364-23-184-1

Nidec
All for dreams

Excel Add-in Software

Tied software of electric torque tester

TNT_DSP

Operation Manual

Please read the following content before operation.

● Please read operation manual of electric torque seat [DSP-10] and Senior function digital torque [TNX] detaitedly, the operate lorreitly.

Notes

- Our company reserve all right, contain [TNT_DSP] and copying of related material.
- About other notes, please confirm the using agreement offered when install the software.

NIDEC DRIVE TECHNOLOGY CORPORATION

Menu

1. Summary 2
2. Preparation 2
   2.1 Connection 2
   2.2 Equipment of Computer 3
   2.3 Preparation of loading macro software 3
3. Start-up of loading macro software 4
   3.1 Menu 4
   3.2 Start of [TNT_DSP] 4
4. Contents of [TNT_DSP] 6
   4.1 Start Menu 6
   4.2 Main Menu 7
   4.3 Change Setting menu 9
      4.3.1 Common Setting item 9
      4.3.2 Set and save 11
   4.4 Home action 13
   4.5 Print preview function 13
   4.6 Mode of Real-time torque expression 14
5. Manufacturing of Test action 15
   5.1 Test start 15
   5.2 During test 15
   5.3 Test end 15
   5.4 Measuring Sheet 17
   5.5 Statistical Sheet 19
   5.6 End of [TNT_DSP] 20
   5.7 Diagram of Test 21
6. Each Test action 22
   6.1 Angle Test 22
   6.2 Torque Test 25
   6.3 Break Test 28
   6.4 Cycle Test 32
   6.5 PP Cap Test 39
   6.6 Sampling Test 46
7. Function of making frequency distribution chart 51
   7.1 Making graph menu 51
   7.2 After finish the statistical graph 52
   7.3 Frequency distribution graph 54
8. Main fault 56

Foreword

Thanks for using our software tied, Excel loading macro software of electric torque stand [DSP-10] and auto torque instrument,

The manual is mainly to introduce the operation of the software.

1. Summary

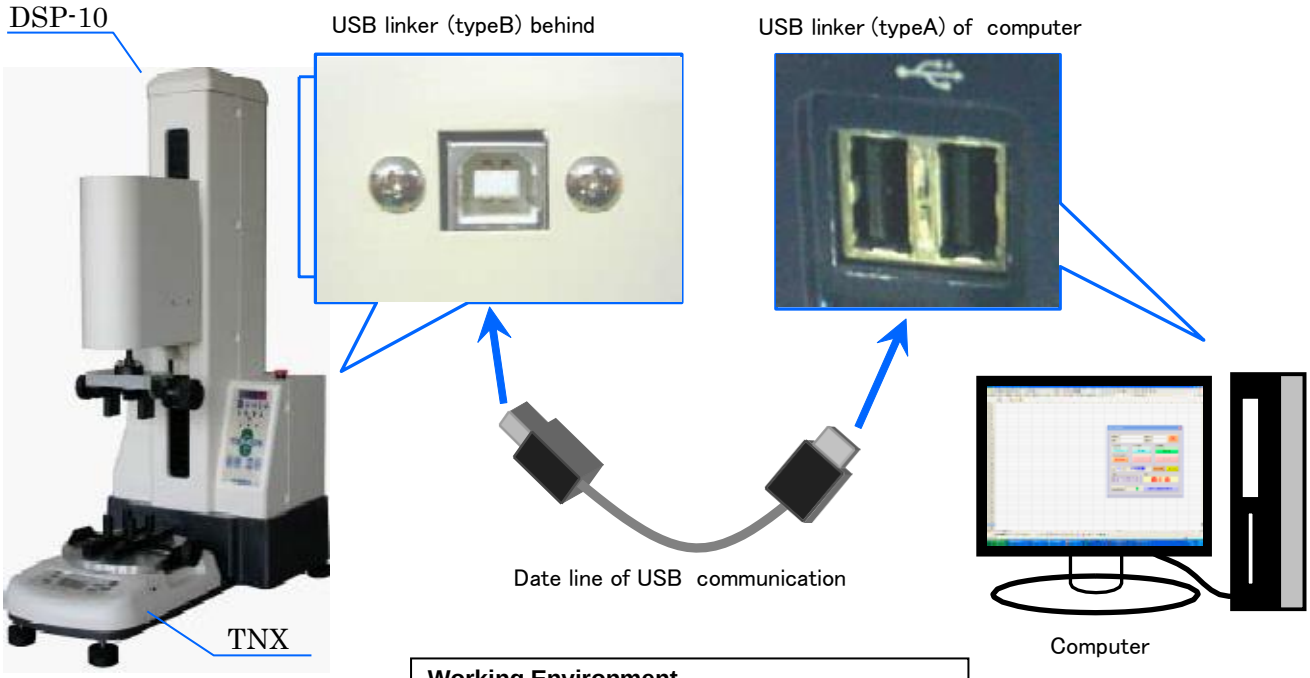
The software is a program facitity for integrative experiment. It cost the torque by electric torque stand [DSP-10] and senior function digital torque tester. The software has follwing functions.

- Action setting of various test.
- Start and over of various test actions.
- Loading torque data in Test control of other actions.
- Determination of torque value, making graph.

2. Preparation

2.1 Connection

The electric torque stand [DSP-10] is connected with senior function digital torque test, please insert the power source, Confirm if [DSP-10] is start up correctly, then use the accessioral USB data line Join USB linker(type B)behind mainframe to USB linker (type A)of computer. About the connection of DSP-10 and TNX, Please refer to electric torque stand DSP-10,USB Linker (typeA) of computer. Contents about the product are as follows.



Working Environment
Microsoft Windows® 10* 64bit
Microsoft Excel® 2016* 32bit/64bit
Microsoft Excel® 2019* 32bit/64bit

*Microsoft, Windows and Excel are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

When operating TNT_DSP, please turn off DSP-10 and TNX. It likely to work singluarty when unit of TNX and other setting change, Please don`t operate in this way when connecting with computer ,If you have to change ,please turn off the power of DSP-10 first, then connect with computer after get though the power again.

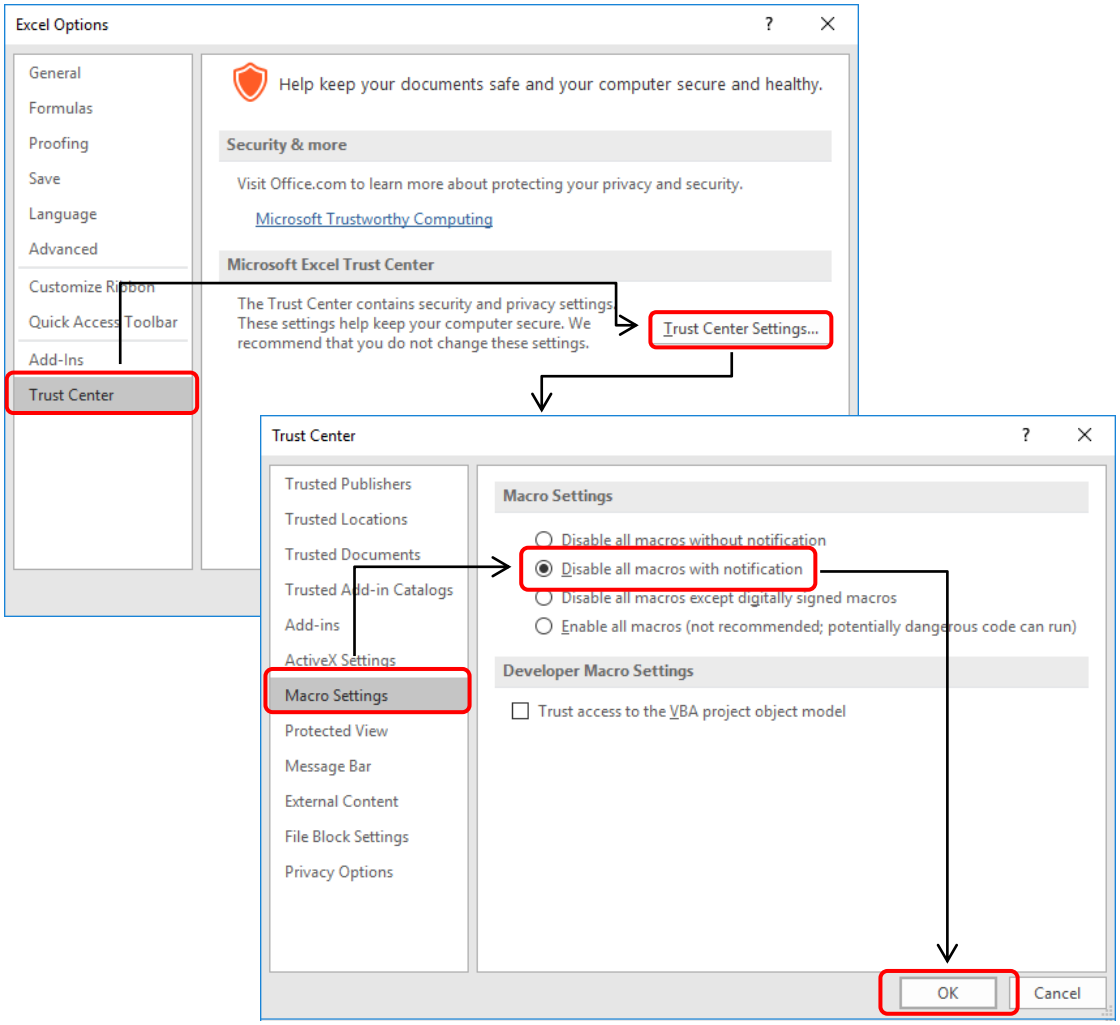
2.2 Equipment of Computer

It`s necessary to use the equipment of USB program facility and [TNT_DSP] in computer when operating the software, please refer to accessorial [TNE_DSP equipment instruction]

2.3 Preparation of loading Macro software

If the window for enable or disable macro is not displayed, please change the security level of macro before starting this software by the following procedure.

(1) Open the "Options" from the "FILE" menu of Excel, and then click the "Trust Center Settings" button on the "Trust Center".
(2) Select "Disable all Macros with notification" in "Macro Settings".
(3) Once finish Excel, then start Excel again. Select "Available Macro" on security windows.



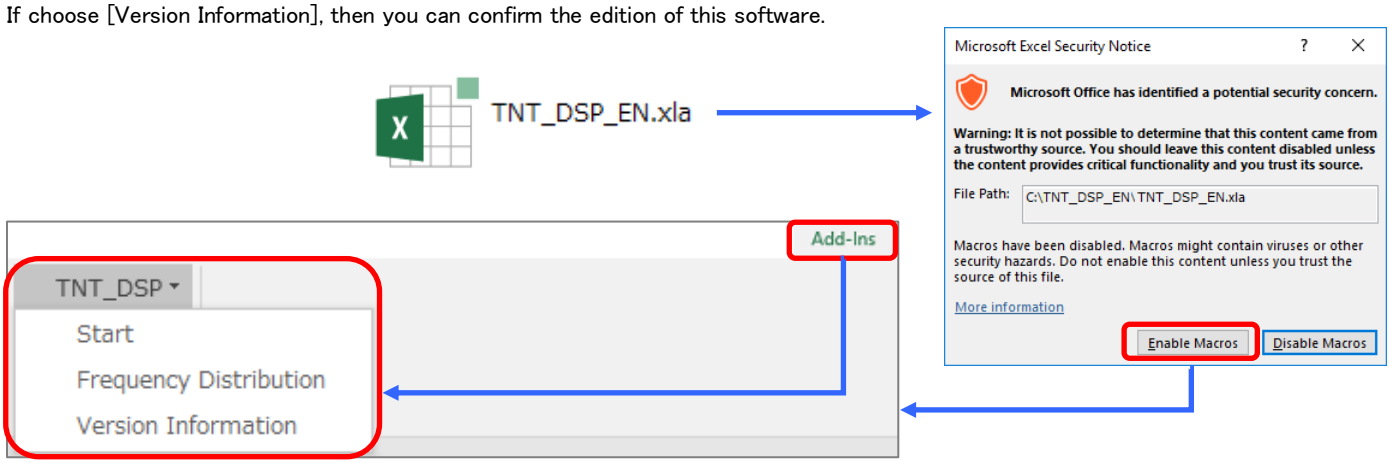
When TNT_DSP is effective,l oading marco software used by tester of our company beyond TNT_DSP .and software used by othen Excel also will probably work singluarly, in TNT_DSP. Please don`t make software beyong TNT_DSP and effective .while operating TNT_DSP.

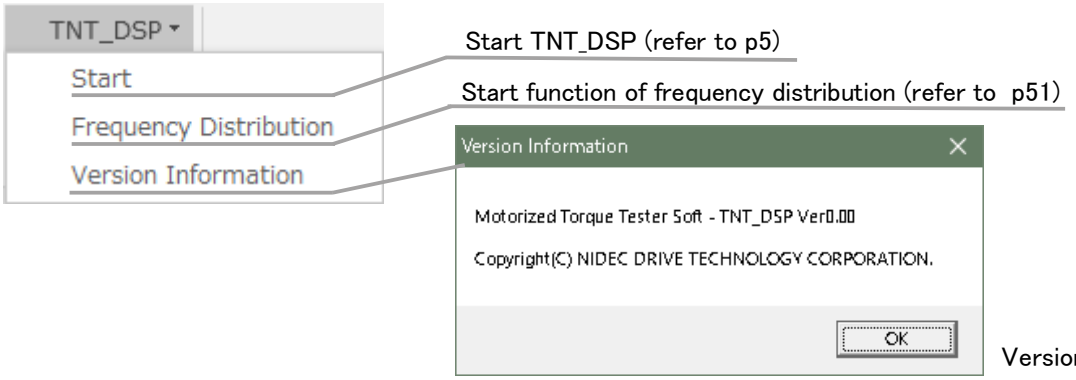
3. Start-up of loading macro software

3.1 Menu

[TNT_DSP] is added to Excel menu. so choose [start] from menu, [TNT_DSP] will START UP, Beside ,choose [Frequency Distribution],[TNT_DSP] start to operate frequency distribution.

If choose [Version Information], then you can confirm the edition of this software.

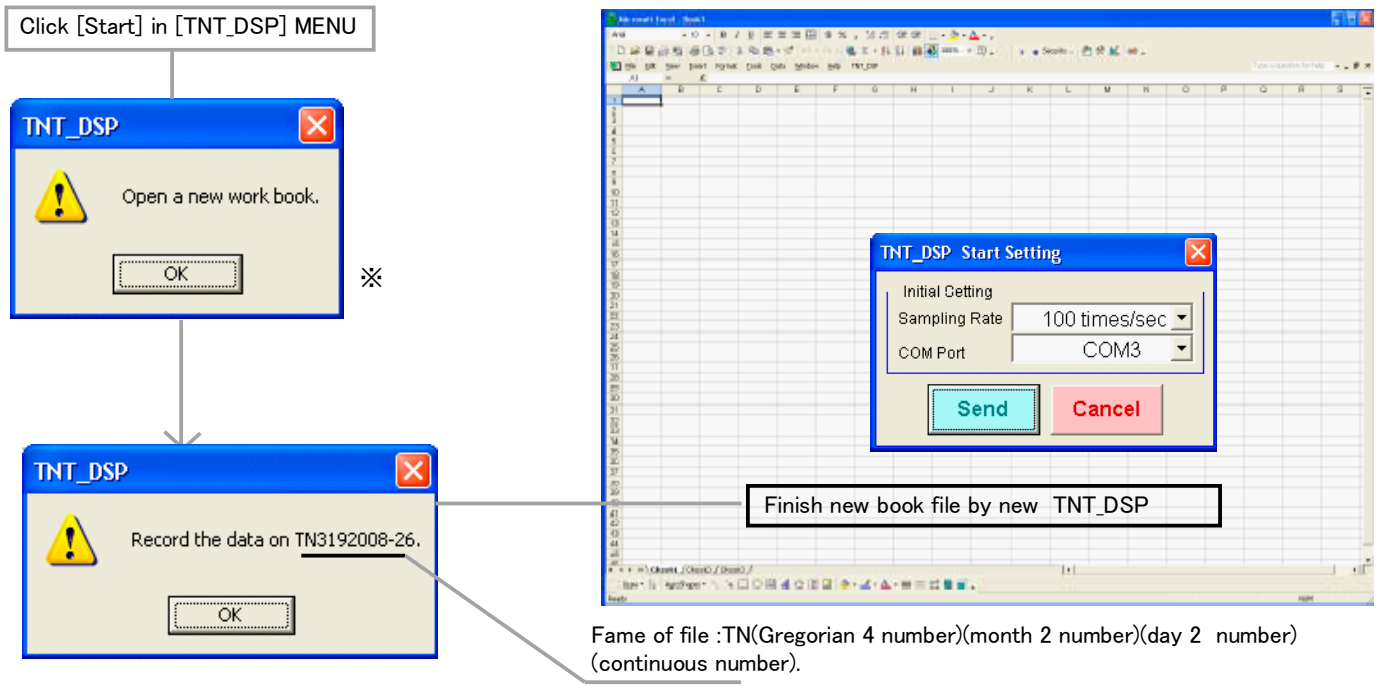




Version Information

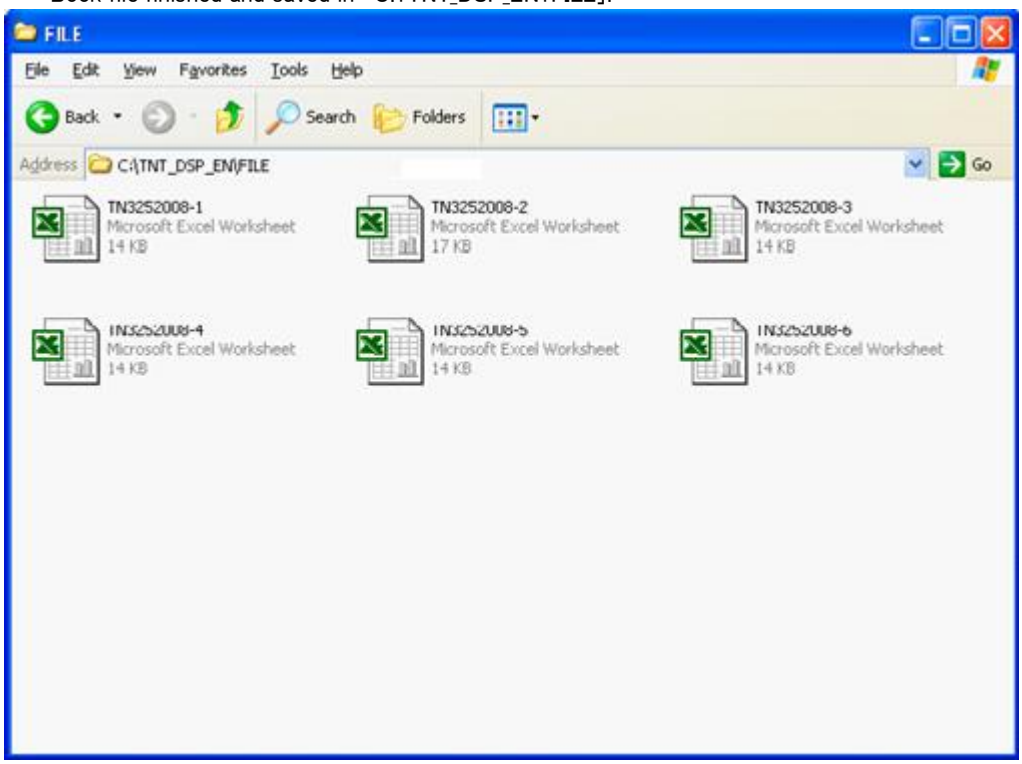
3.2 Start of [TNT_DSP]

Choose [start] in menu of [TNT_DSP], then indicate following information and finish book file in Excel. Save book file and make new book file when it is open. The name of new book file is detemined by start date (year month day).



※ Only can indicate when the book file saved is not open.

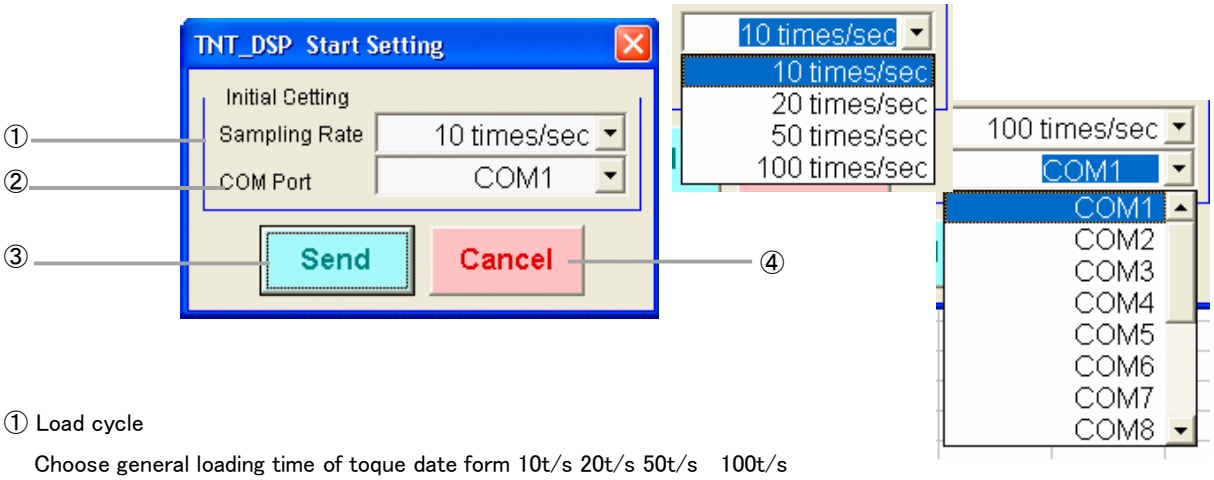
Book file finished and saved in「C:¥TNT_DSP_EN¥FILE」.



4. Contents of [TNT_DSP]

4.1 Start menu

Start-up the software correctly, then indicate of start set choose load cycle and communicating port, then click "send", enter main menu.



① Load cycle

Choose general loading time of toque date form 10t/s 20t/s 50t/s 100t/s

② Communication port

Com1~com15。「choose according to the setting (can refer to <TNT_DSP>equipment instruction in continuity)

③ Send key

Enter next menu

④ Cancel key

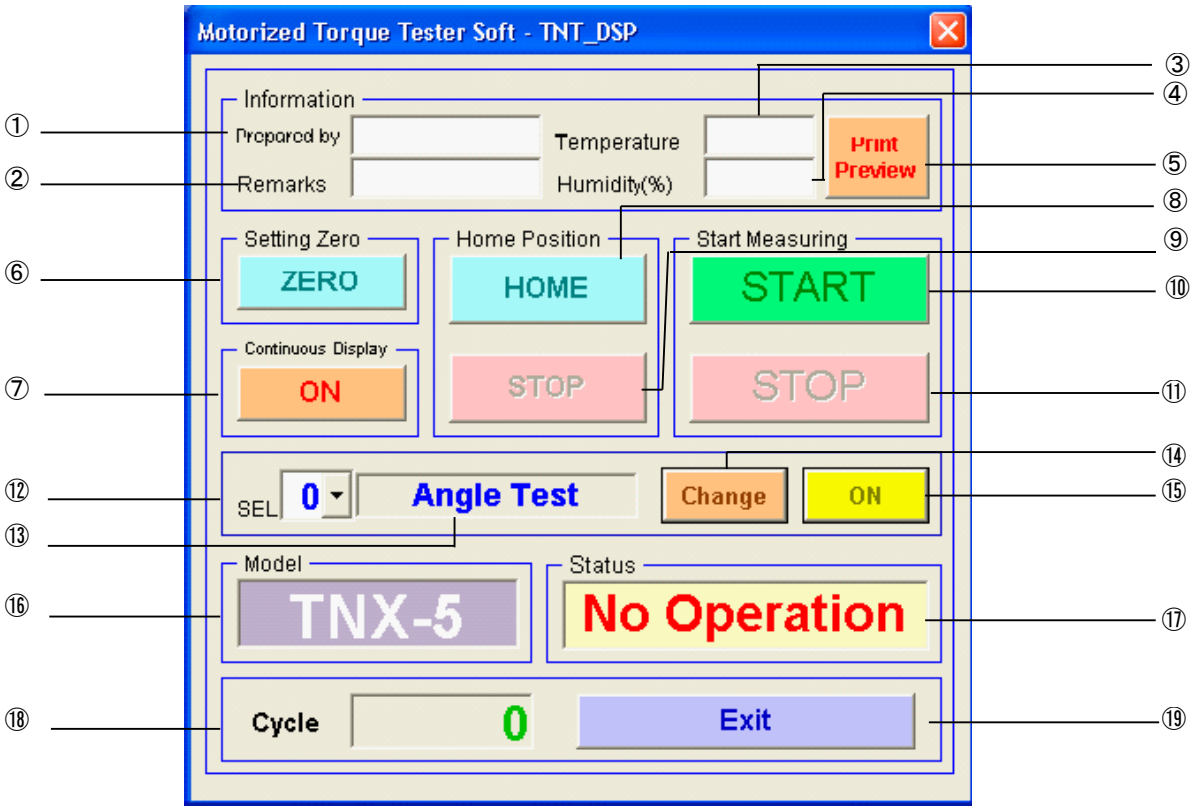
Close start setting menu, TNT_DSP finished.

Click "send" key following information appears if communication is singular.

Turn on DSP-10, then click send key again.	
When choose <communication port> that is different with that set in computer When computer is not connected with DSP-10	
Please confirm the connection between computer and USB data line of DSP-10. If connection is normal please confirm the environment of com port of the computer.	
TNX is not correctly connect with DSP-10	
Please turn off DSP-10 then connect with TNX. Confirm connect with TNX, then turn on DSP-10.	

4.2 Main menu

When communication is normal click send key in start setting menu, it a following main menu.



① Tester input box

When Test is over, the contents input is outputed in Excel(test graph). Input range: SBC case, DBC case, can input 35 words at most

② For reference input box

When Test is over, the contents input is outputed in Excel(test graph). Input range: SBC case, DBC case, can input 35 words at most.

③ Temperature input box

When Test is over, a value input is outputed in Excel(test graph). Input range: DBC English number, can input 12 words at most

④ Humidity input

When Test is over, a value input is outputed in Excel(test graph). Open print preview menu (refer to P13 print preview expression)

⑤ Print preview key

Carry out the setting of TNX if click indicate torque value of「 0 」.

⑥ ZERO key

⑦ Promptly express on key

Indicate promptly express menu of torque (refer to T4.6 promptly express of P14).

⑧ HOME start key

Start HOME action (refer to T4.4 HOME action of P13).

⑨ HOME stop key

Stop HOME action , only can click when DSP-10 in HOME action.

⑩ Test start key

Start Test action of DSP-10 load data of torque value to Excel.

⑪ Test stop key

Stop Test action of DSP-10 the action of DSP-10 stop .loading stop. Only can click when DSP in Test action.

⑫ Choose box of SEL number

Choose SEL number choose range: 0~9.

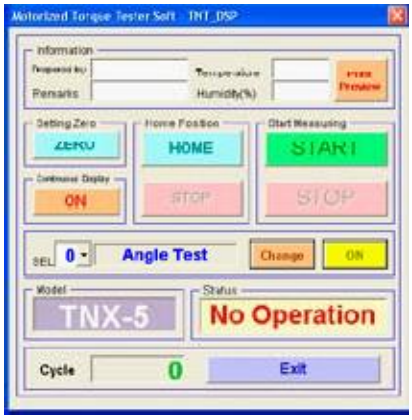
⑬ Expression box of Test kinds

Express Test kinds choose open change setting key setting. (refer to T4.3 setting change menu)

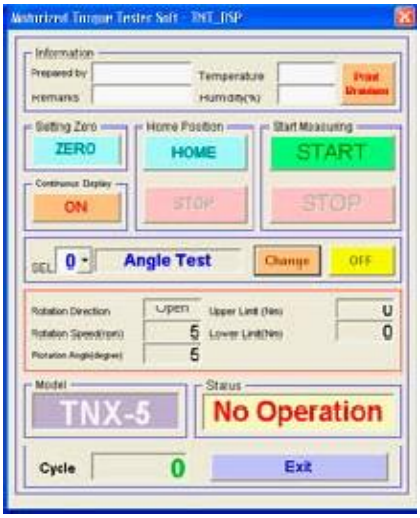
⑭ Change setting key

⑮ setting content expression key

If click it appears setting content of main Test in main click again return to initial state.



Not indicate setting content



Indicate setting content

⑯ Expression box of TNX type

Indicate TNX type connected with DSP-10.

⑰ Expression box of state

Indicate state now, as following shows.

No Operation	indicate「stop」
Measuring	indicate「testing」
Return to Home	indicate「Home action」

⑱ Expression box of numbers of Test occur

Indicate Test times continuously start reset to as TNT_DSP finished.

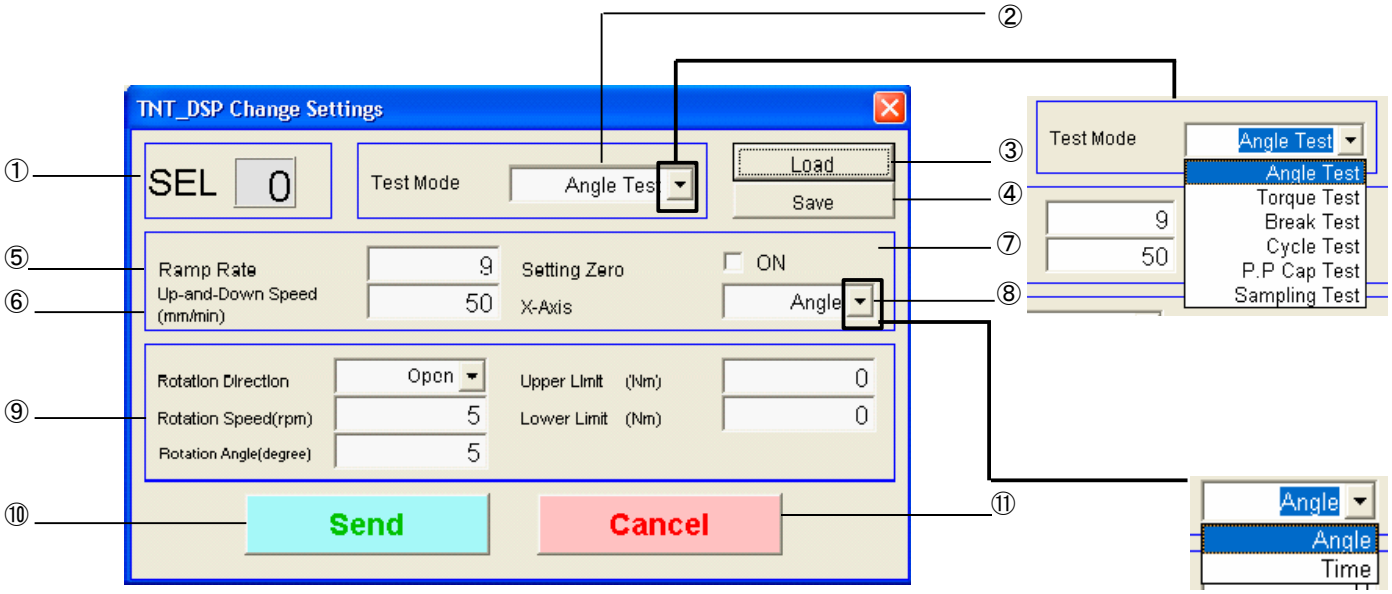
⑲ Over key of TNT_DSP

TNT_DSP is finished.(Please refer to <end of TNT_DSP> is P19)

4.3. Change Setting menu

4.3.1. Common setting item

You can set Test type, Test DSP-10 in set changing menu. Besides set maybe saved in computer in main menu it click "set change" key, it will indicate set changing menu and main face. After setting is over, click "send" key. Set the content will be sent to DSP-10 then ret main menu.



① Expression box of SEL number

Indicate SEL number choose in main menu

② Test kinds: choose box

Choose kinds of Test Choose from <Angle Test> <Torque Test><Break Test>

③ Set load key

Load setting contents of Test action from any CSV file center

④ Set save key

Input rate of arrive time that when chunk starts cycling to

⑤ Set add up/slow down speed input box. (refer to P10)

Input range DBC number: 01~9 can input until under 1 step of.

⑥ Up/down speed (mm/min) input box

Input lift speed of instrument part when DSP-10 is in auto made.

Input range DBC number 10~600 integer,

⑦ZERO set

Choose whether to operate O setting when operation is start Choose examine in examine box when operating 0 setting.

⑧Choosing box of graph abscissa

Choose abscissa data from <angle><time> when graph is finished.

⑨ Setting items of various test

Set settle items of various Test [refer to 6 action of varou Test in P21].

⑩"send" key

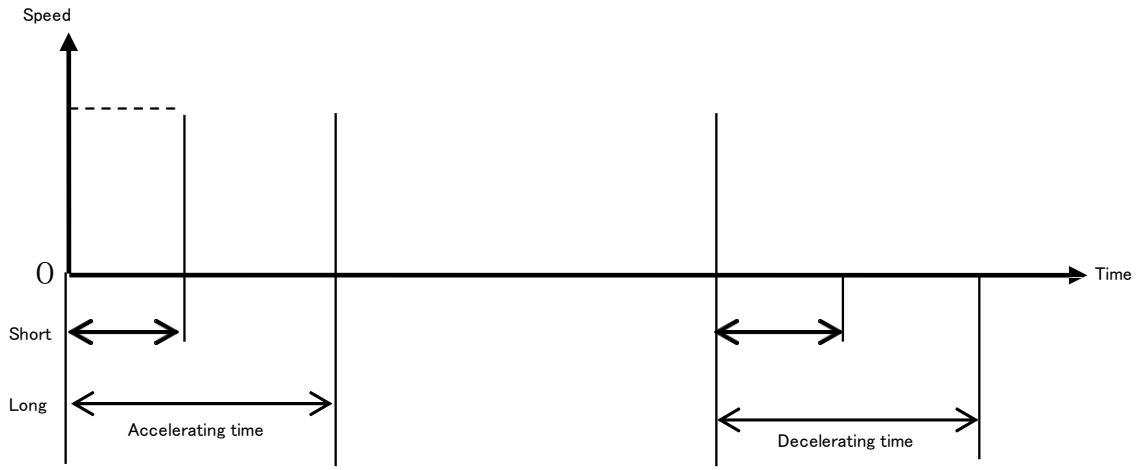
Send the content changed to DSP-10, then return to main menu.

⑪ "cancel" key

Not indicate the setting content changed, then return to main menu.

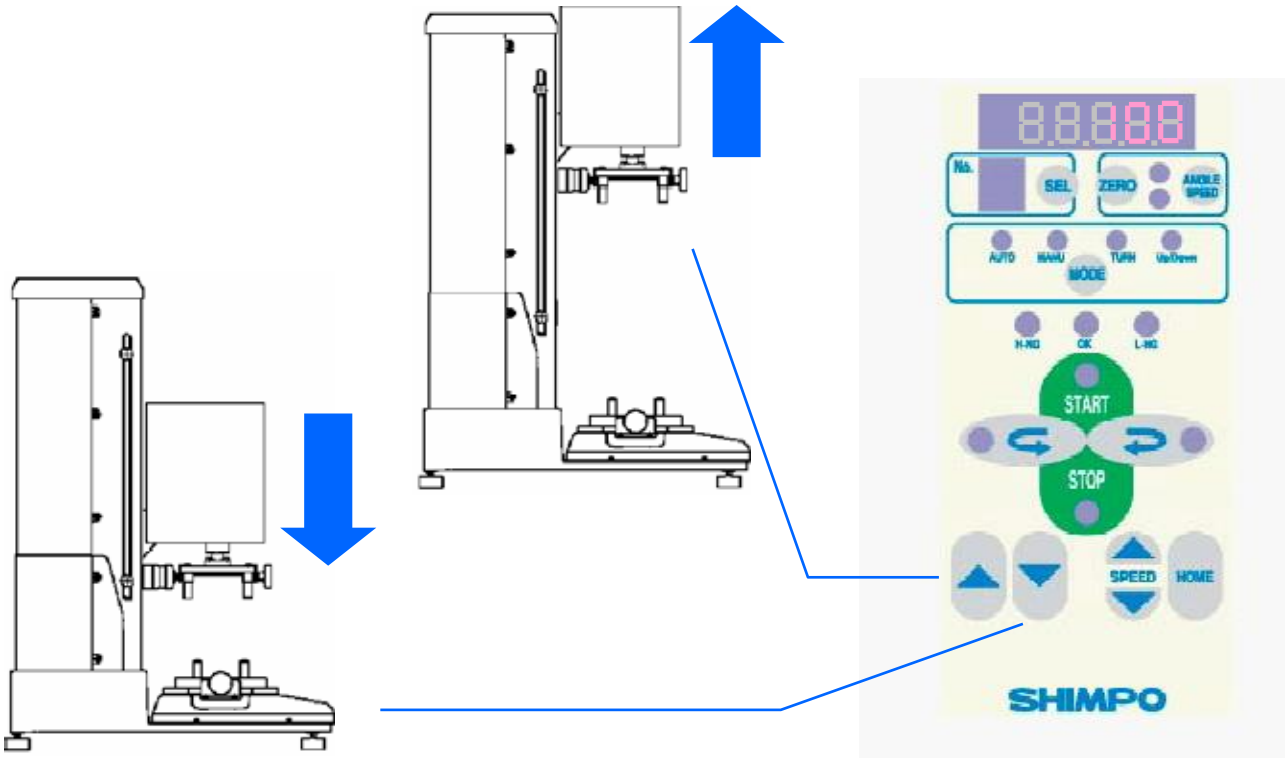
- About setting of speedup and slowdown

In setting of speedup and slowdown you can input rate of arrival time that from chuck st1 cycle to sp in of speedup space and slowdown space become bigger, so does the determinant value of speedup in opposite the determinant value becomes smaller so does the speedup and slowdown.



・About lift speed

Lift speed of mainframe when deter minatory auto mode lift speed inputted here will become the speed of lift action in auto mode. When in auto mode, please press operating switchboard ↑ or ↓ a key, the direction will up/down. The software can't set speed in case of lift action beyond auto mode. About detail please refer to torque stand DSP-10 operation manual> in continuation.

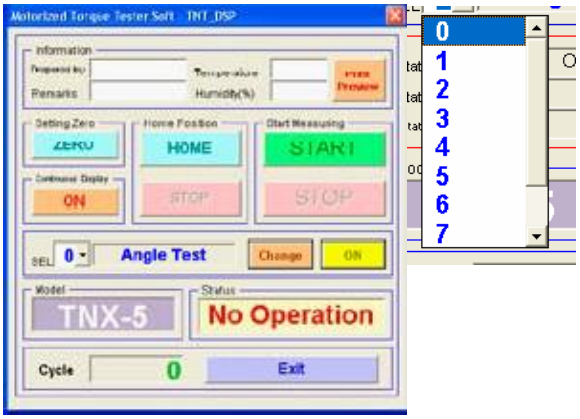


4.3.2 Set and save

save setted content of Test action in CSV file when operating TNT_DSP, then you can load next time.

(1) Save in SEL number (choose number)

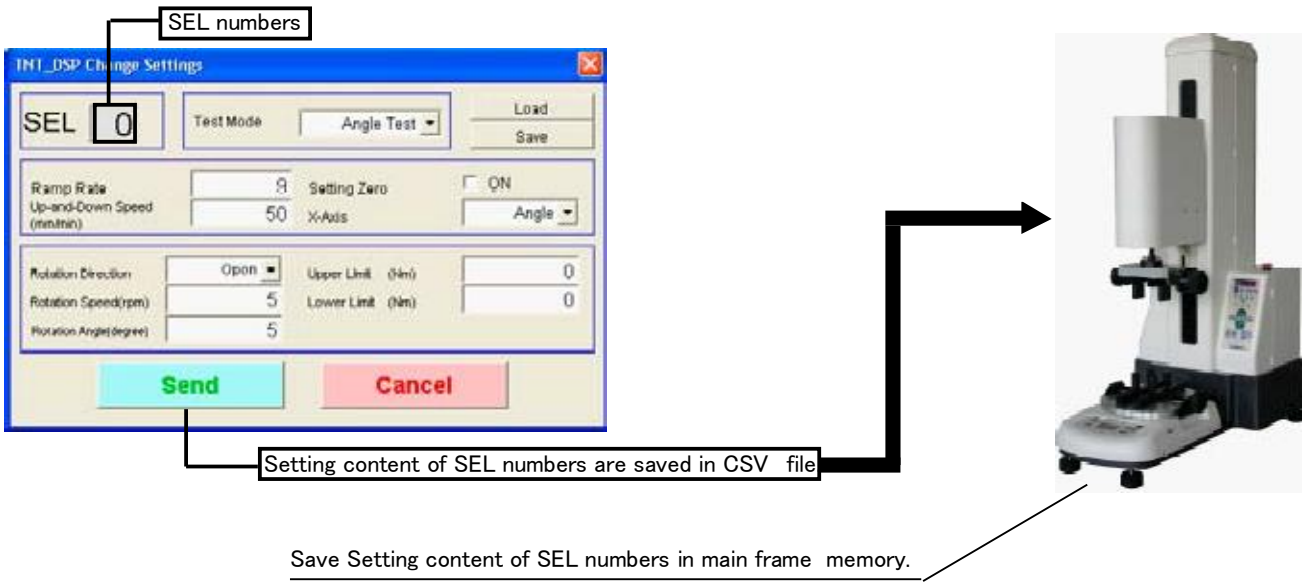
Setting contents of Tested action can saved in sel number (0~9),according to this 10 numbers. If choose SEL number in main menu, it can load setted content saved in SEL number automatically.



SEL No.	Content of Test	Accelerating time	Up and down speed	- -
0	Torque Test	9	10	- -
1	Angle Test	9	600	- -
2	Angle Test	0.5	50	- -
3	Torque Test	0.5	100	- -
4	PP Cap Test	3	10	- -
5	PP Cap Test	2	600	- -
6	PP Cap Test	1	200	- -
7	-	-	-	- -
8	-	-	-	- -
9	-	-	-	- -

Save a setting cintent per SEL number.

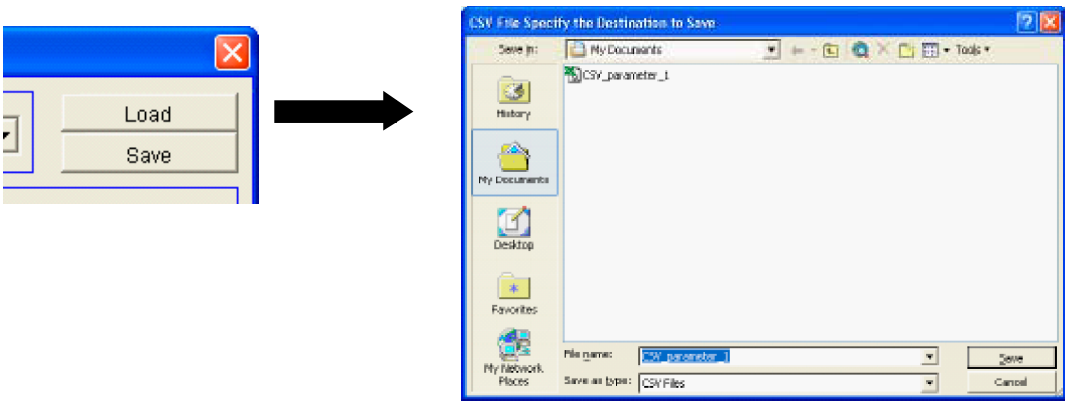
Click "send" key in set changing menu, then it can save setting content automatically. The Setting content is saved in CSV file, and also saved by SEL numbers, so you can still operate the Test even in case of not connected with computer.



Please don't change SEL number in operation switchboard of DSP-10 mainframe when operationg TNT_DSP. Besides, you can`t save DSP-10 of initial state in experiment setting. If operating DSP-10 soldy, please do set experiment in our software first, then operate.

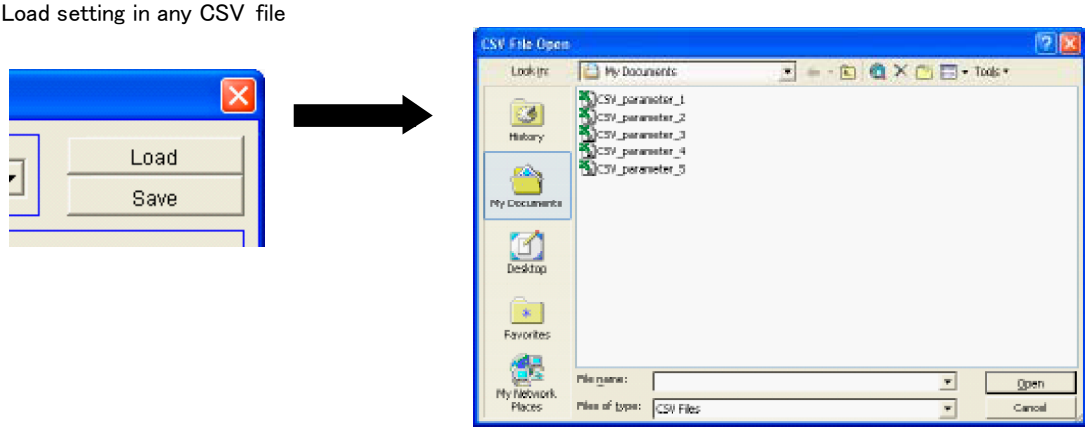
(2) Save setting in any CSV file

It's different with the set and save function of SEL numbers, you can save setting content in any CSV file.



If click [set and save] in set changing menu, it will appear [appoint keeper for CSV file] box, Then in case of saving setting content, please click [save] key to determinate the keeper and file name of CSV file. Initial value of file name is [CSV_parameter_1].

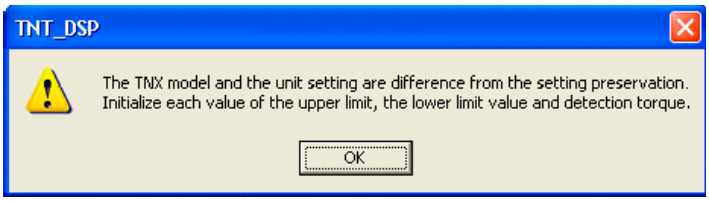
(3) Load setting in any CSV file



Click [set and load] key in set changing menu, it will appear [CSV file choose] box. In condition of loading setting content, please confirm the name of CSV file you want load, then click [open] key. Besides, you can only load CSV file made by ,can't load other CSV file.

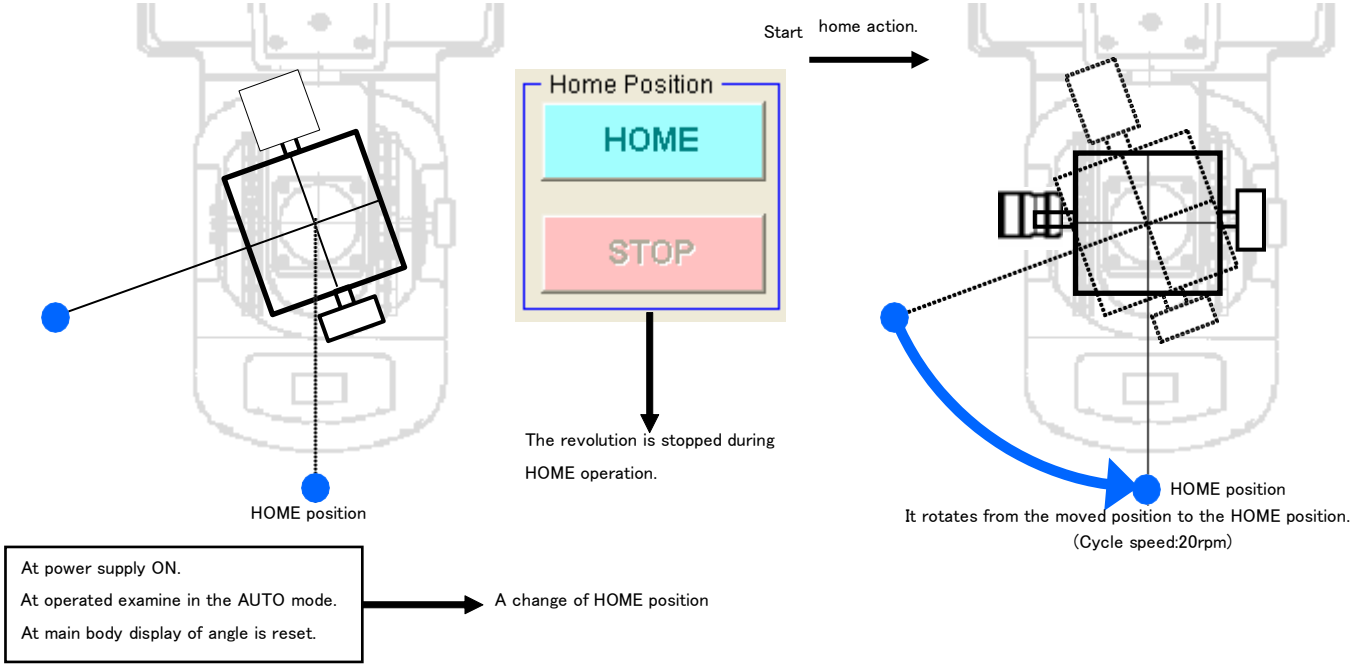
- About unit of TNX

Each value of upper/lower limit determination and torque tested out and so on, part of them are of different input ranges according the kinds and units of TNX. If the content is different with that saved by instrument kinds and units, it may indicate following information to avoid wrong accurs according to the input range. Resert each determinate upper/lower limit value and torque tested out to "0".



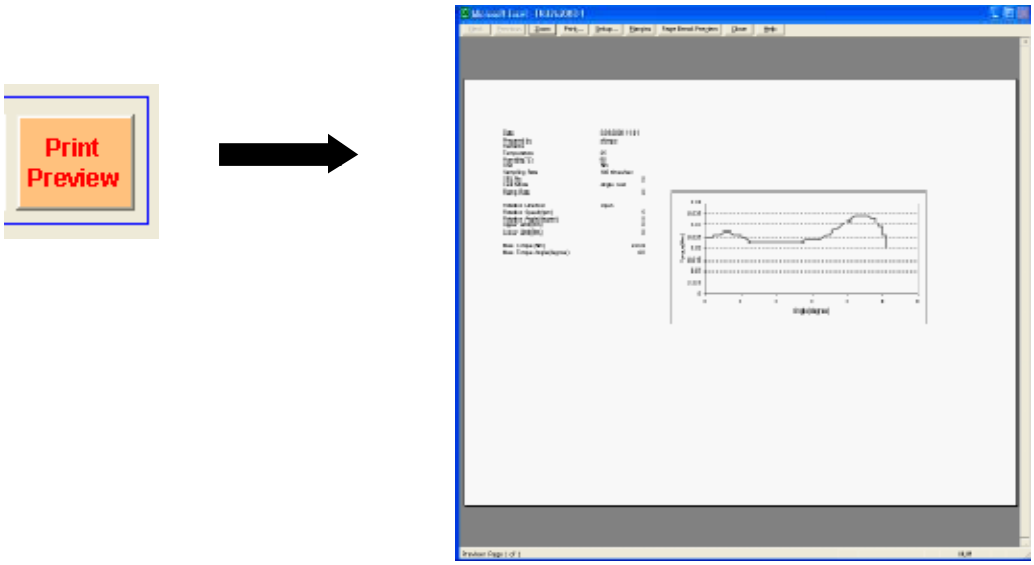
4.4 Home Action

Home action is aimed at returning to initial angle (HOME Location).HOME Location is determined by when DSP-10 is turn on, when Test starts in AUTO made or according to when ZERO key of operation switchboard express angle reset. For example, click HOME key, make the chuck return to HOME location from current location, then stop.



4.5. Print preview function

Click [Print preview] key in main menu, it appears print preview menu of metrical graph. Range of print is setted automatically. Print Test conditions。「graphs。「statistical results with A4 paper. Click [print] key in print preview menu, then print. Close print preview menu and return to main menu.



※ Click [Print preview] key, then it can set print range automatically. Though in some conditions you can't choose proper print range, according to the environment and purpose of operation. Under above conditions, please set print range for print setting function of Excel after the software is closed.

※ In case of imperfect environment, you can't indicate print preview menu, print neither. So please operate TNT_DSP when print is possible.

4.6 Mode of Real-time torque expression

In expression mode of Real_time torque, torque relevant to the inductor of DSP-10 can be indicated in computer in time. In main menu, it will appear Real_time torque expression menu when click [expression on] key of [Real_time expression].You can't use other function while Real_time torque is expressing. Click return to return main menu.

Real_time torque expression box.
Indicated torque relevanted to TNX with Real_time.

Return key.
Return to main menu.

In mode of Real_time torque expression, the update cycle 100t/s is different with that 8t/s in TNX(when DSP-10 is connecting),so there is diversity between expression torque value of mode of Real_time torque expression and that of TNX. Please understand. Besides, it can't indicate Max value in mode of Real_time torque, even the TNX is the state of keeping Max capability(open/close mode).

5. Manufacturing of Test action

5.1. Start Test

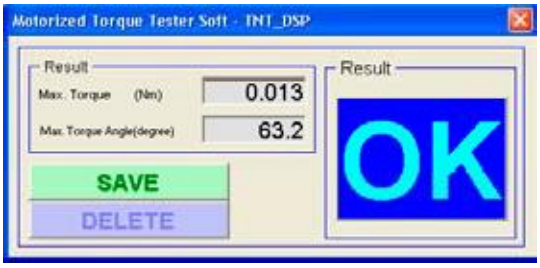
- Input each item in main menu, then click [start] key to start DSP-10 operation.
- It can operate Max power of TNX when the Test is start.
- When introducing data, it will form new format each Test, and record data in it.
- Click "finish" key to stop Test in DSP-10 operation, so as to stop testing in this phase.

5.2. In Test

- Introducing test data into computer from DSP-10 when in Test. Interval of introduced data is according to [introduce cycle] setted in [start menu] of P6 4.1.But it can't indicate correct cycle as there is diversity exsits in introduce cycle.
- Number of introducing data and graph is 32000 for each series. Can't introduce more.
- Forbidd shuting the connection between DSP-10 TNX and computer, turning ON/OFF TNX when in Test.

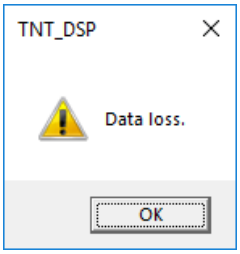
5.3. Test is finished

Click [stop] key to end the test, then it will indicate test result menu. One time Test is over. In test result menu, it will indicate Max torque and its upper/lower limit determinant result of the Test just finished. About detailed content, please refer to [6.Tests] of P21.



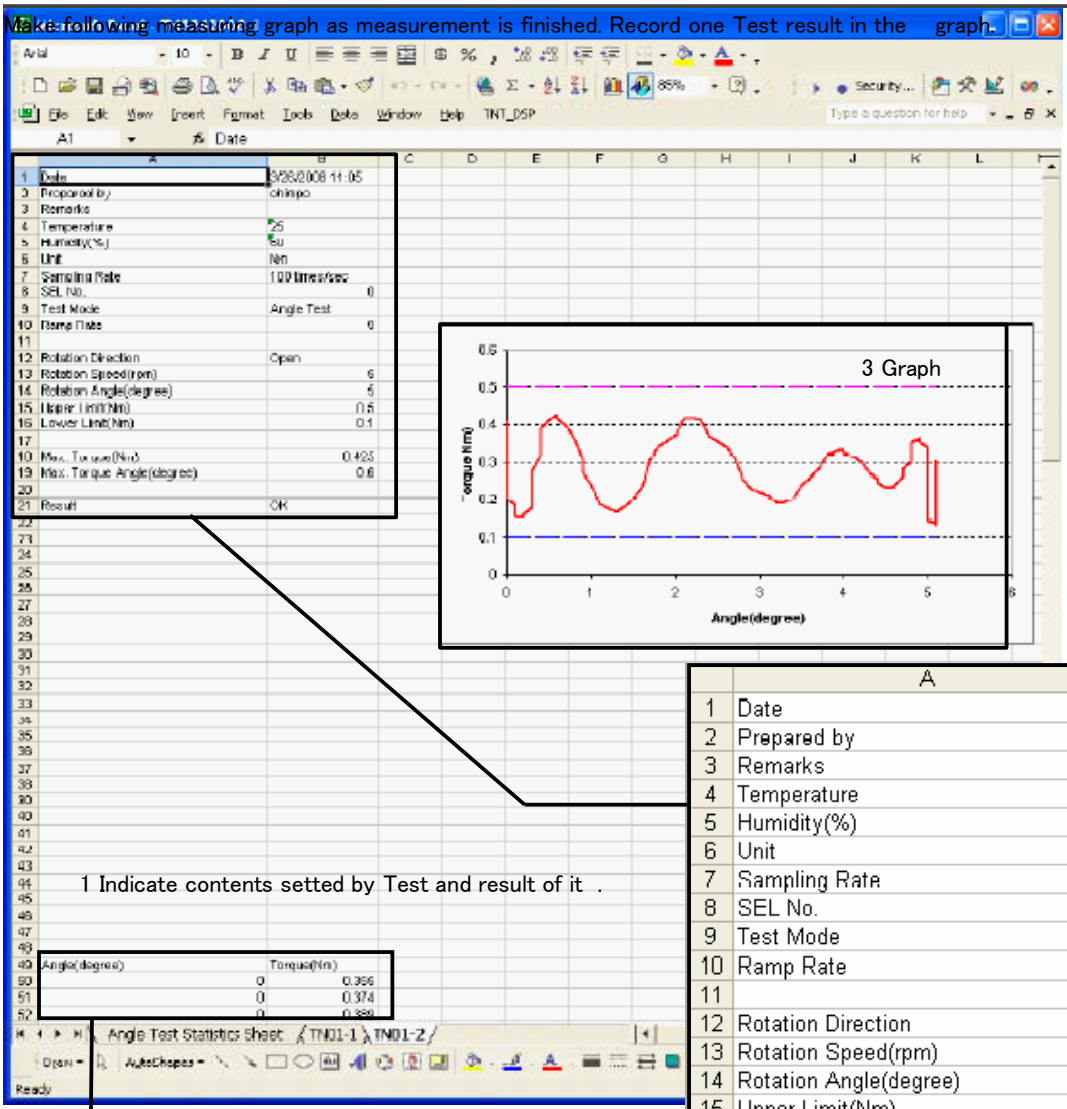
It will return to main menu when click [save], [delete] in any case in test result menu. Click [save] when the metrical graph is ON, then metrical graph just finished is saved. The Max torque value is added to statistical graph. (Please refer to [5.5 statistical graph of page 18]). Click [save] when the metrical graph is OFF, then metrical graph just finished is saved. The Max torque value is added to statistical graph. Statistical graph is abolished. Whether when statistical graph is ON or OFF, it will be abolished without add Max value into it as click [delete] key. Return to main menu, you can go on next test.

When indicating test result menu, if following picture appears ,that maybe the capability or environment of the computer is not suitable for operating our software .Please reduce the set of [load cycle] in initial setting menu, or you have to use another computer. Do the experiment without appearence of following picture.



5.4. Measuring Sheet

Make following measuring graph as measurement is finished. Record one Test result in the graph.



	A	B
1	Date	3/26/2008 11:05
2	Prepared by	shimpo
3	Remarks	
4	Temperature	25
5	Humidity(%)	60
6	Unit	Nm
7	Sampling Rate	100 times/sec
8	SEL No.	0
9	Test Mode	Angle Test
10	Ramp Rate	9
11		
12	Rotation Direction	Open
13	Rotation Speed(rpm)	5
14	Rotation Angle(degree)	5
15	Upper Limit(Nm)	0.5
16	Lower Limit(Nm)	0.1
17		
18	Max. Torque(Nm)	0.425
19	Max. Torque Angle(degree)	0.6
20		
21	Result	OK
22		

2 Angle(time);torque data

49	Angle(degree)	Torque(Nm)
50	0	0.355
51	0	0.374
52	0	0.389
53	0	0.406
54	0	0.407
55	0	0.403

49	Time(sec)	Torque(Nm)
50	0	0.355
51	0.01	0.374
52	0.02	0.389
53	0.03	0.406
54	0.04	0.407
55	0.05	0.403
56	0.06	0.382
57	0.07	0.365
58	0.08	0.346
59	0.09	0.3
60	0.1	0.275

(1) Set Test content, indicate Test result

Indicate date of Test, setting items of Tests and its setting upper/lower limit determination by excel. Moreover, input max when Test is over and angle(time) of max torque ,result of upper/lower limit determination value. (upper limit value ≠ 0 and lower vimit value ≠ 0)About contents indicated , please refer to setting items of each Test ,

(2) Angle (time), torque data.

Indicate inputting data and input torque data into right line, Input angle data when choose [angle] of [graph x axes] in set charging menu. Input time data into left line when choose[time].

(3) Graph

Make graph according to data input. X Y axes value indicate torque x axes value indicates angle data when choose [angle] of [graph x axes] in set changing menu, while indicates time when choose [time].

(4)Measuring graph indication

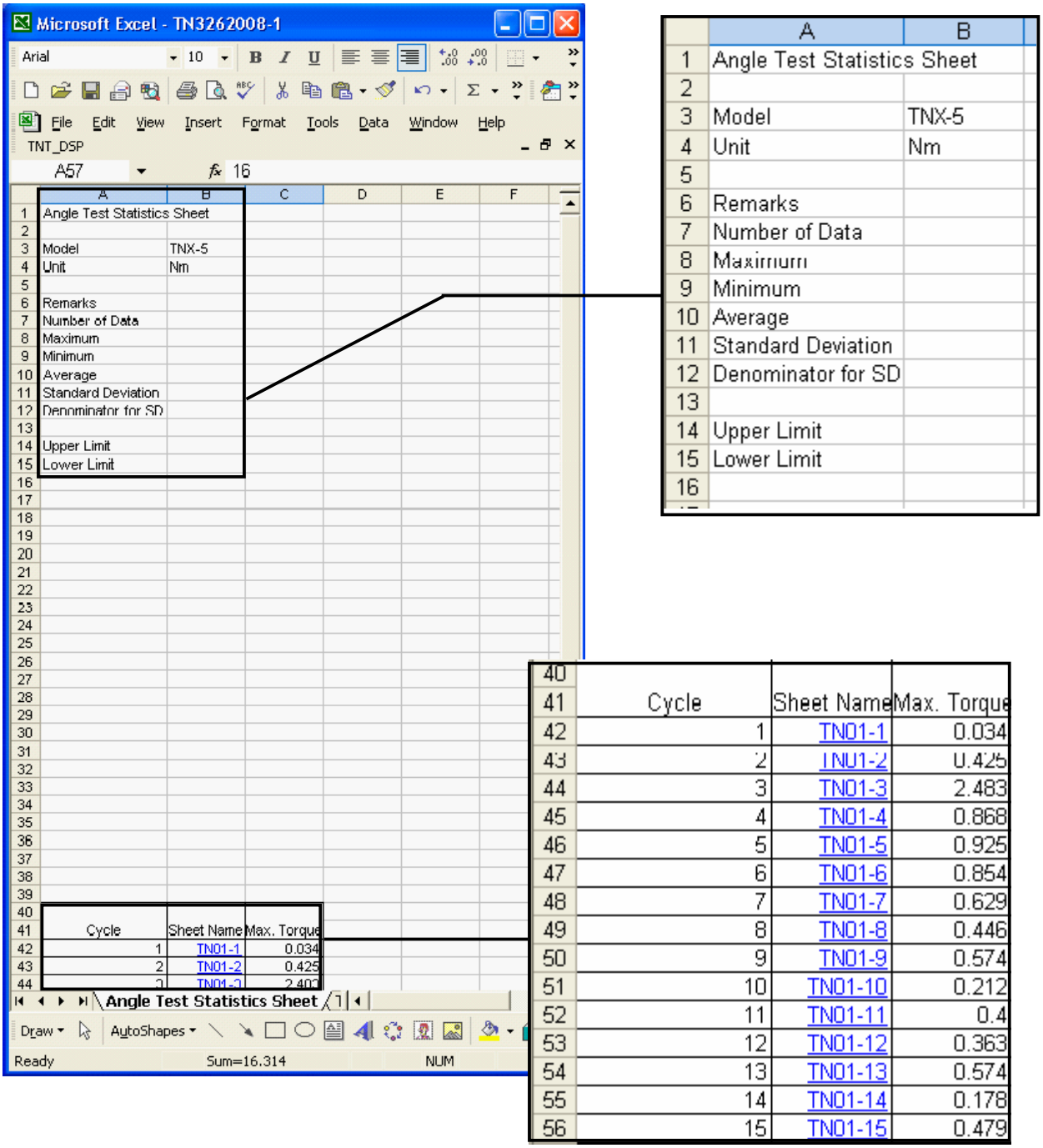
Indicate measuring graph that have been made. Finish of new graph in each Test, As following shows: Name of the graph is defined automatically as it is finished.

Test kinds	Name of graph
Angle Test	TNO1_
Torque Test	TNO2_
Break Test	TNO3_
Cycle Test	TNO4_
PP Cap Test	TNO5_
Sampling Test	TNO6_

※ You can make at most 255 measuring graphs in a file. There maybe freezing excel according to the numbers of data input and the emvironment of operateing the computer.

5.5. Statistical Sheet

When Test in file for the first time, you can make Statistical graphs coordinate with Test line by line in the Statistical graph. Besides, it is possible to input the frequency distribution graph of the max torque in Statistical graph please refer to [7.frequency distribution graph making function] of P50.



(1) Statistical graph, Statistical indication box

Indicating items input in Statistical graphshen the requency distribution graph is finished. Can only indicate the name of item, can't input content when the graph is finished.

(2) Statistical graph. Indication box of max torque

Indicate max value of torque input every Test. After one Test is over, it'll add one line max value of torque automatically shile click[save] key in testing result menu.[name of graph] box indicates the name of the graph that accorded to the max torque. You can click the name to move it to the according Statistical graph. If choose [save] when the graph is OFF, it will destroy the graph and can't indicate the name of the graph.

Indicate max value of each measuring graph in [max torque]. When in Break Test, the graph record [damage torque] instead of [max torque]

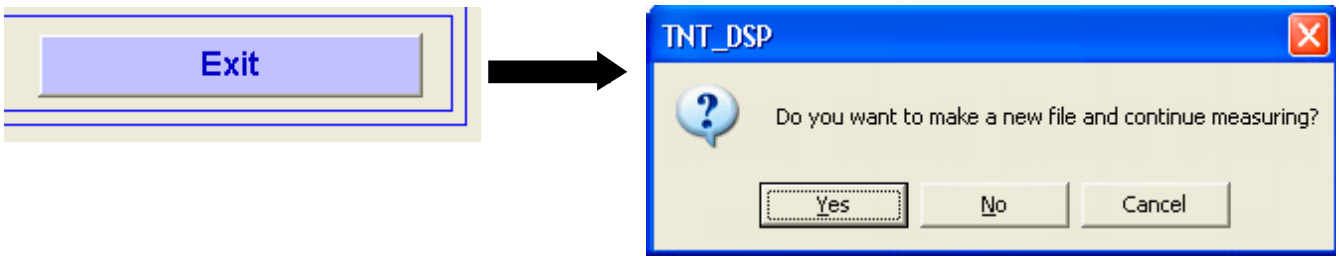
(3) Statistical graphindication

Indicate Statistical graph that is finished. Every kind of Test has its Statistical graph for each file .As following shows, the name of the Statistical graph is defined automatically as it is finished.

Test kinds	Name of statistical graph
Angle Test	Angle Test Statistics Sheet
Torque Test	Torque Test Statistics Sheet
Break Test	Break Test Statistics Sheet
Cycle Test	Cycle Test Statistics Sheet
PP Cap Test	P.P Cap Test Statistics Sheet
Sampling Test	Sampling Test Statistics Sheet

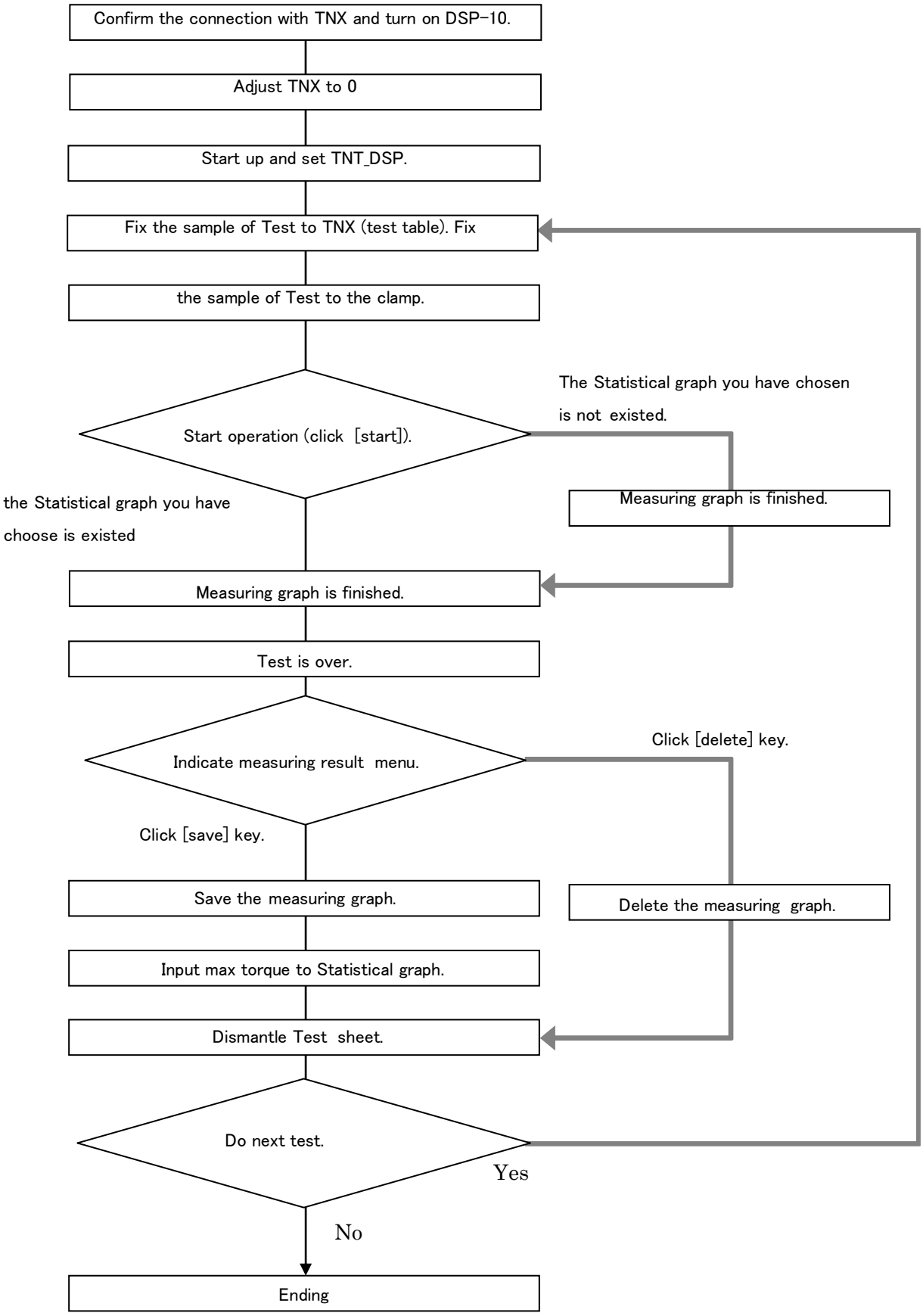
5.6. End of [TNT_DSP]

Click [end TNT_DSP] key in main menu, it will appear dialogue box above, then choose [Yes (Y) to save, end the file that is in use , and open a new file. Go on measure according to [TNT_DSP]. Choose [N(N) to save ,then end the file that is in use and TNT_DSP. TNT_DSP will end through press "close" key to close the main menu, but without saving the file.



5.7. Flow chart of Test

Please operate Tests according to the flow chart below.



6. Action of Tests

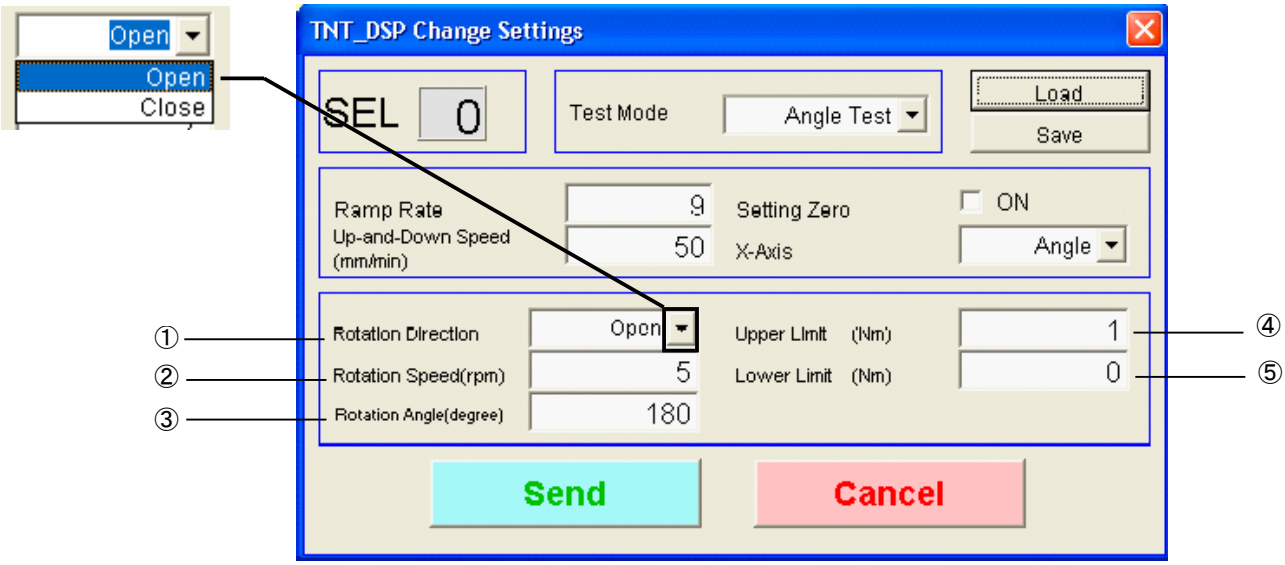
6.1. Angle Test

① Action Summary

Angle Test is only aimed at turning around the chuck for setting angle. Doing cycle Test until it reachen the setting angle, then record measuring torque and angle or past time.

② Set changing menu Action setting

It is necessary to set following items when in Angle Test.



① Cycle direction:

Chuck detemine cycle direction when in Test. open:

circumvolve widdershins.

close: circumvolve deasil.

② Cycle speed:

Cycle speed of chuck when inputting Test action. Input range, 0.1~25,reserve one number beside decimal point.

③ Cycle angle:

Test action is over, then input angle. Input range: Integer 5~1440.

④ Upper limit value:

Input upper limit value of max torque determination.

Input range: 0~upper limit torque, reserve 3 numbers behind decimal point

⑤ Lower limit value:

Input lower limit value of max torque (when max) determination.

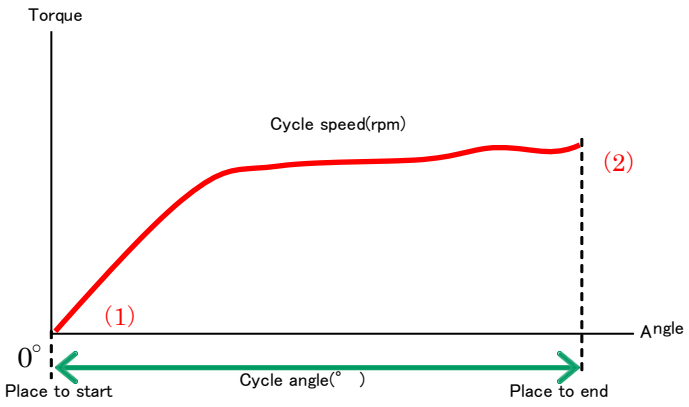
Input range:0~lower limit torque, reserve 3 number behind decimal point(when min).

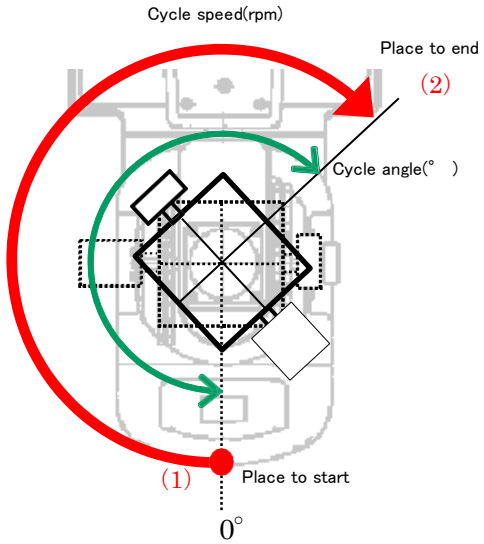
③ Angle Test Contents of Test action. the name of the Statistical graph is defined automatically as it is finished.
When proceeding Angle Test, it make the chuck return to setting cycle angle, then end the Test.

- Angle Test, Test action

(1) The location of chuck is the place to start when the Test is begin, then circumvolve towards the cycle direction (open, close).

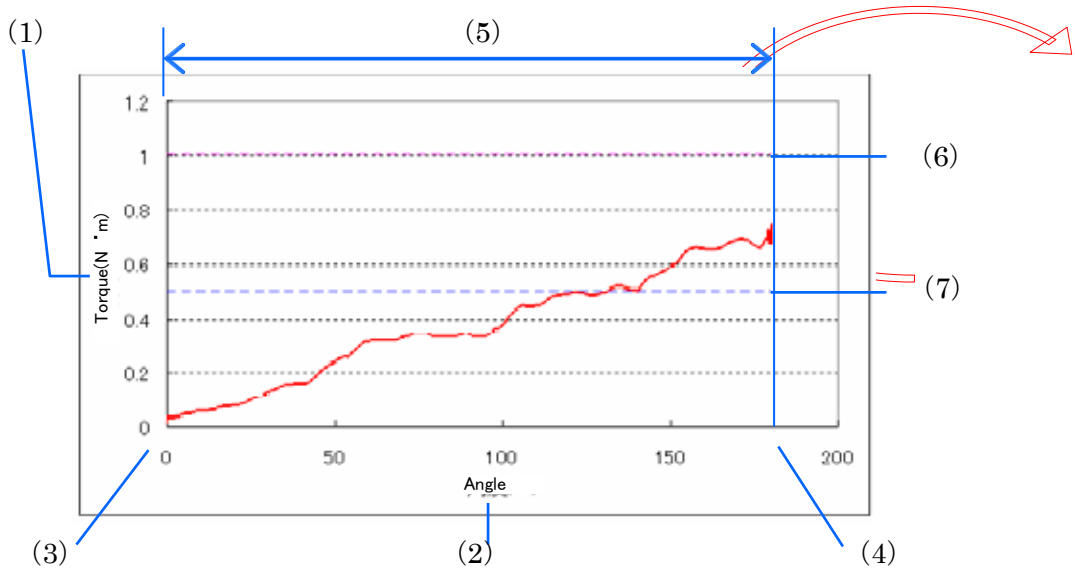
(2) Thtough[cycle angle(rpm),only return to setted cycle angle(o)]then end the experiment action.





③ Graph

Make following graph in measuring graph when in Angle Test.



(1)Y axes: Torque value inputted in Excel is Y axes, until of which is the same as TNX setting.

(2)X axes: Set moving angle as Y axes when X axes is setted as angle. Set past time as Y axes when X axes is setted as time

(3)Place to start: Angle of chuck begins cycling, Start angle from 0.

(4)Place to end: Angle of chuck begins cycling, Return to setted cycle angle, then end.

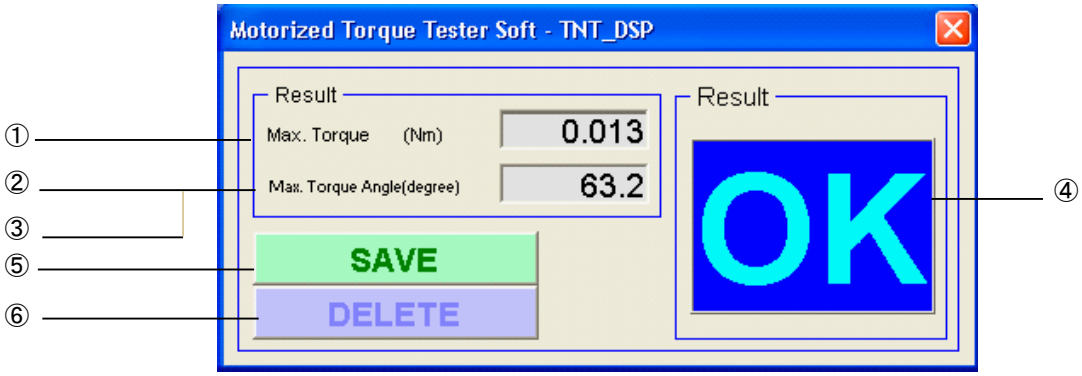
(5)Measuring area: Angle range of starting cycle ~ ending cycle, Indicate that with red graph.

(6)Upper limit value: When determinant upper limit value≠0,indicate determinant upper limit value with pink clashed.

(7)Lower limit value: when determinant lower limit value≠0,indicate determinant lower limit value with blue dashed.

⑤ measuring result menu indication content.

Indicate following test result menu as the Test is over.



① Max torque(Nm or Ncm) : Indicate max value of torque in one Test .

②Max torque angle(°):Indicate angle value of torque when x axes is setted as angle.

③ Max torque time (sec): Indicate past time of torque when x axes is seetted as time.

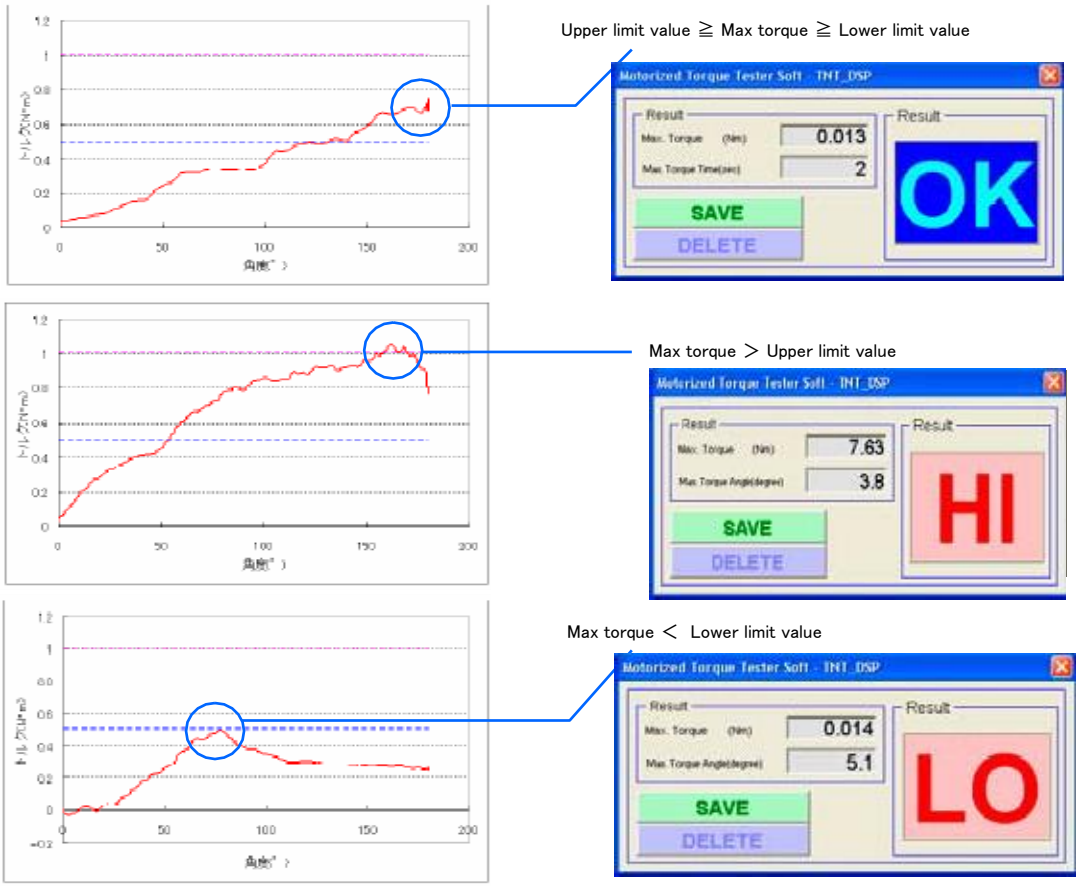
④ Determinant result: indicate determinant result of max torque (no indication when determinant upper limit value =determinant lower limit value=0).

⑤ Save result save contents of measuring result, then input max torque data into [statistical graph of Angle Test] Refer to [5.5 statistical sheet] of P19.

⑥ Cancel key.

- Determinant result determinant standard

Determinant result indicated in measuring result menu is determined according to following determinant standard.



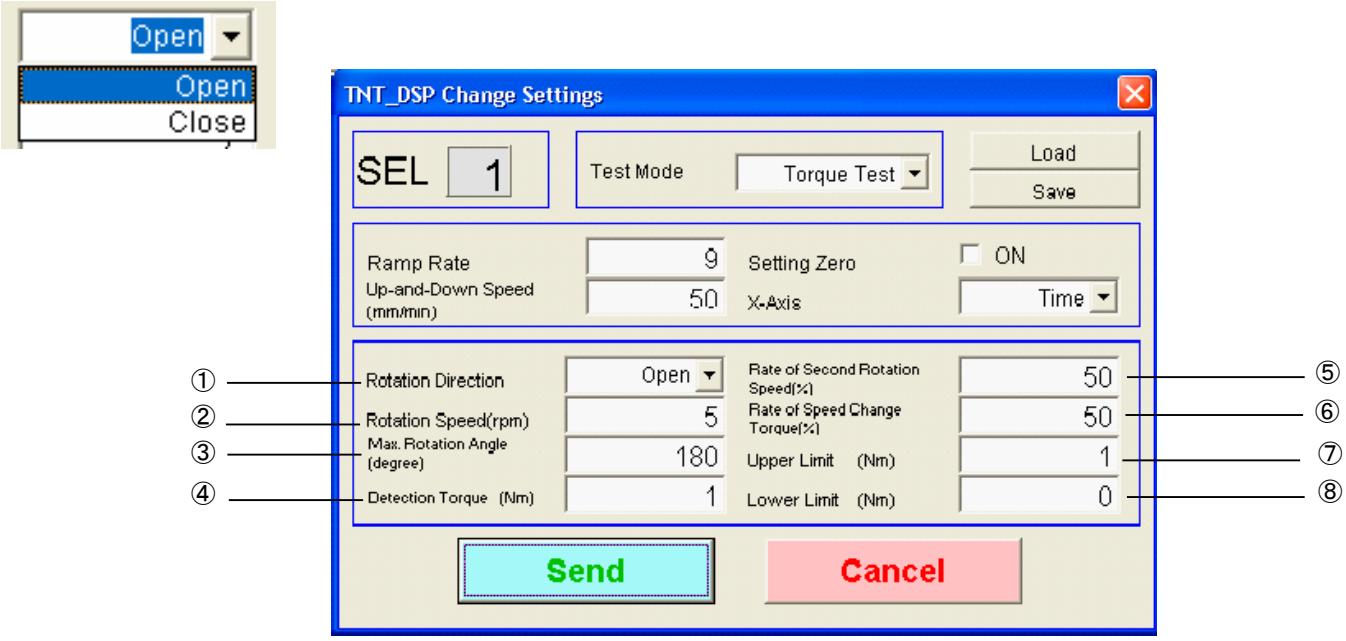
6.2. Torque Test

① Action sunrmary.

Torque Test is a Test that make it return tiu to setting Torque that tested out. Operating cycle Test until test out setting torque value, then record testing torque value and the angle. past time.

② Set changing ment.action setting.

It's necossary to set following items while in Torque Test.



① Cycle direction: Determinate cycle direction of chuck when in Test.

Open: circumvoluewiddershins. Close: circumvolue deasil.

② Cycle speed: Cycle speed of chuck when inputting Test action.

Input range: 0.1 ~ 25.reserve one number behind decimal point.

③ Max Rotation angle: Input angle of Test action is over when it can't test out torque.

Input range: integer 5~1440.

④ Test out torque (N.M or n.cm): Input range: 1% of rated torque value ~ rated torque value, reserve 3

⑤ Second cycle speed rate (%): Set the speed after test out speed shift torque according to the rate of cycle speed.

Input range: integer 10 ~ 90.

⑥ Torque rate (%) of speed shift: Set torque value for speed shift according to the rate of torque tested ort.

Input range: integer 10~100.

⑦ Upper limit value (Nm or Ncm): Input Upper limit value for determine max torque.

Input range 0 ~ rated tprque value, reserve 3 numbers behind decimal point (when max)

⑧ Lower limit value (Nm or Ncm): Input Lower limit value for determine max torque.

Input range 0 ~ rated tprque value, reserve 3 numbers behind decimal point (when max)

③ Torque Test action content.

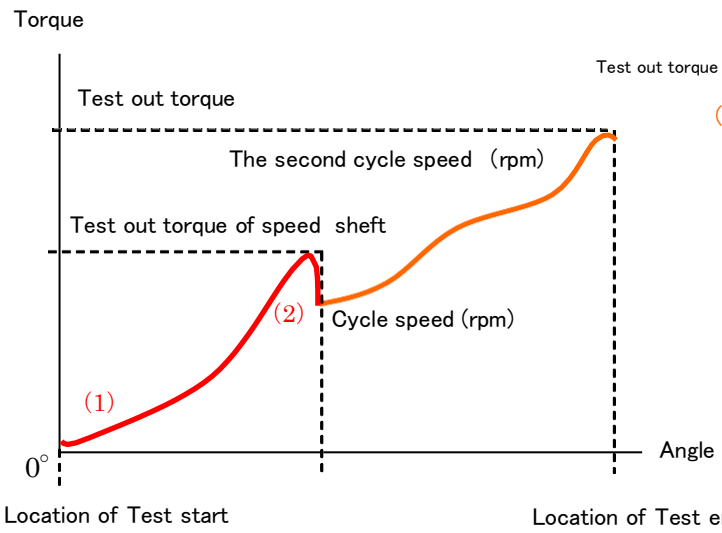
When in Torque Test, you can stop the action by testing out the setling torque value. besides, you can decrease the cycle speed in xeperiment to reduce error during torque testing.

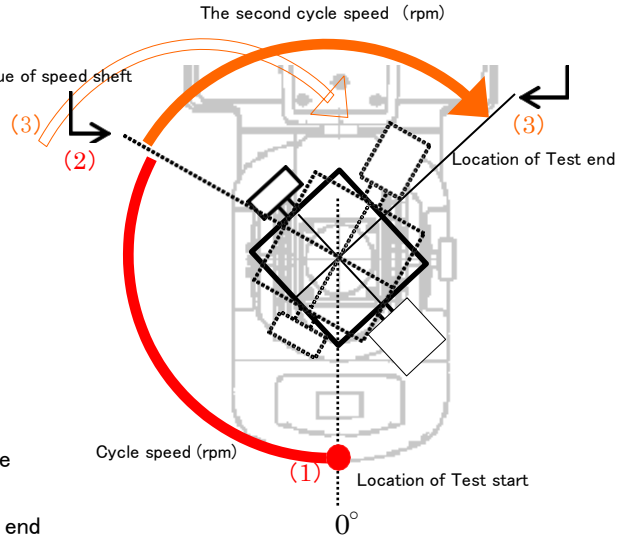
- Torque Test Test action.

(1)Towards cycle direction(close, open) chosen and cycle speed to start cycle, until test out torque of speed shift.

(2)Turn cycle speed to the specond cycle speed if test out torque of speed shift

(3)The Test ends as test out test out torque.





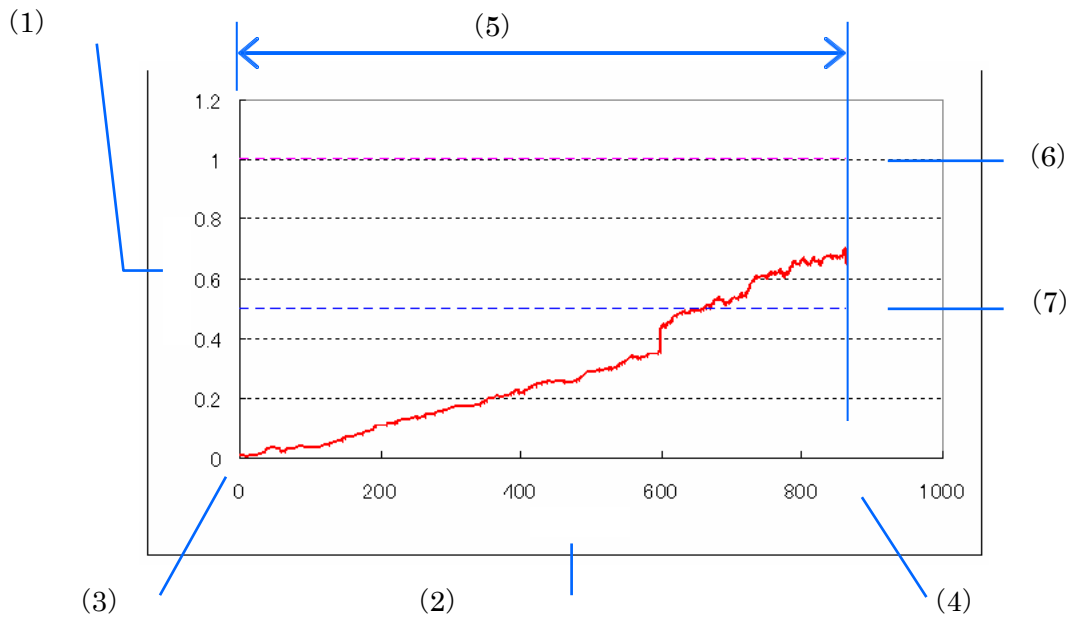
※ Torque of speed sheft=test out torque × torque rate of speed shift (%)/100.

※ The second cycle speed=cycle speed (rpm) × rate of the second cycle speed(%)/100

no shift when torque rate of speed shift is 100(%)

④ Graph.

Making following graph in measuring graph while in Torque Test.



(1)Y axes: Torque value input in enel is Y axes, unit of which is the same as TNX setting.[N m]

(2)X axes: Set moving angle as Y axes when X axes is setted as angle.

Set past time as Y axes when x axes is setted as time.

(3)Angle of Test start: Angle of chuck begins cycling start angle from 0.

(4)Location of Test stop: Angle when chuck stops cycling. return to test torque tested ort or max cycle angle.

(5)Measuring area: Place for starting cycle rang of stop cycling, indicate with red graph.

(6)Upper limit value: When Upper limit value≠0, indicate upper limit value with pink dashed.

(7)Lower limit value: When Lower limit value≠0, indicate lower limit value with blue dashed.

④ Measuring result menu indication content.

About content in measuring result menu. it is the same as in Angle Test.

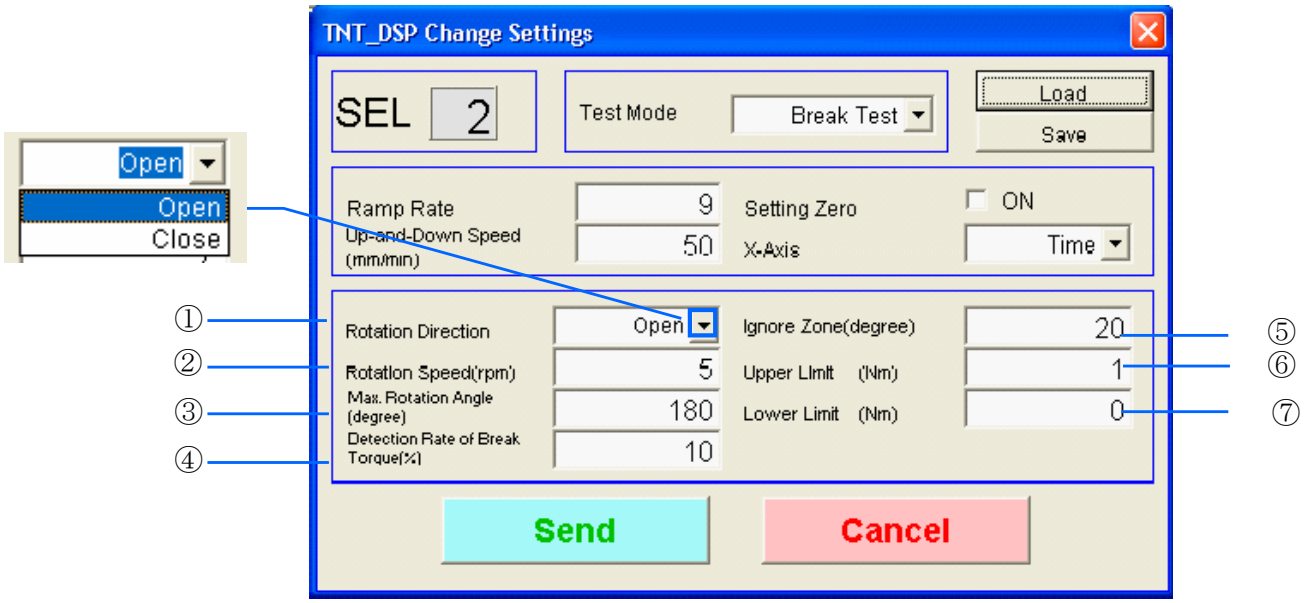
6.3. Break Test

① Action summary.

Break Test is aimed at testing out the damage torque of sample. doing cycle Test until test out damage torque value, then record torque value, angle or past time tested out. while Real_time torque is expressing. Click return to return main menu.

② Set changing men. action setting.

It's necessary to set following items in Break Test.



① Rotation direction: Determinate cycle direction of chuck when in Test Open:

circumvolve widdershins.

Close: cirumvolve deasic.

② Rotation speed(rpm): Rotation speed of chuck when inputting test action.

Input range:0.1~25,reserve one number behind decimal point.

③ Max Rotation argle: When it can't test out Torque damaged input over argle of test action.

Input range: integer 5~1440.

④ Detection Rate of Break(%): Input torque decreasing rate of damage of Test sample.

Input range: 10~10 integer of torque angle.

⑤ Ignore Zone: Set area between start point of Test and

place con't test out Break Torque.

Input range: integer 0~90

⑥ Upper limit value: Input upper limit value for determining max torque.

Input range: 0~upper limit torque, reserve 3 number behind decimal point (when max).

⑦ Lower limit value: Input lower limit value for determining max torque.

Input range: 0~lower limit torque, reserve 3 numbers behind decimal point(when max).

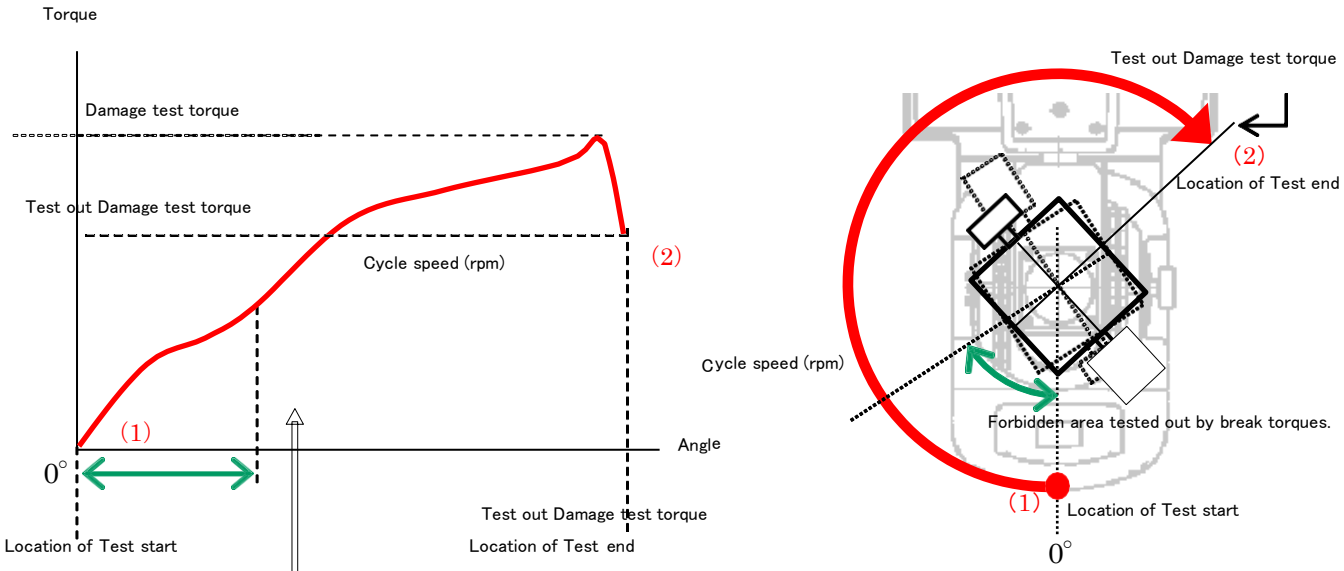
③ Break Test action content.

During Break Test,through test out damage stop action of sample.

- Break Test action contents.

(1)Towaurds cycle direction chosen (open,close).

(2)If test out damage test torque beyond range to start cycle with cycle speed of setting angle in forbidden area tested out by damage torques.About damage test torque.

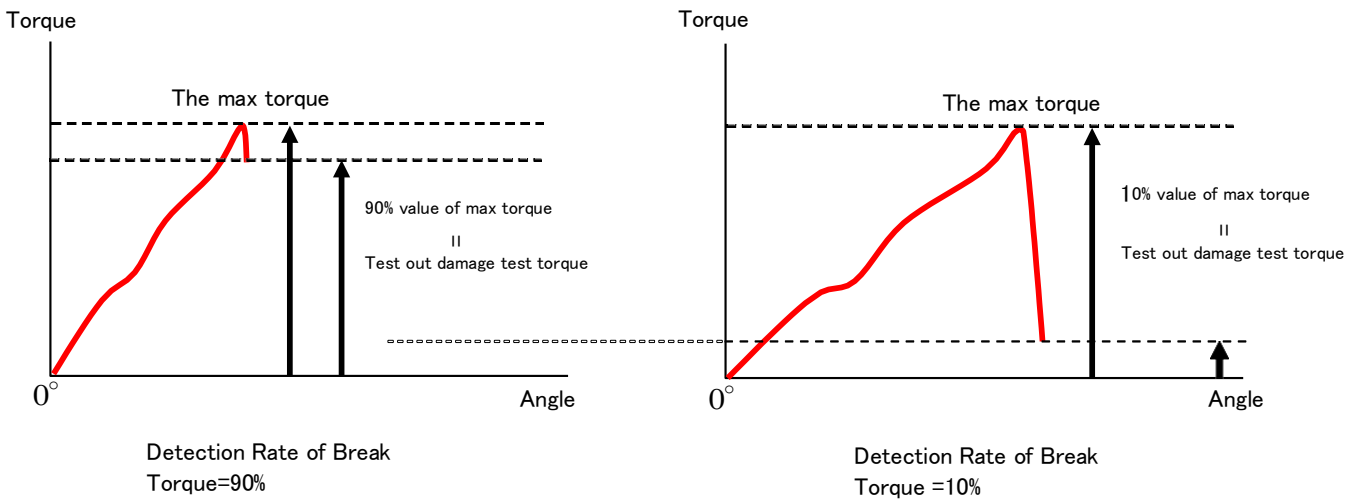


※ About damage test torque.

during Break Test, if torque value inputed is lower than the value break test torque of break test torque.[rate(%)of max torque in current, it will damage the sample.]

Damage test torque=max torque in current*damage test rate(%)/100

Test out break test torque, max torque of is break torque.

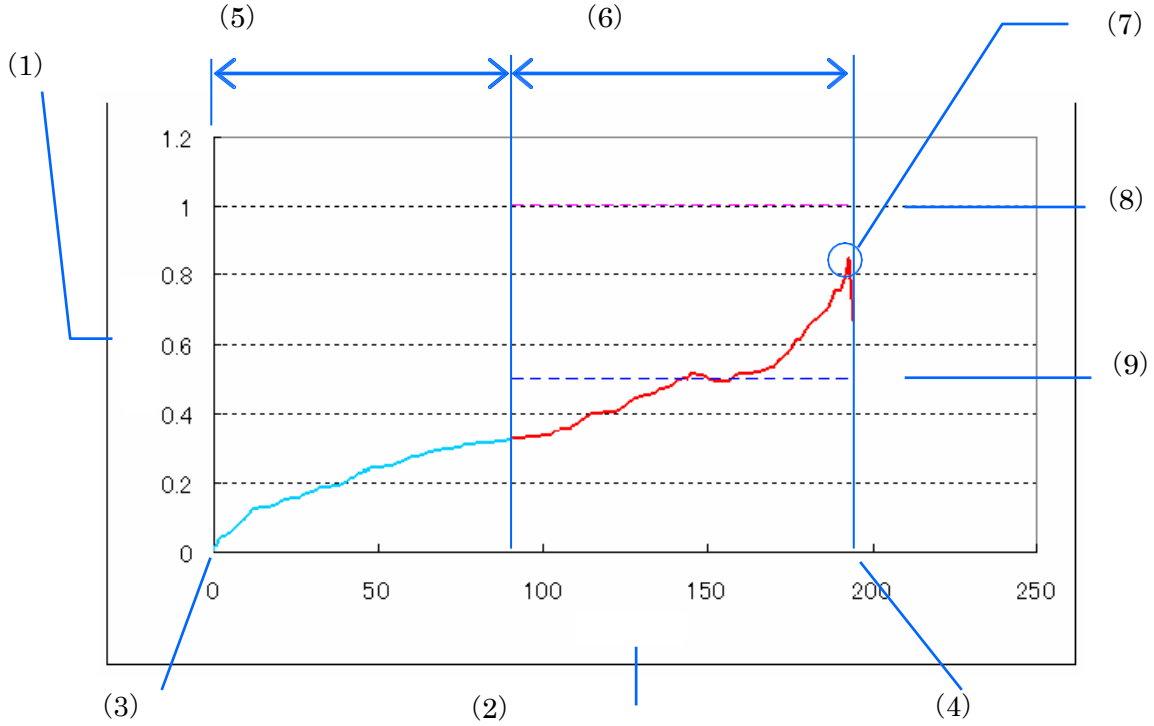


Detection Rate of Break Torque=90%

Detection Rate of Break Torque =10%

④ Graph.

Making following graph in measuring graph during Torque Test.



(1)Y axes: Set torque value input in excel as Y axes, unit of that is the same as that set in TNX. (2)X axes: Set moving angle as X axes when set X axes of graph as angle.

Set past time as X axes when set X axes of graph as time.

(3)Place to start: Angle when chuck starts cycling. set angle from 0.

(4)Place to stop: angle when chuck stops cycling. return to test out damage of sample or max cycle.

(5)Forbidden area of damage torque: Indicate forbidden area of damage torque with water colout ling.

(6)Measuring area: Test after damage torque test out forbidden.

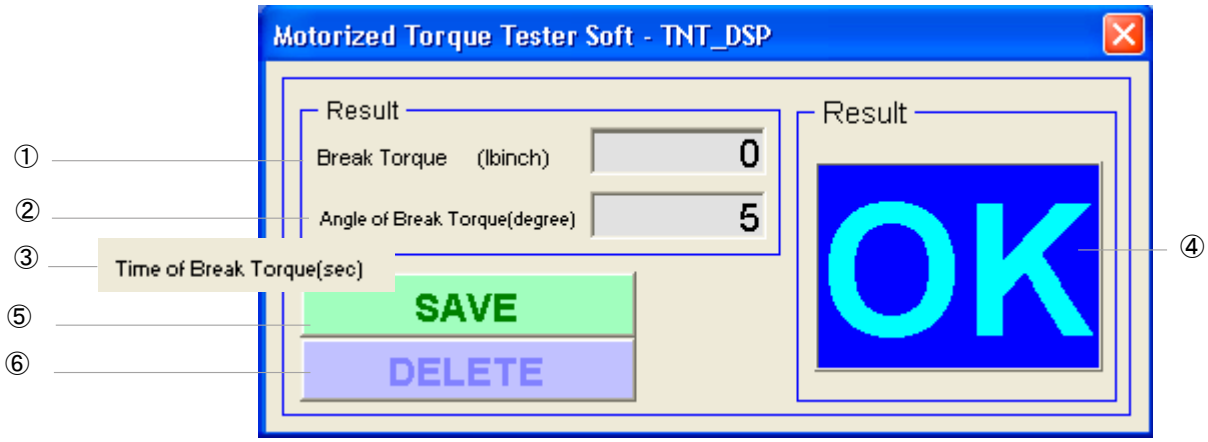
(7)Damage torque: Max torque tested out when Break Test is damage torque.

(8)Determinant upper limit value: When determinant upper limit value, indicate setting determinant upper limit value with pink dashed.

(9)Determinant lower limit value: When determinant lower limit value, indicate setting determinant lower limit value with blue dashed.

⑤ Measuring result menu .indication content.

It'll appear follocoing measuring result mena.



① Break torque: Indicate max value of torque in one Test.

② Break torque angle: Indicate angle value of damage torque tested out when setting angle of graph X axes.

③ Break torque time(sec):Indicate past time of damage torque tested out when setting time of graph X axes.

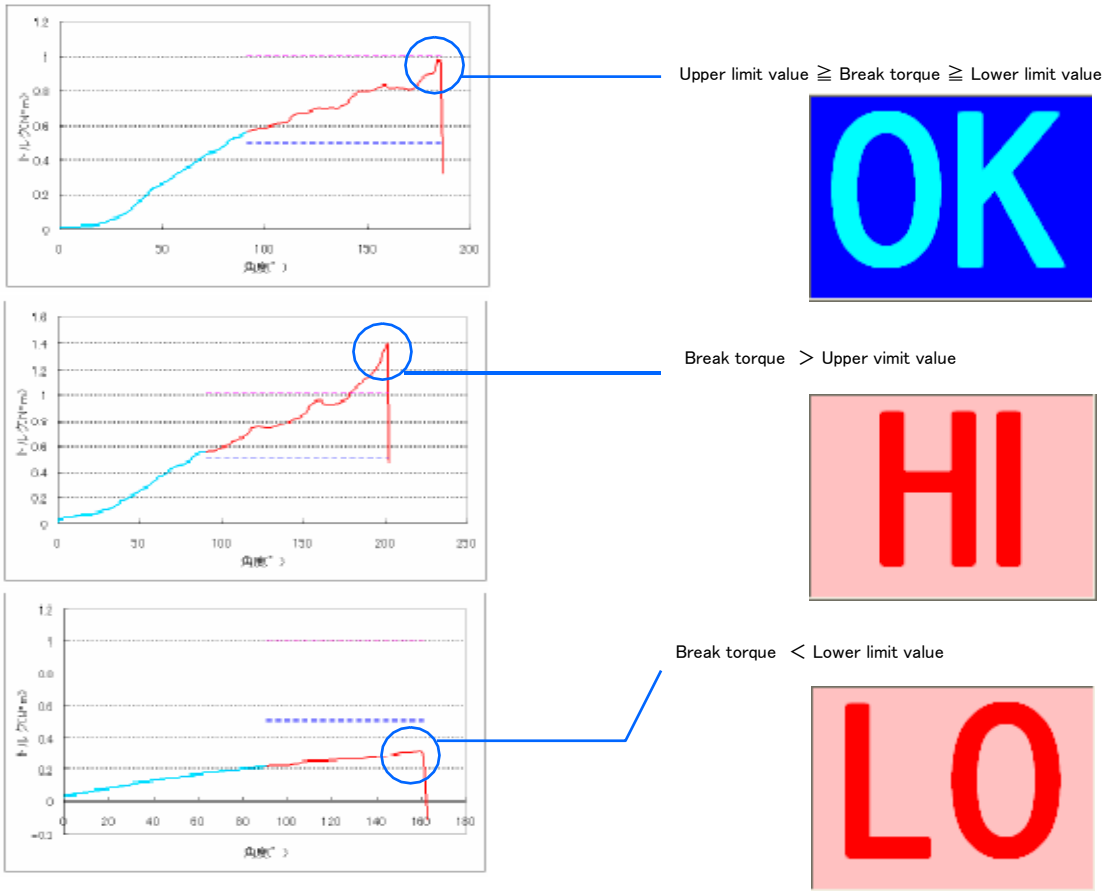
④ Judgment result: Indicate judgment result of max torque.(not indicate when determinant upper limit value=lower limit value=0)

⑤ Save button: Save contents of measuring result. record damage torque data into statistical graph of Break Test(refer to 5.5 statistical Sheet of p18).

⑥ Cancel button: Abolish contents of measuring result (statistical graph).

- Judgment result judgment standard.

Judgment result inolicated in measuring result mena is determined by following judgment standards.



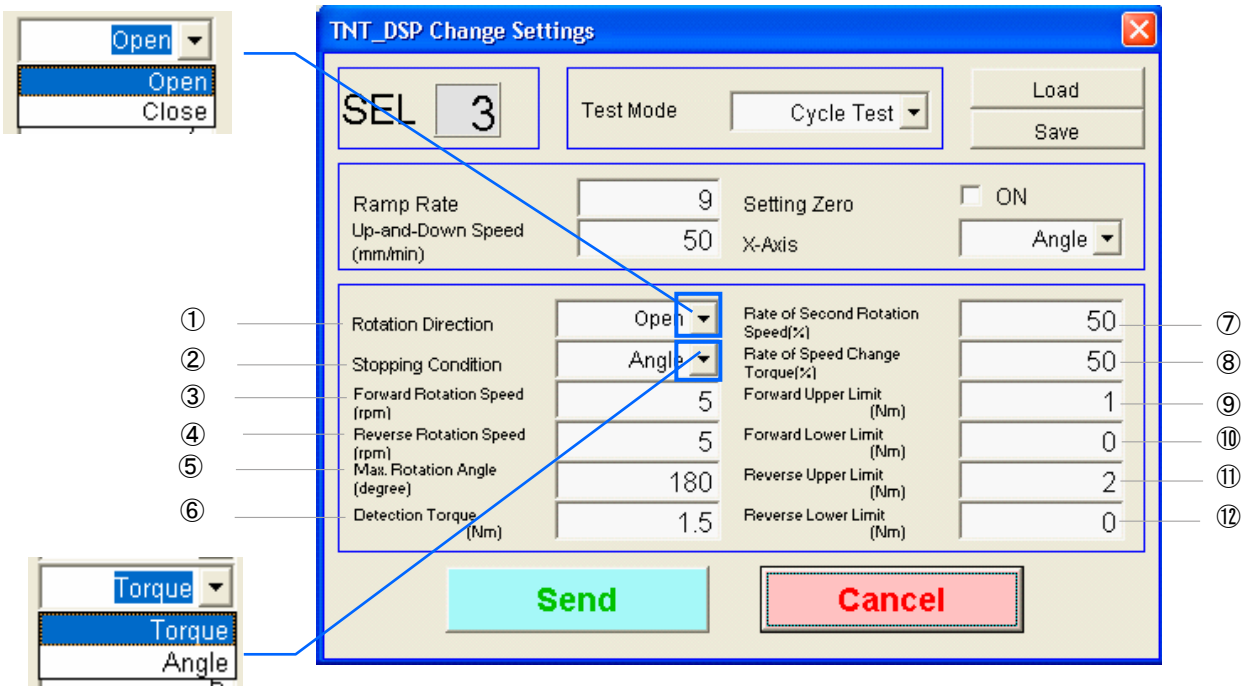
6.4. Cycle Test.

① Action summary.

Cycle test can test torque of forward and reverse. Turring towawd forward direction untic satisfy stop contitions, then it recorer to location when Test starts. Then it recorer record measuring torque angle and past time of cycle route.

② Set changing men. action setting.

It's necessary to set following items in Cycle Test.



① Rotation direction: When in Test cycle direction of chuck is determined by direction of loming route.

Open circumvolve widdershins.

Close circumvolve deasic.

Stop conditions that determine cycle direction of comng ronte when in experiment.

② Stop conditions: [torque] as the same with Torque Test, end Test while test out torque.

Shift to going route experiment.

[angle] as the same with Angle Test, end Test while move to setting coming route direction.

Then shift to going route experiment.

③Forward Rotation Speed: When in Test, input rotation speed of chuck into forward direction.

Input range: 0.1 ~ 25, reserve one number behind decimal point.

④ Reverse Rotation Speed: When in Test, input cycle speed of chuck into reverse direction.

Input range:0.1~25,reserve one number behind decimal point.

⑤ Max Rotation angle: Stop condition torque:while it can't out test torque, end the Test and input the angle.

Stop condition torque: end the Test, then input angle.

Input range: integer 5 ~ 1440.

⑥ Test torque: End Test, then input torque value.(only work when in stop condition input range:1% of rated torque ~ rated torque, reserve 3 numbers torque.)

⑦ Rate of Second Rotation Speed (%): Set the speed after torque test of speed shift, according to the rate of Rotation speed.

Input range: integer 10 ~ 90.

⑧ Rate of Speed Change Torque (%): Set torque value of speed shift by the rate of Rotation speed.

Input range: integer 10~100.

⑨ Forward Upper limit value: Input upper limit value for judging the max torque of forward.

Input range: 0 ~ rated torque, reserve 3 numbers behind decimal point.

⑩Forward Lower limit value: Input lower limit value for judging the max torque of forward.

Input range: 0 ~ rated torque, reserve 3 numbers behind decimal point.

⑪ Reverse Upper limit value: Input upper limit value for judging the max torque of reverse.

Input range: 0 ~ rated torque, reserve 3 numbers behind decimal point.

⑫ Reverse Lower limit value: Input lower limit value for judging the max torque of reverse.

Input range: 0 ~ rated torque, reserve 3 numbers behind decimal point.

.

③ Action contents.

Cycle test is composde by forward Test that set cycle direction of chuck and reverse Test that return to start place after the Test is over. Besides, determine the action of Test according to stop conditions.

Stop conditions: torque

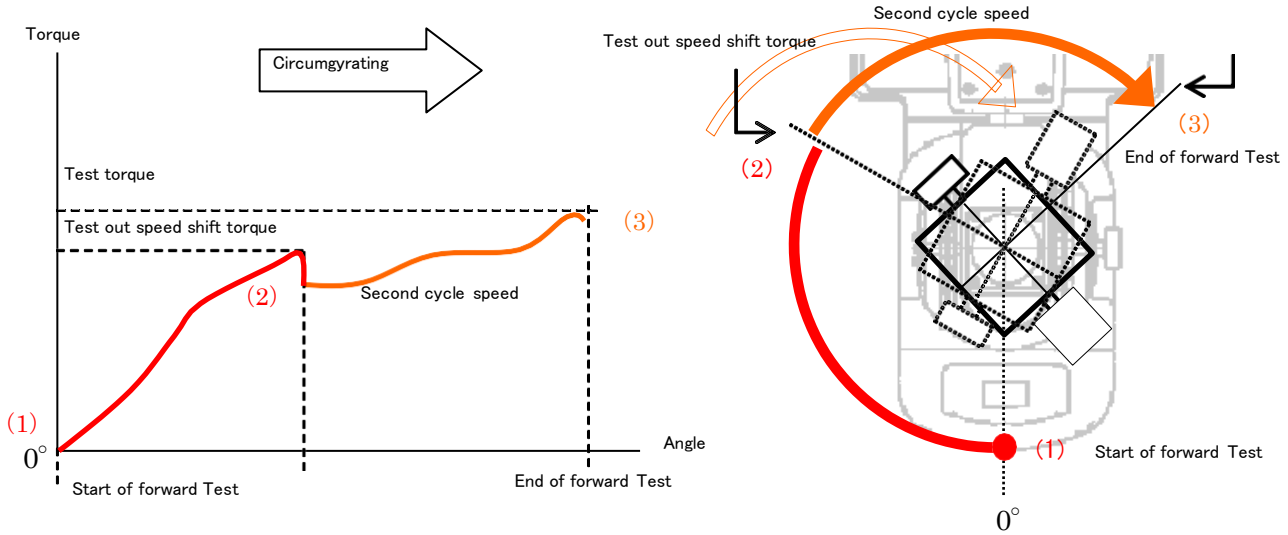
Forward Test does the same action as Torque Test. Reverse Test is to measure the torque between the stop place of forward Test and start place. As in these case, forward Test cinumgyrate in the opposete direction.

- Forward Test action

(1)Rotation diretion cheasen circumgyrate according to cycle speed of forward, until test out speed shift torque.

(2)Ture to second cycle speed as soon as test out speed shift torque.

(3)End Test as soon as test out test torque.



※ Speed shift torque=test torque × speed shift torque rate (%)/100

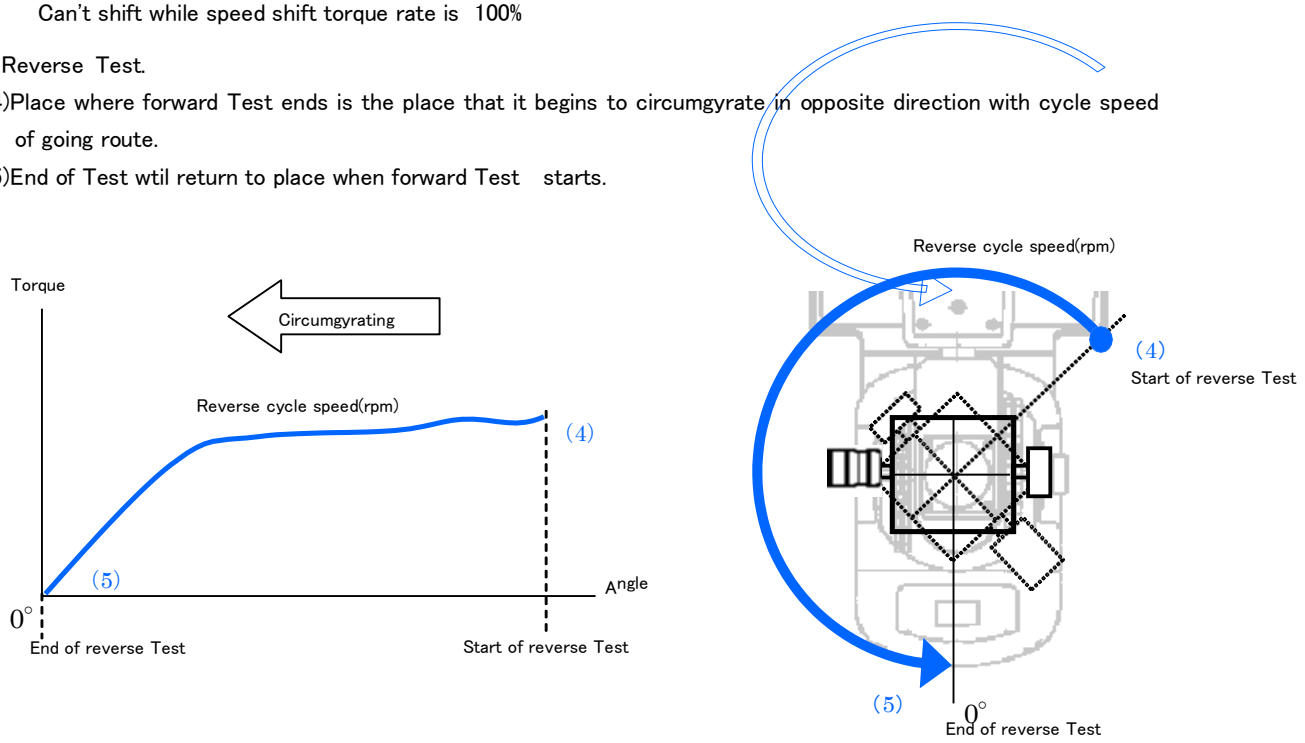
※ Second cycle speed(rpm)=cycle speed of forward(rpm)*second cycle speed rate(%)/100

Can't shift while speed shift torque rate is 100%

- Reverse Test.

(4)Place where forward Test ends is the place that it begins to circumgyrate in opposite direction with cycle speed of going route.

(5)End of Test wtil return to place when forward Test starts.



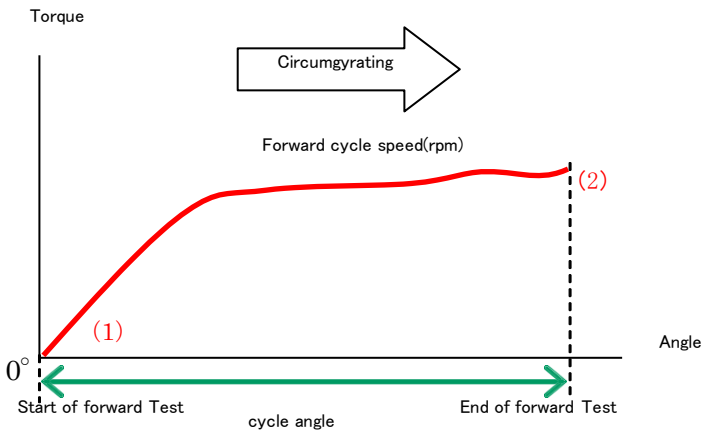
Stop conditions: angle

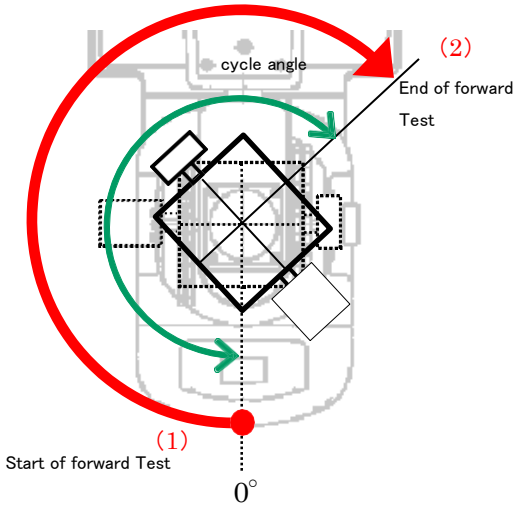
Forward Test does the same action as Angle Test. Reverse Test is to measure the torque from the place Forward stops to return to start place. As in this case, comingroute Test circumgyrate in opposite direction.

- Coming route Test action

(1)Start circemgyrate with cycle speed of coming route towards cycle direction chosen(open, close).

(2)End orf forward Test as soon as reach setting cycle angle.

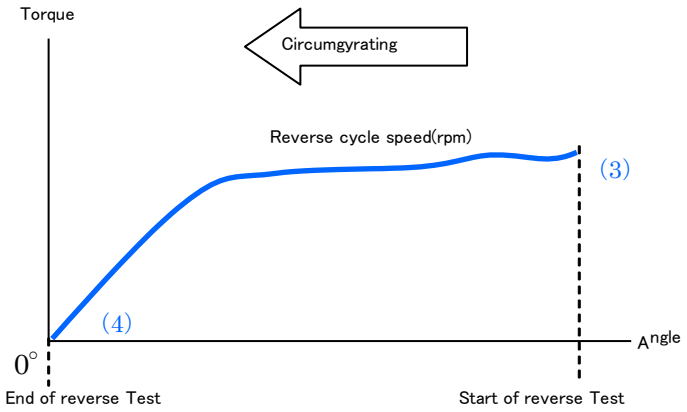


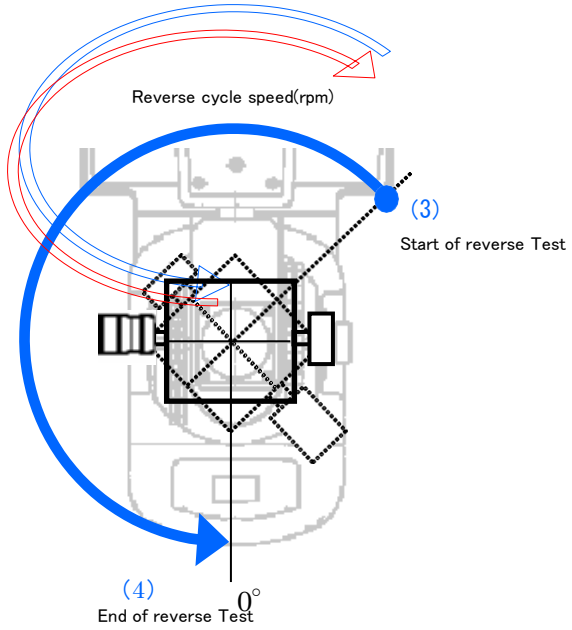


- Forward Test action

(3)Place where forward Test ends is the place that is begins to circumgyrate in opposite direction with cycle speed of reverse.

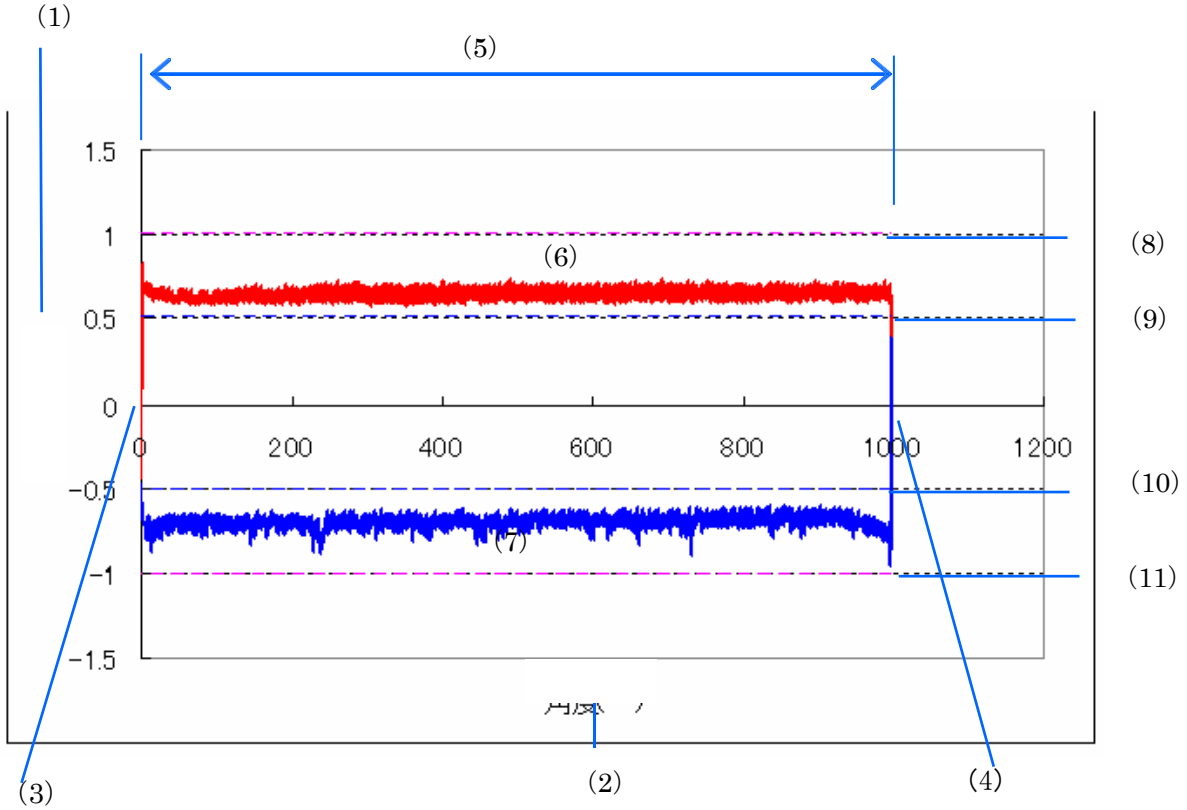
(4)End of experiment until return to place when forward Test.





④ Graph.

Making following graph in measuring graph in measuring graph when in to_and_fro Test.



(1)Y axes: Torque value input in xecel is Y axes, unit of which is the same as TNX setting. (2)X axes: Set moving angle as x axes when x axes is setted as angle.

Set past time as x axes when x axes is setted as time.

(3)Place to start of coming route: It's the angle with which chuck begins to circumgyrate when in coming route Test. set angle fron 0.

(4)Place to stop of coming route Test: It's tge abgke with which chuck stops circumgurating when in coming route Test.

(5)Measuring area: Range of start of coming route Test ~ stop of going route experiment. (6)Coming route torque value: Indicate torque data of coming route Test with rde line in graph. (7)Going route torque value: Indicate torque data of going raoute Test with blue line in graph.

To turn the cycle direction, coverse torque value of going route with symbel opposited torque value tested by coming route.(only in case of indicating in the graph).

(8)Forward Upper limit value: When Forward Upper limit value≠0, indicate Forward Upper limit value of with pink dashed.

(9)Forward Lower limit value: When lower limit value of coming route≠0, indicate Forward Lower limit value with blue dashed.

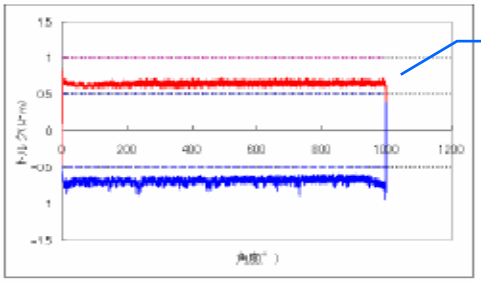
(10)Reverse Upper limit value: When Reverse Upper limit value≠0, indicate Reverse Upper limit value of with pink dashed. Since the direction of rotation is reversed, Reverse Upper limit value is opposite in sign to Forward Upper limit value.

(11)Reverse Lower limit value: When Reverse Lower limit value≠0, indicate Reverse Lower limit value of with blue dashed. Since the direction of rotation is reversed, Reverse Lower limit value is opposite in sign to Forward Lower limit value.

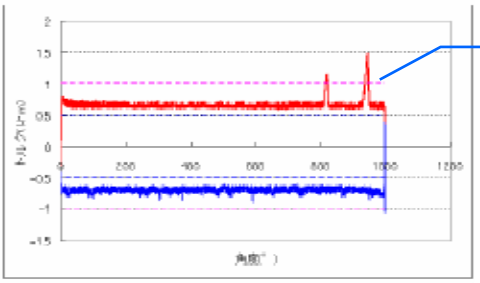
- Indicating result.

  Indicating measuring result in measuring result menu according to following determinant standard.

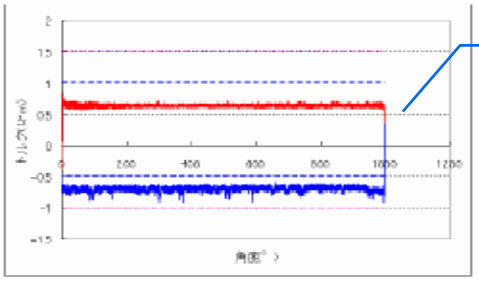
- Forward Test of standard.



Forward Upper limit value > Max torque of forward > Forward Lower limit value.

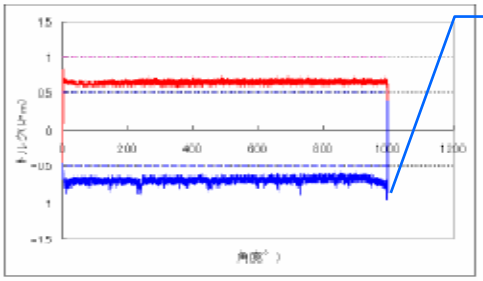


When max torque of forward > Forward Upper limit value

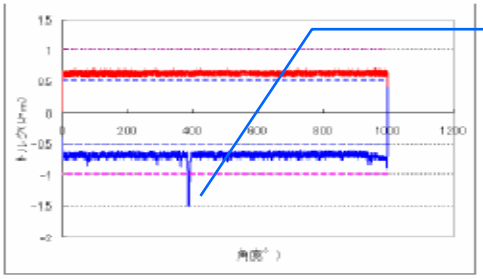


When max torque of forward < Forward Lower limit value

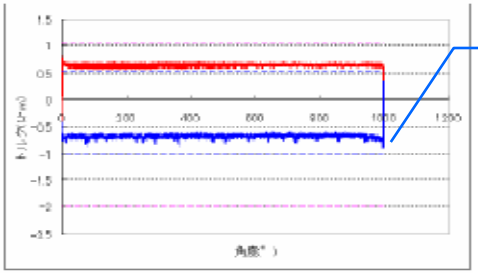
- Reverse Test of standard.



Reverse Upper limit value > max torque of reverse > Reverse Lower limit value



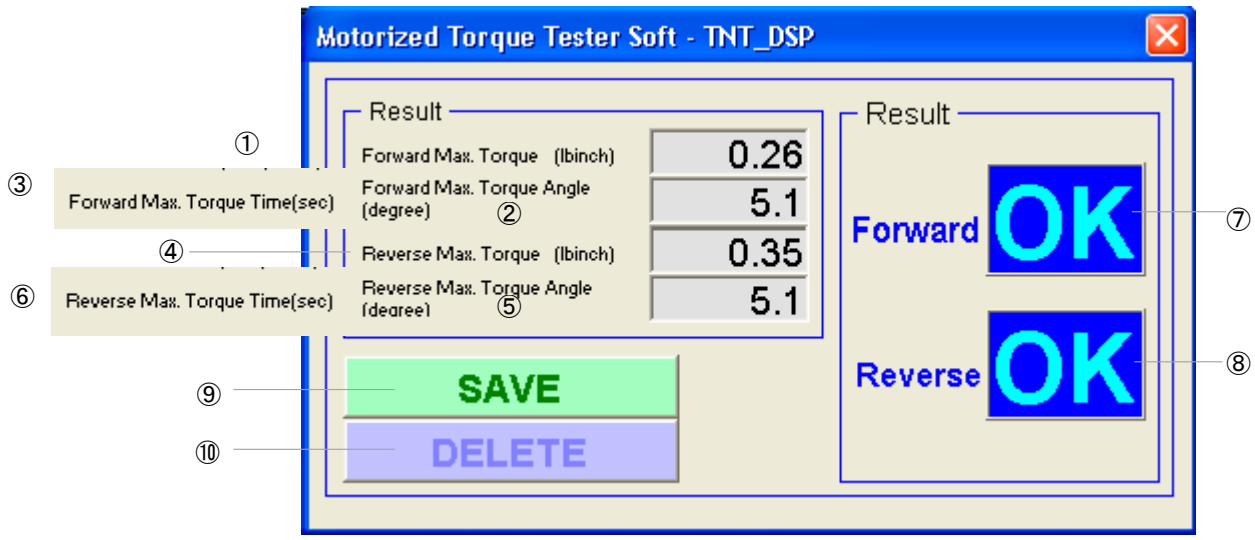
When max torque of reverse > Reverse Upper limit value



When max torque of reverse < Reverse Lower limit value

⑤ Measuring result menu expression content.

Indicate following measuring result menu as the Test is over.Graph.



① Max torque of coming route: Indicate max torque of coming route according to one time Cycle Test.

② Max torque angle of coming route: When x axes indicates setting angle, indicate angle value tested by max torque of coming route.

③ Max torque of going route: When x axes indicates setting time, indicate past time tested by max torque of coming route.

④ Max torque of going route: Indicate max torque of going route according to one time Cycle Test.

⑤ Max torque angle()of going route: When x axes indicates setting angle, indicate angle value tested out by max torque.

⑥ Max torque time (se)of going route: When x axes indicates setting setting time, indicate past time tested out of going route.

⑦ Determinant result of coming route: Indicate determinant result of max torque of coming route .

(determinant upper limit value of coming rotate=determinant lower limit value not indicate as in above condition.)

⑧ Determinant result of going route: Indicate determinant result of max torque of going route.

(determinant upper limit value of going route=determinant lower limit value of going route=0,not indicate as in above condition).

⑨ Save button:Going route=0,not indicate as in above condition.

Save contents of measuring result, input max torque data of coming route and max torque data of going route into statistical graph of going route Test.

⑩ Cancel button: Abolish contents of measuring result.(measuring graph)

※ About max torque of going route and determinant upper/lower limit value of going route.

Going route Test is aim at reversing direction for coming route experiment. And coming route is symbol of reversing torque recorded in excel. But after the coming route Test is over, it is the same as symbol's direction of coming route when comuting max value and its determinant upper/lower limit value.

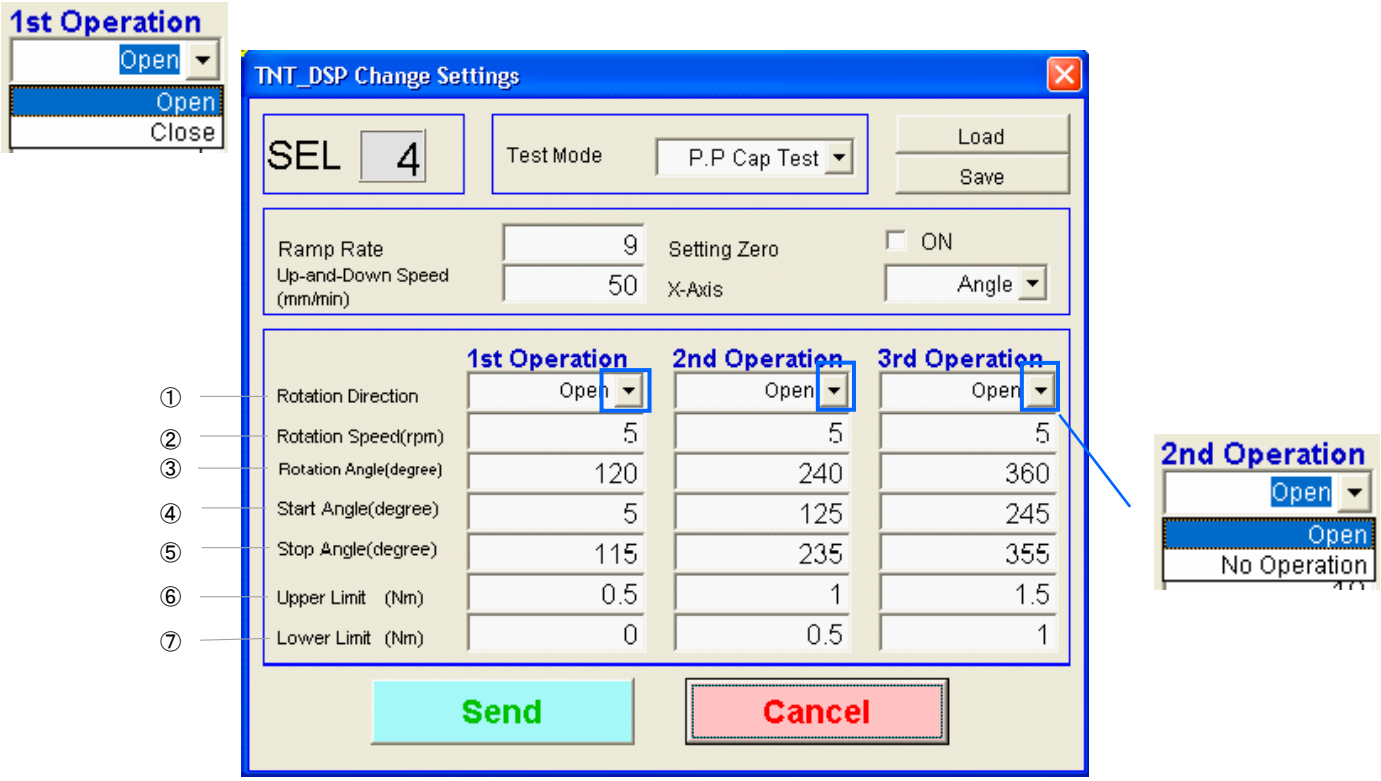
6.5. PP Cap Test

① Action summary.

PP Cap Test is to test plural max value of pp and jump, and measure Test action of necessary Test. set changing mena action setting.

② Set changing men.action setting.

It's necessary to set following items in PP Cap Test.



① Cycle direction turn: When in Test,cycle direction of chuck is determinade by direction of coming route.

1st action 2nd action 3rd action to the same direction.

Only the 1st action can possibly choose open close the 2nd and 3rd is of the .

Same direction as the 1st, they possily don't have to choose.

Open: circumvolue widdershins. Close:circumvolue deasil.

Not necessary: no action (2nd action,3rd action either).

② Cycle speed: Input cycle speed of the 2nd action and 3rd action separately.

Input range: 0.1~25, reserve one number behind decimal point.

③ Cycle angle: Input cycle angle of the 1st, 2nd, 3rd action separately.

Input range: integer 5~1440.

④ Measuring start angle(°):Input measuring start angle of 1st, 2nd, 3rd action separately.
Input range: integer 0~1440.

⑤ Measuring stop angle(°):Input measuring stop angle of 1st, 2nd, 3nd action separately.
Input range: integer 0~1440

⑥ Determinant upper limit value: Input determinant upper limit value of max torque of the 1st,2nd,3rd action.
Input range: 0~rated torque value, reserve 3 number behind decimal point.

⑦ Determinant lower limit value: Input determinant lower limit value of max torque of the 1st,2nd,3rd action.
Input range: 0~rated torque value, reserve 3 numbers behind decimal point.

- Relations between input ranges.

following setting value can't be input according to the inputting value of PP Cap Test.

(1)When the 1st determinant upper limit value < the 1st determinant lower limit value.
(2)When the 2nd determinant upper limit value < the 2nd determinant lower limit value.
(3)When the 3rd determinant upper limit value < the 3nd determinant lower limit value.
(4)When the 1st cycle angle > the 2nd cycle angle.
(5)When the 2nd cycle angle > the 3rd cycle angle.
(6)When the 1st measuring start angle > the 1st measuring stop angle.
(7)When the 2nd measuring start angle > the 2nd measuring stop angle.
(8)When the 3rd measuring start angle > the 3rd measuring stop angle.

③ Action content

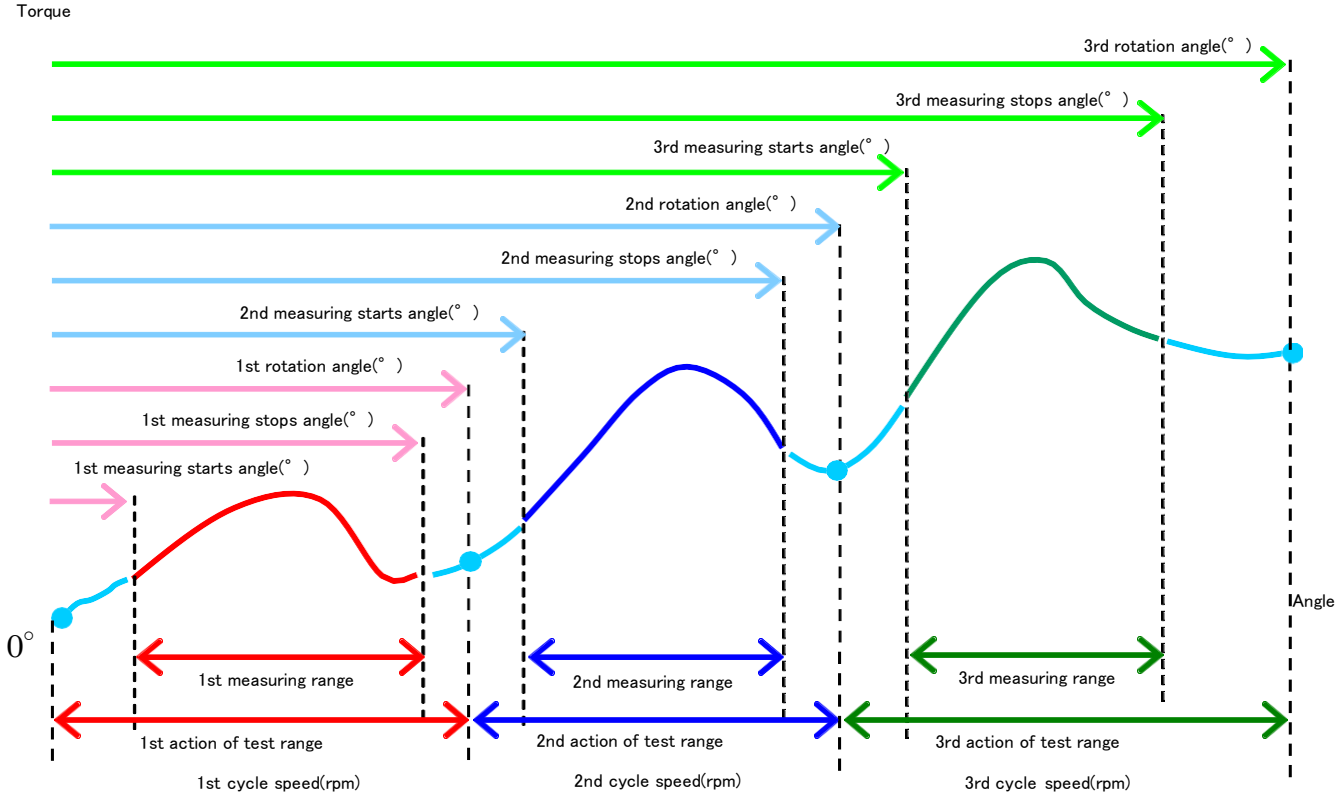
You can operate 3 kinds of test setting in PP Cap Test through the proper test setting. You can test out torque value of the 1st, 2nd, 3rd action.

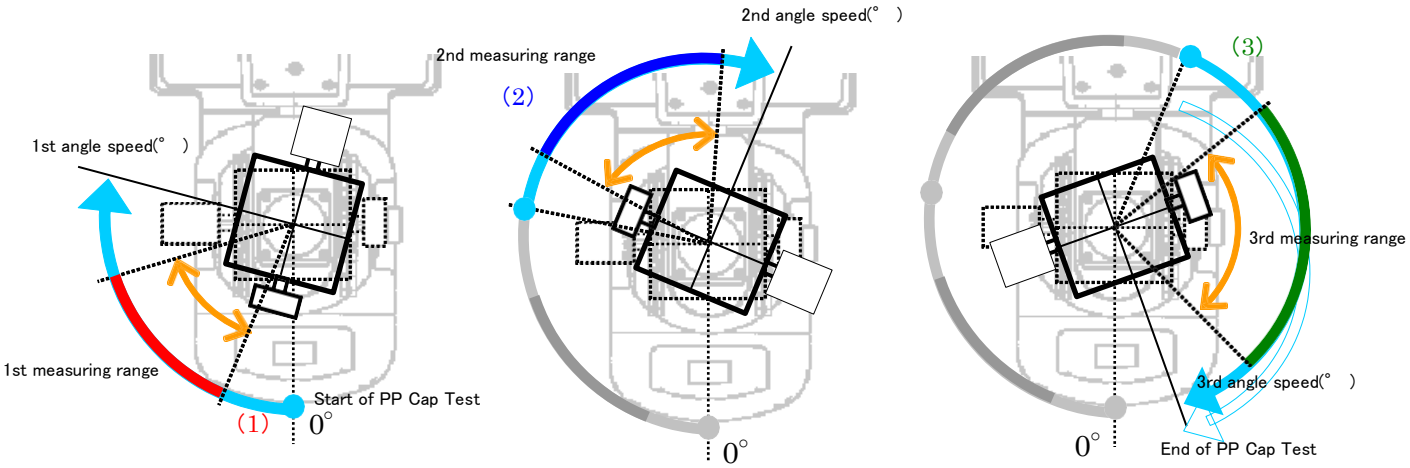
- Action content of PP Cap Test.

(1)circumgyrate towards cycle direction chooser with the 1st cycle speed.

(2)circumgyrate the 1st cycle angles settde, then circumgyrate to the 2nd cycle angel to shift to the 2nd cycle speed.

(3)circumgyrate the 2st cycle speed then circumgyrate to the 3nd cycle angle to shift to the 3rd cycle speed. PP Cap Test ends.



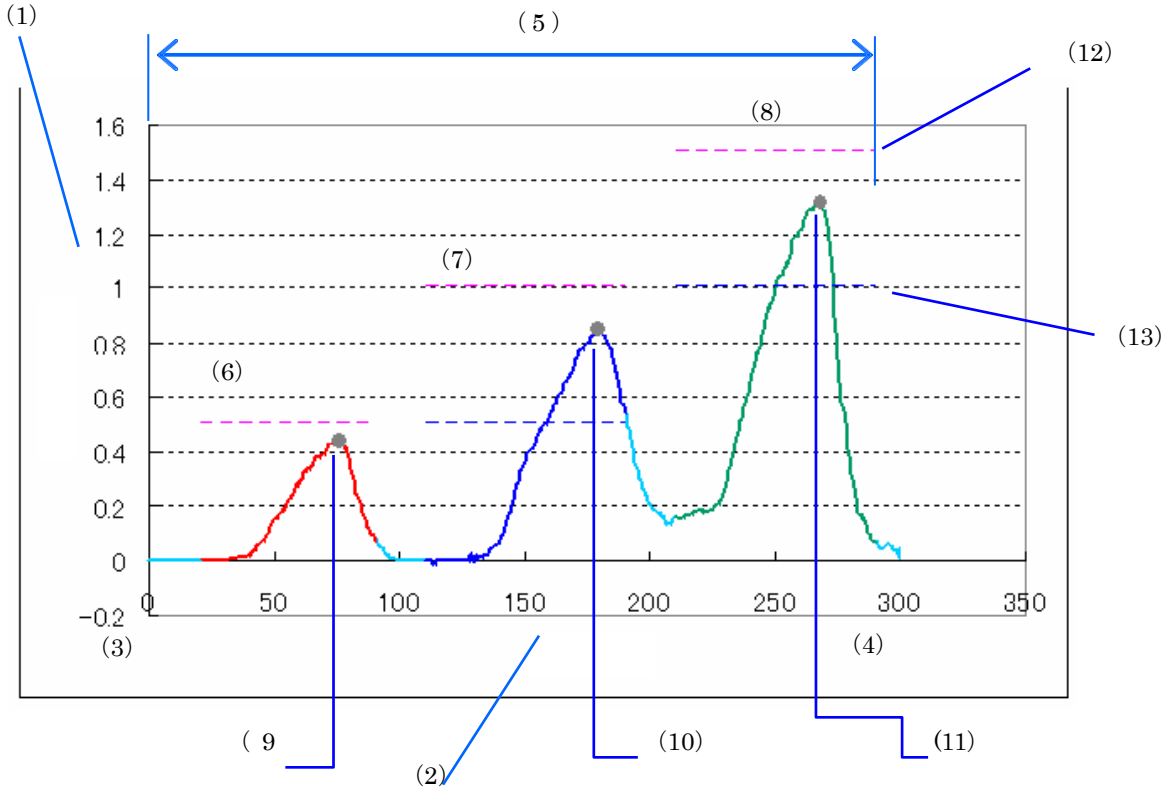


- About measuring start angle and stop angle.

Put the range of measuring star angle measuring stop angle as measuring range. Then test and determine the max torque according to this range.

④ Graph

Making following graph according to the measuring graph in PP Cap Test.



(1)Y axes: Set torque value inputted in excel as y axes unit of that is the same as that set in TNX.

(2)X axes: Set moving angle as x axes when set x axes of graph as angle.
Set past time as x axes when set x axes of graph as time.

(3)Place to starts PP Cap Test: It's the angle when chuck starts circumgyrate in PP Cap Test.
Set the angle from 0.

(4)Place to stop PP Cap Test: It's the angle when chuck stops circumgyrate in PP Cap Test.

(5)Measuring area: Range of PP Cap Test starts ~ PP Cap Test ends.

(6)The 1st measuring range: Range of the 1st measuring starts angle ~ the 1st measuring stops angle in the range of the 1st action is indicated by light blue.
Torque of the 1st action range beyond measuring range is indicated by light blue.

(7)The 2nd measuring range: Range of the 2nd measuring starts angle ~ the 2nd measuring stops angle in the range of the 2nd action. Torque value is indicated by blue graph.
Toque of the 2nd action range beyond measuring range is indicated by light blue graph.

(8)The 3rd measuring range: Range of the 3rd measuring stars angle ~ the 3rd measuring stops angle in the range of the 3rd action. Torque value is indicated by green graph.
Torque of the 3rd action range beyond measuring range is indicated by light blue graph.

(9)The 1st max torque: Indicating the max torque in the 1st measuring range with gray symbol.

(10)The 2nd max torque: Indicating the max torque in the 2nd measuring range with gray symbol.

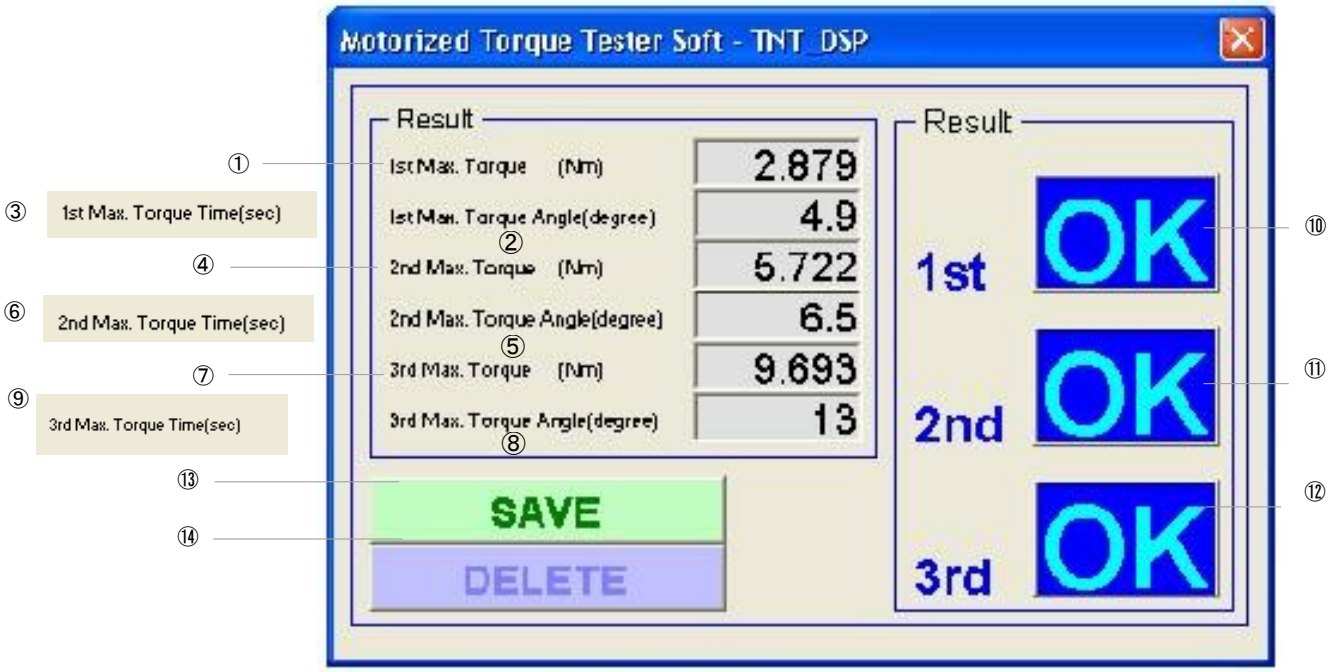
(11)The 3rd max torque: Indicating the max torque in the 3rd measuring range with gray symbol.

(12)Each determinant upper limit: When the determinant upper limit values of 1st, 2nd, 3rd action≠0, indicate them with pink dashed in measuring range of the actions.

(13)Each determinant lower limit: When the determinant lower limit values of 1st, 2nd, 3rd action≠0, indicate them with light blue dashed in measuring range of the actions.

⑤ Measuring result. Indication content.

It's apper following measuring result menu as the Test ends.



① The 1st max torque: Indicating the max torque in PP Cap Test according to the 1st measuring range.

② The 1st max angle: When x axes indicates angle, it is refer to the angle value of the 1st max torque measuring.

③ The 1st max torque time: When x axes indicates time, it is refer to the past time of the 1st max torque measuring.

④ The 2nd max torque: Indicating the max torque in PP Cap Test according to the 2rd measuring range.

⑤ The 2nd max angle: When x axes indicates angle it is refer to the angle value of the 2nd max torque measuring.

⑥ The 2nd max time: When x axes indicates time, it is refer to the past time of the 2nd max torque measuring.

⑦ The 3rd max torque: Indicating the max torque in PP Cap Test according to the 3rd measuring range.

⑧ The 3rd max torque angle: When x axes indicates angle, it is refer to the angle value of the 3rd max torque measuring.

⑨ The 3rd max torque time: When x axes indicates x axes indicates time, it is refer to the past time of the 3rd max torque measuring.

⑩ Determinant result of the 1st action: Indicating the determinant result of the 1st max torque.
(the 1st determinant upper limit value=the 1st determinant lower limit value=0,not indicate)

⑪ Determinant result of the 2nd action: Indicating the determinant result of the 2nd max torque.
(the 2nd determinant upper limit value=the 2nd lower limit value determinant=0,not indicate)

⑫ Determinant result of the 3rd action: Indicating the determinant result of the 3rd max torque.
(the 3rd determinant upper limit value=the 3rd determinant lower limit value=0,not indicate)

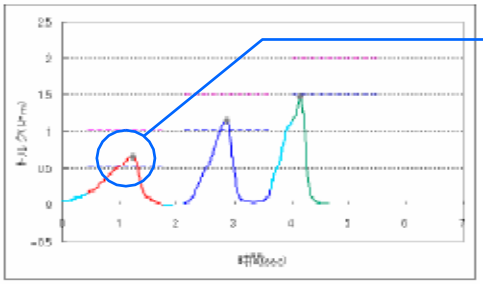
⑬ Save button: Save the measuring result, then input data of the 1st, 2nd, 3rd max torque into statistical graph of PP Cap Test refer to 5.5 statistical graph of p181

Cancel button: Delete measuring result (measuring graph).

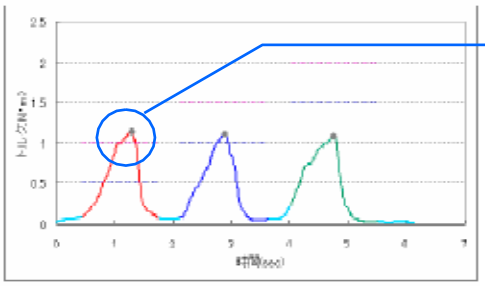
- Judgment result.

  The judgment result indicated in measuring result menu, is judget according to following judgement standard.

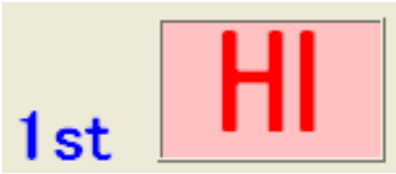
- Judgment standard for the 1st test.

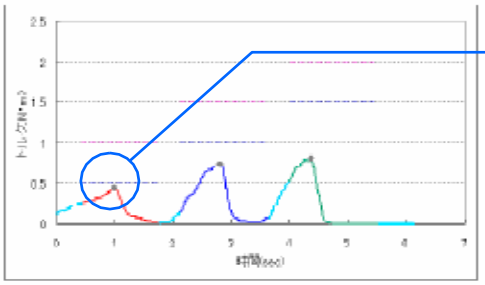


When the 1st determinant upper limit Value ＞ The 1st max torque ＞ The 1st determinant lower limit value

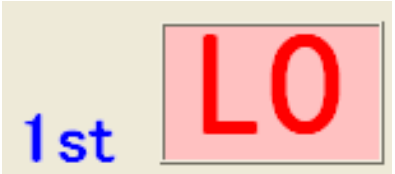


When the 1st max torque ＞ The 1st determinant upper limit value.

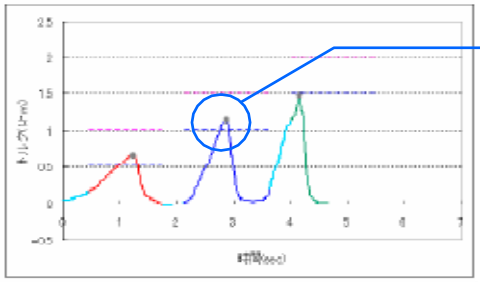




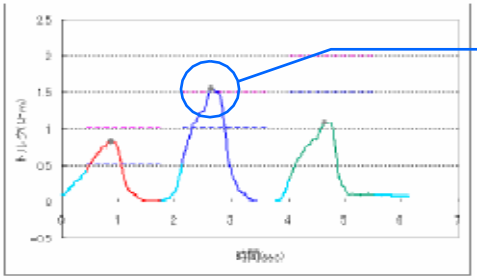
When the 1st max torque ＜ The 1st determinant lower limit value.



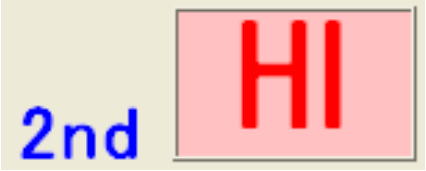
- Judgment standard for the 2nd test

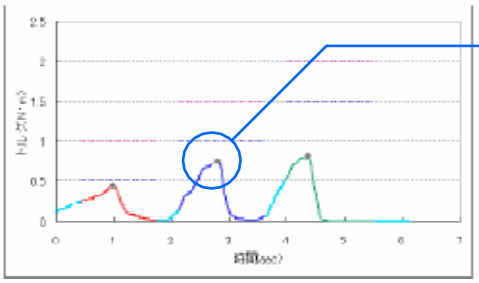


When the 2nd determinant upper limit value ＞ The 2nd max torque ＞ The 2nd determinant lower limit value.



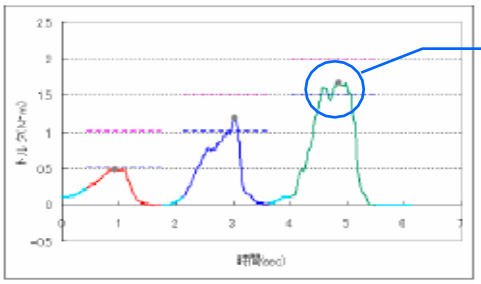
When the 2nd max torque ＞ The 2nd determinant upper limit value.



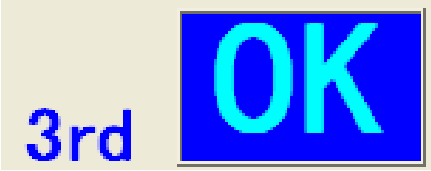


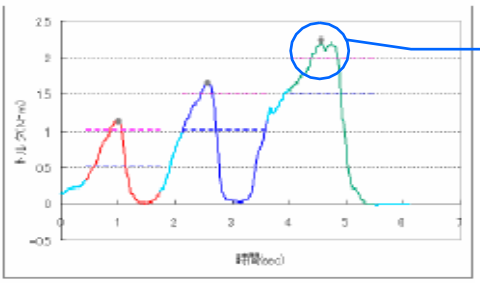
When the 2nd max torque ＜ The 2nd determinant lower limit value.

- Judgment standard for the 3rd test

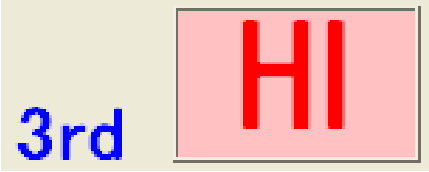


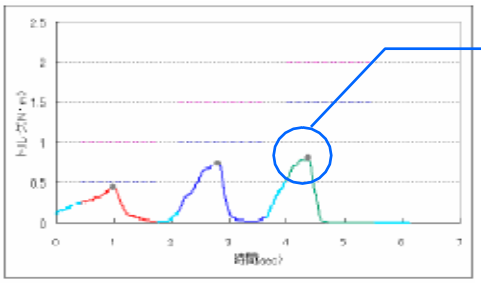
When the 3rd determinant upper limit value ＞ The 3rd max torque ＞ The 3rd determinant lower limit value.



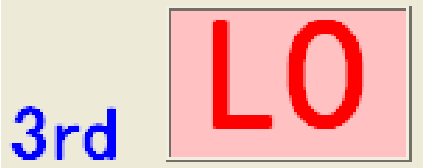


When the 3rd max torque ＞ The 3rd determinant upper limit value.





When the 3rd max torque ＜ The 3rd determinant lower limit value.



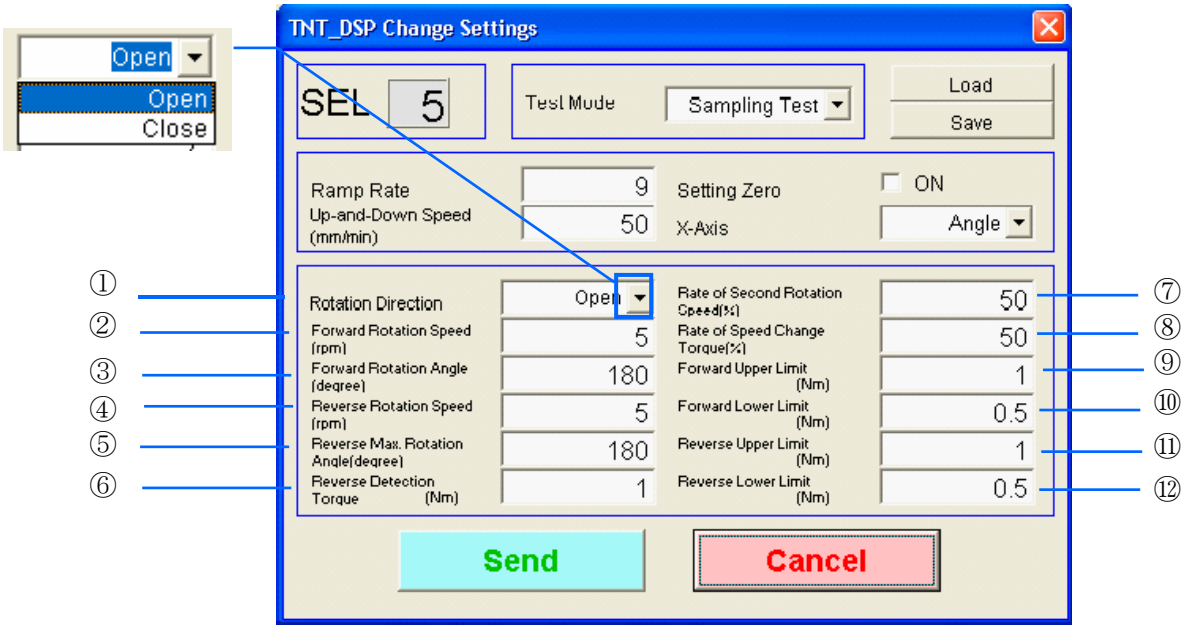
6.6 Sampling Test

① Action summary.

Sampling Test is to screw down again with setting torque after measuring open torque. Circumgyrate towards coming route direction till the setting angle, then circumgyrate towards coming route direction until test out the setting torque, then stop. Record the torque value, angle and the time spent on coming/going route separately.

② Set changing menu action setting

It's necessary to set following items in Break Test.



① Cycle direction: Determinant the cycle direction of chuck towards coming route direction in the Test Open: Anticlockwise direction

Close: Clockwise direction

Determinant the stop condition of cycle towards coming route direction in the test.

② Cycle speed of coming route: Input cycle speed of chuck towards coming route direction in the test.

Input range: 0.1-25,reserve one number behind decimal point.

③ Cycle angle of coming route: Input angle as the coming route ends

Input range: Integer 5-1440

④ Cycle of going route: Input cycle speed of going route direction in the Test. Input range: 0.1-25, reserve one number behind decimal point.

⑤ Max cycle angle of going route: Input the angle of stopping going Test when it can't test out the measuring torque of going route.

Input range: Integer 5-1440

⑥ Measuring torque of going route: Input torque value as going route Test ends.
Input range: 1% of rated torque -rated torque, reserve 3 numbers behind decimal point.(when max)

⑦ The 2nd cycle speed rate: Set it according to the ratio speed tested out by speed shift torque and cycle speed.
Input range: Integer 10-90.

⑧ Speed shift torque rate: Set it according to the ratio of torque value of speed shift and measuring torque.
Input range: Integer 10-100.

⑨ Determinant upper limit value of coming route: Input determinant upper limit value of max torque determination of coming route.
Input range: 0-rated torque value, reserve 3 numbers behind decimal point (when max).

⑩ Determinant lower limit value of coming route: Input determinant lower limit value of max torque determination of coming route.
Input range: 0-rated torque value, reserve 3 numbers behind decimal point (when max).

⑪ Determinant upper limit value of going route: Input determinant upper limit value of max determination of going route.
Input range: 0-rated torque value, reserve 3 numbers behind decimal point (when max).

⑫ Determinant lower limit value of going route: Input determinant lower limit value of max torque value of going route.
Input range: 0-rated torque, reserve 3 numbers behind decimal point (when max).

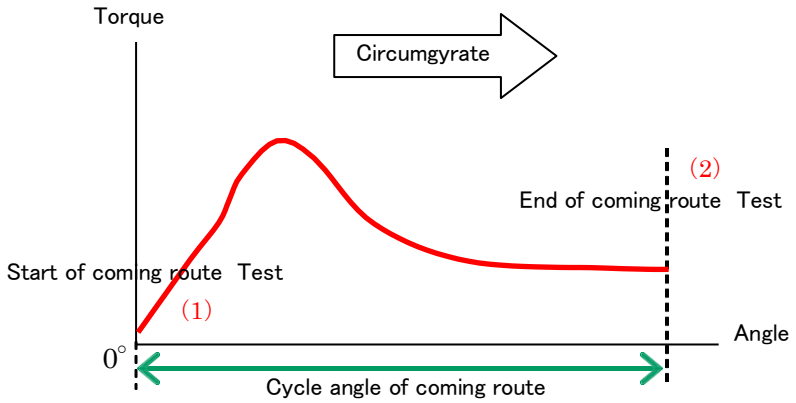
③ Action contents.

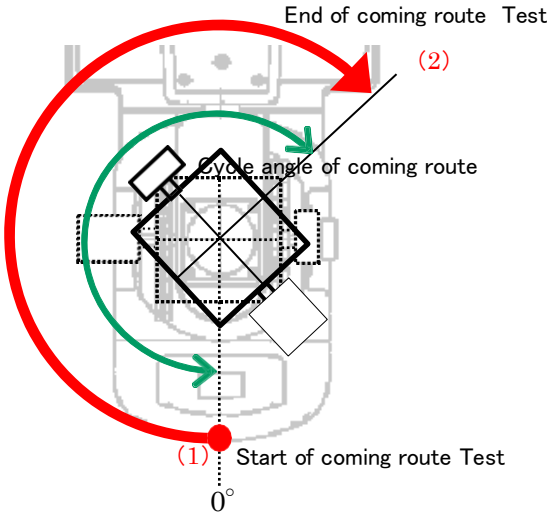
When in Sampling Test, continuously operate the chuck circumgyrate towards setting cycle direction, and then circumgyrate towards the opposite direction of going route Test as the coming route Test ends. Operating the coming route Test to setting angle, then stop operating going route Test according to setting torque tested out.

- Coming route Test action.

Operating the same action as in "Angle Test"(P21) in coming route Test. (1)Circumgyrate towards cycle direction (open/close) with "Cycle speed of coming route".

(2)Stop coming route Test action as circumgyrate to setting "Cycle angle of coming route" cycle direction.



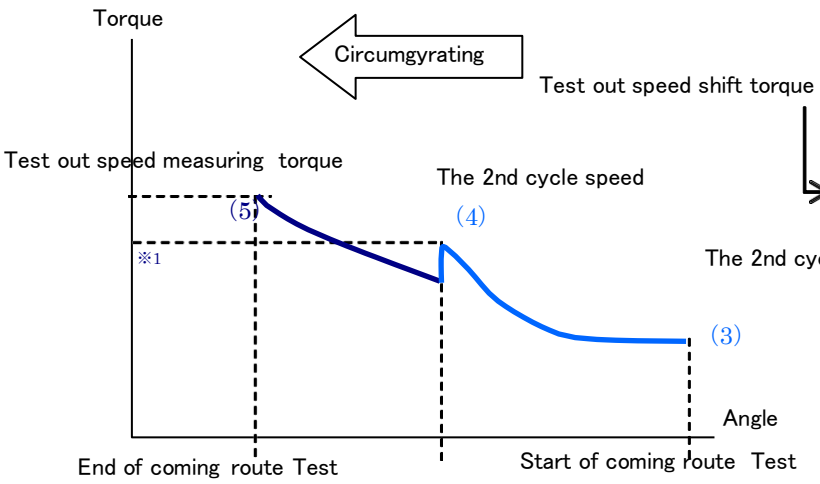


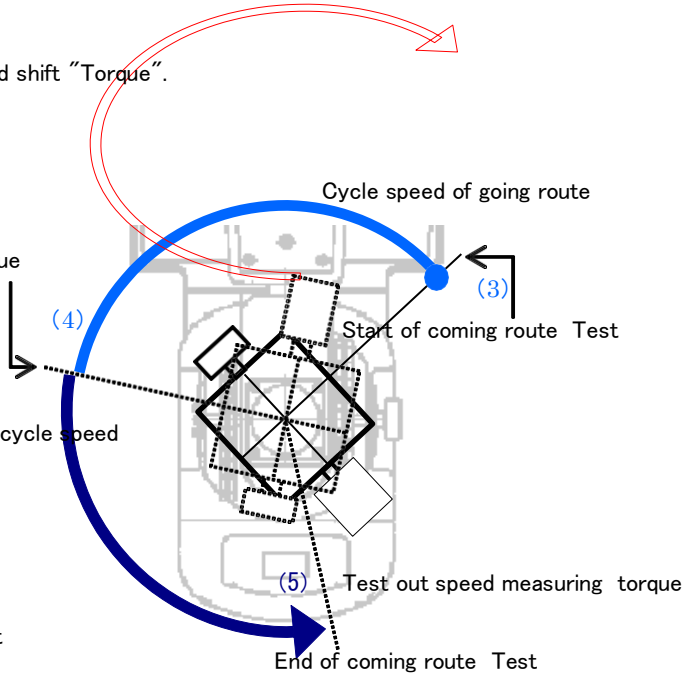
- Going route Test action.

(3)Starting circumgyrating in the opposite direction of coming route Test with "Cycle speed of going route" until circumgyrate to test out speed torque.

(4)Turn the cycle speed to the 2nd cycle speed "As test out" speed shift "Torque".

(5)stop the Test as test out "Measuring torque of going route".





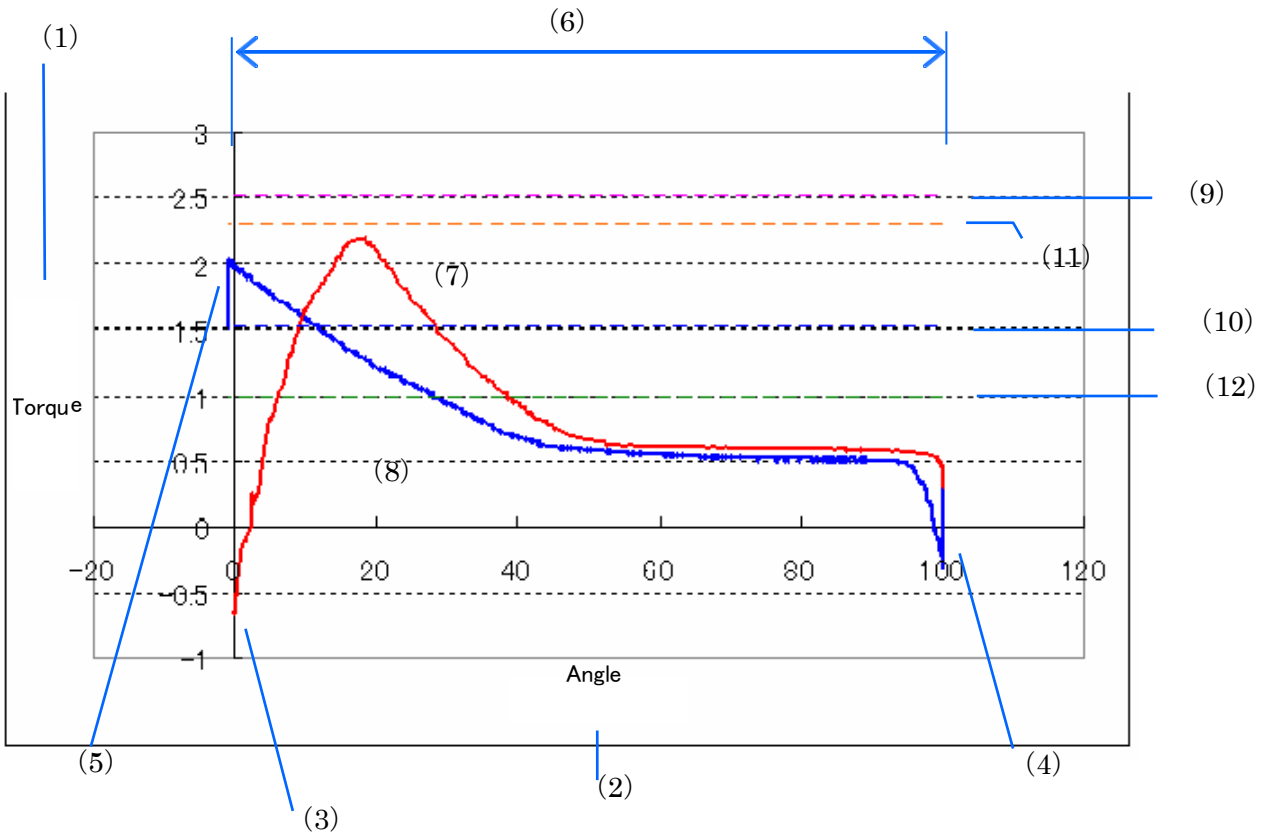
※ 1 "Speed shift torque"="Measuring torque" x "Speed shift torque rate"/100

※ 2 "The 2nd cycle speed" = "Cycle speed of going route" x "The 2nd cycle speed rate" /100

Not shift in condition of speed shift rate is 100%

④ Graph.

it will appear following graph in Sampling Test.



(1)Y axes: Set torque value input in excel as Y axes, unit of that is the same as that set in TNX.

(2)X axes: Set moving angle as X axes when set X axes of graph as angle.

Set past time as X axes when set X axes of graph as time

(3)Place of coming route Test starts: It's the angle when chuck begin circumgyrating in coming route Test.

Set angle from 0.

(4)Place of coming route Test stops: It's the angle when chuck stop circumgyrating in coming route Test .

Begin going Test from this place.

(5)place of going route Test stops: It's the angle when chuck stops circumgyrating in going route Test. It's where spot check stops.

(6)Measuring area: It's the range of coming route Test starts-stops.

(7)Torque value of coming route: Indicating torque value of coming route Test with red graph.

(8)Torque value of going route: Indicating torque value of going route Test with green graph.

(9)Determinant upper limit value of coming route: When determinant upper limit value of coming route ≠ 0,indicate the setting value with pink dashed.

(10)Determinant lower limit value of coming route: When determinant lower limit value of coming route ≠ indicate the setting value with blue dashed.

(11)Determinant upper limit value of going route: When determinant upper limit value of going route ≠ 0,indicate the setting value with orange dashed.

(12)Determinant lower limit value of going route: When determinant lower limit value of going route ≠ 0,indicate the setting value with green dashed.

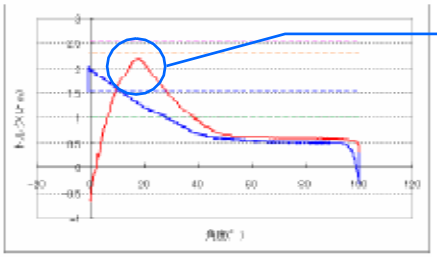
⑤ Measuring result menu of indication content.

About the contents of measuring result menu, it is the same as To-and-Fro Test.

- Judgment result.

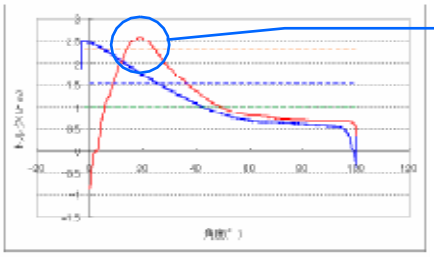
Determinating the judgment result indicated in measuring result menu according to the following standards.

- Judgment standard of forward test.

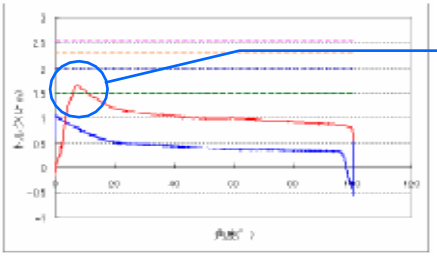


Forward upper limit value≧ Max torqe of forward

≧Forward lower limit value

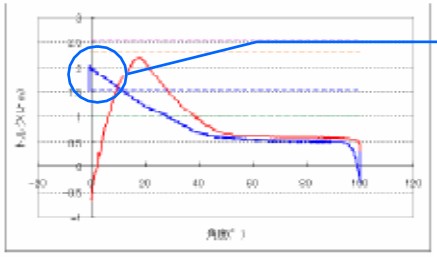


When the max torqe of forward ＞ Forward upper limit valu



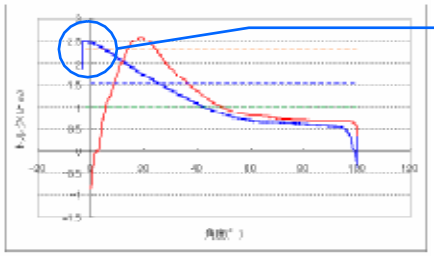
When the max torqe of forward ＜ Forward lower limit value

- Judgment standard of reverse test.

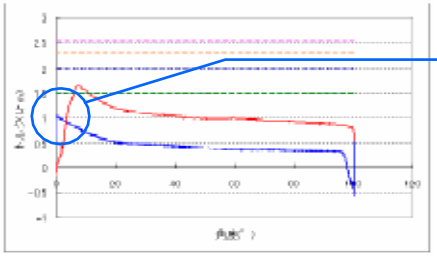


Reverse upper limit value ≧ Max torqe of reverse

≧ Reverse lower limit value



When the max torqe of reverse ＞ Reverse upper limit value



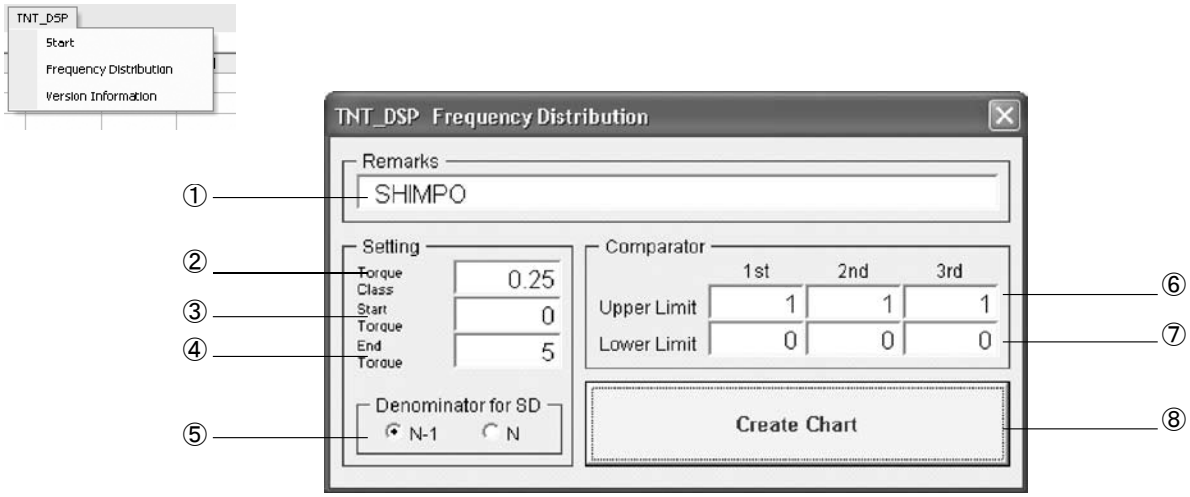
When the max torqe of reverse ＜ Reverse lower limit value

7. Function of Making frequency distribution chart

You can make frequency distribution graph of the max torque recorded in statistics graph through the making function of frequency distribution of TNT_DSP. Besides, it can computes and indicates the statistical data of max torque of the Tests. Only can use the function in statistics about Test kinds.

7. 1 Making graph menu

In state of choosing statistics, choose. make frequency distribution graph in TNT_DSP menu, then it appears making graph menu as following shows. It can't indicate frequency distribution menu if choose other graph (ex: measuring graph) beyond statistics



① For reference box Input for reference Input range: 40 words SBC case DBC case

② Phase width Determinant the width of 1 area of a phase when the statistics is finished.
Input range: min resolving rate of TNT_DSP torque value, reserve 3 numbers behind decimal point.

③ Place to start Determine the min phase value indicated in the graph when the statistics is finished.
Input range: 0-rated torque value, reserve 3 numbers behind decimal point.

④ Place to stop Determine the value included in max phase indicated in the graph when the statistics is finished.
Input range: 0-rated torque, reserve 3 numbers behind decimal point.

⑤ Denominator of standard deviation Choose denominator from N-1, N to compute standard deviation.
Initial state: N-1

⑥ Determinant upper limit value Input determinant upper limit value that proper for Test kinds (at most 3)
Input range: 0-rated torque value, reserve 3 numbers behind decimal point.

⑦ Determinant lower limit value Input determinant lower limit value that proper for Test kinds (at most 3)
Input range: 0-rated torque value, reserve 3 numbers behind decimal point.

⑧ Make frequency distribution graph Frequency distribution graph finished as click

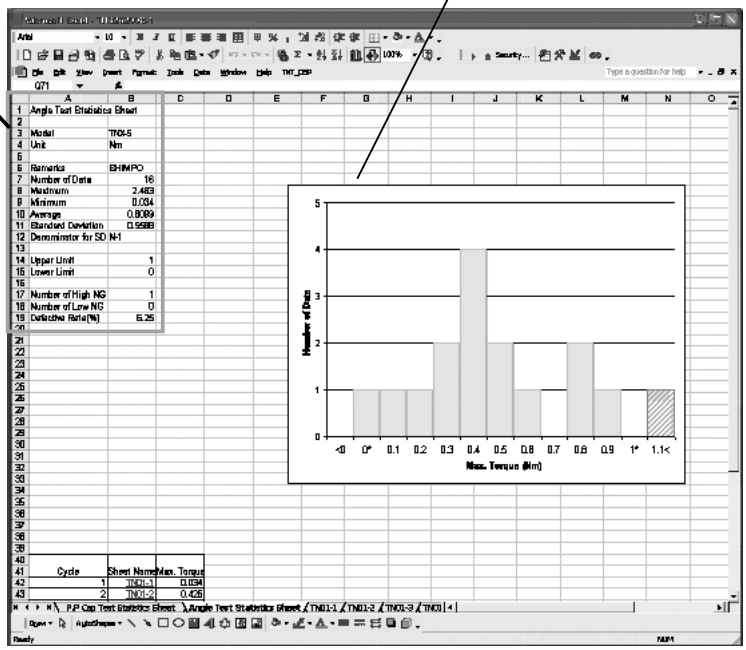
7. 2 Statistics After graph finished

Statistics will turn to following state after graph finished.

Statistics

	A	B	C
1	Angle Test Statistics Sheet		①
2			
3	Model	TNX-5	②
4	Unit	Nm	③
5			
6	Remarks	EHIMPO	④
7	Number of Data	16	⑤
8	Maximum	2.483	⑥
9	Minimum	0.034	⑦
10	Average	0.8089	⑧
11	Standard Deviation	0.5588	⑨
12	Denominator for SD	N-1	⑩
13			
14	Upper Limit	1	⑪
15	Lower Limit	0	⑫
16			
17	Number of High NG	1	⑬
18	Number of Low NG	0	⑭
19	Defective Ratio(%)	6.25	⑮

Frequency distribution graph



When the statistics is finished, input statistics result of max torque into black box in statistics box.

① Statistics names — Indicate the name of statistics.

② Type — Indicate the type of TNX when statistics is finished.

③ Unit — Indicate the indicial unit of TNX when the statistics is finished.

④ For reference — Indicate the for reference input into making graph menu.

⑤ Data number — Indicate the number of max torque recorded in statistics.

⑥ Max value — Indicate the max value of max torque recorded in statistics.

⑦ Min value — Indicate the min value of max torque recorded in statistics.

⑧ Average value — Indicate the average value of max torque recorded in statistics.

⑨ Standard deviation — Indicate the standard deviation recorded in statistics.

⑩ Denominator of standard deviation — Indicate the denominator of standard deviation chosen from making graph menu.

⑪ Upper limit value — Indicate the upper limit value input in making graph menu.

⑫ Lower limit value — Indicate the lower limit value input in making graph menu.

⑬ Number of upper limit NG — Indicate the number of bad max torque that brought by inputting value bigger than determinant upper limit value

⑭ Number of lower limit NG — Indicate the number of bad max torque that brought by inputting value smaller than lower limit value.

⑮ Fraction defective — Indicate the ratio of all data with number of upper limit NG, and with lower limit value.

- Formulary of standard deviation

You can choose the denominator formula of standard deviation in making graph menu.
Formulary is as following shows.

● In case of N−1

$$\text{Standard Deviation} = \sqrt{\frac{\sum (Xi - Average)^2}{N-1}}$$

Average ＝ Σ Xi / N

Xi ＝ Measuring data N ＝ number of memory data

● In case of N

$$\text{Standard Deviation} = \sqrt{\frac{\sum (Xi - Average)^2}{N}}$$

Average ＝ Σ Xi / N

Xi ＝ Measuring data N ＝ number of memory data

About number of upper limit NG .lower limit NG and Defective Rate

Defective Rate indicates the ratio of all data and the max torque of total determinant upper/lower limit value result H.L Formulary of Defective Rate is as following shows.

$$\text{Defective Rate (\%)} = \frac{\text{Number of upper limit NG} + \text{Number of lower limit NG}}{\text{Number of total data}} \times 100$$

Not indicate number of upper limit NG, lower limit NG and Defective Rate as the determinant upper/lower limit value are all 0.

7. 3 Frequency Distribution Graph

(1)Graph content

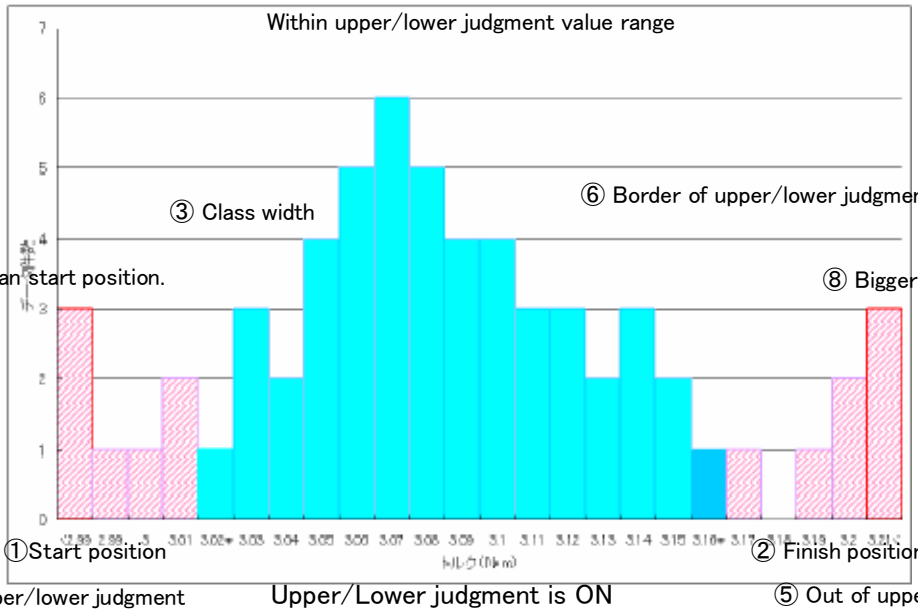
X axes: phase value of max torque Y axes: number of data

Width of phase, place to start (mix phase indicated in the graph) and place to stop (value included in max phase value indicated in the graph)will be inputted into the graph just finished.

Set division number automatically from width of phase value, place to start place to stop

(2)Graph format (when determination of upper/lower limit is ON)

When determination of upper/lower is ON (when upper limit value≠0 or lower limit value ≠0), it appears following graph.



⑤ Out of upper/lower judgment value range (LOW)

Upper/Lower judgment is ON

⑤ Out of upper/lower judgment value range (HIGH)

① Input the phase of ”start place” inputted in making graph menu.

② Torque phase included in [stop place] inputted making graph menu.

③ Width of phase range is the [phase width] inputted in making graph menu.

④ Torque data include in determination phase of upper/lower limit beyond range of determinant upper/lower limit is indicated with blue histogram

⑤ Histogram beyond the range of determinant upper/lower limit value phase is indicated with pink bias.

⑥ Histogram in the range of determinant upper/lower limit value phase is indicated with light blue.

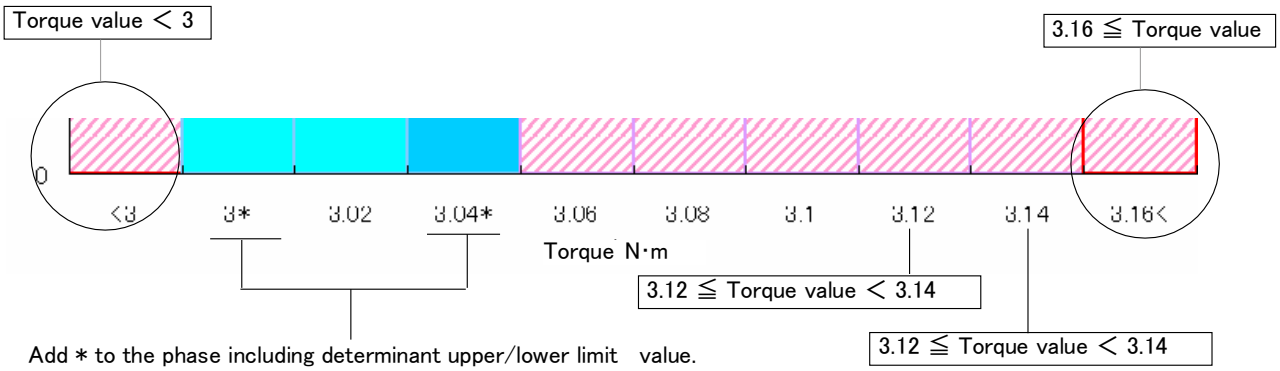
⑦ Torque data before start place is distribute in the initial phase of graph (red line indicates phase).

⑧ Torque data beyond stop place range is distribute in the initial phase of graph (red line indicates phase).

Indication of graph value is as following shows

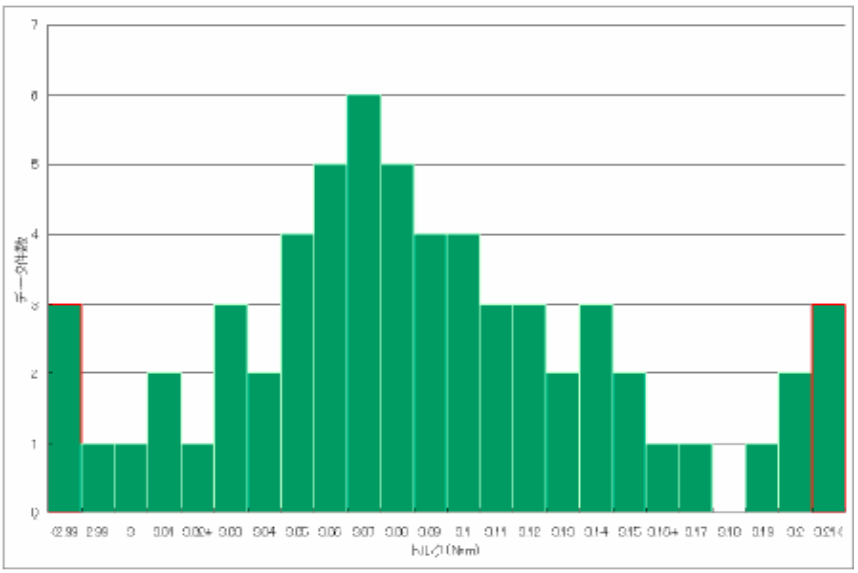
Range of each phase is [phase values ≦ torque value < dextral phase value], the max torque value suitable for this range distribute in this phase.

Fore item ⑦ is" torque value > start place" , ⑧ is the range of [phase value included in stop place phase +width of phaseshounari ≦ torque value.



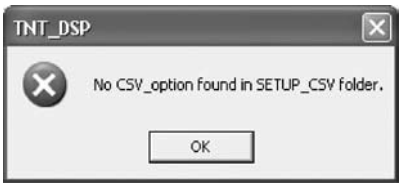
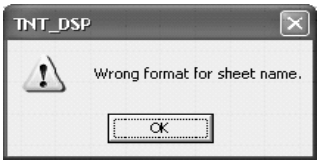
(3)Graph for max (when determination of upper/lower limit is OFF)

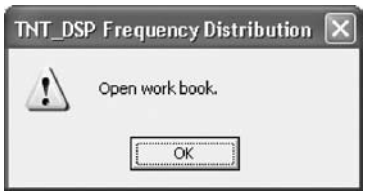
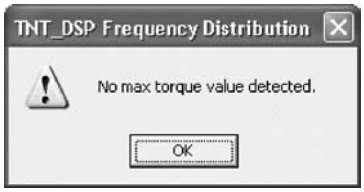
When determination of upper/lower limit is OFF (determinant upper limit value=determinant lower limit value =0), it can't distribute color according to each phase, And indicate as following format.



Upper/Lower judgment is OFF

8. Main mistake

Indicate mistake	Reason	Answer
	There is no essential file exist in C:¥prgram Files ¥ TNT_DSP_EN.	Please install TNT_DSP again.
	There is no essential file exist in C:¥program files ¥TNT- DSP_ SETUP -CSU file of.	Please install TNT_ DSP again .
	TNX and DSP-10 is not correctly connected .	Please connect TNX to DSP- 10 correctly ,then start up DSP-10.
	Choose communicating pant different with that setted in computer . The computer is not connected with DSP-10.	Please confirm whether com port is Right, if the problem can't be solved, please restart drive program of USB.
	Choose wrong com part DSP-10 is not start up (***indicate file name)	Please confirm whether the port number is right and the power source.
	Start measuring when change the state of page name.	Please don't change page name . Return to former page name when alarm.
	Start measuring when press special stop button.	Please confirm the special stop button of DSP-10.
	Exceed the limit of data that can input into excel.	Please make new page to measure.

Indicate mistake	Reason	Answer
	Value inputted is beyond input range (***indicate the input item and range of object).	Please correct input value according to suggestive information.
	Not satisfy the condition of input value (***indicate the input item and range of object).	Please correct input value according to suggestive information .
	Choose format beyond statistics , then choose [make frequency distribution graph].	Please choose statistics first, then choose [making frequency distribution graph].
	Choose [making frequency distribution graph]as choosing graph beyond statistics.	Please resent the statistics form .
	To make frequency distribution graph as there is no record of max in statistics torque data.	Please make frequency distribution graph as there exist max torque data.

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Nidec Shimpo Corporation change its company name to Nidec Drive Technology Corporation on April 1, 2023.