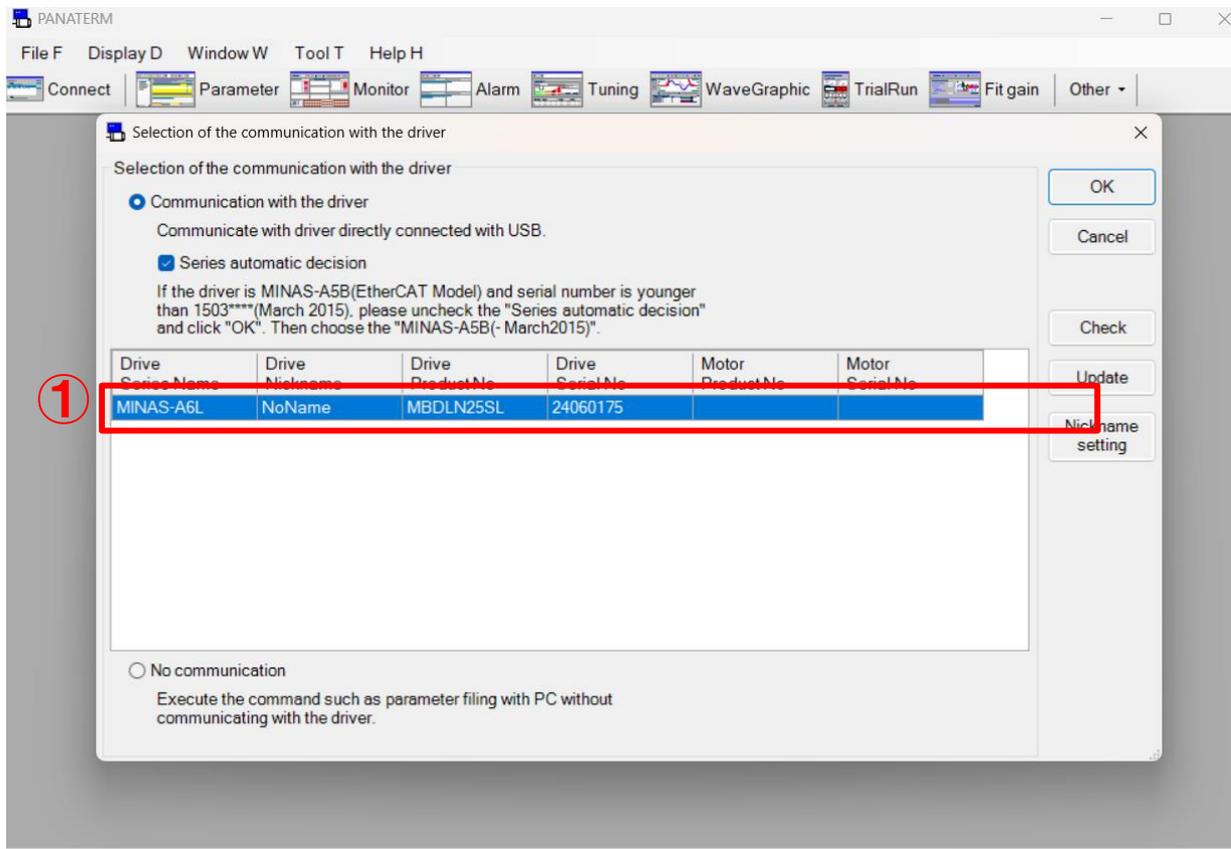


**MiSUMi**  
**Linear Motor Actuator**  
**Panasonic Auto tuning manual**  
Rev.1

**2024-12-21**  
**Technical support team**

# Drive access

- Turn on the drive, connect with USB, and run PANATERM.
- ① When the drive are shown, click “OK”.



PANATERM

File F Display D Window W Tool T Help H

Connect Parameter Monitor Alarm Tuning WaveGraphic TrialRun Fit gain Other ▾

Selection of the communication with the driver

Selection of the communication with the driver

Communication with the driver  
Communicate with driver directly connected with USB.

Series automatic decision

If the driver is MINAS-A5B(EtherCAT Model) and serial number is younger than 1503\*\*\*\*(March 2015), please uncheck the "Series automatic decision" and click "OK". Then choose the "MINAS-A5B(- March2015)".

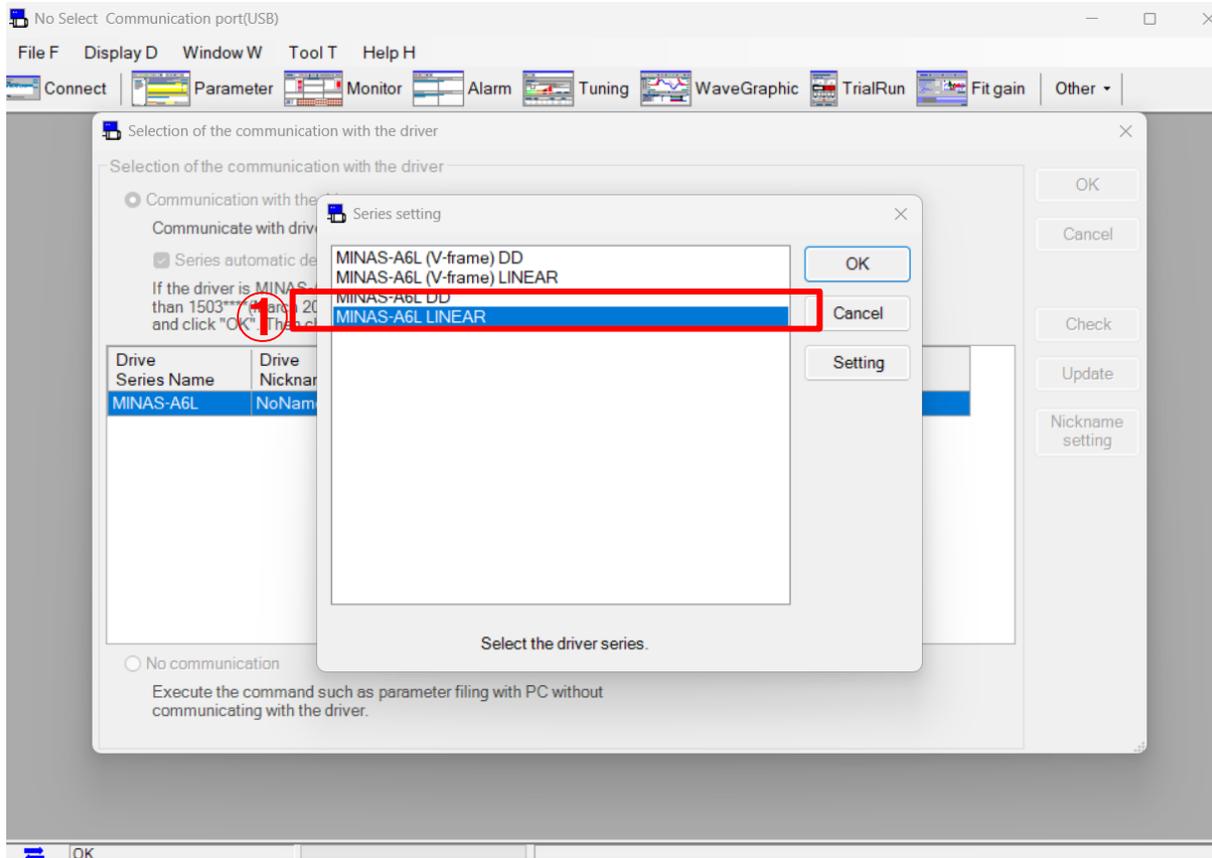
Drive Series Name	Drive Nickname	Drive Product No.	Drive Serial No.	Motor Product No.	Motor Serial No.
MINAS-A6L	NoName	MBDLN25SL	24060175		

No communication  
Execute the command such as parameter filing with PC without communicating with the driver.

OK  
Cancel  
Check  
Update  
Nickname setting

# Drive access

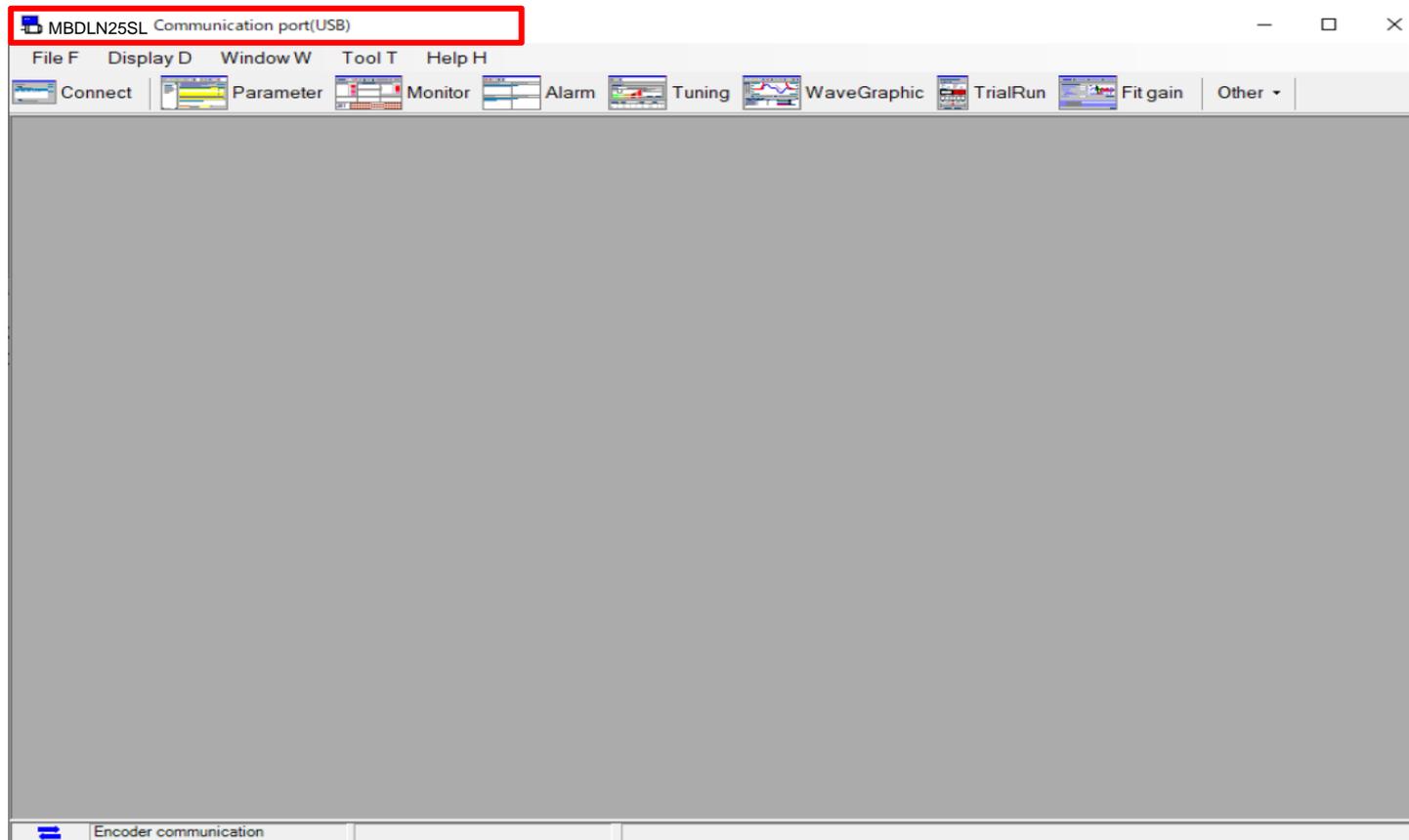
- When a pop-up window appears as shown in the screen, select MINAS-A6L LINEAR as shown in ① and click “OK”.



# Drive access

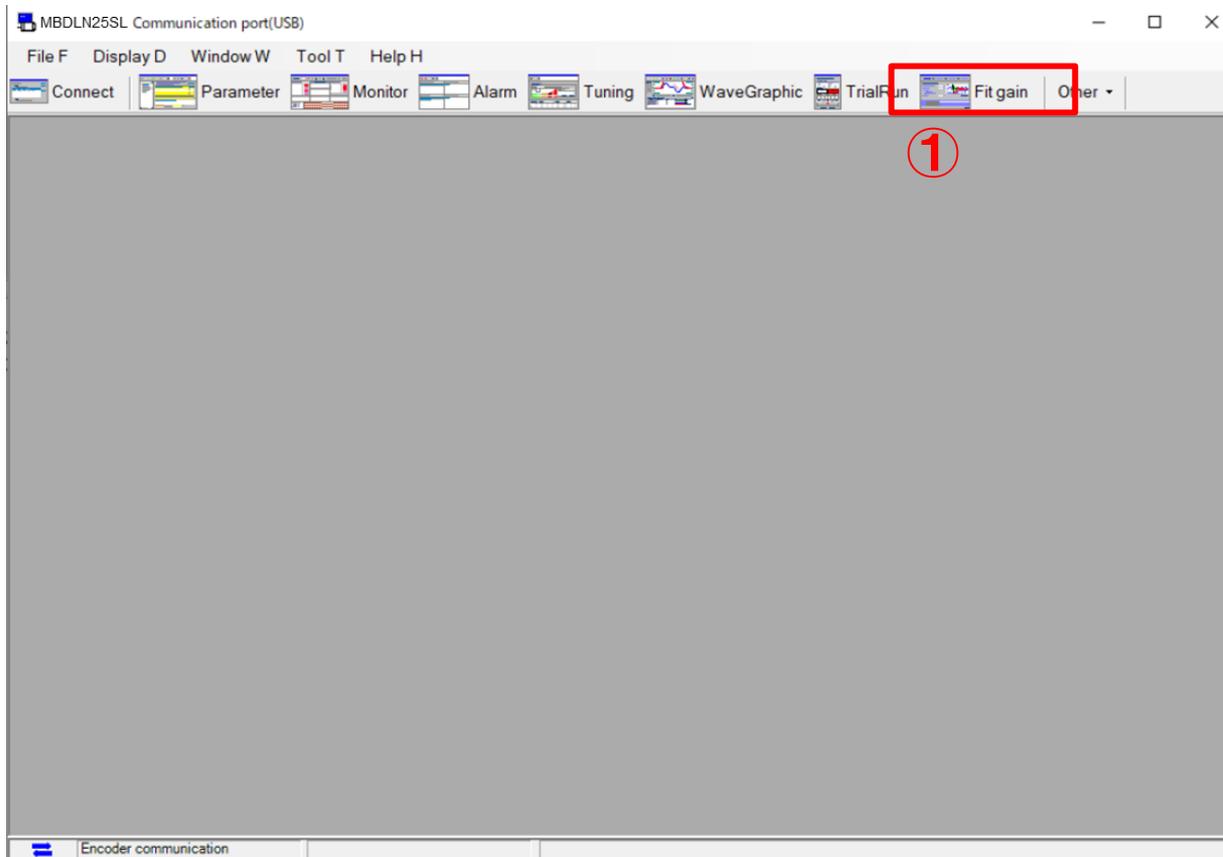
- If communication is normal, the drive type MBDLN25SL is displayed in ①.
- If communication is not possible, reboot the drive and reconnect as done above.

①



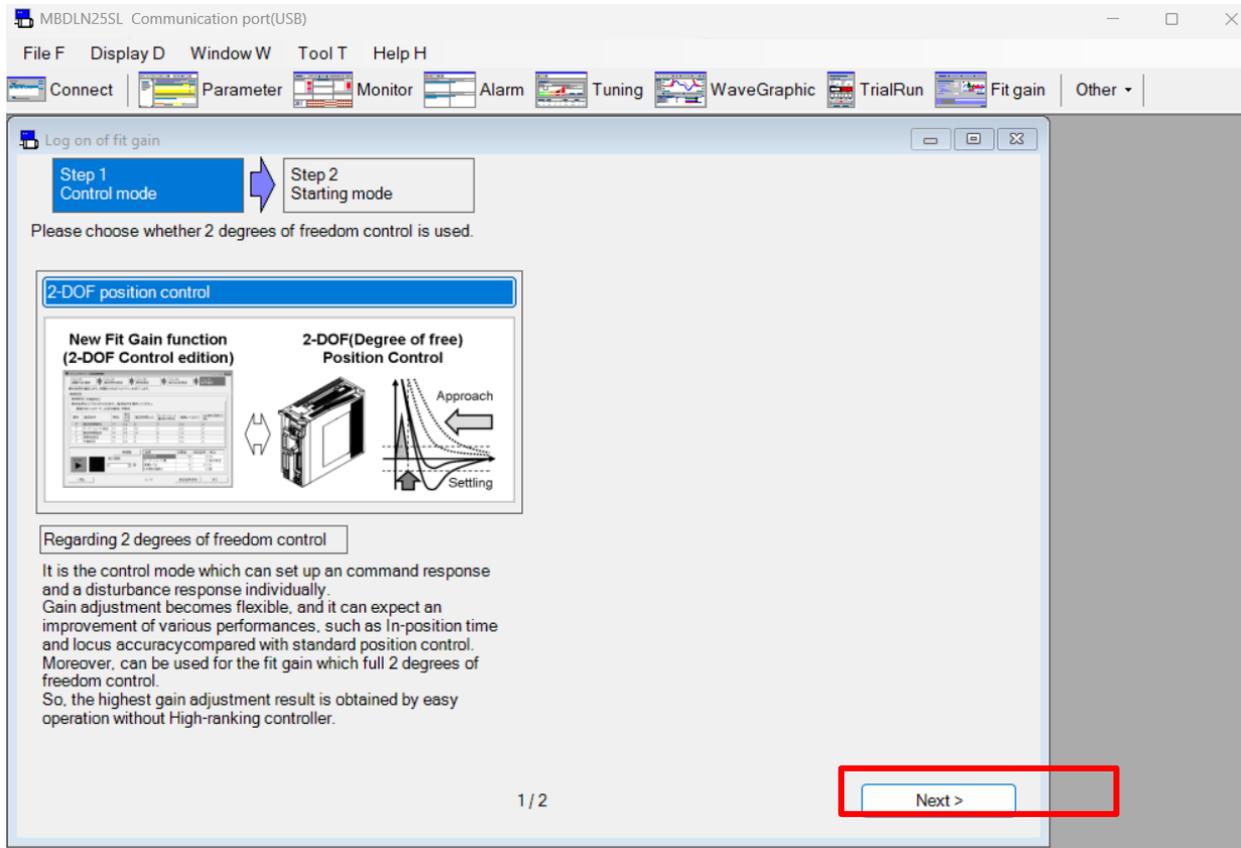
# Drive access

- ① Click Fit gain



# Auto tuning

- Window show you are log on, click “next” change to next step



The screenshot shows the MBDLN25SL software interface. The main window is titled "MBDLN25SL Communication port(USB)". The menu bar includes "File F", "Display D", "Window W", "Tool T", and "Help H". The toolbar contains icons for "Connect", "Parameter", "Monitor", "Alarm", "Tuning", "WaveGraphic", "TrialRun", "Fit gain", and "Other".

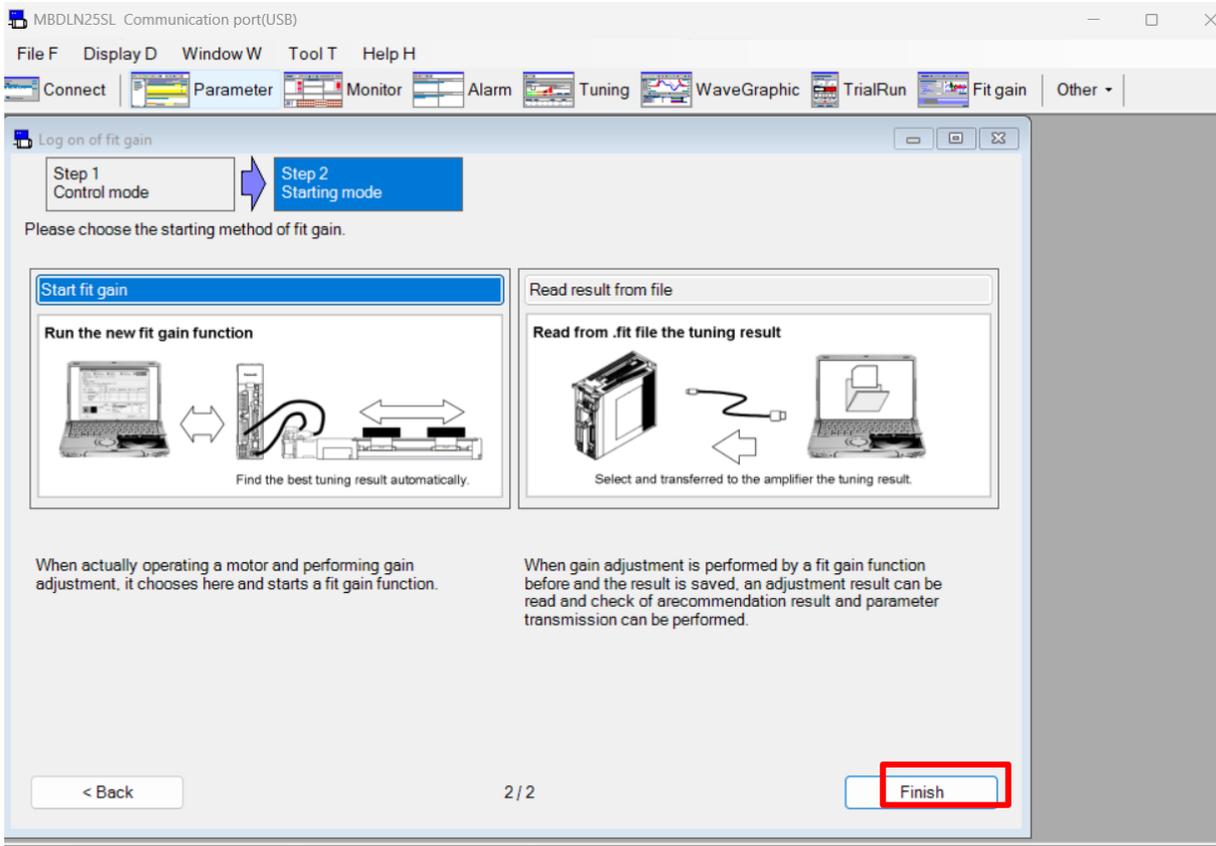
The "Log on of fit gain" dialog box is open, showing a progress indicator with "Step 1 Control mode" and "Step 2 Starting mode". Below the progress indicator, it says "Please choose whether 2 degrees of freedom control is used." There is a section titled "2-DOF position control" which includes a sub-section "New Fit Gain function (2-DOF Control edition)" and a diagram of a motor with a graph showing "Approach" and "Settling" curves. Below this, there is a section titled "Regarding 2 degrees of freedom control" with a text description.

1 / 2

Next >

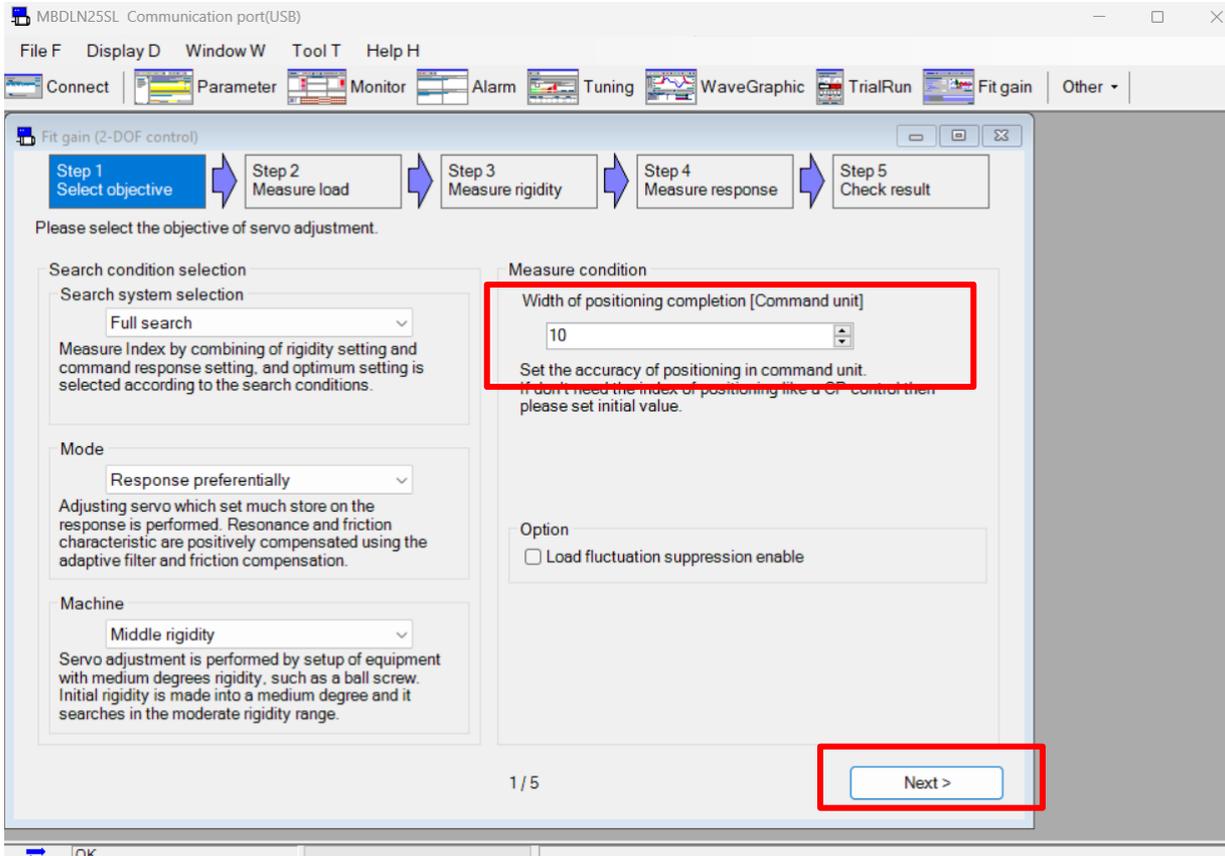
# Auto tuning

- Start fit gain mean you are going to run fit gain function
- Read result from file mean you are going to read tuning parameter from a file
- Click “Finish” to confirm



# Auto tuning

- Chose width of positioning completion you want
- Smaller value, high precision you require (recomment 10)
- After that, Click “Next”



MBDLN255L Communication port(USB)

File F Display D Window W Tool T Help H

Connect Parameter Monitor Alarm Tuning WaveGraphic TrialRun Fit gain Other

Fit gain (2-DOF control)

Step 1 Select objective Step 2 Measure load Step 3 Measure rigidity Step 4 Measure response Step 5 Check result

Please select the objective of servo adjustment.

Search condition selection

Search system selection

Full search

Measure Index by combining of rigidity setting and command response setting, and optimum setting is selected according to the search conditions.

Mode

Response preferentially

Adjusting servo which set much store on the response is performed. Resonance and friction characteristic are positively compensated using the adaptive filter and friction compensation.

Machine

Middle rigidity

Servo adjustment is performed by setup of equipment with medium degrees rigidity, such as a ball screw. Initial rigidity is made into a medium degree and it searches in the moderate rigidity range.

Measure condition

Width of positioning completion [Command unit]

10

Set the accuracy of positioning in command unit.  
If don't need the index of positioning like a CP control then please set initial value.

Option

Load fluctuation suppression enable

1 / 5

Next >

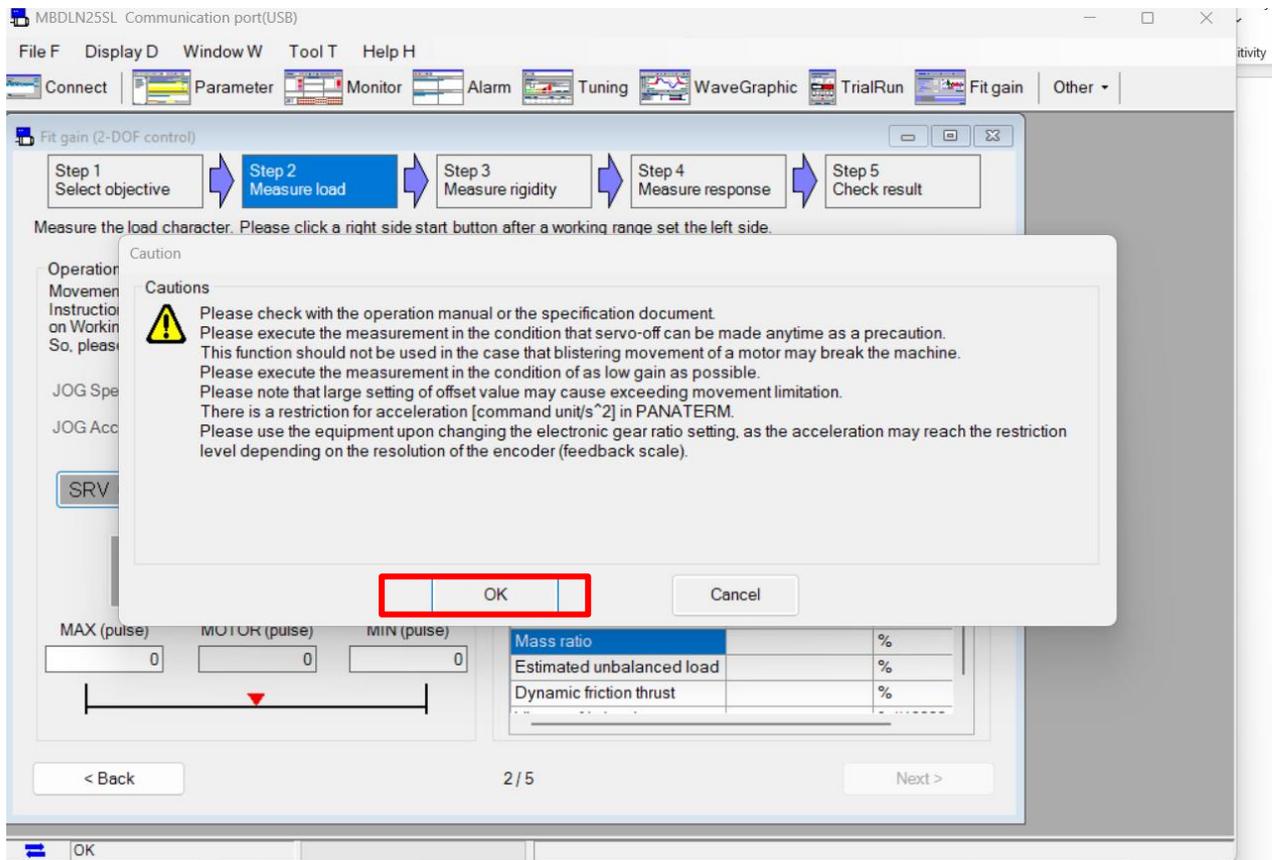
# Auto tuning

- SRV ON to active axis

Load Characteristics	Measurement result	Unit
Mass ratio		%
Estimated unbalanced load		%
Dynamic friction thrust		%

# Auto tuning

- A precaution pop up, click OK to confirm



MBDLN25SL Communication port(USB)

File F Display D Window W Tool T Help H

Connect Parameter Monitor Alarm Tuning WaveGraphic TrialRun Fit gain Other ▾

Fit gain (2-DOF control)

Step 1 Select objective → Step 2 Measure load → Step 3 Measure rigidity → Step 4 Measure response → Step 5 Check result

Measure the load character. Please click a right side start button after a working range set the left side.

Caution

Operation  
Movement  
Instruction  
on Workin  
So, pleas

JOG Spe  
JOG Acc

SRV

MAX (pulse) 0 MOTOR (pulse) 0 MIN (pulse) 0

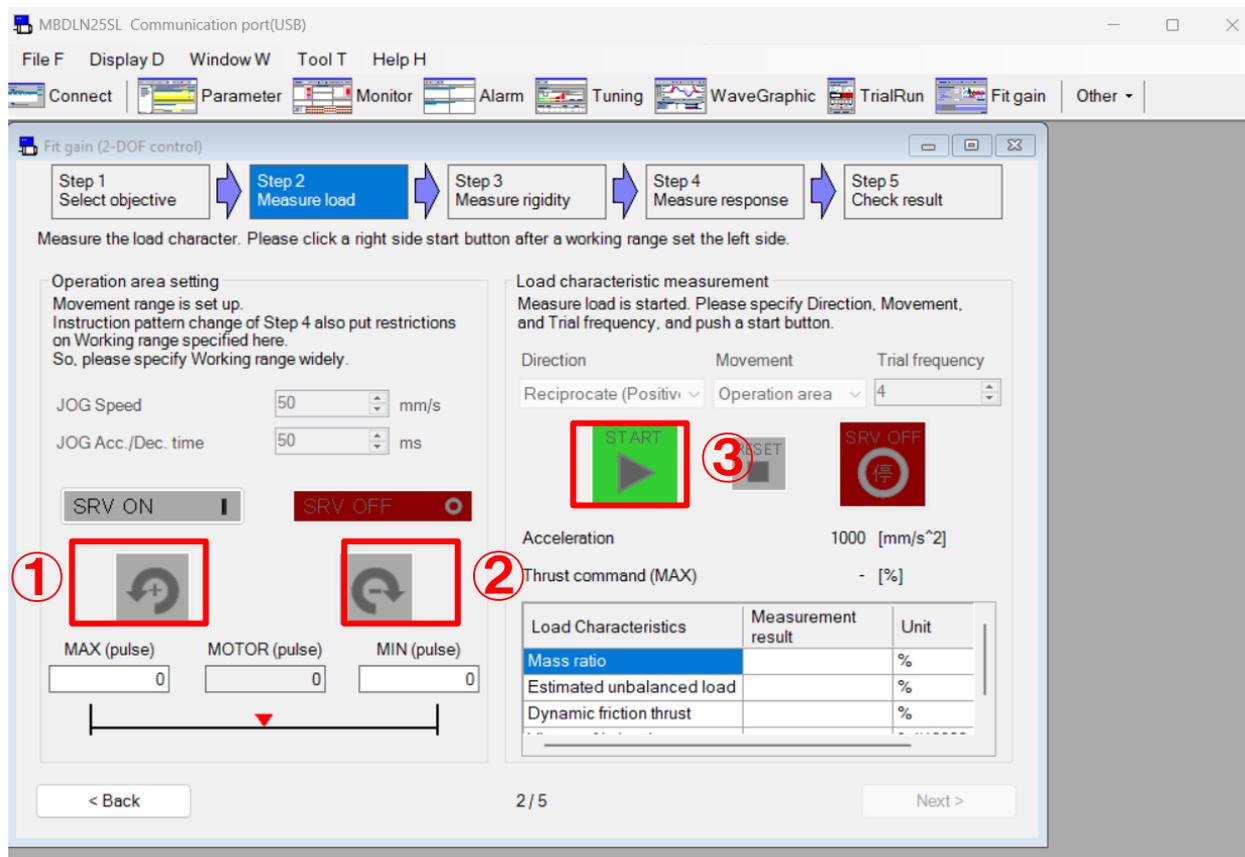
Mass ratio		%
Estimated unbalanced load		%
Dynamic friction thrust		%

< Back 2 / 5 Next >

OK Cancel

# Auto tuning

- ① Jog positive to apply positive operation area
- ② Jog negative to apply negative operation area
- ③ Click Start to measure mass ratio



MBDLN255L Communication port(USB)

File F Display D Window W Tool T Help H

Connect Parameter Monitor Alarm Tuning WaveGraphic TrialRun Fit gain Other

Fit gain (2-DOF control)

Step 1 Select objective → Step 2 Measure load → Step 3 Measure rigidity → Step 4 Measure response → Step 5 Check result

Measure the load character. Please click a right side start button after a working range set the left side.

Operation area setting  
Movement range is set up.  
Instruction pattern change of Step 4 also put restrictions on Working range specified here.  
So, please specify Working range widely.

JOG Speed 50 mm/s  
JOG Acc./Dec. time 50 ms

SRV ON SRV OFF

① MAX (pulse) 0 MOTOR (pulse) 0 MIN (pulse) 0

Load characteristic measurement  
Measure load is started. Please specify Direction, Movement, and Trial frequency, and push a start button.

Direction Reciprocate (Positive) Movement Operation area Trial frequency 4

START ③ ASSET SRV OFF

Acceleration 1000 [mm/s<sup>2</sup>]  
Thrust command (MAX) [%]

Load Characteristics	Measurement result	Unit
Mass ratio		%
Estimated unbalanced load		%
Dynamic friction thrust		%

< Back 2/5 Next >

# Auto tuning

- You need to install actual load on block, if not, load measurement may failed
- Motor will move a short distance if measure load successful
- Wait for driver complete measurement, a complete pop up will show. Click OK to next step

Fit gain (2-DOF control)

Step 1 Select objective → Step 2 Measure load → Step 3 Measure rigidity → Step 4 Measure response → Step 5 Check result

Measure the load character. Please click a right side start button after a working range set the left side.

Operation area setting  
Movement range is set up.  
Instruction pattern change of Step 4 also put restrictions on Working range specified here.  
So, please specify Working range widely.

JOG Speed: 50 mm/s  
JOG Acc./Dec. time: 50 ms

SRV ON | SRV OFF

Direction: Movement: Trial frequency: Reciprocate (Positiv): Operation area: 4

PAUSE | RESET | SRV OFF

Acceleration: 2828 [mm/s<sup>2</sup>]  
Thrust command (MAX): 29.0 [%]

Load Characteristics	Measurement result	Unit
Mass ratio	62	%
Estimated unbalanced load	0	%
Dynamic friction thrust	14	%

MAX (pulse): 48700 | MOTOR (pulse): 48700 | MIN (pulse): -16350

< Back 2/5 Next >

Fit gain (2-DOF control)

Step 1 Select objective → Step 2 Measure load → Step 3 Measure rigidity → Step 4 Measure response → Step 5 Check result

Measure the command response. Please perform command selection on the left side, and click a right side start button.

Select command: Internal command | External command

Initial position setting  
Waiting time: 0.5 s  
Speed: 255 mm/s  
Acc./Dec. time: 255 ms  
Direction: Reciprocate (Positiv): Command Unit: Distance: 65050

MAX (pulse): 48700 | MOTOR (pulse): -16350 | MIN (pulse): -16350

Command response measurement  
Trial frequency: 4 times  
Vibration frequency: 0.0 Hz

START | RESET | SRV OFF

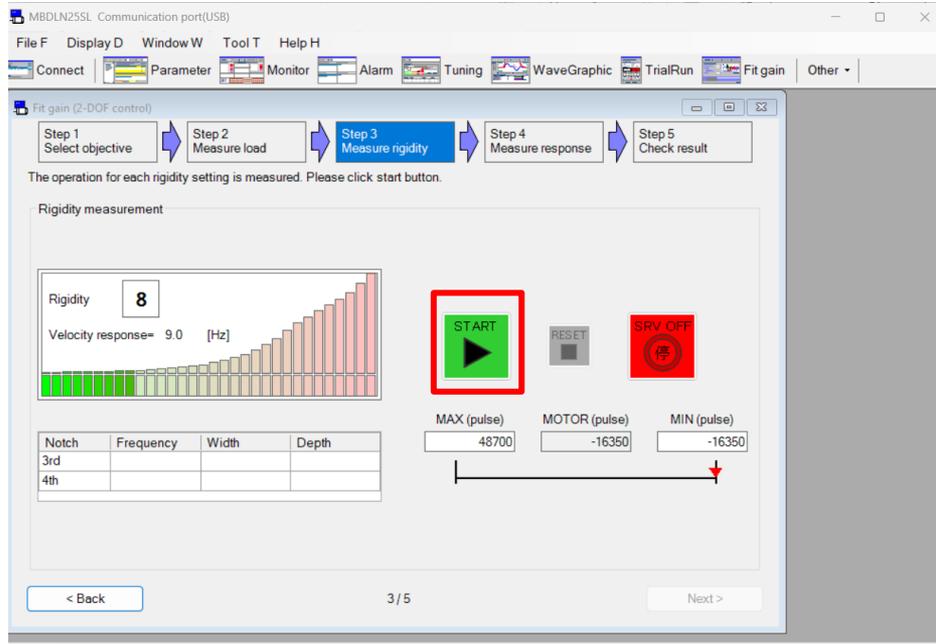
Completed OK

Index	Measurement result	Unit
Stabilization time	-5	ms
Overshoot	2	Command unit
Vibration level	11.2	%
INP crack count of setting	0	times

< Back 4/5 Next >

# Auto tuning

- This step measure rigidity
- Click start to process
- Wait until process complete



MBDLN25SL Communication port(USB)

File F Display D Window W Tool T Help H

Connect Parameter Monitor Alarm Tuning WaveGraphic TrialRun **Fit gain** Other

Fit gain (2-DOF control)

Step 1 Select objective → Step 2 Measure load → **Step 3 Measure rigidity** → Step 4 Measure response → Step 5 Check result

The operation for each rigidity setting is measured. Please click start button.

Rigidity measurement

Rigidity **8**

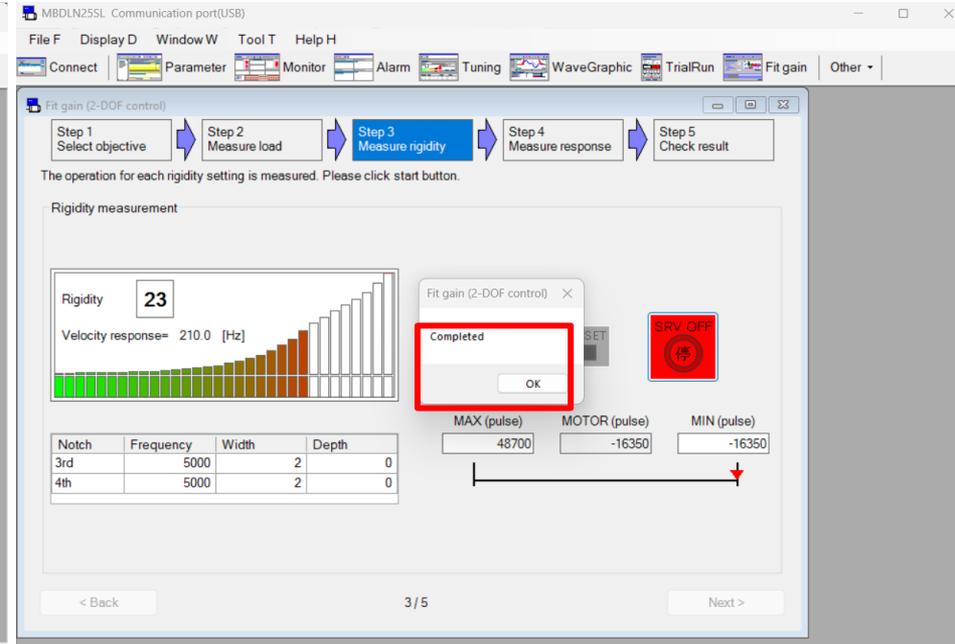
Velocity response= 9.0 [Hz]

**START** RESET SRV OFF

MAX (pulse) 48700 MOTOR (pulse) -16350 MIN (pulse) -16350

Notch	Frequency	Width	Depth
3rd			
4th			

< Back 3/5 Next >



MBDLN25SL Communication port(USB)

File F Display D Window W Tool T Help H

Connect Parameter Monitor Alarm Tuning WaveGraphic TrialRun **Fit gain** Other

Fit gain (2-DOF control)

Step 1 Select objective → Step 2 Measure load → **Step 3 Measure rigidity** → Step 4 Measure response → Step 5 Check result

The operation for each rigidity setting is measured. Please click start button.

Rigidity measurement

Rigidity **23**

Velocity response= 210.0 [Hz]

Completed OK

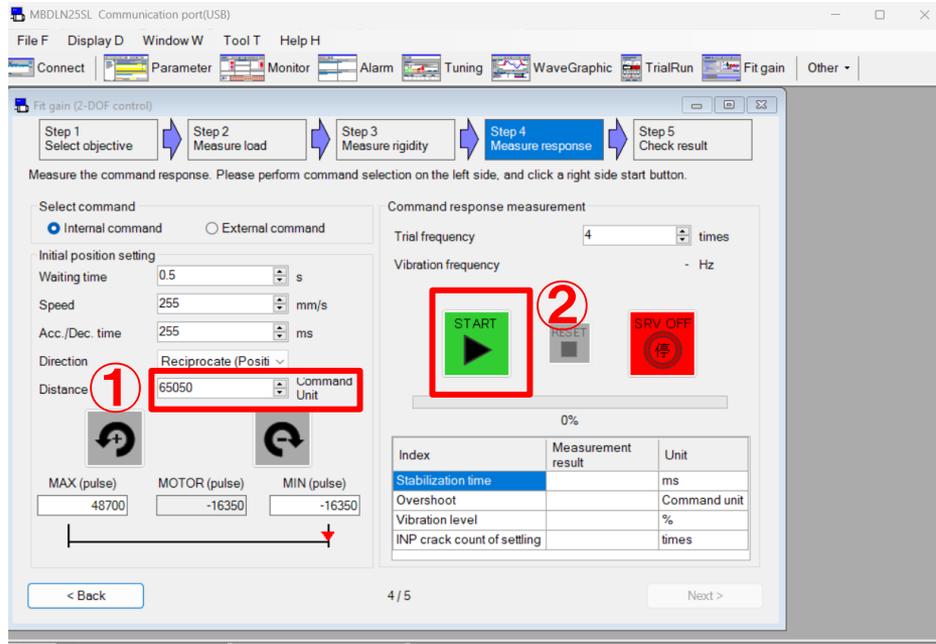
MAX (pulse) 48700 MOTOR (pulse) -16350 MIN (pulse) -16350

Notch	Frequency	Width	Depth
3rd	5000	2	0
4th	5000	2	0

< Back 3/5 Next >

# Auto tuning

- This step measure and adjust tuning gain
- ① Please adjust distance as max operation area.
- Distance = Max (Pulse) - Min (Pulse)
- ② Click start to process and wait for completion



MBDLN25SL Communication port(USB)

File F Display D Window W Tool T Help H

Connect Parameter Monitor Alarm Tuning WaveGraphic TrialRun Fit gain Other

Fit gain (2-DOF control)

Step 1 Select objective → Step 2 Measure load → Step 3 Measure rigidity → Step 4 Measure response → Step 5 Check result

Measure the command response. Please perform command selection on the left side, and click a right side start button.

Select command  
 Internal command  External command

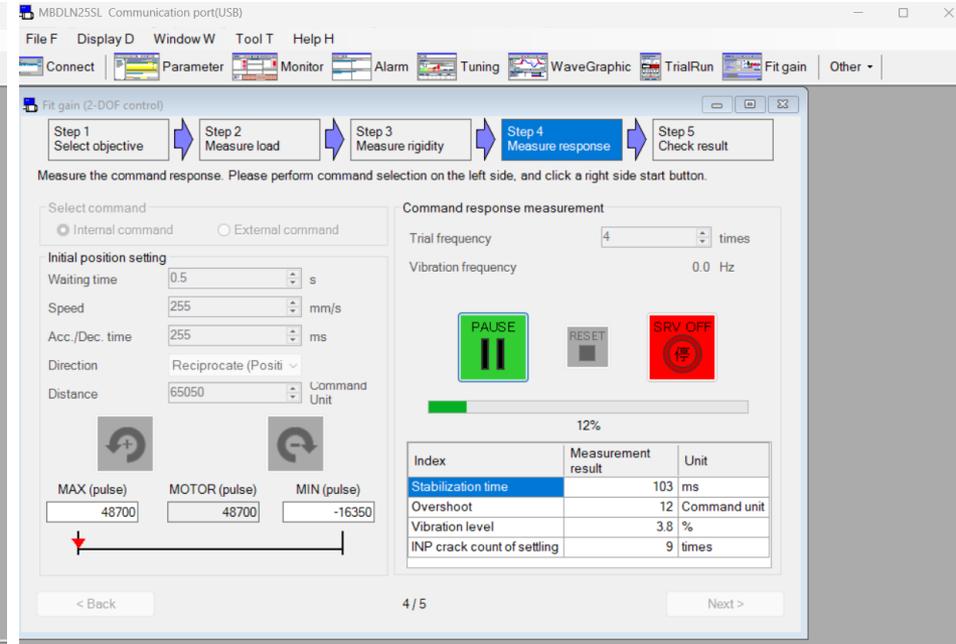
Initial position setting  
Waiting time: 0.5 s  
Speed: 255 mm/s  
Acc./Dec. time: 255 ms  
Direction: Reciprocate (Positi)  
Distance: 65050 Command Unit

Command response measurement  
Trial frequency: 4 times  
Vibration frequency: - Hz

START

Index	Measurement result	Unit
Stabilization time		ms
Overshoot		Command unit
Vibration level		%
INP crack count of settling		times

< Back 4/5 Next >



MBDLN25SL Communication port(USB)

File F Display D Window W Tool T Help H

Connect Parameter Monitor Alarm Tuning WaveGraphic TrialRun Fit gain Other

Fit gain (2-DOF control)

Step 1 Select objective → Step 2 Measure load → Step 3 Measure rigidity → Step 4 Measure response → Step 5 Check result

Measure the command response. Please perform command selection on the left side, and click a right side start button.

Select command  
 Internal command  External command

Initial position setting  
Waiting time: 0.5 s  
Speed: 255 mm/s  
Acc./Dec. time: 255 ms  
Direction: Reciprocate (Positi)  
Distance: 65050 Command Unit

Command response measurement  
Trial frequency: 4 times  
Vibration frequency: 0.0 Hz

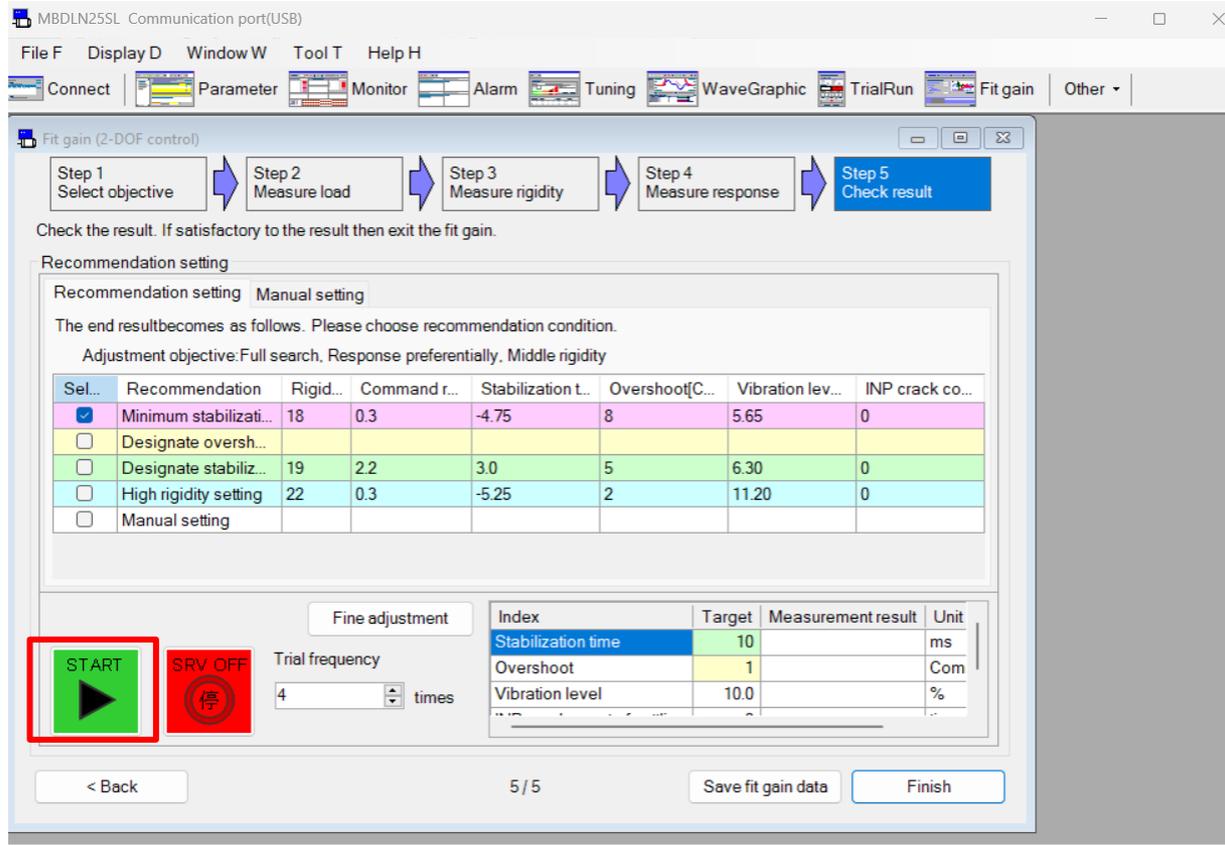
PAUSE

Index	Measurement result	Unit
Stabilization time	103	ms
Overshoot	12	Command unit
Vibration level	3.8	%
INP crack count of settling	9	times

< Back 4/5 Next >

# Auto tuning

- Result tuning data show up.
- You can Start to check axes operation after auto tuning



Fit gain (2-DOF control)

Step 1 Select objective → Step 2 Measure load → Step 3 Measure rigidity → Step 4 Measure response → Step 5 Check result

Check the result. If satisfactory to the result then exit the fit gain.

Recommendation setting

Recommendation setting Manual setting

The end result becomes as follows. Please choose recommendation condition.  
Adjustment objective: Full search, Response preferentially, Middle rigidity

Sel...	Recommendation	Rigid...	Command r...	Stabilization t...	Overshoot(C...	Vibration lev...	INP crack co...
<input checked="" type="checkbox"/>	Minimum stabilizati...	18	0.3	-4.75	8	5.65	0
<input type="checkbox"/>	Designate oversh...						
<input type="checkbox"/>	Designate stabiliz...	19	2.2	3.0	5	6.30	0
<input type="checkbox"/>	High rigidity setting	22	0.3	-5.25	2	11.20	0
<input type="checkbox"/>	Manual setting						

Fine adjustment

START

SRV OFF

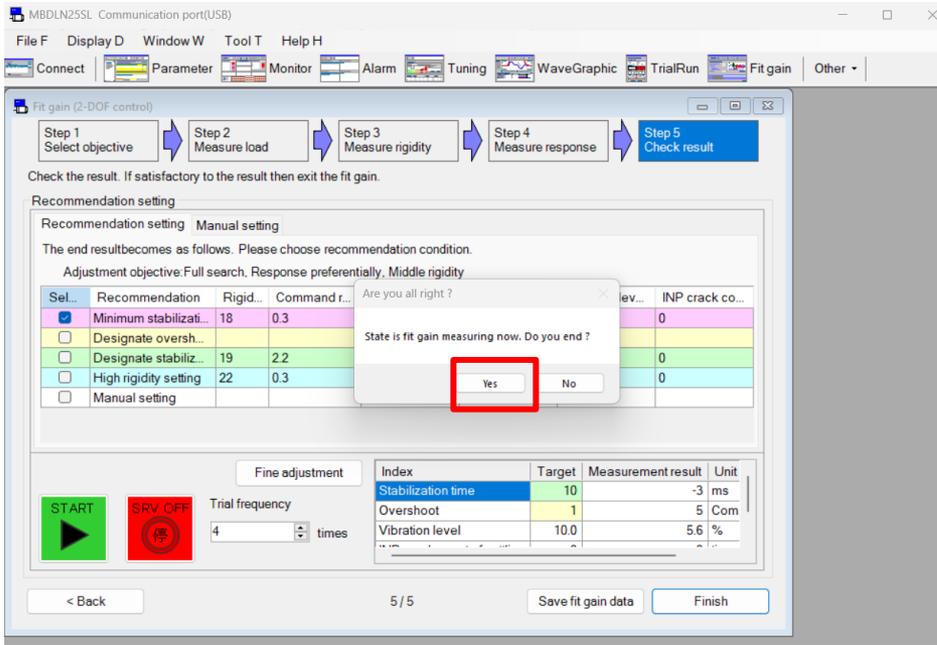
Trial frequency: 4 times

Index	Target	Measurement result	Unit
Stabilization time	10		ms
Overshoot	1		Com
Vibration level	10.0		%

< Back 5 / 5 Save fit gain data Finish

# Auto tuning

- Click finish to apply new parameter
- Click yes to finish fit gain
- A comparison table show these para are going to change
- Click OK to apply new tuning parameter



Fit gain (2-DOF control)

Check the result. If satisfactory to the result then exit the fit gain.

Recommendation setting

Recommendation setting Manual setting

The end result becomes as follows. Please choose recommendation condition.

Adjustment objective: Full search, Response preferentially, Middle rigidity

Sel...	Recommendation	Rigid...	Command r...
<input checked="" type="checkbox"/>	Minimum stabilizati...	18	0.3
<input type="checkbox"/>	Designate oversh...		
<input type="checkbox"/>	Designate stabiliz...	19	2.2
<input type="checkbox"/>	High rigidity setting	22	0.3
<input type="checkbox"/>	Manual setting		

Are you all right?

State is fit gain measuring now. Do you end?

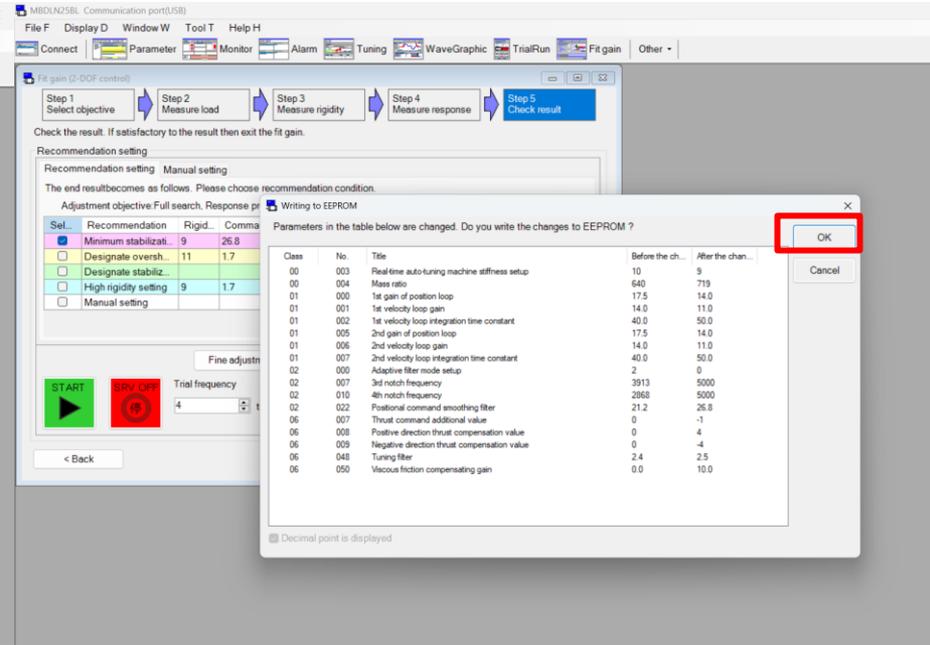
Yes No

Fine adjustment

Index	Target	Measurement result	Unit
Stabilization time	10	-3	ms
Overshoot	1	5	Com
Vibration level	10.0	5.6	%

START SRV OFF Trial frequency 4 times

< Back 5 / 5 Save fit gain data Finish



Fit gain (2-DOF control)

Step 1 Select objective Step 2 Measure load Step 3 Measure rigidity Step 4 Measure response Step 5 Check result

Check the result. If satisfactory to the result then exit the fit gain.

Recommendation setting

Recommendation setting Manual setting

The end result becomes as follows. Please choose recommendation condition.

Adjustment objective Full search, Response preferentially, Middle rigidity

Writing to EEPROM

Parameters in the table below are changed. Do you write the changes to EEPROM?

Class	No	Title	Before the ch...	After the chan...
00	003	Real-time auto-tuning machine stiffness setup	10	9
00	004	Mass ratio	640	719
01	000	1st gain of position loop	17.5	14.0
01	001	1st velocity loop gain	14.0	11.0
01	002	1st velocity loop integration time constant	40.0	50.0
01	005	2nd gain of position loop	17.5	14.0
01	006	2nd velocity loop gain	14.0	11.0
01	007	2nd velocity loop integration time constant	40.0	50.0
02	000	Adaptive filter mode setup	2	0
02	007	2nd notch-frequency	3913	5000
02	010	4th notch-frequency	2668	5000
02	022	Positional command smoothing filter	21.2	26.8
06	007	Thrust command additional value	0	-1
06	008	Positive direction thrust compensation value	0	4
06	009	Negative direction thrust compensation value	0	-4
06	048	Tuning filter	2.4	2.5
06	050	Vacuous friction compensating gain	0.0	10.0

OK Cancel

Decimal point is displayed

## MISUMI Contact for Linear Motor Actuators

Country	Company	Department	E-mail To:
<a href="#">Singapore</a>	MISUMI SOUTH EAST ASIA PTE. LTD.	TECHNICAL SUPPORT TEAM	techsupport@misumi.com.sg
<a href="#">Malaysia</a>	Misumi Malaysia Sdn Bhd	TECHNICAL SUPPORT TEAM	ts@misumi.com.my
<a href="#">Vietnam</a>	MISUMI VIETNAM CO.,LTD.	TECHNICAL SUPPORT TEAM	ts@misumi.com.vn
<a href="#">Thailand</a>	MISUMI (THAILAND) CO.,LTD.	TECHNICAL SUPPORT TEAM	me-ts@misumi.co.th
<a href="#">India</a>	MISUMI INDIA Pvt Ltd.	BD TEAM	BD@misumi.co.in
<a href="#">Indonesia</a>	PT. MISUMI INDONESIA	TECHNICAL SUPPORT TEAM	tech-support.fv@misumi.co.id

# Version Updated

Revision	Date	Reviser	Approver	Remark
1.0	2024.12.21	Nguyen	Lee.Woo.Sup	First version

**MISUMI Group Southeast ASIA  
Technical Support Team**