GIKEN

Mar.2023

GSK_N7

Setting Software Instruction manual

Setting Software Ver7.0.※※

GSK Interface Ver1899-7.0※※

GSK Controller Ver1851-7.※※

Before beginning operation

Caution

■Note

①Please read this instruction manual carefully in order to ensure that you use this product correctly.

②A part or no part of this instruction manual may be used or reproduced without the permission of GIKEN Industrial CO., LTD.

③Regarding the handling process and operation that aren't listed in this instruction manual, please think that they cannot be operated, and don't attempt to operate them. Any defect that would occur when the handling process or the operation that is not listed in this instruction manual is executed should be excluded in the scope of the warranty.

④Matters listed in this instruction manual are subject to change for the improvement without notice.

⑤For the product with special specifications, please consult us because it may not be pertinent to the use of this instruction manual.

⑥The personal computer for set up operation is an option. Please contact us if it is required.

Caution

■Measures in case of an emergency

If this product is in a dangerous condition, immediately turn OFF all power switches of the main unit or the connected equipment, or pull out all power cords from the plug outlets.

(「Dangerous condition」 means the condition when the fire break out or the danger to personal injury can be expected due to the excessive heat generation, smoking or ignition.)

Outline

This product is the set up software for the GSK/GSKW controller.

GSK • GSKW controller can be input setting data manually by the front side of controller, but we will use this software to input the setting data easily and simply.

By using setting PC, you can simplify the initial setting input and improve the maintenance due to the batch transmission function.

In addition, you can read the history of tightening and confirm torque waveform by tightening torque sampling.

Operating environment

OS：Windows XP(32bit, 64bit)

Windows Vista (32bit, 64bit)

Windows 7 (32bit, 64bit)

Windows 8 (32bit, 64bit)

RAM: Windows XP, Vista: 2GB or more, Windows 7, 8: 4GB or more

Installation directory: C:¥GIKEN¥GSK Setting_N7

Remarks 1) Initial password for writing to controller is “2014”.

Remarks 2) Please set COM port No. on “C:¥GIKEN¥GSK Setting_N7¥GSK.ini” file.

Remarks 3) Please set Controller Ver. No. on “C:¥GIKEN¥GSK Settng_N7¥GSK.ini” file.
(Please refer to “1. Before start setting software” in details)

Remarks 4) Please install USB driver of controller to communicate with setting software.
(Please refer to “1. Before start setting software” in details)

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1. Before start setting software

1-1. Install USB driver

Need to install USB driver to connect between GSK controller and setting software.

Please execute the following exe file in setting software disc;

32bit OS ⇒ Execute [VCP_V1.3.1_Setup.exe] and install

64bit OS ⇒ Execute [VCP_V1.3.1_Setup_x64.exe] and isntall

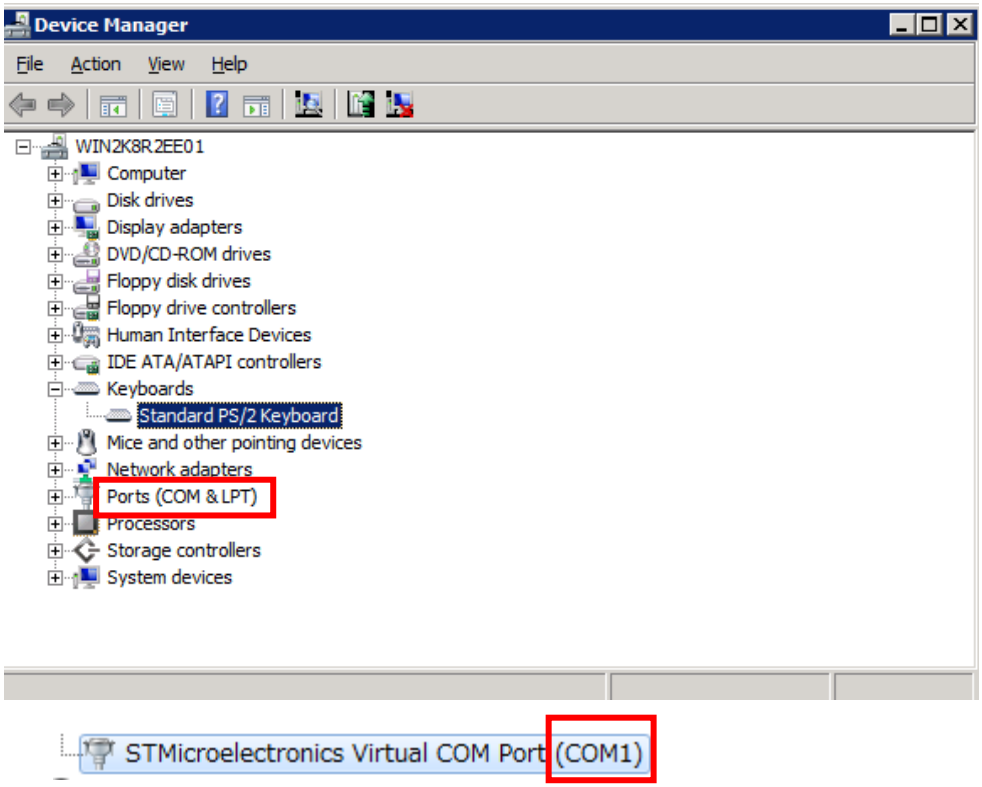
1-2. COM port setting

・Set COM port No. which is used in communication with controller.

Start GSK setting software and set on DISP・PC setting (inside “Main menu” ⇒ “Option”)

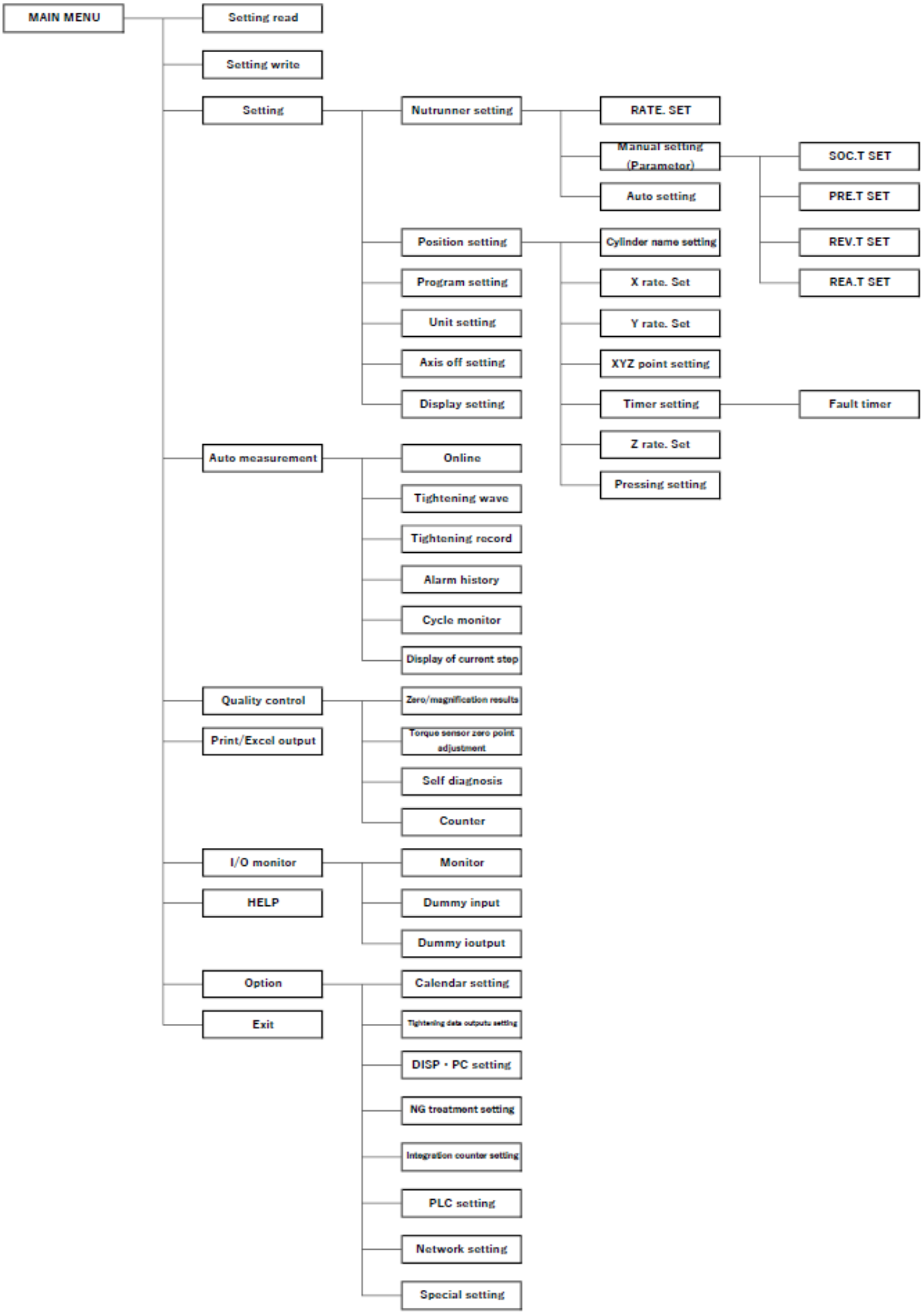
Or, open “¥GSK Setting_N7¥GSK.ini” and set ** part on “GSS_Com=**”.

*You can confirm COM No. in “Device Manager”



2. Screen structure and Communication check

2-1. Screen structure



2-2. Communication check in starting software

Inquiry "Do you want to communicate?" is shown when the program is started.

If you select “Yes”, version and communication check will be started.

If you select “No”, you enter the main menu without communication.

Fig (1-2): "Do you want to communicate?"

2-3. Communication check, Version check function

If you select "Yes" in the above window, automatically GSK controller does communication check and Version check.

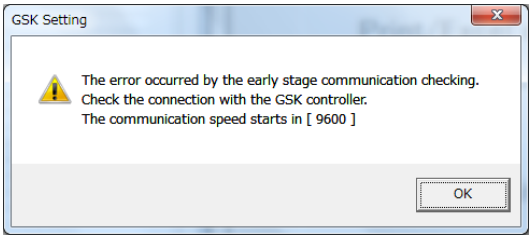


Fig (2-3-1): Initial communication check error

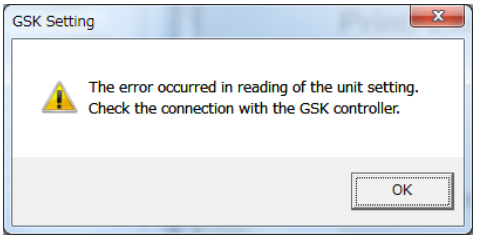
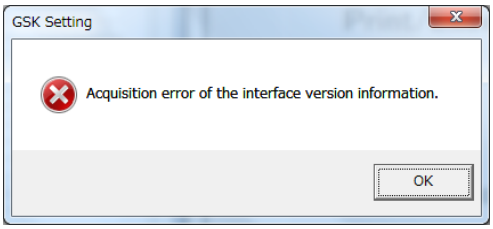


Fig (2-3-2): Unit setting acquisition error

Unit setting of GSK controller is acquired automatically in starting the program.



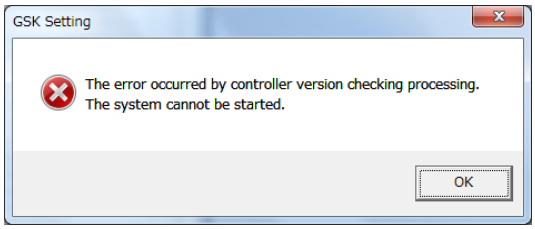


Fig (2-3-3): Controller version check error

Main confirmation points when error occurs;

- Initial communication check error : Confirmation of COM port setting on setting PC
- Error in reading unit setting : Confirmation of ARC-NET connection in controller
- Version check error : Confirmation of Setting software and GSK interface version

3. Main menu

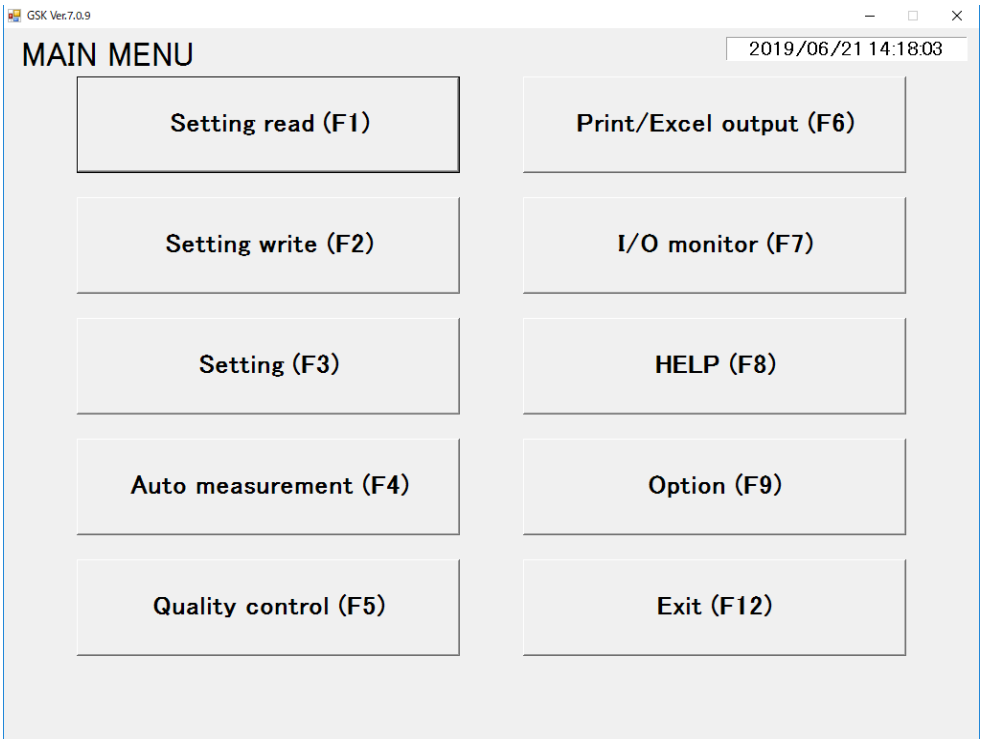


Fig (3-1) Main menu

- Setting read (F1) The setting data is read from file , controller or SD card.
- Setting write (F2) The setting data is written to file , controller or SD card.
- Setting (F3) Setting menu is displayed.
- Auto measurement (F4) Auto measurement menu is displayed.
- Quality control (F5) Quality control screen is displayed.
- Print/Excel output (F6) Print menu is displayed.
- I/O Monitor (F7) I/O monitor menu is displayed.
- Help (F8) Setting software instruction manual is displayed.
- Option (F9) Option menu is displayed.
- Exit (F12) Finish the program.

4. Setting read / write

You can read / write the GSK setting data from file, controller or SD card.

“Operation ready” off will be needed in writing setting to controller.

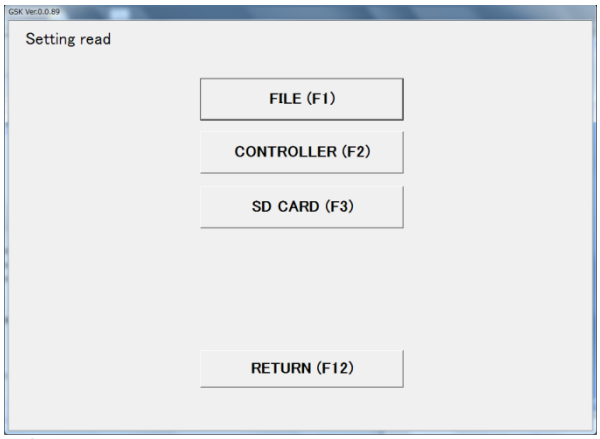


Fig (4-1): Setting read screen

・File (F1)

You can read / write “.GSK” file in PC etc.

・Controller (F2)

You can read / write setting from GSK controller with USB connection.

・SD card (F3)

You can read “.SD” file from SD card.

Or you can save “.SD” file to SD card or PC etc.

Supplement : file extension of each item and data included in “.GSK” file

The below figure shows each data which can be read by “Setting read (F1)” on Main menu (“.GSK” file);

○＝Include/×＝Not Include

Setting items	Individual extension	MAIN MENU Setting read・Setting write (Data included in .GSK)
Settiing Menu		
Display setting	GSKJ	○
Unit setting	GSKU	○
Axis off setting	GSKJG	○
Nutrunner setting		
RATE. SET	GSKT	○
SOC.T SET	GSKO	○
PRE.T SET	GSKK	○
REV.T SET	GSKG	○
REA.T SET	GSKH	○
Wave setting	GSKP	○
Position setting		
Cylinder name setting	GSKCN	○
X rate. Set	GSKXT	○
Y rate. Set	GSKXY	○
Z rate. Set	-	○
Timer setting	GSKST	○
XYZ point setting	-	○
Pressing setting	GSKZ	○
Program setting	GSKP	○
Option	GSKOP	○
Calendar setting		
Tightening data outputu setting		
DISP・PC setting		
NG treatment setting		
Integration counter setting		
PLC setting		
Network setting		
Special setting		
System GSK	GSKSY	×
GFB	GSKGF	×
IDCommunication setting	GSKID	×

4-1. File

After selecting “FILE (F1)” on “Setting read”, the below window will be shown.

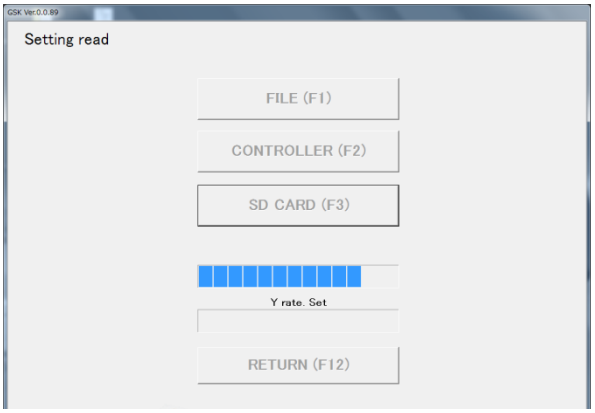
Fig (4-1-1): Select import files

You can read setting data files which saved on your setting PC.

You can read only “.GSK” extension file.

Please aware that you cannot read other setting files in this operation.

Please select a GSK setting file from the window.



After selecting the file, will start reading.
Then, reading progress is shown.

Fig (4-1-2): Progress of reading from “FILE”

After reading is completed, the below message will be shown.

After reading GSK setting file, will return to “Main menu”.

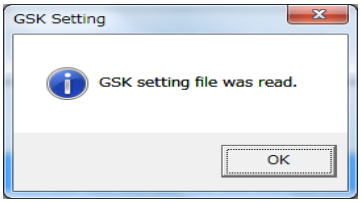


Fig (4-1-3): Completion message

4-2. Controller

GSK setting is read from setting value which saved inside GSK controller.

In case of reading setting file from GSK controller, GSK controller and PC must be connected by USB cable.

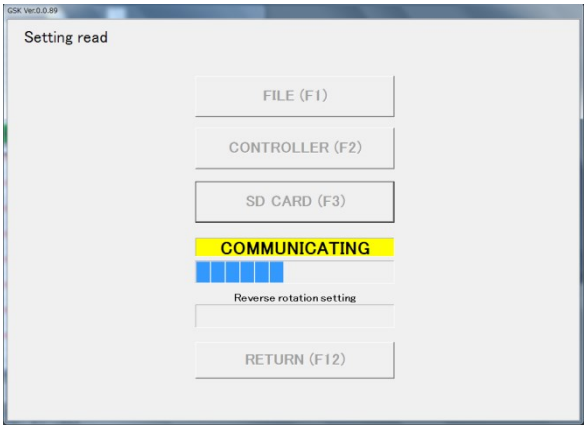


Fig (4-2-1): Progress of reading from “CONTROLLER”

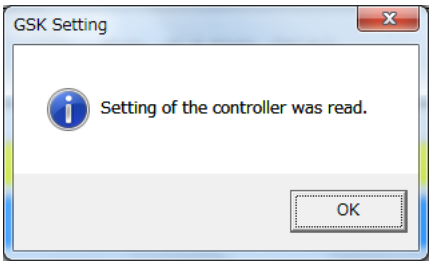


Fig (4-2-2): Completion message

After reading from controller is completed, the message as Fig (4-2-2) will be shown.

After reading GSK setting file from controller, will return to the “Main menu”.

4-3. SD card

You can read ".SD" extension file by "SD CARD (F3)"

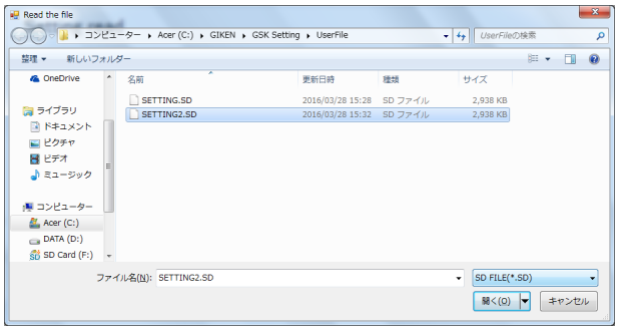


Fig (4-3-1): Import file window

After click "SD CARD (F3)" on "Setting read", the above window will be shown.

Please select and read ".SD" extension file.

*You can select not only from SD card, but from PC etc.

After select the file, the screen will be shown as below.

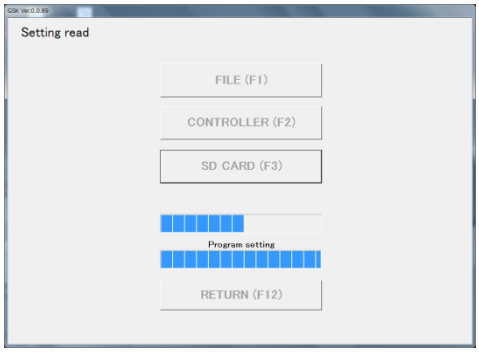


Fig (4-3-2): Progress of reading from SD card

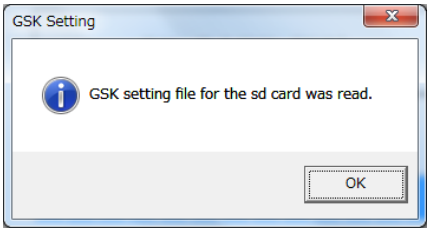


Fig (4-3-3): Completion message

After reading from SD card is completed, the message as Fig (4-3-3) will be shown.

After reading GSK setting file from SD card, return to "Main menu".

5. Setting

You can do various settings on “Setting” inside “Main menu”.

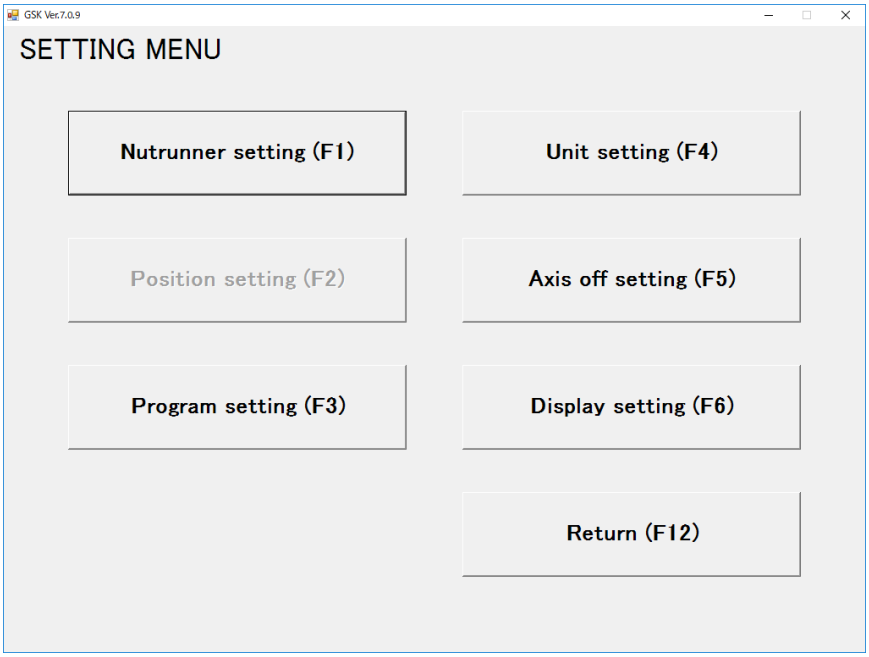


Fig (5-1): Setting Menu

- Nutrunner setting (F1) Various settings of Nutrunner.
- Position setting (F2) Settings of GSK positioning function *1
- Program setting (F3) Settings of Tightening program
- Unit setting (F4) Settings of each axis’ usage and each unit No.
- Axis off setting (F5) Settings of each axis off and its status (NG or OK)
- Display setting (F6) Settings of screw layout on display
- Return (F12) Return to Main Menu.

*1 You cannot select this item if only “N” axes are used on “Unit setting (F4)”

5-1. Display setting

You can set screw No. layout on display.

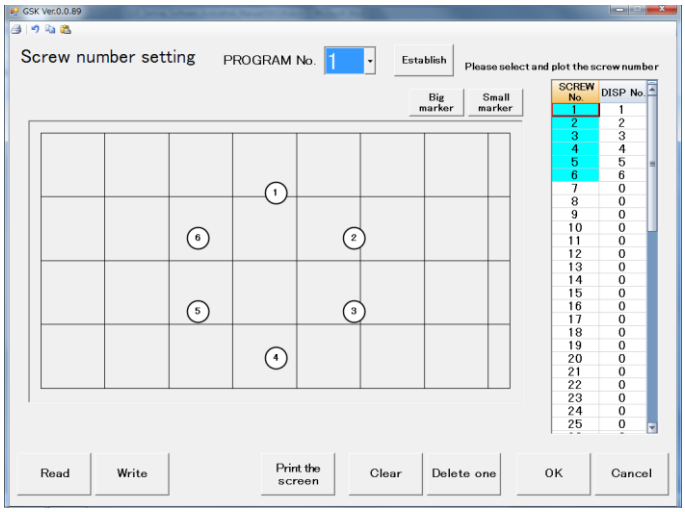


Fig (5-1-1): Display setting

[Item]

- PROGRAM No. Please select program No. which you want to set layout.
- Axis layout setting form You can set axis layout by clicking on the form.
- SCREW No. Please select screw No. which you want to use on this program.
- DISP No . Please select screw No. which you want to show on display.
- Big marker Will show big marker on display
- Small marker Will show small marker on display

[Button]

- Read Will show “Read the thread number setting”.
- Write Will show “Write the thread number setting”.
- Print the screen Will pint the screen.
- Clear Will delete all layout information on the screen.
- Delete one Will delete some screw layout information which selected on the screen.
- OK Can return to “SETTING MENU” with keeping the setting.
- Cancel Can return to “SETTING MENU” without keeping the setting.

Print screen (P) : Print the present screen

Undo (Z) : Cancel all changes

Copy (C) : Copy setting contents of the present program No.

Paste (P) : Paste copied information on designated program No.

5-2. Nutrunner setting

You can do setting of Nutrunner.

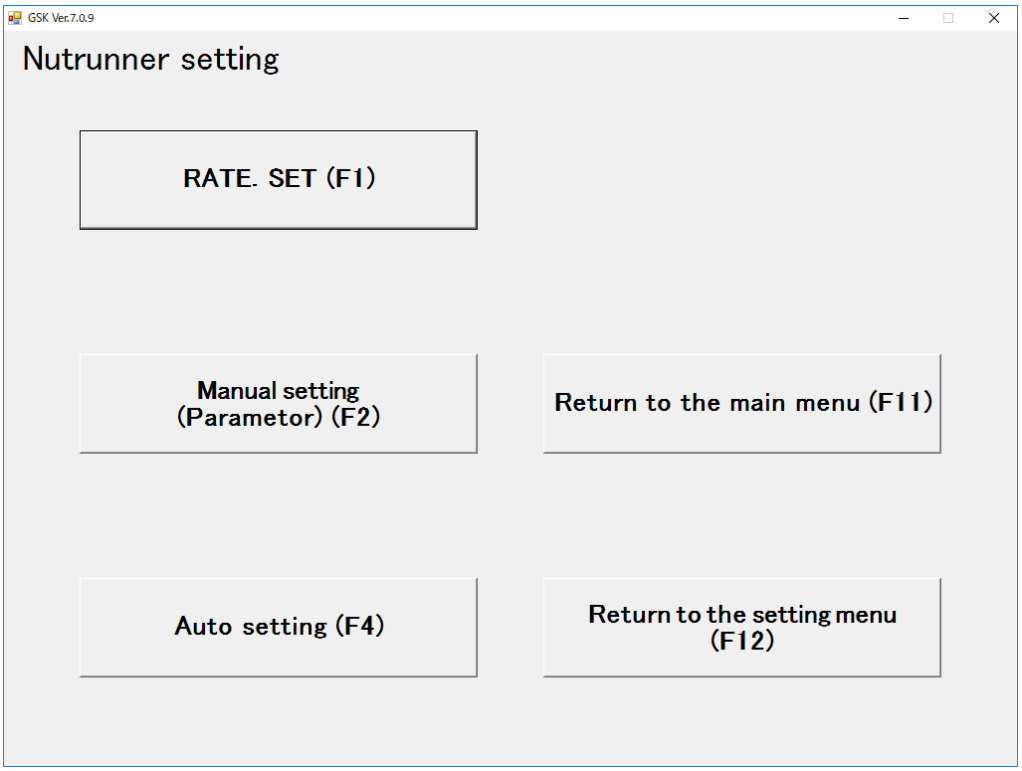


Fig (5-2-1): Nutrunner setting

- RATE. SET (F1) — Rate setting of Nutrunner
- Manual setting (Parameter) (F2) — Each tightening process setting by manual
- Auto setting (F4) — Auto tightening setting by rate data & tightening point
- Return to the main menu (F11) — Return to “Main menu”
- Return to the setting menu (F12) — Return to “Setting menu”

5-2-1. Rate setting

You can set “rate setting” of nutrunnner.

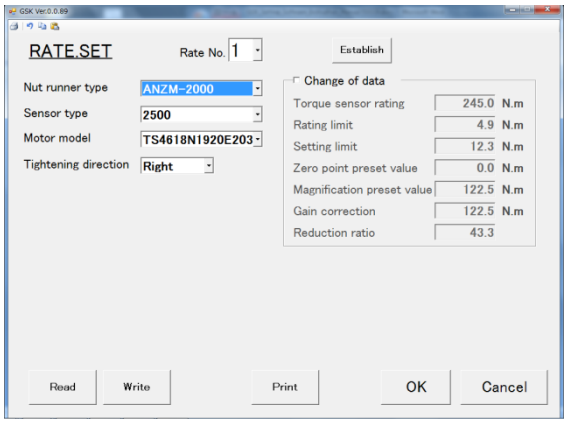


Fig (5-2-2): Rate setting

[Item]

・Nut runner type　You can select nut runner type.

*If nut runner type is chosen, sensor type, motor type and other data will be selected automatically.

・Sensor type　You can select torque sensor type.

*If sensor type is chosen, the related data will be reflected automatically.

・Motor type　You can select motor type.

・Change of data　You can change the below value by putting a check on this item

・Torque sensor rating (Input area：0～6550)　Setting of rate value of torque sensor.
Not recommend to change.

・Rating limit (Input area：0 to 3276.7)　Setting of Limit over value.
To detect abnormal fluctuation of magnification and zero offset value.

・Setting limit (Input area：0 to 3276.7)　Setting of Set over value.
To detect abnormality of magnification and zero offset value.

・Zero point preset value (Input area：0 to 3276.7)　Setting of Zero point preset value.

・Magnification preset value (Input area：0 to 3276.7)　Setting of Magnification preset value.

・Gain correction (Input area：0 to 3276.7)　Setting of Gain correction value.
To fluctuate detected torque by fluctuating this value.

・Reduction ratio (Input area：0 to 9999)	Setting of Reduction ratio of NR. Not recommend to change.
・Max speed	To show settable Max. rpm according to NR
・Max torque	To show settable Max. torque according to NR

Note 1）You can change “Torque sensor rating” value only when “Sensor type” is “OTHER”

Note 2）You cannot set against the input rules as follows;

・Rating limit ＜ torque sensor rate ・Setting limit ＜ torque sensor rate

・Zero point preset value ＜ torque sensor rate ・Magnification preset value ＜ torque sensor rate

・Gain correction ＜ torque sensor rate

[Button]

・Establish button	To fix changes. Not written to controller yet only by clicking this button
・Read button	To move to “Read the rating setting”.
・Write button	To move to “Write the rating setting”.
・Print button	To execute printing of Rate setting.
・OK button	To return to “Nutrunner setting” with keeping changed contents.
・Cancel button	To return to “Nutrunner setting” without keeping changed contents. Changed contents are also reset even if you click “Establish” before this operation.

Print screen (P) : Print the present screen

Undo (Z) : Cancel all changes

Copy (C) : Copy setting contents of the present setting No.

5-2-2. Manual setting

You can set tightening setting of Nut runner.

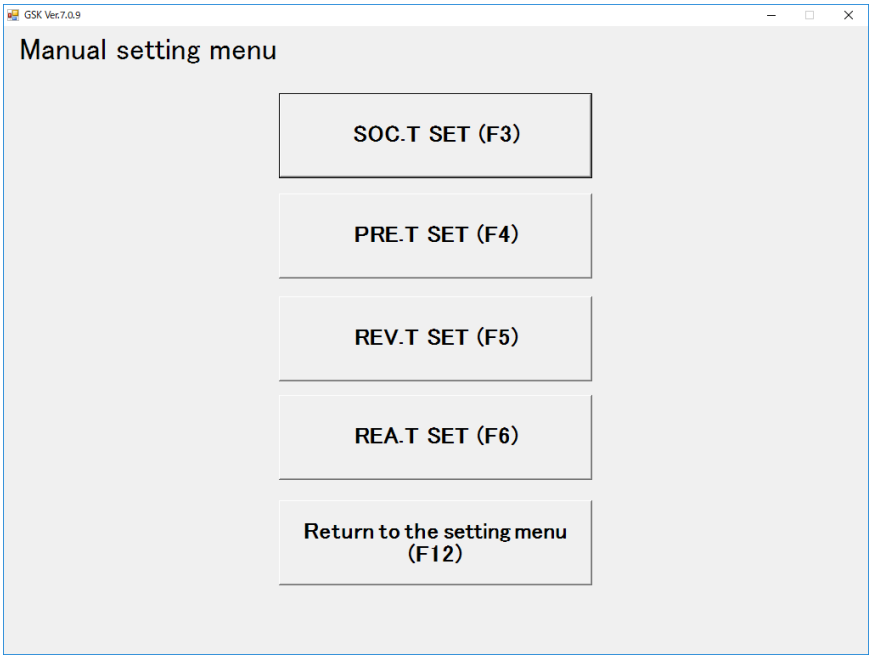


Fig (5-2-3): Manual setting menu

・SOC.T SET (F3) Setting of socket adjustment.
To move to the setting screen.

・PRE.T SET (F4) Setting of pre-tightening.
To move to the setting screen.

・REV.T SET (F5) Setting of reverse.
To move to the setting screen.

・REA.T SET (F6) Setting of final tightening.
To move to the setting screen.

・Return to the setting menu (F12) Return to “Nutrunner setting”.

5-2-2-1. Socket adjusting

You can do setting of fitting between socket and bolt.

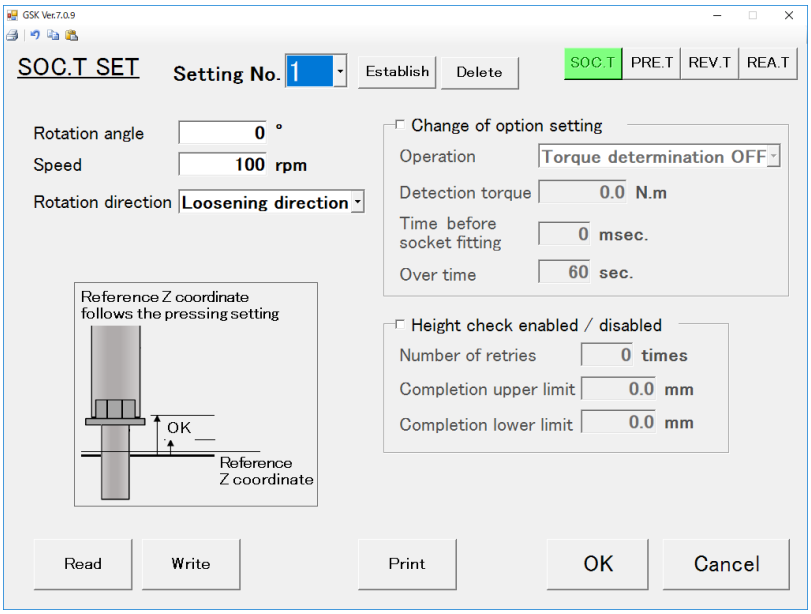


Fig (5-2-4): Socket adjusting

* You can move to "pre-tightening", "reverse rotation" and "final tightening" by clicking the upper right buttons.

[Item]

・Rotation angle (input area：0 to 9999)　　Setting of rotation angle in socket adjustment.

・Speed (input area：0 to 9999)　　Setting of speed in socket adjustment.

・Change of option setting　　You can set the below items if put a check on this item.

・Operation　　You can choose the below movements.

・Torque determination OFF ⇒ To stop movement by Rotation angle or Over time.
Not judge by “Detection torque”.

・One shot reverse ⇒ To reverse rotation but not loosened, and prevent socket from being bitten

・Fitting ⇒ To stop movement by reaching “Detection torque” and go to the next step.
Not reaching “Detection torque” is NG.
To be used for fitting confirmation between tightened bolt and socket.

・Gear check ⇒ Reaching “Detection torque” stops movement and output NG.
To check engagement of gears etc.

Remarks) Setting No. 50 of socket fitting is special for “One shot reverse”. Therefore, normal movement of socket fitting cannot be done. In addition, in setting No. 50, “Detection torque” is ignored due to automatic torque limit.

・Detection torque (input area：0 to 3276.7)　　Setting of “Detection torque” value.

・Time before socket fitting (input area：0 to 9999)　Setting of time until start movement.

・Over time (input area：0 to 60)　Setting of Max. movement time for socket fitting.

To stop movement and output NG if socket fitting not finished during this time.

・Height check enabled / disabled　To repeat socket fitting until reaching the designated coordinates by watching Z axis coordinates.

*This item becomes active when “Pressing setting” is set.

・Number of retries ⇒ Setting of repeat number of socket fitting.

To repeat socket fitting the set times until Z axis coordinates come into the limit area.

Or to stop socket fitting and go to next step regardless of this setting number if Z axis coordinates come into the limit area.

・Completion upper limit ⇒ To complete retry of socket fitting if Z axis coordinates over this setting value.

Setting datum is distance from Z axis coordinates which teaching has been done.

*Coordinates of “Pressing down” command which is in the previous block of this fitting block becomes datum.

・Completion lower limit ⇒ To output NG if Z axis coordinates over this setting value.

=About “Completion upper limit”, “Completion lower limit”=

Setting datum is distance from Z axis coordinates which teaching has been done.

*Z axis coordinates which teaching has been done means coordinates of X, Y axis moving block which is in the previous block of this fitting block.

In the setting of socket fitting, input check will be done according to the below conditions.

You cannot set against the input rules.

*Input check will not be done if “Rotation angle” is zero.

[Button]

・Establish button ⇒ To fix changes.

・Delete button ⇒ All changes in the present setting No. returns to the initial values.

・Read button ⇒ To move to “Read the socket fitting setting”.

・Write button ⇒ To move to “Write the socket fitting setting”.

・Print button ⇒ To execute printing of setting of socket fitting.

・OK button ⇒ To return to “Manual setting menu” with keeping changed contents.

・Cancel button ⇒ To return to “Manual setting menu” without keeping changed contents. Changed contents are also reset even if you click “Establish” before this operation.

Print screen (P) : Print the present screen

Undo (Z) : Cancel all changes of the present setting No.

Copy (C) : Copy setting contents of the present setting No.

5-2-2-2. pre-tightening

You can do setting of pre-tightening.

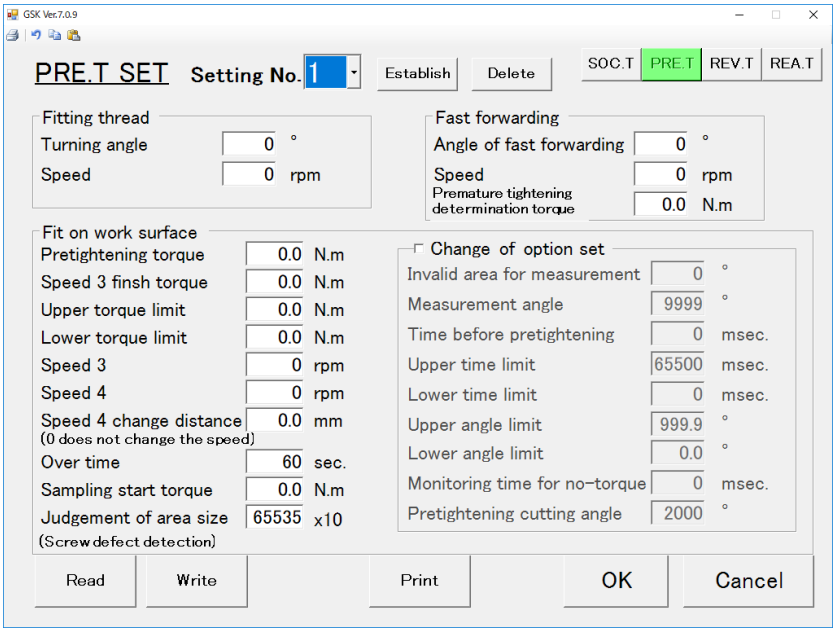


Fig (5-2-5): Pre-tightening

* You can move to "socket fitting", "reverse rotation" and "final tightening" by clicking the upper right buttons.

[Items]

・Fitting thread (setting in fitting thread and female thread)

・Turning angle (input area：0 to 9999) Setting of rotation angle in thread fitting.

・Speed (input area：0 to 9999) Setting of speed in thread fitting.

・Fast forwarding Setting from thread fitting finish until before fit on work surface.

・Angle of fast forwarding (input area：0 to 9999) Setting of rotation angle in fast forwarding.

・Speed (input area：0 to 9999) Setting of speed in fast forwarding.

・Premature tightening determination torque (input area：0 to 3276.7)

To output NG if the setting torque is detected.

Monitor range: from pre-tightening start until fast forwarding finish.

・Fit on work surface (movement until fit on work surface)

・Pre-tightening torque (input area：0 to 3276.7) Setting of target torque in pre-tightening.
To stop pre-tightening by reaching this torque.

・Speed 3 finish torque (input area：0 to 3276.7) Torque value to change from speed 3 to speed 4.

・Upper torque limit (input area：0 to 3276.7) Upper limit torque against pre-tightening torque.
Threshold for torque over NG.

・Lower torque limit (input area：0 to 3276.7) Lower limit torque against pre-tightening torque.
Threshold for torque under NG.

・Speed 3 (input area：0 to 9999) Speed mainly in fitting on work surface.

・Speed 4 (input area：0 to 9999) Final tightening speed in pre-tightening.

・Speed 4 change distance (input area：0 to 9999) To change speed by using Z axis coordinates.
*Can be used in pressing control.

・Over time (input area：0 to 60) Setting of Max. movement time in pre-tightening.
To stop movement and output NG If over this time setting.

・Sampling start torque (input area：0 to 3276.7) Starting point torque for upper / lower limit of time and angle.

・Judgment of area size (input area：0 to 65535) Setting of area size value used for judging screw defect.

・Change of option set

・Invalid area for measurement (input area：0 to 9999) Setting the area not used for area judgement by angle.
Stretched waveform (angle – torque) to be used for area judgement.

・Measurement angle (input area：0～9999) Setting angle for measuring area.

・Time before pre-tightening (input area：0 to 65500) Setting of time before start rotation.

・Upper time limit (input area：0 to 65500) Setting of upper time limit for judging time.

・Lower time limit (input area：0 to 65500) Setting of lower time limit for judging time.

・Upper angle limit (input area：0 to 999.9) Setting of upper angle limit for judging angle.

・Lower angle limit (input area：0 to 999.9) Setting of lower angle limit for judging angle.

・Monitoring time for no torque (input area：0 to 65500) No torque judgment time from start movement.

・Pre-tightening cutting angle (input area：0 to 9999)　Setting of Max. angle in pre-tightening.

In Pre-tightening setting, input check will be done according to the below conditions.
You cannot set against the input rules.
In case of both speed 3 and speed 4 are zero, input check not done.

・Over time＞= 1　・Angle of fast forwarding＞=rotation angle　・Upper torque limit＞Lower torque limit
・Upper time limit＞Lower time limit　・Upper angle limit＞Lower tangle limit
・Pre-tightening torque＞Sampling start torque　・Upper torque limit＞Pre-tightening torque＞Lower torque limit

[Button]
・Establish button　⇒　To fix changes.

・Delete button　⇒　All changes in the present setting No. returns to the initial values.

・Read button　⇒　To move to “Read the pre-tightening setting”.

・Write button　⇒　To move to “Write the pre-tightening setting”.

・Print button　⇒　To execute printing of setting of pre-tightening setting.

・OK button　⇒　To return to “Manual setting menu” with keeping changed contents.

・Cancel button　⇒　To return to “Manual setting menu” without keeping changed contents.
Changed contents are also reset even if you click “Establish” before this operation.

Print screen (P)　:　Print the present screen

Undo (Z)　:　Cancel all changes of the present setting No.

Copy (C)　:　Copy setting contents of the present setting No.

5-2-2-3. reverse rotation

You can do setting of reverse rotation. Mainly detect seizure and abnormality of bolt.

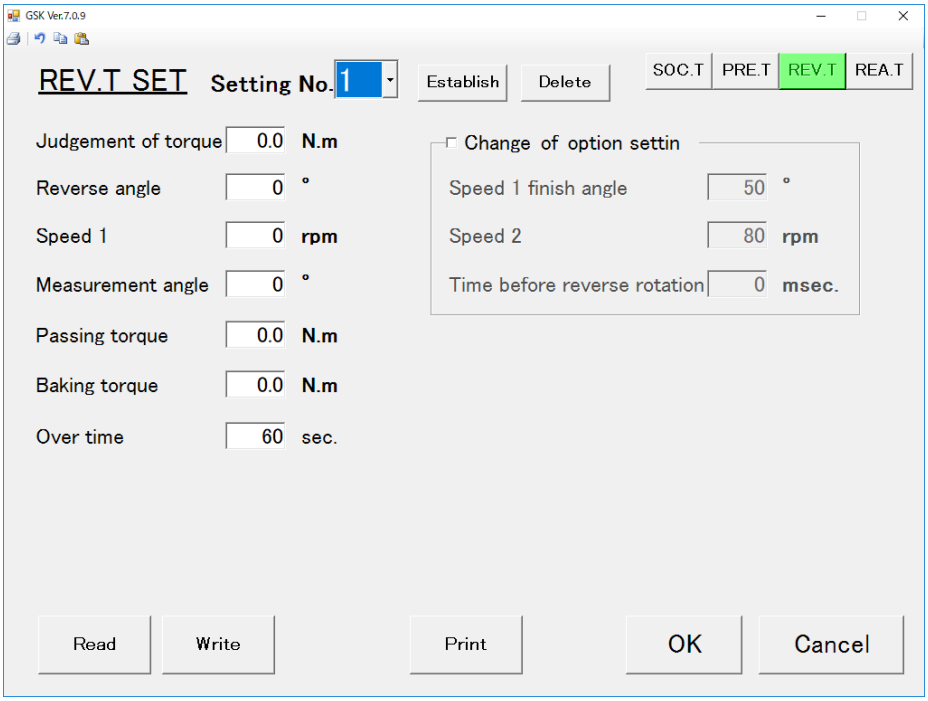


Fig (5-2-6): reverse rotation

* You can move to "socket fitting", "pre-tightening" and "final tightening" by clicking the upper right buttons.

[Items]

・Judgment of torque (input area：0 to 3276.7) Setting of judgement torque for judging screw defect. To judge by measuring torque in measurement angle.

・Reverse angle (input area：0 to 9999) Setting of rotation angle in reverse rotation.

・Speed 1 (input area：0 to 9999) Setting of speed in starting movement. Normally, to be set in low speed for loosening.

・Measurement angle (input area：0 to 9999) Setting of angle of measuring torque for detecting screw defect.

・Passing torque (input area：0 to 3276.7) Torque setting for detecting broken screw etc. If not detecting this torque in reverse rotation, “No detection of reverse passing torque NG” will be output.

・Baking torque (input area：0 to 3276.7) Setting of torque for judging screw defect.

・Over time (input area：0 to 60)　　Setting of Max. movement time in reverse rotation.
To stop movement and output NG if not finish movement within this time.

[Change of option setting]

・Speed 1 finish angle (input area：0 to 9999)　Setting of angle for switching from speed 1 to speed 2.

・Speed 2 (input area：0 to 9999)　　To loosen bolts by this speed.
Normally, speed 1 in low speed and speed 2 in high speed.

・Time before reverse rotation　　Setting of waiting time before starting reverse rotation.
(input area：0 to 65500)

In reverse rotation setting, input check will be done according to the below conditions.
You cannot set against the input rules.
*In case that “Reverse angle” is zero, input check not done.
・Over time＞=1　・Reverse angle＞=Measurement angle　・Reverse angle＞=Speed 1 finish angle

[Button]

・Establish button　⇒　To fix changes.
・Delete button　⇒　All changes in the present setting No. returns to the initial values.
・Read button　⇒　To move to “Reading the reverse rotation setting”.
・Write button　⇒　To move to “Write the reverse rotation setting”.
・Print button　⇒　To execute printing of setting of reverse rotation setting.
　・OK button　⇒　To return to “Manual setting menu” with keeping changed contents.
　・Cancel button　⇒　To return to “Manual setting menu” without keeping changed contents.
Changed contents are also reset even if you click “Establish” before this operation.

Print screen (P)　：Print the present screen
Undo (Z)　：Cancel all changes of the present setting No.
Copy (C)　：Copy setting contents of the present setting No.
Paste (P)　：Paste copied information on the present setting No.

5-2-2-4. final tightening

You can do setting of final setting.

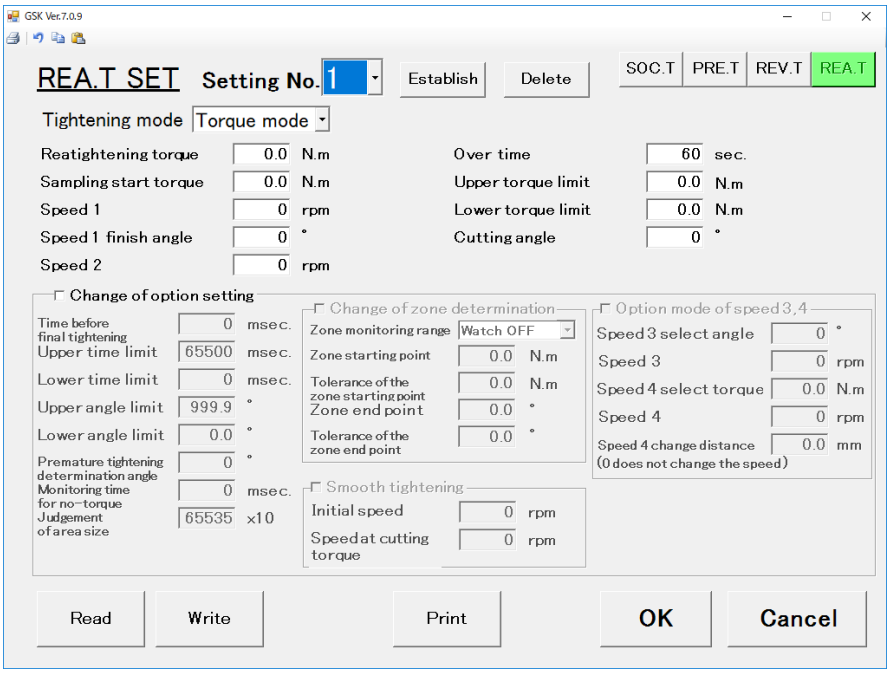


Fig (5-2-7): final tightening (torque mode)

* You can move to "socket fitting", "pre-tightening" and "reverse rotation" by clicking the upper right buttons.

Final tightening – Torque mode

[Items]

・Tightening mode　　To decide tightening method in final tightening.
To select from “Torque mode” and “Angle mode”.

・Real tightening torque　　Setting of target torque in final tightening.
(input area：0 to 3276.7)

・Sampling start torque　　Setting of measuring start torque for judging angle and time
(input area：0 to 3276.7)

・Speed 1 (input area：0 to 9999)　　Setting of rotation speed in starting movement.

・Speed 1 finish angle　　Setting of angle value for switching from speed 1 to speed 2.
(input area：0 to 9999)

・Speed 2 (input area：0 to 999)　　Setting of rotation speed after reaching “Speed 1 finish angle”
In case of no use of speed 3 and speed 4, this setting will be final tightening speed.

・Over time (input area：1 to 60)　Setting Max. movement time in final tightening.
To stop movement and output NG if final tightening not finish within this time.

・Upper torque limit　Setting of upper torque limit for target torque.
(input area：0 to 3276.7)

・Lower torque limit　Setting of lower torque limit for target torque.
(input area：0 to 3276.7)

・Cutting angle (input area：0 to 9999)　Setting of Max. movement angle in this movement.
To stop movement and judge torque in reaching this angle.

[Change of option setting]

・Time before final tightening　Setting of waiting time before starting final tightening.
(input area：0 to 65500)

・Upper time limit (input area：0 to 65500)　Setting of upper time limit in final tightening.

・Lower time limit (input area：0 to 65500)　Setting of lower time limit in final tightening.

・Upper angle limit (input area：0 to 999.9)　Setting of upper angle limit in final tightening.

・Lower angle limit (input area：0 to 999.9)　Setting of lower angle limit in final tightening.

・Premature tightening determination angle　Setting of angle used for judging early tightening error.
(input：0 to 9999)　When the tightening torque is exceeded within this set angle　Premature tightening NG is output

・Monitoring time for no torque　During this time from start movement, not judge torque.
(input area：0 to 65500)

・Judgment of area size　Setting of area value used for judging screw defect.
(input area：0 to 65535)　This area is calculated from stretched waveform.
Please set based upon the result value of “Auto measurement”.

・Change of zone determination　In normal movement, a slope of torque is stable.
To judge according to variations of the slope.

・Zone monitoring range　To select from the below patterns.

“Watch off”　⇒　Not do zone judgement.

“Lower off”　⇒　Not judge lower limit in zone judgement.

“Upper off”　⇒　Not judge upper limit in zone judgement.

“Watch on”　⇒　To judge by using upper / lower limit in zone judgement.

・Zone starting point　　Setting of starting torque in zone judgement.
(input area：0 to 3276.7)
・Tolerance of the zone starting point　　Setting of tolerance of starting torque in zone judgement.
(input area：0 to 3276.7)
・Zone end point (input area：0 to 999.9)　　Setting of finish angle in zone judgement.
To finish zone in passing this angle from start point angle.
・Tolerance of the zone end point　　Setting of tolerance of finish angle in zone judgement.
(input area：0 to 999.9)

・Smooth tightening　　To tighten by changing speed automatically according to time and torque from start tightening until reaching cutting torque and finish.
・Initial speed (input area：0 to 9999)　　Setting of starting speed in smooth tightening.
・Speed at cutting torque　　Setting of speed when reaching cutting torque.
(input area：0 to 9999)

・Option mode of speed 3,4　　To add speed 3 and speed 4 in final tightening.
・Speed 3 select angle　　Setting of angle for switching to speed 3 from final tightening start.
(input area：0 to 9999)
・Speed 3 (input area：0 to 9999)　　Setting of rotation speed of speed 3.
・Speed 4 select torque　　Setting of torque for switching to speed 4.
(input area：0 to 3276.7)
・Speed 4 (input area：0 to 9999)　　Setting of rotation speed of speed 4.
・Speed 4 change distance　　To switch speed by using Z axis coordinates.
(input area：0 to 3276.7)　　*Can be used in Pressing control

Setting datum is distance from Z axis coordinates which teaching has been done.

*Z axis coordinates which teaching has been done means coordinates of X, Y axis moving block which is in the previous block of this fitting block.

In final tightening – torque mode setting, input check will be done according to the below conditions.
You cannot set against the input rules.
*In case that “Cutting angle” is zero, input check not done.

・Over time＞=1　・Upper torque limit＞Lower torque limit　・Upper time limit＞Lower time limit
・Upper torque limit＞Real-tightening torque＞Lower torque limit
・Initial speed＞=Speed at cutting torque

[Button]

・Delete button ⇒ All changes in the present setting No. returns to the initial values.

・Read button ⇒ To move to “Read the real tightening setting”.

・Write button ⇒ To move to “Write the real tightening setting”.

・Print button ⇒ To execute printing of setting of final tightening setting.

・OK button ⇒ To return to “Manual setting menu” with keeping changed contents.

・Cancel button ⇒ To return to “Manual setting menu” without keeping changed contents. Changed contents are also reset even if you click “Establish” before this operation.

Print screen (P) : Print the present screen

Undo (Z) : Cancel all changes of the present setting No.

Copy (C) : Copy setting contents of the present setting No.

Paste (P) : Paste copied information on the present setting No.

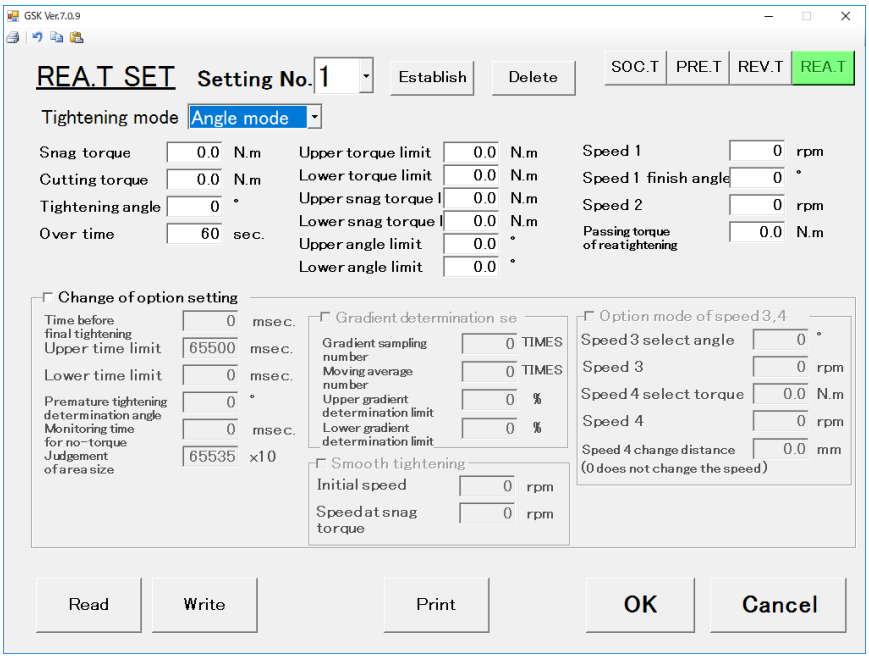


Fig (5-2-8): final tightening (angle mode)

* You can move to "socket fitting", "pre-tightening" and "reverse rotation" by clicking the upper right buttons.

Final tightening－angle mode

[Items]

・Tightening mode　To decide tightening method in final tightening.
To select “Angle mode”.

・Snag torque (input area：0～3276.7)　Torque for starting angle-mode tightening.
To set the value which torque rise becomes stable after seating.

・cutting torque (input area：0～3276.7)　To stop the movement if over this value before reaching target tightening angle.

・Tightening angle (input area：0～9999)　Setting of target angle from snug torque.
Normally, to stop the movement by this setting.

・Over time (input area：0～60)　Setting of Max. movement time in final tightening.

・Upper torque limit　Setting of upper torque limit for target torque.
(input area：0 to 3276.7)　To set lower value against cutting torque.

・Lower torque limit　Setting of lower torque limit for target torque.
(input area：0 to 3276.7)

・Upper snag torque limit　Setting of upper torque limit for snag torque.
(input area：0 to 3276.7)

・Lower snag torque limit Setting of lower torque limit for snag torque.
(input area：0 to 3276.7)
・Upper angle limit Setting of upper angle limit for tightening angle.
(input area：0 to 999.9)
・Lower angle limit Setting of lower angle limit for tightening angle.
(input area：0 to 999.9)
・Speed 1 (input area：0 to 9999) Setting of rotation speed in starting final tightening.
・Speed 1 finish angle Setting of rotation angle with speed 1.
(input area：0 to 9999) To switch to speed 2 after reaching this angle.
・Speed 2 (input area：0 to 999) Setting of speed value of speed 2.
・Passing torque of real tightening The torque which monitoring torque down after snag torque.
(input area：0 to 3276.7) To output NG if under this torque after passing snag torque.

*If “Passing torque of real tightening” is set in bigger than “Snag torque”, the movement will be stopped in reaching snag torque and NG is output.

[Change of option setting]
・Time before final tightening Setting of waiting time before starting this movement.
(input area：0 to 65500)
・Upper time limit (input area：0 to 65500) Setting of upper time limit in this movement.
・Lower time limit (input area：0 to 65500) Setting of lower time limit in this movement.
・Premature tightening determination angle Setting of the angle used for judging early tightening error.
(input area：0 to 9999) To output NG if over this angle.
・Monitoring time for no torque During this time from start movement, not judge torque.
(input area：0 to 65500)
・Judgment of area size Setting of area value used for judging screw defect.
(input area：0 to 65535) This area is calculated from stretched waveform.
Please set based upon the result value of “Auto measurement”.

・Gradient determination setting To confirm whether the slope just before end is lower than the slop in start by detecting both torque.

・Gradient sampling number　To set sampling range by “0.5 * Gradient sampling number”.
(input area：0 to 99)
・Moving average number　To set number of sampling.
(input area：0 to100)　After getting torque rise value, calculate the average
by this number.
・Upper gradient determination limit　Setting of upper gradient determination limit by %.
(input area：0 to 100)
・Lower gradient determination limit　Setting of lower gradient determination limit by %.
(input area：0 to 100)

・Smooth tightening　To tighten by changing speed automatically according to time and torque from start tightening until reaching cutting torque and finish.
・Initial speed (input area：0 to 9999)　Setting of starting speed in smooth tightening.
・Speed at cutting torque　Setting of speed in reaching cutting torque.
(input area：0 to 9999)

・Option mode of speed 3,4　To add speed 3 and speed 4 in final tightening.
・Speed 3 select angle　Setting of angle for switching to speed 3 from final tightening start.
(input area：0 to 9999)
・Speed 3 (input area：0 to 9999)　Setting of rotation speed of speed 3.
・Speed 4 select torque　Setting of torque for switching to speed 4.
(input area：0 to 3276.7)
・Speed 4 (input area：0 to 9999)　Setting of rotation speed of speed 4.
・Speed 4 change distance　To switch speed by using Z axis coordinates.
(input area：0 to 3276.7)　*Can be used in Pressing control

Setting datum is distance from Z axis coordinates which teaching has been done.

*Z axis coordinates which teaching has been done means coordinates of X, Y axis moving block which is in the previous block of this fitting block.

In final tightening – angle mode setting, input check will be done according to the below conditions.

You cannot set against the input rules.

*In case that “Tightening angle” is zero, input check not done.

・Over time＞=1

・Upper torque limit＞Lower torque limit

・Upper time limit＞Lower time limit

・Upper angle limit＞Lower angle limit

・Upper snag torque limit＞Lower snag torque limit

5-2-3. auto setting

You can do tightening setting of nut runner automatically.

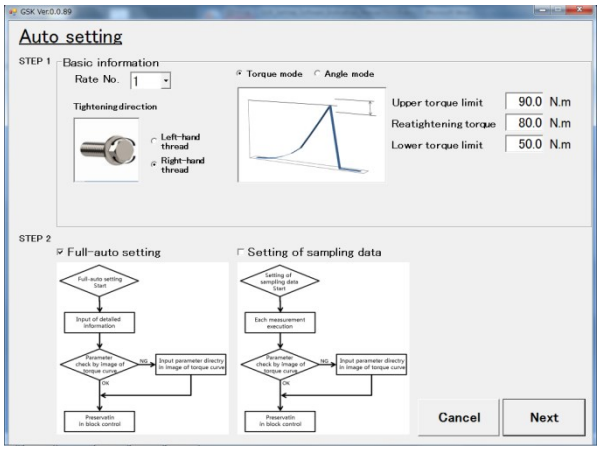


Fig (5-2-9): Torque mode

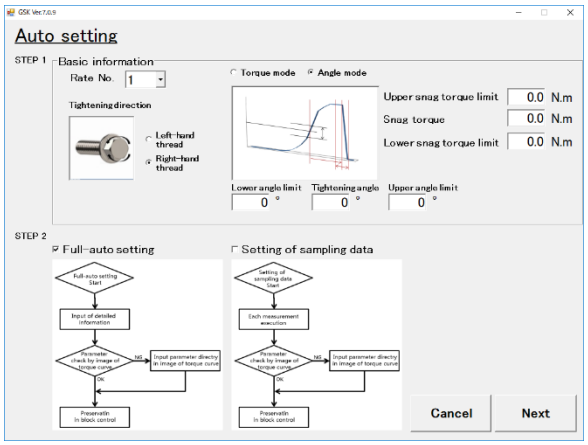


Fig (5-2-10): Angle mode

*Before doing this setting, you need to do “Rate setting” of nut runner.

[STEP 1]

To input basic information of tightening.

Basic information　　To input basic information of nut runner.
Basic information are Rate of nut runner, Tightening direction,
Tightening mode of final tightening and tightening target.

*Setting contents of tightening target is changed according to each tightening mode.
The difference of setting contents are as follows;

・Torque mode　　Setting of final tightening torque and its upper / lower torque limit.

・Angle mode　　Setting of snag torque, its upper / lower torque limit, tightening angle and its upper / lower angle limit.

[Items]

・Rate No.　　Setting of rate of nut runner.

・Tightening direction　　To select tightening direction.

・Torque mode, Angle mode　　To select tightening mode.

[Torque mode]

Rea tightening torque　　Setting of target torque of final tightening.

Upper torque limit　　Setting of upper limit of final tightening torque

Lower torque limit　　Setting of lower limit of final tightening torque.

[Angle mode]

Snag torque	Starting point torque in angle control after bolt seating in final tightening.
Upper snag torque limit	Setting of upper limit of snag torque.
Lower snag torque limit	Setting of lower limit of snag torque.
Tightening angle	Setting of rotation angle after passing snag torque.
Upper angle limit	Setting of upper limit of tightening angle.
Lower angle limit	Setting of lower limit of tightening angle.

[STEP 2]

To select setting flow in auto setting.

There are 2 patterns of flow. Input contents from next page are changed according to each pattern.

[Items]

・Full-auto setting To do setting automatically by inputting information of screw.

・Setting of sampling data To make tightening setting based upon the information which are collected by auto sampling.

[Button]

・Next To move to next page after checking the input information.

・Cancel To finish “Auto setting” and return to “Nutrunner setting”.
Normally, if clicking this button, return to “Nutrunner setting” and reset.
But, Not be reset if move to next page once.

5-2-3-1. full-auto setting

You can move to “Standard setting” if you select “Full-auto setting” in “Auto setting” and click “Next”.

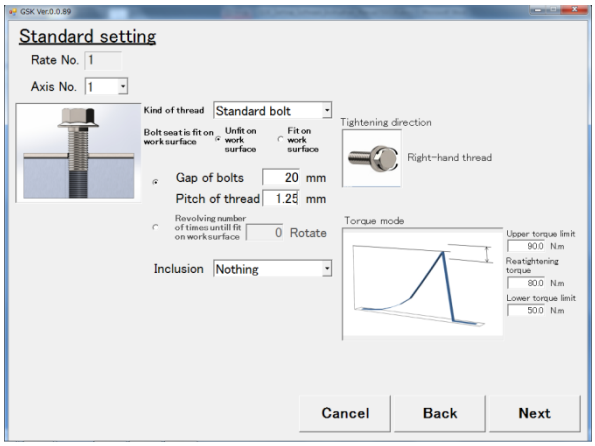


Fig (5-2-11): Standard setting

Setting of tightening objects

[Items]

・Rate No. To show Rate No. which was input in “Auto setting”.

・Axis No. To select axis which the block made in this setting is assigned.

・Kind of thread To select kind of thread of tightening object.

By this selection, movement contents included in block are changed.

・Standard bolt → Socket fitting + Pre-tightening + Reverse + Final tightening

・Nut → Socket fitting + Pre-tightening + Reverse + Final tightening

・Bolt with sealing compound → Socket fitting + Pre-tightening + Final Tightening

・Bolt seat is fit on work surface

Setting of seating condition of bolt in starting tightening.

If select “Fit on work surface”, “Pre-tightening” is excluded from the above contents.

In addition, information input of “Gap of bolts” etc. becomes invalid.

・Gap of bolts, Pitch of thread　To input gap between bottom of bolt head and work surface and pitch of thread for angle information until seating.

This setting becomes valid in case of “Unfit on work surface”.

If select this setting, “Revolving number of times until fit on work surface” becomes invalid.

・Revolving number of times until fit on work surface

To input number of rotations until seating.

Based upon this, angle until seating is calculated.

This setting becomes valid in case of “Unfit on work surface”.

・Inclusion　To be selected if any inclusion which reflect on tightening between bolt and work surface.

If “FIPG” is selected, “Reverse” is excluded from movement contents.

[Button]

・Next　To move to “Screen for image of torque curve” after checking input.

・Back　To return to “Auto setting” with reset input.

・Cancel　To return to “Nutrunner setting” with reset input.

After input in “Standard setting” is finished, “Next” button becomes valid.

Then move to “Screen for image of torque curve”.

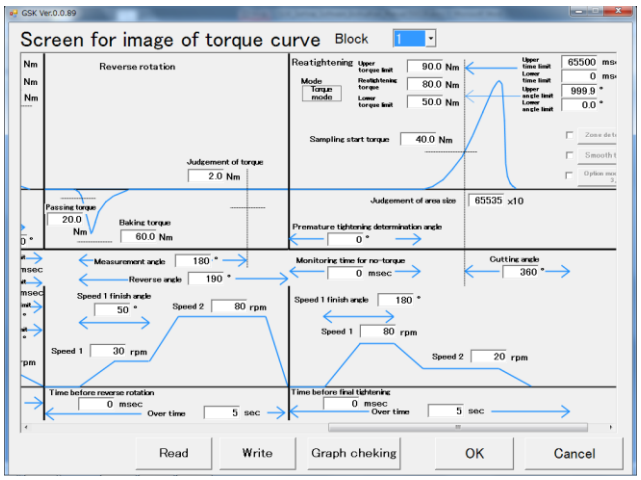


Fig (5-2-12): Screen for image of torque curve

In this page, you can confirm waveform which is made by auto setting.

[Items]

- Block — You can change block No. which were already set before.
- Setting items — Please confirm setting items of each movement in manual setting.

[Button]

- Read — To open “Setting read”.
  This “Read” is same function as that in “Main menu”.
- Write — To open “Setting write”.
  This “Write” is same function as that in “Main menu”.
- Graph checking — To open “Graph checking for torque curve”.
  In this page, you can confirm simple cycle time and rough torque curve by value.
- OK — To return to “Nutrunner setting” with keeping setting inside setting software.
- Cancel — To return to “Standard setting” without keeping setting which is made automatically.

5-2-3-2. setting of sampling data

"Setting of sampling data" is shown if click "Next" after selecting "Setting of sampling data" in "Auto setting".

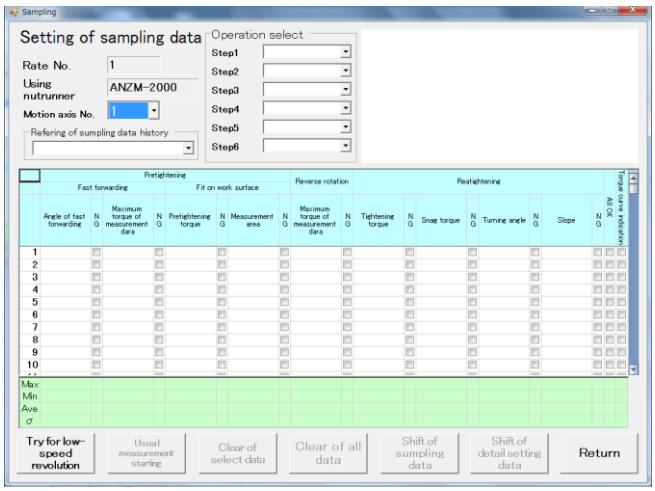


Fig (5-2-13): Setting of sampling data

[Items]

- Rate No. Rate No. of nutrunner is shown.
- Using nutrunner Nutrunner which is defined on the above rate No. is shown.
- Motion axis No. To select axis No. to be assigned.
- Operation select To select movement in each step (1～6).
  No need to select in all steps.

[Buttons]

- Try for low speed revolution To start sampling in low speed rotation.
- Usual measurement starting This button becomes valid after collecting information in "Try for low speed revolution".
  To continue making setting automatically based upon basic information and result of "Try for low speed revolution".
- Clear of select data To reduce the selected data on the information result list.
- Clear of all data To reduce all result data on the list.

・Shift of sampling data　　To save result data as file in setting PC.
The saved data can be read from “Referring of sampling data history”.

・Shift of detail setting data　　To show details on “Screen for image of torque curve” after fixing the settings which was checked in “All OK”.

・Return　　To return to “Auto setting”.

*As for setting of tightening sampling cutting torque, please refer to
"GSK controller instruction manual 6-1 *Tightening sampling cutting torque setting procedures” (Ver.8～).

***Flow of “Setting of sampling data”**

Sampling is set in flow as follows;

① Selection of movement to be set

To select movement to be set in “Operation select”.

Selectable movements are “SOC. T”, “PRE. T”, “REV. T” and “REA. T”.

② Measurement of angle until seating by low speed rotation try.

To measure by low speed rotation try to confirm tightening stroke of bolt and existence of inclusion.

This operation cannot be done if “Operation ready completed” is not output.

Measurement starts by clicking “Try for low speed revolution” under same conditions as actual tightening.

If measurement starts, “A low-speed revolution is being tried” is displayed.

You can cancel low speed rotation try by “Cancel” button.

During low speed rotation try, the rotation speed is 40 rpm, which is specified speed, and the angle until reaching tightening sampling cutting torque is measured.

After reaching tightening sampling cutting torque, then take place loosening until the angle which is 1.5 times of measurement angle and finish measurement rotation try.

During this movement, if not reaching sampling tightening torque within specified time or specified angle due to breakage of bolt etc., NG code “0033” is output.

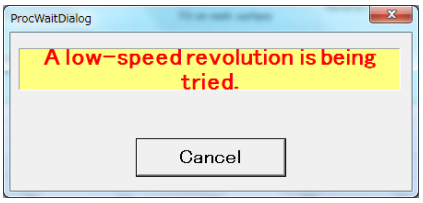


Fig (5-2-14): A low-speed revolution is being tried

③ Start sampling by “Usual measurement starting”.

By clicking “Usual measurement starting” button, setting of movement based upon measured angle in low speed rotation try and block are made.

During “Usual measurement starting”, the below message is shown. After getting necessary data, please click “Cancel” button on “Now on sampling” message.

Fig (5-16): Now on sampling

④ To click cancel button after getting necessary data in “Usual measurement starting”.

Firstly, when making setting value by collected data, data to be excluded are selected on “NG”, “All OK”.

(Checked data on “NG” and not checked data on “All OK” are excluded)

After selecting, collected data are saved in setting PC by “Shift of sampling data” button.

Then, when doing setting on block, click “Shift of detail setting data” button (to ⑤), or

when measuring by setting value which are made by collected data, click “Usual measurement starting” (to ②).

The data on upper right is stretched torque curve.

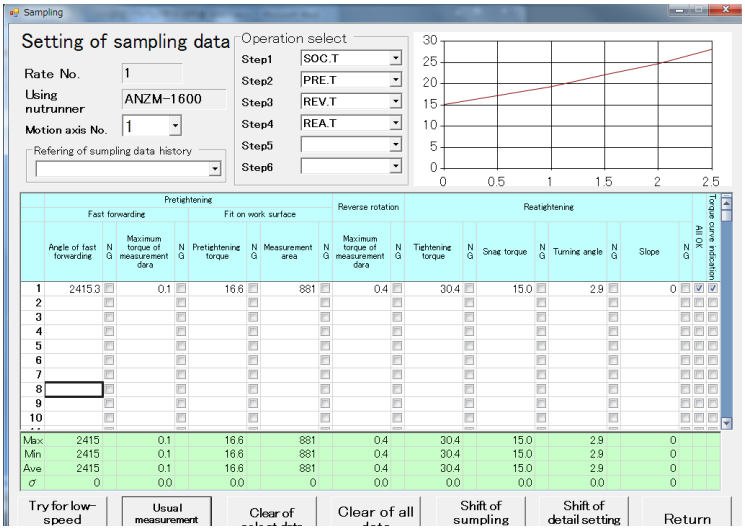


Fig (5-17): Setting of sampling data after measurement

⑤ By clicking “Shift of detail setting data”, move to “Screen for image of torque curve” and show block No.

Then, after clicking “OK”, information of the block is saved on setting PC.

*The block No. is smallest block number in unused numbers.

Setting value can be change in “Screen for image of torque curve”.

5-3. Position setting

You can do setting of X axis, Y axis and Z axis.

Remarks) If X, Y or Z axis is not selected in “Unit setting”, this item is invalid.

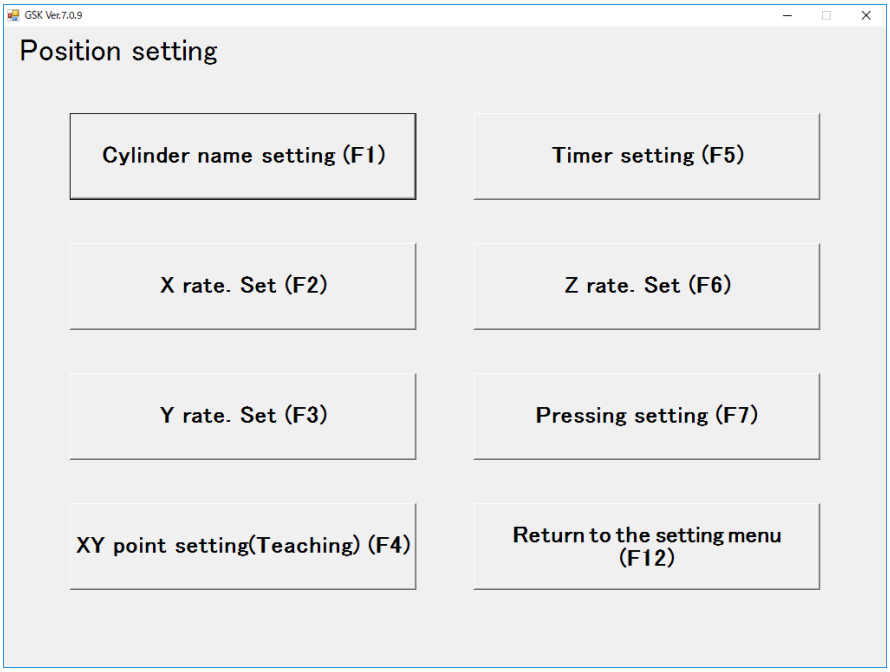


Fig (5-3-1): Position setting

- Cylinder name setting (F1) Setting of cylinder name and movement to be used for each unit.
- X rate. Set (F2 Setting of rate of motor used on X axis.
- Y rate. Set (F3) Setting of rate of motor used on Y axis.
- XYZ point setting (Teaching) (F4) Setting of coordinates
- Timer setting (F5) Setting of timer used for outputting NG.
  - Z rate. Set (F6) Setting of rate of motor used on Z axis.
  - Pressing sitting (F7) Setting of pressing control of Z axis.
- Return to the setting menu (F12) To return to “SETTING MENU”.

5-3-1. Cylinder name setting

You can change command name used in “Program setting” according to usage of Z axis.

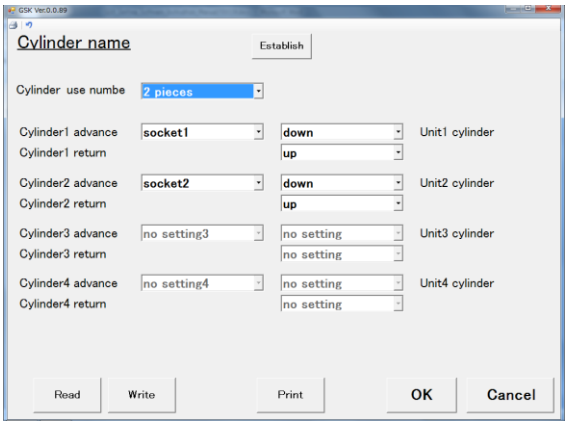


Fig (5-3-2): Cylinder name setting

After setting cylinder name, command name in “I/O monitor” will be same as set here.

You can set each cylinder for each unit.

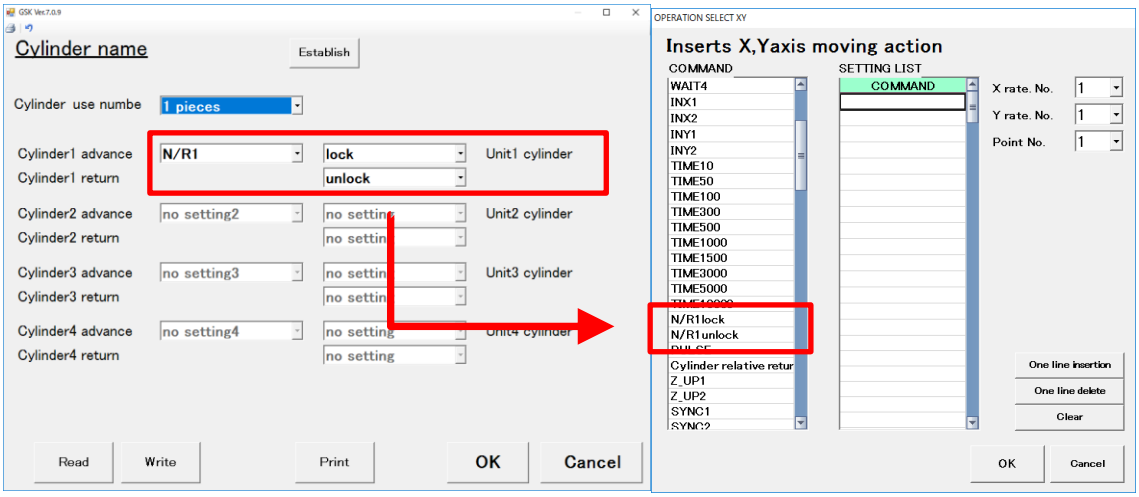
If numbers of setting exceed numbers of unit used, you cannot use in “Program setting”.

ex) Cylinder1 advance ⇒ N/R 1 down

[Items]

・Cylinder use number To select numbers of unit which each cylinder is used.
Max. numbers of setting is 4 (same as Max. numbers of unit).
You can do setting in selected numbers.

・Cylinder name setting To select an item which is moved by the cylinder.
(N/R, Socket etc.)
To select direction of movement on the right.
(up・down, advance・return etc.)



[Buttons]

- Read To move to “Read the cylinder name setting”.
- Write To move to “Write the cylinder name setting”.
- Print To print setting of cylinder name.
- OK To return to “Position setting” menu with keeping changed contents.
- Cancel To return to “Position setting” menu without keeping changed contents.
  Changed contents are also reset even if you click “Establish” before this operation.

Print screen (P) : Print the present screen

Undo (Z) : Cancel all changes

5-3-2. X rate. Set

You can do setting of rate of X axis.

Here, it will set the rating of the X-axis positioning motor.

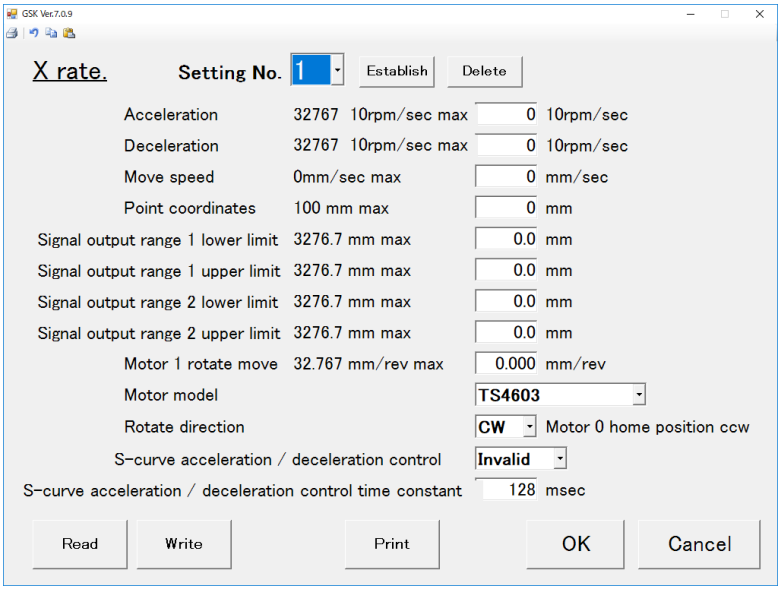


Fig (5-3-3): X rate setting

[Items]

・Setting No. To select rate No. to be set.

・Acceleration (Input range: 0 to 32767) Setting of acceleration of positioning motor from start until reaching
Rough initial value : 3000 “Move speed”.

・Deceleration (Input range: 0 to 32767) Setting of deceleration of positioning motor from “Move speed” until
Rough initial value : 3000 stop.

・Move speed Setting of speed of movement.
(Input range: [“Motor 1 rotate move” * 75])

・Point coordinates Setting of range which can be detected as point in outputting point.
(Input range: 0 to 100)

・Signal output range 1 lower limit Setting of lower limit of area which outputs “X extent output 1”
(Input range: 0 to 3276.7) of output signal

・Signal output range 1 upper limit Setting of upper limit of area which outputs “X extent output 1”
(Input range: 0 to 3276.7) of output signal

ex) Present X coordinate is within the above output range, output signal “X extent output 1” becomes ON

・Signal output range 2 lower limit Setting of lower limit of area which outputs “X extent output 2”
(Input range: 0 to 3276.7) of output signal

・Signal output range 2 upper limit Setting of upper limit of area which outputs “X extent output 2”
(Input range: 0 to 3276.7) of output signal

ex) Present X coordinate is within the above output range, output signal “X extent output 2” becomes ON

・Motor 1 rotate move　　Setting of screw pitch of ball screw used in positioning.

(Input range: 0 to 32.767)　　By this setting, Max. value of “Move speed” is decided.

・S-curve acceleration / deceleration control

Setting of valid / invalid of control.

To reduce vibration in acceleration / deceleration.

・S-curve acceleration / deceleration control time constant

Setting of time constant in s-curve control.

(rough value : 128msec)

[Button]

・Establish button　　To fix changes.

・Delete button　　All changes in the present setting No. return to the initial values.

・Read button　　To move to “Reading the X rating setting”.

・Write button　　To move to “Write the X rating setting”.

・Print button　　To execute printing of setting of X rating setting.

・OK button　　To return to “Position setting” menu with keeping changed contents.

・Cancel button　　To return to “Position setting” menu without keeping changed contents.

Print screen (P)　　:　Print the present screen

Undo (Z)　　:　Cancel the previous operation

Copy (C)　　:　Copy setting contents of the present setting No.

Paste (P)　　:　Paste copied information on the present setting No.

Remarks) “Setting No. 30” is used in “return” operation.

5-3-3. Y rate. Set

You can do setting of Y axis rating.

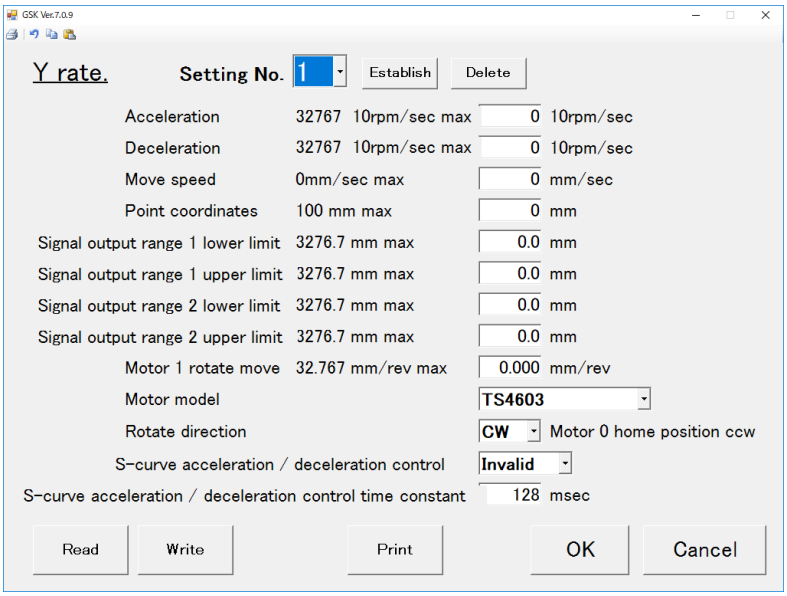


Fig (5-3-4): Y rate setting

[Items]

・Setting No. To select rate No. to be set.

・Acceleration (Input range: 0 to 32767) Setting of acceleration of positioning motor from start until reaching Rough initial value : 3000 “Move speed”.

・Deceleration (Input range: 0 to 32767) Setting of deceleration of positioning motor from “Move speed” until Rough initial value : 3000 stop.

・Move speed Setting of speed of movement.
(Input range: [“Motor 1 rotate move” * 75])

・Point coordinates Setting of range which can be detected as point in outputting point.
(Input range: 0 to 100)

・Signal output range 1 lower limit Setting of lower limit of area which outputs “Y extent output 1”
(Input range: 0 to 3276.7) of output signal

・Signal output range 1 upper limit Setting of upper limit of area which outputs “Y extent output 1”
(Input range: 0 to 3276.7) of output signal

ex) Present Y coordinate is within the above output range, output signal “Y extent output 1” becomes ON

・Signal output range 2 lower limit Setting of lower limit of area which outputs “Y extent output 2”
(Input range: 0 to 3276.7) of output signal

・Signal output range 2 upper limit Setting of upper limit of area which outputs “Y extent output 2”
(Input range: 0 to 3276.7) of output signal

ex) Present Y coordinate is within the above output range, output signal “Y extent output 2” becomes ON

・Motor 1 rotate move　　Setting of screw pitch of ball screw used in positioning.

(Input range: 0 to 32.767)　　By this setting, Max. value of “Move speed” is decided.

・Rotate direction　　Setting of direction of motor which becomes + direction from origin.

・S-curve acceleration / deceleration control

Setting of valid / invalid of control.

To reduce vibration in acceleration / deceleration.

・S-curve acceleration / deceleration control time constant

Setting of time constant in s-curve control.

(rough value : 128msec)

[Button]

・Establish button　　To fix changes.

・Delete button　　All changes in the present setting No. return to the initial values.

・Read button　　To move to “Reading the Y rating setting”.

・Write button　　To move to “Write the Y rating setting”.

・Print button　　To execute printing of setting of Y rating setting.

・OK button　　To return to “Position setting” menu with keeping changed contents.

・Cancel button　　To return to “Position setting” menu without keeping changed contents.

Print screen (P)　　:　Print the present screen

Undo (Z)　　:　Cancel all changes

Copy (C)　　:　Copy setting contents of the present setting No.

Paste (P)　　:　Paste copied information on the present setting No.

Remarks) “Setting No. 30” is used in “return” operation.

5-3-4. Z rate. Set

You can do setting of Z axis rating.

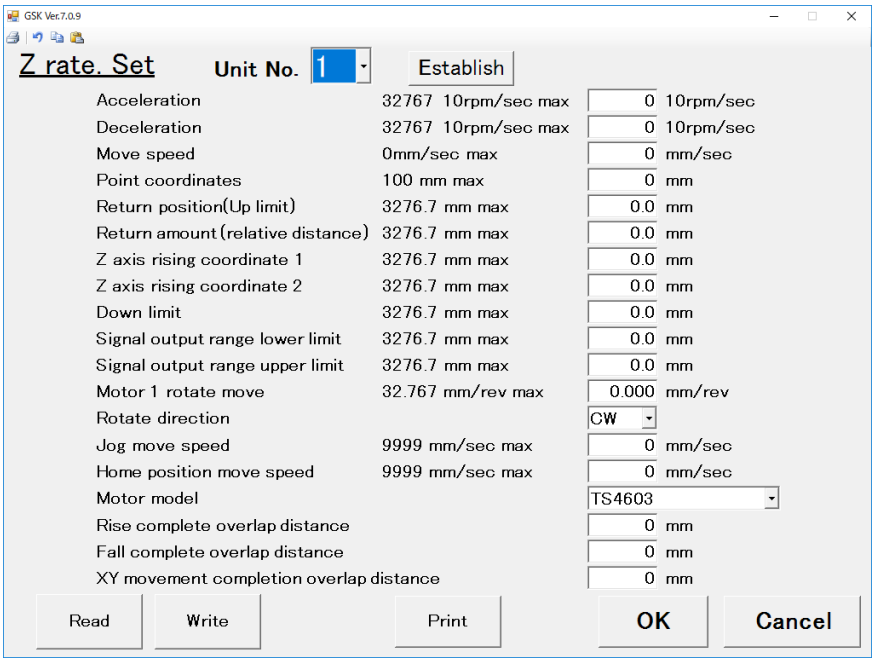


Fig (5-3-5): Z rate setting

[Items]

・Setting No. To select rate No. to be set.

・Acceleration (Input range: 0 to 32767) Setting of acceleration of positioning motor from start until reaching Rough initial value : 3000 “Move speed”.

・Deceleration (Input range: 0 to 32767) Setting of deceleration of positioning motor from “Move speed” until Rough initial value : 3000 stop.

・Move speed Setting of speed of movement.
(Input range: [“Motor 1 rotate move” * 75])

・Point coordinates Setting of range which can be detected as point in outputting point.
(Input range: 0 to 100)

・Return position (Up limit) Max. value of upside of Z axis.
To set some mms down from 0 point which is end point of upward.

・Return amount (relative distance) When “Cylinder relative return” command is input in “Program setting”, Z axis return finishes at the coordinate which this amount is subtracted from Z coordinate of next point.

・Z axis rising coordinate 1, 2 Setting of the position which Z axis shifts by command “Z_UP1”, “Z_UP2”

・Down limit Setting of Max. bottom position of Z axis.

To set some mms down from 0 point which is end point of upward.

・Signal output range lower limit To output signal at any position.
If Z axis coordinate exists between upper and lower limit,
"Z output range" can be output.

・Signal output range upper limit To output signal at any position.
If Z axis coordinate exists between upper and lower limit,
"Z output range" can be output.

・Motor 1 rotate move Setting of moving amount if the axis per 1 rotation of motor.
(input area : 0～32.767) The pitch of ball screw is input in this value.
Max. moving speed is decided by this value.

・Rotate direction Setting of direction of rotating motor to + direction.

・Jog move speed Setting of moving speed in jog operation.

・Home position move speed When "X return signal" or "Y return signal" is input,
return movement starts.
Setting of the speed.

・Motor model To select motor model for Z axis positioning.

・Rise complete overlap distance To output the signal which Z axis up completes early
and makes timing of start of next step faster.
The setting distance is distance from target point coordinate.

・Fall complete overlap distance To output the signal which Z axis down completes early
and makes timing of start of next step faster.
The setting distance is distance from target point coordinate.

・XY movement completion overlap distance
To output the signal which X, Y axis move completes early
and makes timing of start of next step faster.
The setting distance is distance from target point coordinate.

[Button]

・Establish button To fix changes.

・Write button To move to "Write the Z rating setting".

・Print button To execute printing of setting of Z rating setting.

・OK button To return to "Position setting" menu with keeping changed contents.

・Cancel button To return to "Position setting" menu without keeping changed contents.

Print screen (P) : Print the present screen

Undo (Z) : Cancel all changes

5-3-5. XYZ point setting (Teaching)

You can do setting related to teaching.

The following screen appears when you select “XY point setting (Teaching)” from “Position setting” menu.

Please select the "NO" if not communicating.

If communicating, please select “YES” after selecting “Setting point try” or “All the time communication”.

“Setting point try” The setting coordinates are imported in entering into “XY point setting”.
The present coordinates are not read.

“All the time communication” The setting coordinates are imported in entering into “XY point setting”.
In addition, the present coordinates are always updated by all time communication.

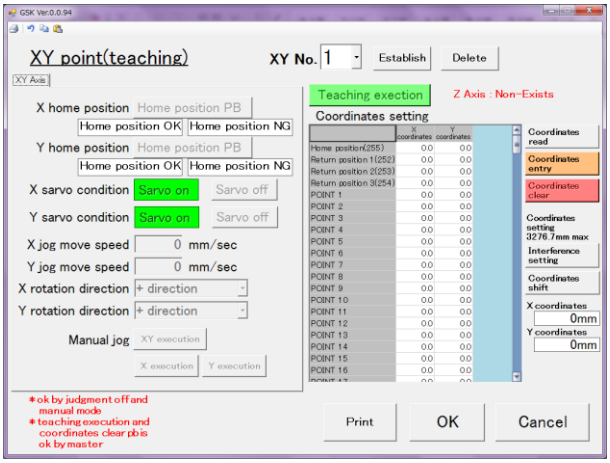


Fig (5-3-6): XY point setting (Teaching)

[Items]

・XY No. To select unit No.

・X home position The X axis is on home position, “Home position OK” is ON.
On other positions, “Home position NG” is ON.
In case of no communication, both are OFF.

・Y home position The Y axis is on home position, “Home position OK” is ON.
On other positions, “Home position NG” is ON.
In case of no communication, both are OFF.

・X servo condition To show whether driving power is supplied to X axis motor or not.
If supplied, “Sarvo on” is ON. If not supplied, “Sarvo off” is ON.
In case of no communication, “Sarvo on” is ON.

・Y servo condition　To show whether driving power is supplied to Y axis motor or not.
If supplied, “Sarvo on” is ON. If not supplied, “Sarvo off” is ON.
In case of no communication, “Sarvo on” is ON.

・Current value 0 set

・X set　To change the present X axis coordinate to 0.

・Y set　To change the present Y axis coordinate to 0.

・Jog move speed

・X axis　Setting of moving speed of X axis in manual jog movement.
Unit is [mm/sec].

・Y axis　Setting of moving speed of Y axis in manual jog movement.
Unit is [mm/sec].

・X rotation direction　if not indicate point in manual jog operation, X axis moves to this direction in jog move speed.

・Yrotation direction　if not indicate point in manual jog operation, Y axis moves to this direction in jog move speed.

・Manual jog　To start jog movement by the below 3 buttons;

・XY execution　X axis and Y axis do jog movement simultaneously.

・X execution　Only X axis do jog movement.

・Y execution　Only Y axis do jog movement.

・Operation mode / Adjustment mode
In operation mode, XYZ axes move in speed set in each rate setting.
In adjustment mode, XYZ axes move in 10% of speed set in each rate setting.
*The percentage of speed can be set on “Special setting” in “Option”.

・Teaching execution　To set the present coordinate on designated point.
(No need to click coordinate registration button again because writing order is sent to controller)

・Coordinates setting　To show coordinate chart of point no. 1-60, home position and relay point.
Please click a cell in left end line in specifying a point.
If selected, the cell turns to yellow.

・Coordinate writing　To register all coordinates values shown in “Coordinates setting” into controller.
Each value of coordinate can be changed by direct input.

・Soft limit setting　To move to “Soft limit setting”.
Setting of movable area of X axis and Y axis.

・Coordinates shift　　Setting of shifting value. By inputting this value on the below window, all coordinates in “Coordinates setting” shifts.

*If the coordinate value is 0, not shift.

ex) If shift value is (20, 0), (30, 40) shifts to (50, 0)

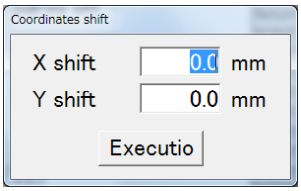


Fig (5-3-7): Coordinates shift

・X coordinates　　To show the present coordinate value of X axis.

・Y coordinates　　To show the present coordinate value of Y axis.

・Z coordinates　　To show the present coordinate value of Z axis.

[Button]

・Establish button　　To fix changes.

・Coordinate Write button　　To move to “Write the Coordinate setting”.

・Print button　　To execute printing of setting of Z rating setting.

・OK button　　To return to “Position setting” menu with keeping changed contents.

・Cancel button　　To return to “Position setting” menu without keeping changed contents.

Print screen (P)　　:　Print the present screen

Undo (Z)　　:　Cancel all changes

Copy (C)　　:　Copy setting contents of the present setting No.

Paste (P)　　:　Paste copied information on the present setting No.

5-3-5-1. Soft limit setting

You can setting of movable range of XY unit.

Alarm is output if over the soft limit range.

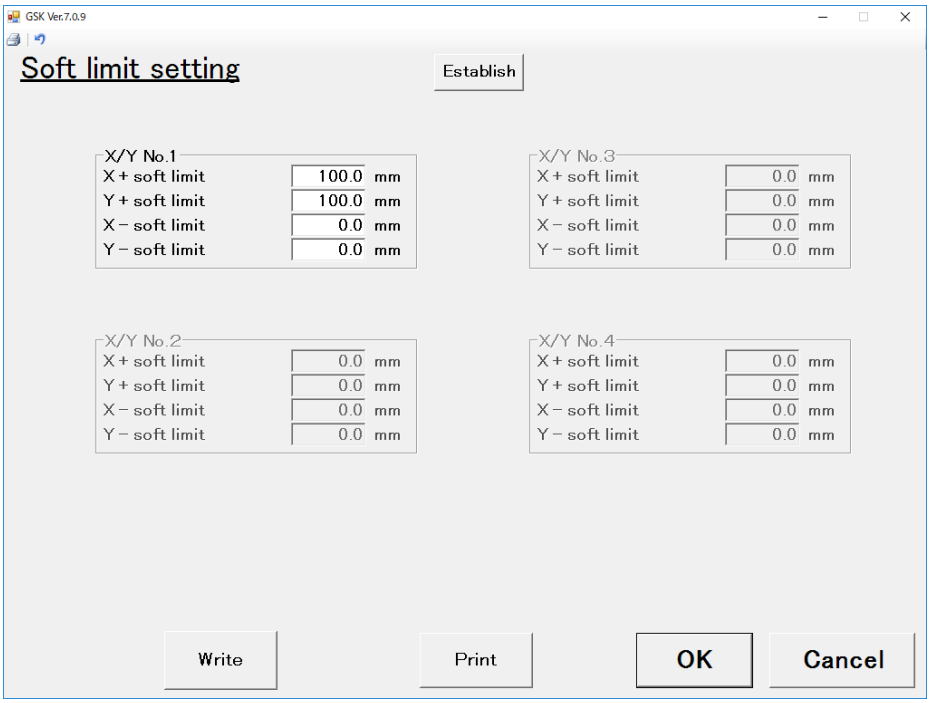


Fig (5-3-8): Soft limit setting

・X + soft limit, X – soft limit

Y + soft limit, Y – soft limit

(input area : -3276.7～3276.7)

Setting of movable area of X axis and Y axis.

You cannot register the value over this area on “Coordinates setting”.

Remarks 1) About direction of +-

-direction is the direction which moves to home position.

+direction is the direction which moves to opposite side of home position.

Remarks 2) In case of inputting “-“, also need to input “-“ mark.

Print screen (P) : Print the present screen

Undo (Z) : Cancel all changes

5-3-6. Timer setting

To monitor moving time of each axis to target positions. If over this setting, alarm is output.

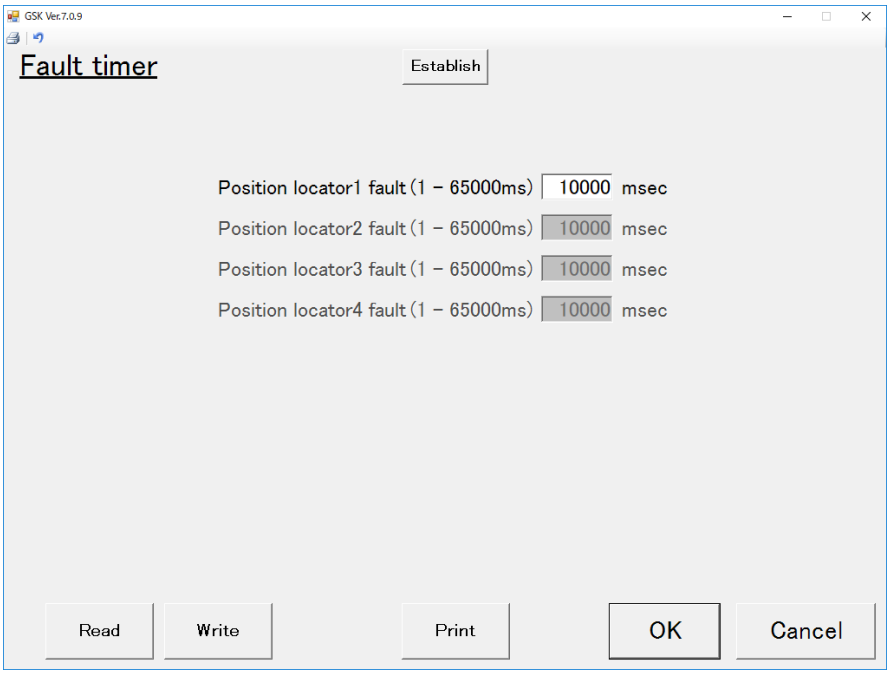


Fig (5-3-9): Timer setting

Position locator fault ⇒ GSK judges error on movement and output “Position locator fault” signal if jog movement, MOV_X, MOV_Y or MOV_XY not finishes within this time

- Position locator 1 fault Setting of upper time limit of MOV command of unit 1.
- Position locator 2 fault Setting of upper time limit of MOV command of unit 2.
- Position locator 3 fault Setting of upper time limit of MOV command of unit 3.
- Position locator 4 fault Setting of upper time limit of MOV command of unit 4.

[Button]

- Establish button To fix changes.
- Read button To move to “Reading the fault timer setting”.
- Write button To move to “Write the fault timer setting”.
- Print button To execute printing of timer setting.
- OK button To return to “Position setting” menu with keeping changed contents.
- Cancel button To return to “Position setting” menu without keeping changed contents.

Print screen (P) : Print the present screen

Undo (Z) : Cancel all changes

5-3-7. Z axis・Pressing setting

You can do setting of Z axis pressing control.

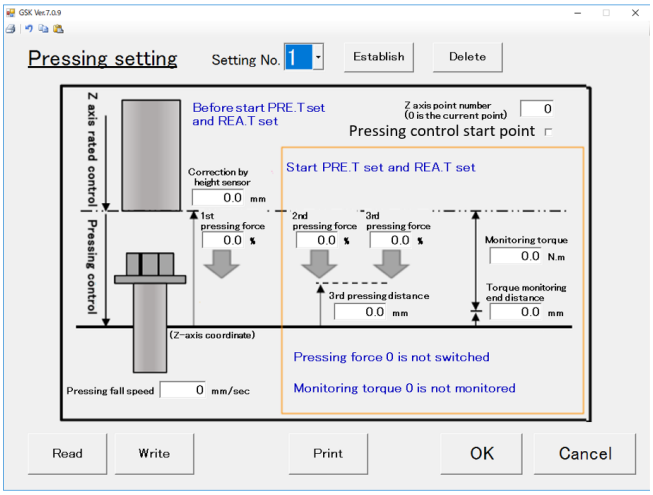


Fig (5-3-10): Pressing setting

This setting becomes valid if “Pressing down 1-10” is selected for Z axis down command in Program setting. The pressing control keeps being valid until Z axis up command is input.

・Pressing control start point Setting of position which start pressing control.

(input area：0.0～3276.7) Standard of position is the distance based upon Z axis coordinate of the designated point in program setting.

・If Z point No. is other than 0, the position is the distance from the designated point in Z point No. (the above point is ignored).

・1st pressing force Setting of pressing force from pressing control start position to starting

(input area：0.0～3276.7) pre-tightening or final tightening.

・2nd pressing force Setting of pressing force from starting pre-tightening or final tightening to

(input area：0.0～100.0) passing 3rd pressing distance or Z axis up command.

・3rd pressing force Setting of pressing force from passing 3rd pressing distance to Z axis up

(input area：0.0～100.0) command.

If 3rd pressing distance is 0, not changed to 3rd pressing force.

・3rd pressing distance　　Setting of distance which 3rd pressing force is changed.
(input area：0.0～3276.7)　　The standard of distance is the distance based upon Z axis coordinate of designated point in program setting.

*If Z point No. is other than 0, the position is the distance from the designated point in Z point No. (the above point is ignored).

・Monitoring torque　　To monitor torque of nut runner between pressing control starting point and
(input area：0.0～3276.7)　　torque monitoring end distance.
If detecting the torque, NG judgement is output.

・Torque monitoring end distance　Setting of distance which monitoring torque is finished.
(input area：0.0～3276.7)　　The standard of distance is the distance based upon Z axis coordinate of designated point in program setting.

*If Z point No. is other than 0, the position is the distance from the designated point in Z point No. (the above point is ignored).

・Pressing fall speed　　Setting of down speed after changing to pressing control.
(input area：0～9999)　　After passing pressing control starting position, the speed set in Z axisrating is invalid and this setting is valid.

・Z axis point number　　To be set if the standard of distance is fixed freely.
(input area: 0～9999)

・Correction by height sensor　To be set if correction of distance is input from outside.
(input area：ON / OFF)　　In case of unstable surface height, the starting position can be decided by corrected value from sensor etc.

5-4. Program setting

You can select Max. number of each setting in “Unit setting”.

As default setting. “30 axes, 16 programing, 220 steps” is selected.

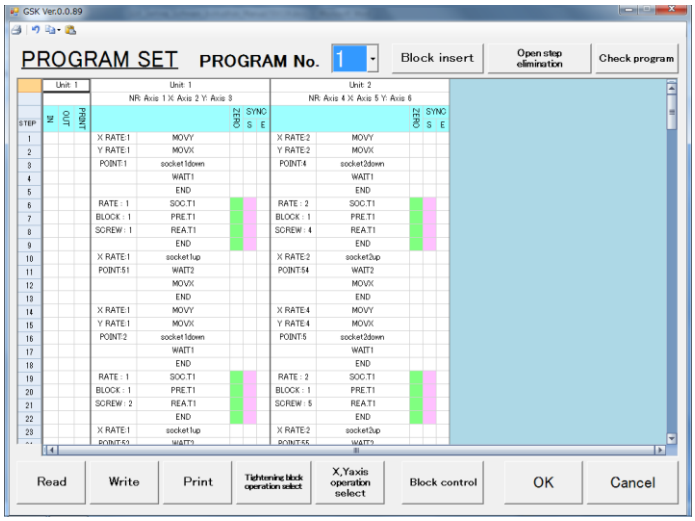


Fig (5-4-1): Program setting

[Items]

- IN — To make “Wait for IN signal” valid.
  Wait for starting the step until IN signal is input from outside.
- OUT — To output “OUT” signal after movement.
  “OUT” signal is stopped by next “IN” signal input.
- PRINT — To print the designated contents after executing the step.
- Program area — To show contents of selected program No.
- ZERO — To execute zero / magnification check.
- SYNC/S — To be synchronized with other axes in starting this step.
- SYNC/E — To be synchronized in finishing this step.

[Buttons]

・Block insert To insert an open block before the selected cell

・Open step elimination To delete open blocks in the selected unit.

・Check program To check whether blocks used in program are same composition as blocks registered.

・Read To move to “Program setting reading”.

・Write To move to “Write the program setting”.

・Print To print program setting.

・Tightening block operation select

To move to “OPERATION SELECT NUTRUNNER”.

In this page, you can select a block to be inserted into program and movement command etc. in the block.

・X, Y axis operation select

To move to “OPERATION SELECT XY”.

In this page, you can select movement of XYZ axes from command list and set as step on program.

・OK To return to “SETTING MENU” with keeping changes.

・Cancel To return to “SETTING MENU” without keeping changes.

5-4-1. Tightening block operation select

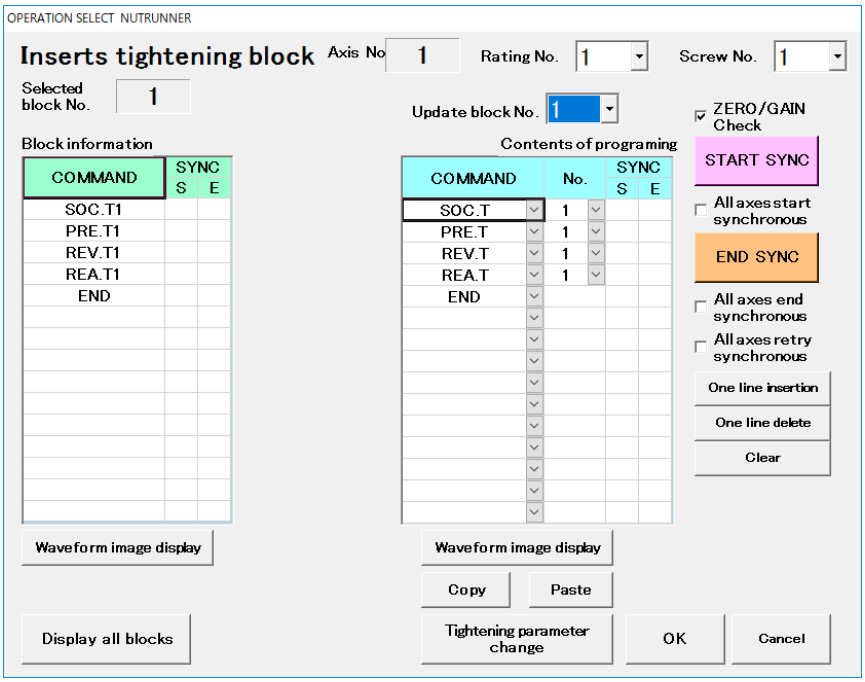


Fig (5-4-2): Inserts tightening block

・Rating No. To specify rating No. of tightening block to be inserted.

・Screw No. To specify screw No. of tightening block to be inserted.

・Selected Block No. To show block No. which is inserted into the present program step.

・Block information To show contents of movement and synchronization of selected block.

・Command To show contents of movement of the block.

・Sync/S, E To show that “S” means start synchronization and “E” means end synchronization. If being valid, each cell turns to be colored.

・Waveform image display

To confirm movement of selected block by simple waveform.

・Update block No. To specify block No. to be inserted.

・Contents of programing　To show contents of block to be inserted or made.

・Command　To select movement to be inserted.

To select only kind of movement.

・No.　To select No. of selected movement in “Command”.

・Sync/S, E　To show that “S” means start synchronization and “E” means end synchronization.

If being valid, each cell turns to be colored.

・Waveform image display

To confirm movement of selected block by simple waveform.

・Copy　To copy contents of program and keep as back data.

・Paste　To paste contents which is kept as back data to “Contents of programing”.

・Tightening parameter change

To move to each setting of movement selected in command.

・ZERO / GAIN check　To execute zero / magnification check before starting movement of block.

・START SYNC　To be synchronized between units.

This becomes valid only when positioning units are used.

In case of normal unit or multi axis mode, always to be synchronized regardless of “START SYNC”.

・All axes start synchronous

Start synchronization becomes valid in all axes in a unit

*Start synchronization in all axes of selected program can be confirmed.

・END SYNC　To re-tighten after final tightening. *Valid only in final tightening.

・All axes end synchronous

End synchronization becomes valid in all axes in a unit

End synchronization in all axes of selected program can be confirmed.

・All axes retry synchronous

Valid only in selecting retry.

*If this movement is executed, all axes set retrial start retry simultaneously.

・Display all blocks　To move to “Full block indicate”.

・OK　To return to “PROGRAM SET” with reflecting changes.

・Cancel　To return to “PROGRAM SET” without reflecting changes.

5-4-1-1. Graph checking for torque curve

You can open in clicking “Waveform image display” in “Inserts tightening block”.

To confirm image of simple torque curve and speed curve, and rough cycle time.

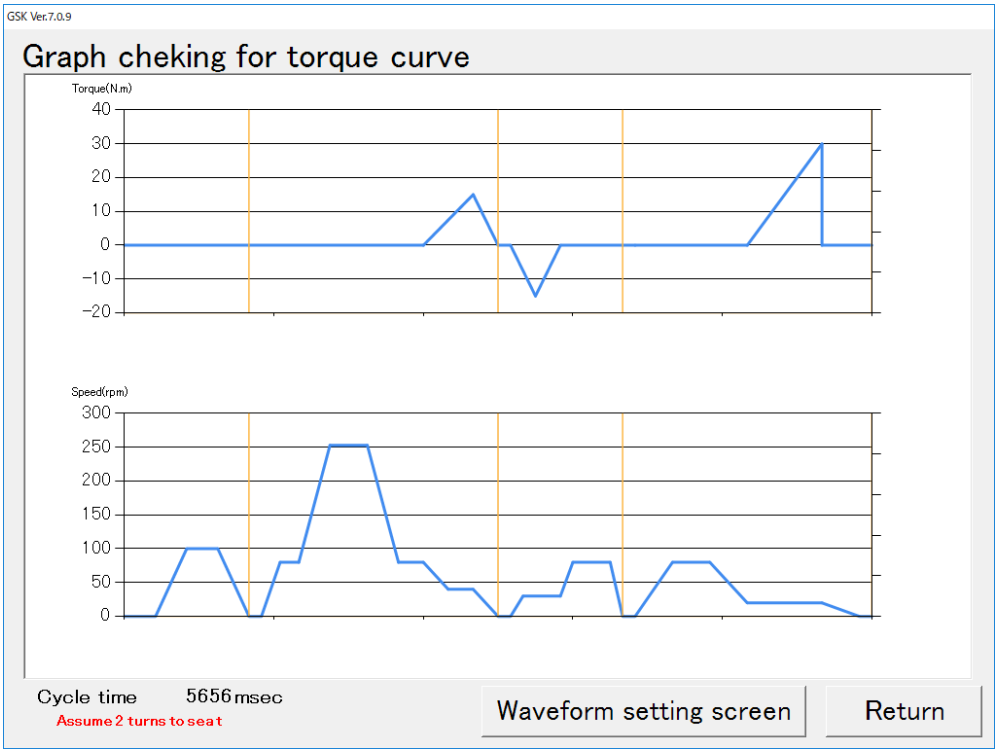


Fig (5-4-3): Graph checking for torque curve

- Cycle time To show rough cycle time.
- Waveform setting screen
  To move to “Screen for image of torque curve”.
- Return To move to “Inserts tightening block”.

5-4-1-2. Screen for image of torque curve

You can change settings of movement on image of waveform.

This is basic waveform of each movement and not changed according to settings.

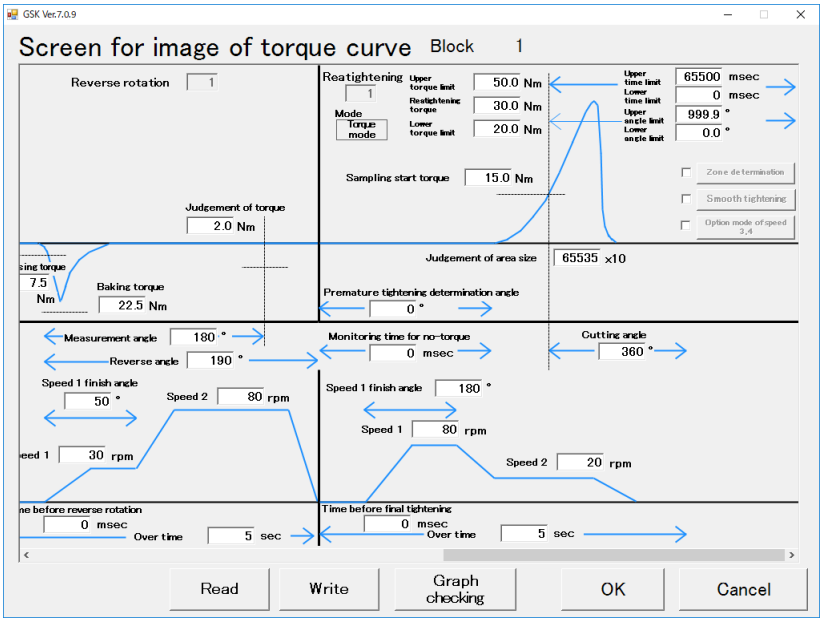


Fig (5-4-4): Screen for image of torque curve

・Block To show block No. which is selected by “Waveform image display” in “Inserts tightening block”.

・SOC. T To show socket fitting No. which is used in the block.

・PRE. T To show pre-tightening No. which is used in the block.

・REA.T To show final tightening No. which is used in the block.

・Read To read GSK setting file same as “Setting read” in “Main menu”.

・Write To write GSK setting file same as “Setting write” in “Main menu”.

・Waveform image To return to “Graph checking for torque curve”.

・OK To return to “Inserts tightening block” with keeping changes.

・Cancel To return to “Inserts tightening block” without keeping changes.

*As for changes in this page, need to write in this page.

5-4-2. Inserts X,Y axis moving action

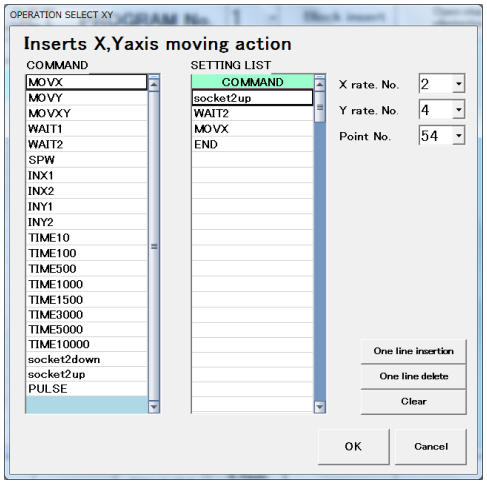


Fig (5-4-5): Inserts X,Y axis moving action

[Items]

- X rate No. To specify X axis rate No. of XY movement.
- Y rate No. To specify Y axis rate No. of XY movement.
- Point No. To specify target point No.to move by this movement.

[Buttons]

- One line insertion To insert a blank cell above the selected cell in “SETTING LIST”.
- One line delete To delete the selected cell in “SETTING LIST”.
- Clear To clear all contents in “SETTING LIST”.
- OK To return to “PROGRAM SET” with reflecting changes to “PROGRAM SET”.
- Cancel To return to “PROGRAM SET” with all clear.

[Command]

・MOVX To move X axis motor to the designated point.

・MOVY To move Y axis motor to the designated point.

・MOVXY To move XY axis motors to the designated point simultaneously.

・WAIT1-4 To wait, not going to the next step until WAIT input signal corresponding to each command is input.

・SYNC1-20 Not to proceed with the next step until each unit arrives at SNYC(N) position. After all units arrive at same No. of SYNC(N), all units proceed with the next step simultaneously.

・MARK1-20 Passing marker of program. After passing, this command is ON.

・WT_MK1-20 To wait for marker. Waiting until MARK command is ON.

・INX1, INX2 To wait, not going to the next step until INX input signal is input from outside.

・INY1, INY2 To wait, not going to the next step until INY input signal is input from outside.

・TIME10-10000 Command which stops movement during this setting time. Unit is msec. After passing this setting time, proceed with the next step.

・socket 1 down Usable when input signal “cylinder 1 up end” is input. To output signal of cylinder down, and make cylinder move. After signal “cylinder 1 down end” is input, proceed with the next step.

・socket 1 up Usable when input signal “cylinder 1 down end” is input. To output signal of cylinder up, and make cylinder move. After signal “cylinder 1 up end” is input, proceed with the next step.

・PULSE Cylinder movement continues until end signal is input. This command makes cylinder movement OFF forcibly when the cylinder movement keeps in certain period of time to protect cylinder.

・Z_UP1,2 To specify middle end of Z axis up. The coordinate can be specified in “Z rate. Set”.

・Cylinder relative return

This command is usable only when special driver for positioning is used.

After going up by cylinder return until the setting point of “Return amount” in “Z rate. Set”, move to the next point with keeping its height.

・Pressing down1-10 To specify middle end of Z axis up. The coordinate can be specified in “Z rate. Set”.

5-5. Unit setting

You can set combination of unit of nut runner or positioning motor and axis No. to be used.

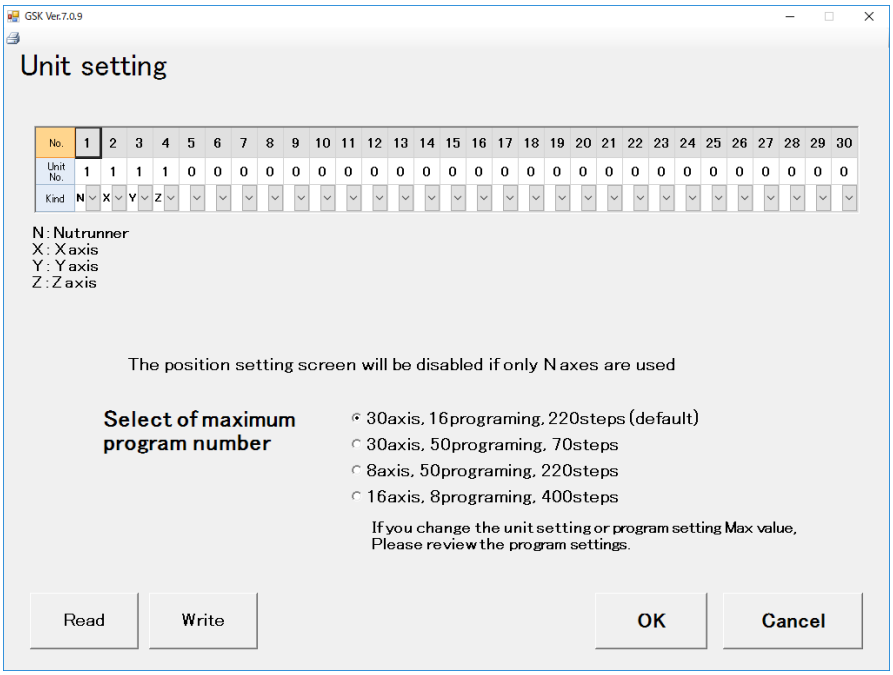


Fig (5-5-1): Unit setting

- Unit No. Setting of unit No. of each axis.
- Kind To select N (nut runner) or X (X axis) or Y (Y axis) or Z (Z axis) for each axis to be used.
- Selection of maximum program number

  To change each max. number of program, number of step and number of axis.

[Buttons]

- Read To move to “Read the unit setting”.
- Write To move to “Write the unit setting”.
- OK To return to “SETTING MENU” with reflecting changes to program setting.
- Cancel To return to “SETTING MENU” with all clear.

5-6. Axis off setting

By making axes off, you can use GSK without moving the axes.

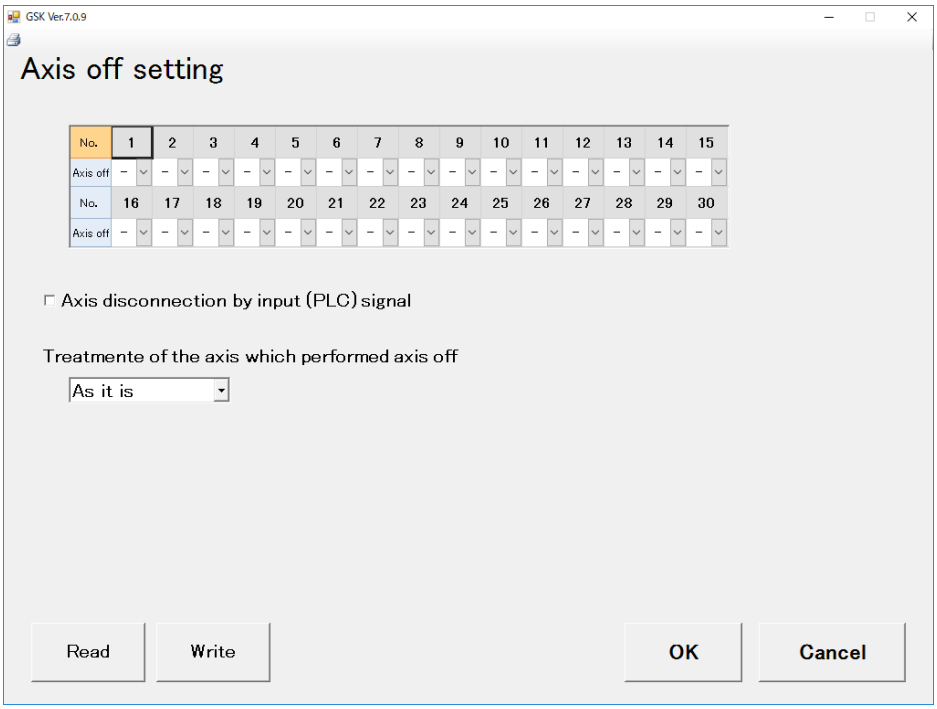


Fig (5-5-1): Axis off setting

- No. Axis No.
- Axis off To make the axis off by selecting “off”.

  Remarks) Axis off is possible only on axes which “N” is selected in “Unit setting”.

  Remarks) Power ON /OFF is needed to make axis off valid after changing setting.
- Axis disconnection by input (PLC) signal

  To be selected in executing axis off by signal from outside.

  Power ON / OFF is not needed.

  Remarks) This item cannot be used under condition which controller always output alam,

  Remarks) Signal change during movement is ignored.

・Treatment of the axis which performed axis off

To select output contents of tightening result of the axis.

Display, output of block judgement, output of total judgement and output of screw OK are changed.

・As it is Display : No color change (only off axis)

Screw OK signal : No output (Only off axis)

Block judgement : according to result of normal axis

Total judgement : according to result of normal axis

・NG display Display : Change to red (Only off axis)

Screw OK signal : No output (Only off axis)

Block judgement : Always output NG

Total judgement : Always output NG

・OK display Display : Change to green (Only off axis)

Screw OK signal : Output OK

Block judgement : According to result of normal axis

Total judgement : Subject to result of normal axis

6. Auto measurement

The below screen is shown if “Auto measurement” is selected in “Main menu”.

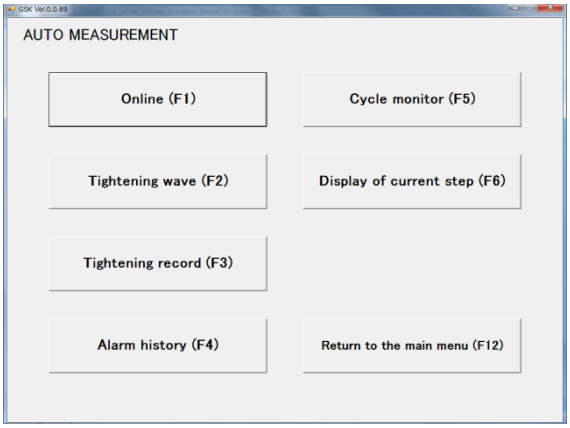


Fig (6-1): Auto measurement menu

- Online (F1) To confirm and save result data in every tightening.
- Tightening wave (F2) To confirm and save each tightening wave.
- Tightening record (F3) To see history of tightening saved in controller.
- Alarm history(F4) To see alarm history saved in controller.
- Cycle monitor (F5) To monitor signals between PLC and controller.
- Display of current step (F6) To confirm which movement is executed from program list.
- Return to the main menu (F12) To return to “Main menu”.

6-1. Online

To show tightening results in real time.

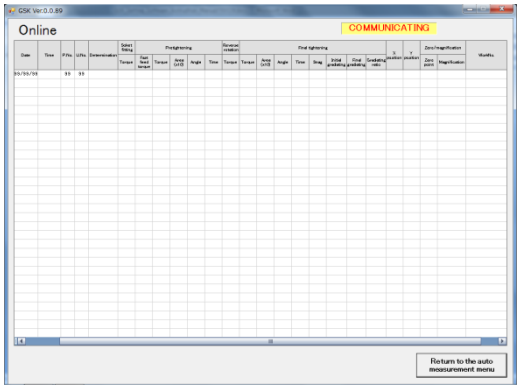


Fig (6-1-1): Online

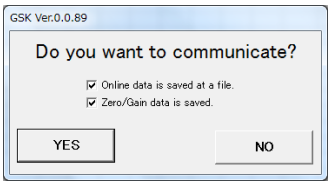


Fig (6-1-2): Communication confirmation

Firstly, communication confirmation is done after selecting “Online” in “Auto measurement”

In the screen as Fig (6-1-2), to select whether tightening results taken automatically and zero / magnification data saved in CSV file or not. If save tightening results or zero / magnification data automatically, to check each check box. In “Online”, the last tightening result of each movement for one tightening block is saved.

*In case of tightening block; SOC. T 1→PRE. T1→PRE. T2→REV. T1→REA. T1→REA. T2→REA. T3, saved result is; SOC. T1→PRE. T2→REV. T1→REA. T3.

*File of online information is saved on “C:¥GIKEN¥GSK SETTING¥AUTO MEASUREMENT¥ONLINE”.

[Items]

・Axis No. To show axis No.

・Screw No. To show screw No.

・Date To show YMD of finishing last movement

・Time To show time of finishing last movement.

・P.No. To show program No.

・U.No. To show unit No.

・Determination If OK, to show ○. If NG, to show NG code

・SOC. T / Torque To show torque value in finishing socket fitting. Unit is Nm.

・PRE. T / Fast feed torque

To show max. torque during fast feed section when NR rotates until early tightening angle. Unit is Nm.

To show 0 Nm when NR not rotates until early tightening angle.

・PRE. T / Torque To show last torque value in pre-tightening. Unit is Nm.

・PRE. T / Area (X10) To show judgement area calculated from stretched waveform in pre-tightening.

・PRE. T / Angle To show angle from angle measuring start torque.

・PRE. T / Time To show time from starting pre-tightening by 10msec

・REV. T / Torque To show last torque value in reverse.

・REA. T / Torque To show last torque value in final tightening. Unit is Nm.

・REA. T / Area (X10) To show judgement area calculated from stretched waveform in final tightening.

・REA. T / Angle To show angle from angle measuring start torque by °.

・REA. T / Time To show time from starting final tightening by 10msec.

・REA. T / Snag To show angle measuring start torque in final tightening. Unit is Nm.

・REA. T / Initial gradienting

To show gradient average value soon after snag torque in angle mode.

・REA. T / Final gradienting To show gradient average value before finishing tightening in angle mode.

・REA. T / gradient ratio To show gradient ratio calculated from final gradient / initial gradient * 100.

・X-position To show coordinate position of X axis in tightening.

・Y-position To show coordinate position of Y axis in tightening.

・Zero / magnification / Zero point

To show zero point measuring result in zero / magnification check before starting tightening.

・Zero / magnification / magnification

To show magnification measuring result in zero / magnification check before starting tightening.

・Work No. To show work No.

[Buttons]

・Return to the Auto measurement menu

To return to “Auto measurement” menu.

6-2. Tightening wave

You can confirm waveform of tightening.

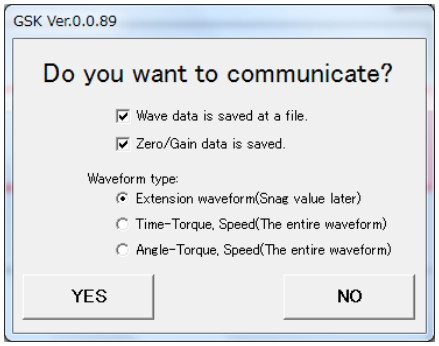


Fig (6-2-1): Communication confirmation

The following operation is changed depending upon the selection “Yes” or “No”.

If you select [Yes]:

To show tightening waveform (“Time-Torque, Speed”, “Angle-torque, Speed”) and stretch waveform automatically in every finishing tightening block.

By selecting axis No. at upper part of screen, display change of each axis and all axes can be done.

In case of selecting “Wave data is saved at a file”, wave data is saved on CSV file automatically.

If you select [No]:

To read tightening waveform (“Time-torque, Speed”, “Angle-torque, Speed”) and stretch waveform from controller manually.

The wave data can be saved on file manually. In addition, wave data can be shown after reading saved wave data file.

*File of tightening wave data is saved on “C:¥GIKEN¥GSK SETTING¥AUTO MEASUREMENT¥WAVE”.

In case of tightening waveform auto acquisition mode (If you select [Yes])

You can set OK range for each program which is displayed by waveform.

*The specified area in OK range is surrounded by red frame on the graph.

If OK range setting is end, to be operated in auto display mode and communicated with controller.

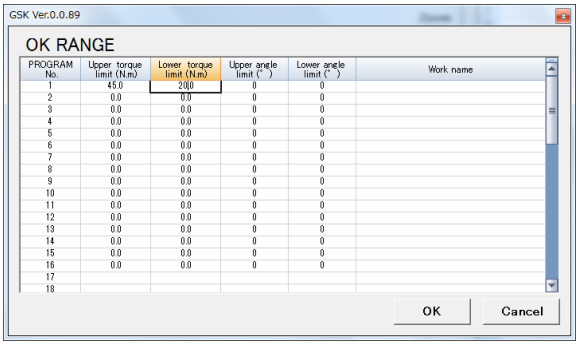


Fig (6-2-2): OK range setting

・Torque upper limit　　Setting of upper torque limit of OK range.

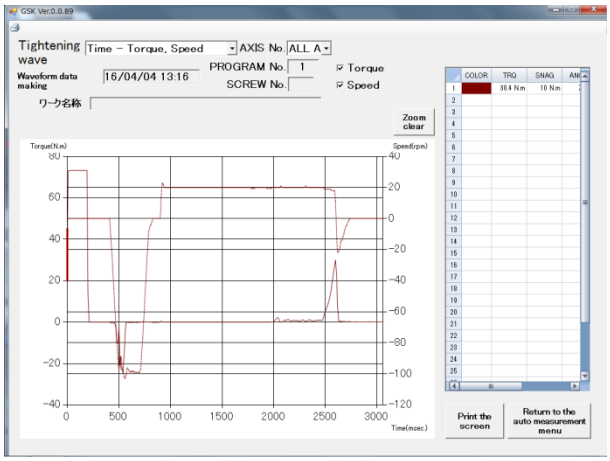
・Torque lower limit　　Setting of lower torque limit of OK range.

・Angle upper limit　　Setting of upper angle limit of OK range.

・Angle lower limit　　Setting of lower angle limit of OK range.

・Work name　　You can input the name of tightening object for each program.

*Blank is no problem



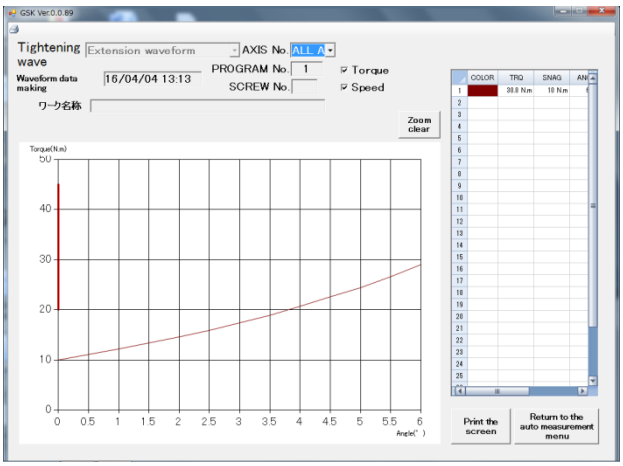


Fig (6-2-3): Waveform　Auto save

If you specify the range of the graph, the range will be expanded.

You cannot read the data from file and controller and save on file manually in auto acquisition mode of tightening waveform and stretched waveform.

[Items]

- Tightening wave — You cannot select in selecting stretched waveform.
- Axis No. — To select axis No.
  If selecting “All”, graph of each axis is shown by each color simultaneously.
  If selecting each axis No., graph of only one axis is shown.
- Waveform data making — To show date and time which tightening wave data is taken
- PROGRAM NO. — To show program No. which tightening wave data is taken.
- Screw No. — To show screw No. which tightening wave data is taken.
- Sampling data list — To show the below value for each axis No. on right side of screen.
  Red colored No. shows NG.
- Color — In showing all axes, each axis is shown by each color.
  To show colors assigned to each axis.
- TRQ — To show last tightening torque.
- Snag — To show snag torque or measuring start torque.
- Angle — To show angle from snag in last tightening or measuring start torque.
- Graph — To show graph corresponding to each axis.
  Each graph has each color in detailed data for each axis.
  Speed wave=dotted line, Torque wave=solid line
- Torque, Speed — To select which is displayed (torque wave or speed wave). Both are also OK.

[Buttons]

- Zoom clear — To return expanded graph to original.
- Print the screen — To print the present displayed screen.
- Return to the Auto measurement menu

To return to “Auto measurement” menu.

Print (P) — To print the present screen.

In case of tightening waveform manual acquisition mode (If you select [No])

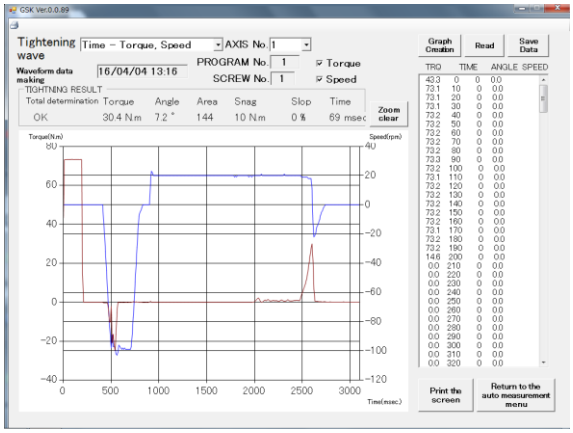


Fig (6-2-4): Tightening wave screen

*The red line on the graph is for torque and the Blue graph is for speed.

If you specify the graph, the range will be expanded.

・Tightening wave To show graph by tightening wave of Time-Angle, Time-Torque and Angle-Torque.

・Axis No. Setting of axis number.

・Waveform data making To show date and time that the tightening waveform is acquired .

・PROGRAM No. To show program number that tightening waveform is acquired.

・SCREW No. To show screw number that tightening waveform is acquired.

・Torque, Speed Please put a check on the check box which waveform is shown.

・Tightening result

・Total determination Total OK: ○, Total NG: NG code

・Torque If the last step is final tightening or pre-tightening, the last torque is shown by Nm. In other steps, 0 is shown.

・Angle If the last step is final tightening or pre-tightening, the angle until finish is shown by ° . In other steps, 0 is shown.

*Same as online angle value of pre-tightening, final tightening

・Snag If the last step is pre-tightening or final tightening, the angle measuring start torque value is shown by ° . In other steps, 0 is shown.

・Time If the last step is final tightening or pre-tightening, the time until finish is shown by 10msec. In other steps, 0 is shown.

・Zoom clear To return expanded waveform graph to original size.

・Graph creation To make waveform from selected information in sampling data list.

・Save data To save waveform data read from controller in file.

・Read To reads tightening waveform data of specified axis No. from controller. .
In addition, read waveform data from saved file.

・Table (right) To show sampling data as list which tightening waveform is made.
You can make waveform from any data area by clicking “Graph creation” after selecting some data in this list.

・Graph（Center） To show tightening waveform.

・Print the screen To print the present screen.

・Return to the Auto measurement menu

To return to “Auto measurement” menu.

Print (p): To print the present screen.

6-3. Tightening record

You can read 5000 tightening records per 1 axis from controller.

You can also output the displayed records as CSV file.

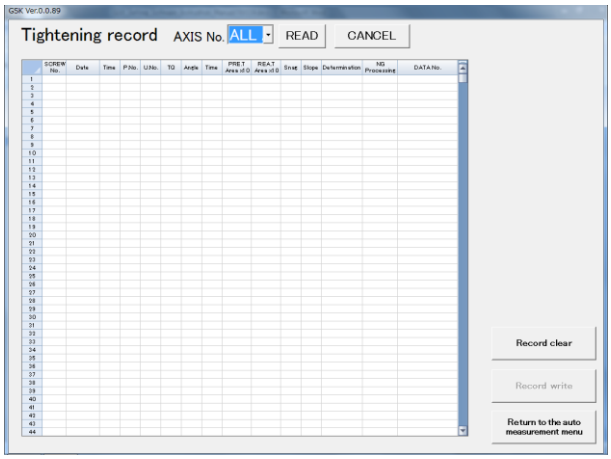


Fig (6-3-1): Tightening record

[Items]

- Screw No . To show screw number.
- Date To show YMD in finishing the last movement.
- Time To show time in finishing the last movement.
- P. No. To show program number.
- U. No. To show unit number.
- TQ To show final torque. Unit is Nm.
- Angle To show angle from the start to end on the last step. Unit is °.
- Time Time from start to end on the last step. Unit is ms.
- PRE. T area * 10 To show pre-tightening area if pre-tightening is included.
- REA. T area * 10 To show final tightening area if final tightening is included.

・Snag To show angle measuring start torque by Nm.

・Slope To show gradient ratio of final tightening angle mode.

・Determination OK: ○, NG: NG code

・NG processing To show the presence or absence of NG processing by QL input.

If there is QL processing, “presence" is shown.

If not, “absence" is shown.

*In using positioning mode, not saved in tightening record even if there is QL treatment for NG judgement.

・Data No. To show work number.

*Data is acquired from controller and sorted in order of date, time and screw No.

[Buttons]

・AXIS No. To select all axis or each axis No.

・READ To read tightening record.

・CANCEL To stop reading.

・Record clear To clear tightening record data saved in controller.

・Record write To save tightening record as CSV file.

・Return to the Auto measurement menu

To return to “Auto measurement” menu.

6-4. Alarm history

You can read 16 Alarm records per 1 axis from controller

You can also output displayed alarm as CSV file.

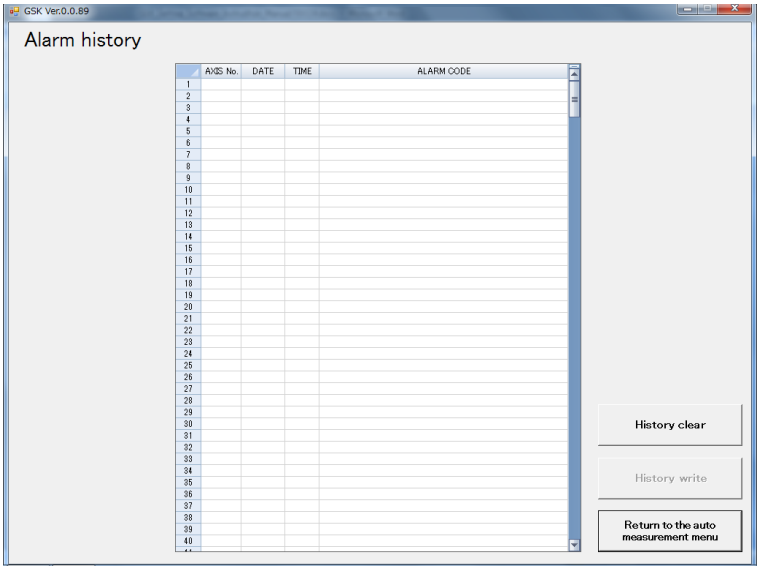


Fig (6-4): Alarm history

[Items]

- Axis No. To show axis number that the alarm has occurred.
- Data To show YMD that the alarm has occurred.
- Time To show time that the alarm has occurred.
- Alarm code To show alarm code of the alarm.

[Buttons]

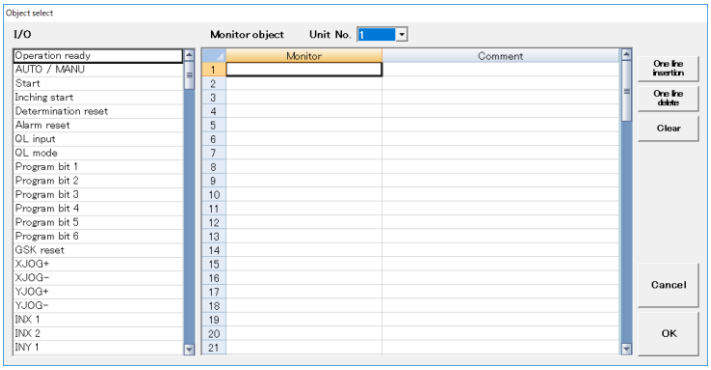
- History clear To clear alarm history saved in controller.
- History write To save displayed alarm history as CSV file.
- Return to the Auto measurement menu

To return to “Auto measurement” menu.

6-5. Cycle monitor

You can show the operating status of input and output signals between PLC etc. and controller.

You can also output the displayed data as CSV file.



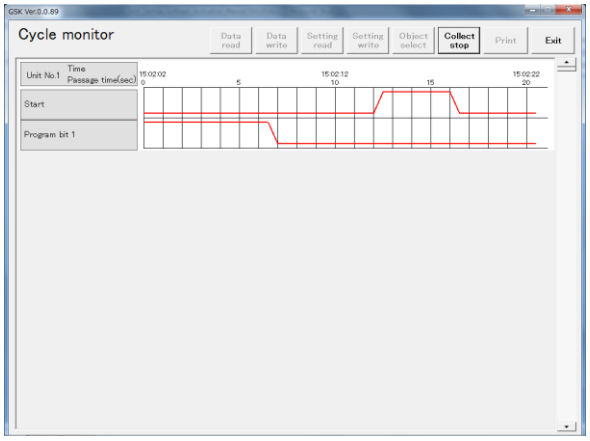


Fig (6-5): Cycle monitor

- Data read To read signal waveform from file.
- Data write To save the displayed signal data and signal in file.
- Setting read To read the selected signal from file.
- Setting write To save selection of data acquisition signal in file.
- Object select To select signal names from the list in left.
- Collect start To acquire waveform of selected signal.

  *acquisition from clicking the button
- Print To print the screen.
- Exit To return to “Auto measurement” menu.

6-6. Display of current step

To show yellow on the present step according to the movement..

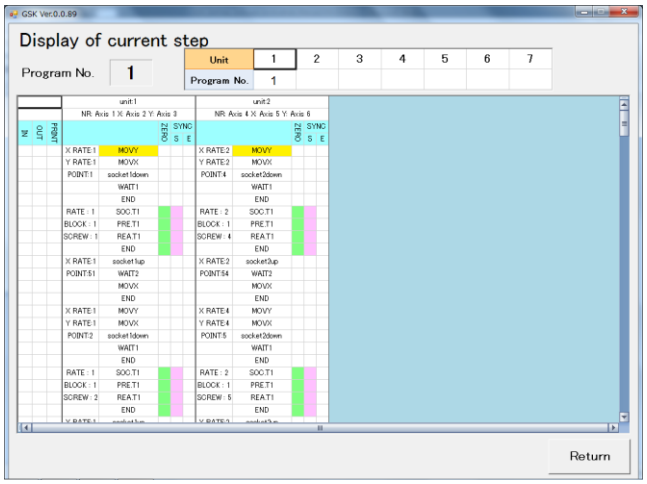


Fig (6-6-1): During operation

Fig (6-1-1): Display of current step

[List]

・Unit To show each unit No.

・Program No. To show program number for each unit No.

[Items]

・Program No. To show program number recognized by controller.

・Step display To show yellow on the present step.

・Return to the Auto measurement menu To return to the Auto measurement menu.

7. Quality control

To be shown as below if select “Quality control” from “Main menu”.

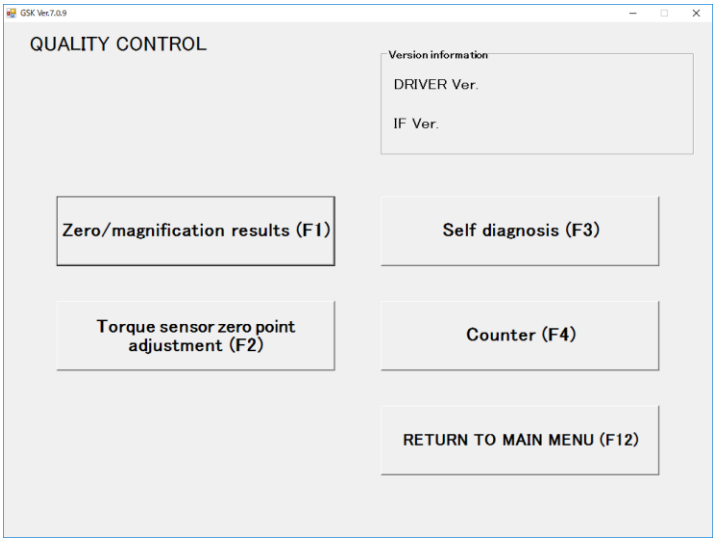


Fig (7-1): Quality control menu

・Version information	To show version information of controller and interface.
・Driver ver.	To show software version of controller for 1st axis.
・IF ver.	To show software version of interface.
・Zero / magnification results (F1)	To show the result of zero check and zero / magnification check of torque sensor.
・Torque sensor zero point adjustment (F2)	To adjust zero point of torque sensor.
・Self diagnosis (F3)	To show software version of setting software ,IF unit, controller and display. In addition, to check controller version is all same.
・Counter	To show number of work piece and screw.
・Return to main menu (F12)	To return to “Main menu”.

7-1.Zero / magnification results

To show the result of zero / magnification check of torque sensor.

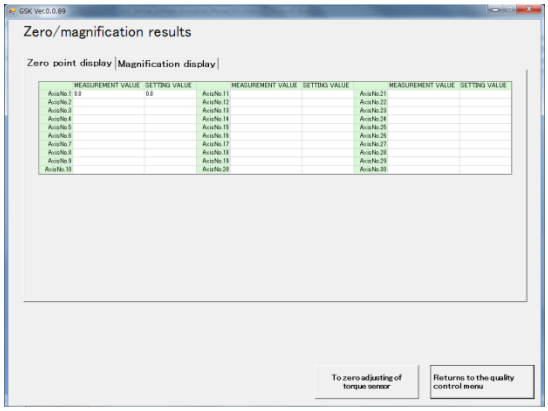


Fig (7-1-1): Zero point display

・Zero point display　　To show setting value and zero point measurement value of each axis.

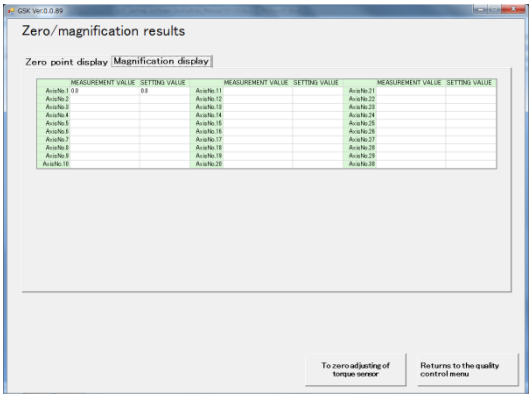


Fig (7-1-2): Magnification display

・Magnification display　　To show setting value and magnification measurement value of each axis.

The unit is "Nm".

[Buttons]

・To zero adjusting of torque sensor　　To move to “Torque sensor zero point adjustment” screen.

・Return to the Quality control menu　　To return to “Quality control” menu.

＊Zero point / magnification display shows the result after zero/magnification check.

7-2. Torque sensor zero point adjustment

To show output value [Nm] of torque sensor for each axis and GSK display value, and execute torque sensor zero point adjustment based upon these output.

・Torque sensor zero point adjustment

The operation which torque sensor output value in no load is output as 0 in GSK torque output is called “Torque sensor zero point adjustment”.

・Sensor output value is shown by converting sensor output voltage to torque as calculated below;

Formula: Sensor output value = Sensor output value acquired from controller / 2048 * Sensor rate for each axis

GSK display value shows how sensor output value is recognized inside GSK controller.

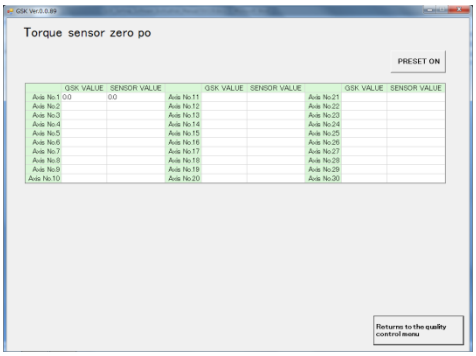


Fig (7-2-1): Torque sensor zero point adjustment

・PRESET ON To make GSK display value of selected axis 0 by clicking this button.

・Return to the Quality control menu

To return to “Quality control” menu.

7-3. Self diagnosis

To show each version of setting PC, IF unit, controller and display.

In addition, to show details of alarm, communication status with each controller and status of IF board.

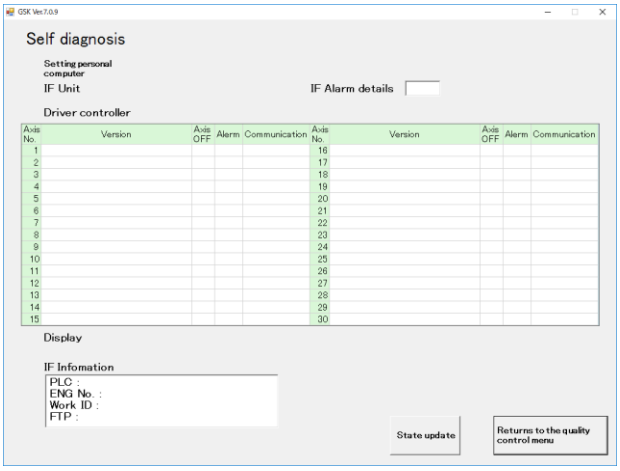


Fig (6-5): Self diagnosis

[Items]

・Setting personal computer　To show version of setting software.

・IF Unit　To show version of Interface unit.

・IF Alarm details　To show detailed alarm code of interface.

・Driver controller　To show version of driver controller for each axis.

If not match with version of driver in GSK.ini file,

“ROM Ver error” is displayed on right end of each axis.

Please set version as below in GSK.ini file.

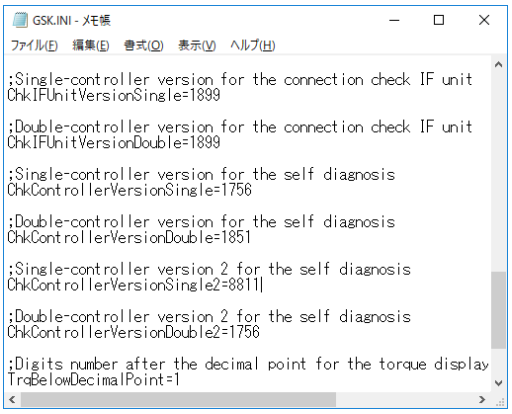


Fig (7-3-2): Self diagnosis controller version

・Display　To show version of display.

・IF information

・PLC To show kind of Anybus installed on IF

・ENG No. To show ENG No.

・Work ID To show work ID No. which is different from ENG No.

・FTP To show version of controller for each axis.

[Buttons]

・State update To read latest information.

・Return to the Quality control menu

To return to “Quality control” menu.

7-4. Counter

To show number of tightening workpiece and tightening screw.

(Alarm can be output if over the value which is set in “Integration counter setting” in “Option”.)

*Only display, not stop GSK.

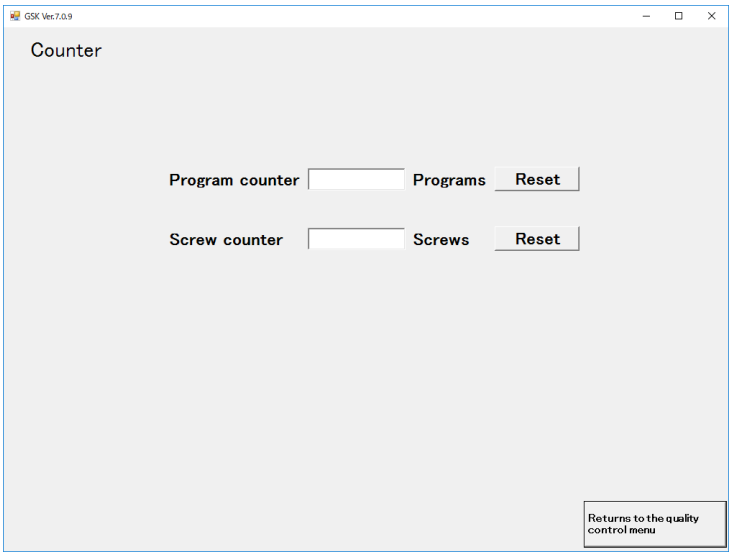


Fig (7-4-1): Counter

- Program counter　　To show number of auto cycle.
- Screw counter　　To show total number of tightening screw by auto cycle.
- Reset　　To return to 0.

Max. value of accumulated counter is 99,999,999. Count up is done in finishing auto cycle.

Not count up in case of interrupting during auto cycle

(make GSK reset signal ON before making Total OK or Total NG signal ON).

You can confirm and reset the counter by PC and outside display.

[Buttons]

- Returns to the quality control menu

　　To return to “Quality control” menu.

8. Print /Excel output

You can do setting of printer which is connected with GSK interface, print of setting and file conversion.

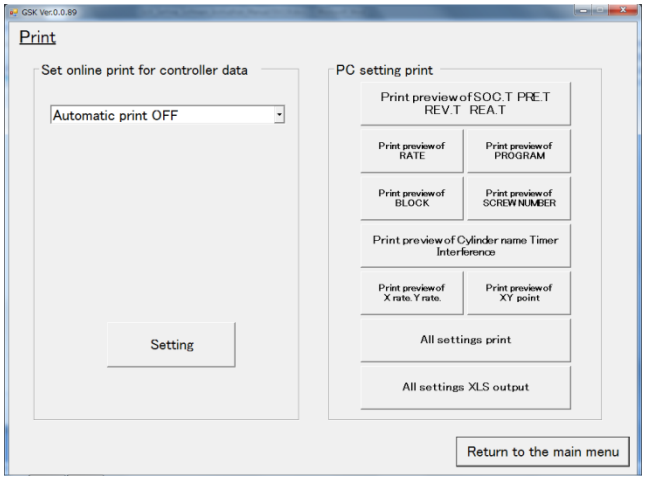


Fig (8-1): Print and Excel output screen

・Set online print for controller data

Setting of printing contents and timing in printing tightening result by printer connected with interface.

・Print mode selection To select timing of print from below items;

・Automatic print OFF Not print tightening result by using printer connected with interface.

*Setting in program setting is not included.

・At every tightening end To print tightening result in every finishing tightening.

・When NG occurred To print tightening result only when tightening NG occurs.

・First N set + data when NG occurred

To print tightening result every time for N times set.

After this, print only when NG occurs.

*If you select other than "Automatic print OFF", result printing is selected.

Please select from the following items

・Socket fitting result print

・Pre tightening result print

・Reverse rotation result print

・Real tightening result print

・Zero magnification result print

*Only when you select "First N set + data when NG occurred", first number is set.

・First number Numbers of executing tightening program from machine power ON.

To count by numbers of total judgement from machine power ON.

・PC setting print　　To print setting or convert to Excel file by each item or all together.
After clicking each button below, print preview screen is shown.
Your default printer is selected automatically.

・Print preview of SOC.T, PRE.T, REV.T, REA.T

To print data of SOC.T, PRE.T, REV.T and REA.T kept in PC.

Clicking this button shows comment input screen. If no comment, no problem.

Clicking “Preview” shows print preview screen, then clicking “Print” button starts printing.

・Print preview of RATE

To print rate data kept on your using software.

Clicking this button shows print preview screen, then clicking “Print” button starts printing.

・Print preview of PROGRAM

To print program data kept on your using software.

Clicking this button shows print preview screen, then clicking “Print” button starts printing.

・Print preview of BLOCK

To print screw No. arrangement data kept on your using software.

Clicking this button shows print preview screen, then clicking “Print” button starts printing.

・Print preview of SCREW NUMBER

To print block data kept on your using software.

Clicking this button shows print preview screen, then clicking “Print” button starts printing.

・Print preview of Cylinder name Timer Interference

To print cylinder name, timer and interference data kept on your using software.

Clicking this button shows print preview screen, then clicking “Print” button starts printing.

・Print preview of X rate Y rate

To print XY axis rate data kept on your using software.

Clicking this button shows print preview screen, then clicking “Print” button starts printing.

・Print preview of X Y point

To print XY point data kept on your using software.

Clicking this button shows print preview screen, then clicking “Print” button starts printing.

・All settings print

To print all settings data kept on your using software.

Clicking this button shows comment input screen. If no comment, no problem.

Clicking “Preview” shows print preview screen, then clicking “Print” button starts printing.

・All settings XLS output

To output all setting data kept on your using software.

・Return to the Main menu

To return “Main menu”.

9. I/O Monitor

You can confirm the status of input / output signal and control.

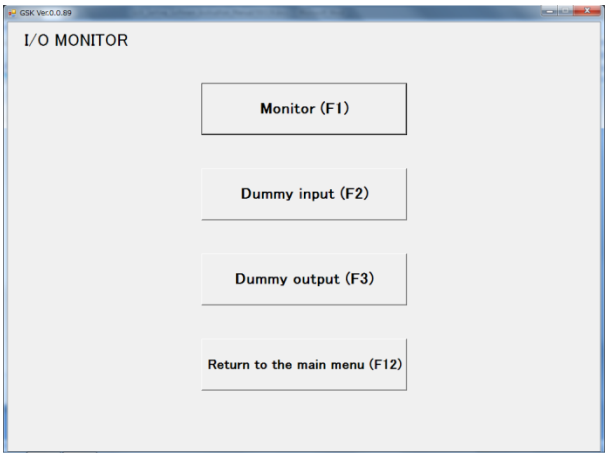


Fig (9-1): I/O monitor menu

- Monitor (F1) To show monitor screen.
- Dummy input (F2) To show dummy input screen.
- Dummy output (F3) To show dummy output screen.
- Return to the main menu (F12) To return to “Main menu”.

9-1. Monitor

Selecting “Monitor” from “I/O monitor” menu.

To monitor signal between GSK and PLC.

*Signal ON: Green, Signal OFF: Gray

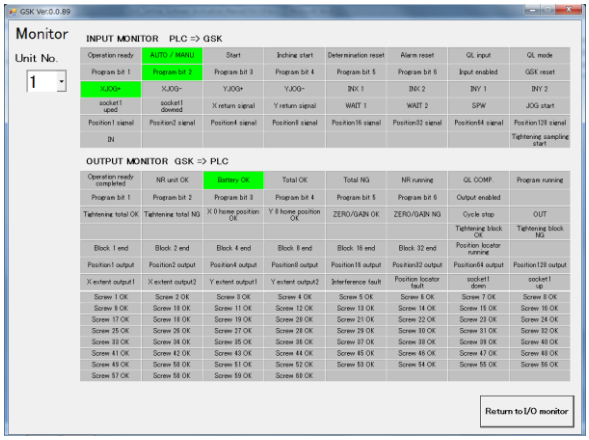


Fig (9-1-1): I/O monitor

・Unit No. To specify unit No.

・Input monitor To show input status of input signal of controller.
*As for details of each signal, please refer to instruction manual of controller.

・Output monitor To show output status of output signal of controller.
*As for details of each signal, please refer to instruction manual of controller.

・Return to I/O monitor To return to “I/O monitor” menu.

9-2. Dummy input

The below screen is shown if selecting “Dummy input” in “I/O monitor”.

You can input outside input signals of GSK to GSK on this screen.

By using this function, you can control GSK without using outside equipment like PLC etc.

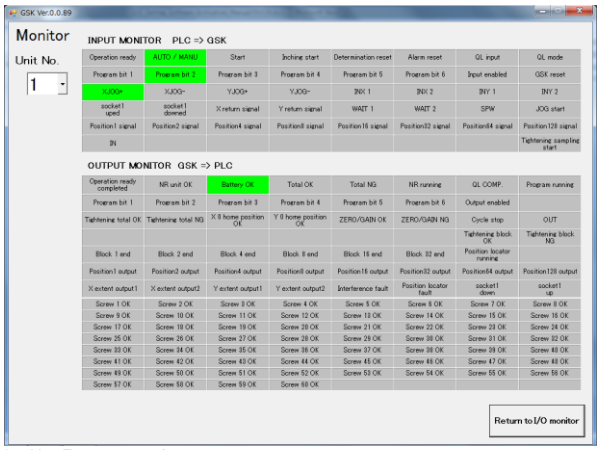


Fig (9-2-1): Dummy input screen

[Items]

- Dummy input — To select signals to GSK from signal list
  Selected signals turn to green.
  Selecting several signals is also possible.
- Output monitor — To show output signals which GSK outputs to outside.
  Output signals turn to green.

[Buttons]

- Run — To send signals selected on “Dummy input” to GSK.
  Password is needed for execution.
- Cancel — To cancel selection of signals input on “Dummy input”.
  If several signals are selected, all cancelled
- Return to I/O monitor — To return to “I/O monitor” menu.

9-3. Dummy output

The below screen is shown if selecting “Dummy output” in “I/O monitor”.

To confirm movement of outside equipment, you can send output signals of GSK to PLC etc. via interface at any timing.

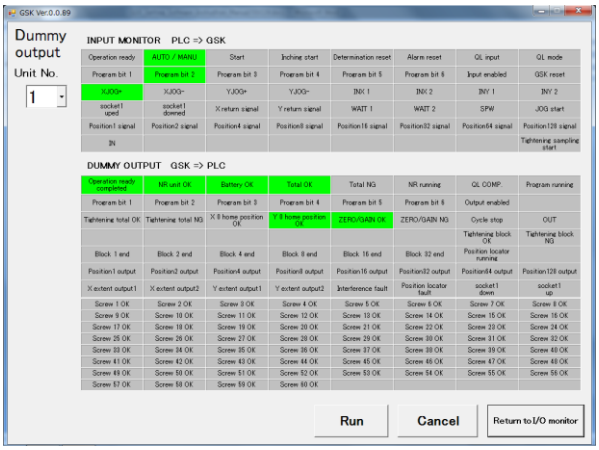


Fig (9-3-1): Dummy output screen

[Items]

- Input monitor — To show the status of input signals from outside. Signals to be input turn to green. Selecting several signals is also possible.
- Dummy output — To select signals which is sent outside from GSK. Selected signals turn to green. Selecting several signals is also possible.

[Buttons]

- Run — To send signals selected on “Dummy output” to GSK. Password is needed for execution.
- Cancel — To cancel selection of signals on “Dummy output”. If several signals are selected, all cancelled
- Return to I/O monitor — To return to “I/O monitor” menu.

10. Help

To open instruction manual.

After clicking “Help” button in “Main menu”, “help.pdf” file in install folder of setting software is opened.

AutoMeasurement	2019/04/30 10:34	ファイル フォルダー	
Log	2019/06/26 9:13	ファイル フォルダー	
MasterFile	2019/06/21 14:17	ファイル フォルダー	
Plugins	2019/04/30 10:34	ファイル フォルダー	
Sampling	2019/04/30 10:34	ファイル フォルダー	
UserFile	2019/06/21 14:17	ファイル フォルダー	
Comm.dll	2019/04/11 17:37	アプリケーション拡張	12 KB
FarPoint.CalcEngine.dll	2019/04/11 17:37	アプリケーション拡張	320 KB
FarPoint.Excel.dll	2019/04/11 17:37	アプリケーション拡張	5,972 KB
FarPoint.PDF.dll	2019/04/11 17:37	アプリケーション拡張	564 KB
FarPoint.PluginCalendar.WinForms.dll	2019/04/11 17:37	アプリケーション拡張	132 KB
FarPoint.Win.Chart.dll	2019/04/11 17:37	アプリケーション拡張	3,426 KB
FarPoint.Win.dll	2019/04/11 17:37	アプリケーション拡張	896 KB
FarPoint.Win.SpreadJ.dll	2019/04/11 17:37	アプリケーション拡張	4,700 KB
GSK.exe	2019/05/16 14:51	アプリケーション	20,794 KB
GSK.INI	2019/05/16 14:51	構成設定	2 KB
help.pdf	2019/05/13 13:47	Adobe Acrobat D...	6,217 KB
JPMIT_UI.dll	2019/04/11 17:37	アプリケーション拡張	22 KB
Microsoft.VisualBasic.PowerPacks.Vs.dll	2012/07/26 19:41	アプリケーション拡張	264 KB

Fig (10-1): Install folder

11. Option

You can do setting of various options.

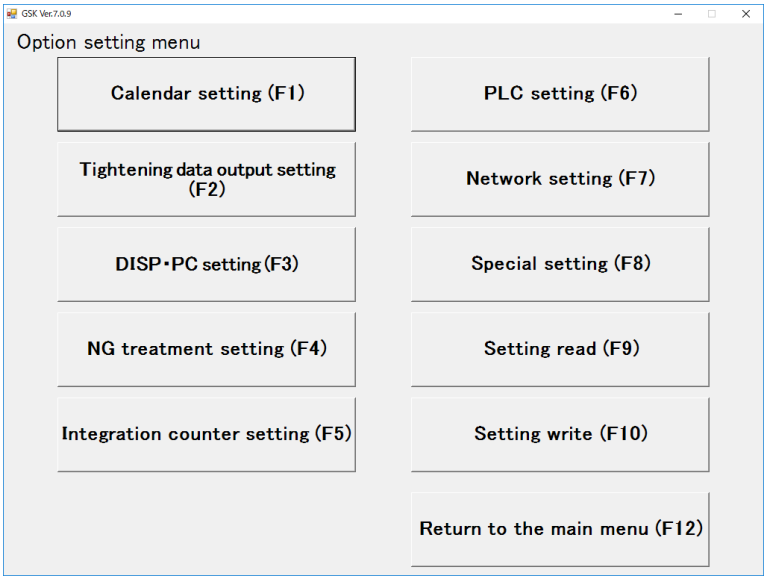


Fig (11-1): Option menu

- Calendar setting — Setting of date information.
- Tightening data output setting — Setting of output conditions ex) output tightening data etc to outside
- DISP・PC setting — Setting of display and setting PC
- NG treatment setting — Setting of details of tightening NG and cycle stop
- Integration counter setting — Setting of threshold of counter alarm
- PLC setting — Setting related to connection with PLC
- Network setting — Setting related to IP address, FTP
- Special setting — Setting for special specification or setting of speed of adjustment mode
- Setting read — To read tightening data output setting from controller or file
- Setting write — To write tightening data output setting to controller or file
- Return to the main menu — To return to “Main menu”.

11-1. Calendar

You can do setting of date of GSK.

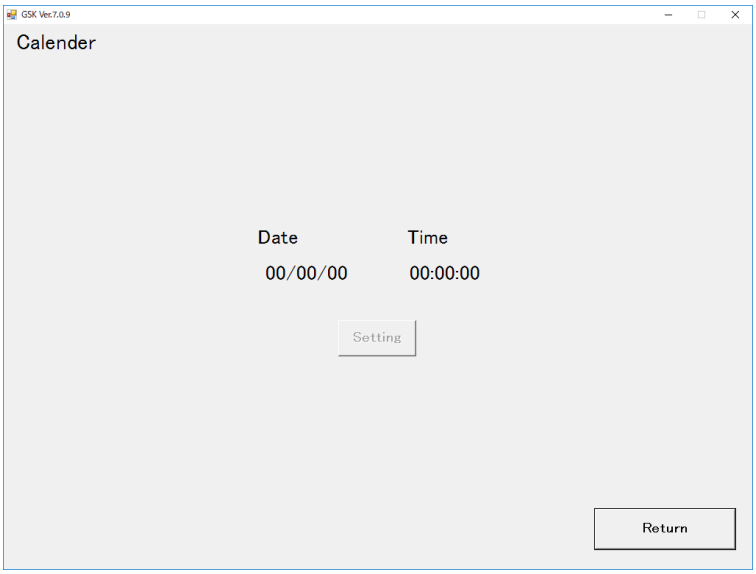


Fig (11-1-1): Calendar

[Items]

・Setting　　The present date and time is updated by clicking “Setting”.
Then, if clicking OK button for “Do you want to set Calendar?” message with password,
the calendar setting is written to controller.

[Buttons]

・Return　　To return to “Option setting menu”.

11-2. Tightening data output setting

You can do setting of tightening data which is output to PLC, ID controller and printer etc. by RS422 or RS232C.

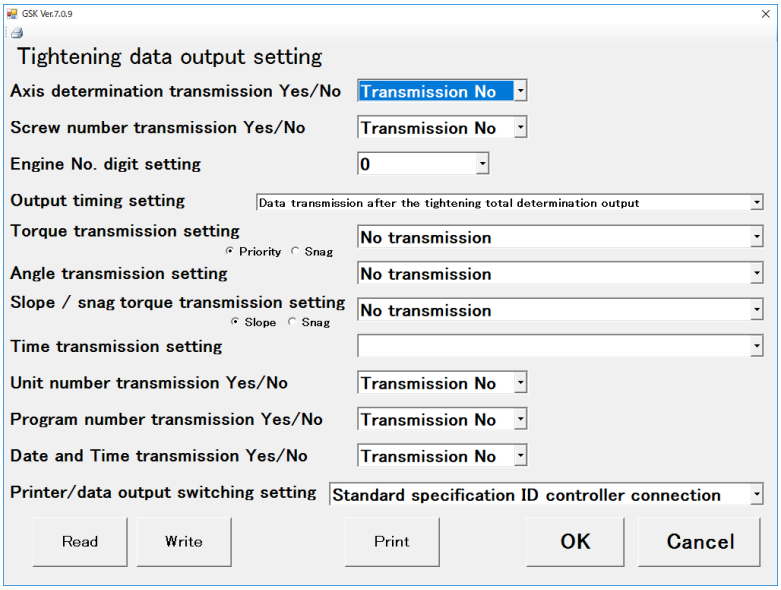


Fig (11-2-1): Tightening data output setting

[Communication connection example]

*GSK interface CN8 (ID controller / RS422)

CN9 (printer or quality control / RS422)

CN10 (printer / RS232C)

*Printer: DPU-414 thermal printer / made by Seiko Instruments Inc. (RS232C)

(As for details, please refer to GSK・GKL controller instruction manual.)

[Items]

・Axis determination transmission Yes/No Yes/No selection for transmitting output of OK, NG and No judgement for each axis.

・Screw number transmission Yes/No Yes/No selection for transmitting No. of screw.

・Engine No. digit setting Number of digits of Engine No. or Work identification No. (input area : 0-8)

・Output timing setting To select timing of tightening data output from the below 3 kinds;

"Data transmission after the tightening total determination output"

"Data transmission after the next block started or the determination reset is input"

"Data transmission by the data transmission requirement from the

upper rank”

・Torque transmission setting　Setting related to torque value output of tightening result.
To select “No transmission” or according to digits of transmission.

・Priority　Tightening torque is output according to the below priority;
Priority　(High)　1: Final tightening
2: Reverse rotation
3: Pre-tightening
(Low)　4: Socket fitting
*Data to be transmitted is only 1 kind according to the priority even if
various movements are executed in same block.

・Snag　Snag torque value in final tightening setting (angle mode) is transmitted.

・Angle transmission setting　Setting related to angle value output of tightening result.
To select “No transmission” or according to digits of transmission.
Tightening angle is output according to the below priority;
Priority　(High)　1: Final tightening
2: Reverse rotation
3: Pre-tightening
(Low)　4: Socket fitting
*Data to be transmitted is only 1 kind according to the priority even if
various movements are executed in same block.

・Slope / snag torque transmission setting　Setting related to output in angle mode.
To select “No transmission” or according to digits of transmission.

・Slope　The result of gradient judgement used in angle mode.

・Snag　The result of snag torque used in angle mode.

・Time transmission setting　Setting related to time value output of tightening result.
To select “No transmission” or according to digits of transmission.
Tightening angle is output according to the below priority;
Priority　(High)　1: Final tightening
2: Reverse rotation
3: Pre-tightening
(Low)　4: Socket fitting
*Data to be transmitted is only 1 kind according to the priority even if
various movements are executed in same block.

・Unit number transmission Yes/No　Yes/No selection for transmitting unit No.

・Program number transmission Yes/No　Yes/No selection for transmitting program No.

・Date and Time transmission Yes/No　Yes/No selection for transmitting date and time.

・Printer/data output switching setting　To select destination of tightening data output and transmission format.

*As for communication spec. and transmission/reception format,
please refer to GSK・GKL controller instruction manual.

[Buttons]

・Read　To read tightening data output setting from controller or file.

・Write　To write tightening data output setting to controller or file.

・Print　To print contents of this setting.

・OK　To return to “Option setting menu” with fixing changes.

・Cancel　To return to Option setting menu” with cancelling changes.

Print screen (P)　To print the present screen.

11-3. DISP・PC setting

You can do setting of display and setting PC.

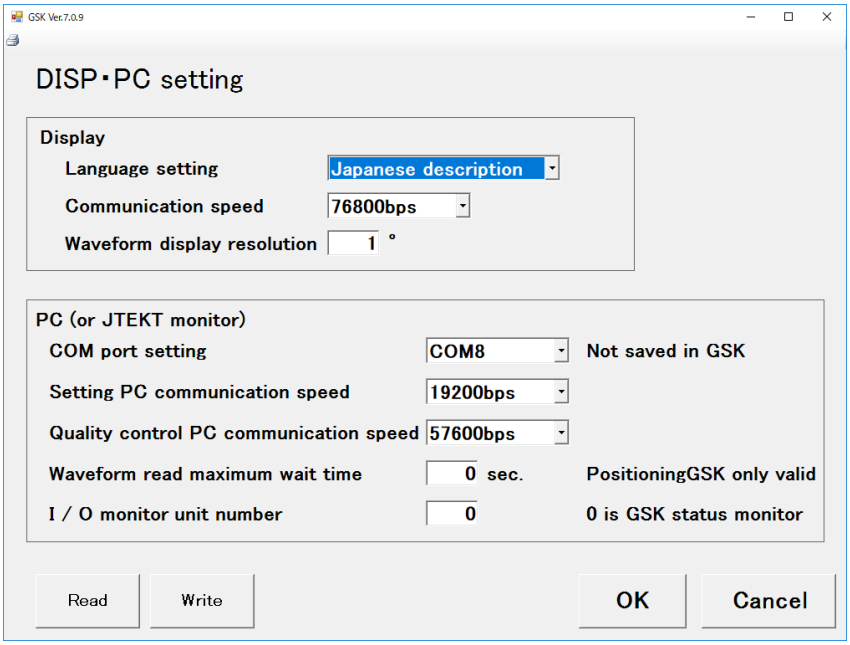


Fig (11-3-1): DISP・PC setting

[Items]

Display

・Language setting　　Setting of language in disply.

*The display needs to correspond with the language.

*In selecting “No description”, communication is not executed.

・Communication speed　　Setting of communication speed between display and GSK

・Waveform display resolution　　To input resolution of tightening waveform in display.

PC (or JTEKT monitor)

・COM port setting　　Setting of COM No. in communication between setting PC and GSK.

・Setting PC communication speed

Setting of communication speed between setting PC and GSK.

・Quality control PC communication speed

Setting of communication speed between quality control PC and GSK.

*Quality control PC: PC which tightening data collection software (made by GIKEN) is installed.

・Waveform read maximum wait time

To be set in case of not finishing reading of tightening waveform between blocks in short time. Movement stops during this setting time to give priority to waveform reading. After completing reading waveform within the setting time, proceeding with the next step.

*Valid only in positioning GSK.

・I/O monitor unit number blocks in (input area：0-7)

To be set in case of not finishing reading of tightening waveform between short time. Movement stops during this setting time to give priority to waveform reading.

[Buttons]

・Read To read tightening data output setting from controller or file.

・Write To write tightening data output setting to controller or file.

・OK To return to “Option setting menu” with fixing changes.

・Cancel To return to Option setting menu” with cancelling changes.

Print screen (P) To print the present screen.

11-4. NG treatment setting

You can do setting of treatment in occurring tightening NG and the movement after stopping cycle.

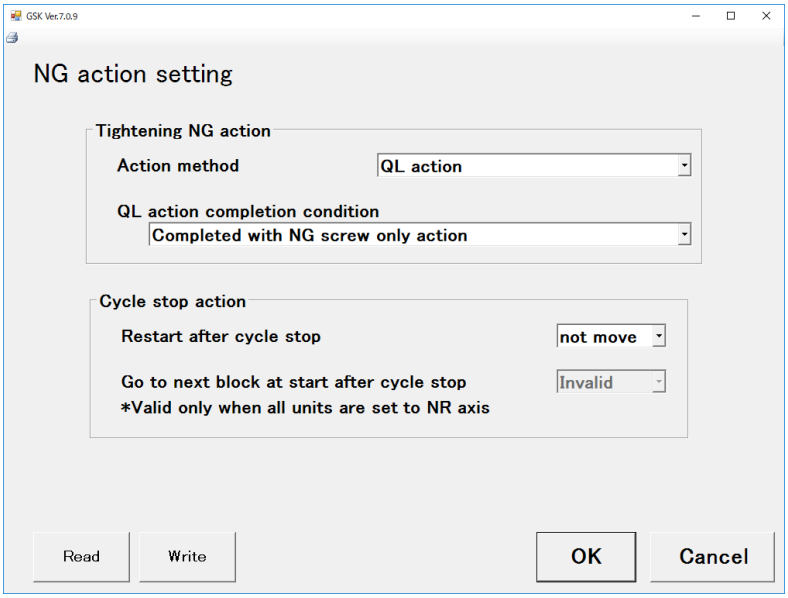


Fig (11-4-1): NG treatment

[Items]

Tightening NG action

・Action method

QL action　　To change NG output to OK output by the signal input from outside (QL wrench etc.)

Retightening by program operation

To retighten the total NG screw by restart of program.

The movement after restart is repeat operation in program unit.

Multi axis GSK:　Usable

・To tighten only screw to be retightened.

・As for IN/SYNC/START SYNC etc, move as normal.

Positioning GSK: Usable

・Z axis down commands are executed only in tightening screw.

・Z axis up commands are treated as cylinder return (up until up end).

・As for SYN, WAIT and MARK etc, move as normal.

Retightening by block operation

To retighten the block NG screw in block unit.

Multi axis GSK:　To execute same block again by start signal ON after the block NG.

To tighten only screw to be retightened.

As for IN/OUT/PRINT, move as normal.

SYNC command is ignored.

Positioning GSK: Unusable

Retightening by NG screw only

To retighten the total NG screw by restart of program.

The movement after restart is repeat operation only for NG screw.

Multi axis GSK:　Unusable

Positioning GSK: To tighten only tightening NG screw with XY movement.

・QL action completion condition

Valid in selecting “QL action” in “Action method”.

Completed with NG screw only action

To be total OK if signal input from outside (QL wrench etc.) is input in same numbers of NG.

Completed with all screw treatment after NG screw action

To be total OK if signal input from outside (QL wrench etc.) is input in numbers which equal numbers of NG + numbers of all screws.

Cycle stop action

・Restart after cycle stop　To select “not move” or “move” for restart after cycle stop.

・Go to next block at start after cycle stop

Invalid: To restart from the beginning of the interrupted block.

Valid: To restart from the next step of the interrupted block.

[Buttons]

・Read　To read tightening data output setting from controller or file.

・Write　To write tightening data output setting to controller or file.

・OK　To return to “Option setting menu” with fixing changes.

・Cancel　To return to Option setting menu” with cancelling changes.

Print screen (P)　To print the present screen.

11-5. Integration counter setting

You can do setting of threshold to output alarm from integration counter.

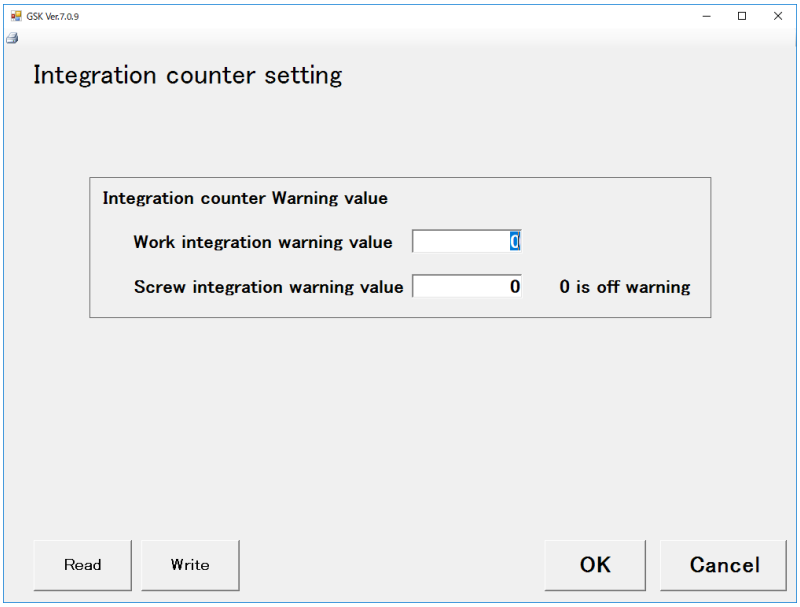


Fig (11-5-1): Integration counter setting

[Items]

- Work integration warning value　Setting of threshold to output alarm against work integration value.
- Screw integration warning value　Setting of threshold to output alarm against screw integration value.

[Buttons]

- Read　To read tightening data output setting from controller or file.
- Write　To write tightening data output setting to controller or file.
- OK　To return to “Option setting menu” with fixing changes.
- Cancel　To return to Option setting menu” with cancelling changes.

Print screen (P)　To print the present screen.

11-6. PLC setting

You can do setting related to PLC connection.

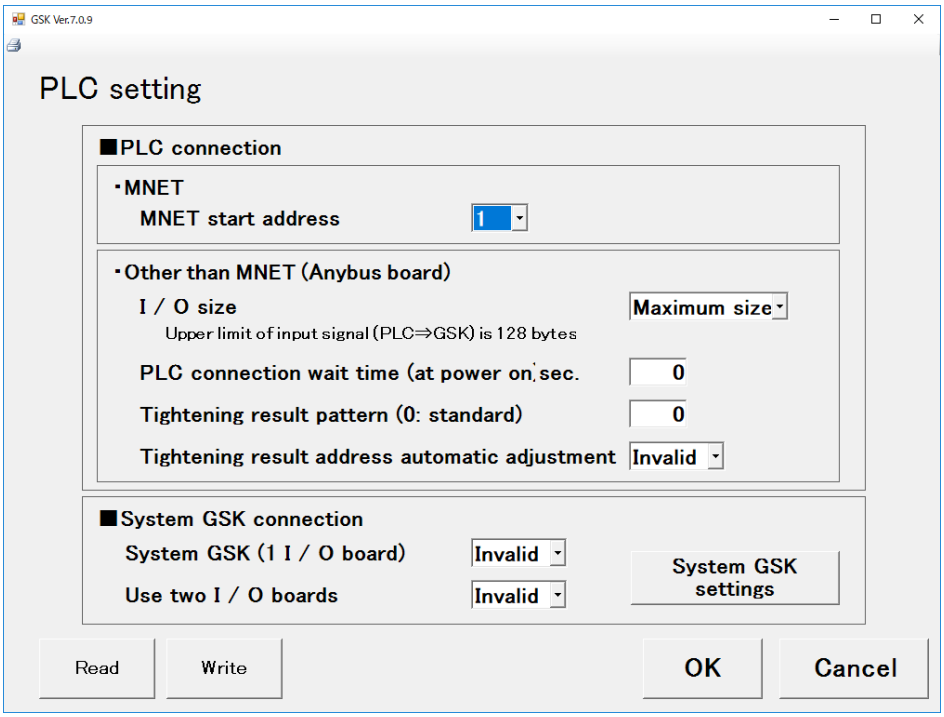


Fig (11-6-1): PLC setting

[Items]

PLC connection

・MNET start address (input area : 1-7) Setting of communication address with MNET

・I/O size To select I/O size of communication to be used in Anybus.

・PLC connection wait time (Input area : 0-50) Some PLC cut connection temporarily and re-connect soon after completing connection after power ON.

GSK judges as PLC connection error and output alarm in detecting such a cutting.

By this setting, such a connection error can be avoided.

Please set enough time in considering the timing of re-connection of PLC.

・Tightening result pattern (input area：0-15)　To select contents of tightening result which is notified per one screw according to tightening pattern.

Pattern No. Setting PC Decimal Fn6-12 (Hexadecimal)	Byte per one screw	Offset	Contents of notification	
0	8	+0	NG code	
		+2	Time	*1
		+4	Angle	
		+6	Torque	
1	6	+0	NG code	--
		+2	Angle	*1
		+6	Torque	
2	20	+0	NG code	--
		+2	Pre-tightening time	--
		+4	Pre-tightening angle	--
		+6	Pre-tightening torque	--
		+8	Pre-tightening area	--
		+10	Final tightening time	--
		+12	Final tightening angle	--
		+14	Final tightening torque	--
		+16	Final tightening area	--
		+18	Final tightening snag torque	--
3	8	+0	NG code	--
		+2	Snag torque	--
		+4	Angle	*1
		+6	Torque	
4	4	+0	Angle	*1
		+2	Torque	
5	12	+0	NG code	--
		+2	Alarm	--
		+4	Socket fitting torque	--
		+6	Snag torque	--
		+8	Angle	*1
		+10	Torque	
6	2	+0	Torque	--
7	2	+0	Snag torque	--
8	4	+0	NG code	--
		+2	Torque	--

9	4	+0	NG code	--
		+2	Snag torque	--
(～15)	Spare			

*1 Result data in priority.

As for torque data, time data and angle data, data to be sent is only 1 kind even if several movements are executed in same block.

The selection of movement is taken place according to the below priority.

If same movements are executed more than 2 times in same block, the last movement is selected.

Priority (High) 1: Final tightening

2: Reverse rotation

3: Pre-tightening

(Low) 4: Socket fitting

Item	Unit	Supplementation
Time	1ms	
Angle	0.1 degrees	
Torque	0.1Nm	
Area	1Nm・degree	
NG code	Hexadecimal 4 digits	To be “FFFF” in case of stopping without alarm. To be “FFXX” in case of stopping by alarm “XX”. ex) “FFC4” in case of alarm “C4”
Alarm	Hexadecimal 4 digits	Upper 2 digits IF alarm / Lower 2 digits DRV alarm

・Tightening result address automatic adjustment

In valid, more results can be output by reducing blank parts of tightening result.

*In valid, the address is different from I/O map table.

System GSK connection　System GSK is GIKEN original sequence system.

・System GSK (1 I/O board)　Selecting Valid / Invalid of system GSK.

・Use 2 I/O boards　To select valid in using 2 I/O boards.

・System GSK　To move to “System GSK setting” menu.

As for operation, please refer to “System GSK instruction manual”.

[Buttons]

・Read　To read tightening data output setting from controller or file.

・Write　To write tightening data output setting to controller or file.

・OK　To return to “Option setting menu” with fixing changes.

・Cancel　To return to Option setting menu” with cancelling changes.

Print screen (P)　To print the present screen.

11-7. Network setting

You can do setting related to Ethernet or FTP server.

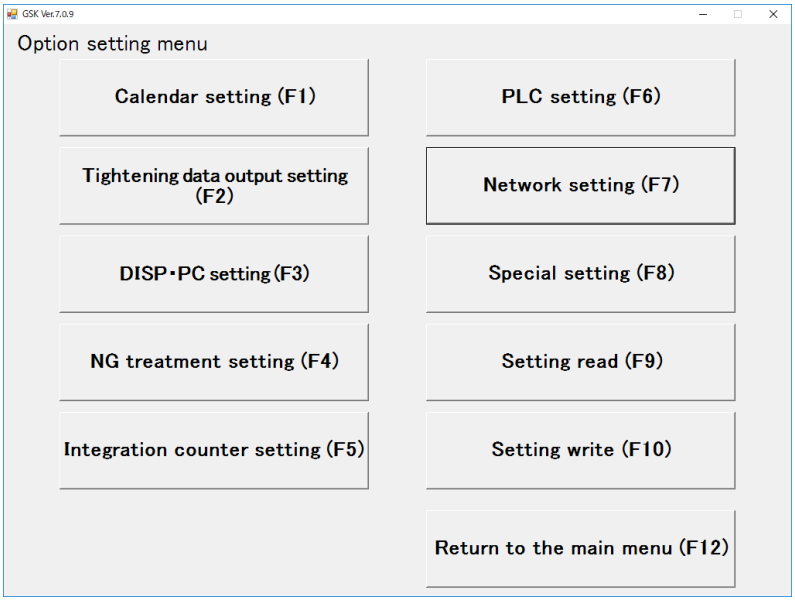


Fig (11-7-1): Network setting

[Items]

- PLC Network setting　　Setting of IP address of Ethernet.
- FTP Network setting　　Setting related to FTP server.

11-7-1. PLC Network setting

You can do setting related to Ethernet or FTP server.

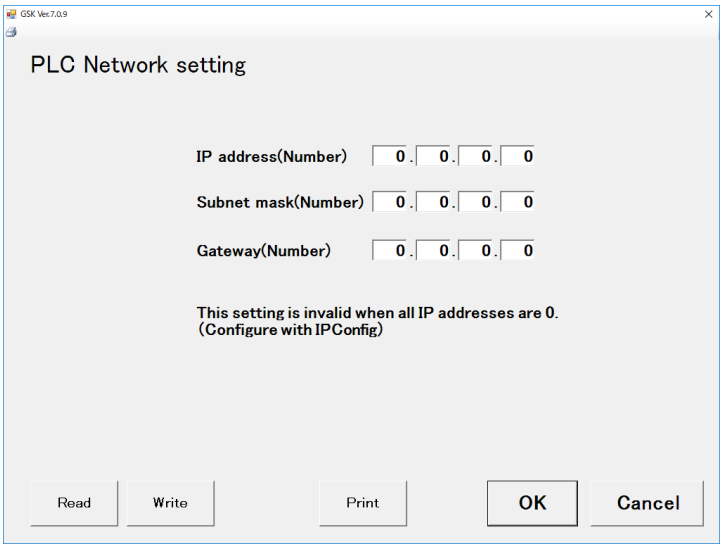


Fig (11-7-2): PLC Network setting

Setting of address in using Ethernet of Anybus or PROFINET etc.

11-7-2. FTP Network setting

11-7-2-1. Network

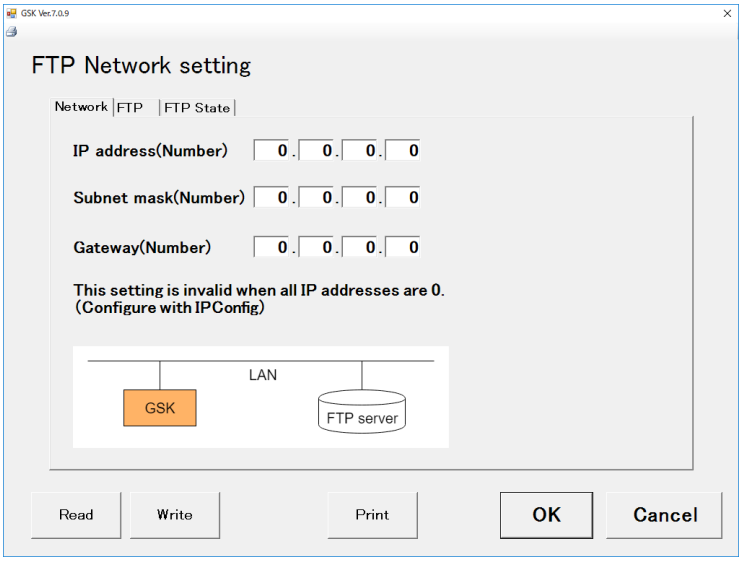


Fig (11-7-3): FTP Network setting　Network tab

Setting of address in using BIG　DATE or FTP server.

11-7-2-2. FTP

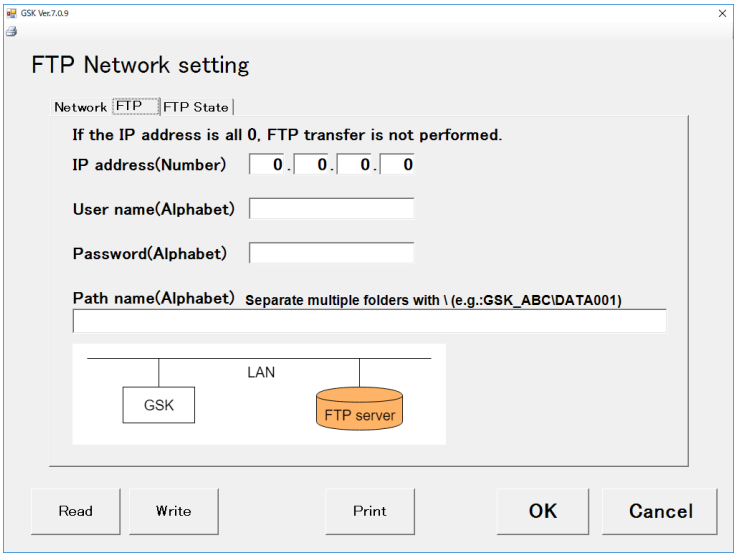


Fig (11-7-4): FTP Network setting　FTP tab

Setting of address in using FTP server and name etc.

11-7-2-3. FTP state

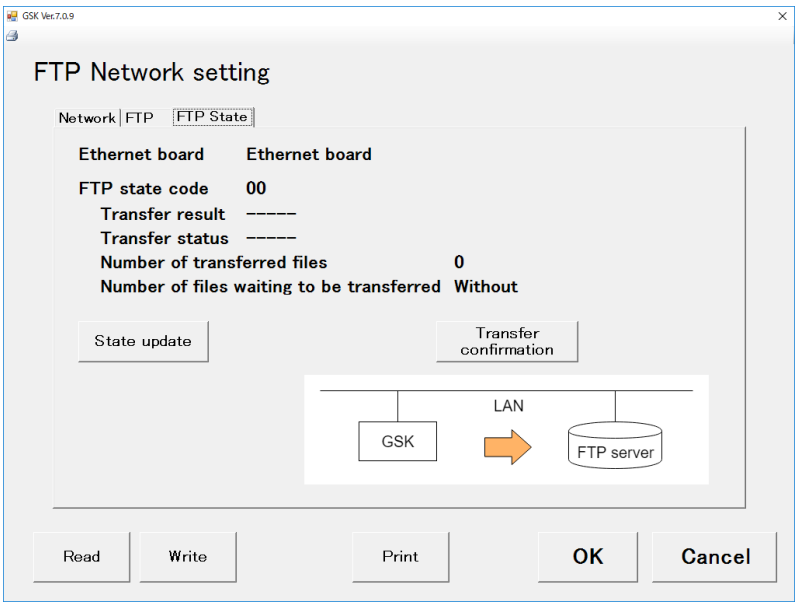


Fig (11-7-5): FTP Network setting　FTP state tab

To confirm the status of FTP server.

11-8. Special setting

You can do setting related to special spec. machine.

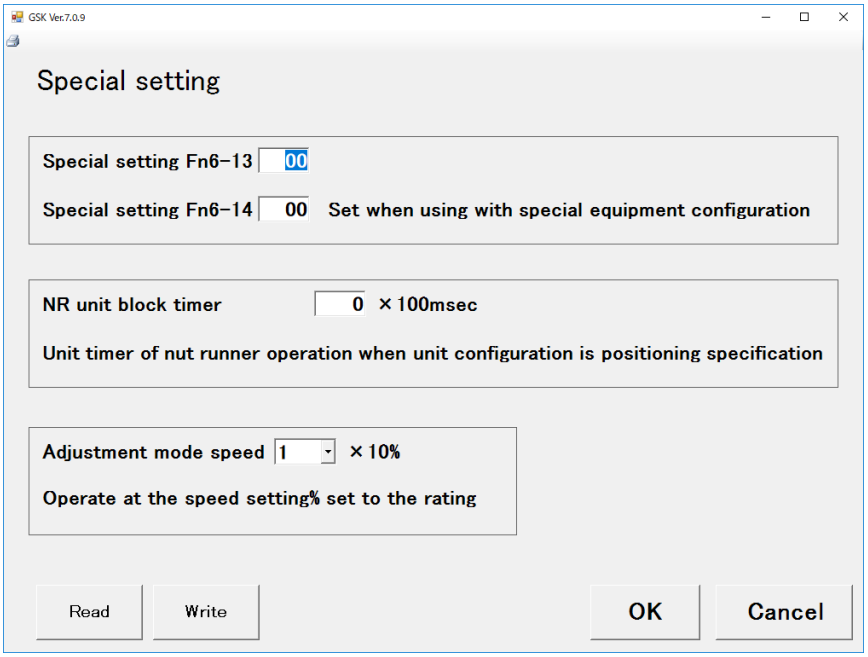


Fig (11-8-1): Special setting

[Items]

- Special setting Fn6-13 Manufacturer's specification. Normal setting: 00
- Special setting Fn6-14 Manufacturer's specification. Normal setting: 00
- NR unit block timer (input area : 0-15) Manufacturer's specification. Normal setting: 00
- Adjustment mode speed Setting of percentage of speed in adjustment mode on XY teaching.

[Buttons]

- Read To read tightening data output setting from controller or file.
- Write To write tightening data output setting to controller or file.
- OK To return to "Option setting menu" with fixing changes.
- Cancel To return to Option setting menu" with cancelling changes.

Print screen (P) To print the present screen.

11-9. Setting read, Setting write

You can read and write setting of .GSKOP extension file.

12. NG code · Alarm code

12-1. NG code list

Mode	Code	Contents
Always	FFFF FF00	Emergency stop Ready OFF during operation or Start OFF during program running.
Zero / Magnification check etc.	0001	Zero offset error Zero output exceeds “Set over” range in Zero / Magnification check.
	0002	Magnification error Magnification output exceeds “Set over” range in Zero/Magnification check.
	0003	Zero offset fluctuation error The difference between the latest output and the last one exceeds “Limit over”.
	0004	Magnification fluctuation error The difference between the latest output and the last one exceeds “Limit over”.
	0033	In case of Nut runner Tightening sampling error
		In case of positioning Home return over time error
	0034	Operation in not completion of home return Under the status of not completion of home return, position shift commands of X, Y axis are input.
SOC. T	0106	Gear check NG1 Reach “Cutting angle” during “Monitoring time for no-torque”
	0107	Gear check NG2 Rotating motor current exceeds “Upper torque limit”.
	0108	Fitting angle over Not reach “Fitting torque” after over “Cutting angle”.
	0111	Fitting torque over Over “Upper torque limit” when stop.
	0112	Fitting torque under
	0133	Fitting over time
PRE. T	0207	Pre-tightening early tightening NG Reach “Premature tightening determination torque” between start and “Angle of fast forwarding”.
	0208	Reservation
	0211	Pre-tightening torque over Over Upper torque limit when stopped
	0212	Pre-tightening torque under Not reach Lower torque limit when stopped

Mode	Code	Contents
PRE. T	0221	Pre-tightening time over Over upper time limit when stopped.
	0222	Pre-tightening time under Not reach lower time limit when stopped
	0231	Pre-tightening angle over Over upper angle limit when stopped
	0232	Pre-tightening angle under Not reach under angle limit when stopped
	0233	Pre-tightening over time
	0240	Pre-tightening area over
Reverse	0306	Passing torque no detection NG Not reach passing torque
	0307	Baking torque NG
	0311	Reverse judgement torque over Over judgement torque in measurement angle
	0321	Reverse time over Over upper time limit when stopped
	0322	Reverse time under Not reaching lower time limit when stopped
	0333	Reverse over time
Final tightening	0403	Final tightening zone NG Out of zone judgement range in Torque mode
	0404	Final Tightening slope NG Over setting in Angle mode Movement finish before getting basic slope
	0405	Quality check torque NG Over torque range when stopped
	0406	Quality check angle NG Over angle range when stopped
	0407	Early tightening torque NG Reached Cut torque between start and premature tightening determination angle
	0411	Final tightening torque over Over torque upper limit when stopped
	0412	Final tightening torque under Not reaching lower torque limit when stopped
	0421	Final Tightening time over Over upper time limit when stopped

Mode	Code	Contents
Final tightening	0422	Final Tightening time under Not reaching lower time limit when stopped
	0431	Final tightening angle over Over upper angle limit when stopped
	0432	Final tightening angle under Not reaching lower angle limit when stopped
	0433	Final tightening over time
	0434	Final tightening Cutting angle over Over Cutting angle from Final tightening start (Only without torque sensor)
	0440	Final tightening area over
	0441	Final tightening Snag torque over Snag torque over the range
	0442	Final tightening Snag torque under Snag torque not reach the range
	0451	Final tightening torque decline NG Getting lower than Passing torque of reatightening after passing Snag torque.

12-2. Alarm code list (EC alarm)

Alarm which are occurred in GSK interface.

Code / Display content	Factor	Cause	Countermeasures
EC 0 Program No. error	Program select error / Content error	The designated program is out of range.	Confirm signal of selecting program
		Program data stored in GSK-IF is incorrect (check SUM)	Re-setting of program
		No NR axis in multi axis mode	Confirm unit setting
EC 1 Movement content error	Unbreakable movement is set	Program data stored in GSK-IF is incorrect (Unknown command is found)	Re-setting of program
EC 2 No moving axis error *Reset impossible	The designated axis is not installed / Axis No. is duplicated	Mistake of unit setting	Confirm unit setting
		ARCNET communication fault	Confirm communication between GSK-IF and GSK controller
			Confirm communication between GSK controllers
			Confirm matching axis No. in unit setting and that in GSK controller
EC 3 FRAM error *Reset impossible	Detect error by self-check of GSK-IF	Shortage of back up area etc.	Re-setting of program
EC 4 Outside communication error *Reset impossible	Stop communication with outside (mainly PLC)	Miswiring of M-NET connection	Confirm wiring
		Station address error of sequencer, Numbers of transceiver byte error	Confirm setting of sequencer
		Mis-setting of M-NET station address	Confirm M-NET station address
		Shield processing defect of M-NET wire	Confirm wire

EC 5 Rate No. setting error	Rate No. error of NR axis, X axis, Y axis	Rate specification of NR axis, X axis, Y axis is other than 1-30	Confirm program setting
EC 6 Position select error	Position select error in JOG operation	Position specification in JOG operation is other than 1-255	Confirm input/output signal
EC 7 CAN communication error	Communication error with CAN	Can cable connection defect	Replace cable
EC 9 ARCNET communication error in power ON	Occur in power ON	ARCNET communication defect	Same as EC 2
		No reply from controller	Confirm matching axis No. in unit setting and that in GSK controller

12-3. Alarm code list (EC alarm details)

You can confirm code details of alarm by connecting with setting PC.

"Man menu" ⇒ "Quality control" ⇒ "Self diagnosis"

EC0 Program operation error

[Detecting contents] Errors related to program operation. These occur in detecting problem in selection and contents of program.

[Status and Countermeasures]

Code details (***1)	Cause	Countermeasures
0101	Selected program No. is out of range (0 or over max. program no.)	Confirm program No. of input signal
0201	Some NR axis moves in first program start of all units	Start until stopping NR movement
0301	NR axis of the unit moves in starting block of the unit	Start until stopping NR movement
0401	Block to be executed is not decided in start	Block to be executed is not decided in start
0501	Blocks to be executed for all axes are blank	Confirm program contents of No. to be executed
0601	The block No. to be started is over max. (Self diagnosis error of IF firm)	Confirm version of IF firm Version up of IF firm
0701	Zero/magnification ON in block which tightening command not exist	Confirm contents of program. Tightening command is necessary for block of zero/magnification ON
0801	MARK command No. is duplicated	Confirm MARK command No. in program
0901	Timing of retightening start is too early	About 300ms interval is needed between loosening signal ON and start signal ON
0A01	Retightening cannot be started by mismatch of block numbers of each unit in retightening of multi-unit and block movement mode.	To match numbers of block by inserting dummy blocks, or change the mode of retightening
0B01	XY block is detected in multi-axis mode (After changing unit setting, program not overwritten) *XY block is prohibited in multi-axis mode)	Confirm contents of program Input correct program
0C01	NR block is detected in positioning mode and unit without NR axis *NR block is prohibited in unit without NR	Confirm contents of program Input correct program

	axis	
0D01	MOVXY command which cannot be executed is detected (ex: MOVX command is detected in unit without X axis)	Confirm MOVX, MOVY, MOVXY command. Input correct program
0E01	Z axis command which cannot be executed is detected (ex: Pressing down command is detected in unit without Z axis)	Confirm command related to Z axis
0F01	"Finish SYNC" ON is detected in positioning mode. *"Finish SYNC" is only used in multi-axis mode	Make program without "Finish SYNC"

EC1 Program step error

[Detecting contents] Unbreakable movement is set in program. Step cannot be read.

[Status and Countermeasures]

Code details (***2)	Cause	Countermeasures
0102	Backup error of program (Old FRAM etc.) (This also occurs if the program never be written after changing setting of program max. value)	Rewriting program To replace IF in occurring frequently
0202	Unbreakable step command is detected (undefined command)	Rewriting program *
0302	SPW command is detected	Rewriting program *
0402	Program step is over	Rewriting program *
0502	Rate No. is out of range	Rewriting program *
0602	Internal memory shortage for program cache Valid axis No. which is exceeding program max. value	Confirm unit setting and program max. value setting. Rewriting program *
0702	END command of program cannot be detected	Rewriting program *

EC2 Controller connection error

[Detecting contents] Communication with controller (driver) cannot be executed.

Mainly ARCNET communication error.

[Status and Countermeasures]

Code details (***3)	Cause	Countermeasures
0103	In start-up: Version of controller (driver) is old (GSK driver, but old version)	Version up firm of controller Replacement of controller
0203	In start-up: System No. error of controller	Replacement of controller
0303	In start-up: Axis of controller not found (No reply from driver)	Confirm axis No. of controller Confirm connection between GSKIF and controller ・Termination resistor is installed? ・There is noise or not? ・Contact failure of cable?
0403	In start-up: Axis which no reply from controller)	Refer to 0303
1003	ARCNET communication is interrupted (Communication success in start-up, but failed later)	Refer to 0303

EC3 I/F unit error

[Detecting contents] Any IF error is detected.

[Status and Countermeasures]

Code details (***4)	Cause	Countermeasures
0104	Backup error of parameter (Old FRAM etc.) (Possibility of breaking of various setting value	Rewriting of GSK setting parameter
0204	Definition error of input/output signal (Self-diagnosis error of IF firm)	Version up of IF firm
0304	Size shortage of program area (Problem of IF firm. Shortage of backup area)	Version up of IF firm

EC4 Outside communication error (Sequencer connection error)

[Detecting contents] Sequencer (M-NET etc.) communication error is detected.

[Status and Countermeasures]

Code details (***5)	Cause	Countermeasures
0105	In start-up: Sequencer communication defect	According to the sequencer Refer to supplementation
0205	M-NET: Receive size specification from parent station is too small	Confirm IO size of MNET sequencer
0305	M-NET: Receive size specification from parent station is too large	Confirm IO size of MNET sequencer
0405	M-NET: Receive size specification from parent station is too small	Confirm IO size of MNET sequencer
0505	M-NET: Receive size specification from parent station is too large	Confirm IO size of MNET sequencer
1005	Sequencer communication error (Success in start-up, but failed later)	Refer to supplementation

[Supplementation] In case that PLC is M-NET

Status	Cause	Countermeasures
Occurred after power ON *1	Mis-wiring of M-NET connection	Confirm wiring
	Mismatch in PLC station address, communication speed etc. *2	Confirm M-NET address setting matches with PLC setting
	Shield treatment fault of M-NET wire	Confirm wiring
*1 In case of M-NET, EC 4 is not occurred right after GSKIF power ON even if M-NET cannot be connected. EC 4 is occurred in case of interruption after M-NET is connected once after power ON (Same as GSS). If GSKIF does not reply to signals from PLC regardless of no EC 4, please check the above cause and countermeasures.		
Others M-NET instructs numbers of send/receive bytes, but not check whether this size matches with input/output signal size of GSKIF. If only a part of input/output signals can be communicated, please confirm each signal size according to PLC stations.		
[Related main parameter] M-NET station address setting: Fn7-No.03		

[Supplementation] In case that PLC is other than M-NET (Anybus board is connected in CN 13 connector)

Status	Cause	Countermeasures
Occurred after power ON *1	Mis-wiring of PLC connection	Confirm wiring
	Mismatch of PLC address, communication speed etc. *2	Confirm whether PLC setting matches with Anybus board setting or not.
	Mismatch of input/output signal size	Confirm PLC setting (Fn6-12) Confirm PLC setting (Fn6-15)
	Shield treatment fault of PLC wire	Confirm wiring
Occurred after power ON	Shield treatment fault of PLC wire	Confirm wiring
How to use Anybus board is different according to kinds of PLC (Devicenet/CCLINK/Profinet etc.) As for details, please refer to Anybus specification. *1 Sometimes it takes max. a few tens of seconds until alarm because sometimes it takes time for completion of connection sequence with PLC. *2 Setting is different according to PLC.		
[Related main parameter] PLC setting: Fn6-No.12		

EC5 Fault of position movement

[Detecting contents] Error related to XYZ movement

[Status and Countermeasures]

Code details (***6)	Cause	Countermeasures
0106	Return: Cannot move because some axes not return to home position	Make the axes return to home position
0206	Program operation cannot be done because some axes not return to home position	Make the axes return to home position
0306	Error of POS No. range which specified in program operation	Confirm position No. specified by input signal (If Z axis exists, max. No. is 160)
0406	There is problem in X rate (speed 0 etc.)	Confirm X rate
0506	There is problem in Y rate (speed 0 etc.)	Confirm Y rate
0606	There is problem in Z rate (speed 0 etc.)	Confirm Z rate
1006	Z axis: Home return parameter error	Confirm Z rate
1106	Z axis: JOG parameter error	Confirm Z rate
1206	Z axis: Teaching parameter error	Confirm Z rate
1306	Fault of Z axis down. Z axis down during Z axis operation. *Error in IF internal check. Possibility is low.	Mainly rewrite IF firm, but correction of overwrap distance in Z rate setting or insertion of wait by DELAY command will be effective.
2006	XY movement by JOG signal: Cannot move by interference *Now not occur	Start JOG after reducing interference between units.
2206	XY movement by JOG signal: Error of POS No. of target position	Confirm the range of position No. specified by input signal.
2306	XY movement by JOG signal: Cannot move because some axes not return to home position	Make the axes return to home position

EC6 Out of range of target positions

[Detecting contents] Error related to target positions of XYZ movement

[Status and Countermeasures]

Code details (***7)	Cause	Countermeasures
0107	Z axis: Error of target coordinates, limit over (Try to move over up limit or down limit)	Confirm Z axis coordinates of the specified position
0207	Z axis: Z axis coordinates is unknown in cylinder down command ・Coordinate value of Z axis is 0 mm ・The point No. without Z axis coordinates is specified. ex) return No. 255 etc.	Confirm whether the specified point No. is within the range. Confirm whether Z axis coordinate value of the specified point is larger than up limit (Need to turn to down direction).
0307	X coordinates of return target point is out of soft limit.	Confirm XY coordinates of target point are within soft limit. To expand the range of soft limit if necessary.
0407	Y coordinates of return target point is out of soft limit.	
1007	X coordinates of program target point is out of soft limit.	
1107	Y coordinates of program target point is out of soft limit.	
2007	X coordinates of JOG target point is out of soft limit.	
2107	Y coordinates of JOG target point is out of soft limit.	

EC7 CAN communication error

[Detecting contents] Error in CAN communication (SVNET communication)

[Status and Countermeasures]

Code details (***8)	Cause	Countermeasures
0108	CAN open fault (Shortage of resource of RAM etc.)	Version up of IF firm
0208	CAN communication fault in start up ・Connection fault of CAN cable ・Axis No. of Z axis is duplicated, mismatch	Confirm wiring (termination resistance etc.) Confirm electricity Confirm axis No. (MAC-ID)
0308	CAN communication fault after start up (Interrupted after connected once)	Confirm wiring

EC8 Error of parameter contents

[Detecting contents] Inappropriate parameter contents of IF

[Status and Countermeasures]

Code details (***9)	Cause	Countermeasures
0109	UNIT setting: No valid axis	Confirm unit setting.
0209	UNIT setting: UNIT No. for each axis is not ascending order.	Confirm unit setting. Each axis No. shall be decided in ascending order of unit No.
0309	UNIT setting: Axis No. is not in order as NR/X/Y/Z.	Confirm unit setting. As for axes in same unit, each axis No. in ascending order is allotted to NR/X/Y/Z.
0409 *1	UNIT setting: X axis not exist, Y axis exists (Positioning cannot be done without X axis)	To add dummy X axis.
0509 *1	UNIT setting: Only Z axis exists as positioning (Positioning cannot be done without X axis)	To add dummy X axis. Correct axes in machine.
0609	UNIT setting: numbers of unit over (Max. numbers of unit in positioning is 4 units)	Add additional IF.

*1: For old version. Movable in the latest IF.

EC9 Tightening movement error

[Detecting contents] Error related to NR movement

[Status and Countermeasures]

Code details (***A)	Cause	Countermeasures
010A	Axis off against other than NR axes in “Axis off setting”.	Confirm contents of axis off setting
020A	Axis off against other than NR axes by input signal	Confirm input signal for axis off
200A	NR axis inching: Start fault (Selected program No. or program contents are broken)	Confirm the selected program No.. Confirm program contents for inching. Rewrite if necessary.
210A	NR axis inching: Start fault (Selected program is blank. No valid program.)	Confirm program contents for inching. (More than 1 tightening block be existed.)

13. Others

13-1. About Operation ready ON/OFF in reading/writing setting

・Read setting

The entire setting	○
Nut runner setting (Rate setting, Block control, SOC.T, PRE.T, REV.T, REA.T)	○
Unit setting	○
Tightening data output setting	○
Option setting	○
Screw number setting	○
Program setting	○
Position setting(Cylinder name、X rate、Y rate、Interference)	○
XY Point	○
Timer setting	○
Tightening record	×

・Write setting

The entire setting	×
Nut runner setting (Rate setting, Block control, SOC.T, PRE.T, REV.T, REA.T)	×
Unit setting	×
Tightening data output setting	×
Option setting	×
Screw number setting	×
Program setting	×
Position setting(Cylinder name、X rate、Y rate、Interference)	×
Timer setting	×
XY Point	△(Note1)

(Note1) Only single operation in single, judgement OFF

The terminology explanation

・UNIT

Max. 30 axes of motors are controlled in several groups.

The group is called “Unit”.

1 unit of interface can control max. 7 axes in multi-axis and max. 4 units in positioning.

At least more than one axis of motor is belonged to one interface, and each unit moves simultaneously.

In communicating with PLC etc., signals need to be input to each unit.

・PROGRAM

The largest framework regarding movement of NR and positioning motor is called “program”.

Axis numbers, setting numbers and setting contents of program is selected from the below 1-3;

30 axes, 16 program No., 220 steps

30 axes, 50 program No., 70 steps

8 axes, 50 program No., 220 steps

As default, 1 is selected.

Program is set by using tightening block and positioning command regarding movement of NR and positioning motor which are set in unit setting.

In program, at least more than one block needs to be set.

・STEP

Movement content of each NR which is set in program is called “Step”.

Each step has its number from No.1 to max. No. which is selected, and movement is decided by inserting tightening blocks and positioning commands into each step.

Movement of NR is executed from step 1, and finish in the last end command.

After reaching the last end command, GSK outputs total judgement (Total OK/NG).

Each NR axis in a unit is synchronized in each step, and axes which finish movement of the step turn servo off and wait until other remaining axes finish movement.

After all axes finish the step, proceed to the next step.

・BLOCK

A set of tightening command for each screw is called “block”.

The tightening command is operation command as Socket fitting, Pre-tightening, Reverse rotation and Final tightening and order command as Socket removal, Retry and End.

Block which NR rate No., screw No. and zero/magnification check etc. are added is inserted into steps.

When program start is ON, one block in multi-axis and all steps in positioning are executed.

In the step of finishing the block, judgement (Block OK/NG) to the block is output.

If any step in the block is NG, judgement becomes Block NG and the next step is not executed.

After judgement, the next block is started by program start.

In case of retry, the following tightening command of retry command is executed before judgement, and in case of positioning unit, the next tightening is executed after judgement.

・RETRY

The command to retry operation in case of NG in each operation (Fitting, Pre-tightening, Reverse and Final tightening) of block.

In case of setting retry in tightening block and outputting NG from block start until retry, operation after retry until end is executed.

If NG not occurs, tightening block is finished normally.

・SOCKET FITTING

To rotate in specified speed and until specified angle.

To be inserted into steps of tightening block and tightening program.

By using monitoring torque as option, pick up (fitting between socket and screw) operation before tightening and preventive operation against socket-engagement after tightening can be done.

・PRETIGHTENING

The operation from screw rotation until pre-tightening.

This operation consists of 3 processes; Screw fitting process, Fast feeding process without load and tightening process.

To be inserted into steps of tightening block and tightening program.

・REVERSE ROTATION

To loosen screw in some rotation after seating.

By monitoring the residual torque, judgement of bolt seizure can be done.

・FINAL TIGHTENING

To be used as final tightening in normal tightening setting.

Several judgements can be done by tightening method like Torque mode and Angle mode etc. and torque curve method like zone judgement and gradient judgement etc.

・SOCKET REMOVAL

The command used for removing socket from the screw which is tightened in final tightening.

Setting No. 50 of socket fitting is used for the movement.

This command is inserted into steps of tightening block and tightening program.

・QL INPUT

In the block where the tightening operation is in progress, if the tightening operation is not within the OK range, “NG” determination is output in this block. Operator looks at this “NG” determination and needs to retighten the screw manually. At this time, it is possible to change the determination “NG” to “OK” by inputting the tightening output of the manual torque wrench to the controller. This input is called a QL input.

・TIGHTENING OUTPUT SETTING

To set data which is output from interface unit to ID controller.

・TIGHTENING SUMPLING OPERATION

The operation to measure the length of screw in using sampling setting of auto setting.

To make NR rotate in constant speed to tightening direction of selected rate information, and finish in “Tightening sampling stop torque”, then calculate the angle of the rotation.

Based upon this angle, simple setting is made and sampling data is acquired, then setting value is made from this data.

・SMOOTHING TIGHTENING

Stepless control of rotary speed from “Initial speed” until “Speed in cutting torque” is called “Smoothing tightening”.

・AREA CULCULATING

Integrated value of the torque value every 0.5 degree from this total or at the beginning of the temporary closing movement to the end (the 1Nm unit) is indicated. The indicated value is 1/10 of a calculation result.

・END SYNCHRONIZATION

To re-tighten until the tightening torque in 5 rpm after pre-tightening and final tightening

・STRETCH WAVEFORM

Torque mode in final tightening: Measuring start torque, Angle mode: tightening waveform from snag torque

The revise history

Version	Change contents	notes
001	New creation	Arp.2019
002	E-mail address change	Mar.2020
003	Addition of overseas bases	Mar.2023

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