

MiSUMi

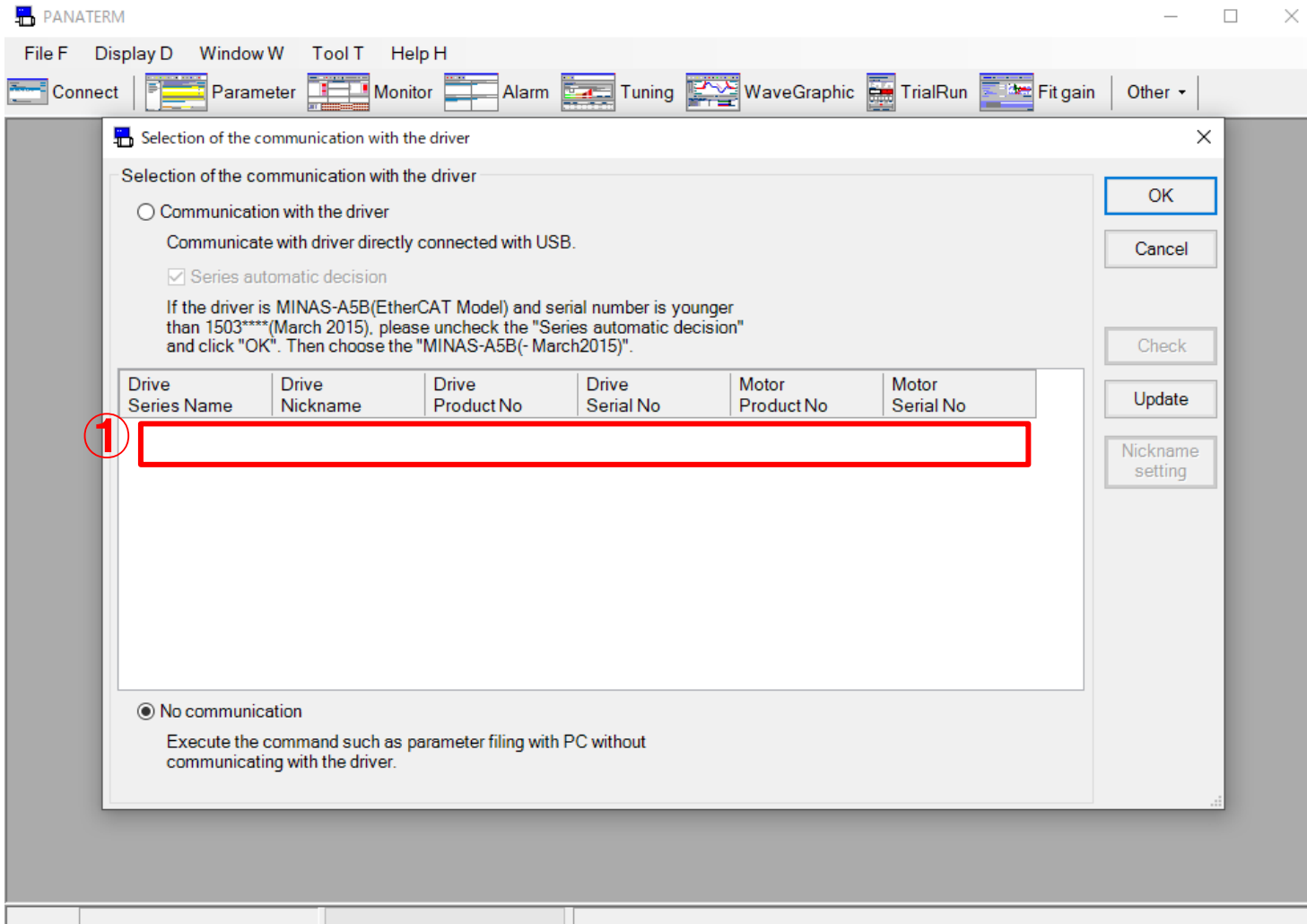
Linear Motor Actuator

Panasonic SetUp Manual

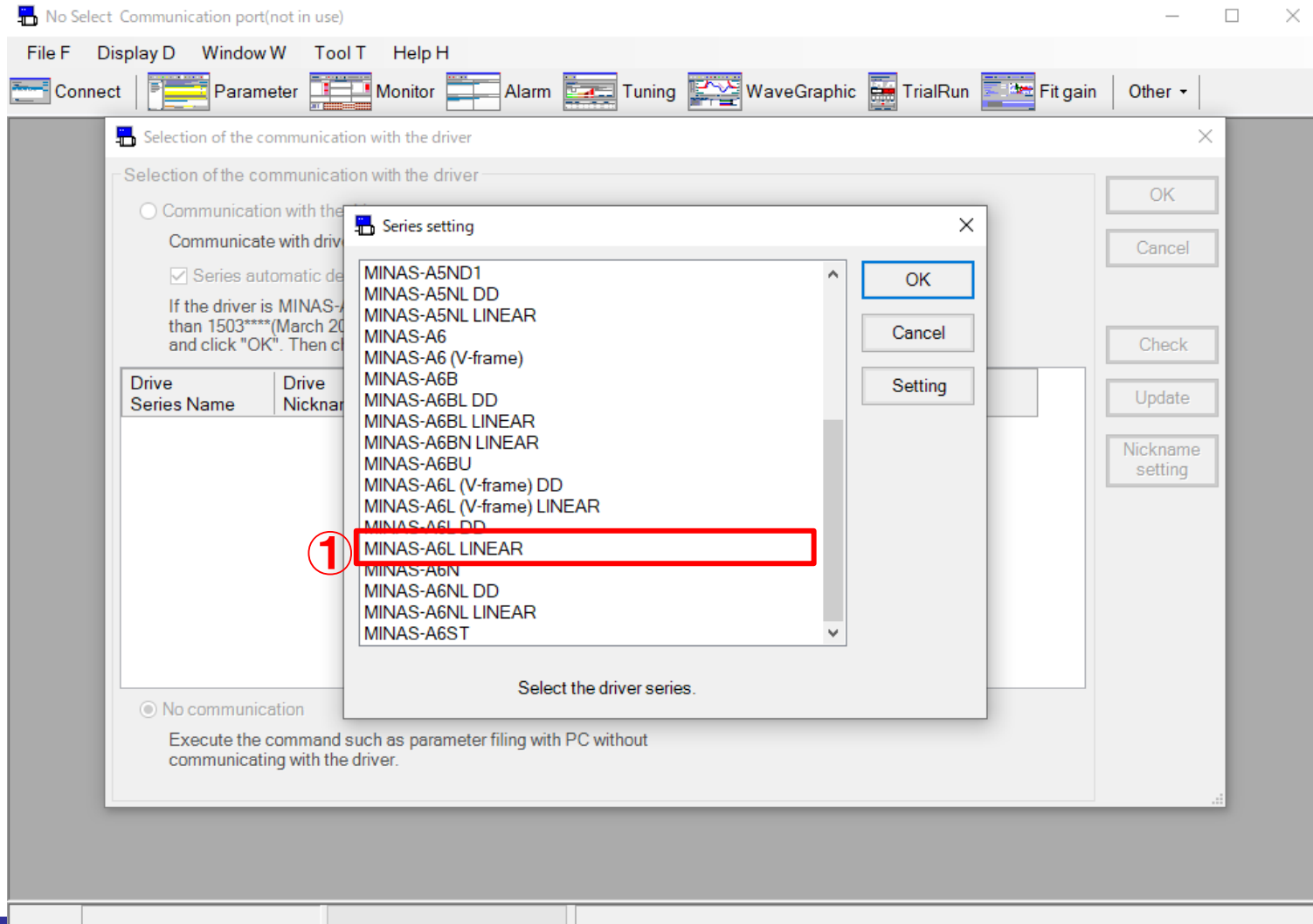
Rev.1

2024-07-30
IM Division
Motion Unit Team

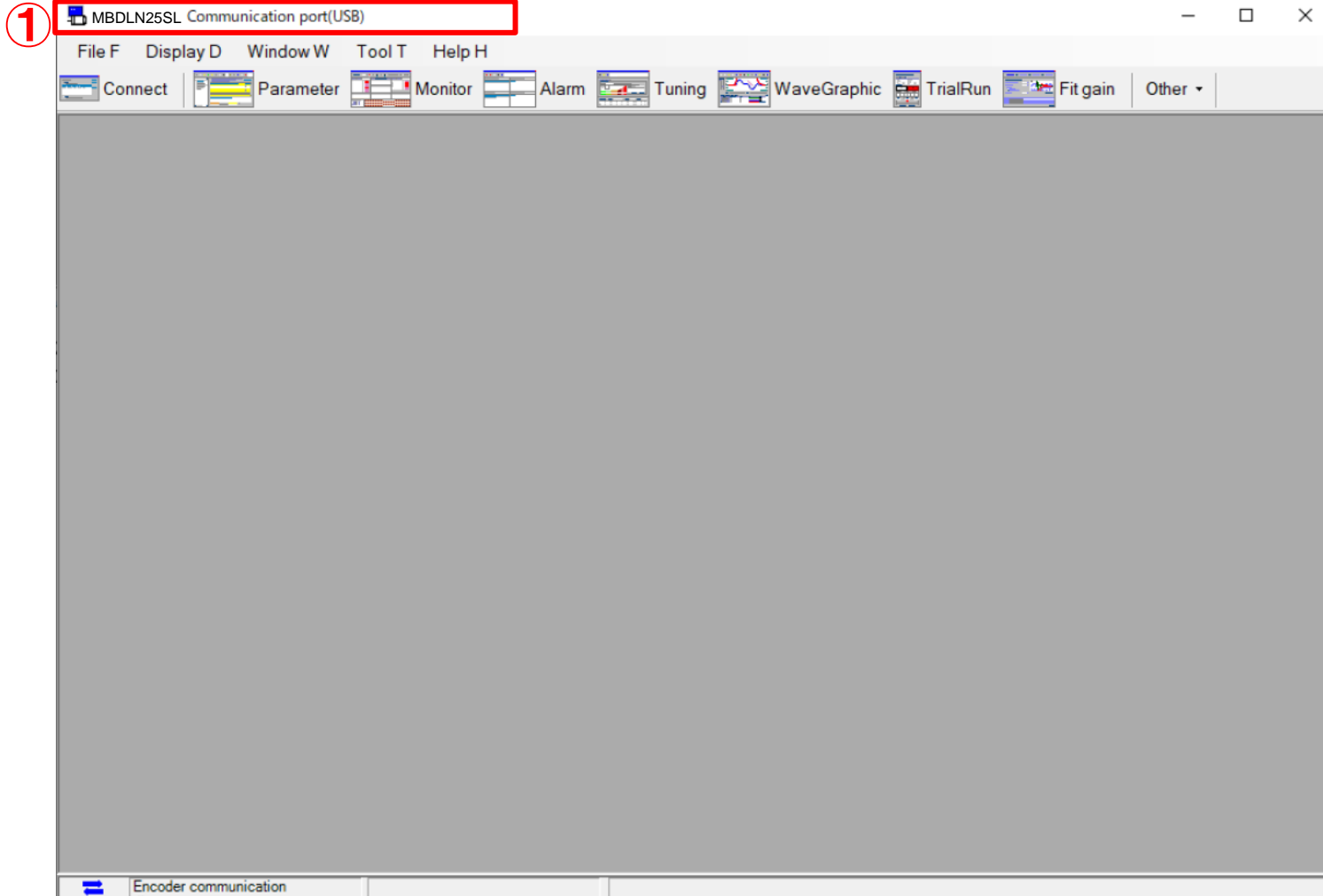
- Turn on the drive, connect with USB, and run PANATERM.
- ① When the drive are shown, click “OK”.



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

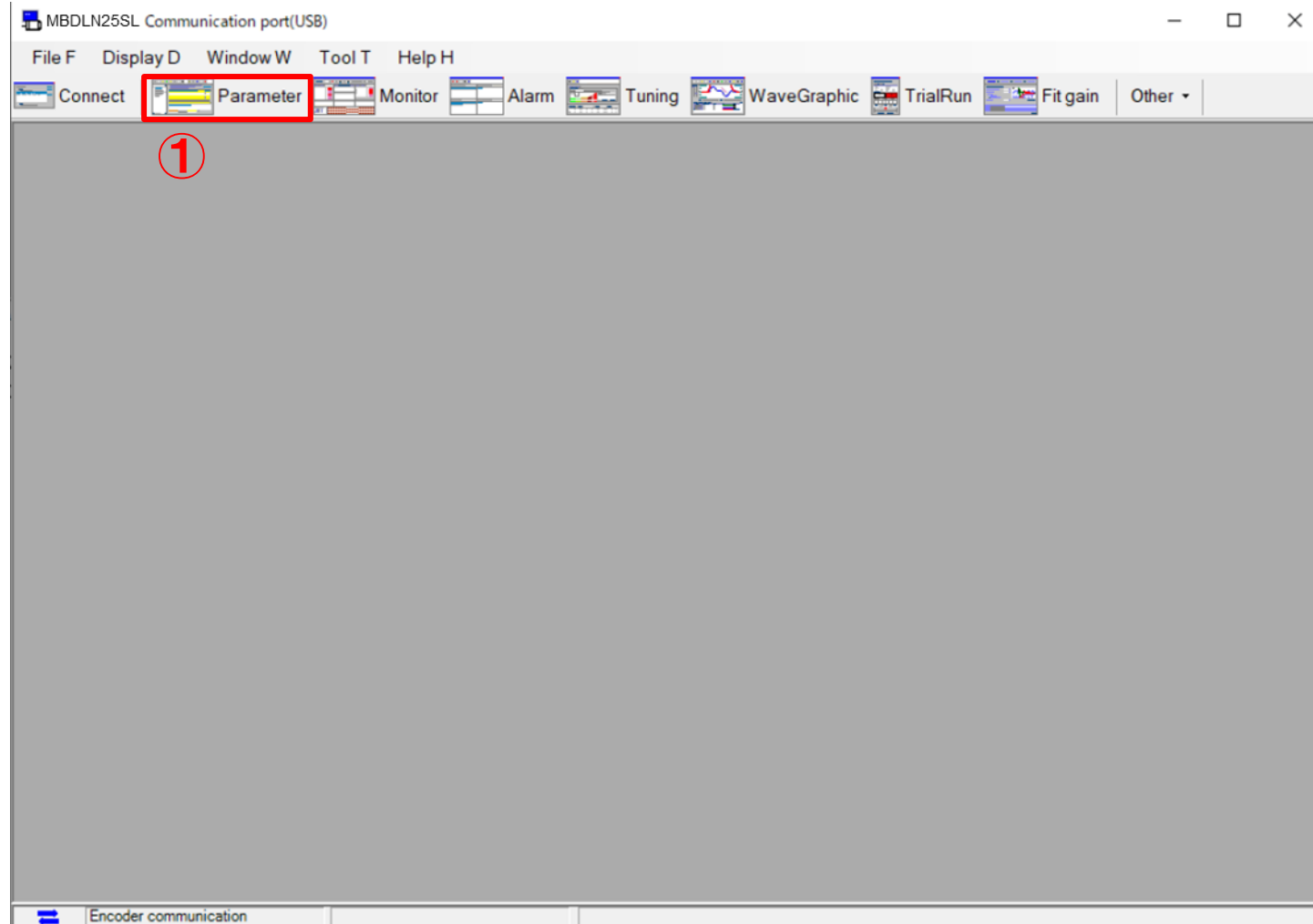


- If communication is normal, the drive type MBDLN25SL is displayed in ①.
- If communication is not possible, reboot the drive and reconnect as done above.



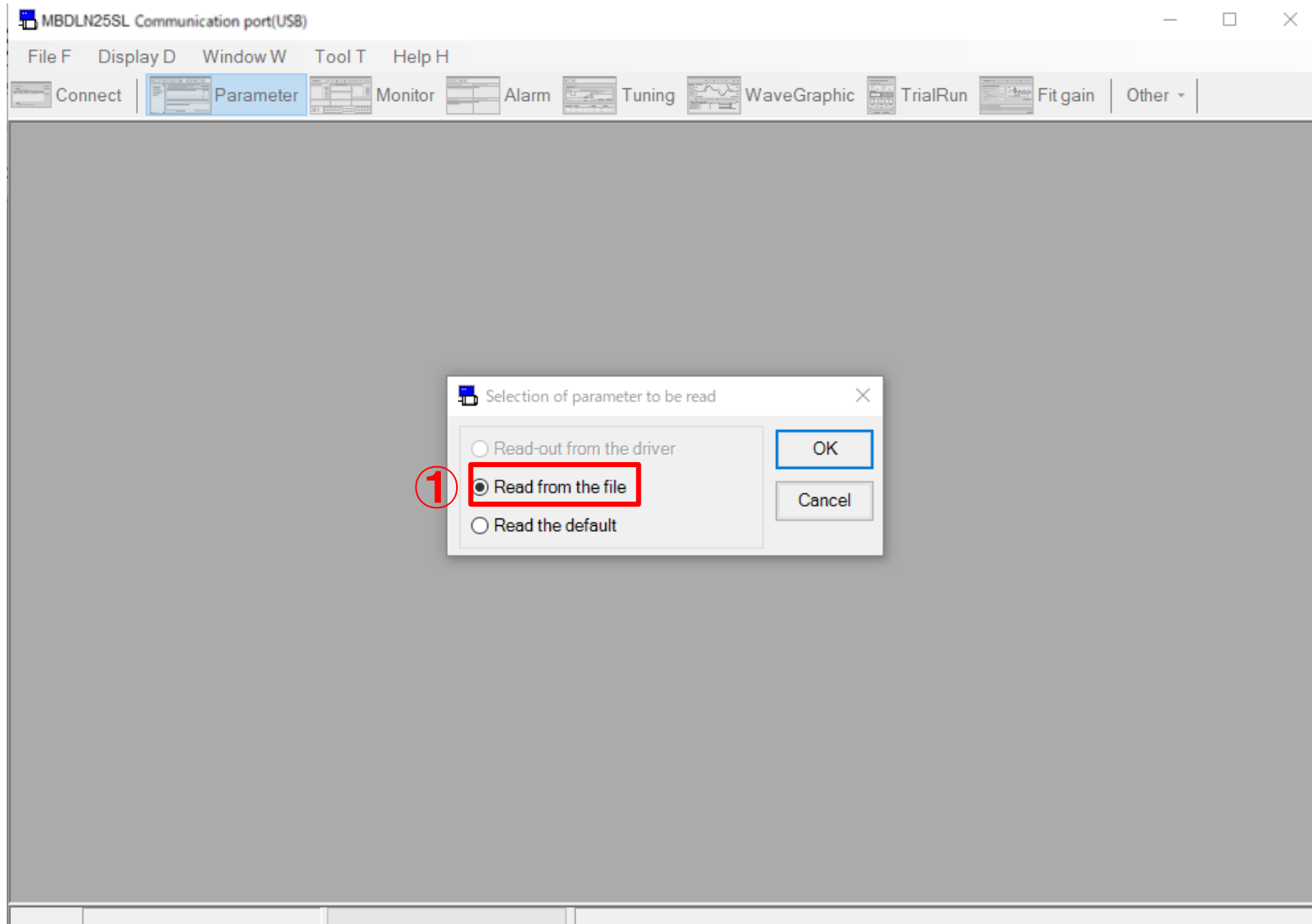
Parameter Restore

- ① Click Parameters.



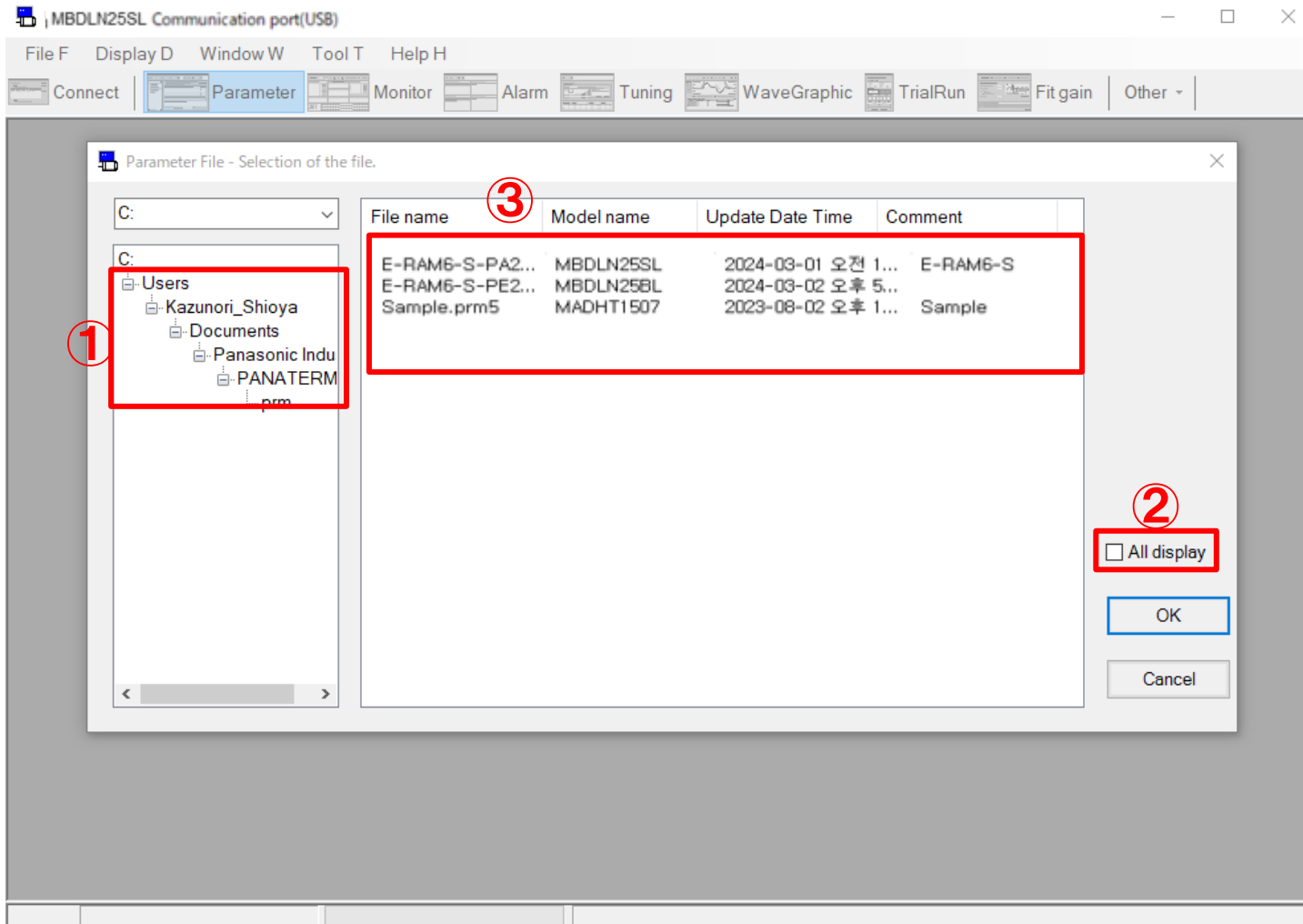
Parameter Restore

- Select “Read from the file” and click “OK”.



Parameter Restore

- ① Check the location where the parameters are saved and click ② “All display”.
③ Select the parameter file and click “OK”.



Parameter Restore

- After clicking “OK” in the pop-up window that appears, select ① Category 9 and ② check whether the parameter values are entered correctly.

Parameter(Value read from the file)

Read Save Cmmt Rcv Trans Prnt Exit EEP Screen Comp Initial Bin/Hex

A6SM Parameter list

Class 0 (Basic)
Class 1 (Gain)
Class 2 (Damping)
Class 3 (Verocity/Thrust/Sc
Class 4 (I/F, Monitor)
Class 5 (Enhancing)
Class 6 (Special)
Class 7 (Special)
Class 8 (Maker uses)
Class 9 (Linear)
Class 15 (Special)

By the selecting the theme from the left above, and selecting the sub-theme from the left below, the related parameters can be displayed. To display all parameters in numerical order, please select the "Parameter list". Please double-click the sub-theme left below to refer the details of each sub-theme. Parameter value can be changed in two ways. One way to press the Enter key after the input. Another way to click <Change of set value> button.

Change of set value

Class	No.	Parameter name	Setup range	Set value	Unit
09	000	Motor type selection	0- 3	1	---
09	001	Feedback scale resolution	0- 536870912	1000	nm
09	002	Magnetic pole pitch	0- 32767	2000	0.01mm
09	003	For manufacturer's use	0- 255	0	---
09	004	Motor mass	0- 32767	130	0.01kg
09	005	Rated motor thrust	0- 32767	520	0.1N
09	006	Rated motor effective current	0- 32767	25	0.1Arms
09	007	Maximum instantaneous mot...	0- 32767	100	0.1A
09	008	Motor phase inductance	0- 32767	1000	0.01mH

Selects the motor type to be connected.
Note) The definition file currently selected in PANATERM is for linear.
If you are using the motor type with rotary, please select the model which is displayed "DD" at the end in model selection again.

Read Only Not Use Reset
System Other Normal

☐ Can over value
☐ Display - Set value description

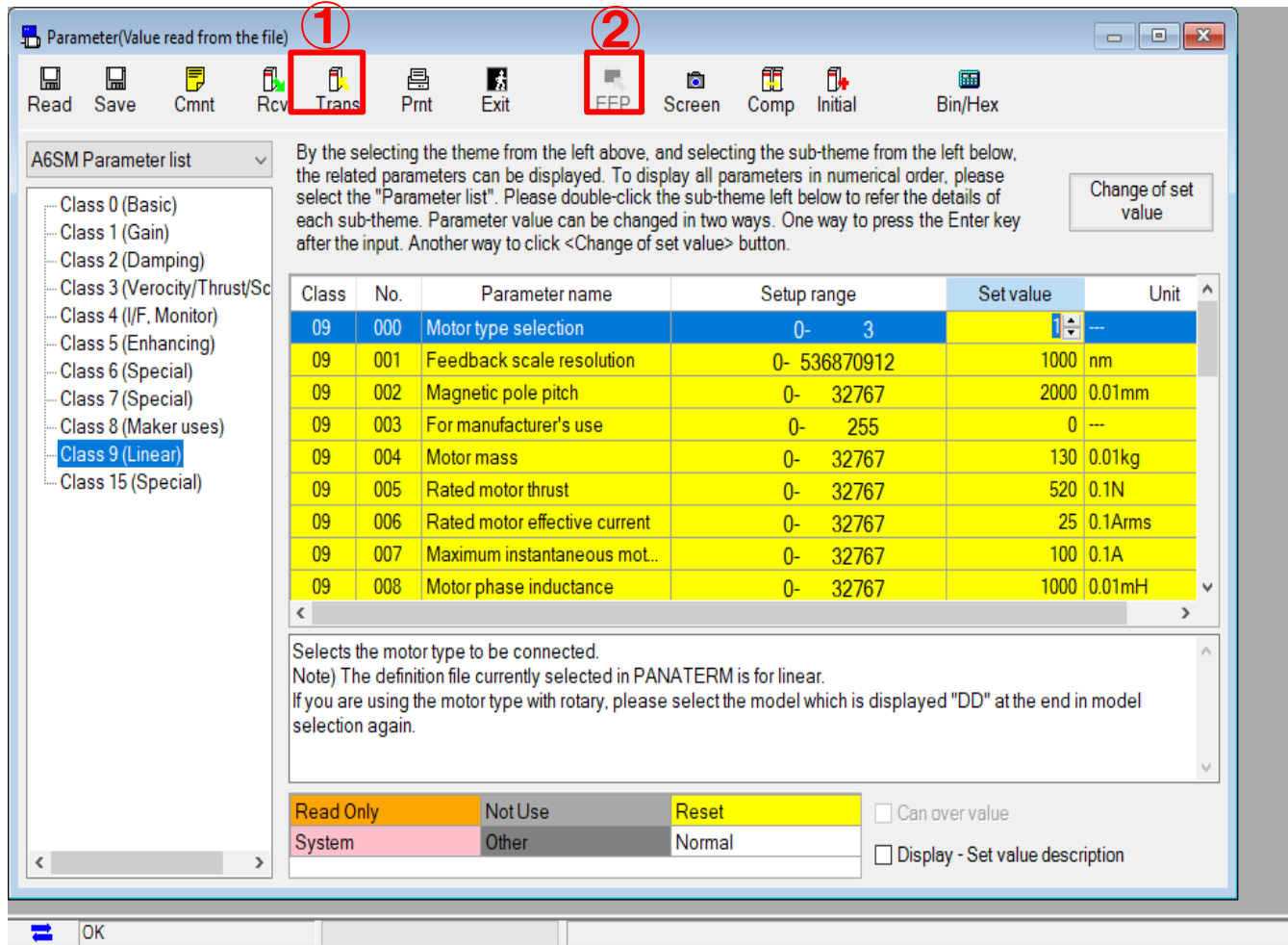
OK

E-RAM6-S			
09	000	-	1
09	001	nm	1000
09	002	mm	20
09	004	kg	0.35
09	005	N	38
09	006	Arms	2.5
09	007	A	10
09	008	mH	9.4
09	009	Ω	3.2
09	010	mm/s	1500
09	020	-	2
09	022	ms	200
09	023	%	80

E-RAM8-M			
1			
1000			
20			
1.7			
98			
2.5			
10			
21.4			
6.6			
2000			
2			
200			
80			

Parameter Restore

- ① Click “Trans” and when transmission is complete, ② Click OK in the pop-up window that appears after clicking “EEP”.
- When the pop-up window closes, the drive will reboot.



Parameter(Value read from the file)

Read Save Cmmt Rcv Trans Pmt Exit EEP Screen Comp Initial Bin/Hex

A6SM Parameter list

- Class 0 (Basic)
- Class 1 (Gain)
- Class 2 (Damping)
- Class 3 (Verocity/Thrust/Sc)
- Class 4 (I/F, Monitor)
- Class 5 (Enhancing)
- Class 6 (Special)
- Class 7 (Special)
- Class 8 (Maker uses)
- Class 9 (Linear)
- Class 15 (Special)

By the selecting the theme from the left above, and selecting the sub-theme from the left below, the related parameters can be displayed. To display all parameters in numerical order, please select the "Parameter list". Please double-click the sub-theme left below to refer the details of each sub-theme. Parameter value can be changed in two ways. One way to press the Enter key after the input. Another way to click <Change of set value> button.

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09	003	For manufacturer's use	0- 255	0	---
09	004	Motor mass	0- 32767	130	0.01kg
09	005	Rated motor thrust	0- 32767	520	0.1N
09	006	Rated motor effective current	0- 32767	25	0.1Arms
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Selects the motor type to be connected.
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If you are using the motor type with rotary, please select the model which is displayed "DD" at the end in model selection again.

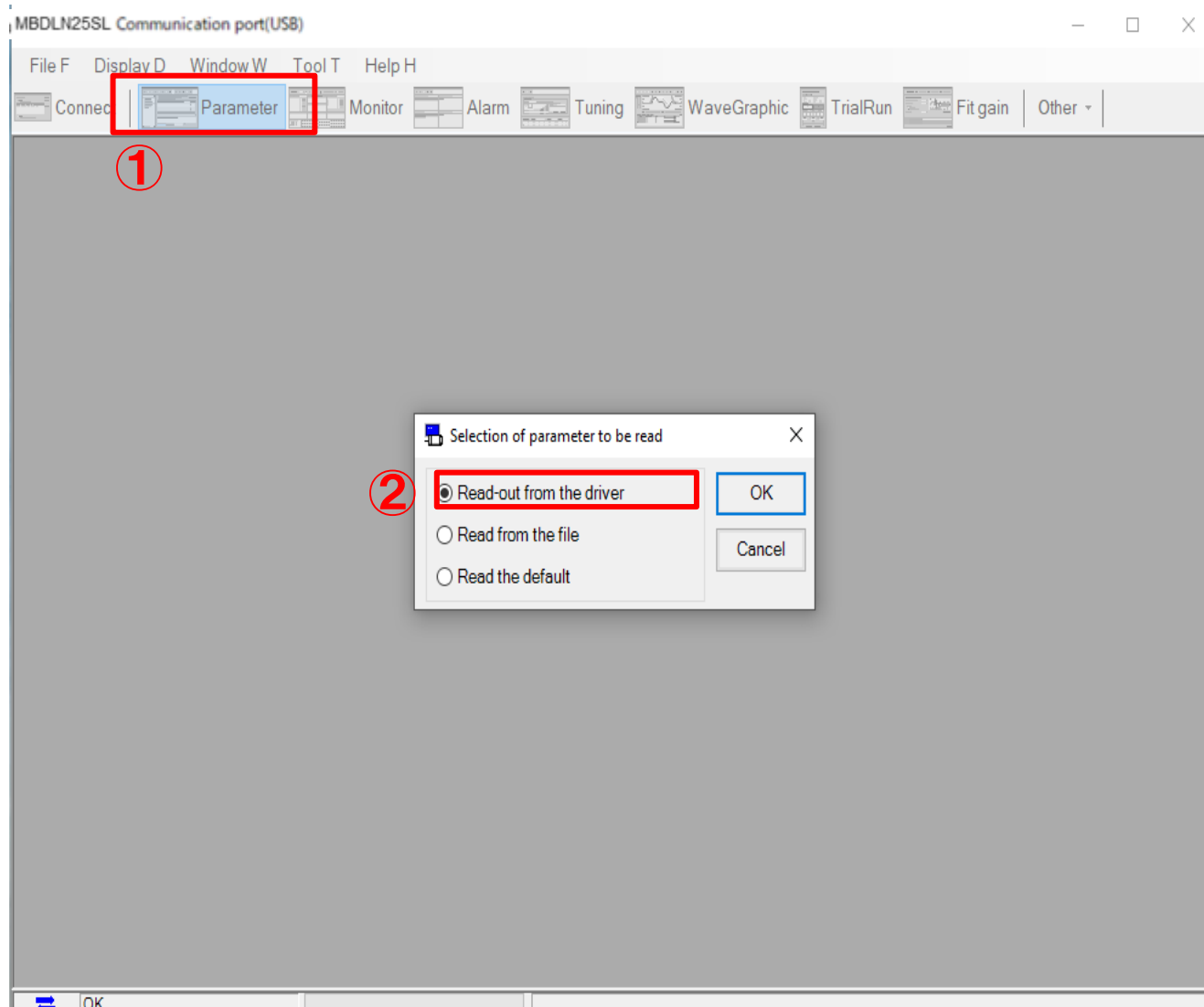
Read Only Not Use Reset
System Other Normal

☐ Can over value
☐ Display - Set value description

OK

Parameter Restore

- After reconnecting with the drive, click ① Parameters and then ② Click “Read out from the driver”



- ① After selecting category 9, ② check whether the parameter values are entered correctly.

Parameter(Value read from the file)

Read Save Cmmt Rcv Trans Pmt Exit EEP Screen Comp Initial Bin/Hex

A6SM Parameter list

By the selecting the theme from the left above, and selecting the sub-theme from the left below, the related parameters can be displayed. To display all parameters in numerical order, please select the "Parameter list". Please double-click the sub-theme left below to refer the details of each sub-theme. Parameter value can be changed in two ways. One way to press the Enter key after the input. Another way to click <Change of set value> button.

Change of set value

①

Class 0 (Basic)
Class 1 (Gain)
Class 2 (Damping)
Class 3 (Verocity/Thrust/Sc
Class 4 (I/F, Monitor)
Class 5 (Enhancing)
Class 6 (Special)
Class 7 (Special)
Class 8 (Maker uses)
① Class 9 (Linear)
Class 15 (Special)

Class	No.	Parameter name	Setup range	Set value	Unit
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09	003	For manufacturer's use	0- 255	0	---
09	004	Motor mass	0- 32767	130	0.01kg
09	005	Rated motor thrust	0- 32767	520	0.1N
09	006	Rated motor effective current	0- 32767	25	0.1Arms
09	007	Maximum instantaneous mot...	0- 32767	100	0.1A
09	008	Motor phase inductance	0- 32767	1000	0.01mH

②

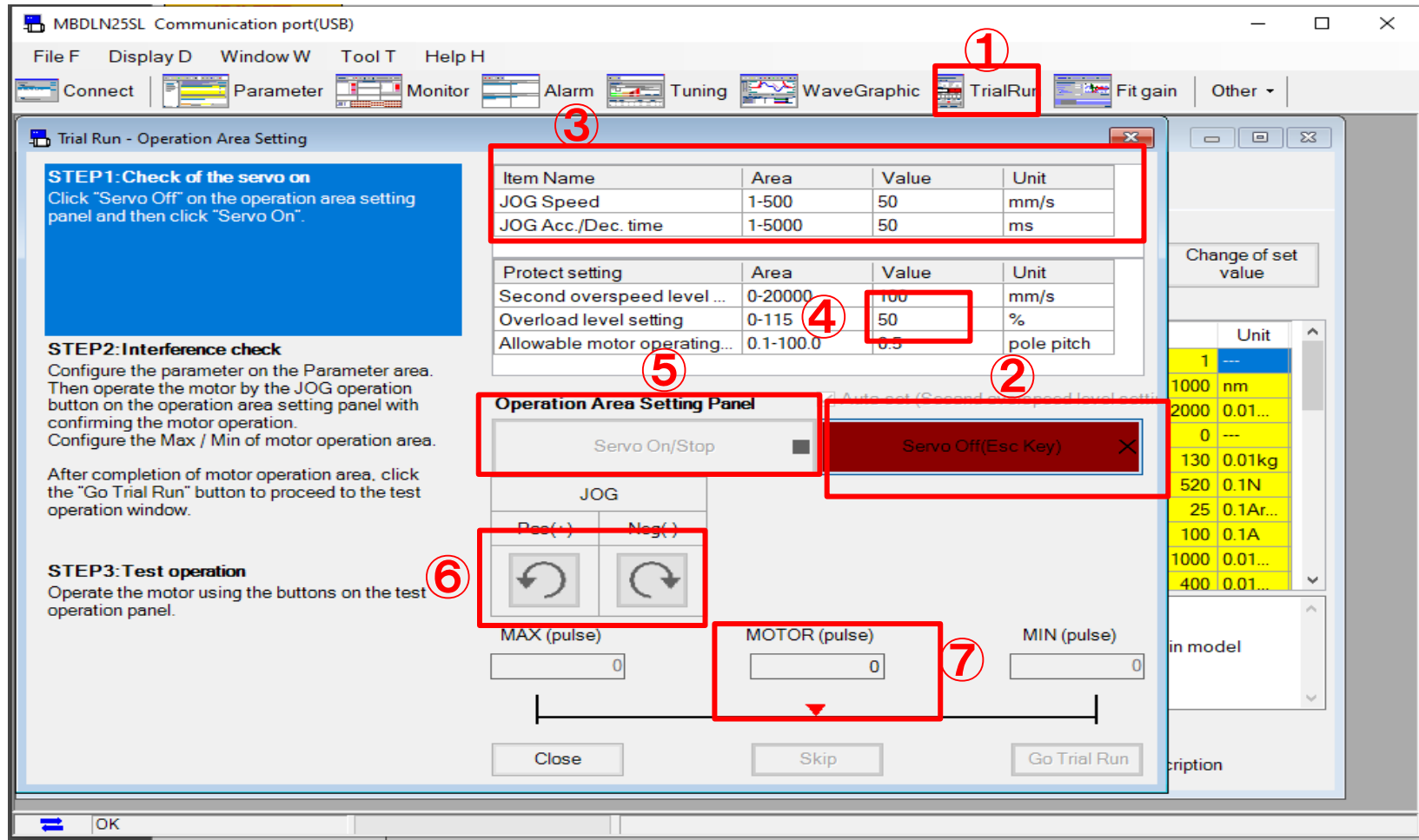
Selects the motor type to be connected.
Note) The definition file currently selected in PANATERM is for linear.
If you are using the motor type with rotary, please select the model which is displayed "DD" at the end in model selection again.

Read Only Not Use Reset
System Other Normal

☐ Can over value
☐ Display - Set value description

OK

- ① After selecting “Trial Run”, ② turn off the servo to kill the motor, ③ input the acceleration/deceleration and speed values required for jog operation.
- ④ After inputting the overload level 115, ⑤ turn on the motor servo and prepare for jog operation.
- Click ⑥ and check whether the value ⑦ changes according to motor drive and jog drive.



MBDLN25SL Communication port(USB)

File F Display D Window W Tool T Help H

Connect Parameter Monitor Alarm Tuning WaveGraphic TrialRun Fit gain Other ▾

Trial Run - Operation Area Setting

STEP1: Check of the servo on
Click “Servo Off” on the operation area setting panel and then click “Servo On”.

STEP2: Interference check
Configure the parameter on the Parameter area. Then operate the motor by the JOG operation button on the operation area setting panel with confirming the motor operation. Configure the Max / Min of motor operation area.
After completion of motor operation area, click the “Go Trial Run” button to proceed to the test operation window.

STEP3: Test operation
Operate the motor using the buttons on the test operation panel.

Item Name	Area	Value	Unit
JOG Speed	1-500	50	mm/s
JOG Acc./Dec. time	1-5000	50	ms

Protect setting	Area	Value	Unit
Second overspeed level ...	0-20000	100	mm/s
Overload level setting	0-115	50	%
Allowable motor operating...	0.1-100.0	0.5	pole pitch

Operation Area Setting Panel

Servo On/Stop ☐

Servo Off(Esc Key)

JOG

Pos(+) Neg(-)

MAX (pulse)

MOTOR (pulse)

MIN (pulse)

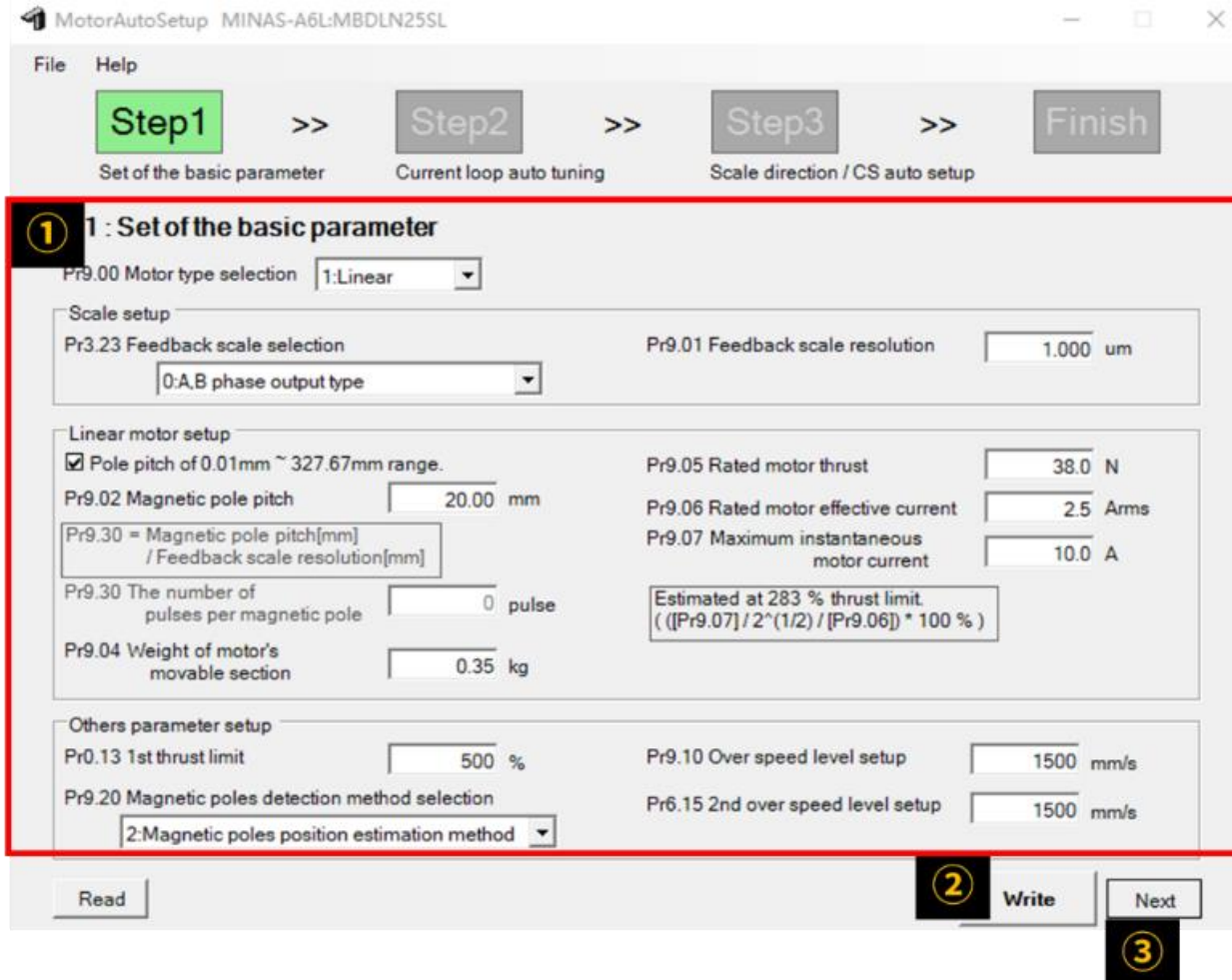
Close Skip Go Trial Run

Change of set value

Unit
1
1000 nm
2000 0.01...
0
130 0.01kg
520 0.1N
25 0.1Ar...
100 0.1A
1000 0.01...
400 0.01...

Auto Tuning (MotorAutoSteup)

- ① Check if Motor parameters are correct (especially Pr9.01 and Pr9.02).
- ② Click “Write”, and ③ Click “Next”.



MotorAutoSetup MINAS-A6L:MBDLN25SL

File Help

Step1 >> Step2 >> Step3 >> Finish

Set of the basic parameter Current loop auto tuning Scale direction / CS auto setup

① 1 : Set of the basic parameter

Pr9.00 Motor type selection 1:Linear

Scale setup

Pr3.23 Feedback scale selection 0:A.B phase output type

Pr9.01 Feedback scale resolution 1.000 um

Linear motor setup

☒ Pole pitch of 0.01mm ~ 327.67mm range.

Pr9.02 Magnetic pole pitch 20.00 mm

Pr9.30 = Magnetic pole pitch[mm] / Feedback scale resolution[mm]

Pr9.30 The number of pulses per magnetic pole 0 pulse

Pr9.04 Weight of motor's movable section 0.35 kg

Pr9.05 Rated motor thrust 38.0 N

Pr9.06 Rated motor effective current 2.5 Arms

Pr9.07 Maximum instantaneous motor current 10.0 A

Estimated at 283 % thrust limit.
(([Pr9.07] / 2^(1/2)) / [Pr9.06] * 100 %)

Others parameter setup

Pr0.13 1st thrust limit 500 %

Pr9.10 Over speed level setup 1500 mm/s

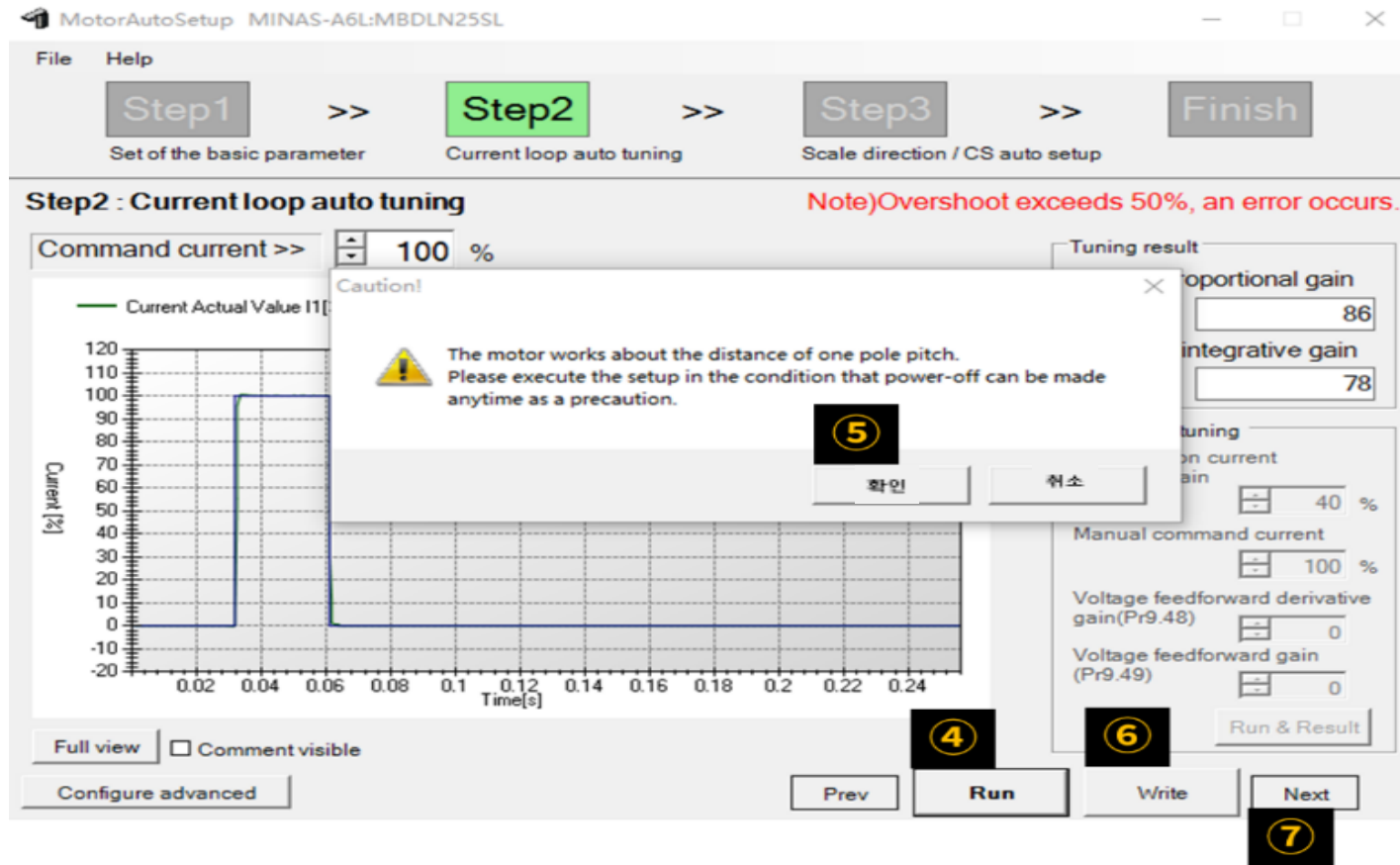
Pr9.20 Magnetic poles detection method selection 2:Magnetic poles position estimation method

Pr6.15 2nd over speed level setup 1500 mm/s

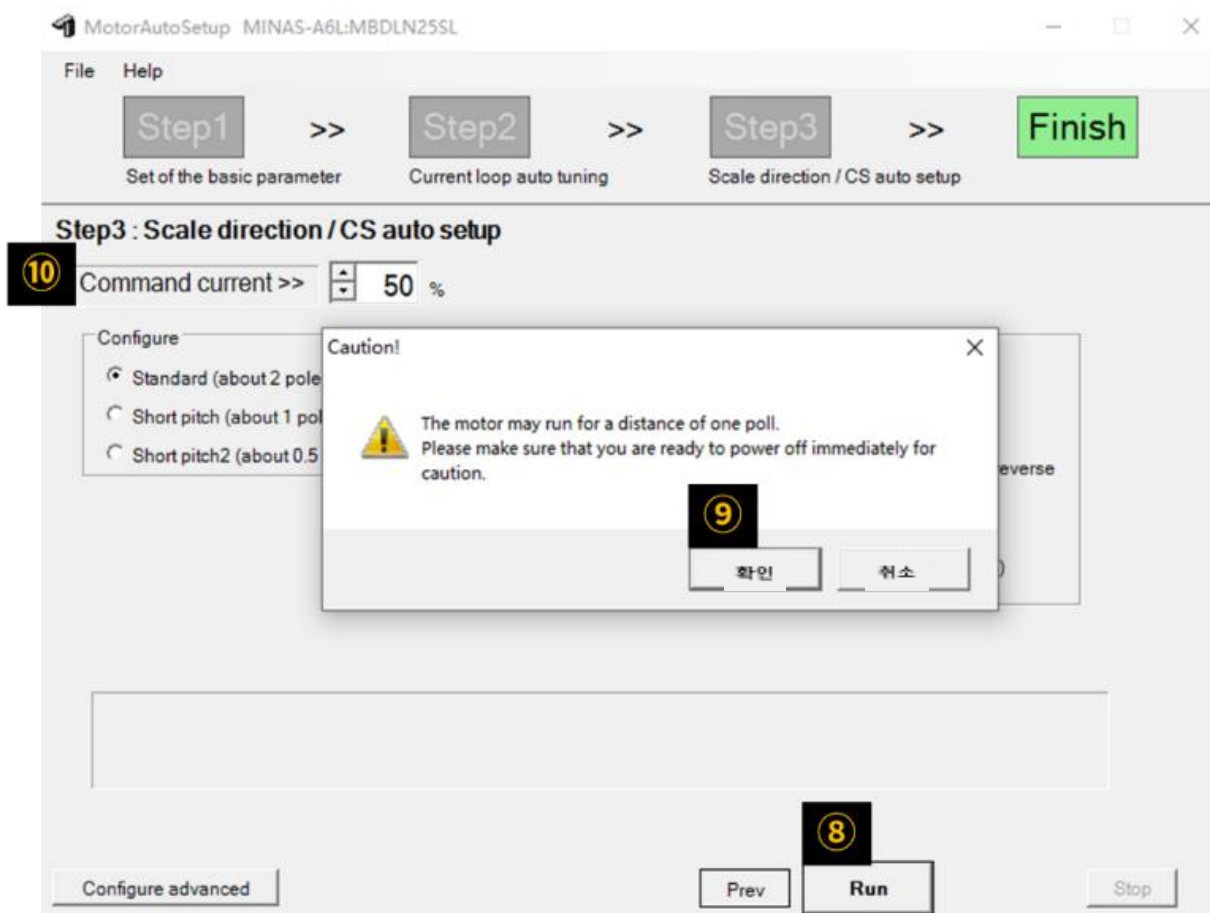
Read Write Next

② **③**

- ④Click “Run”, ⑤Click “Confirm”, the actuator operates slightly for a moment and then stops.
- ⑥Click “Write”, ⑦Click “Next”.



- ⑧Click “Run”, ⑨Click “Confirm”, the actuator operates slightly for a moment and then stops.
- ! When an alarms, ⑩”Command current” can be increased appropriately.



- ⑪ Click “OK” to close this software and turn off the driver and turn it on again.

Result parameters

Before parameters

Pr3.23 Feedback scale selection

0:A,B phase output type

Pr9.00 Motor type selection

1:Linear

Pr9.01 Feedback scale resolution

1 um

Pr9.02 Magnetic pole pitch

20 mm

Pr9.30 The number of pulses per magnetic pole

0 pulse

Pr9.04 Weight of motor's movable section

0.35 kg

Pr9.05 Rated motor thrust

38 N

Pr9.06 Rated motor effective current

2.5 Arms

Pr9.07 Maximum instantaneous motor current

10 A

Pr9.10 Over speed level setup

1500 mm/s

Pr6.15 2nd over speed level setup

1500 mm/s

Pr0.13 1st thrust limit

500 %

Pr9.20 Magnetic poles detection method selection

2:Magnetic poles position estimation method

Pr3.26 Reversal of direction of Feedback scale / CS direction

0

Pr9.13 Current proportional gain

88

Pr9.14 Current integrative gain

80

Pr9.21 CS phase setting

0 degree

After parameters

Pr3.23 Feedback scale selection

0:A,B phase output type

Pr9.00 Motor type selection

1:Linear

Pr9.01 Feedback scale resolution

1 um

Pr9.02 Magnetic pole pitch

20 mm

Pr9.30 The number of pulses per magnetic pole

0 pulse

Pr9.04 Weight of motor's movable section

0.35 kg

Pr9.05 Rated motor thrust

38 N

Pr9.06 Rated motor effective current

2.5 Arms

Pr9.07 Maximum instantaneous motor current

10 A

Pr9.10 Over speed level setup

1500 mm/s

Pr6.15 2nd over speed level setup

1500 mm/s

Pr0.13 1st thrust limit

500 %

Pr9.20 Magnetic poles detection method selection

2:Magnetic poles position estimation method

Pr3.26 Reversal of direction of Feedback scale / CS direction

0

Pr9.13 Current proportional gain

86

Pr9.14 Current integrative gain

78

Pr9.21 CS phase setting

11 degree

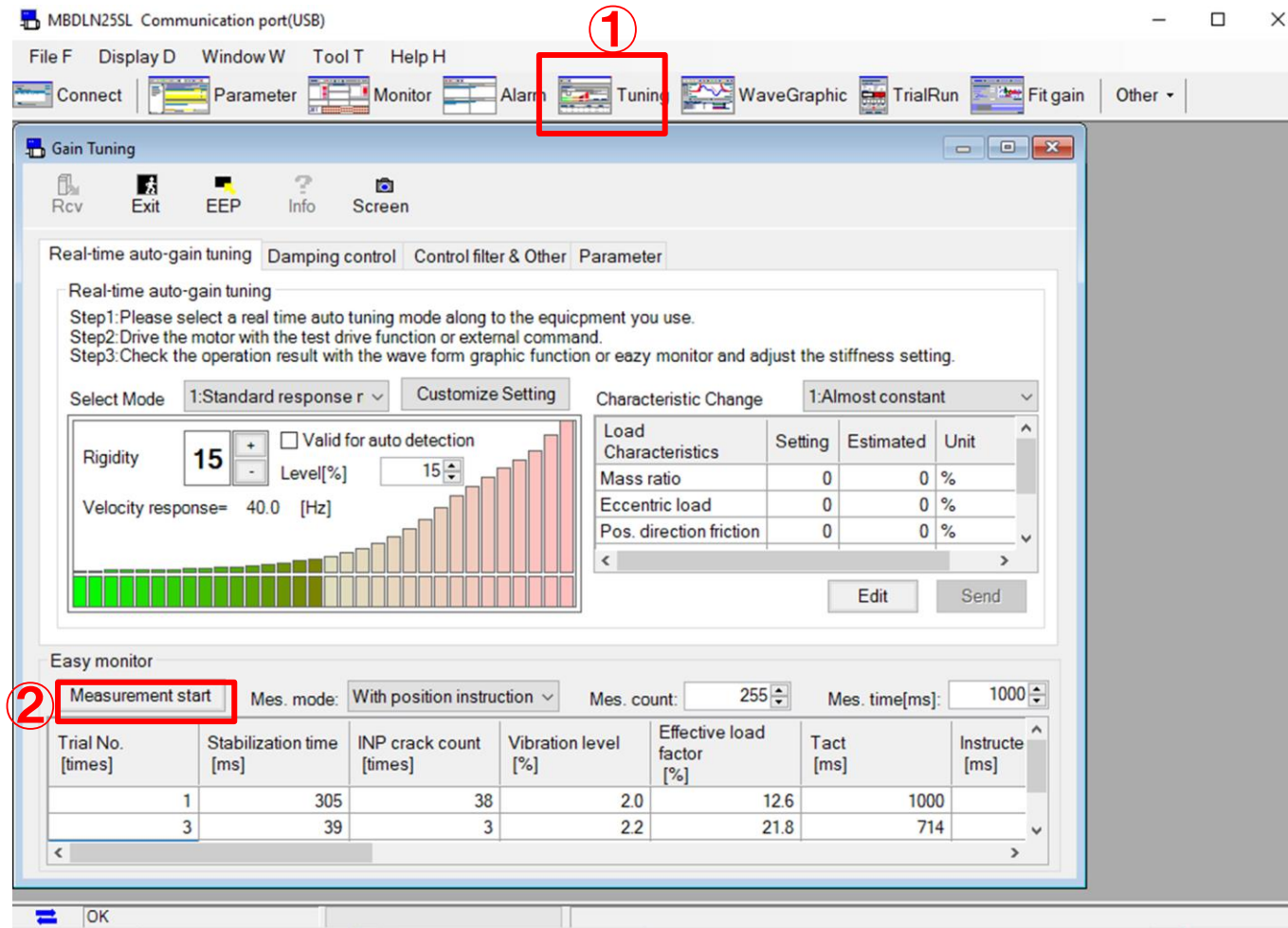
OK

⑪

OK

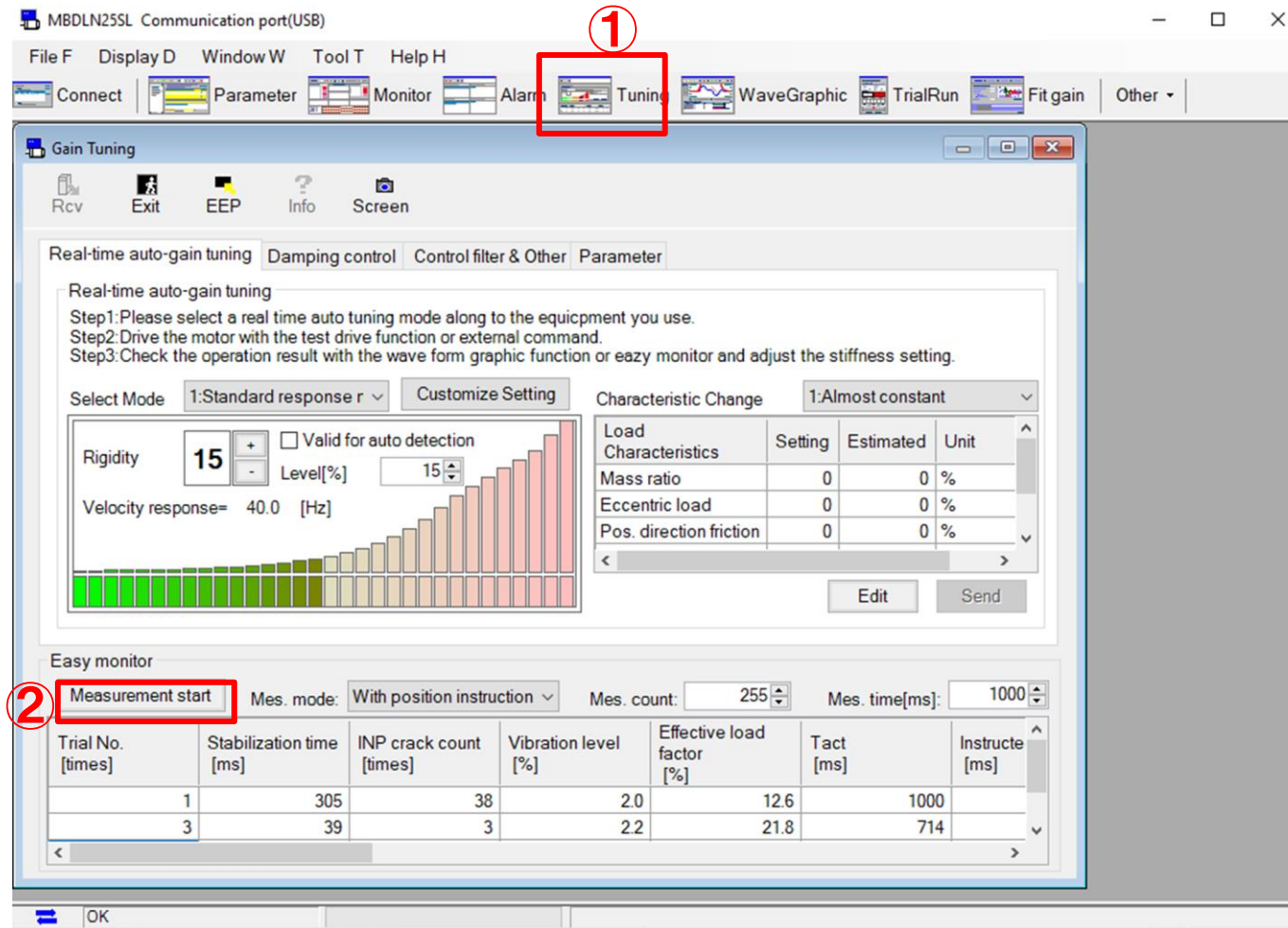
Auto tuning (Panaterm)

- ① Click “Tuning”.
- ② Click “Start Measurement” to check the current status.



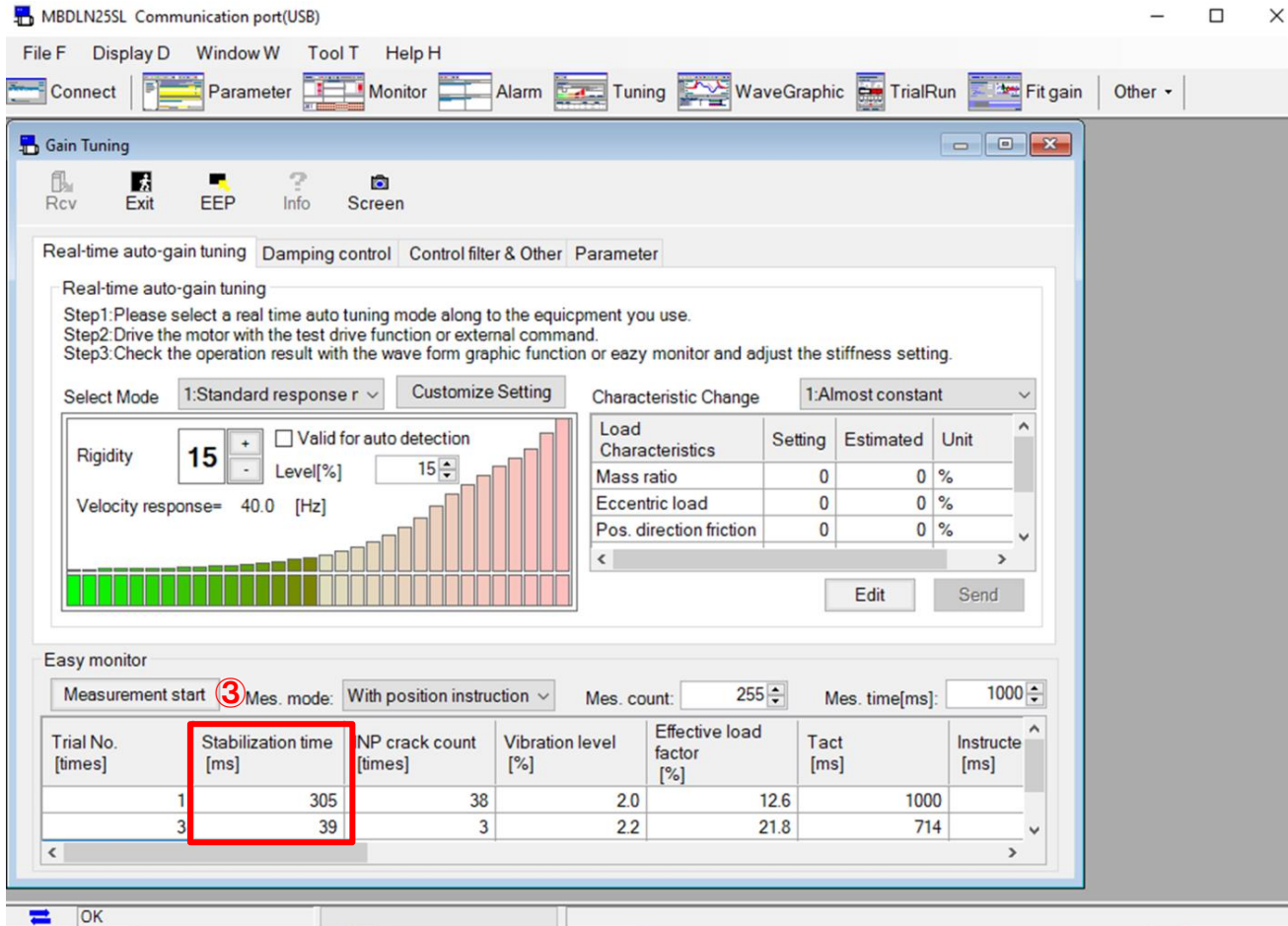
Auto tuning (Panaterm)

- ① Click “Tuning”.
- ② Click Start Measurement to check the current status.



Auto tuning (Panaterm)

- After starting measurement, drive the actuator during test run and measure ③ settling time. Check it by repeating 2–3 times.



The screenshot shows the MBDLN25SL Communication port(USB) software interface. The main window is titled "Gain Tuning" and contains several tabs: "Real-time auto-gain tuning", "Damping control", "Control filter & Other", and "Parameter". The "Real-time auto-gain tuning" tab is active, displaying instructions for real-time auto-gain tuning and a "Select Mode" dropdown set to "1:Standard response r". A "Rigidity" value of 15 is shown, along with a "Velocity response" of 40.0 [Hz]. A bar chart displays the response curve. The "Easy monitor" section at the bottom shows a table of measurement results. The "Mes. mode" is set to "With position instruction", "Mes. count" is 255, and "Mes. time[ms]" is 1000. The table lists trial numbers, stabilization times, NP crack counts, vibration levels, effective load factors, and tact times. The stabilization times for trials 1 and 3 are 305 ms and 39 ms, respectively, with the latter highlighted by a red box.

Real-time auto-gain tuning

Step1: Please select a real time auto tuning mode along to the equipment you use.
Step2: Drive the motor with the test drive function or external command.
Step3: Check the operation result with the wave form graphic function or easy monitor and adjust the stiffness setting.

Select Mode: 1:Standard response r

Rigidity: 15

Velocity response= 40.0 [Hz]

Level[%]: 15

Characteristics Change: 1:Almost constant

Load Characteristics	Setting	Estimated	Unit
Mass ratio	0	0	%
Eccentric load	0	0	%
Pos. direction friction	0	0	%

Easy monitor

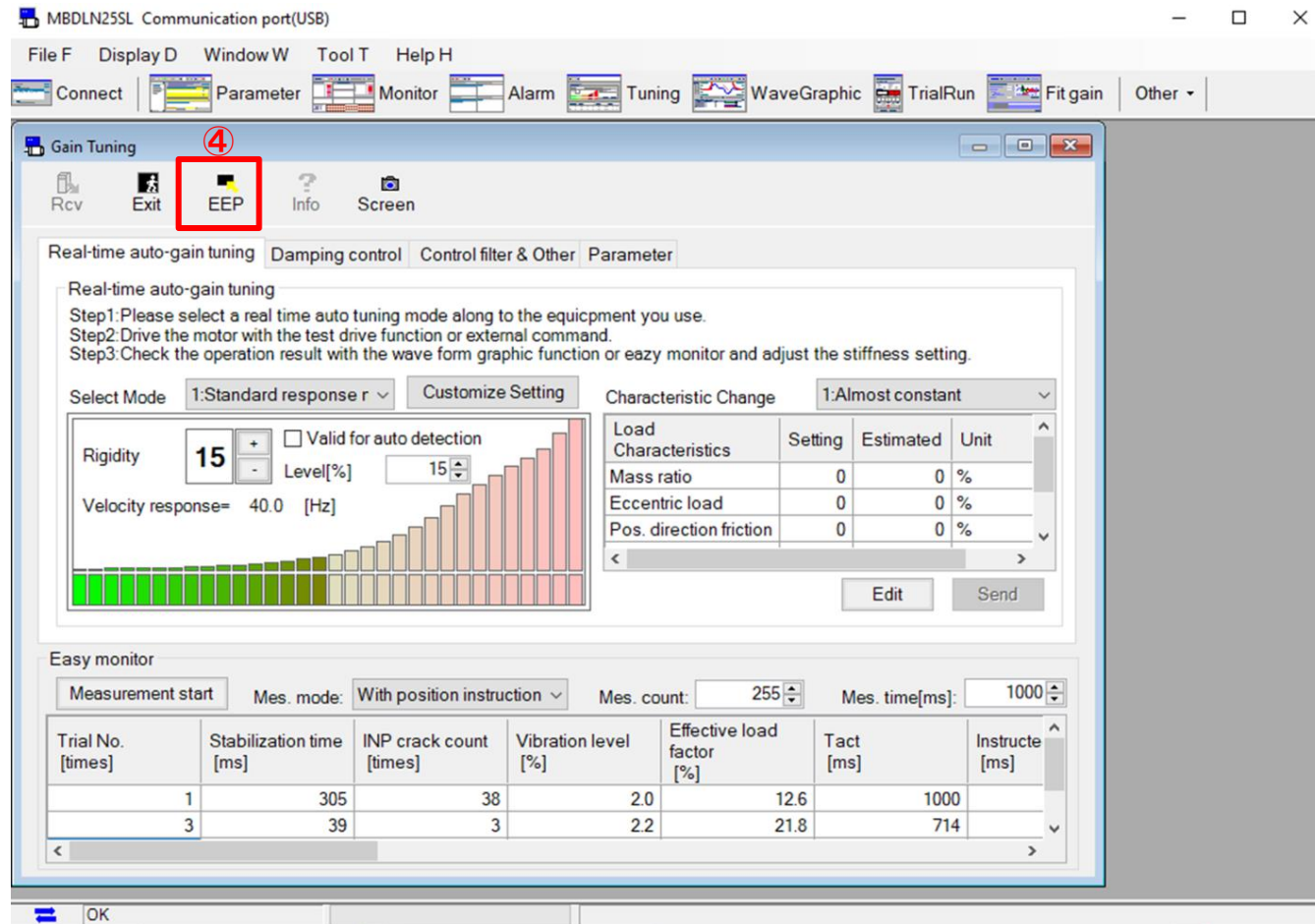
Measurement start: ③ Mes. mode: With position instruction

Mes. count: 255 Mes. time[ms]: 1000

Trial No. [times]	Stabilization time [ms]	NP crack count [times]	Vibration level [%]	Effective load factor [%]	Tact [ms]	Instructe [ms]
1	305	38	2.0	12.6	1000	
3	39	3	2.2	21.8	714	

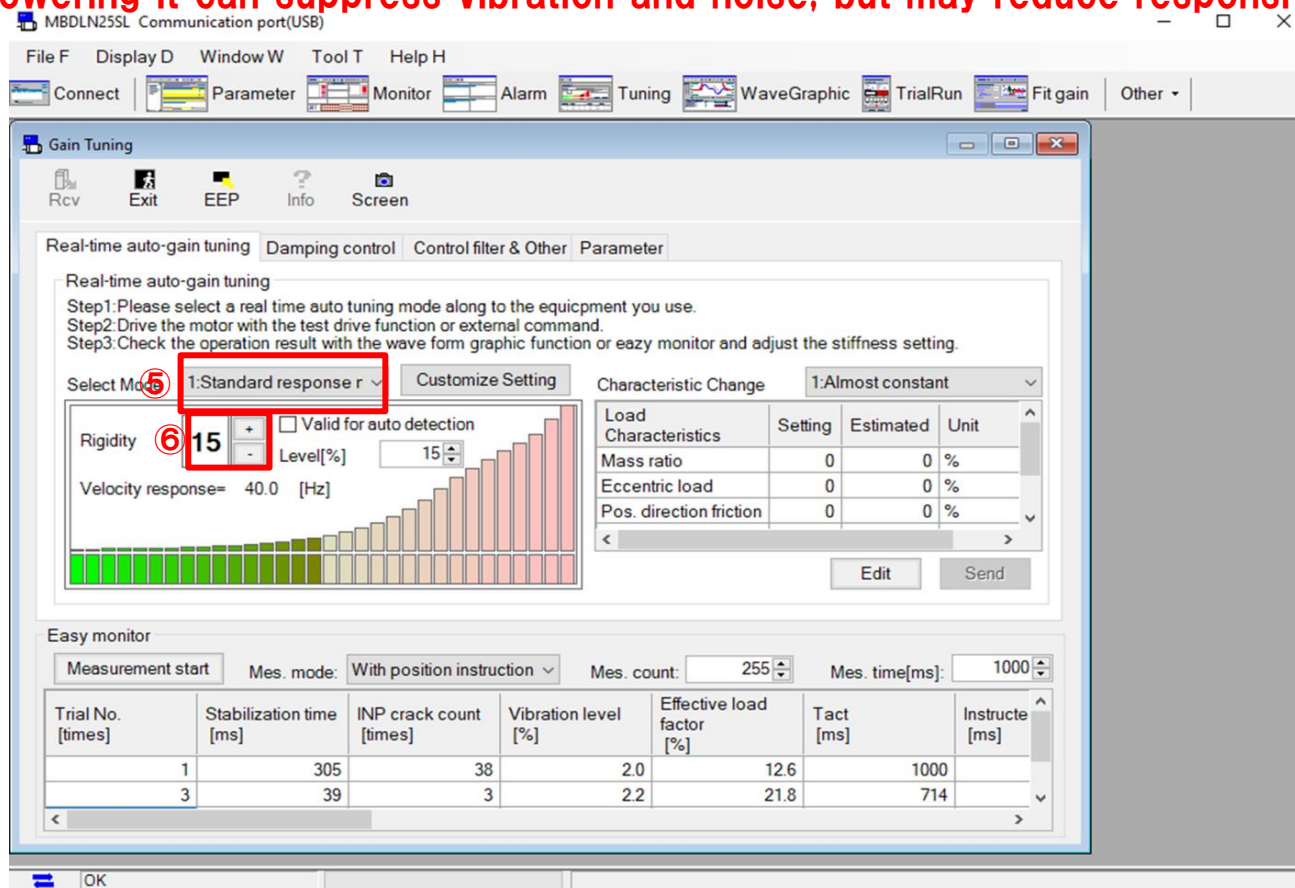
Auto tuning (Panaterm)

- ④ If the correction time meets the specifications, click “EEP” to save the data.



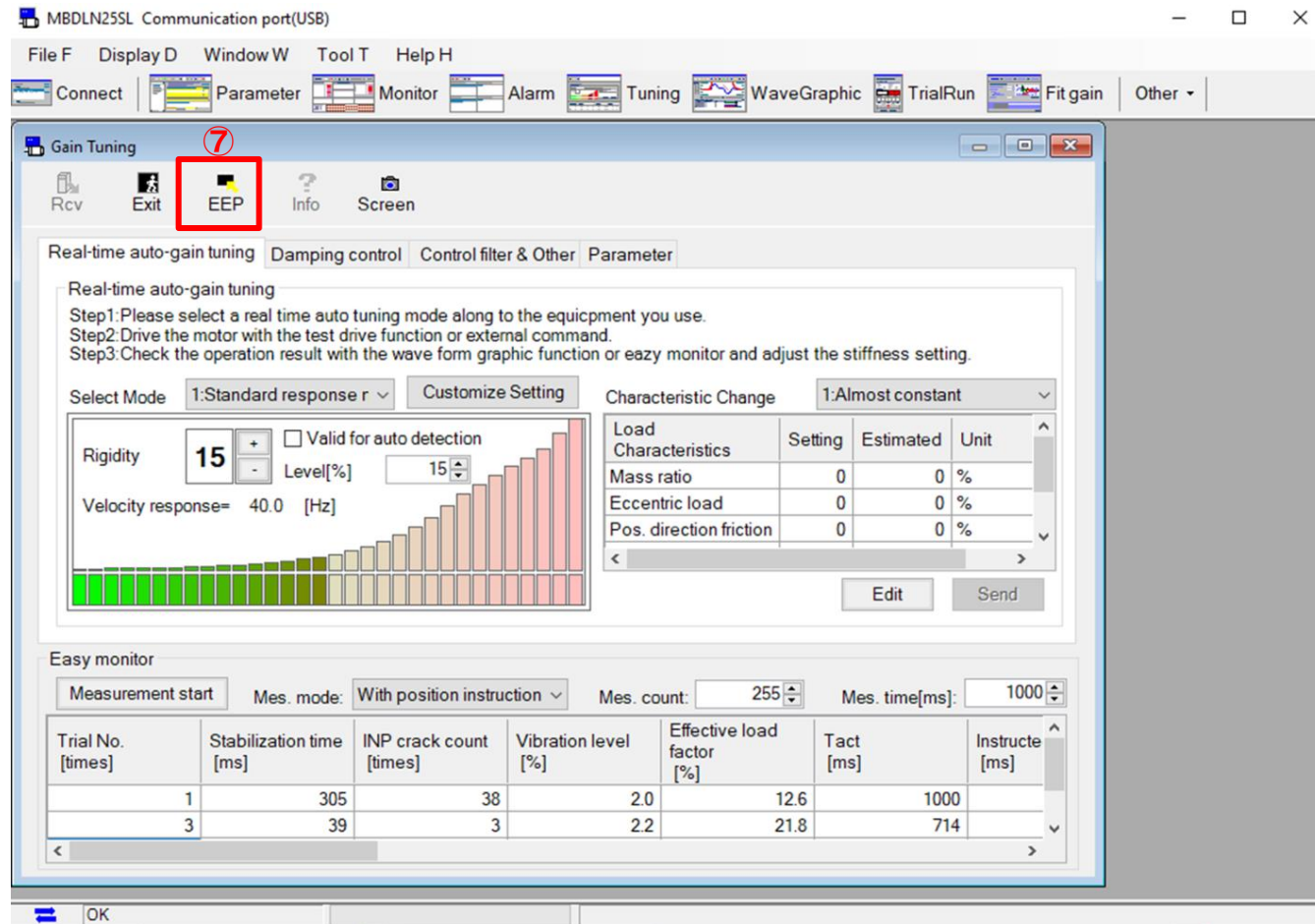
Auto tuning (Panaterm)

- If the settling time is out of the specifications, select “1” in ⑤ “Mode selection”: standard response mode.
- ⑥ Proceed with rigidity adjustment in rigidity settings
- ! Increasing it may provide more responsiveness, but may cause noise or vibration in the actuator.
- ! Lowering it can suppress vibration and noise, but may reduce responsiveness.



Auto tuning (Panaterm)

- If you find a correction time that meets the specifications through rigidity adjustment, click ⑦ "EEP" to save the data.



Revision	Date	Reviser	Approver	Remark
1.0	2024.05.02	J.G.MIN	E.W.SHIN	First version