

# SAH DS2 Servo Driver Software Manual

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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

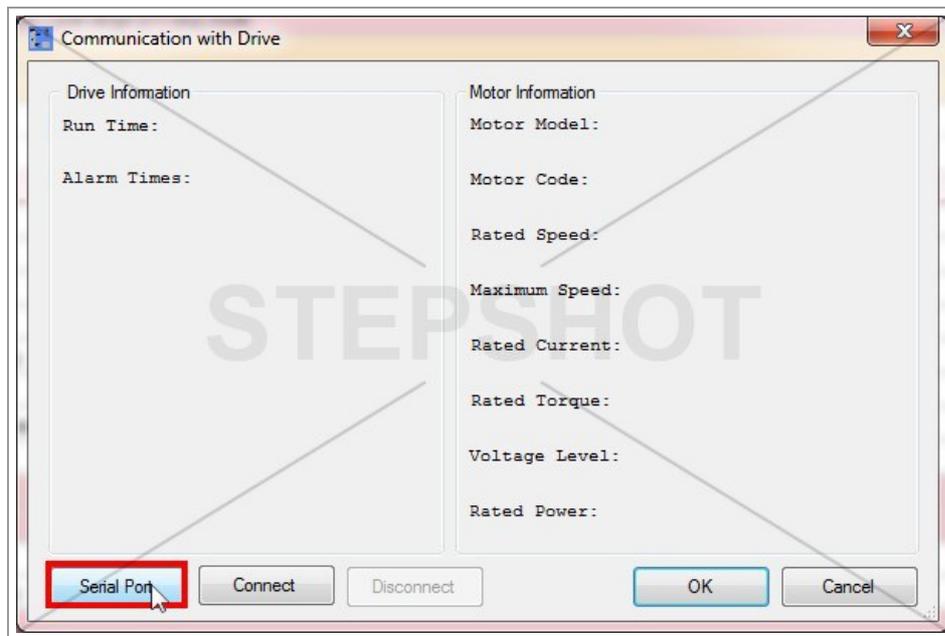
## Communication Settings

The screenshot shows the DS2 Servo Driver software interface. The 'Communication' tab is selected in the top toolbar. The main window displays a table of parameters with columns for Serial Number, Name, Unit, Min, Max, Default Value, and Set Value. A large 'TEPSHOT' watermark is overlaid on the table. At the bottom, there are five buttons for parameter modification: 'Modify anytime, effective re-power', 'Modify OFF, effective ON', 'Modify anytime, effective immediately', 'Read-only', and 'Modified'. The status bar at the bottom left indicates 'Communication status: off-line'.

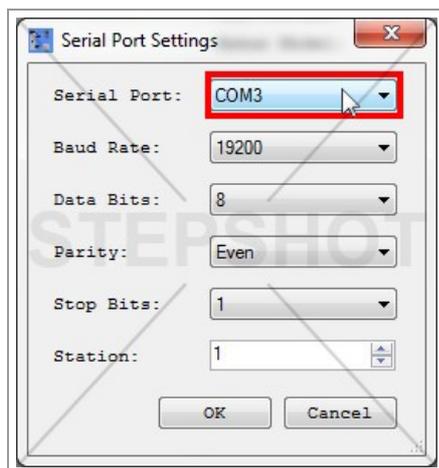
Serial Number	Name	Unit	Min	Max	Default Value	Set Value
PD01	Submode 1	-	0	7	6	
PD02	Submode 2	-	0	7	0	
PD03	Modbus station of serial port 2	-	1	255	1	
PD04	Parameter of serial port 2	-	0000	2209	2206	
PD05	Rotation direction selection	-	0	1	0	
PD06	Stop mode when servo OFF or alarm / over range (OT) stop mode	-	0000	0302	0202	
PD07	T-REF distribution	-	0	3	0	
PD08	V-REF distribution	-	0	1	0	
PD09	Forced input terminal	-	0	3	0	
PD16	Forced ON the fan	-	0	1	0	
PD10	Regenerative resistor selection	-	0	1	0	
P100	The gain of speed loop	Hz	1	5000	100	
P101	Speed loop integral time	0.1ms	1	50000	400	
P102	The gain of position loop	1/s	1	2000	100	
P104	The gain of second speed loop	Hz	1	5000	250	
P105	Integral time of second speed loop	0.1ms	1	50000	400	
P106	The gain of second position loop	1/s	1	2000	250	
P109	The gain of position loop feedforward	1%	0	100	0	
P110	Feedforward filter time	0.01ms	0	55535	0	
P200	Command pulse state	-	0	2	2	
P201	Position command filter selection	-	0	1	0	
P202	Electronic gear ratio (molecular)	-	1	65535	1	
P203	Electronic gear ratio (denominator)	-	1	65535	1	
P204	Position command filter time	ms	0	128	0	
P205	Command pulse frequency at rated speed	100Hz	1	10000	5000	

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.).

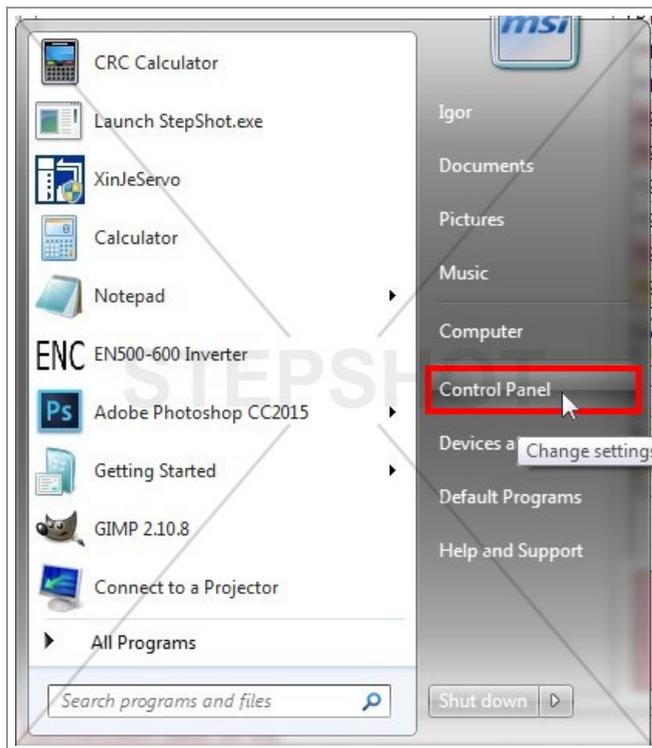


By clicking on "Serial Port" dropdown menu, you'll get the list of all available serial ports on your computer.

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.

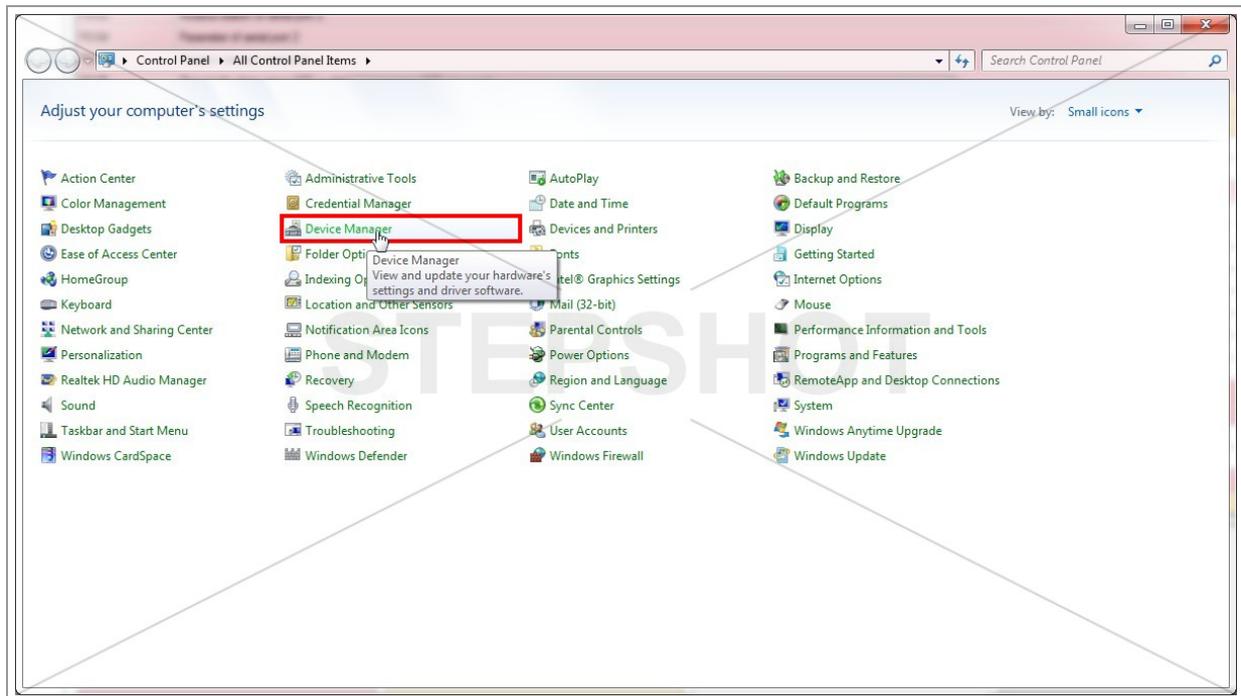
If you're having a problem with this, check next few steps.

## Check for Serial Port

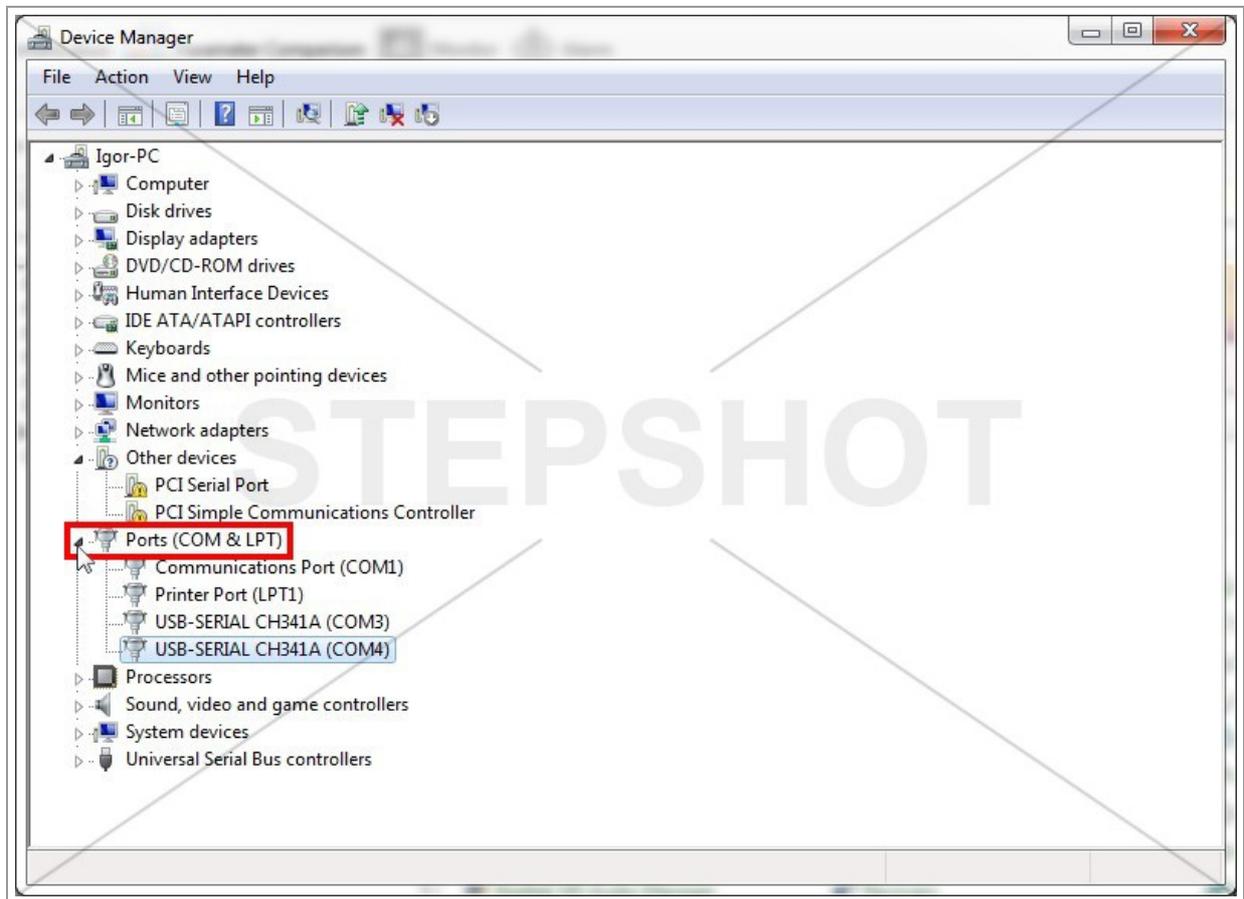


This is the procedure of checking your serial port if you're using Windows 7. It's similar to other Windows platforms.

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



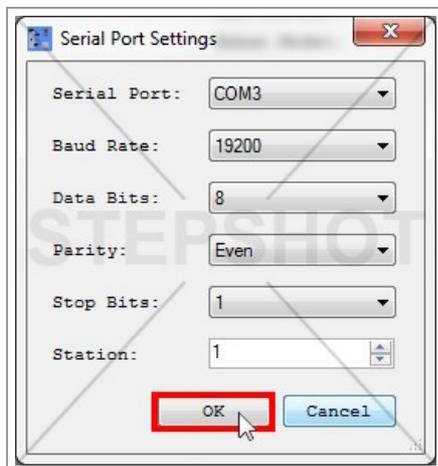
Click on "Device Manager" link in "All Control Panel Items" (if you cannot find it, search for "Device Manager" in search box).



In "Device Manager" menu click on small triangle left to "Ports (COM & LPT)" to expand the all connected ports to your computer.

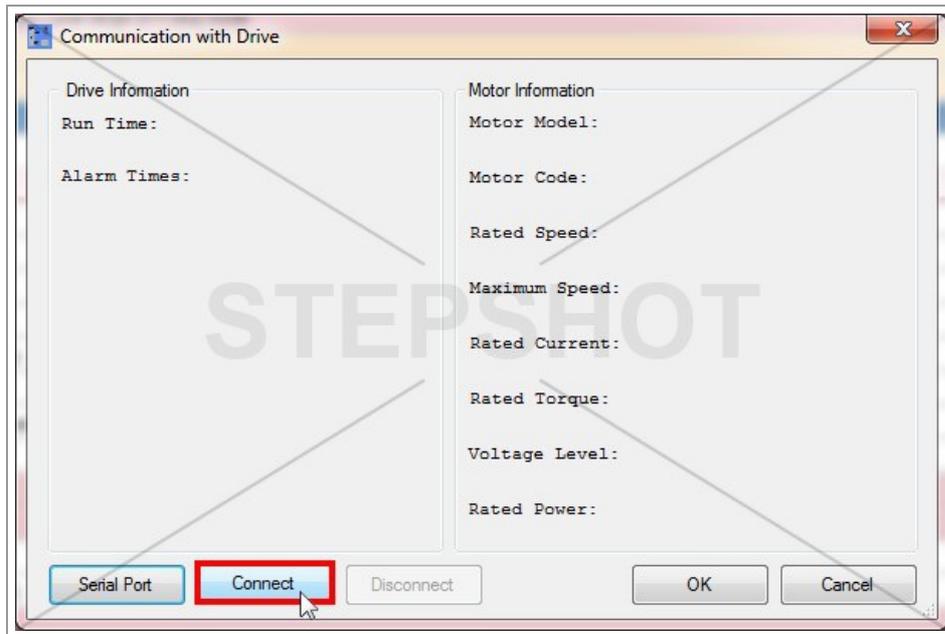
Find "USB-SERIAL CH341A" and notice its label in brackets (COM + number).

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.

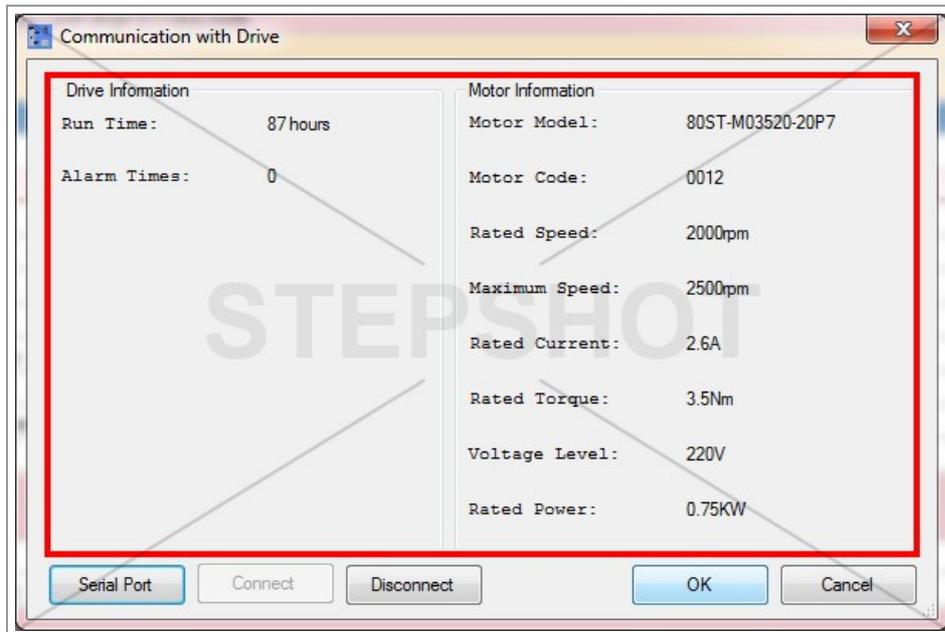
## Connect the Servo Driver



Click on "Connect" button in "Communication with Drive" to establish the communication with servo driver.

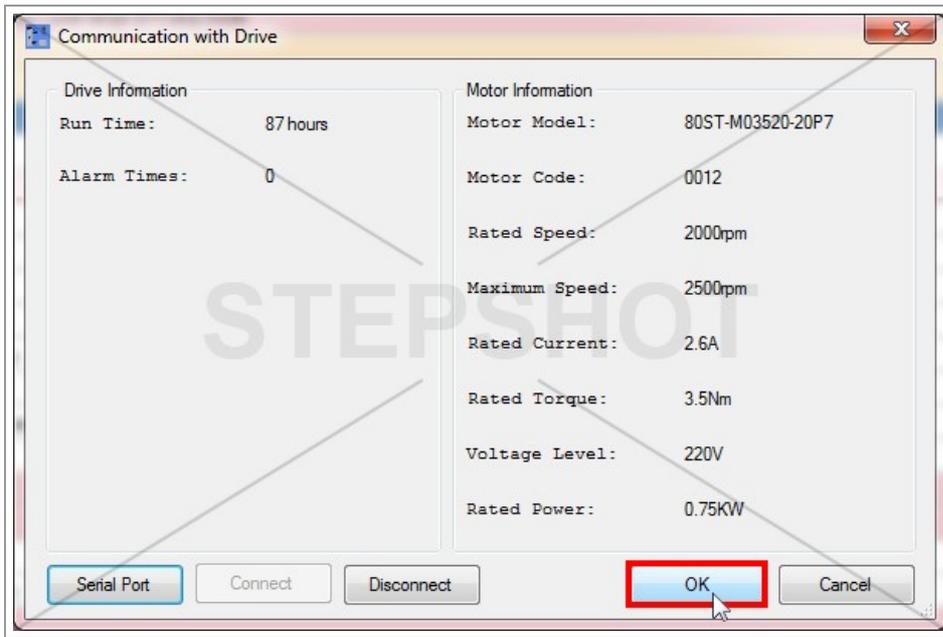


You should get the information about successful communication establishment.

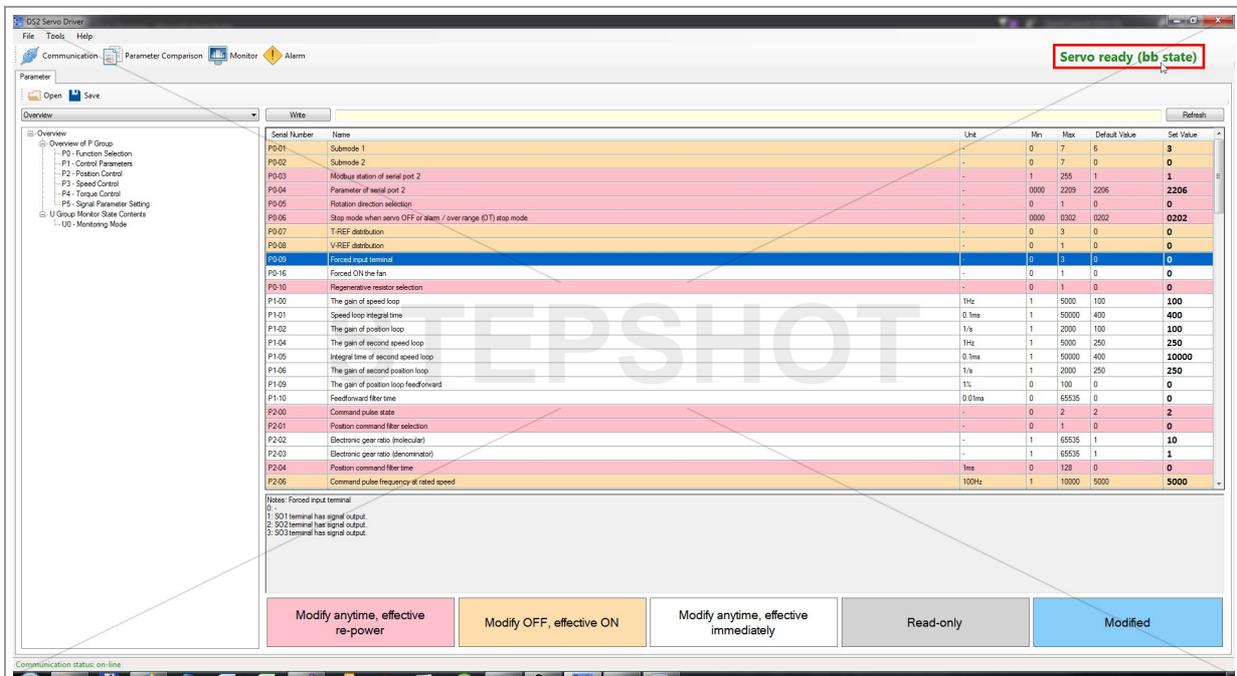
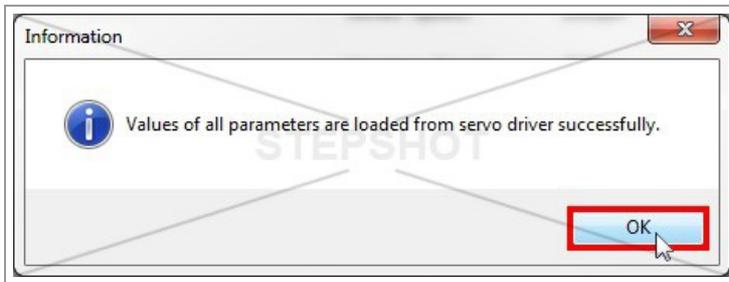


You'll get the essential information about your driver and motor.

# Read The Values From Driver

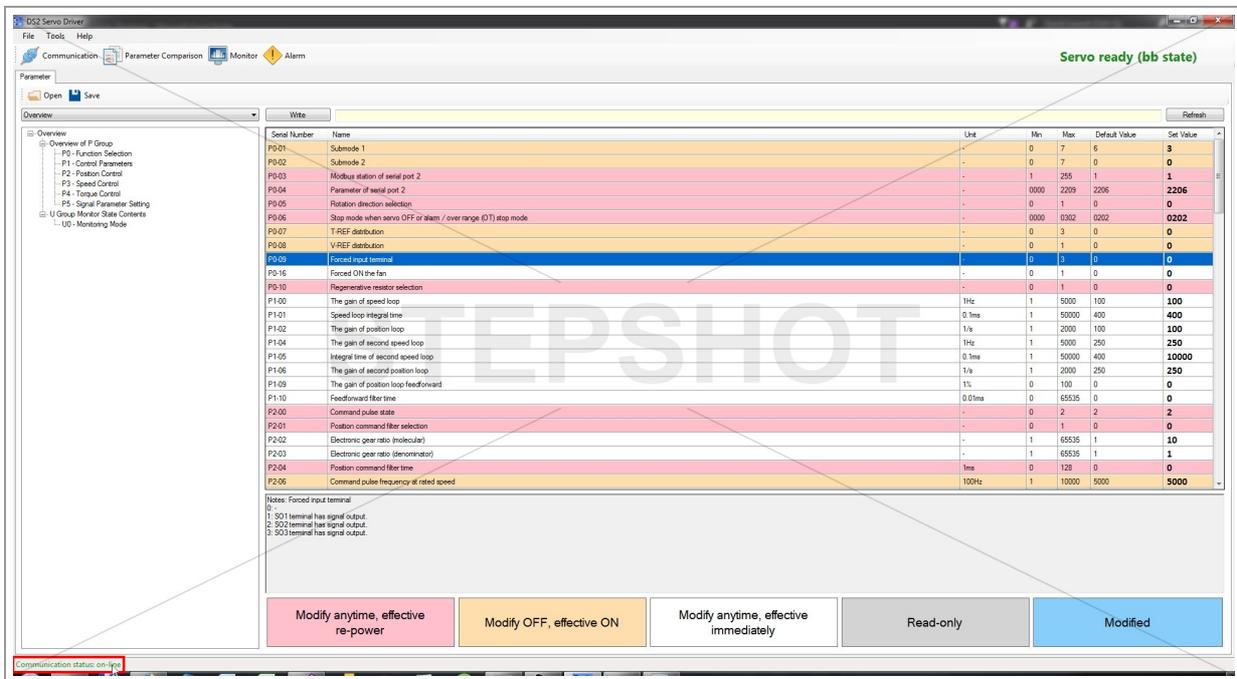


Click on "OK" button in "Communication with Drive" to load the values of all driver parameters.



You'll notice that the servo status indicator is changed from "Servo not connected" to "Servo ready (bb state)".

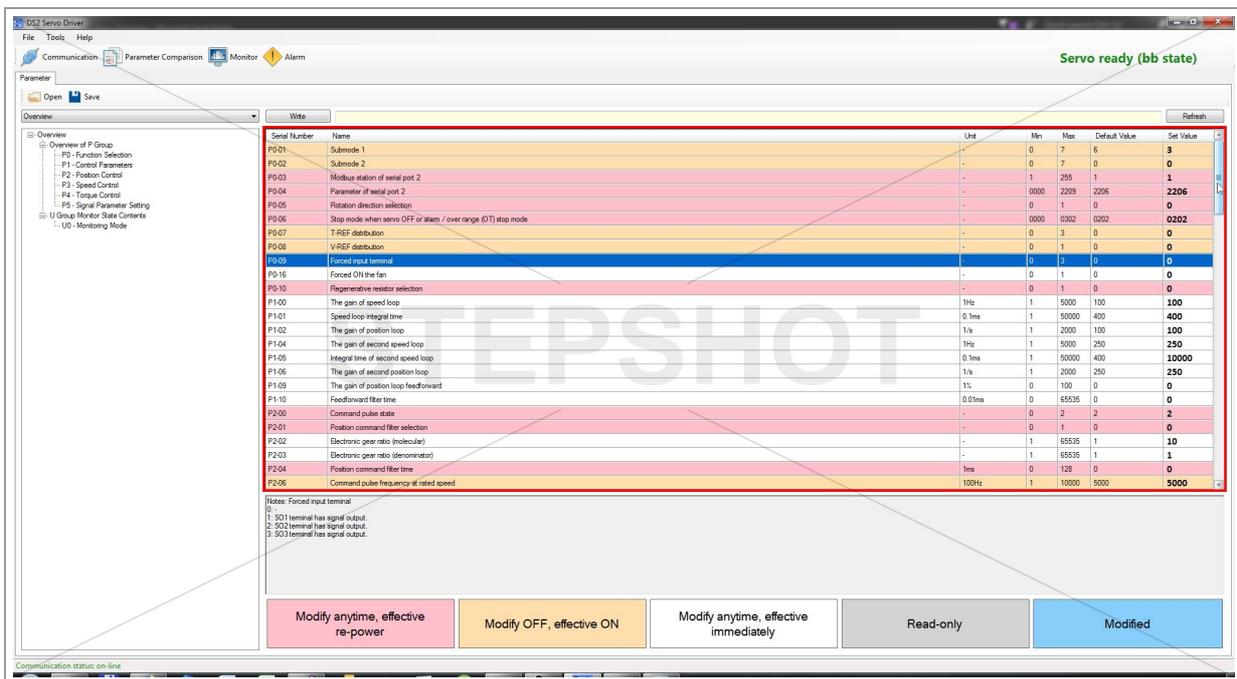
This indicator shows the current state of servo (bb, run, alarm, connected, not connected).



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

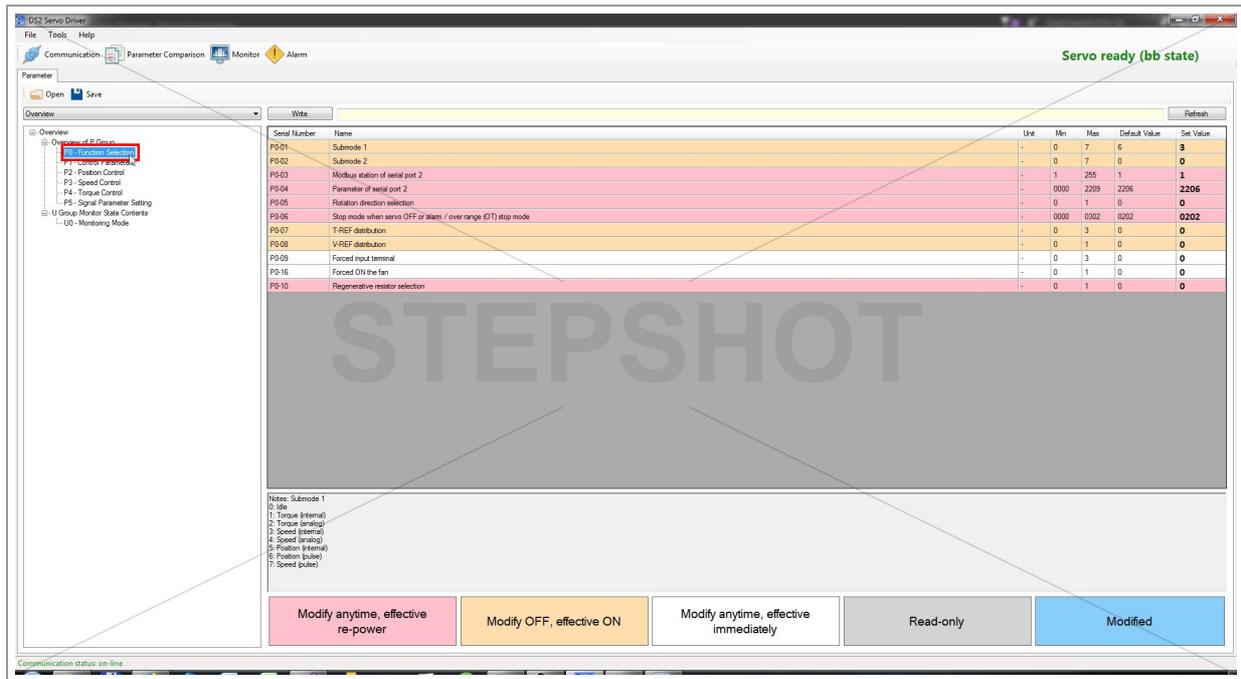
### Parameter Table



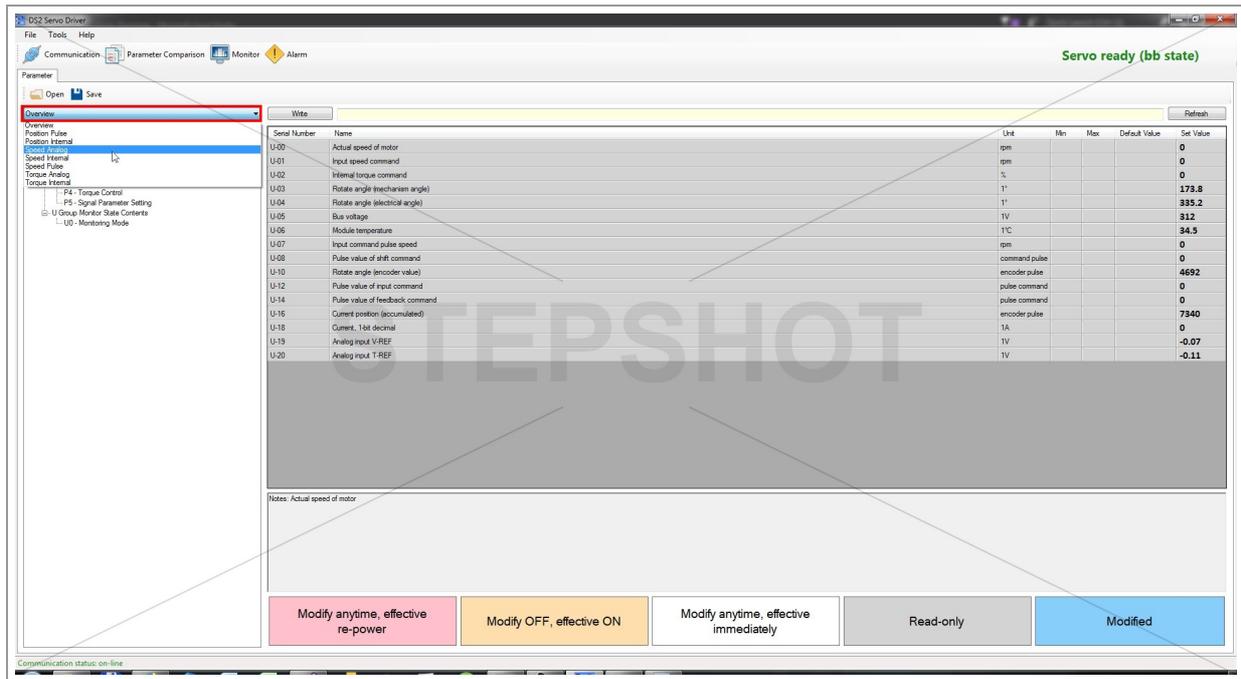
All available parameters are shown in the full table view with their serial number, description, unit, minimum value, maximum value, factory default value and current value read from the servo driver in the moment of establishing communication.

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.

Parameter: Speed Analog

Serial Number	Name	Unit	Min	Max	Default Value	Set Value
PD-01	Submode 1	-	0	7	6	3
PD-07	T-REF distribution	-	0	3	0	0
P3-00	Analog value of rated speed	0.07V	150	3000	1000	1000
P3-05	Soft start acceleration time	1ms	0	65535	0	100
P3-06	Soft start deceleration time	1ms	0	65535	0	100
P3-07	Speed command filter time	0.01ms	0	65535	0	20
P3-08	Speed feedback filter time	0.01ms	0	65535	20	20
P3-10	Speed command input dead area voltage	0.01V	0	100	0	0
P4-02	Forward torque limit	1%	0	300	300	300
P4-03	Reverse torque limit	1%	0	300	300	300
P4-04	Forward external torque limit	1%	0	300	100	100
P4-05	Reverse external torque limit	1%	0	300	100	100
P5-01	Zero clamp speed /ZCLAMP	rpm	0	300	10	10
P5-03	Coarse speed checking signal width /VCMF	rpm	1	250	10	10
P5-10	/S-ON servo signal	-	0000	0016	Input term. dist.	0001
P5-11	/P-ON proportion action command ditto	-	0000	0016	Input term. dist.	0000
P5-15	/P-CL forward external torque limit ditto	-	0000	0016	Input term. dist.	0000
P5-16	/V-CL reverse external torque limit ditto	-	0000	0016	Input term. dist.	0000
P5-17	/SPD-0 internal speed direction ditto	-	0000	0016	Input term. dist.	0006
P5-21	/ZCLAMP zero clamp ditto	-	0000	0016	Input term. dist.	0000
P5-29	/VCMF speed coarse checking ditto	-	0000	0013	Output term. dist.	0000
P5-32	/CLT torque limit ditto	-	0000	0013	Output term. dist.	0000

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

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

## Notes

Parameter: Speed Analog

Serial Number	Name	Unit	Min	Max	Default Value	Set Value
P5-10	/S-ON servo signal	-	0000	0016	Input term. dist.	0001

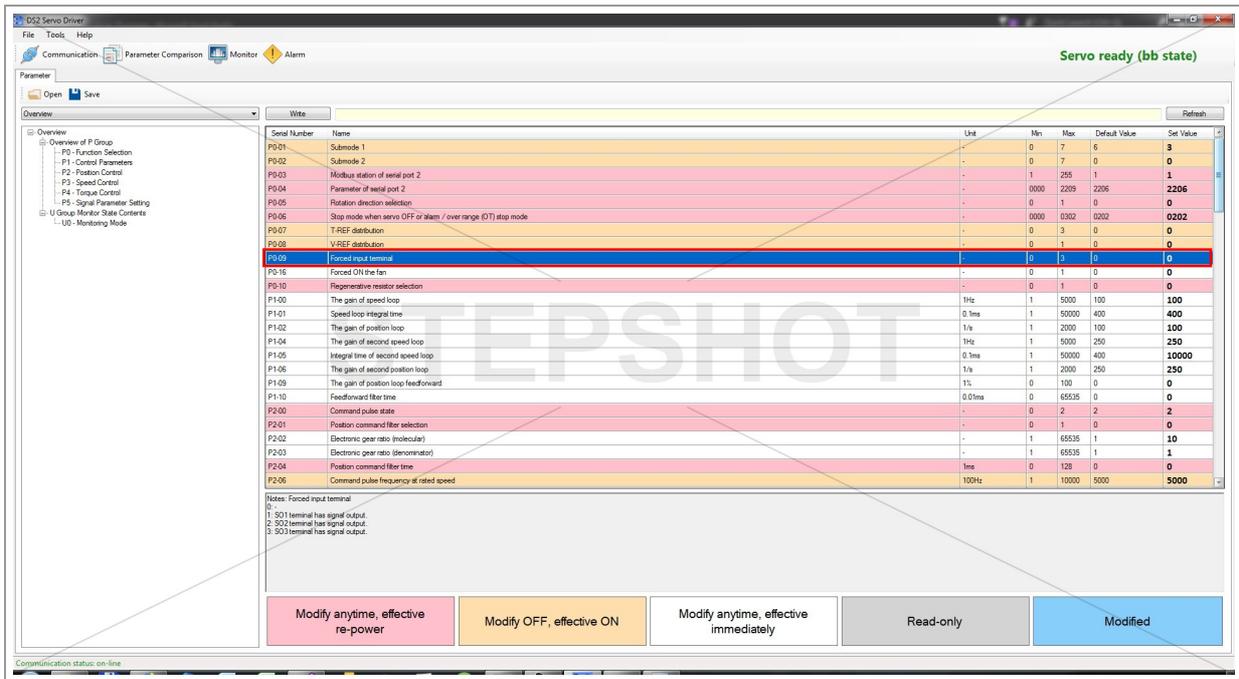
Notes: Servo ON Setting /S-ON  
 0000: Signal is always ineffective  
 0001: Input positive signal to S11  
 0002: Input positive signal to S12  
 0003: Input positive signal to S13  
 0004: Input positive signal to S14  
 0005: Input positive signal to S15  
 0006: Input positive signal to S16  
 0010: Signal is always effective  
 0011: Input negative signal to S11  
 0012: Input negative signal to S12  
 0013: Input negative signal to S13

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

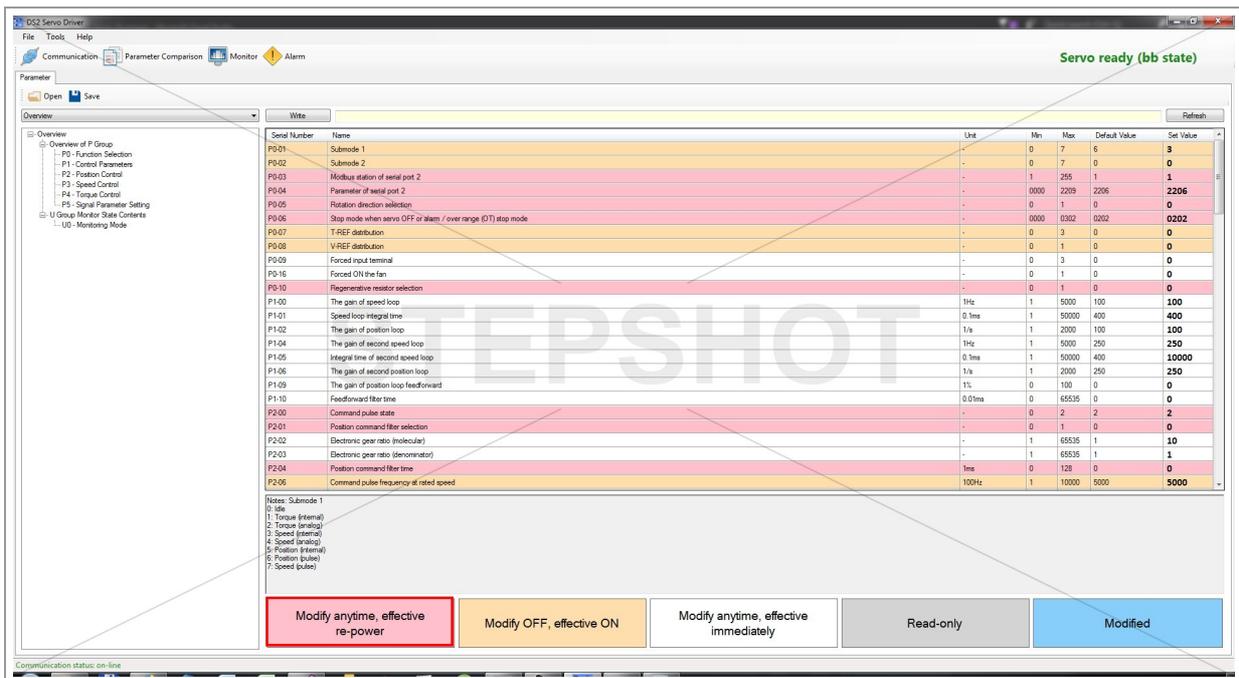
Notes are shown for each parameter, when clicked.

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.

DS2 Servo Driver

File Tools Help

Communication Parameter Comparison Monitor Alarm

Parameter

Overview

Write Refresh

Serial Number	Name	Unit	Min	Max	Default Value	Set Value
P0-D1	Submode 1	-	0	7	6	3
P0-D2	Submode 2	-	0	7	0	0
P0-D3	Modbus station of serial port 2	-	1	255	1	1
P0-D4	Parameter of serial port 2	-	0000	2209	2206	2206
P0-D5	Rotation direction selection	-	0	1	0	0
P0-D6	Stop mode when servo OFF or alarm / over range (OT) stop mode	-	0000	0302	0202	0202
P0-D7	T-REF distribution	-	0	3	0	0
P0-D8	V-REF distribution	-	0	1	0	0
P0-D9	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
F1-00	The gain of speed loop	Hz	1	5000	100	100
F1-01	Speed loop integral time	0.1ms	1	50000	400	400
F1-02	The gain of position loop	1/s	1	2000	100	100
F1-04	The gain of second speed loop	Hz	1	5000	250	250
F1-05	Integral time of second speed loop	0.1ms	1	50000	400	10000
F1-06	The gain of second position loop	1/s	1	2000	250	250
F1-09	The gain of position loop feedforward	1%	0	100	0	0
F1-10	Feedforward filter time	0.01ms	0	65535	0	0
F2-00	Command pulse state	-	0	2	2	2
F2-01	Position command filter selection	-	0	1	0	0
F2-02	Electronic gear ratio (numerator)	-	1	65535	1	10
F2-03	Electronic gear ratio (denominator)	-	1	65535	1	1
F2-04	Position command filter time	1ms	0	128	0	0
F2-06	Command pulse frequency at rated speed	100Hz	1	10000	5000	5000

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

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

Communication status: on-line

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

DS2 Servo Driver

File Tools Help

Communication Parameter Comparison Monitor Alarm

Parameter

Overview

Write Refresh

Serial Number	Name	Unit	Min	Max	Default Value	Set Value
P0-D1	Submode 1	-	0	7	6	3
P0-D2	Submode 2	-	0	7	0	0
P0-D3	Modbus station of serial port 2	-	1	255	1	1
P0-D4	Parameter of serial port 2	-	0000	2209	2206	2206
P0-D5	Rotation direction selection	-	0	1	0	0
P0-D6	Stop mode when servo OFF or alarm / over range (OT) stop mode	-	0000	0302	0202	0202
P0-D7	T-REF distribution	-	0	3	0	0
P0-D8	V-REF distribution	-	0	1	0	0
P0-D9	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
F1-00	The gain of speed loop	Hz	1	5000	100	100
F1-01	Speed loop integral time	0.1ms	1	50000	400	400
F1-02	The gain of position loop	1/s	1	2000	100	100
F1-04	The gain of second speed loop	Hz	1	5000	250	250
F1-05	Integral time of second speed loop	0.1ms	1	50000	400	10000
F1-06	The gain of second position loop	1/s	1	2000	250	250
F1-09	The gain of position loop feedforward	1%	0	100	0	0
F1-10	Feedforward filter time	0.01ms	0	65535	0	0
F2-00	Command pulse state	-	0	2	2	2
F2-01	Position command filter selection	-	0	1	0	0
F2-02	Electronic gear ratio (numerator)	-	1	65535	1	10
F2-03	Electronic gear ratio (denominator)	-	1	65535	1	1
F2-04	Position command filter time	1ms	0	128	0	0
F2-06	Command pulse frequency at rated speed	100Hz	1	10000	5000	5000

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

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

Communication status: on-line

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

DS2 Servo Driver

File Tools Help

Communication Parameter Comparison Monitor Alarm

Servo ready (bb state)

Parameter

Open Save

Write Refresh

Serial Number	Name	Unit	Min	Max	Default Value	Set Value
P0-D1	Submode 1	-	0	7	6	3
P0-D2	Submode 2	-	0	7	0	0
P0-D3	Modbus station of serial port 2	-	1	255	1	1
P0-D4	Parameter of serial port 2	-	0000	2209	2206	2206
P0-D5	Rotation direction selection	-	0	1	0	0
P0-D6	Stop mode when servo OFF or alarm / over range (OT) stop mode	-	0000	0302	0202	0202
P0-D7	T-REF distribution	-	0	3	0	0
P0-D8	V-REF distribution	-	0	1	0	0
P0-D9	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
F1-00	The gain of speed loop	Hz	1	5000	100	100
F1-01	Speed loop integral time	0.1ms	1	50000	400	400
F1-02	The gain of position loop	1/s	1	2000	100	100
F1-04	The gain of second speed loop	Hz	1	5000	250	250
F1-05	Integral time of second speed loop	0.1ms	1	50000	400	10000
F1-06	The gain of second position loop	1/s	1	2000	250	250
F1-09	The gain of position loop feedforward	1%	0	100	0	0
F1-10	Feedforward filter time	0.01ms	0	65535	0	0
F2-00	Command pulse state	-	0	2	2	2
F2-01	Position command filter selection	-	0	1	0	0
F2-02	Electronic gear ratio (numerator)	-	1	65535	1	10
F2-03	Electronic gear ratio (denominator)	-	1	65535	1	1
F2-04	Position command filter time	ms	0	128	0	0
F2-06	Command pulse frequency at rated speed	100Hz	1	10000	5000	5000

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

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

Communication status: on-line

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

DS2 Servo Driver

File Tools Help

Communication Parameter Comparison Monitor Alarm

Servo ready (bb state)

Parameter

Open Save

Write Refresh

Serial Number	Name	Unit	Min	Max	Default Value	Set Value
P0-D1	Submode 1	-	0	7	6	3
P0-D2	Submode 2	-	0	7	0	0
P0-D3	Modbus station of serial port 2	-	1	255	1	1
P0-D4	Parameter of serial port 2	-	0000	2209	2206	2206
P0-D5	Rotation direction selection	-	0	1	0	0
P0-D6	Stop mode when servo OFF or alarm / over range (OT) stop mode	-	0000	0302	0202	0202
P0-D7	T-REF distribution	-	0	3	0	0
P0-D8	V-REF distribution	-	0	1	0	0
P0-D9	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
F1-00	The gain of speed loop	Hz	1	5000	100	100
F1-01	Speed loop integral time	0.1ms	1	50000	400	400
F1-02	The gain of position loop	1/s	1	2000	100	100
F1-04	The gain of second speed loop	Hz	1	5000	250	250
F1-05	Integral time of second speed loop	0.1ms	1	50000	400	10000
F1-06	The gain of second position loop	1/s	1	2000	250	250
F1-09	The gain of position loop feedforward	1%	0	100	0	0
F1-10	Feedforward filter time	0.01ms	0	65535	0	0
F2-00	Command pulse state	-	0	2	2	2
F2-01	Position command filter selection	-	0	1	0	0
F2-02	Electronic gear ratio (numerator)	-	1	65535	1	10
F2-03	Electronic gear ratio (denominator)	-	1	65535	1	1
F2-04	Position command filter time	ms	0	128	0	0
F2-06	Command pulse frequency at rated speed	100Hz	1	10000	5000	5000

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

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

Communication status: on-line

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

The screenshot shows the DS2 Servo Driver software interface. At the top right, it indicates 'Servo ready (bb state)'. The main area contains a table of parameters with columns: Serial Number, Name, Unit, Min, Max, Default Value, and Set Value. A search box is highlighted in red at the top of the table, containing the text 'Write'. Below the table, there are five buttons for parameter modification: 'Modify anytime, effective re-power', 'Modify OFF, effective ON', 'Modify anytime, effective immediately', 'Read-only', and 'Modified'. The status bar at the bottom left shows 'Communication status: on-line'.

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	Module station of serial port 2	-	1	255	1	1
P0-04	Parameter of serial port 2	-	0000	2305	2305	2305
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
P0-18	Regenerative resistor selection	-	0	1	0	0
F1-00	The gain of speed loop	Hz	1	5000	100	100
F1-01	Speed loop integral time	0.1ms	1	50000	400	400
F1-02	The gain of position loop	1/s	1	2000	100	100
F1-04	The gain of second speed loop	Hz	1	5000	250	250
F1-05	Integral time of second speed loop	0.1ms	1	50000	400	10000
F1-06	The gain of second position loop	1/s	1	2000	250	250
F1-09	The gain of position loop feedforward	1/s	0	100	0	0
F1-10	Feedforward filter time	0.01ms	0	65535	0	0
F2-00	Command pulse state	-	0	2	2	2
F2-01	Position command filter selection	-	0	1	0	0
F2-02	Electronic gear ratio (numerator)	-	1	65535	1	10
F2-03	Electronic gear ratio (denominator)	-	1	65535	1	1
F2-04	Position command filter time	time	0	128	0	0
F2-05	Command pulse frequency at rated speed	100Hz	1	10000	5000	5000

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.

The screenshot shows the DS2 Servo Driver software interface. At the top right, it indicates 'Servo ready (bb state)'. The main area contains a table of parameters with columns: Serial Number, Name, Unit, Min, Max, Default Value, and Set Value. A search box is highlighted in yellow at the top of the table, containing the text 'offset'. Below the table, there are five buttons for parameter modification: 'Modify anytime, effective re-power', 'Modify OFF, effective ON', 'Modify anytime, effective immediately', 'Read-only', and 'Modified'. The status bar at the bottom left shows 'Communication status: on-line'.

Serial Number	Name	Unit	Min	Max	Default Value	Set Value
F5-24	/CLR clear pulse offset ditto	-	0000	0016	Input term. distr.	0000
F5-25	/CHGstp stop change signal ditto	-	0000	0016	Output term. distr.	0001
F5-28	/COM positioning finished	-	0000	0013	Output term. distr.	0000
F5-29	/COM speed checking ditto	-	0000	0013	Output term. distr.	0000
F5-30	/TSDI station checking ditto	-	0000	0013	Output term. distr.	0000
F5-31	/SRDY ready ditto	-	0000	0013	Output term. distr.	0003
F5-32	/CLT torque limit ditto	-	0000	0013	Output term. distr.	0000
F5-33	/VLT speed limit checking ditto	-	0000	0013	Output term. distr.	0000
F5-34	/BK brake lock ditto	-	0000	0013	Output term. distr.	0000
F5-35	/WARN warn ditto	-	0000	0013	Output term. distr.	0000
F5-36	/NEAR near ditto	-	0000	0013	Output term. distr.	0000
F5-37	/ALM alarm ditto	-	0000	0013	Output term. distr.	0002
F5-38	/Zencoder Z signal ditto	-	0000	0013	Output term. distr.	0000
U-00	Actual speed of motor	rpm				0
U-01	Input speed command	rpm				0
U-02	Internal torque command	%				0
U-03	Rotate angle (mechanism angle)	1°				173.8
U-04	Rotate angle (electrical angle)	1°				335.2
U-05	Bus voltage	V				312
U-06	Module temperature	1°C				34.5
U-07	Input command pulse speed	rpm				0
U-08	Pulse value of shift command	command pulse				0
U-10	Rotate angle (encoder value)	encoder pulse				4692
U-12	Pulse value of input command	pulse command				0
U-14	Pulse value of feedback command	pulse command				0

Parameter List:

Serial Number	Name	Unit	Min	Max	Default Value	Set Value
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	ms	0	128	0	0
P2-06	Command pulse frequency at rated speed	100Hz	1	10000	5000	5000
P2-07	Speed command pulse filter time	0 ms	0	1000	20	20
P2-10	Internal position mode setting	-	-	-	0000	0000
P2-11	First segment pulse (low bit)	1	-9999	9999	0	0
P2-12	First segment pulse (high bit)	1	-9999	9999	0	0
P2-13	First segment speed	0 rpm	0	50000	0	0
P2-14	First segment adjustment time	ms	0	65535	0	0
P2-15	First segment command filter time	0 ms	0	65535	0	0
P2-94	Find the original point / the signal quantity pass	-	00	1F	02	02
P2-95	The speed of closing the proximity switch	0 rpm	0	50000	600	600
P2-96	The speed of leaving the proximity switch	0 rpm	0	50000	100	100
P2-97	Set segment through communication	-	00	16	00	00
P3-00	Analog value of rated speed	0.01V	150	3000	1000	1000
P3-01	Internal setting speed 1	rpm	-5000	5000	100	100
P3-02	Internal setting speed 2	rpm	-5000	5000	200	200
P3-03	Internal setting speed 3	rpm	-5000	5000	300	450
P3-04	JOG speed	rpm	0	1000	100	100
P3-05	Soft start acceleration time	ms	0	1000	100	100
P3-06	Soft start deceleration time	ms	0	65535	0	100
P3-07	Speed command filter time	0.0ms	0	65535	0	20
P3-08	Speed feedback filter time	0.0ms	0	65535	20	20

Notes: Pulse deviation clear (CLR)  
Pulse deviation: The difference between command pulse of controller (such as PLC) and feedback pulse of servo in position mode.  
Its unit is 1 reference unit. It is related to the reference unit of the electronic gear ratio.

Buttons: Modify anytime, effective re-power; Modify OFF, effective ON; Modify anytime, effective immediately; Read-only; Modified

## Write to Servo

Parameter List:

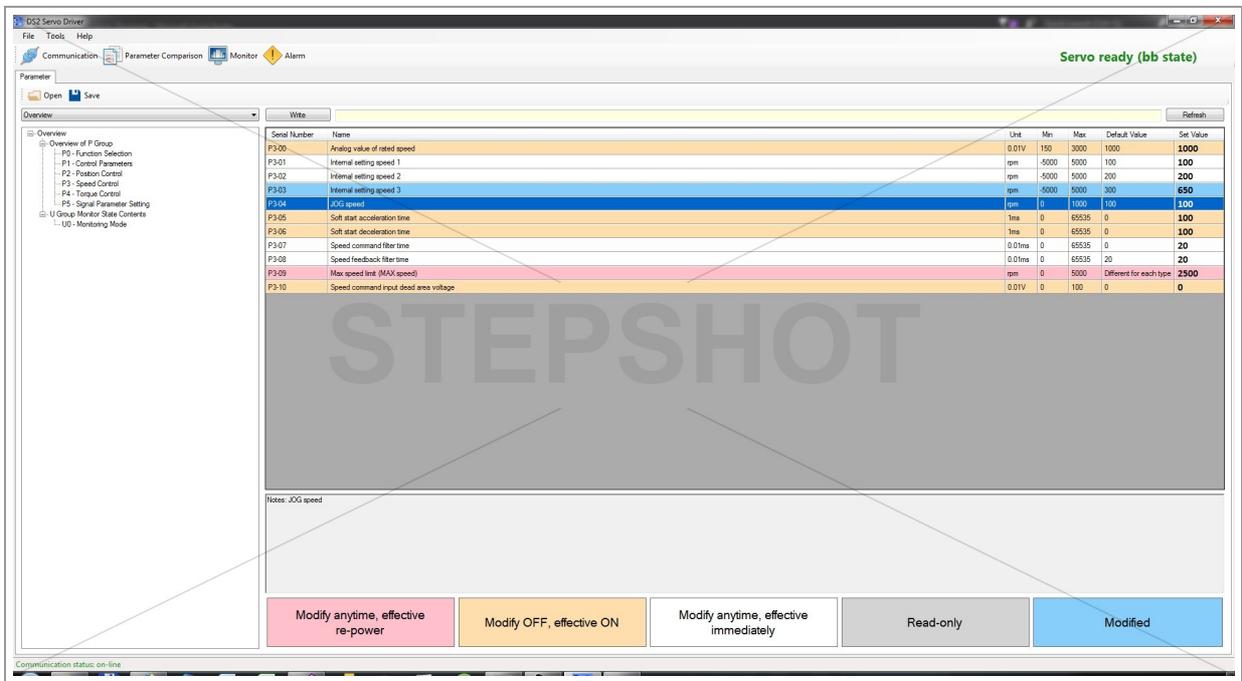
Serial Number	Name	Unit	Min	Max	Default Value	Set Value
P3-00	Analog value of rated speed	0.01V	150	3000	1000	1000
P3-01	Internal setting speed 1	rpm	-5000	5000	100	100
P3-02	Internal setting speed 2	rpm	-5000	5000	200	200
P3-03	Internal setting speed 3	rpm	-5000	5000	300	650
P3-04	JOG speed	rpm	0	1000	100	100
P3-05	Soft start acceleration time	ms	0	1000	100	100
P3-06	Soft start deceleration time	ms	0	65535	0	100
P3-07	Speed command filter time	0.0ms	0	65535	0	20
P3-08	Speed feedback filter time	0.0ms	0	65535	20	20
P3-09	Max speed limit (MAX speed)	rpm	0	5000	Different for each type	2500
P3-10	Speed command input dead area voltage	0.01V	0	100	0	0

Note: Internal setting speed 3

Buttons: Modify anytime, effective re-power; Modify OFF, effective ON; Modify anytime, effective immediately; Read-only; Modified

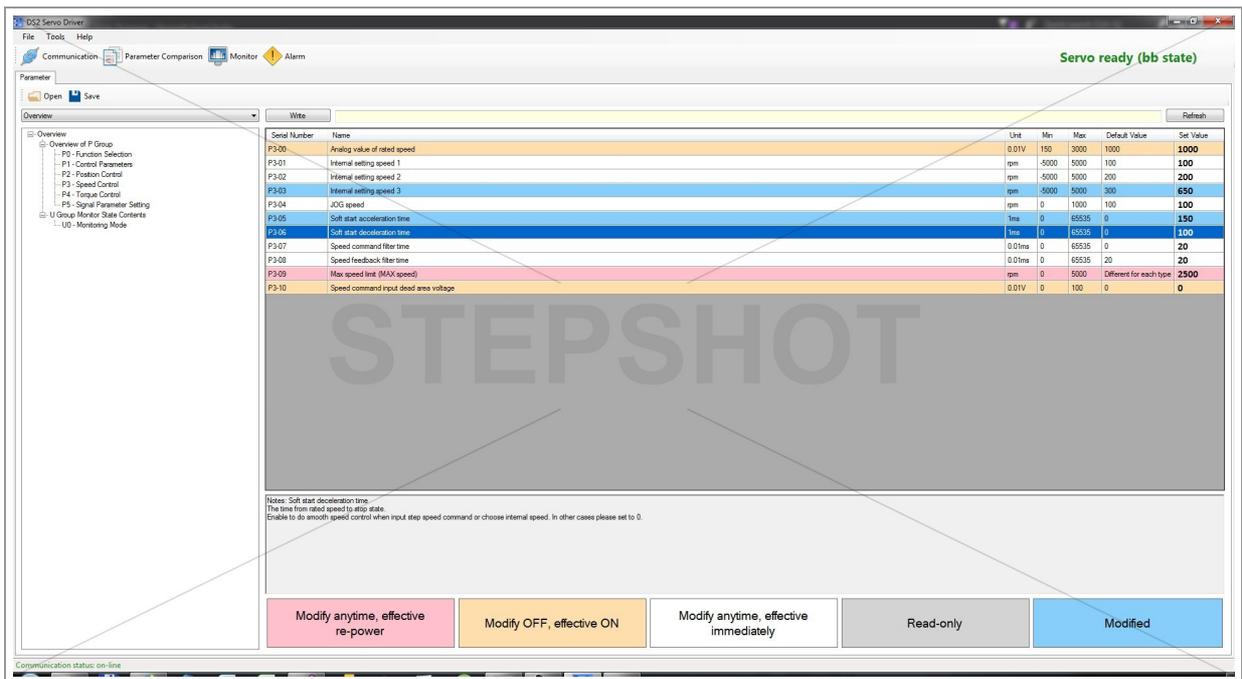
To change the current value of certain parameter double-click on it, type the value you want to write and press ENTER.

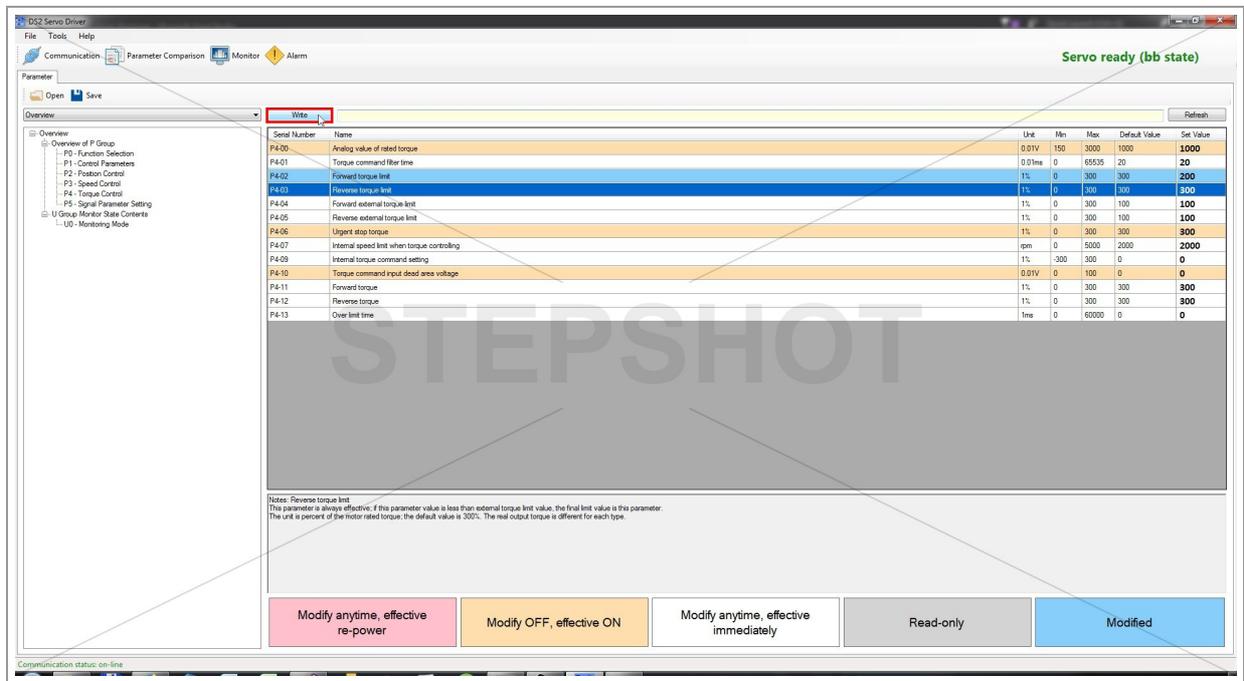
Note: Make sure that your value does not exceed the minimum and maximum limit.



By pressing ENTER, you'll notice that the row of changed parameter became colored in light blue.

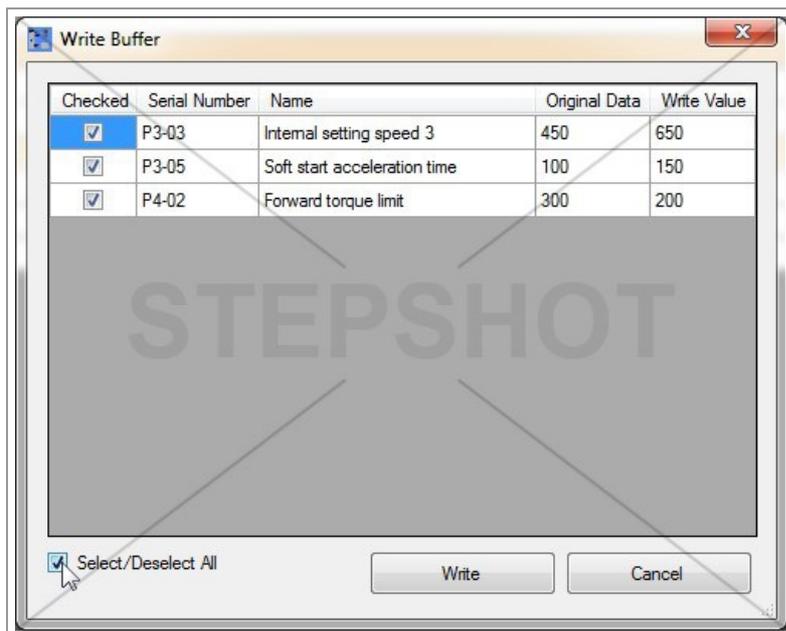
You can change the value of as many parameters as you wish before write all of them to servo (parameters doesn't have to be in the same group).





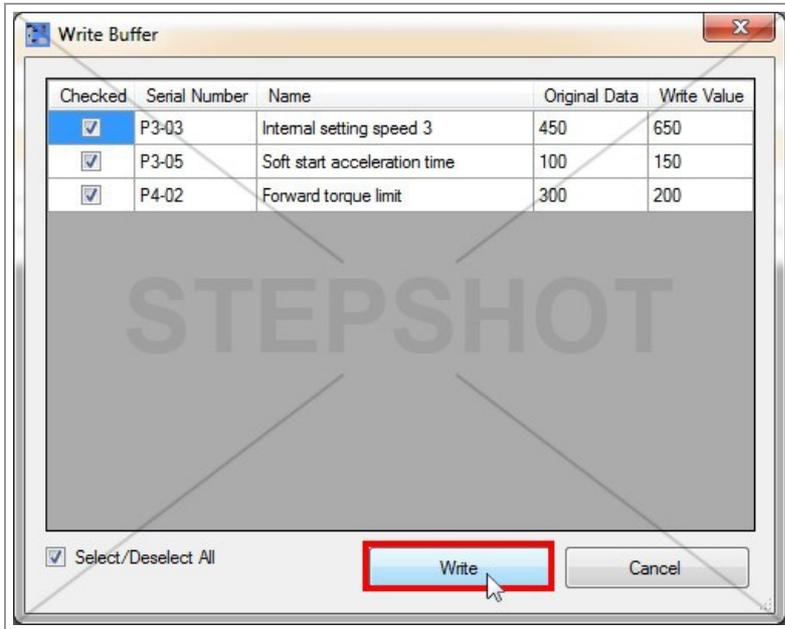
After you finish with modifying the values, click on "Write" button to select which of them you want to be written to servo driver.

## Write Buffer



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

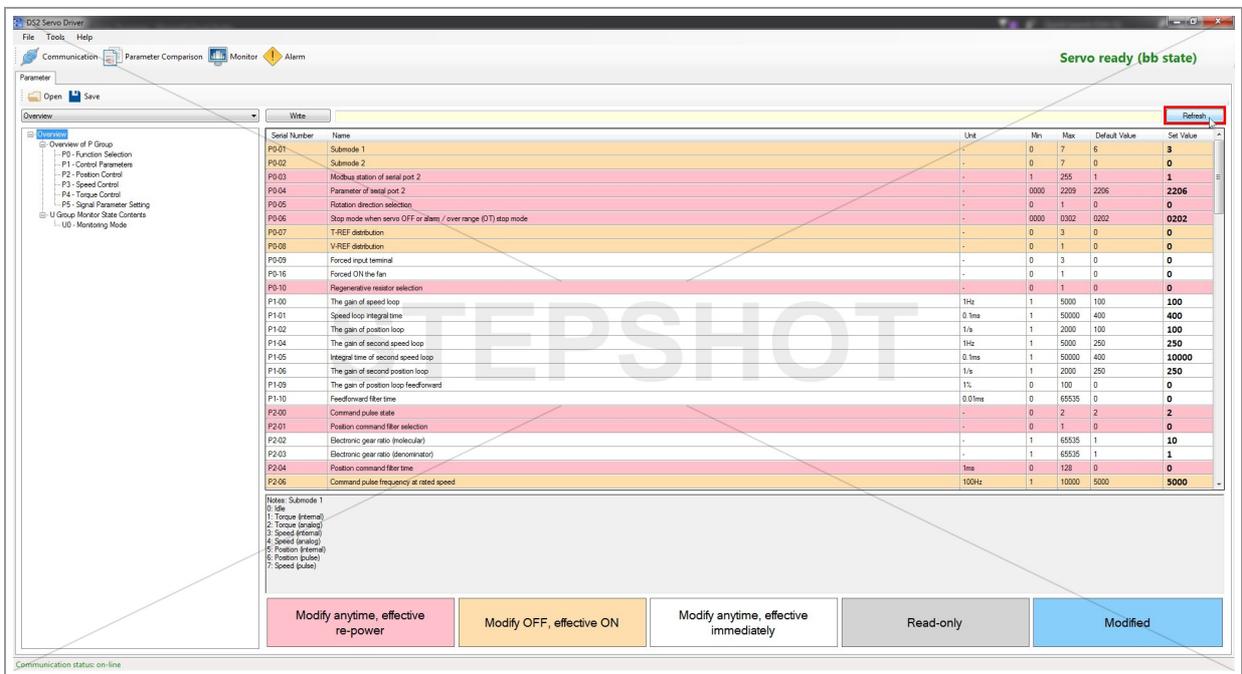
By default, all the changes are checked; if you don't want some change to be applied, you can uncheck the certain row or the whole table by clicking on "Select/Deselect All" checkbox.



Click on "Write" button in "Write Buffer" to write the new values of all selected parameters to servo.

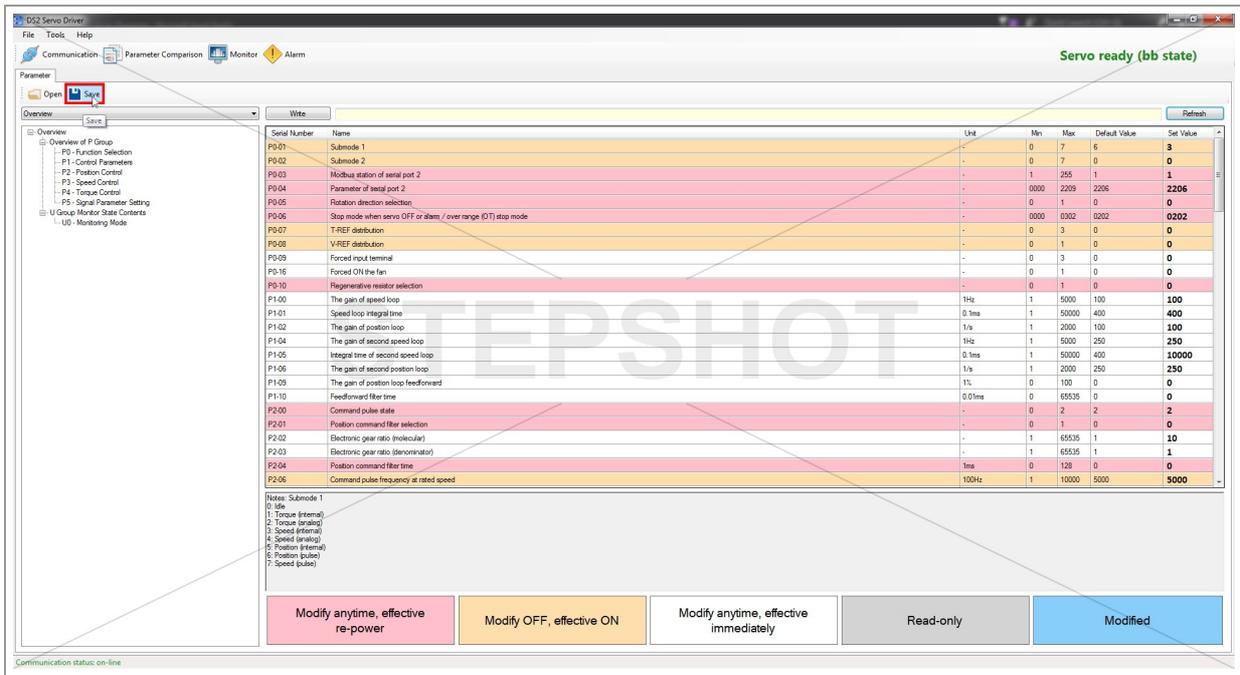


Refresh The Current Table View

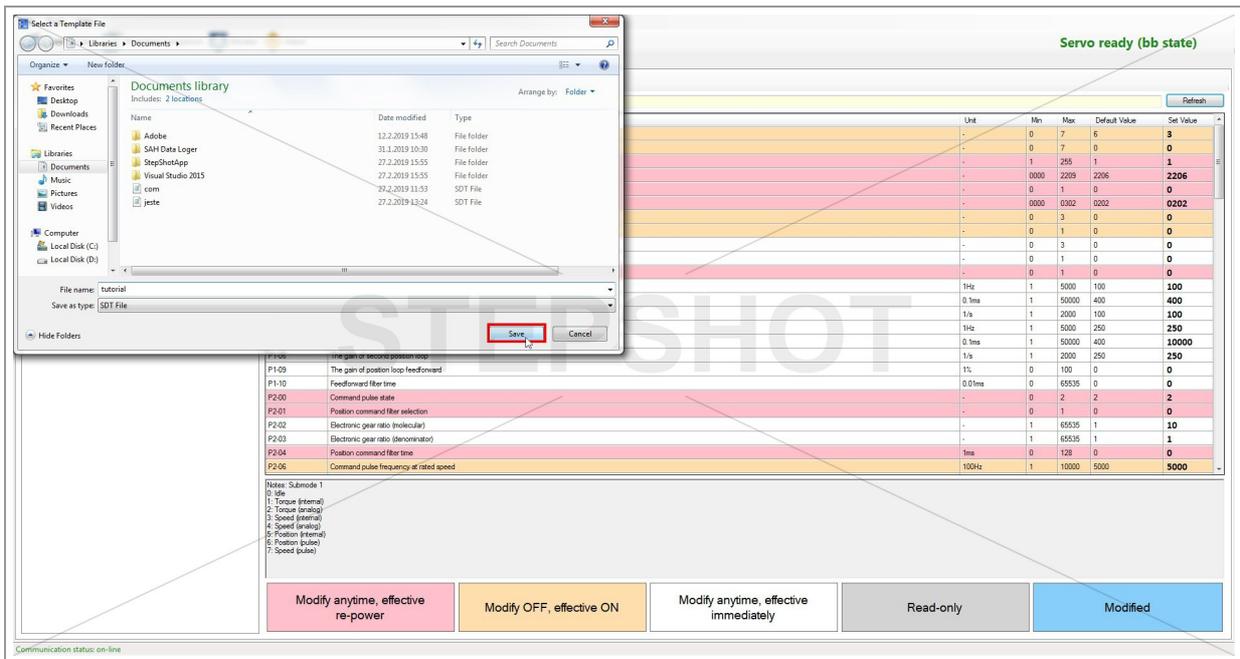


You can always reload from servo the values of parameters in the current view by clicking on "Refresh" button.

# 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.

The screenshot shows the parameter configuration interface. A table lists parameters with columns for Serial Number, Name, Unit, Min, Max, Default Value, and Set Value. An information dialog box is open in the center, displaying the message: "Template file has been successfully saved." with an "OK" button.

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	0202	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	Hz	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	Hz	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	ms	0	128	0	0
P2-06	Command pulse frequency at rated speed	100Hz	1	10000	5000	5000

Buttons at the bottom: Modify anytime, effective re-power; Modify OFF, effective ON; Modify anytime, effective immediately; Read-only; Modified.

## Import Data

This screenshot is identical to the one above, but the "Open" button in the top-left corner of the software window is highlighted with a red box, indicating the step for importing data.

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

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

Communication status: on-line

Servo ready (bb state)

Select a Template File

Libraries > Documents > Documents library

Name	Date modified	Type
Adobe	12.2.2019 15:48	File folder
SAH Data Logger	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	28.2.2019 15:53	SOT File
jeste	27.2.2019 13:24	SOT File
tutorial	28.2.2019 12:58	SOT File

File name: com

SOT File

Open

Serial Number	Name	Unit	Min	Max	Default Value	Set Value
P1-06	The gain of second position loop	-	0	7	6	3
P1-09	The gain of position loop feedforward	-	0	7	0	0
P1-10	Feedforward filter time	0.0ms	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 (numerator)	-	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
P2-05	Command pulse frequency at rated speed	100Hz	1	10000	5000	5000

Notes: Subnode 1  
0: life  
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

File Tools Help

Communication Parameter Comparison Monitor Alarm

Servo ready (bb state)

Parameter

Open Save

Write

Overview

- 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 Status Contents
- U0 - Monitoring Mode

Serial Number	Name	Unit	Min	Max	Default Value	Set Value
P0-01	Subnode 1	-	0	7	6	3
P0-02	Subnode 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	Hz	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	Hz	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/s	0	100	0	0
P1-10	Feedforward filter time	0.0ms	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 (numerator)	-	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
P2-05	Command pulse frequency at rated speed	100Hz	1	10000	5000	5000

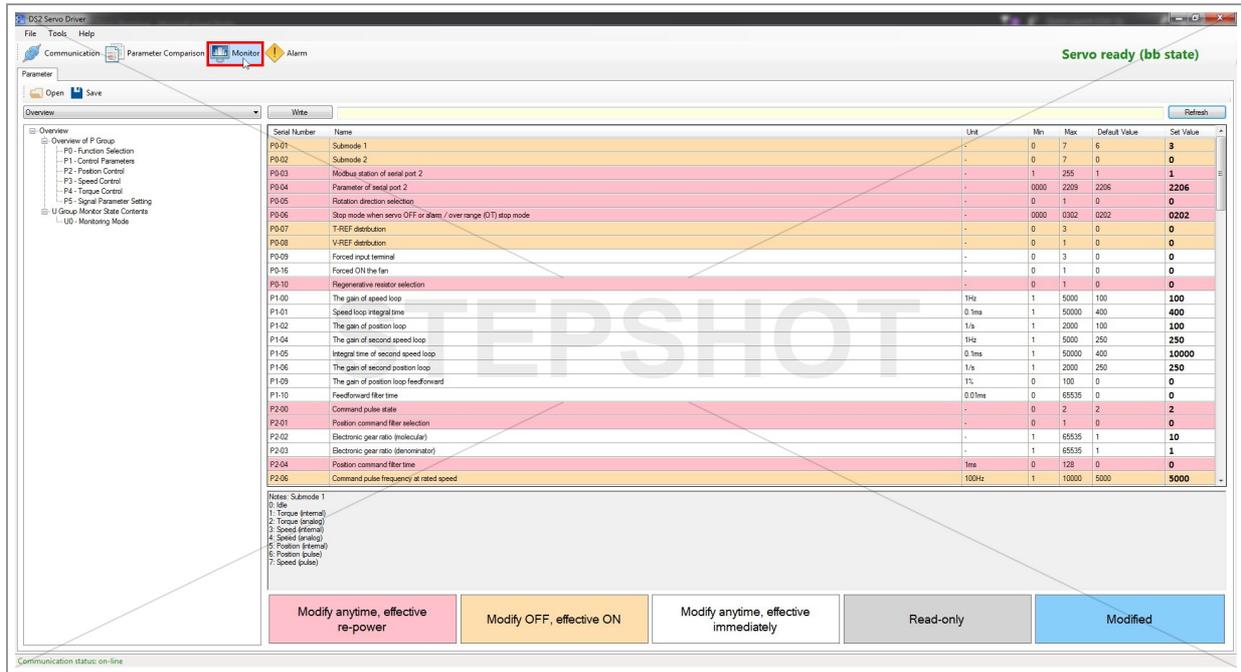
Notes: Subnode 1  
0: life  
1: Torque (Internal)  
2: Torque (analog)  
3: Speed (Internal)  
4: Speed (analog)  
5: Position (Internal)  
6: Position (pulse)  
7: Speed (pulse)

Information: Template file has been successfully loaded.

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

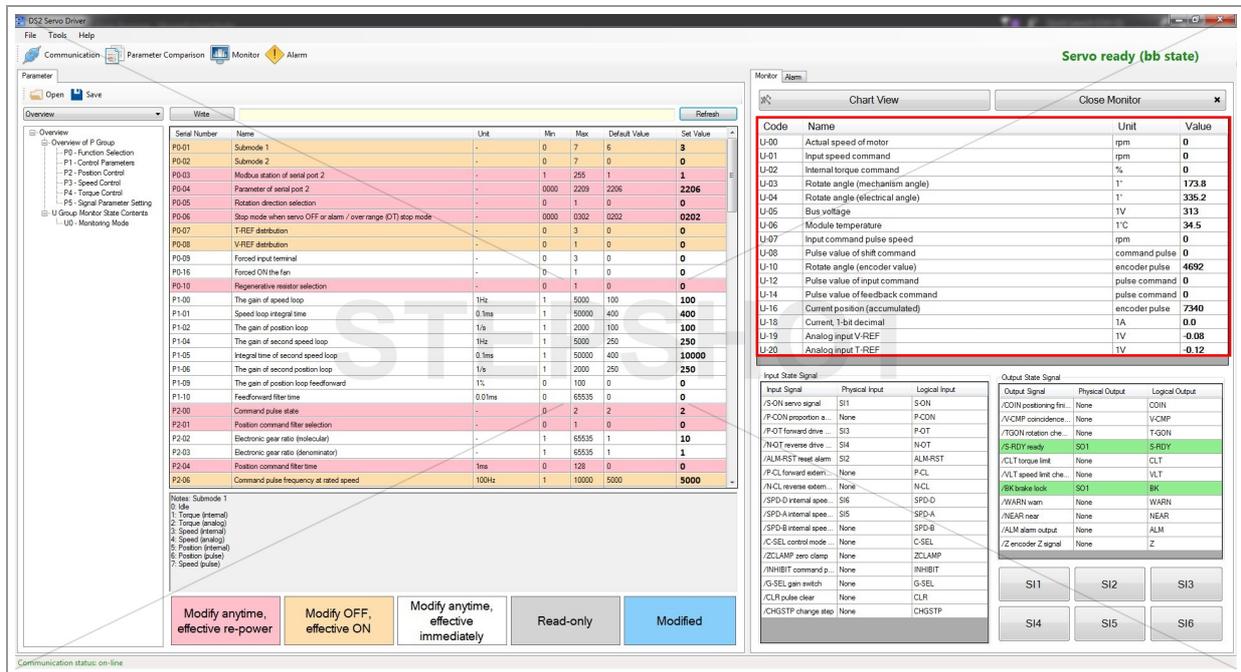
# Monitor Mode

## 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

The screenshot shows the DS2 Servo Driver software interface. On the left, a list of parameters (P0-01 to P26-06) is displayed with columns for Serial Number, Name, Unit, Min, Max, Default Value, and Set Value. Parameters P5-10 are highlighted in pink, indicating they are related to input state signals. On the right, the 'Monitor' tab is active, showing a table of 'Input State Signal' and 'Output State Signal'. The 'Input State Signal' table has columns for Input Signal, Physical Input, and Logical Input. The 'Output State Signal' table has columns for Output Signal, Physical Output, and Logical Output. The 'S11' and 'S12' signals are highlighted in light green, indicating they are currently active. Below the tables, there are buttons for 'S11', 'S12', 'S13', 'S14', 'S15', and 'S16'.

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: "S11" is related to S-ON, "S12" is related to ALM-RST, etc.

# Output State Signal

The screenshot shows the DS2 Servo Driver software interface, similar to the previous one. The 'Monitor' tab is active, showing the 'Output State Signal' table. The 'Output State Signal' table has columns for Output Signal, Physical Output, and Logical Output. The 'S11', 'S12', and 'S13' signals are highlighted in light green, indicating they are currently active. Below the tables, there are buttons for 'S11', 'S12', 'S13', 'S14', 'S15', and 'S16'.

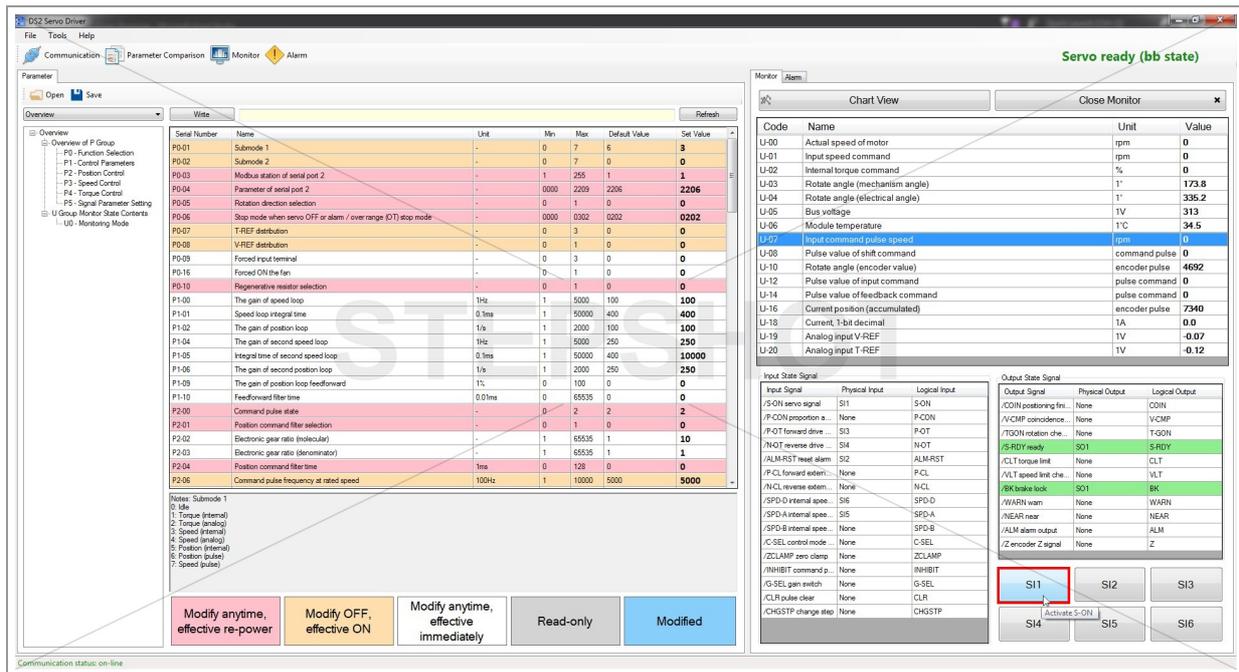
Parameters in output state signal are read-only and they indicate the current output state of servo.

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

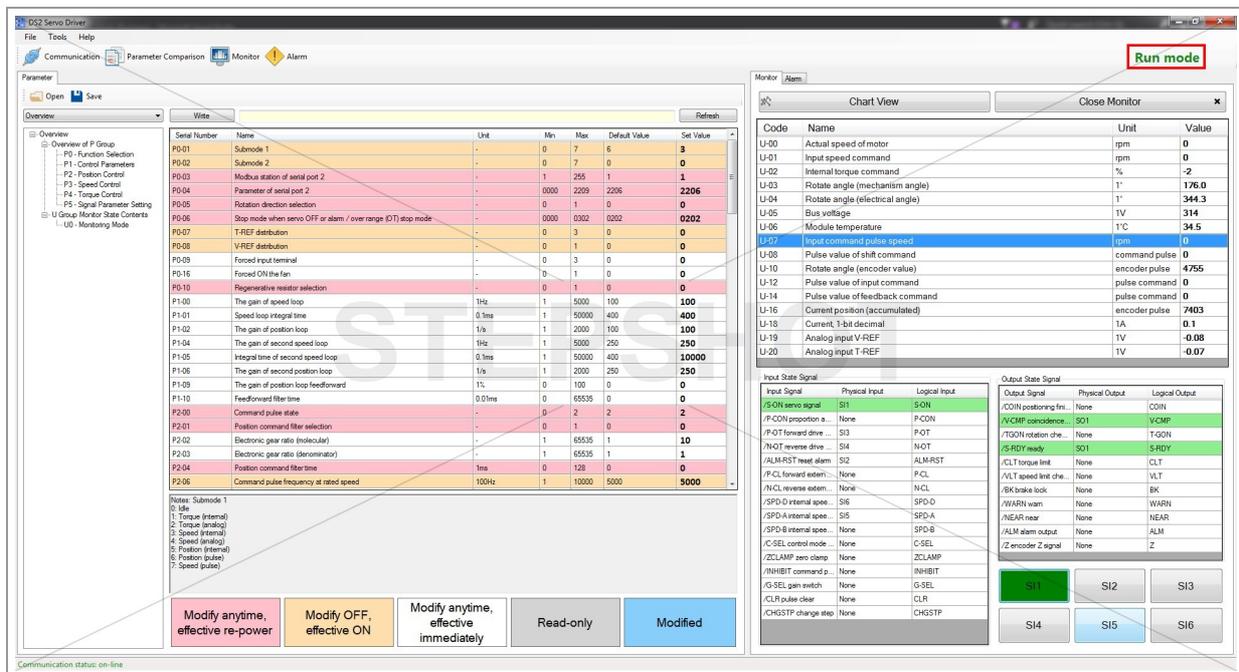


When you mouse hover some of the "SI" buttons, the tooltip will appear.

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

The screenshot shows the DS2 Servo Driver software interface. The 'Parameter' window displays a list of parameters for Submode 1, including speed, position, and torque settings. The 'Monitor' window shows the 'Code' table with the following data:

Code	Name	Unit	Value
U-00	Actual speed of motor	rpm	500
U-01	Input speed command	rpm	500
U-02	Internal torque command	%	7
U-03	Rotate angle (mechanism angle)	1°	324.4
U-04	Rotate angle (electrical angle)	1°	217.7
U-05	Bus voltage	1V	312
U-06	Module temperature	1°C	34.5
U-07	Input command pulse speed	rpm	0
U-08	Pulse value of shift command	command pulse	0
U-10	Rotate angle (encoder value)	encoder pulse	8876
U-12	Pulse value of input command	pulse command	0
U-14	Pulse value of feedback command	pulse command	0
U-16	Current position (accumulated)	encoder pulse	751513
U-18	Current, 1-bit decimal	1A	0.2
U-19	Analog input V-REF	1V	-0.10
U-20	Analog input T-REF	1V	-0.11

The 'Input State Signal' table shows the following active signals:

Input Signal	Physical Input	Logical Input
/SON servo signal	SI1	SON
/POT forward dir...	SI2	POT
/NOT reverse dir...	SI4	NOT
/ALM-RST reset alm...	SI2	ALM-RST
/P-CL forward exte...	None	P-CL
/N-CL reverse exte...	None	N-CL
/SPD-D internal spee...	SI6	SPD-D
/SPD-A internal spee...	SI5	SPD-A
/SPD-B internal spee...	None	SPD-B
/C-SEL control mode...	None	C-SEL
/Z-CLAMP zero clamp	None	Z-CLAMP
/INHBIT command p...	None	INHBIT
/G-SEL gan switch	None	G-SEL
/CLR pulse clear	None	CLR
/CHGSTP change step	None	CHGSTP

The 'Output State Signal' table shows the following active signals:

Output Signal	Physical Output	Logical Output
/COIN positioning fr...	None	COIN
/VCOMP coincidence...	SO1	VCOMP
/TSGON rotation che...	SO1	TSGON
/S-READY ready	SO1	S-READY
/CLT torque limit	None	CLT
/ALT speed limit che...	None	VLT
/BK brake lock	None	BK
/WARN warn	None	WARN
/NEAR near	None	NEAR
/ALM alarm output	None	ALM
/Z encoder Z signal	None	Z

The 'Monitor' window also features a 'Close Monitor' button and a 'Chart View' button. The 'Input State Signal' table shows 'SI5' is active, and the 'Output State Signal' table shows 'SI5' is active.

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

# Change Rotate Direction

The screenshot shows the DS2 Servo Driver software interface. The 'Parameter' window displays a list of parameters for Submode 1, including speed, position, and torque settings. The 'Monitor' window shows the 'Code' table with the following data:

Code	Name	Unit	Value
U-00	Actual speed of motor	rpm	-499
U-01	Input speed command	rpm	-499
U-02	Internal torque command	%	-8
U-03	Rotate angle (mechanism angle)	1°	225.9
U-04	Rotate angle (electrical angle)	1°	183.7
U-05	Bus voltage	1V	313
U-06	Module temperature	1°C	34.5
U-07	Input command pulse speed	rpm	0
U-08	Pulse value of shift command	command pulse	0
U-10	Rotate angle (encoder value)	encoder pulse	6140
U-12	Pulse value of input command	pulse command	0
U-14	Pulse value of feedback command	pulse command	0
U-16	Current position (accumulated)	encoder pulse	-1011196
U-18	Current, 1-bit decimal	1A	0.2
U-19	Analog input V-REF	1V	-0.11
U-20	Analog input T-REF	1V	-0.09

The 'Input State Signal' table shows the following active signals:

Input Signal	Physical Input	Logical Input
/SON servo signal	SI1	SON
/POT forward dir...	SI3	POT
/NOT reverse dir...	SI4	NOT
/ALM-RST reset alm...	SI2	ALM-RST
/P-CL forward exte...	None	P-CL
/N-CL reverse exte...	None	N-CL
/SPD-D internal spee...	SI6	SPD-D
/SPD-A internal spee...	SI5	SPD-A
/SPD-B internal spee...	None	SPD-B
/C-SEL control mode...	None	C-SEL
/Z-CLAMP zero clamp	None	Z-CLAMP
/INHBIT command p...	None	INHBIT
/G-SEL gan switch	None	G-SEL
/CLR pulse clear	None	CLR
/CHGSTP change step	None	CHGSTP

The 'Output State Signal' table shows the following active signals:

Output Signal	Physical Output	Logical Output
/COIN positioning fr...	None	COIN
/VCOMP coincidence...	SO1	VCOMP
/TSGON rotation che...	SO1	TSGON
/S-READY ready	SO1	S-READY
/CLT torque limit	None	CLT
/ALT speed limit che...	None	VLT
/BK brake lock	None	BK
/WARN warn	None	WARN
/NEAR near	None	NEAR
/ALM alarm output	None	ALM
/Z encoder Z signal	None	Z

The 'Monitor' window also features a 'Close Monitor' button and a 'Chart View' button. The 'Input State Signal' table shows 'SI6' is active, and the 'Output State Signal' table shows 'SI6' is active.

SPD-D changes the current rotate direction.

# Chart View

The screenshot shows the 'D52 Servo Driver' software interface. On the left, there is a 'Parameter' list with columns for Serial Number, Name, Unit, Min, Max, Default Value, and Set Value. The 'Chart View' button in the top right of the parameter list is highlighted with a red box. Below the parameter list are several status buttons: 'Modify anytime, effective re-power', 'Modify OFF, effective ON', 'Modify anytime, effective immediately', 'Read-only', and 'Modified'. On the right side, there is a 'Monitor' window with a 'Chart View' tab selected, showing a table of input and output signals.

Code	Name	Unit	Value
U-00	Actual speed of motor	rpm	499
U-01	Input speed command	rpm	-499
U-02	Internal torque command	%	-7
U-03	Rotate angle (mechanism angle)	1°	5.6
U-04	Rotate angle (electrical angle)	1°	22.5
U-05	Bus voltage	1V	313
U-06	Module temperature	1°C	34.6
U-07	Input command pulse speed	rpm	0
U-08	Pulse value of shift command	command pulse	0
U-10	Rotate angle (encoder value)	encoder pulse	21
U-12	Pulse value of input command	pulse command	0
U-14	Pulse value of feedback command	pulse command	0
U-16	Current position (accumulated)	encoder pulse	-2717289
U-18	Current, 1-bit decimal	1A	0.2
U-19	Analog input V-REF	1V	-0.11
U-20	Analog input T-REF	1V	-0.10

Click on "Chart View" button to open a new tab on the left side of your window.

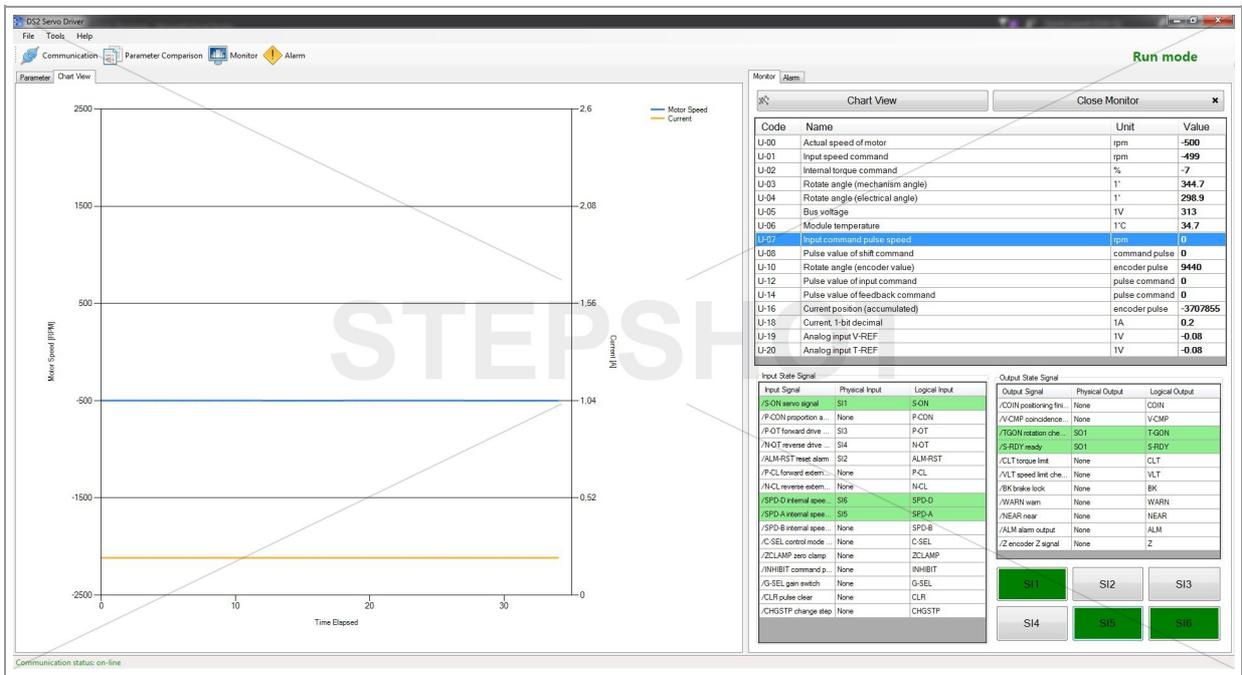
The line chart with real-time values for the actual speed of motor and the present current will appear.

# Stop Motor

The screenshot shows the 'D52 Servo Driver' software interface with the 'Chart View' window open. The chart displays 'Motor Speed [rpm]' on the left y-axis (ranging from -2500 to 2500) and 'Current [A]' on the right y-axis (ranging from 0 to 2.6). The x-axis is 'Time Elapsed' (0 to 40). The motor speed (blue line) starts at 0, rises to approximately 1500 rpm at 35 seconds, and then falls back to 0. The current (yellow line) starts at 0, rises to approximately 1.56 A at 35 seconds, and then falls back to 0. The 'Chart View' button in the top right of the chart window is highlighted with a red box.

Stop the motor rotation by deactivating input "SI5".

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

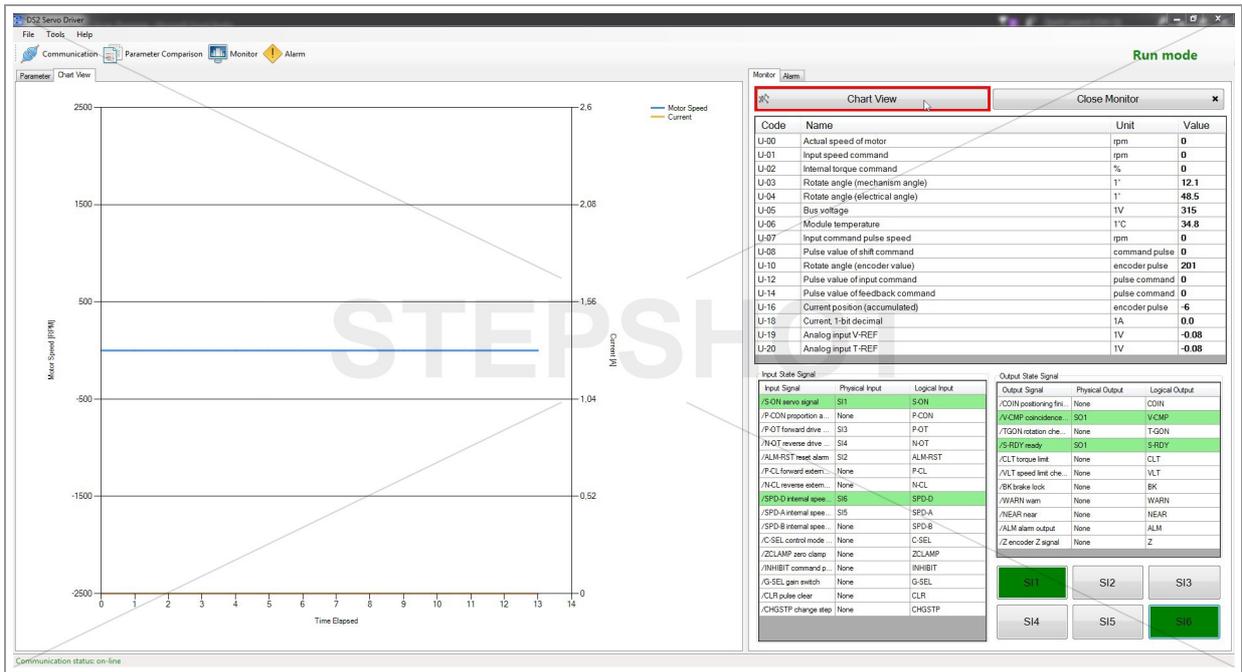


Line that indicates the motor speed value is colored in blue and its range is shown on the left side of Y-axis.

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.

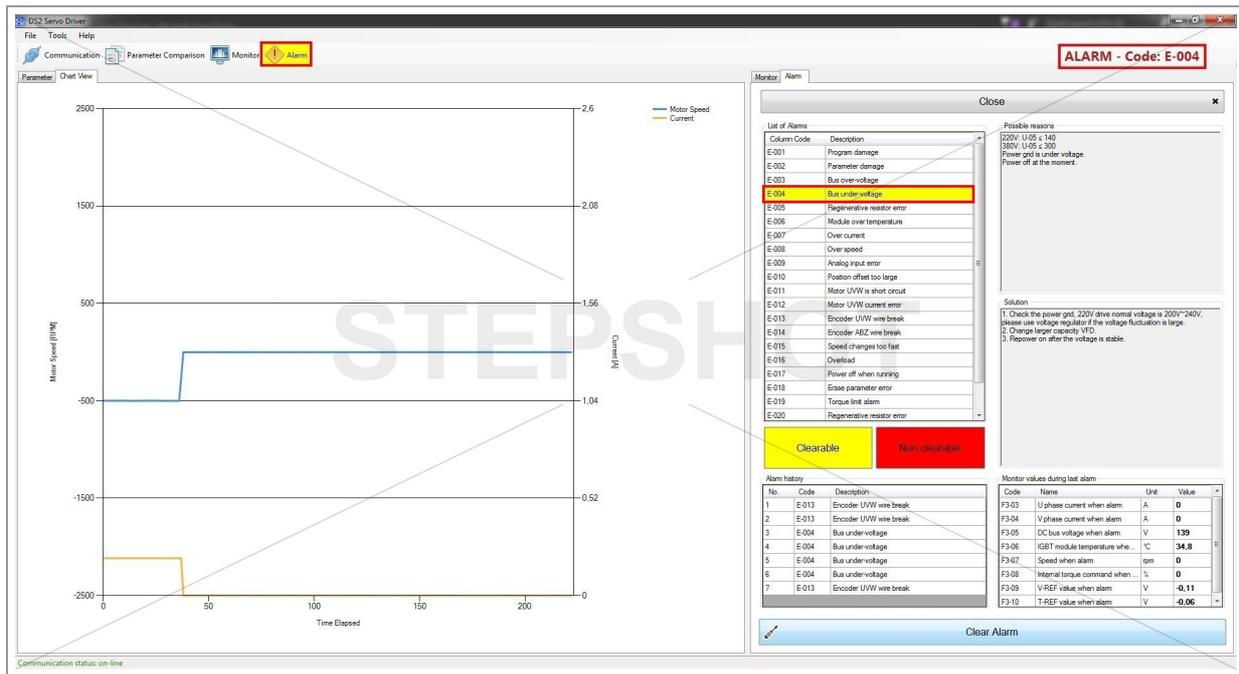
## Refresh Chart View



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

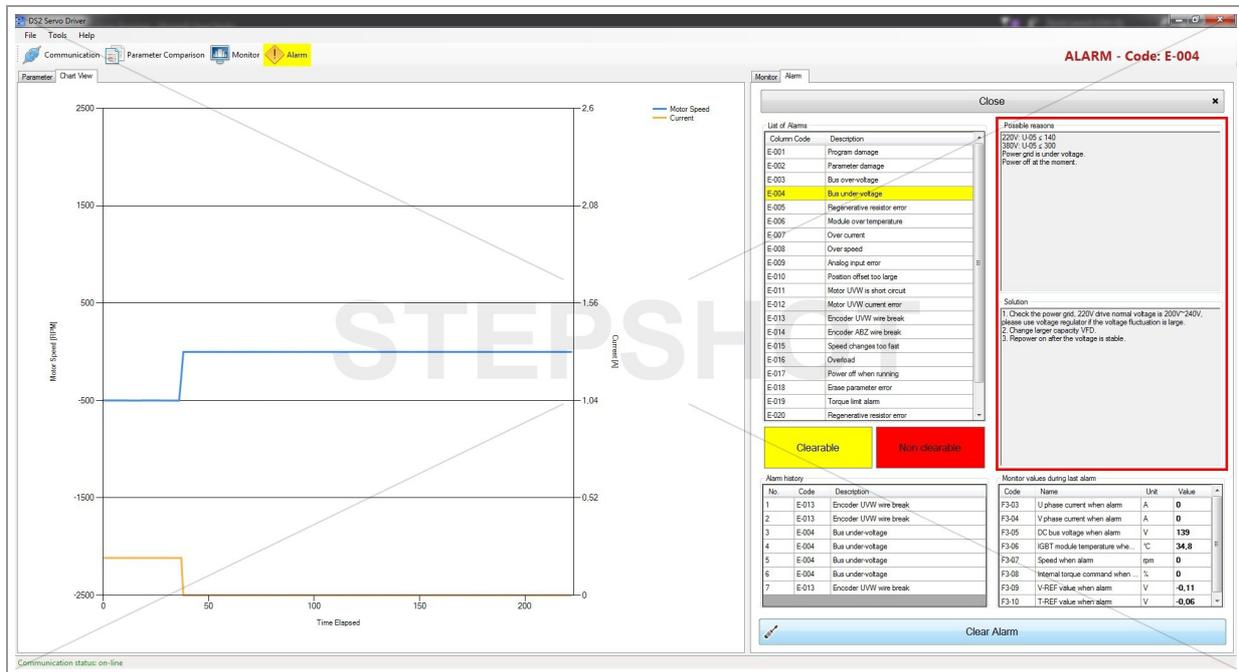
# Alarm

## Alarm Occur



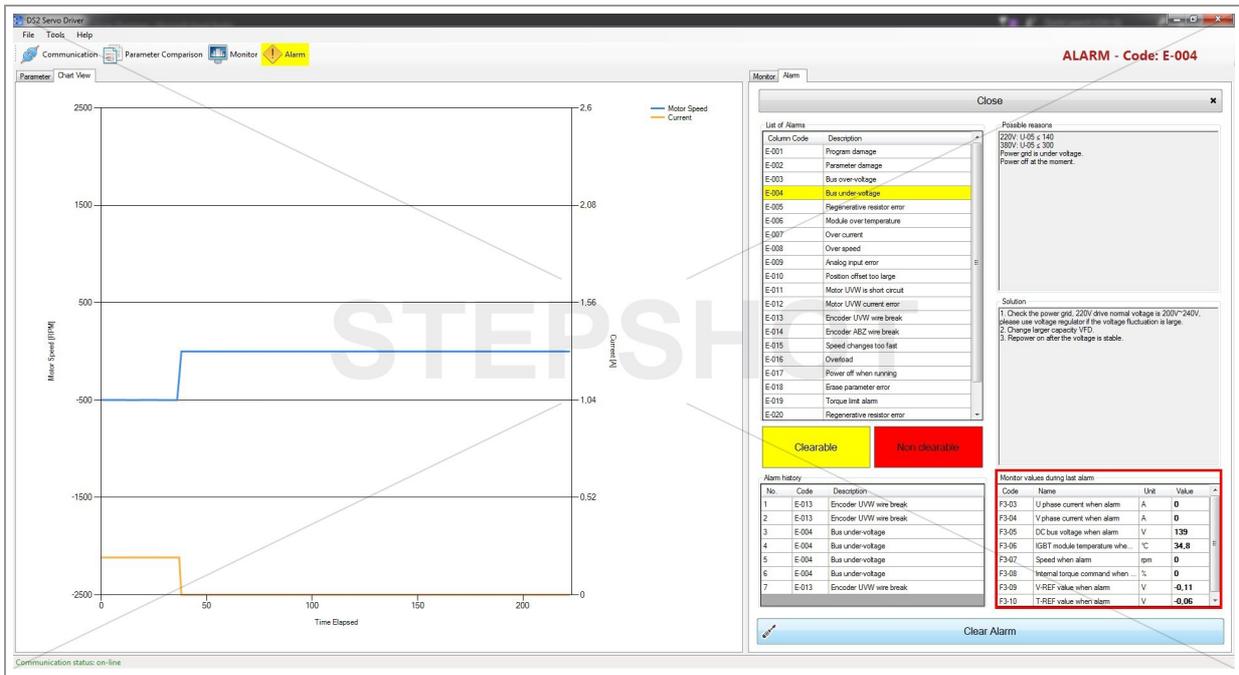
When the clearable alarm occurs, the alarm icon and the alarm code from the list of alarms get colored in yellow.

## Possible Reasons and Solution



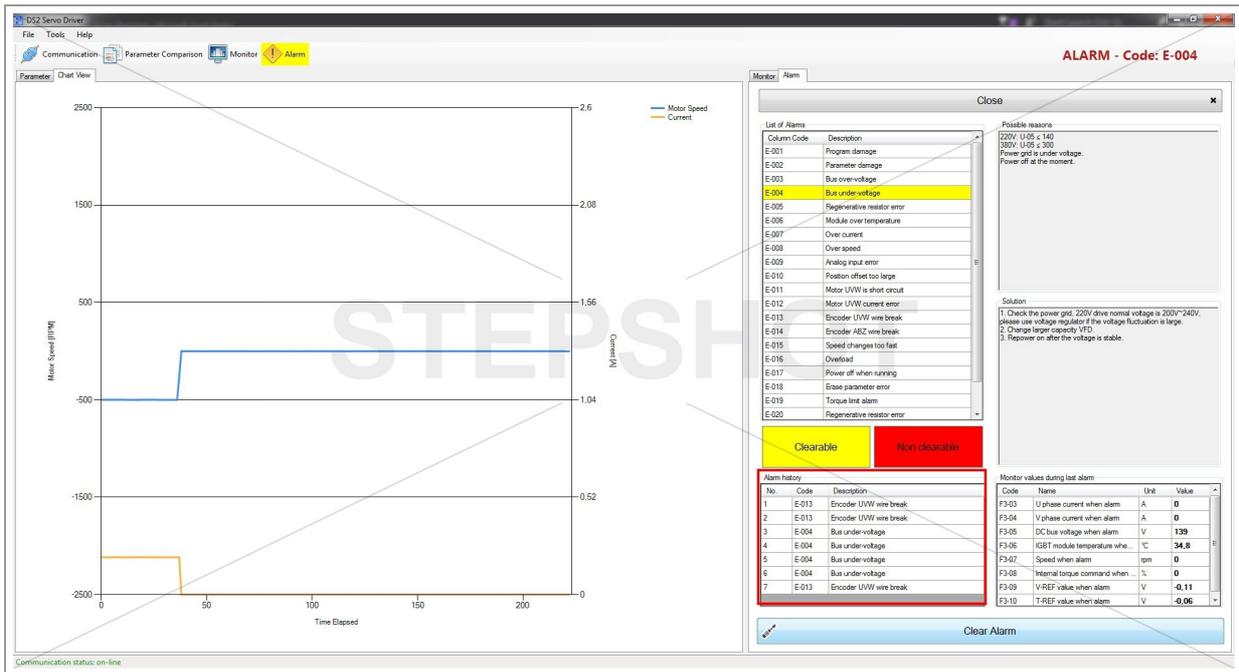
The list of possible reasons for the present error occurring and solutions for it are shown in marked textboxes.

# Monitor Values During the Last Alarm



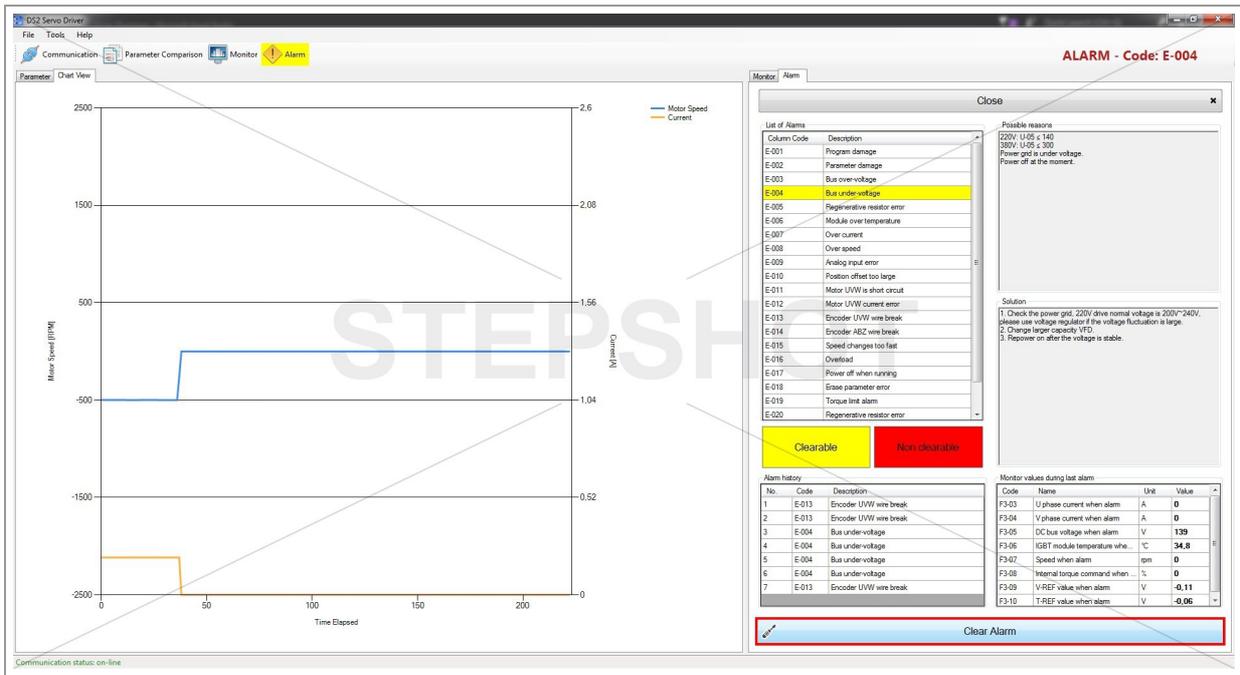
The values of some key parameters are being recorded in the moment of last occur of alarm.

## Alarm History



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

# Clear Alarm

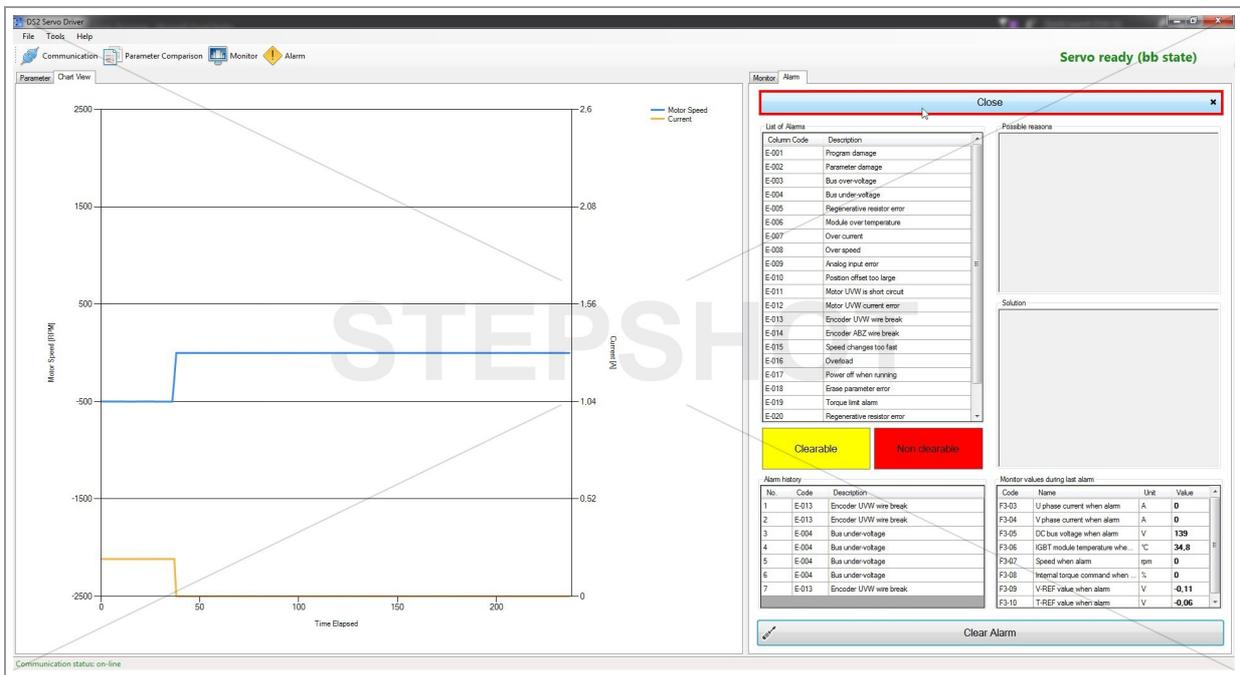


If the alarm is clearable, you can clear it and back servo to bb state by clicking the "Clear Alarm" button.

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.

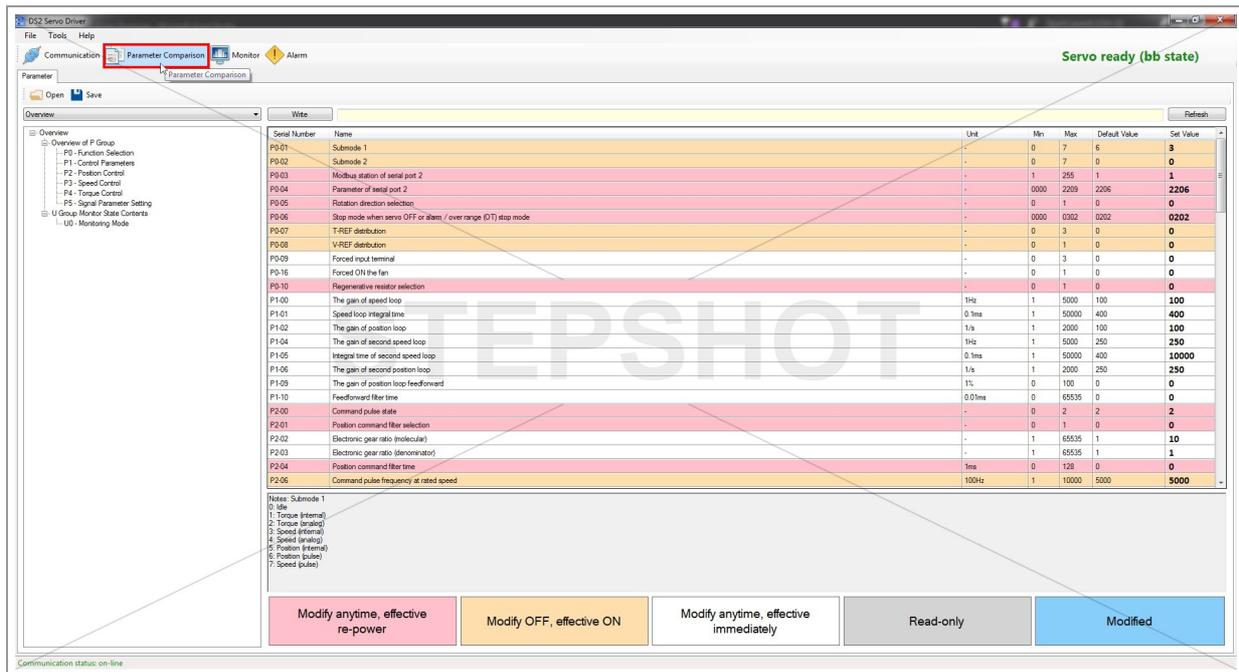
# Close Monitor Mode



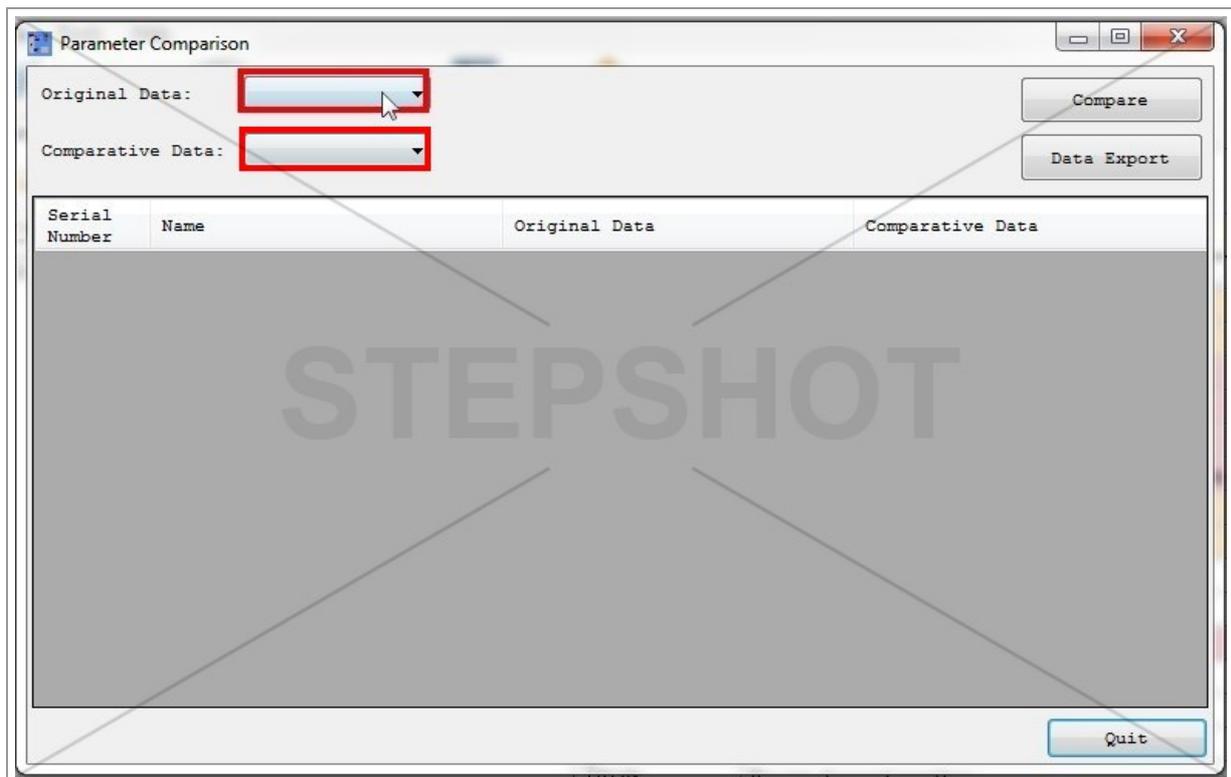
To close the monitor mode and get back to full parameter table view, click "Close" button in "Alarm" tab or "Close Monitor" button in "Monitor" tab.

# Other Features

## Parameter Comparison

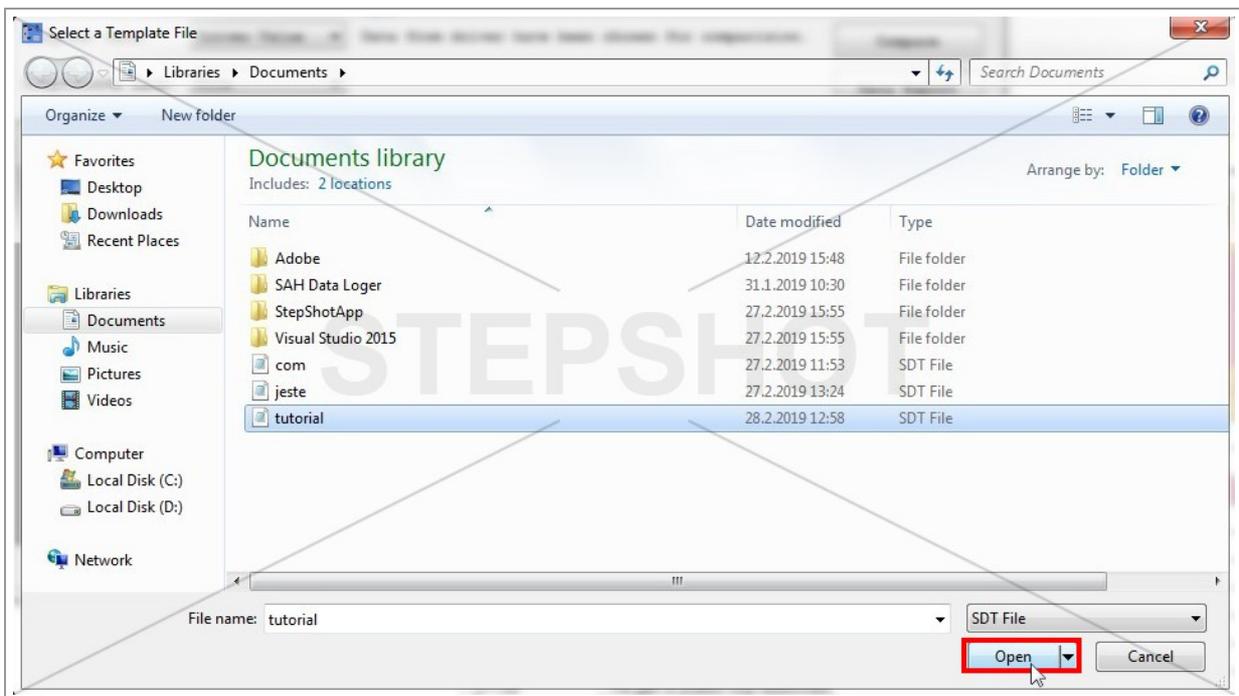
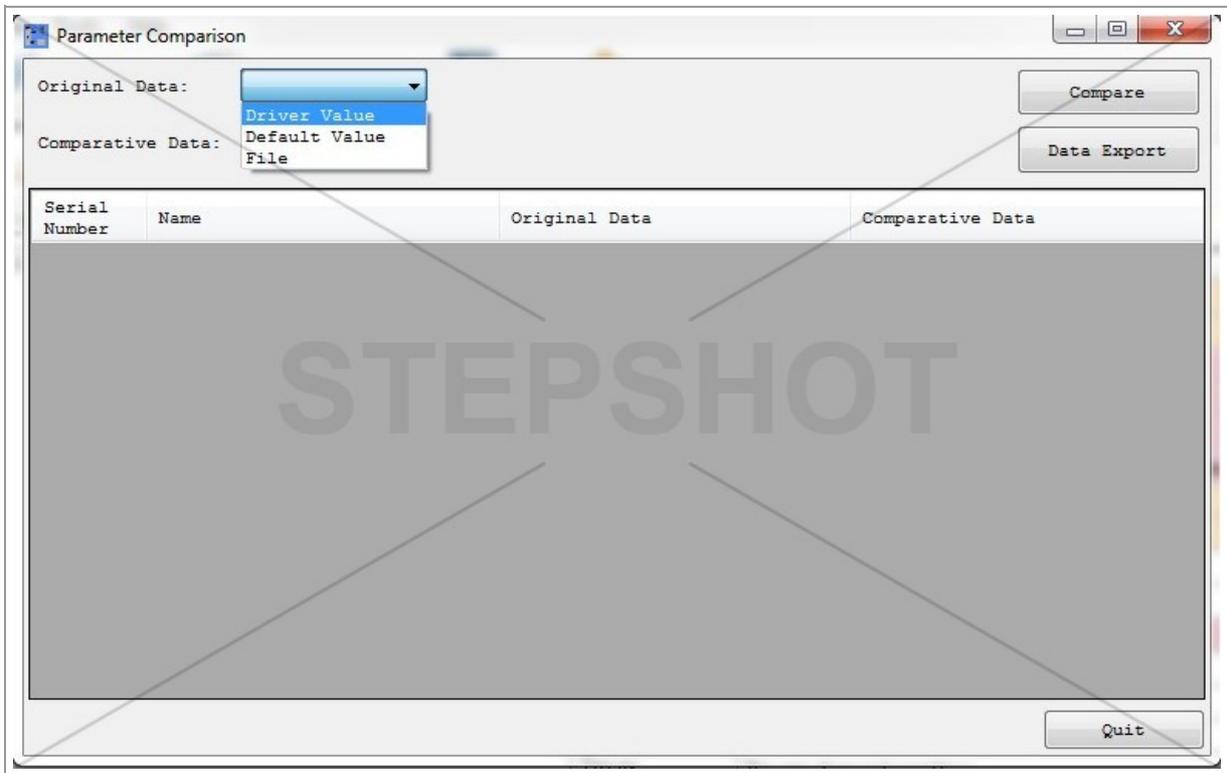


If you need to compare the data from the driver, parameter default values or data from saved file one with each other, click on "Parameter Comparison" icon.



Select the original and comparative data from dropdown menus to compare the values of all parameters.

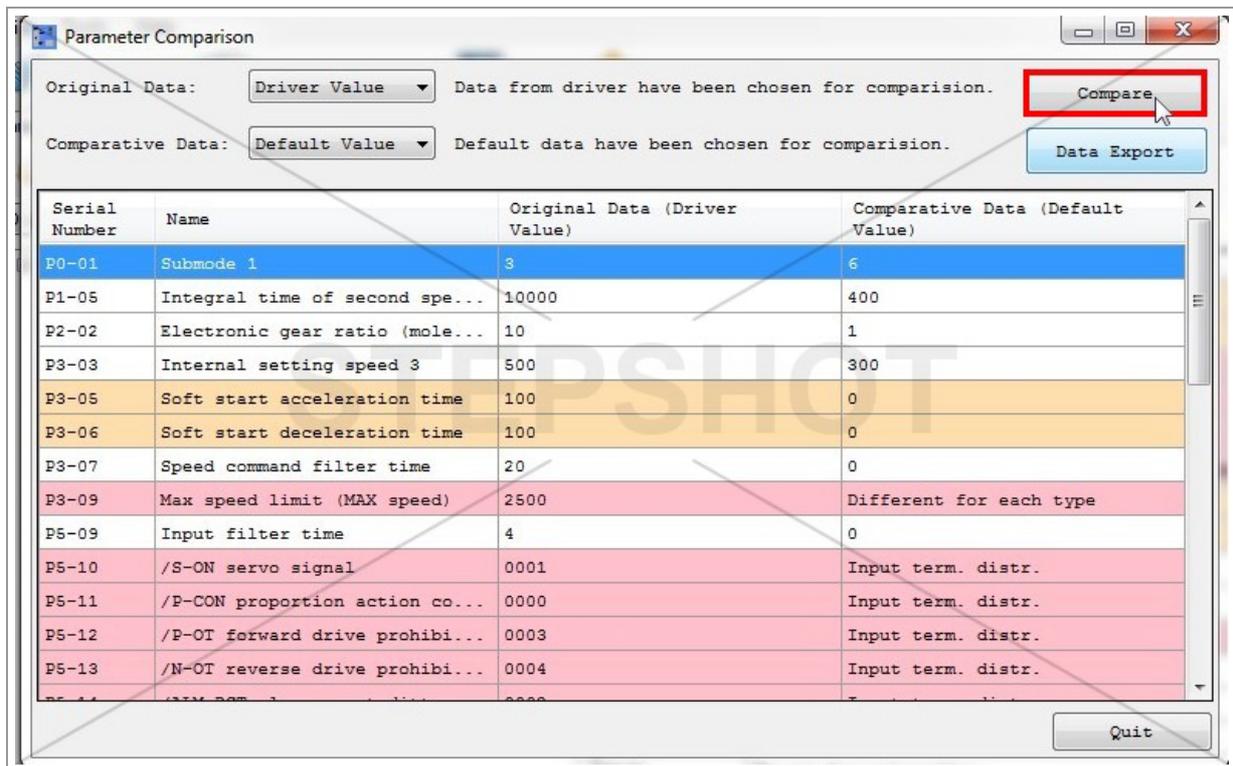
Note: Make sure that selected original and comparative data are different; otherwise, there will be nothing to compare.



If you choose "File", the open dialog box will appear and you'll be prompted to choose the exported .sdf template file.

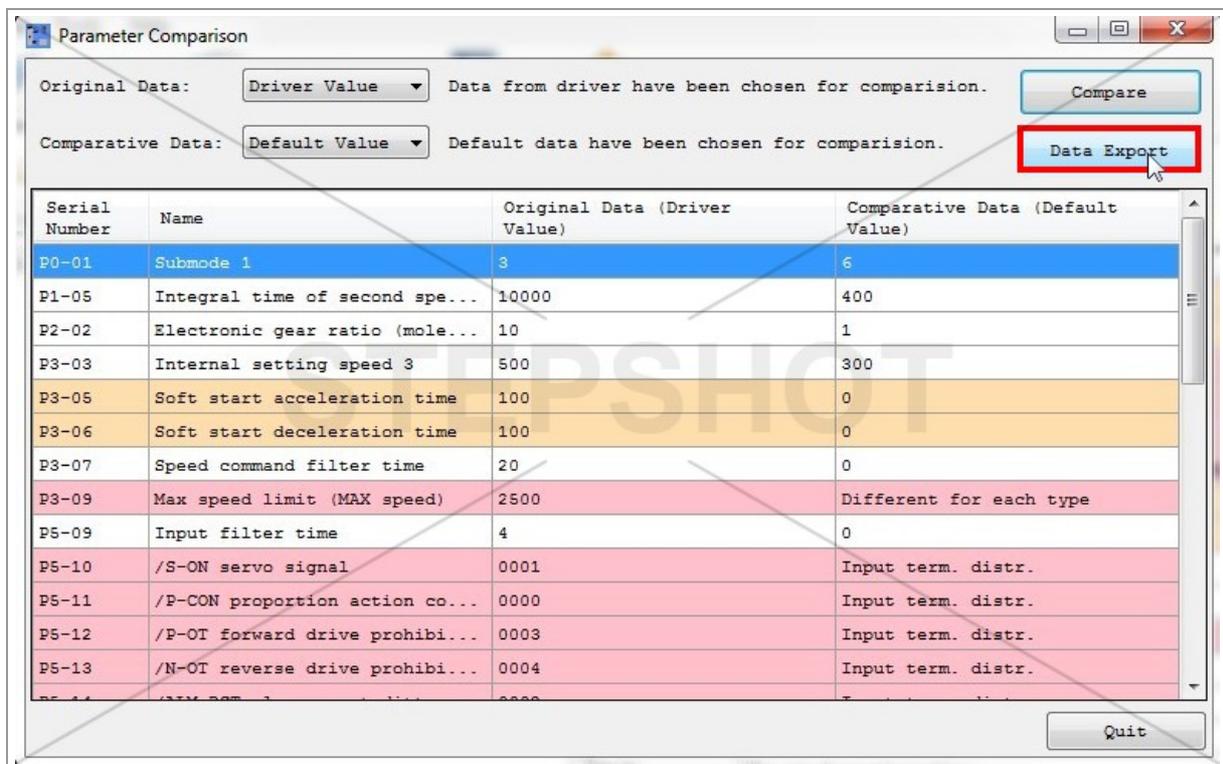
Press "Open" button to load it.

## Compare The Data



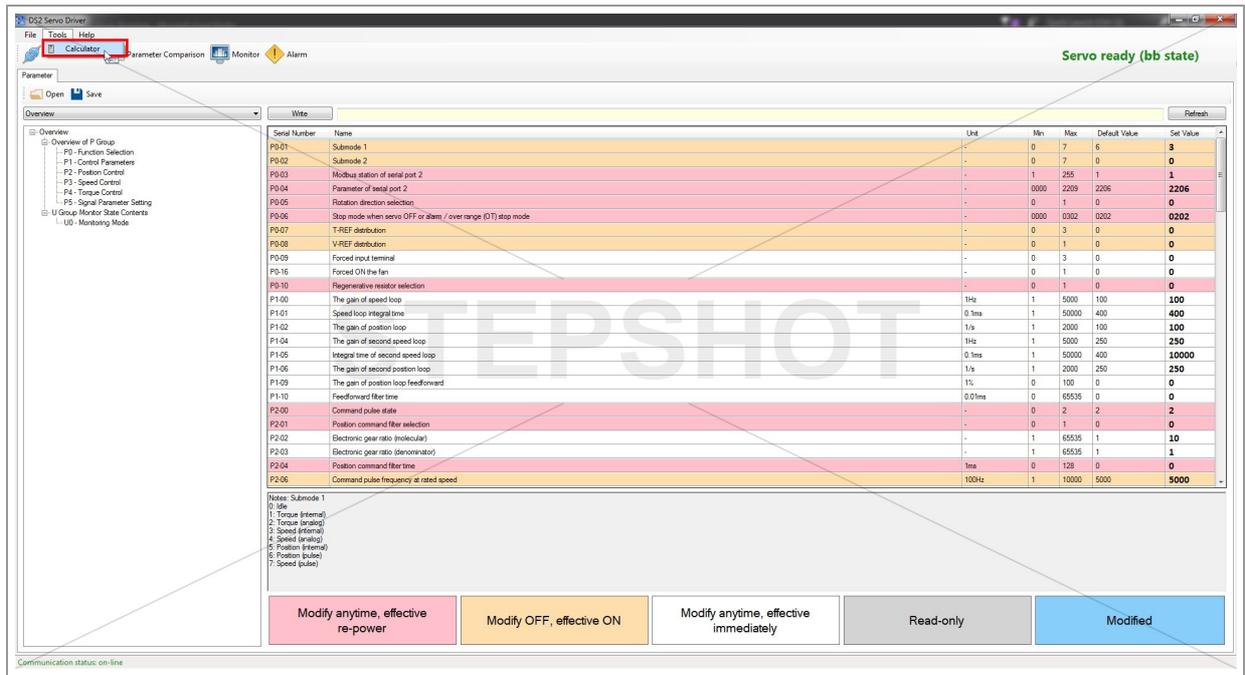
Click on "Compare" button to see the list of all parameters from selected original data which values are different than selected comparative data.

## Export the Compared Data

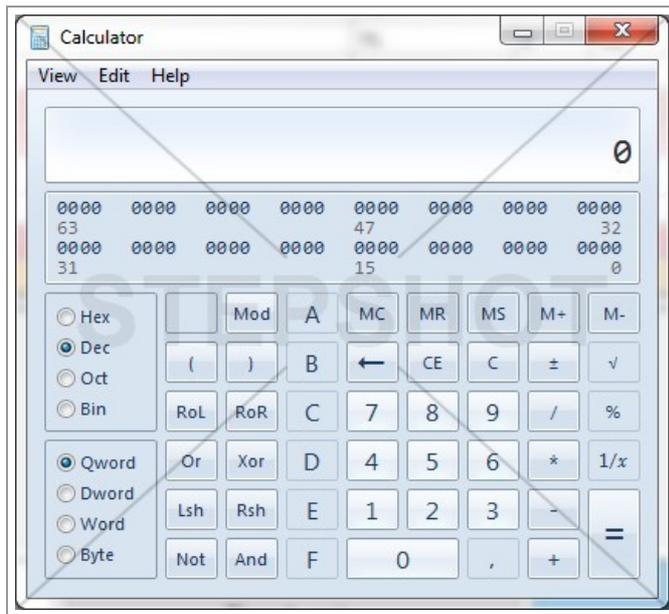


You can export the data from the table to .csv file, if you need to, by clicking "Data Export" button.

# Tools



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



# Help

DS2 Servo Driver

File Tools Help

Comm Device Manual Software Manual About

Parameter Open Save

Overview

Write Refresh

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	Offset value of serial port 2	-	1	255	1	4
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
P0-18	Regenerative resistor selection	-	0	1	0	0
P1-00	The gain of speed loop	Hz	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	Hz	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/s	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	ms	0	128	0	0
P2-05	Command pulse frequency at rated speed	100Hz	1	10000	5000	5000

Notes: Submode 1  
0. Idle  
1. Torque (Internal)  
2. Torque (External)  
3. Speed (Internal)  
4. Speed (External)  
5. Position (Internal)  
6. Position (External)  
7. Speed (pulse)

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

Communication status: on-line

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.