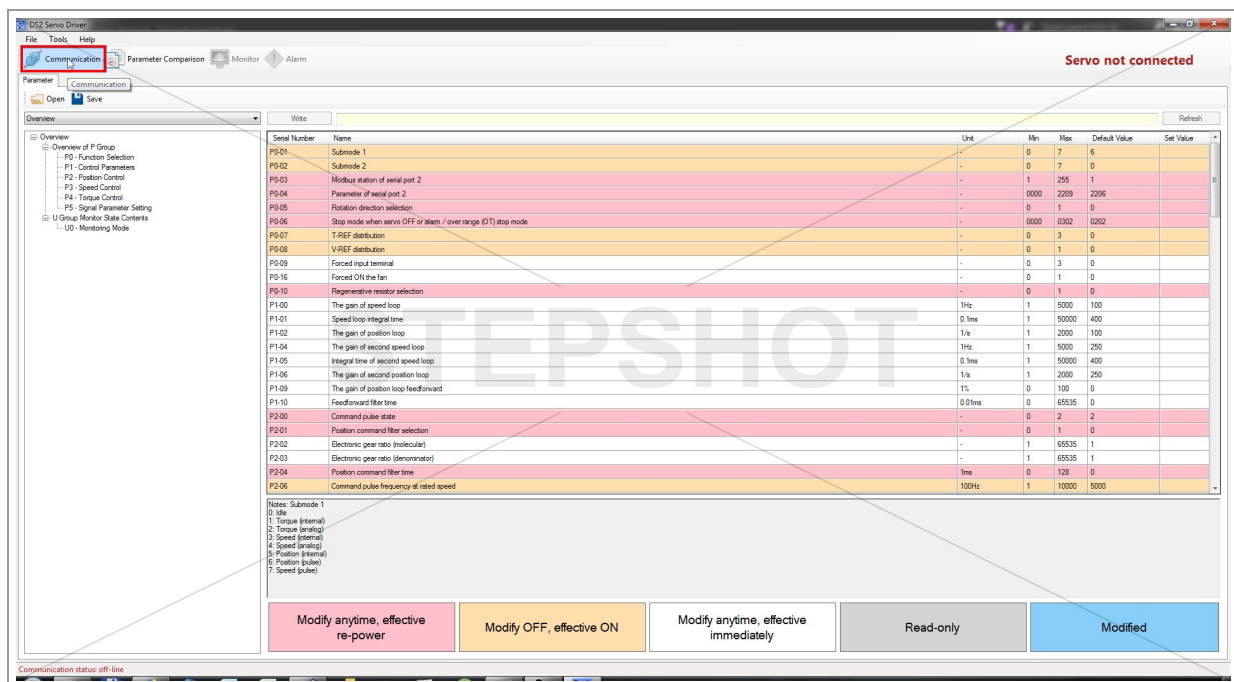# SAH DS2 Servo Driver Software Manual

Igor Filipovic

This is a brief overview of all implemented software features and cases of use. If you have any issues or questions, feel free to contact me: igor@sah.rs
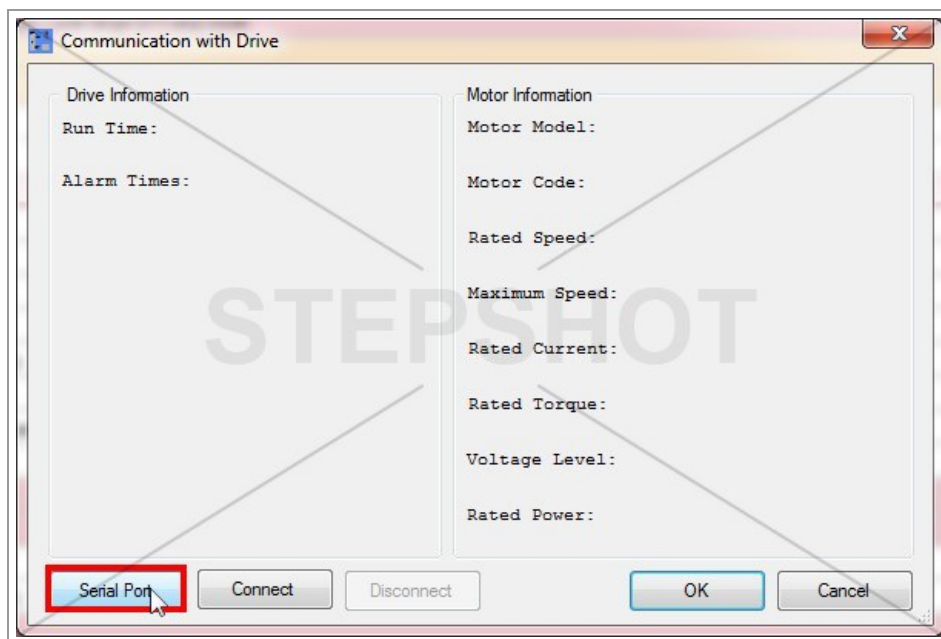
Communication Establishment
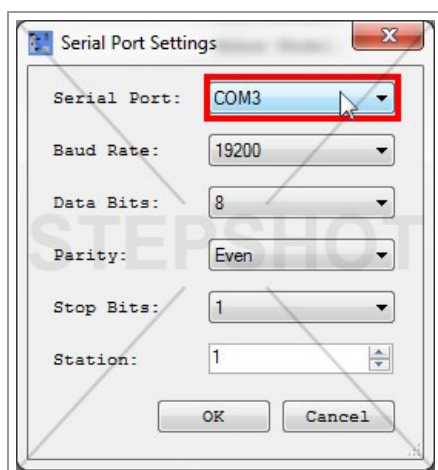
Communication Settings

Click on "Communication" button to open the settings for communication establishment.

Serial Port Settings

Click on "Serial Port" button to set the parameters of your communication (serial port number, baud rate, parity, etc.).
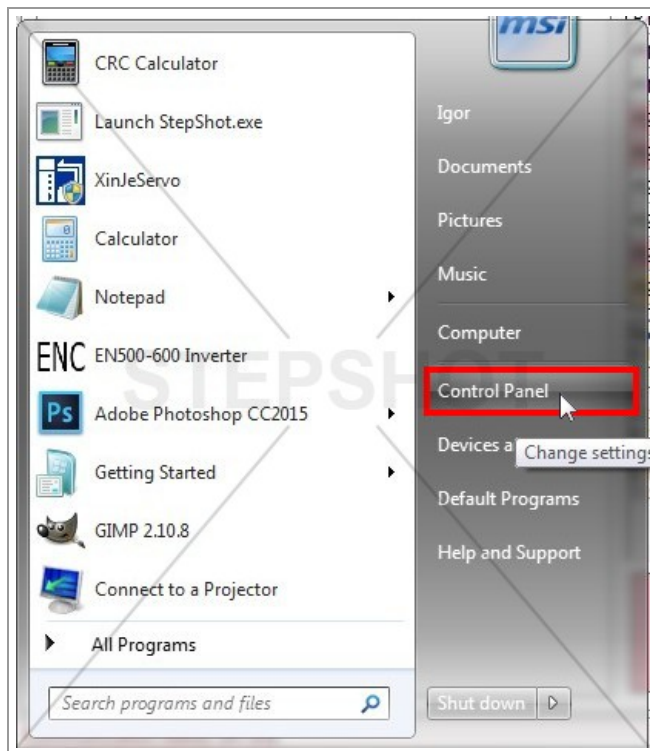

By clicking on "Serial Port" dropdown menu, you'll get the list of all available serial ports on your computer.

To make sure what port is your servo driver connected to, go to Control Panel -> Device Manager -> Ports (COM & LPT) and check for USB-SERIAL CH341A.
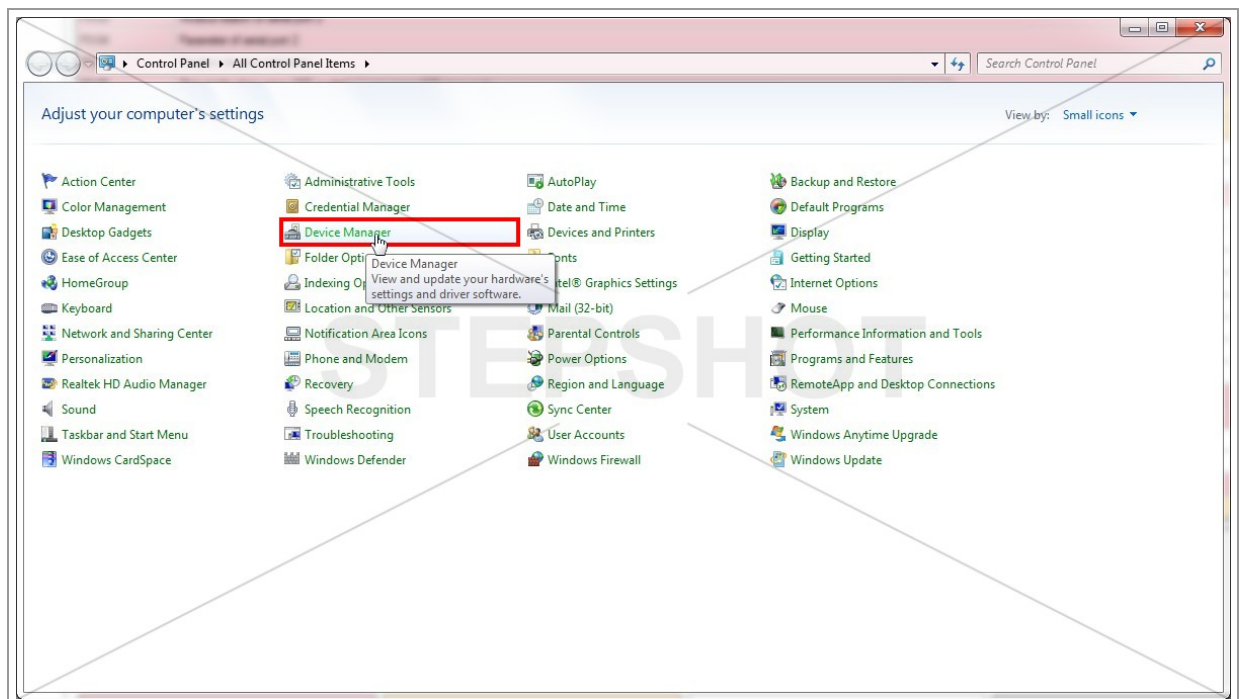
If you're having a problem with this, check next few steps.
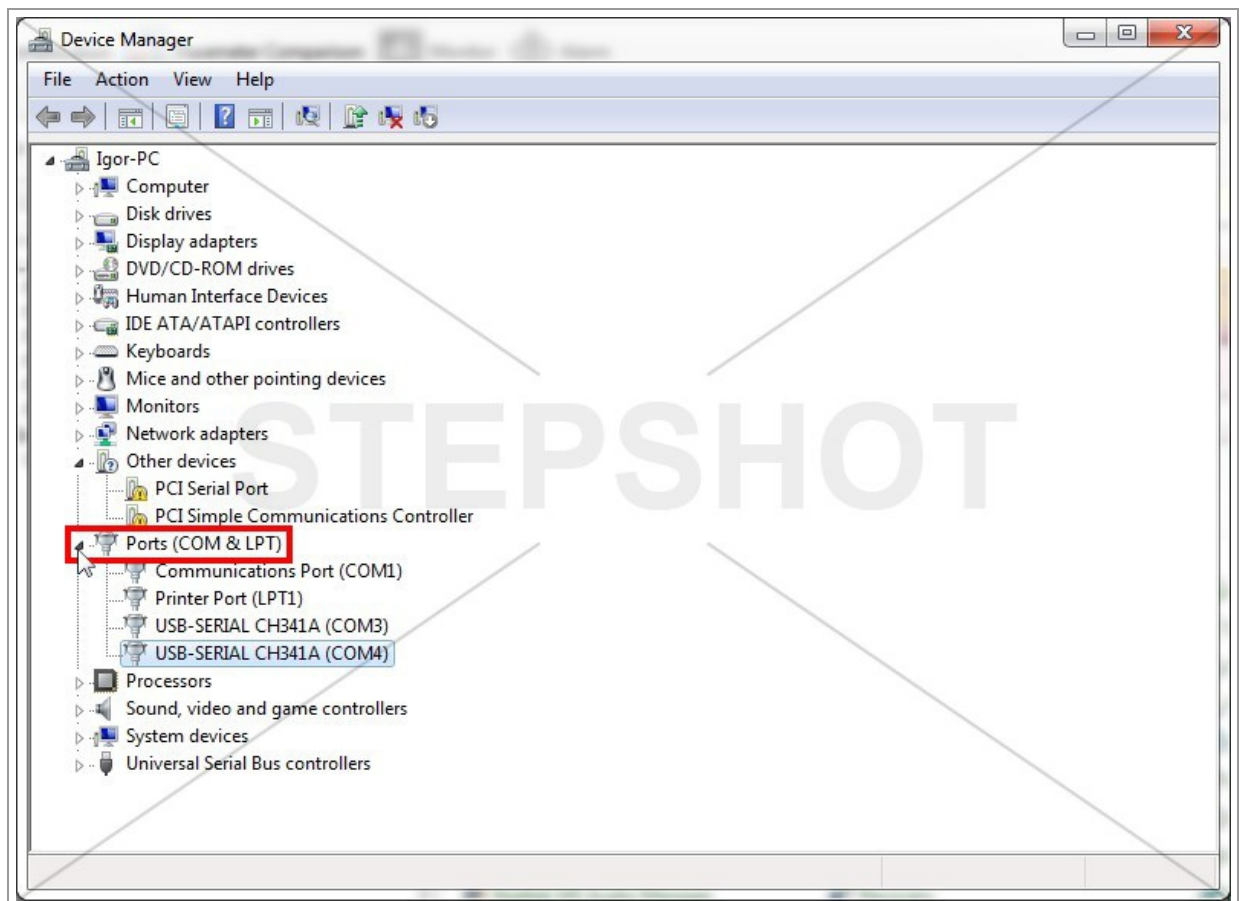
Check for Serial Port

This is the procedure of checking your serial port if you're using Windows 7. It's similar to other Windows platforms.

Click on "Control Panel" button in your Start menu.

Click on "Device Manager" link in "All Control Panel Items" (if you cannot find it, search for "Device Manager" in search box).

In "Device Manager" menu click on small triangle left to "Ports (COM & LPT)" to expand the all connected ports to your computer.
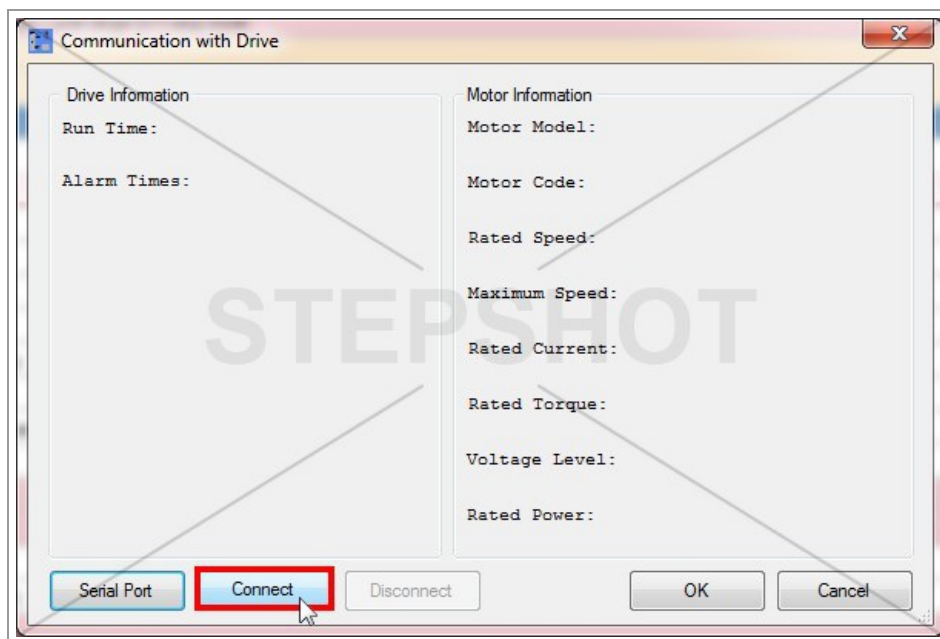
Find "USB-SERIAL CH341A" and notice its label in brackets (COM + number).

Use that label in your serial port selection.
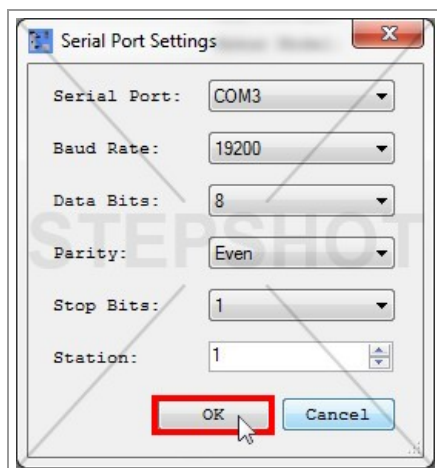
Go back to your "Serial Port Settings", set the other parameters as explained in device manual and click on "OK" button to confirm them.
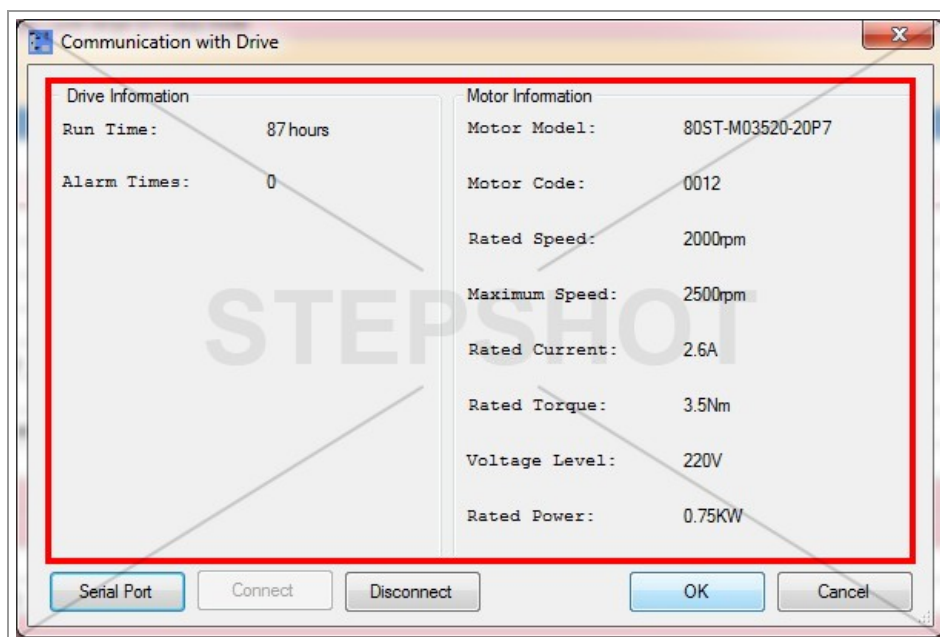
Connect the Servo Driver

Click on "Connect" button in "Communication with Drive" to establish the communication with servo driver.
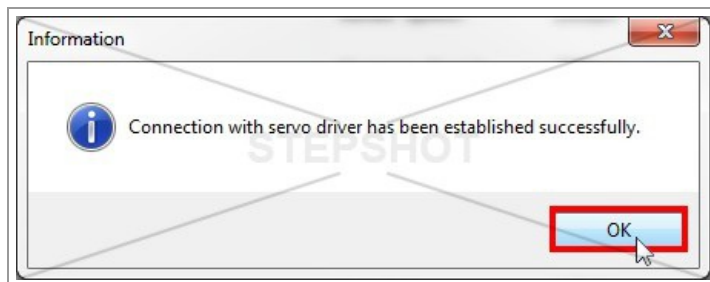
You should get the information about successful communication establishment.

You'll get the essential information about your driver and motor.
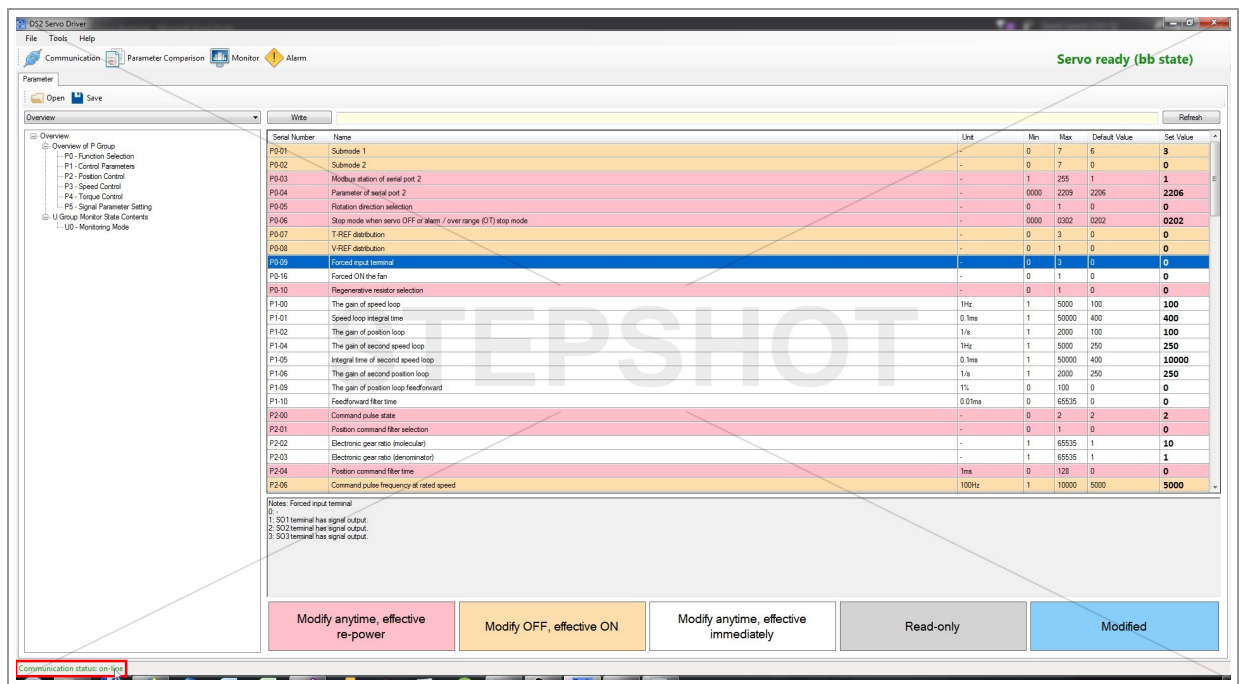
Read The Values From Driver
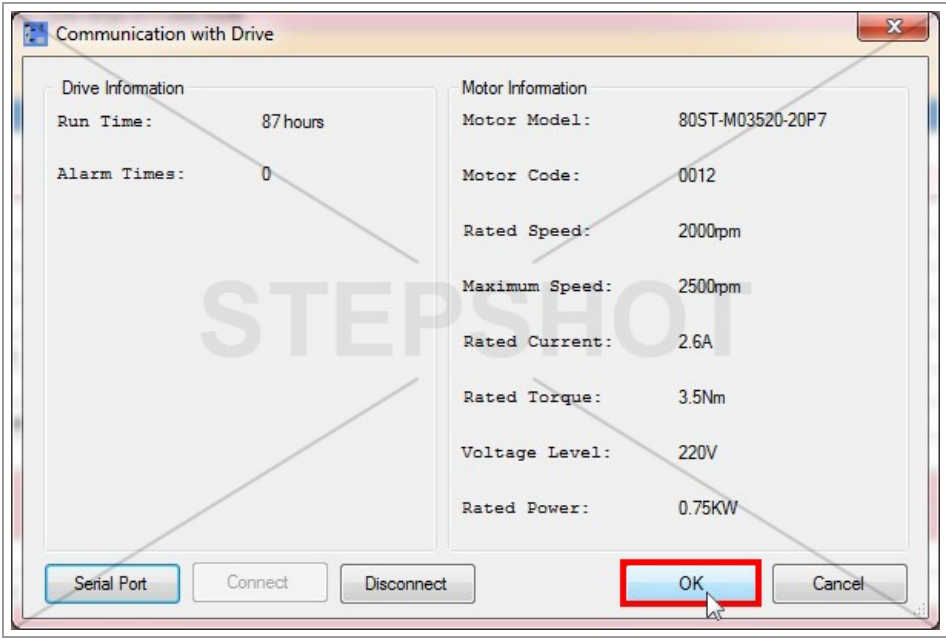
Click on "OK" button in "Communication with Drive" to load the values of all driver parameters.
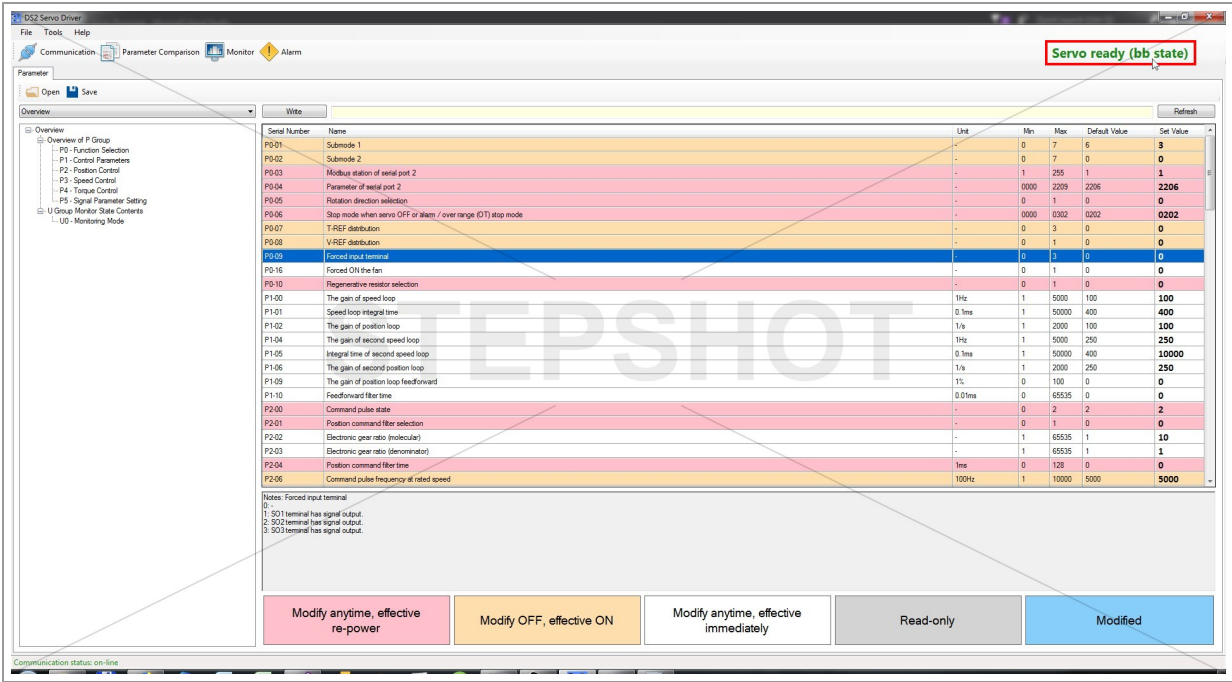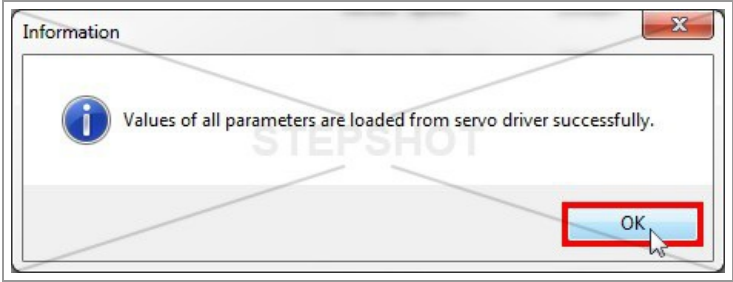
You'll notice that the servo status indicator is changed from "Servo not connected" to "Servo ready (bb state)".

This indicator shows the current state of servo (bb, run, alarm, connected, not connected).

You can also check for the current communication status in the left corner of your status bar (green -> on-line, red -> off-line).

Review of The Main Features

Parameter Table
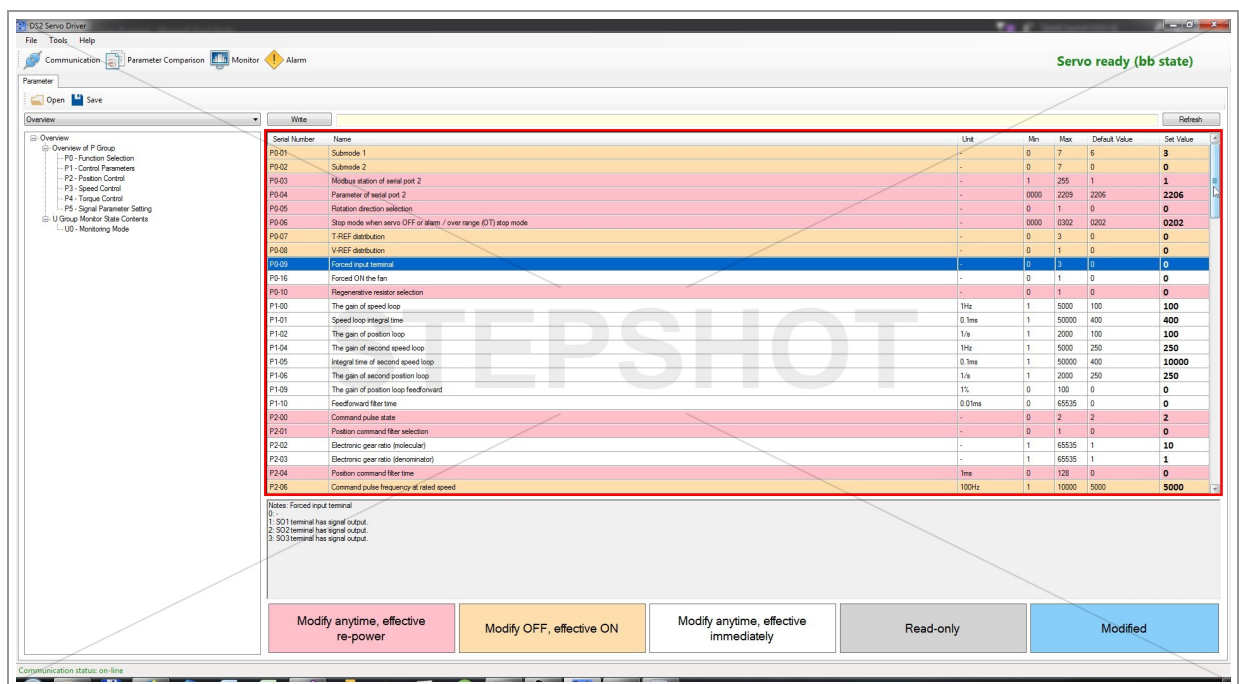
All available parameters are shown in the full table view with their serial number, description, unit, minimum value, maximum value, factory default value and current value read from the servo driver in the moment of establishing communication.

You are able to scroll the table vertically.

Tree View Selection
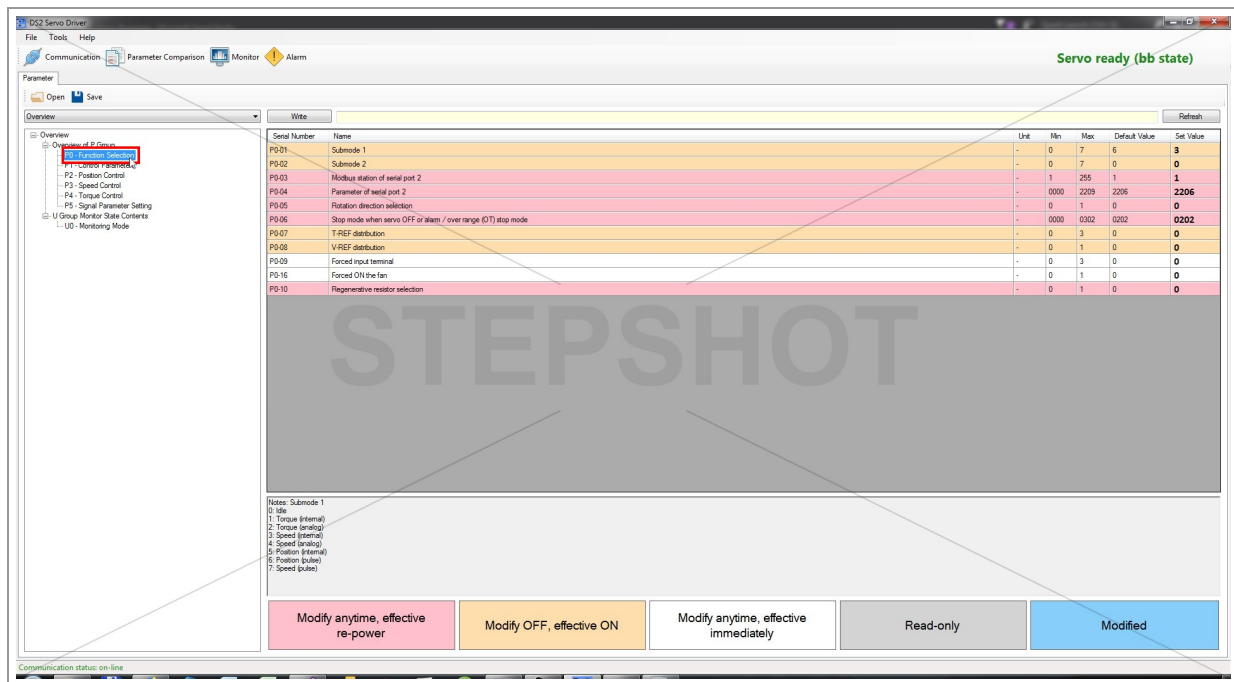
You can shorten the list of parameters in table by clicking the desired group of parameters in the tree view menu.
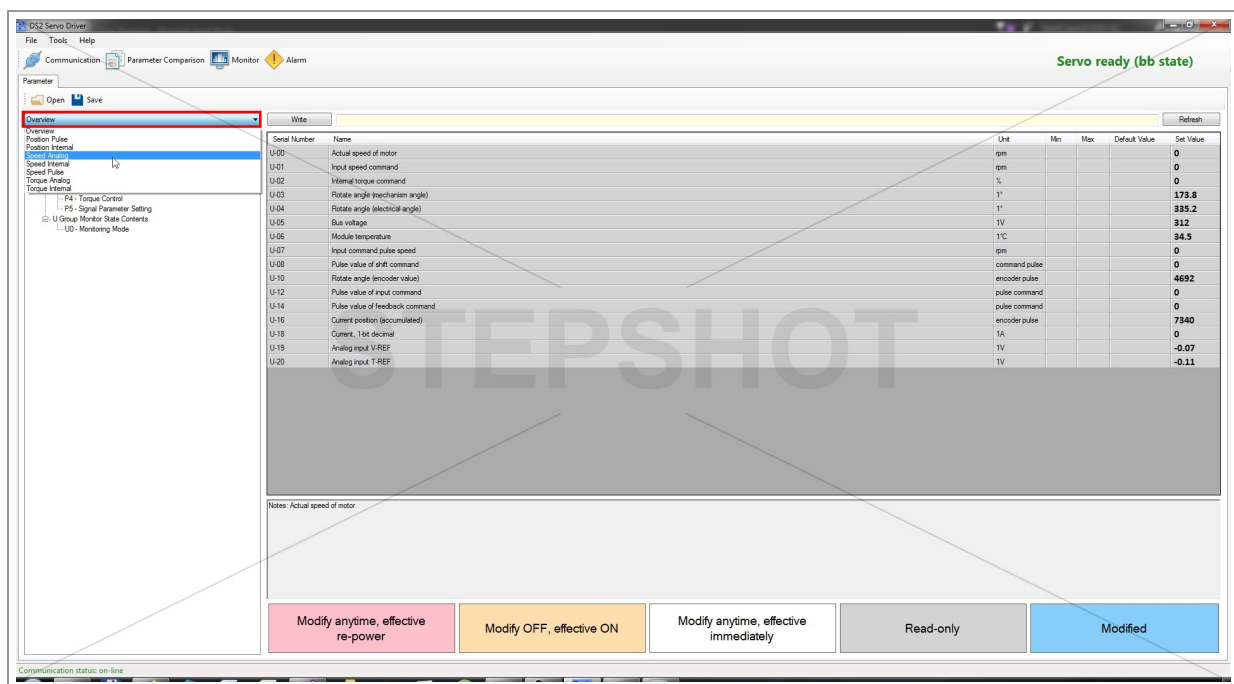
Also you can select the parameters relevant to certain control mode by choosing it from dropdown menu above the tree list.

Notes

Notes are shown for each parameter, when clicked.

There you can find the more detailed description and the list of possible values with explanation.

Row Color Explanation

The currently selected row is colored in dark blue.

When colored in pink, the parameter can be changed anytime, but it will be applied after re-powering the servo drive.

You cannot change the orange parameters when the servo is in run mode, only when it's in bb state.

White parameters can be changed anytime and their change is effective immediately.

Parameters colored in grey are read-only (monitor U parameters), so their value cannot be changed by user.

When you enter your own value for the certain parameter, it becomes colored in light blue, which means that it is added to write buffer (more in section Write to Servo).

Search Box

You can search for the certain term or part of the term in table ("Name" column) by writing the search term and pressing ENTER key on your keyboard.

Write to Servo

To change the current value of certain parameter double-click on it, type the value you want to write and press ENTER.

Note: Make sure that your value does not exceed the minimum and maximum limit.
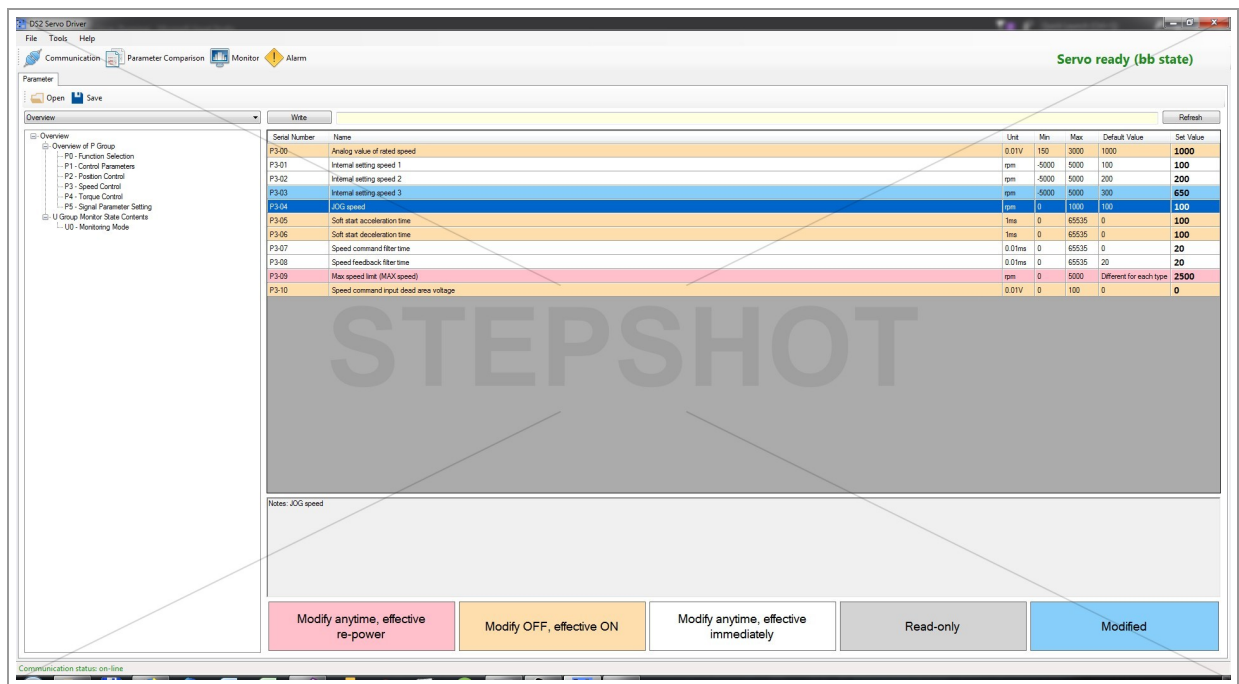
By pressing ENTER, you'll notice that the row of changed parameter became colored in light blue.

You can change the value of as many parameters as you wish before write all of them to servo (parameters doesn't have to be in the same group).
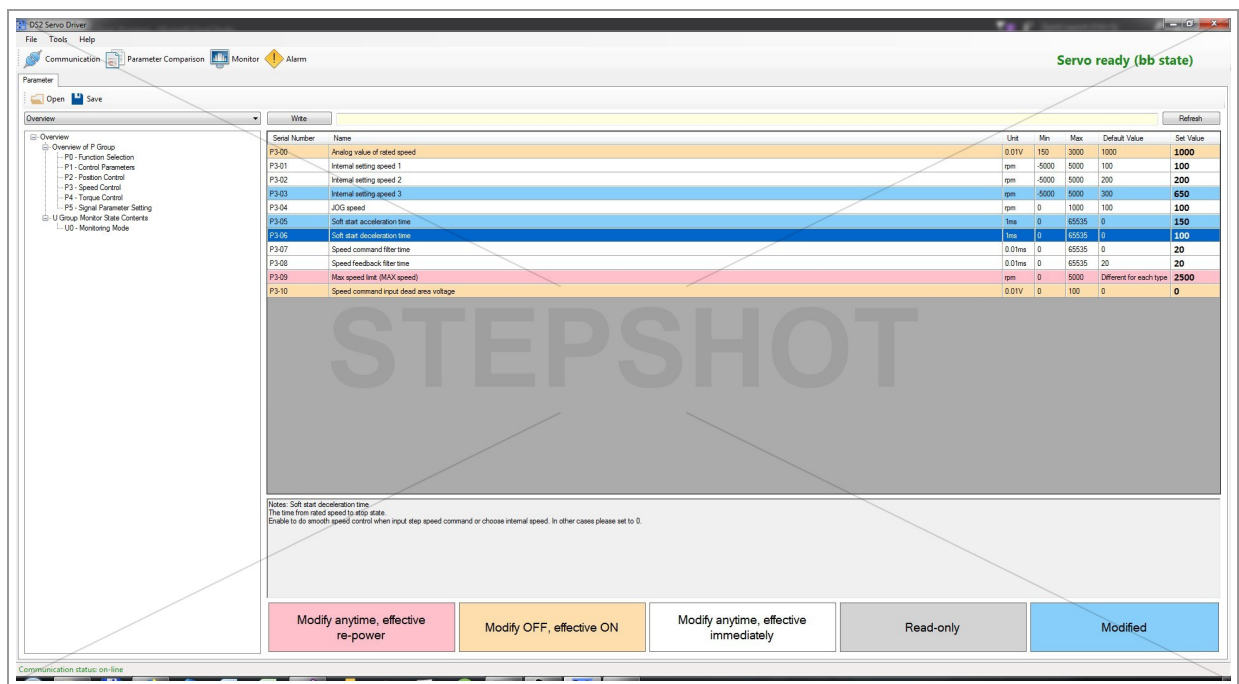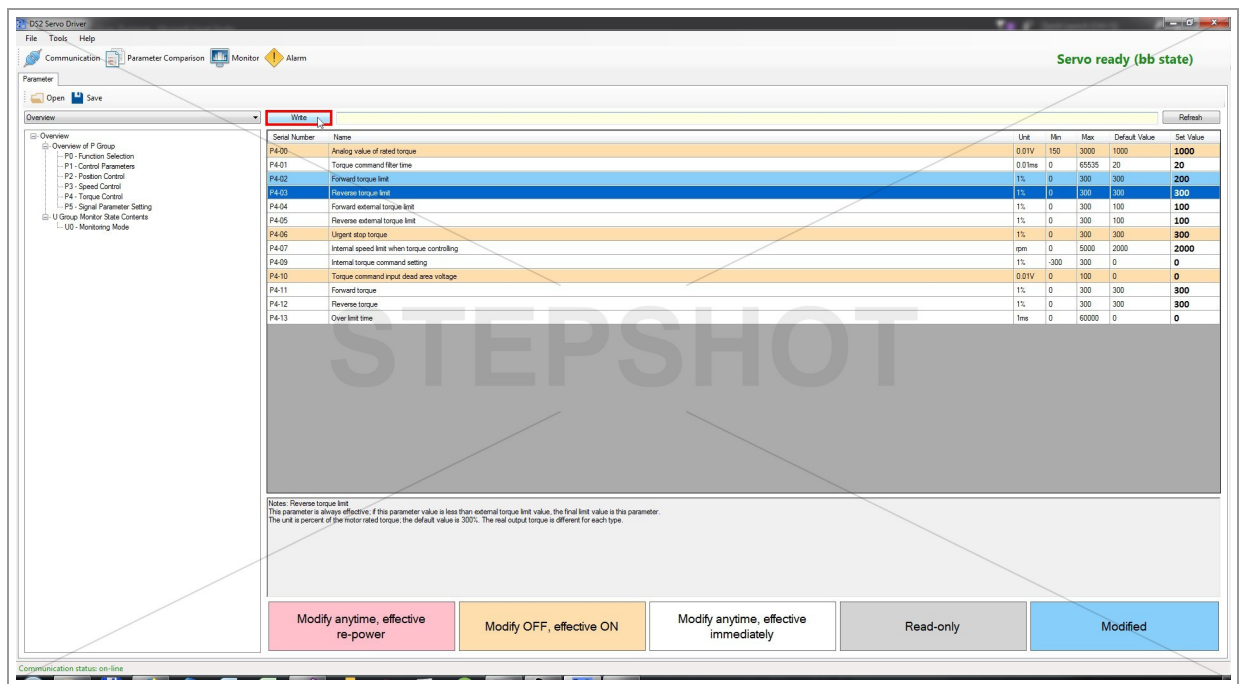
After you finish with modifying the values, click on "Write" button to select which of them you want to be written to servo driver.

Write Buffer
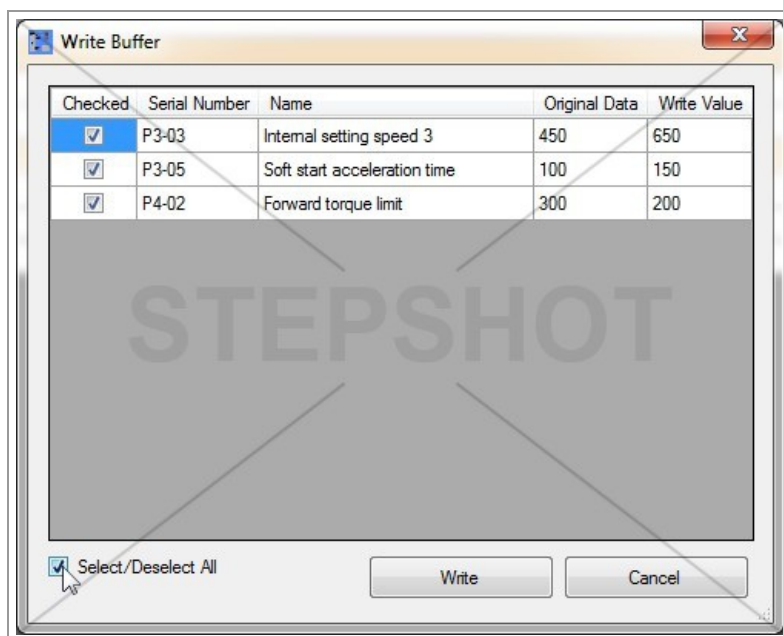
You'll get the window with mini table that contains the preview of your potential changes (write buffer).

By default, all the changes are checked; if you don't want some change to be applied, you can uncheck the certain row or the whole table by clicking on "Select/Deselect All" checkbox.
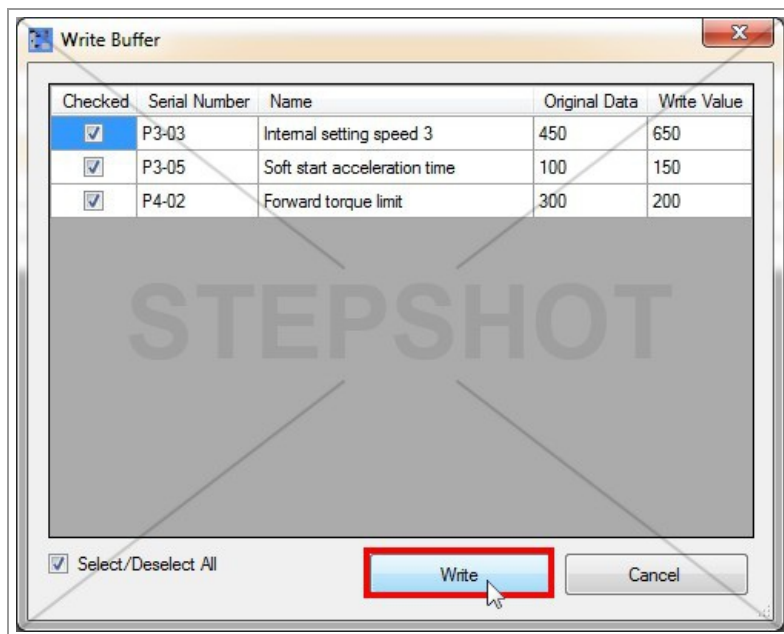
Click on "Write" button in "Write Buffer" to write the new values of all selected parameters to servo.
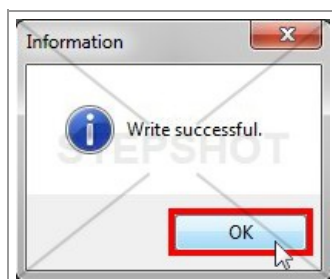
Refresh The Current Table View
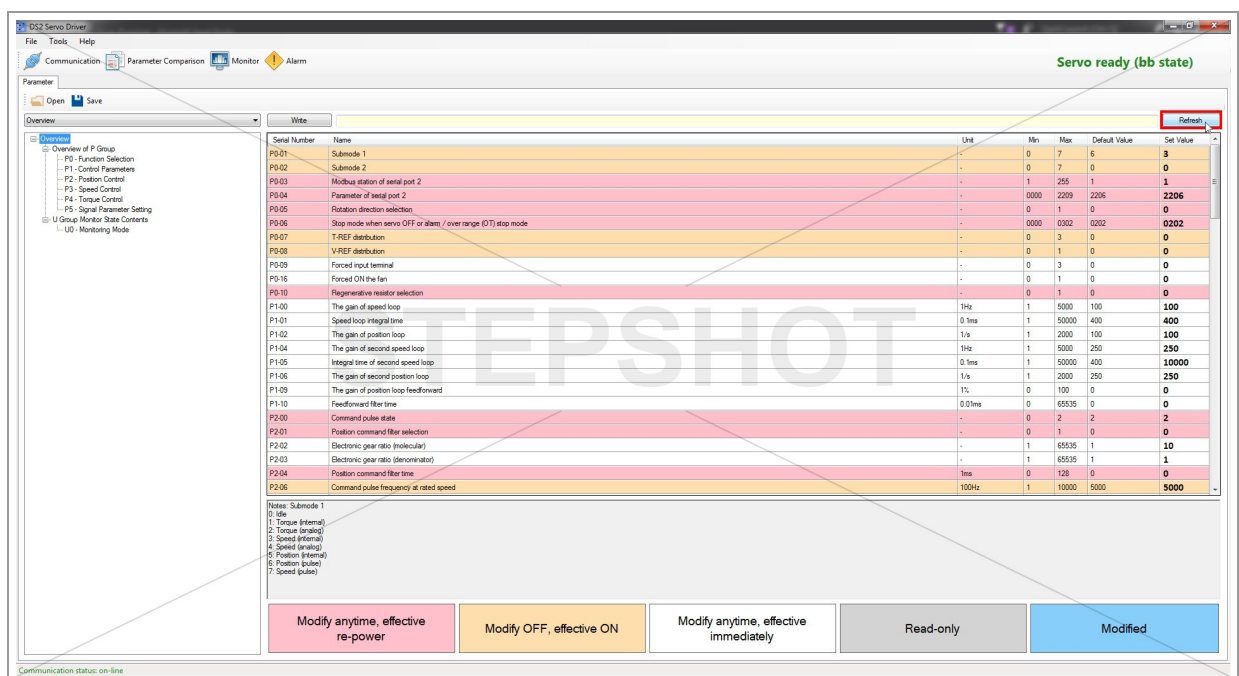
You can always reload from servo the values of parameters in the current view by clicking on "Refresh" button.

Export Data
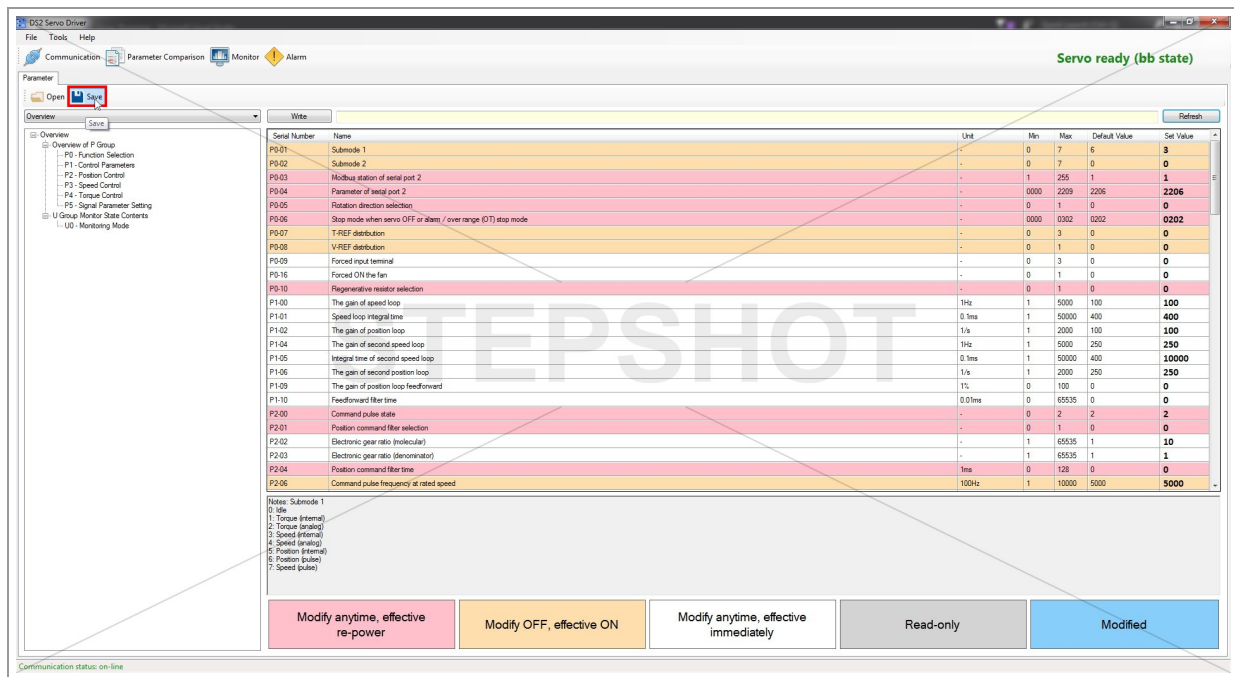
You can export the current values of all parameters to file by clicking on "Save" button.

Enter the desired name of your template and click "Save".

Note: This file will have the unique .sdt extension that is not compatible with other similar software.

Import Data

Also you can import the previously saved template in a similar way.

Click the "Open" button and find the .sdt file you with to load.

Screenshot 1: Select a Template File dialog

Select a Template File

Libraries ▶ Documents ▶

Organize ▾   New folder

Favorites
- Desktop
- Downloads
- Recent Places

Libraries
- Documents
- Music
- Pictures
- Videos

Computer
- Local Disk (C:)
- Local Disk (D:)

Network

Documents library
Includes: 2 locations

Arrange by: Folder ▾

Name	Date modified	Type
Adobe	12.2.2019 15:48	File folder
SAH Data Loger	31.1.2019 10:30	File folder
StepShotApp	27.2.2019 15:55	File folder
Visual Studio 2015	27.2.2019 15:55	File folder
com	27.2.2019 11:53	SDT File
jeste	27.2.2019 13:24	SDT File
tutorial	28.2.2019 12:58	SDT File

File name: com   SDT File

Open   Cancel

Servo ready (bb state)

	Unit	Min	Max	Default Value	Set Value
	-	0	7	6	3
	-	0	7	0	0
	-	1	255	1	1
	-	0000	2209	2206	2206
	-	0	1	0	0
	-	0000	0302	0202	0202
	-	0	3	0	0
	-	0	1	0	0
	-	0	3	0	0
	-	0	1	0	0
	-	0	1	0	0
P1-00	1Hz	1	5000	100	100
P1-01	0.1ms	1	50000	400	400
P1-02	1/s	1	2000	100	100
P1-04	1Hz	1	5000	250	250
P1-05	0.1ms	1	50000	400	10000
P1-06 The gain of second position loop	1/s	1	2000	250	250
P1-09 The gain of position loop feedforward	1%	0	100	0	0
P1-10 Feedforward filter time	0.01ms	0	65535	0	0
P2-00 Command pulse state	-	0	2	2	2
P2-01 Position command filter selection	-	0	1	0	0
P2-02 Electronic gear ratio (molecular)	-	1	65535	1	10
P2-03 Electronic gear ratio (denominator)	-	1	65535	1	1
P2-04 Position command filter time	1ms	0	128	0	0
P2-06 Command pulse frequency at rated speed	100Hz	1	10000	5000	5000

Notes: Submode 1
0: Idle
1: Torque (internal)
2: Torque (analog)
3: Speed (internal)
4: Speed (analog)
5: Position (internal)
6: Position (pulse)
7: Speed (pulse)

| Modify anytime, effective re-power	Modify OFF, effective ON	Modify anytime, effective immediately	Read-only	Modified

Communication status: on-line

Screenshot 2: Information dialog "Template file has been successfully loaded"

File   Tools   Help

Communication   Parameter Comparison   Monitor   Alarm

Servo ready (bb state)

Parameter

Open   Save

Overview

Write

Serial Number	Name	Unit	Min	Max	Default Value	Set Value
P0-01	Submode 1	-	0	7	6	3
P0-02	Submode 2	-	0	7	0	0
P0-03	Modbus station of serial port 2	-	1	255	1	1
P0-04	Parameter of serial port 2	-	0000	2209	2206	2206
P0-05	Rotation direction selection	-	0	1	0	0
P0-06	Stop mode when servo OFF or alarm / over range (OT) stop mode	-	0000	0302	0202	0202
P0-07	T-REF distribution	-	0	3	0	0
P0-08	V-REF distribution	-	0	1	0	0
P0-09	Forced input terminal	-	0	3	0	0
P0-16	Forced ON the fan	-	0	1	0	0
P0-10	Regenerative resistor selection	-	0	1	0	0
P1-00	The gain of speed loop	1Hz	1	5000	100	100
P1-01	Speed loop integral time	0.1ms	1	50000	400	400
P1-02	The gain of position loop	1/s	1	2000	100	100
P1-04	The gain of second speed loop	1Hz	1	5000	250	250
P1-05	Integral time of second speed loop	0.1ms	1	50000	400	10000
P1-06	The gain of second position loop	1/s	1	2000	250	250
P1-09	The gain of position loop feedforward	1%	0	100	0	0
P1-10	Feedforward filter time	0.01ms	0	65535	0	0
P2-00	Command pulse state	-	0	2	2	2
P2-01	Position command filter selection	-	0	1	0	0
P2-02	Electronic gear ratio (molecular)	-	1	65535	1	10
P2-03	Electronic gear ratio (denominator)	-	1	65535	1	1
P2-04	Position command filter time	1ms	0	128	0	0
P2-06	Command pulse frequency at rated speed	100Hz	1	10000	5000	5000

Overview of P Group
- P0 - Function Selection
- P1 - Control Parameters
- P2 - Position Control
- P3 - Speed Control
- P4 - Torque Control
- P5 - Signal Parameter Setting

U Group Monitor State Contents
- U0 - Monitoring Mode

Information

Template file has been successfully loaded.

OK

Notes: Submode 1
0: Idle
1: Torque (internal)
2: Torque (analog)
3: Speed (internal)
4: Speed (analog)
5: Position (internal)
6: Position (pulse)
7: Speed (pulse)

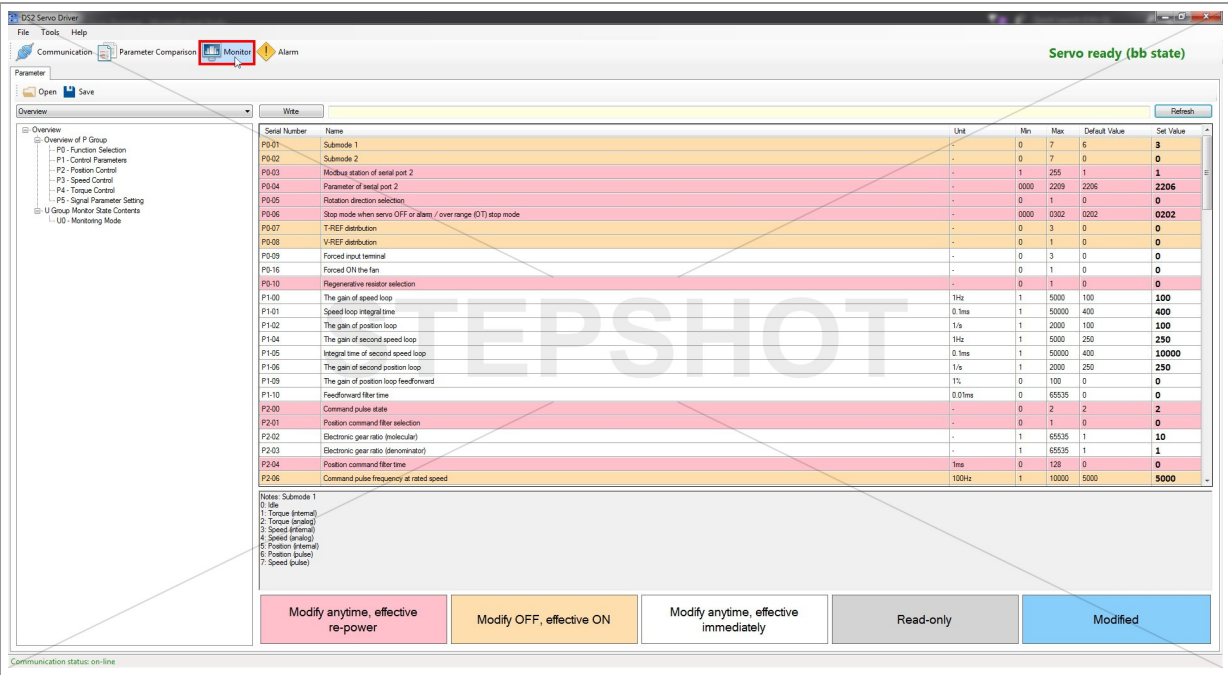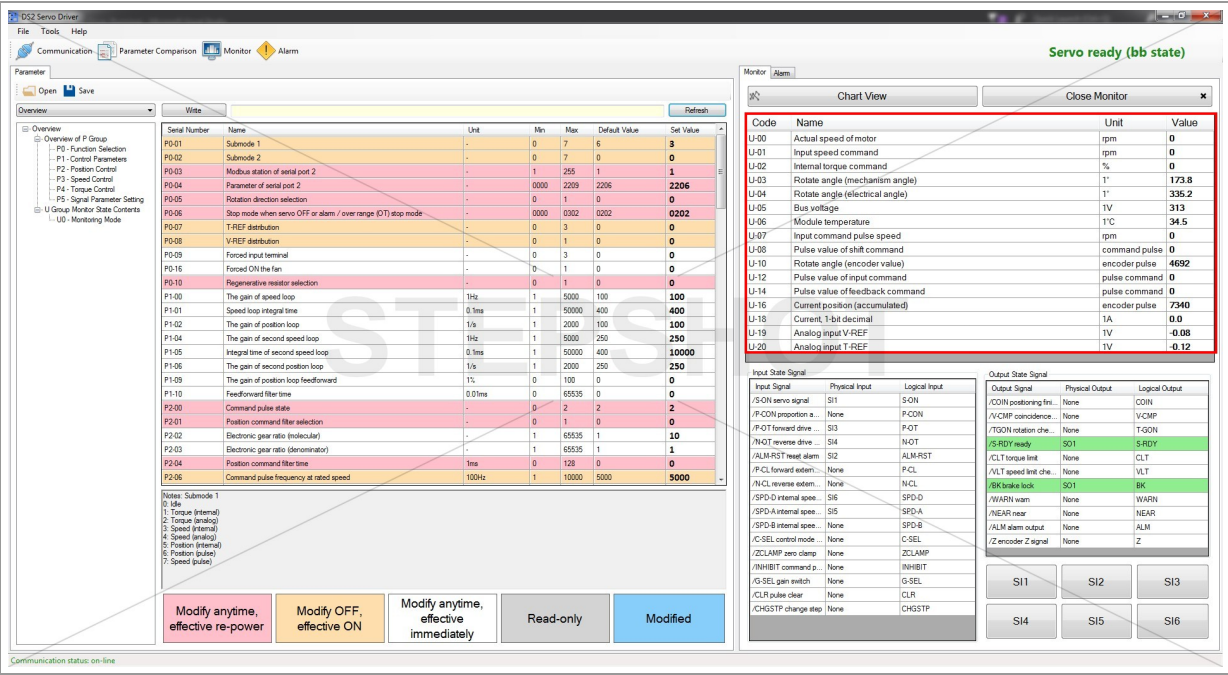| Modify anytime, effective re-power	Modify OFF, effective ON	Modify anytime, effective immediately	Read-only	Modified

Communication status: on-line

Monitor Mode

Monitor

By clicking on "Monitor" icon, the new tab with monitor parameters and input/output signal state opens on the right side.

Monitor Status Parameters

U parameters are being loaded every 500ms.

Input State Signal

Input signals are related to values of the parameters P5-10 ~ P5-25.

When you set the index of P5 input to certain value 1-6, the change of that parameter appears in input state signal table as "Physical Input".

For example: "SI1" is related to S-ON, "SI2" is related to ALM-RST, etc.

Output State Signal

Parameters in output state signal are read-only and they indicate the current output state of servo.

Parameters that are currently active on some of the physical outputs are colored in light green.

For example: S-RDY active means that servo is in ready state (bb state).

Input Commands

Signal Input Buttons

When you mouse hover some of the "SI" buttons, the tooltip with will appear.

It indicates what logical input in input state signal table is that button related to.

In this example, SI1 is related to S-ON -> by clicking on button "SI1", S-ON input will activate (servo will switch to run mode).

Run Mode

Also you'll notice that the servo state indicator is changed to "Run mode" and the pressed "SI1" button is colored to green.

Also, activated input is colored to light green.

Start Motor

By clicking on "SI5" button, SPD-A activates (motor starts to rotate at a given speed).

Change Rotate Direction

SPD-D changes the current rotate direction.

Chart View

Click on "Chart View" button to open a new tab on the left side of your window.
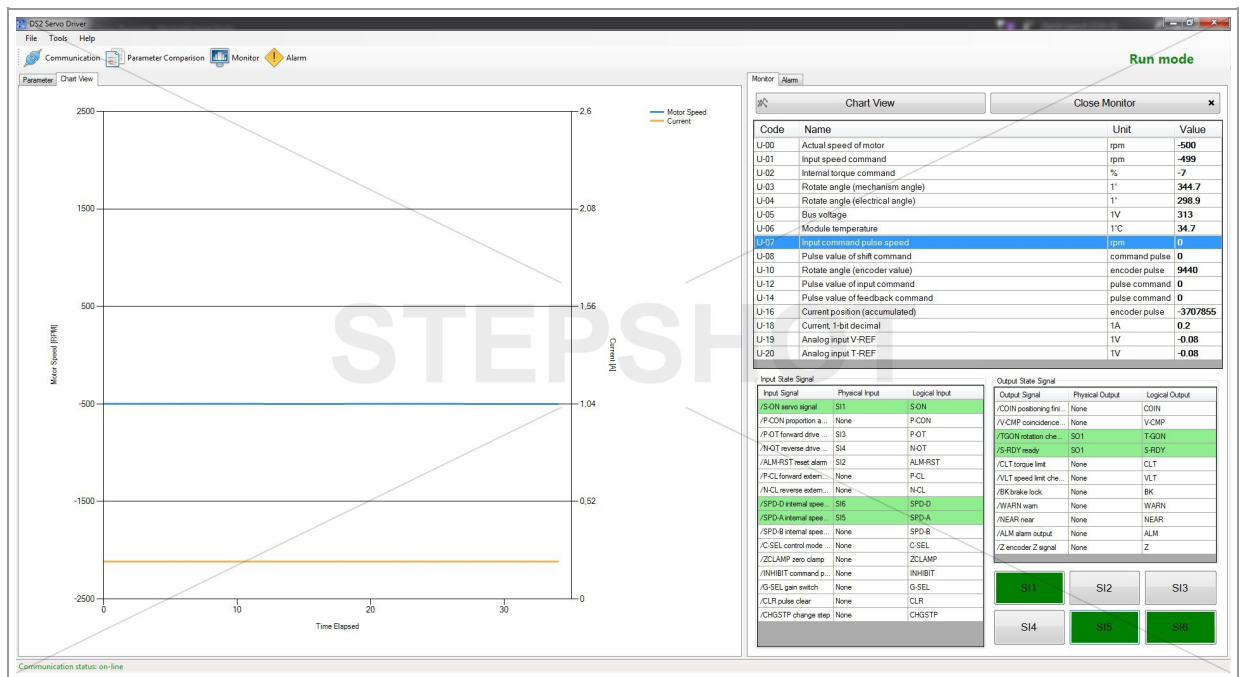
The line chart with real-time values for the actual speed of motor and the present current will appear.

Stop Motor

Stop the motor rotation by deactivating input "SI5".

You'll notice the fall of motor speed and current to 0 on the graph.

Line that indicates the motor speed value is colored in blue and its range is shown on the left side of Y-axis.

Present current line is colored in orange and its values can be read on the right side of vertical axis.

X-axis moves by 1 in every 100ms when the motor speed and current are different than 0; otherwise, the sampling interval is 1s.

Refresh Chart View

To refresh the table and start trending data from the beginning, click on "Chart View" button again.

Alarm

Alarm Occur

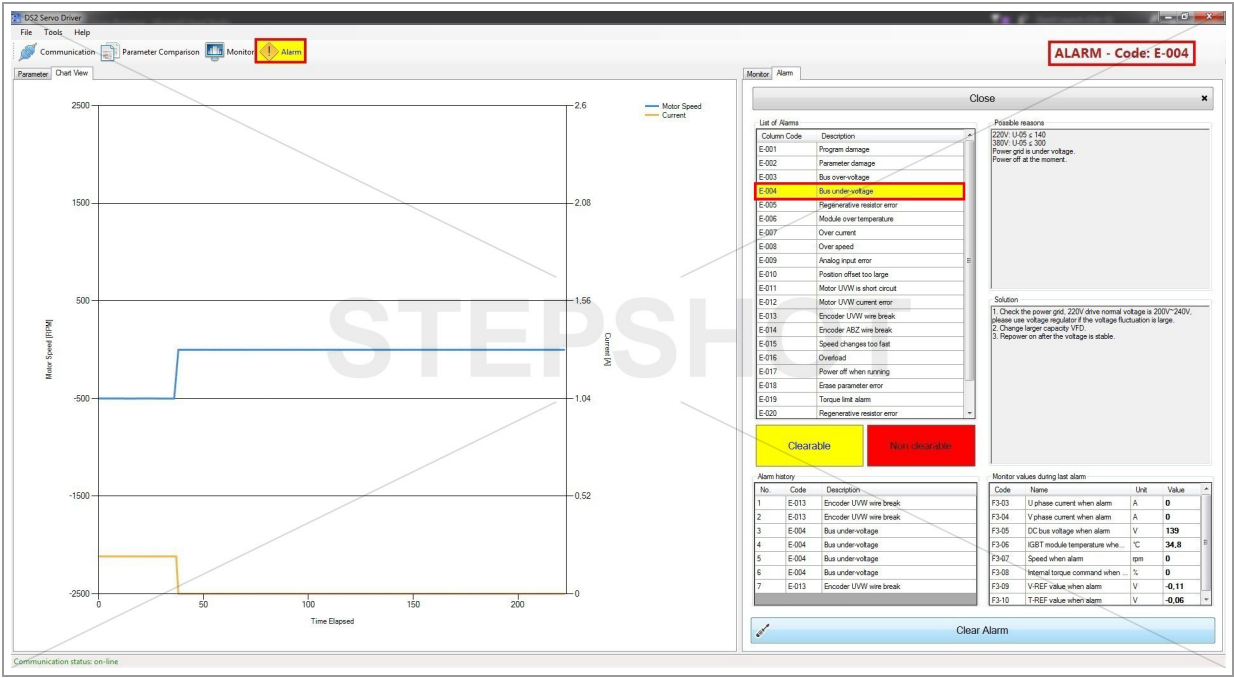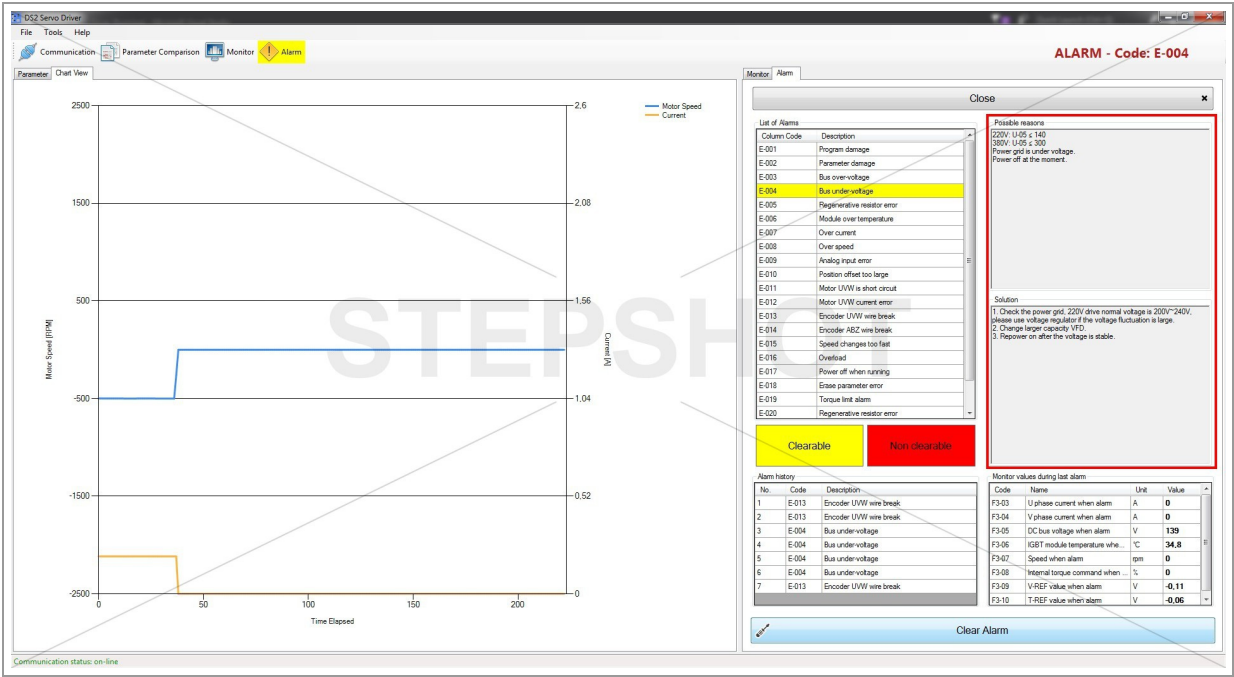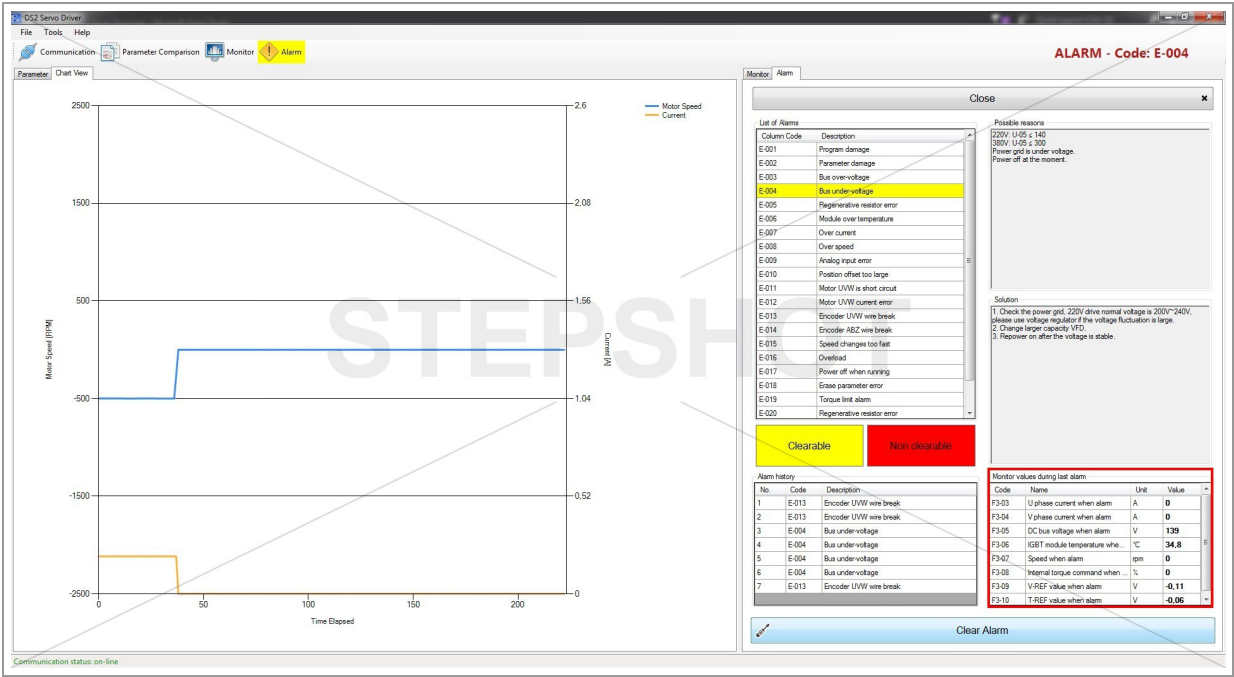When the clearable alarm occurs, the alarm icon and the alarm code from the list of alarms get colored in yellow.
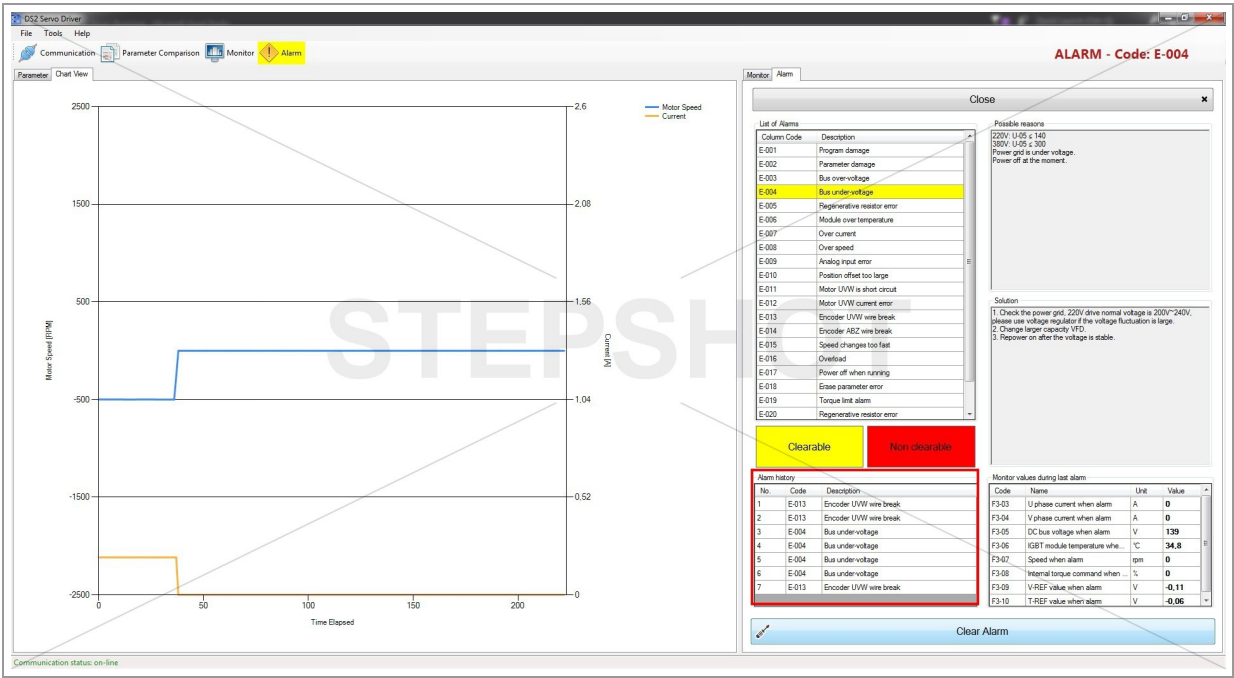
Possible Reasons and Solution

The list of possible reasons for the present error occurring and solutions for it are shown in marked textboxes.

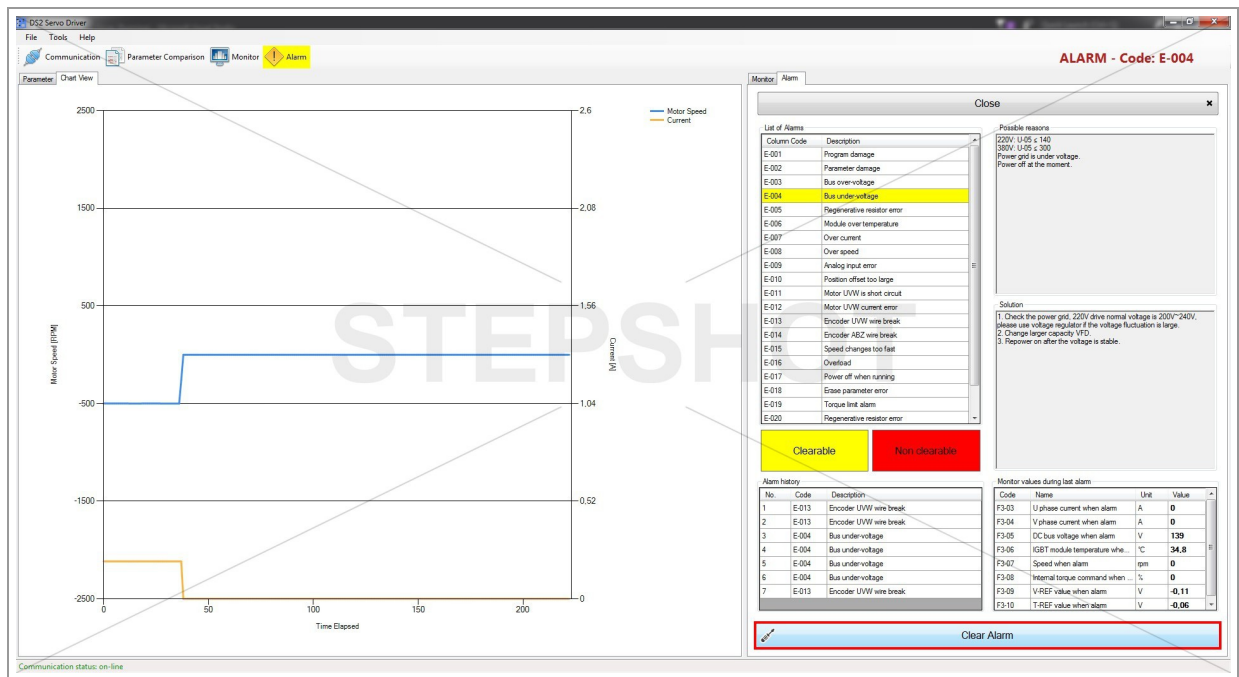## Monitor Values During the Last Alarm

The values of some key parameters are being recorded in the moment of last occur of alarm.

Alarm History

The history of the last 7 occurred alarms can be found in the marked table.
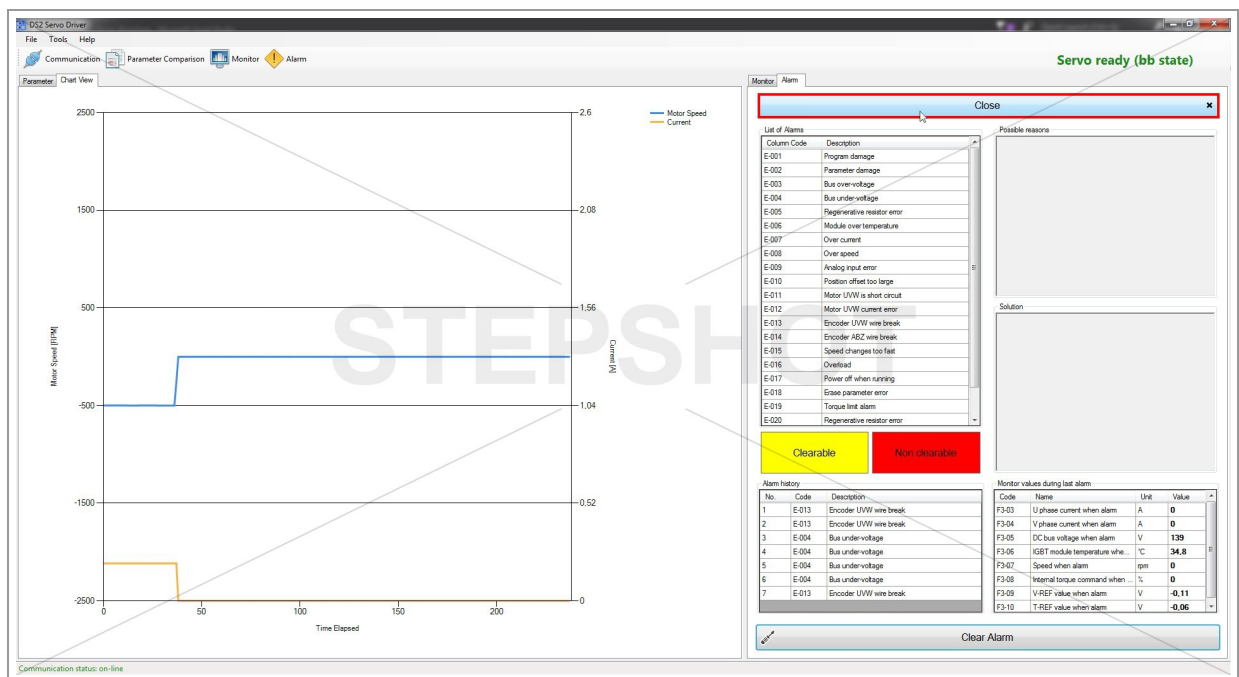
Clear Alarm

If the alarm is clearable, you can clear it and back servo to bb state by clicking the "Clear Alarm" button.

Otherwise, if the alarm color is red, you have to re-power the servo in order to clear the error.

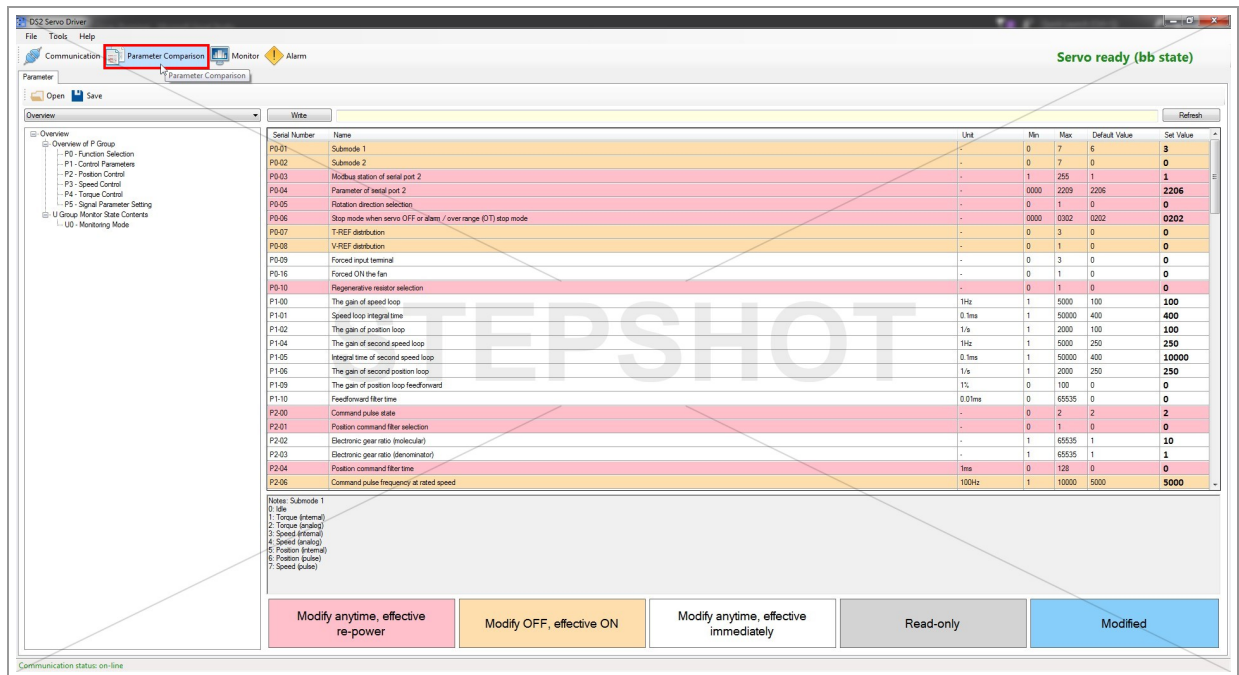In that case, "Clear Alarm" command cannot be applied.
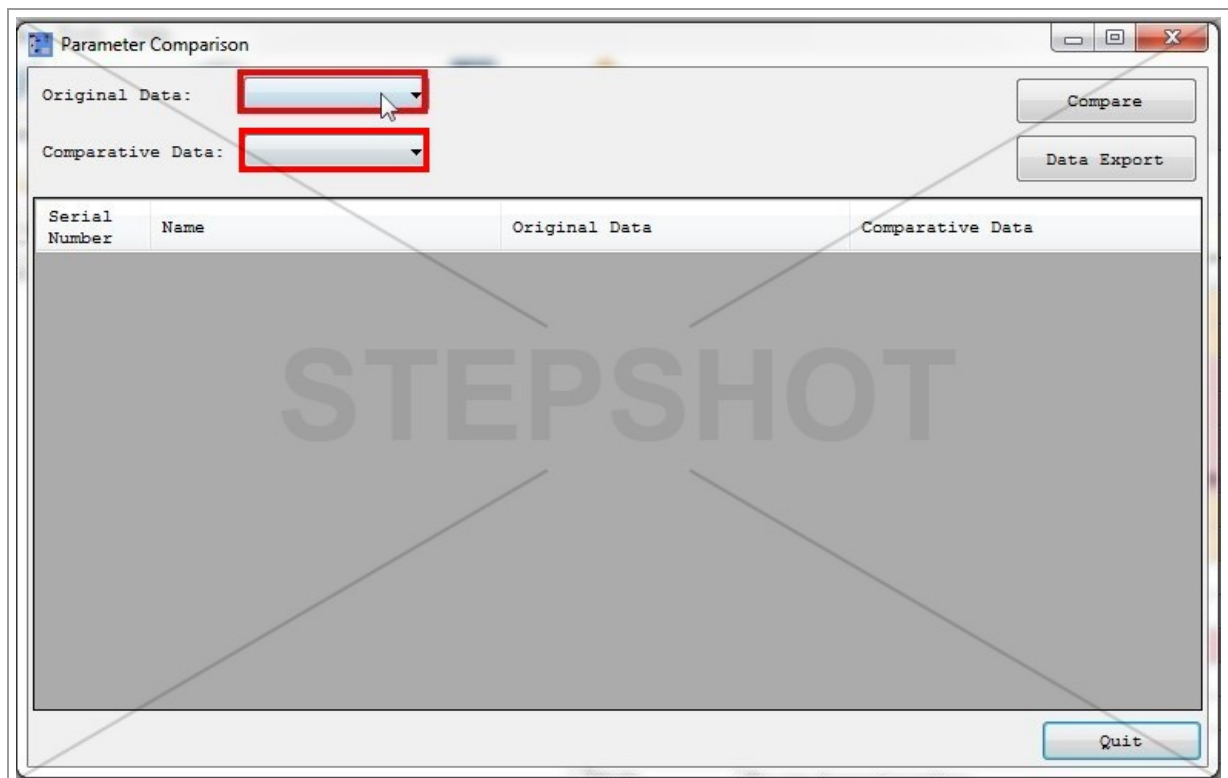
Close Monitor Mode

To close the monitor mode and get back to full parameter table view, click "Close" button in "Alarm" tab or "Close Monitor" button in "Monitor" tab.

Other Features

Parameter Comparison

If you need to compare the data from the driver, parameter default values or data from saved file one with each other, click on "Parameter Comparison" icon.

Select the original and comparative data from dropdown menus to compare the values of all parameters.
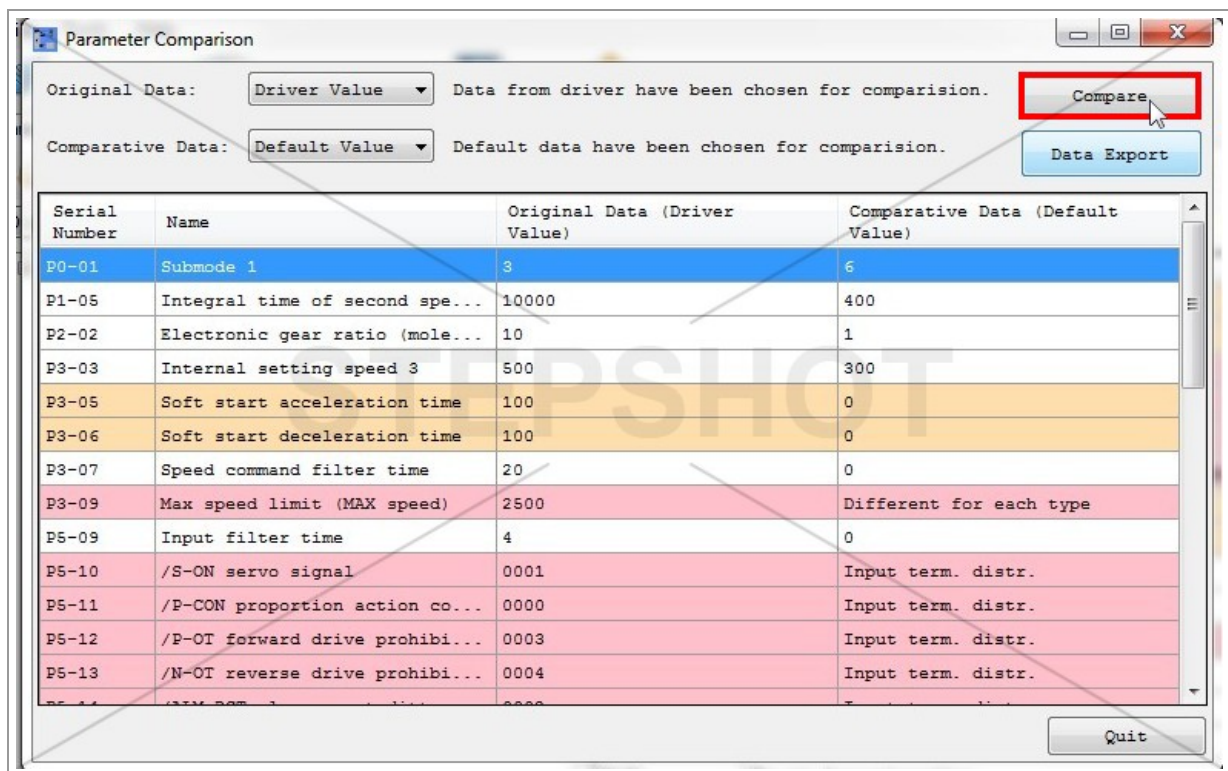
Note: Make sure that selected original and comparative data are different; otherwise, there will be nothing to compare.
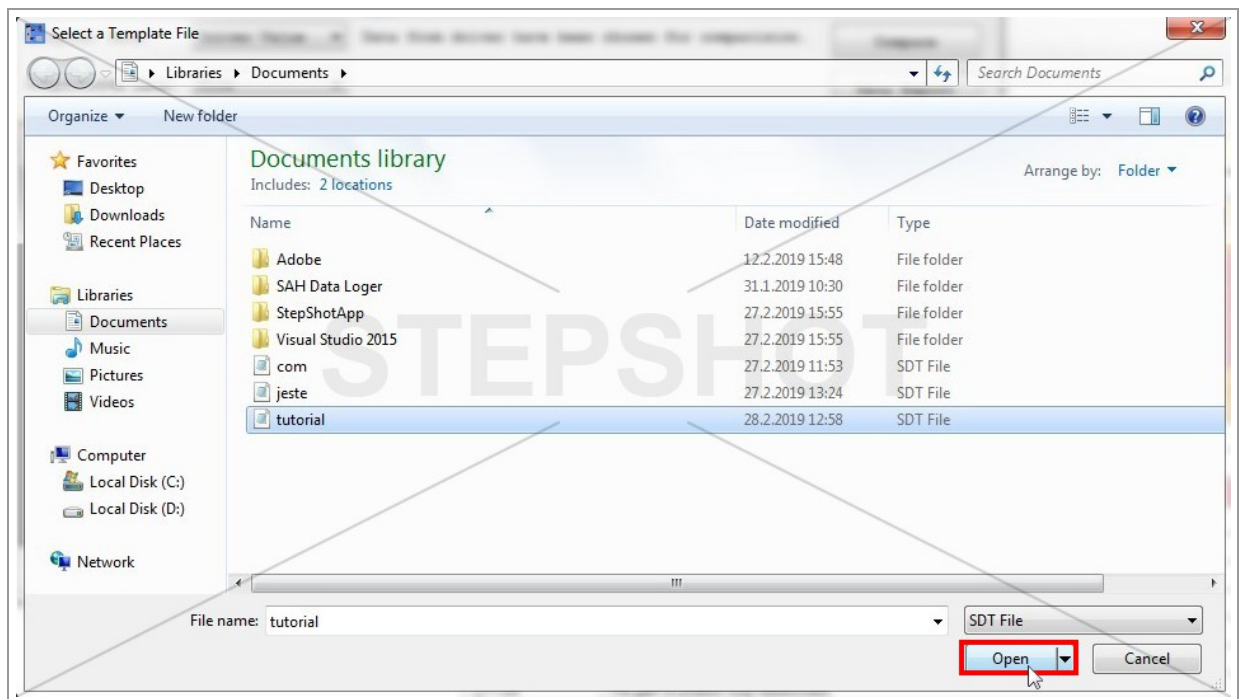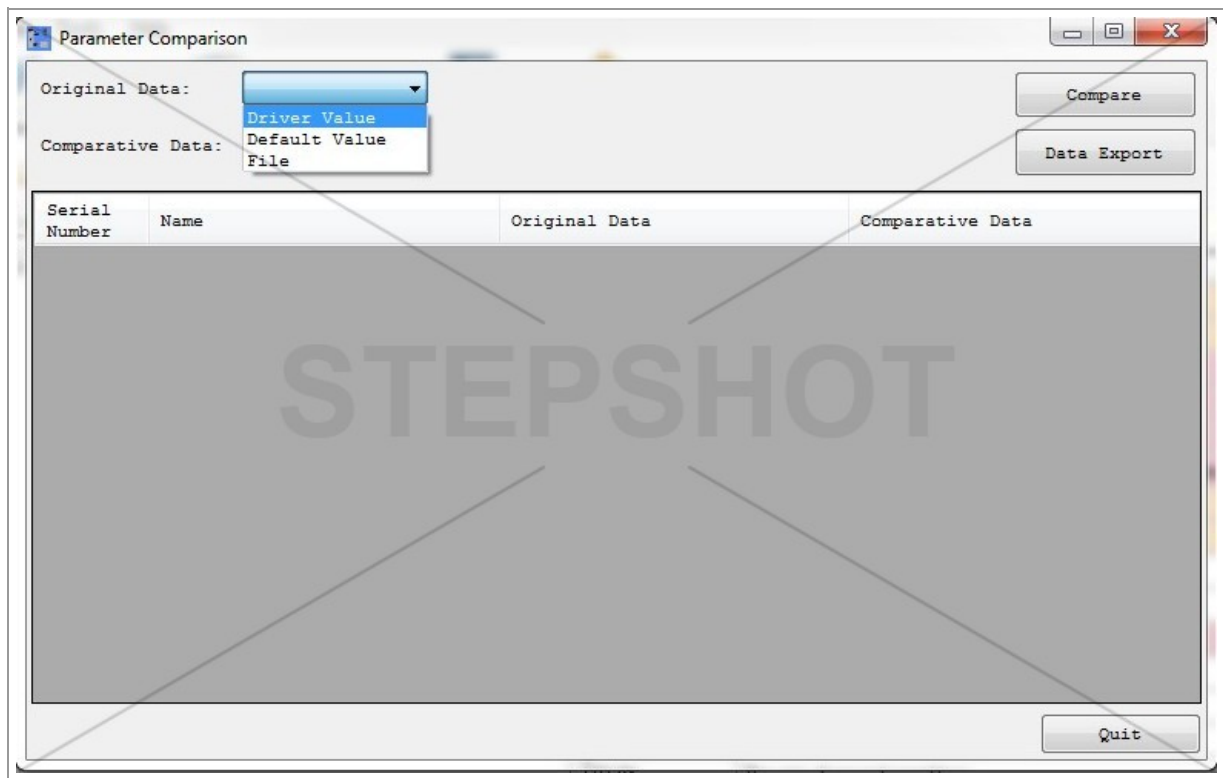
If you choose "File", the open dialog box will appear and you'll be prompted to choose the exported .sdf template file.
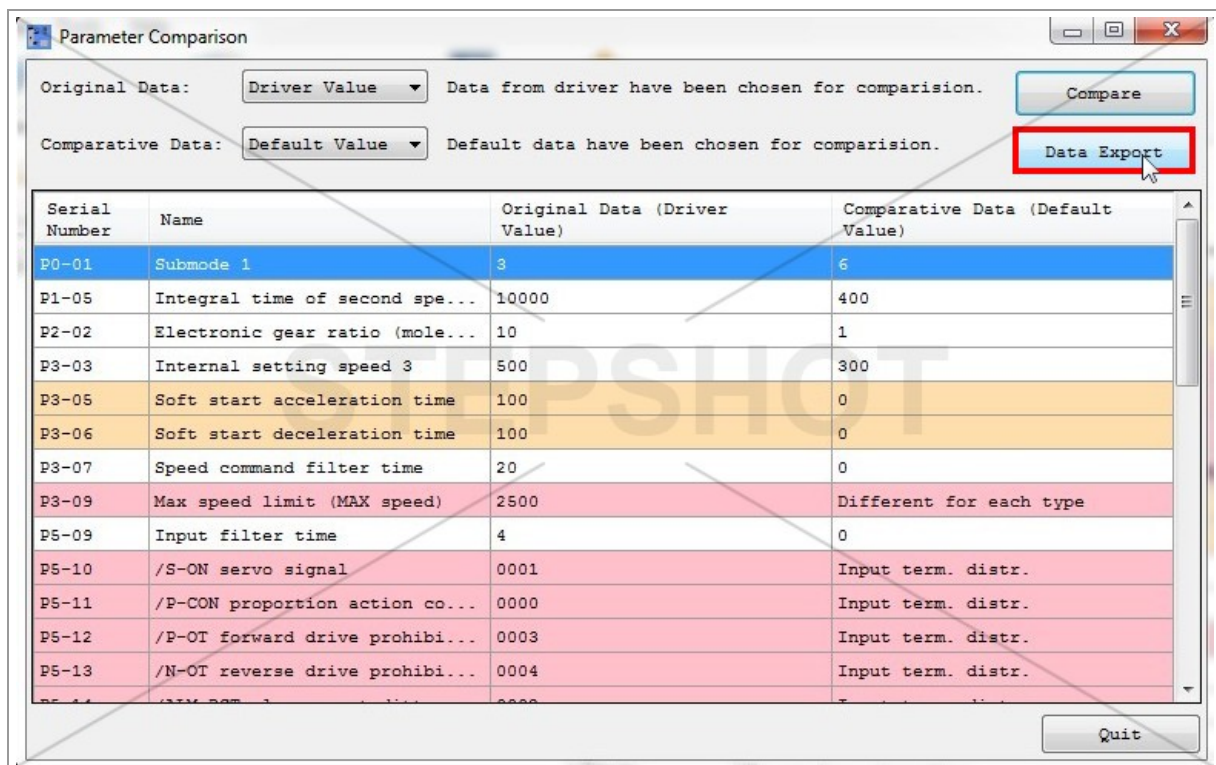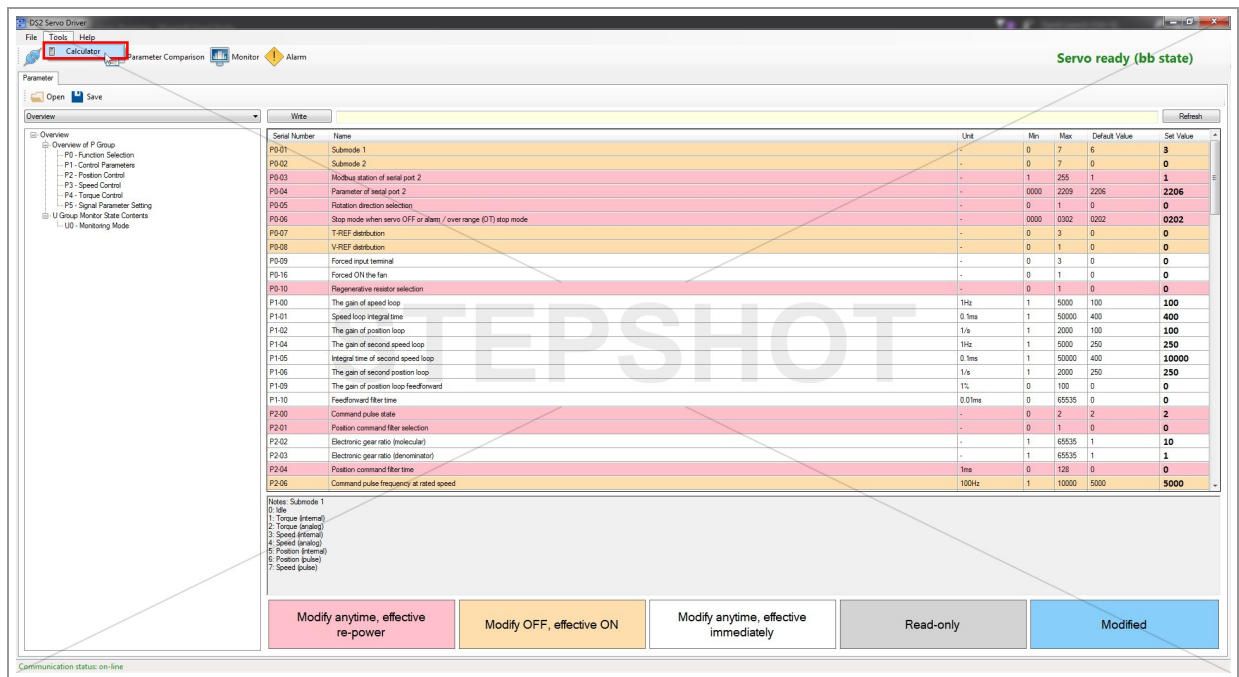
Press "Open" button to load it.

Compare The Data

Click on "Compare" button to see the list of all parameters from selected original data which values are different than selected comparative data.
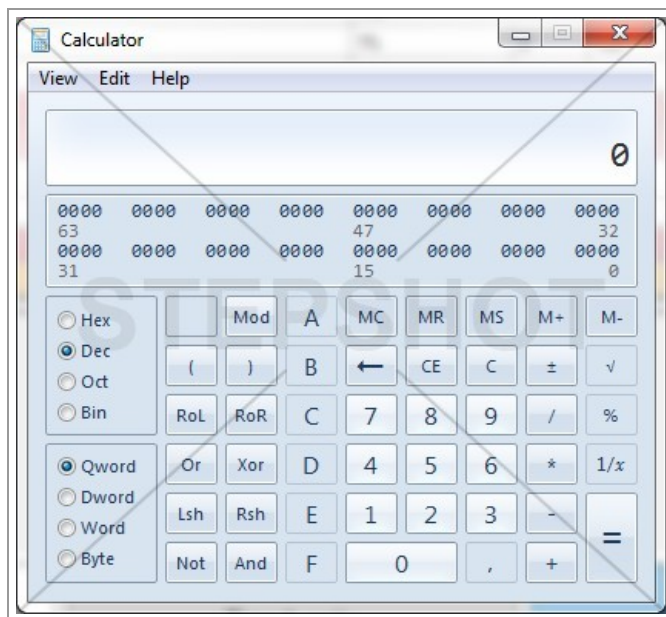
Export the Compared Data

You can export the data from the table to .csv file, if you need to, by clicking "Data Export" button.

Tools

Go to Tools -> Calculator from main menu to open the classic Windows calculator.

Help

In "Help" section from main menu you can find device manual for XINJE DS2 Series Servo, the software manual you're reading right now and the information about author of this software.