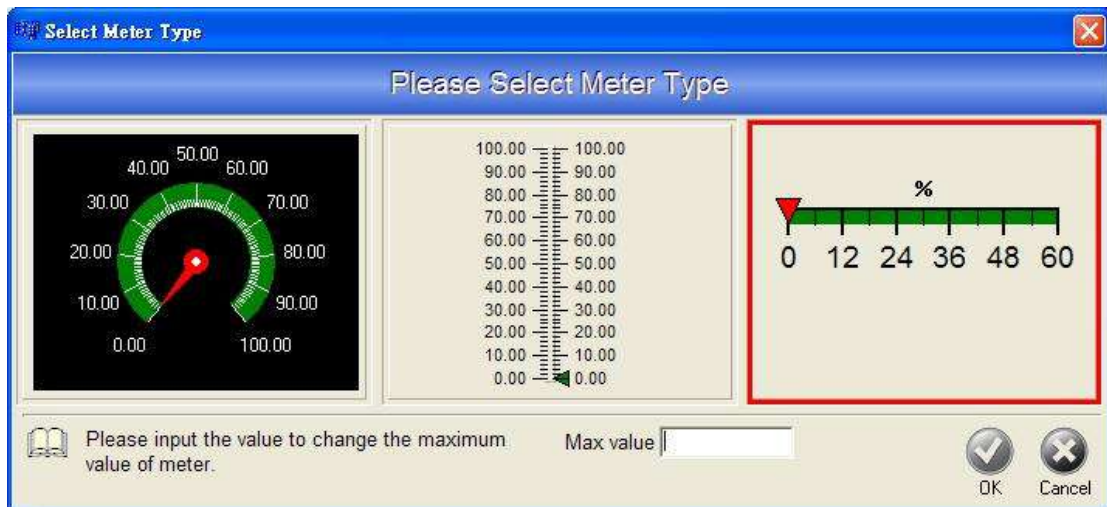
2.8 Instant monitoring




1. Click  to start instant monitoring



2. Click  to select meter type



3. The following oscillograph has the same function with trend record, but it has only one channel

4. You can select  to use online operating tool (Please refer to 3-3)

2.9 Advanced functions

2.9.1 Page A

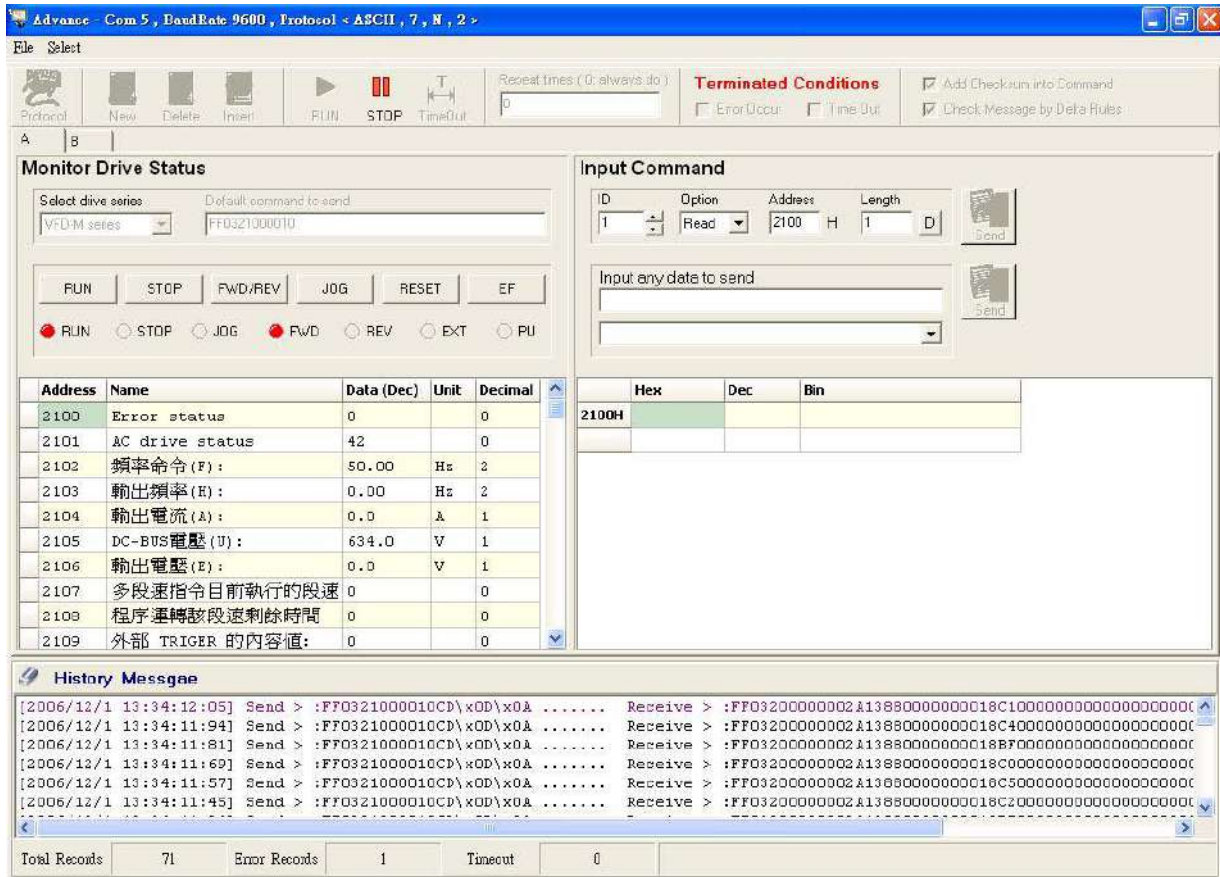


Here is for communication data monitoring as showed in the following window

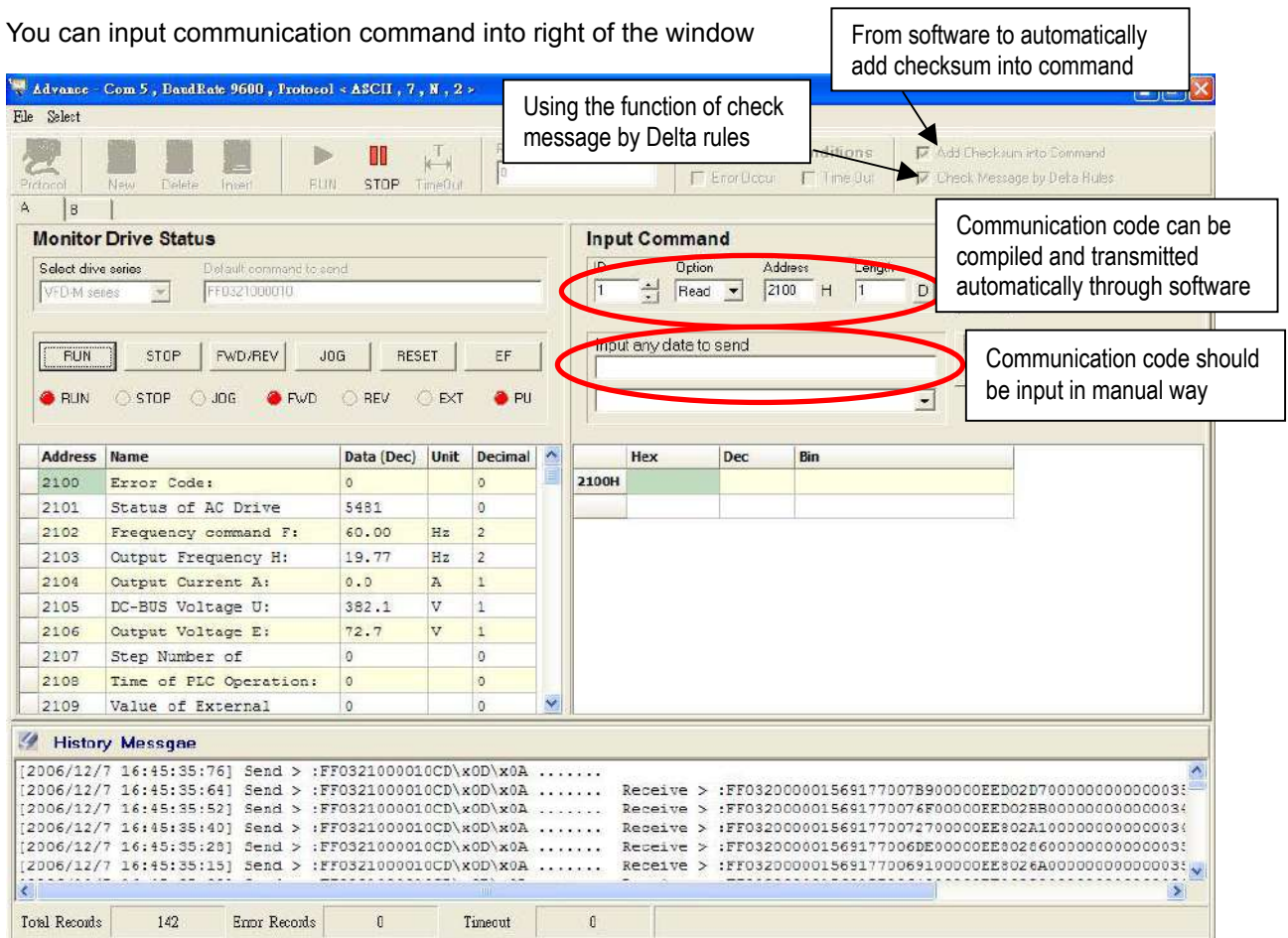
Select models

Here can control VFD's operating, but please first change the operating command source to communication controlling

Address	Name	Data (Dec)	Unit	Decimal
2100	Error Code:			0
2101	Status of AC Drive			0
2102	Frequency command F:		Hz	2
2103	Output Frequency H:		Hz	2
2104	Output Current A:		A	1
2105	DC-BUS Voltage U:		V	1
2106	Output Voltage E:		V	1
2107	Step Number of			0
2108	Time of PLC Operation:			0
2109	Value of External			0

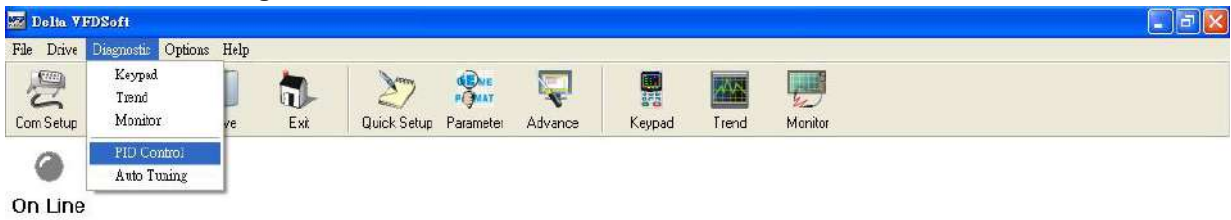


You can input communication command into right of the window



2.10 Other functions

2.10.1 PID controlling



The PID Control window is divided into two main sections: 'Troubleshooting' and 'PID Diagram'.

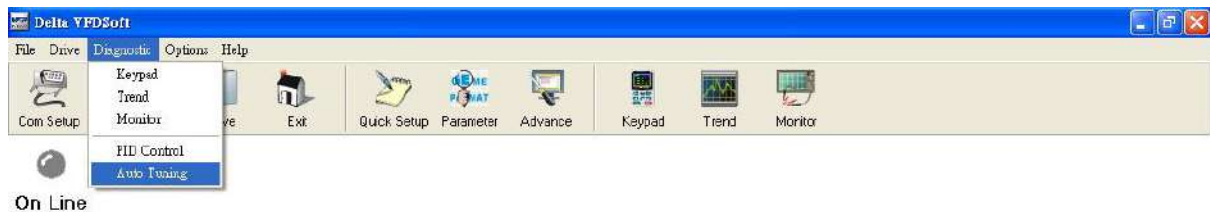
Troubleshooting: A graph plots Speed (0-7) against Time (0-6). Two curves are shown: 'Before' (red) and 'After' (blue). The 'After' curve shows a significantly reduced overshoot and faster settling time compared to the 'Before' curve. Text instructions suggest: 'Decrease Integral time(I) and increase Differential time(D)'. Below the graph are checkboxes for 'Overshoot', 'Rise time too large', 'Settle time too large', and 'Undamped, Marginal stable'.

PID Diagram: A block diagram of the PID control loop. It starts with a 'Targeted value' entering a summing junction. The output of the summing junction goes to the 'P' block (Pr.117). The output of the P block goes to another summing junction. The output of this second summing junction goes to the 'I' block (Pr.118). The output of the I block goes to a third summing junction. The output of the third summing junction goes to the 'D' block (Pr.119). The output of the D block goes to a fourth summing junction. The output of the fourth summing junction goes to the 'Limit of PID Output Frequency' block (Pr.122). The output of the limit block goes to the 'One Time Delay' block (Pr.121). The output of the delay block goes to the 'Frequency Command' block. The 'Frequency Command' block outputs to the 'LPF' block (Pr.135). The 'LPF' block outputs back to the first summing junction. The 'LPF' block also receives input from the 'Definition of Detection Value' block (AVI/Pr.128-Pr.130; ACI/Pr.131-Pr.133). The 'Definition of Detection Value' block also receives input from the 'Selection of Detection value' block (Pr.116).

Pr. No	Description	Unit	Data	Default	Min	Max
116	PID Feedback		0	0	0	3
117	PID P gain		1.0	1.0	0.0	10.0
118	PID I gain	sec	1.00	1.00	0.00	100.00
119	PID D gain	sec	0.00	0.00	0.00	1.00
120	I upper limit	Hz	300	100	0	100
121	PID filter	sec	0.0	0.0	0.0	2.5
122	PID out limit	Hz	300	100	0	110
128	Min ref0-10V	V	0.0	0.0	0.0	10.0
129	Max ref0-10V	V	10.0	10.0	0.0	10.0

At the bottom of the window are control buttons: RUN, STOP, JOG, FWD, REV, and an Exit button.

2.10.2 Automatically measuring of motor parameters



The Auto Tuning window displays instructions for performing auto-tuning. It includes a list of steps and a table of parameters.

Before Auto Tuning:

- Make sure motor wiring is correct.
- Make sure the motor has no-load before executing auto-tuning and the shaft is not connected to any belt or gear motor.
- Fill in Parameters as below with correct values:

Pr. No	Description	Unit	Data	Default	Min	Max
01-01	Max volt freq	Hz	60.00	60.00	0.10	400.00
01-02	Max output volt	V	440.0	440.0	0.2	510.0
07-00	Motor rated curr	%	100	100	30	120
07-04	Poles of motor		4	4	2	10
07-08	Rated slip	Hz	3.00	3.00	0.00	20.00
07-01	No-load current	%	40	40	1	90
07-06	R1 line to line	mohm	0	0	0	65535

Below the table is a dropdown menu showing '1: Auto Tuning R1 (motor does not run)'. A 'START' button is present, with a note: 'Only auto detect R1 value and Pr.07.01 must be input manually.' A speedometer graphic shows a needle pointing to approximately 10 Hz. An 'Exit' button is also visible.