INSTRUCTION MANUAL
FOR
GSS/GSSW SETUP SOFTWARE

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GIKEN INDUSTRIAL CO., LTD.

Before beginning operation:

Caution

■Note

1. Please read this instruction manual carefully in order to ensure that you use this product correctly.
2. A part or no part of this instruction manual may be used or reproduced without the permission of Giken Industrial Co.,Ltd.
3. Regarding the handling process and operation that are not listed in this instruction manual, please think that they cannot be operated, and do not 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.
4. Matters listed in this instruction manual are subject to change for the improvement without notice.

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 setup software for the GSS/GSSW controller. Setup input can be entered from the front panel of the controller manually for the GSS/GSSW controller, but this software is used to facilitate the setup input in a way easy to understand. When the personal computer with this software installed is used, it is possible to simplify the initial setup input and improve the maintainability due to its batch transmission function while monitoring the display screen. As the other feature, the tightening history can be read and the torque waveform display can be checked by sampling the tightening torque value.

Hardware requirements

OS: WINDOWS'95
WINDOWS'98
WINDOWS NT
WINDOWS ME
WINDOWS 2000
WINDOWS XP

RAM: 64MB or more

Installation destination: C:¥Program Files¥GSS Setup

Activation method: Execute GSS_IF.exe

Password to write to the controller is 2003.

Contents

1. MAIN MENU

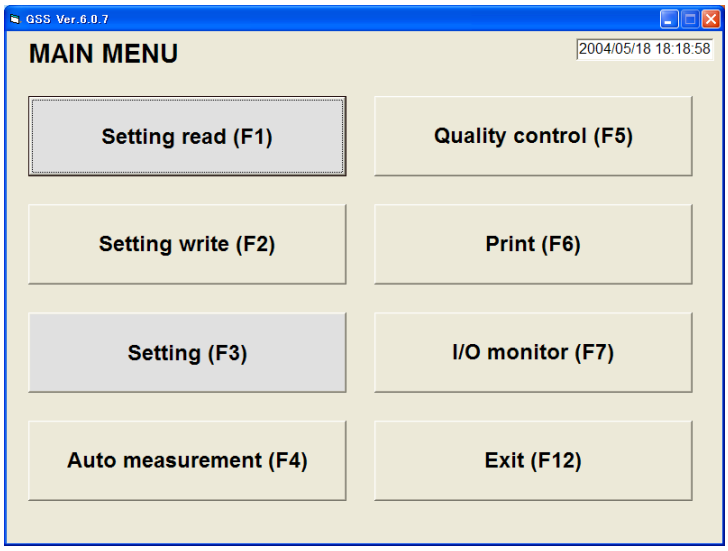
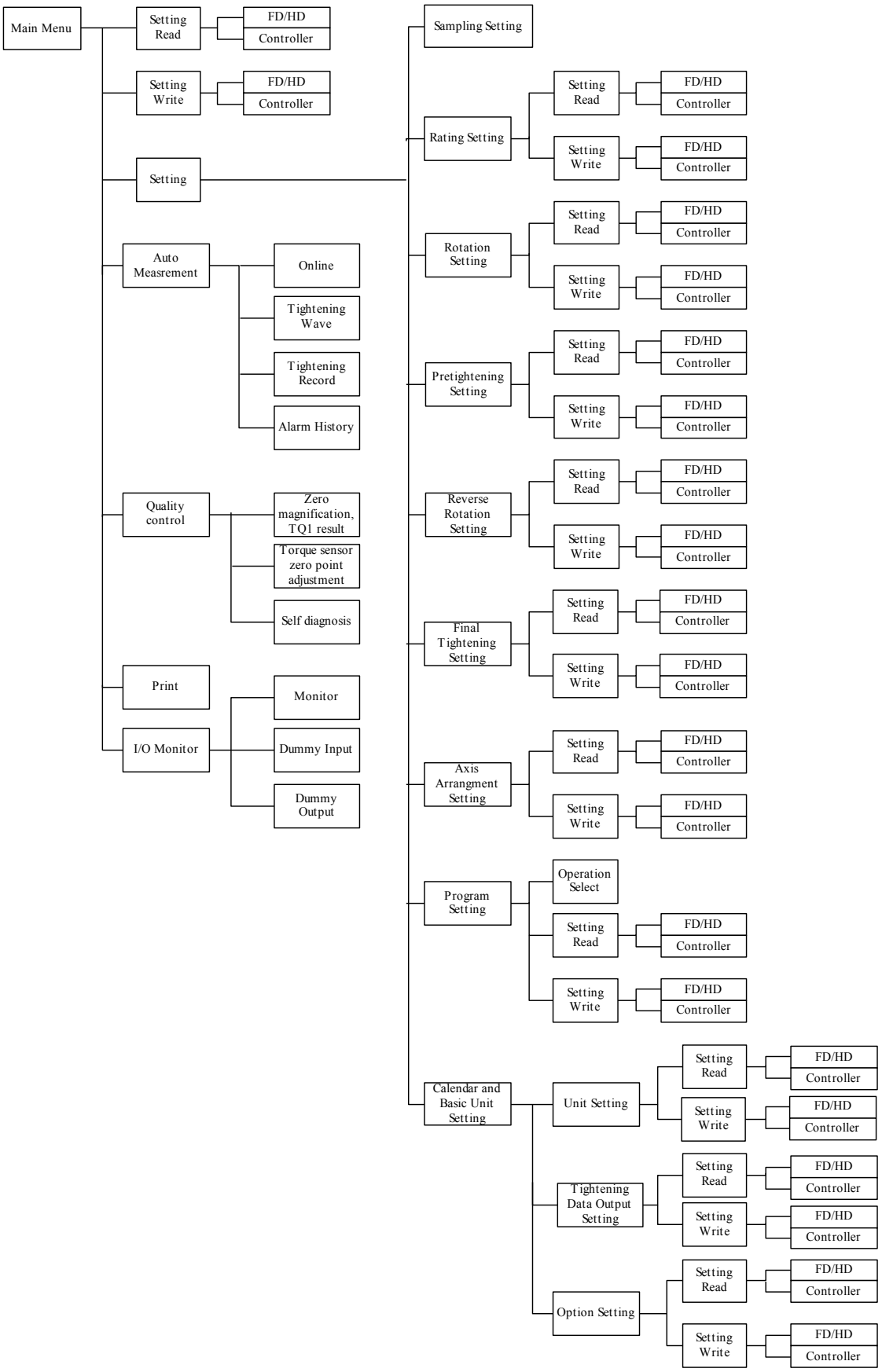


Fig. 1-1. MAIN MENU

- SETTING READ (F 1)
  Loads settings from a file or the controller.
- SETTING WRITE (F 2)
  Writes settings to a file or the controller.
- SETTING (F 3)
  Displays the SETTING screen.
- QUALITY CONTROL (F 5)
  Displays the QUALITY CONTROL screen.
- I/O MONITOR (F 7)
  Displays the I/O MONITOR MENU.
- AUTO MEASUREMENT (F 4)
  Displays the AUTO MEASUREMENT MENU.
- PRINT (F 6)
  Displays the PRINT screen.
- EXIT (F 12)
  Exits the program.

1-1. Organizations of Screens

The organization of screens is diagrammatically shown below



1-2. Automatic Communication Check

When the program is started, the communication baud rate of the GSS controller is automatically detected and set accordingly. If the program is started without connecting the GSS controller, the settings for the last successful communication are used.

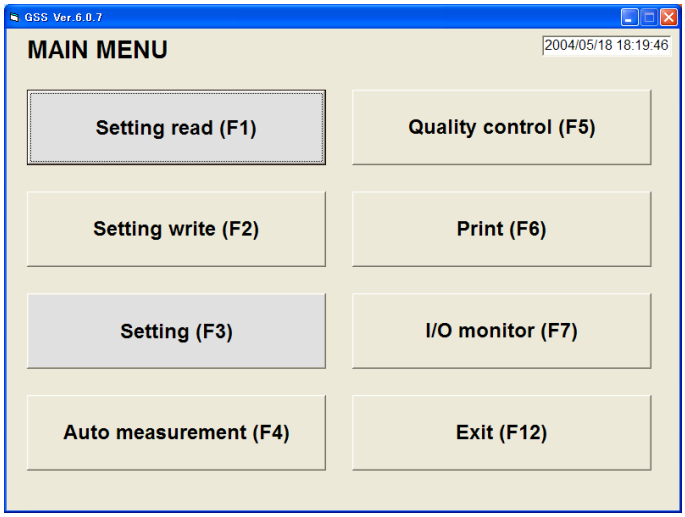


Fig. 1-2. MAIN MENU (communication check in progress)

Fig. 1-3. Initial communication check error

Fig. 1-4. Unit setting acquisition error

When the program is started, the unit settings of the GSS controller are automatically acquired.

1-3. Automatic Communication Check Function

When the program is started, the version of the GSS controller is automatically checked. When the product is attempted to connect with the GSS controller that cannot be connected, the alarm message appears and the program exits.

Fig.1-5. Controller version check error

Fig.1-6. GSS check error

When the product is connected with the controller that is set to GSS, the alarm message also appears and the program exits.

2. SETTING READ

The SETTING READ screen allows you to load GSS settings from a file or the controller.

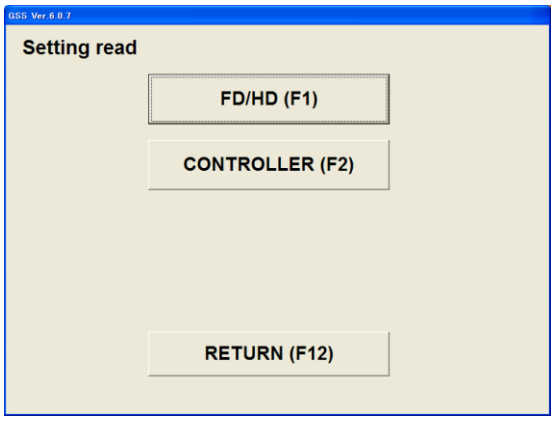
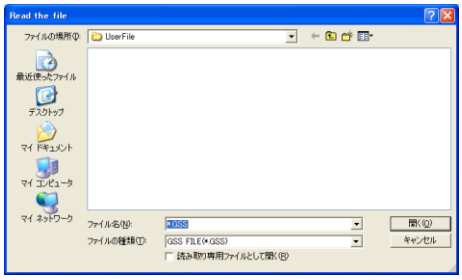


Fig. 2-1. SETTING READ screen

2-1. FD/HD

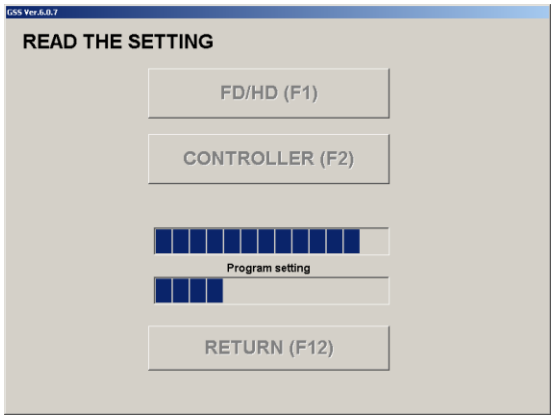
- FD/HD (F 1)
  Loads GSS settings from a file.
- CONTROLLER (F 2)
  Loads GSS settings from the GSS controller.
  This requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.
- RETURN (F 12)
  Returns to the MAIN MENU.



To load GSS settings, select a file with this extension.

Fig. 2-2. Selecting the file to be loaded

Using the File Select dialog box, select the GSS settings file you want to load.



When a file for GSS settings is selected, its loading is started.
The progress of this loading is displayed.
The GSS settings file contains the following settings:

Unit settings	Rating settings
Rotation settings	Pretightening settings
Reverse rotation settings	Final tightening settings
Axial arrangement settings	Program settings

Fig. 2-3. Progress of loading from FD/HD

When the GSS settings file has been loaded successfully, the following message appears.
After the GSS settings file has been loaded, the SETTING screen is displayed.
Password input appears to display the SETTING screen.

Fig. 2-4. Message for successful completion of loading the data

2-2. Using the CONTROLLER Key

When the CONTROLLER key is clicked, GSS settings are loaded from the GSS controller. This requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.

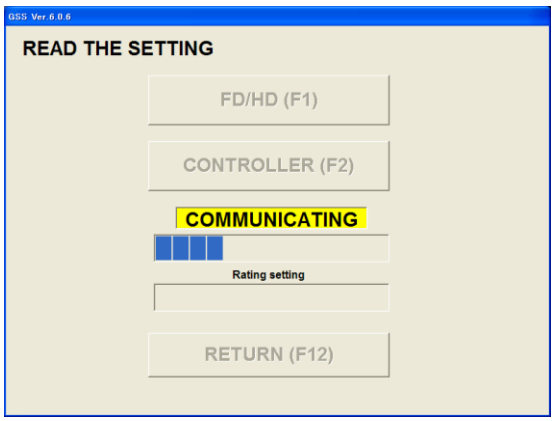


Fig. 2-5. Progress of loading from controller

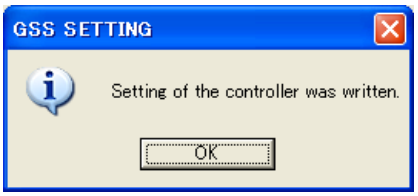


Fig. 2-6. Message for successful completion of loading the data from controller

When the loading from the controller has been finished, the message on the right appears. When the loading from the controller has been finished, the screen moves to the setting menu.
Password input appears to display the SETTING screen.

3. SETTING WRITE

The SETTING WRITE screen allows you to write settings to a file or the controller.

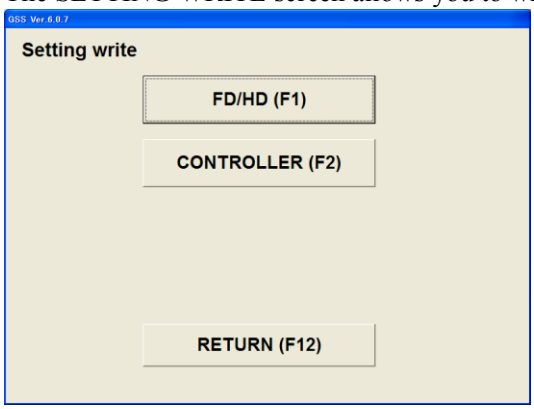


Fig. 3-1. SETTING WRITE screen

- FD/HD (F 1)
  Writes GSS settings to a file.
- CONTROLLER (F 2)
  Writes GSS settings to the GSS controller.
  This requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.
- RETURN (F 12)
  Returns to the MAIN MENU.

3-1. Using the FD/HD Key

When the FD/HD key is clicked, GSS settings are written to a file on the floppy disk (FD), hard disk (HD), or other accessible media.
The file for the GSS settings is saved under a name with an extension of GSS.

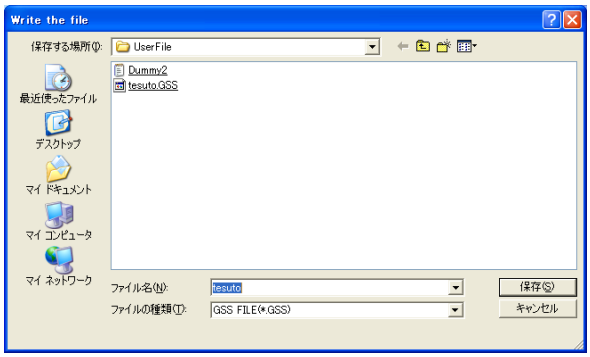


Fig. 3-2. Selecting a file to write settings

Using the FILE SELECT dialog box, select the file to which you want to write GSS settings.

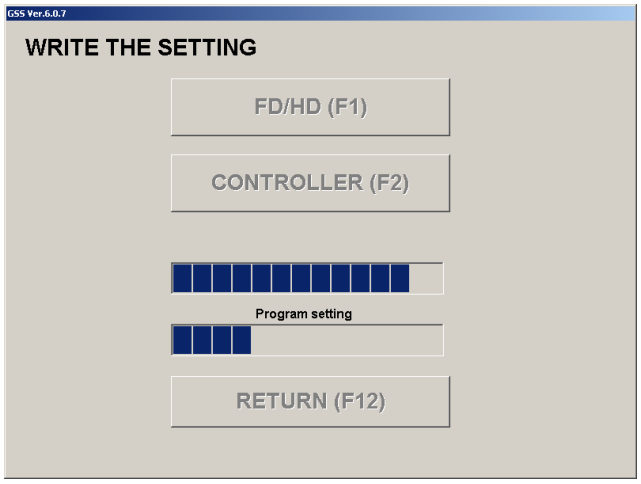


Fig. 3-3. Progress of writing to FD/HD

Fig. 3-4. Message for successful completion of writing the data to the GSS settings file

When a file is selected, writing is started.

The progress of writing GSS settings to the file is displayed.

The following settings are saved in the GSS settings file.

Unit settings	Rating settings	Rotation settings	Pretightening settings
Reverse rotation settings	Final tightening settings	Axial arrangement settings	Program settings

When the settings have been successfully written to the GSS settings file, the message on the right appears:

3-2. Using the CONTROLLER Key

When the CONTROLLER key is clicked, GSS settings are written to the GSS controller.

This requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.

Writing data to the controller requires entering your password. If your password is incorrect, you are not permitted to write GSS settings to the controller.

Fig. 3-5. Password check

Operation ready is forcibly turned OFF after checking

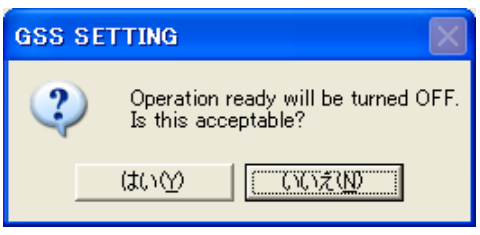


Fig. 3-6. Operation ready OFF check

Select “Yes” when the operation ready is the password

allowed. If the operation ready is not turned OFF, to be turned OFF.
you are not permitted to write.

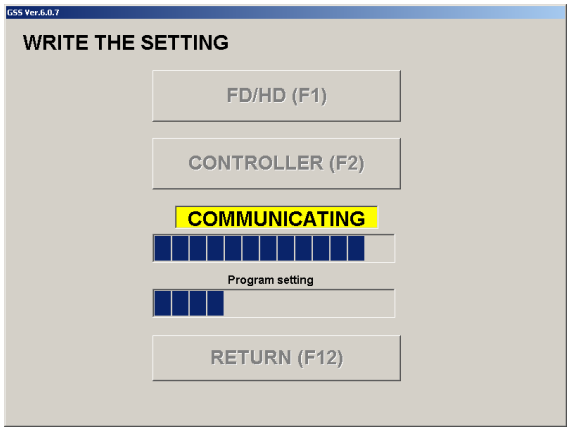


Fig. 3-7. Progress of writing to the controller

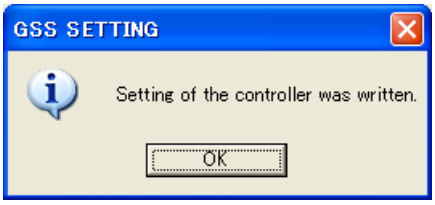


Fig. 3-8. Message for successful completion of writing the data to the controller

When the GSS settings have been successfully written to the controller, the message (Fig. 3-8.) appears.

4. SETTING

When SETTING is selected from the MAIN MENU, the SETTING screen is displayed.

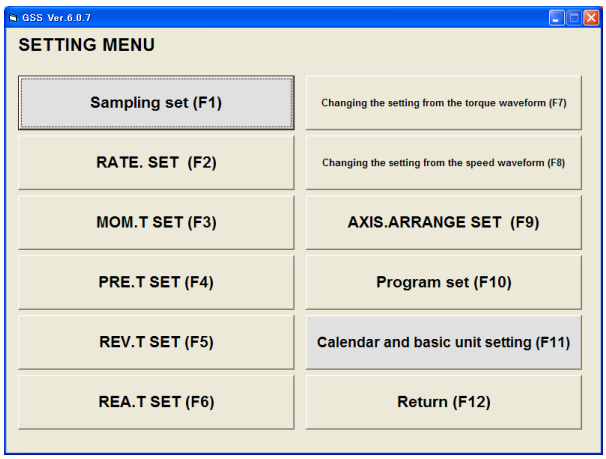


Fig. 4. SETTING screen

- SAMPLING SET (F 1)
  Displays the SAMPLING SET screen.
- MON.T SET (F 3)
  Displays the MON.T SET screen.
- REV.T SET (F 5)
  Displays the REV.T SET screen.
- AXIS.ARRANGE SET (F 9)
  Displays the AXIS.ARRANGE SET screen.
- CALENDAR AND BASIC UNIT SETTING (F 11)
  Displays the CALENDAR AND BASIC UNIT SETTING screen
- RATE. SET (F 2)
  Displays the RATE. SET screen.
- PRE.T SET (F 4)
  Displays the PRE.T SET screen.
- REA.T SET (F 6)
  Displays the REA.T SET screen.
- PROGRAM SET (F 10)
  Displays the PROGRAM SET screen.
- RETURN (F 12)
  Returns to the MAIN MENU

4-1. SAMPLING SET

The SAMPLING SET screen allows you to sample the tightening angle and simply provide the rating, pretightening, final tightening, and program settings.
For the pretightening and final tightening settings, values are established in the uncompleted setting No.

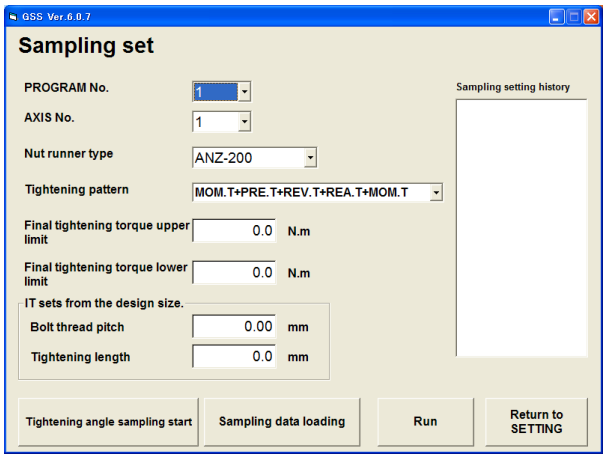


Fig. 4-1. SAMPLING SET screen

- Program No.

  Specify the setting number for which the pretightening, final tightening, and program settings are being simply provided.

  The pretightening, final tightening, and program settings for the specified number are updated.

- Axis No.

  Specify the axis number for which the settings are being simply provided.

  The rating and program settings for the specified number are updated.

- Nut Runner Type

  Specify a nut runner type.

  The specified nut runner is updated in the rating settings.

- Tightening Pattern

  Select the tightening pattern that is being simply provided.

  The program settings are updated with the specified tightening pattern.

- Final Tightening Torque Upper Limit (0 to 999.9)

  The pretightening and final tightening settings are updated with the specified upper limit of final tightening torque.

- Final Tightening Torque Lower Limit (0 to 999.9)

  The pretightening and final tightening settings are updated with the specified lower limit of final tightening torque.

- Bolt Thread Pitch (0 to 99.99)

  The pretightening settings are updated with the specified bolt thread pitch.

- Tightening Length (0 to 999.9)

  The pretightening settings are updated with the specified tightening length.

- Sampling Setting History

  The program number and axis number for which the simple settings have been provided are displayed as history.

- Tightening Angle Sampling Start

  The tightening angle starts being sampled.

- Sampling Data Loading

  Based on the sampled data on tightening angle, either bolt thread pitch or tightening length is set.

- Run

  The simple settings are run.

- Return to SETTING

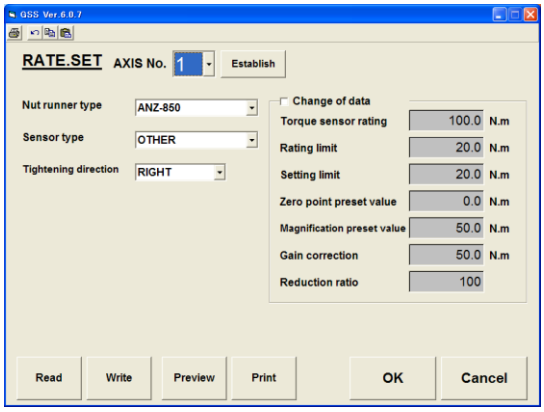
  You return to the SETTING screen.

The SAMPLING SET screen allows you to check the input under the following conditions. Setting against the input rule is not allowed.

- Final Tightening Torque Upper Limit > Final Tightening Torque Lower Limit
- Bolt Thread Pitch > 0
- Tightening Length > 0

4-2. RATE. SET

The RATE.SET screen allows you to modify the rating settings.




Print : Prints out the current screen as it is.


Undo : Undoes the last entered data.


Copy : Copies the settings for each axis number.


Paste : Pastes the copied data to the specified setting number.

Fig. 4-2-1. RATE. SET screen

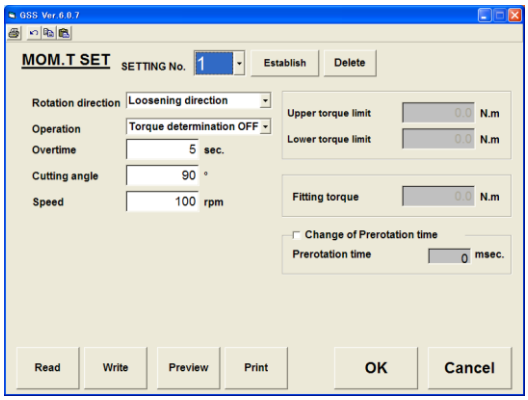
- Setting No.
  Select the setting number for which settings are to be modified.
- Read button
  Displays the RATE. SET READ screen.
- Preview button
  Displays the print preview for the rating settings.
- OK button
  Establishes the modification and returns to the SETTING screen.
- Nut Runner Type
  Enter a nut runner type.
- Tightening direction
  Enter a tightening direction.
- Rating Limit (0 to 999.9)
  Enter a rating limit.
- Zero point preset value
  Enter a zero point preset value.
- Gain correction
  Enter a gain correction.
- Establish button
  Establishes the modification.
- Write button
  Displays the RATE. SET WRITE screen.
- Print button
  Prints out the rating settings.
- Cancel button
  Cancels the modification and returns to the SETTING screen.
- Sensor Type
  Enter a sensor type.
- Setting Limit (0 to 999.9)
  Enter a setting limit.
- Reduction Ratio (0 to 9999)
  Enter a reduction ratio.
- Magnification preset value (0 to 999.9)
  Magnification preset value (0 to 999.9)

The RATE. SET screen allows you to check the input under the following conditions.
Setting against the input rule is not allowed.

- Rating Limit < Torque sensor rating
- Setting Limit < Torque sensor rating
- Zero point preset value < Torque sensor rating
- Magnification preset value < Torque sensor rating
- Gain correction < Torque sensor rating

4-3. MOM.T SET

The MOM.T SET screen allows you to provide rotation settings.




Print : Prints out the current screen as it is.


Undo : Undoes the last entered data.


Copy : Copies the settings for each axis number.


Paste : Pastes the copied data to the specified setting number.

Fig. 4-3-1. MOM.T SET screen

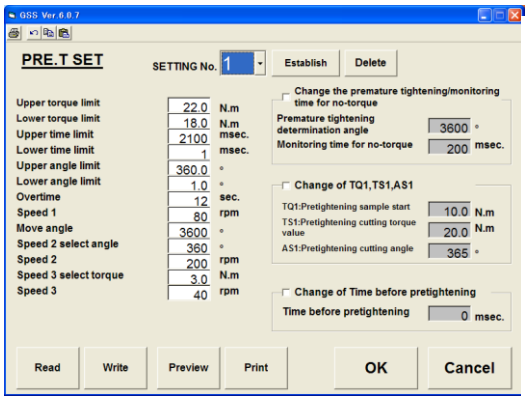
- Setting No.
  Select the setting number for which settings are to be modified.
- Establish button
  Establishes the modification.
- Read button
  Displays the MOM.T SET READ screen.
- Write button
  Displays the MOM.T SET WRITE screen.
- Preview button
  Displays the print preview for the rotation settings
- Print button
  Prints out the rotation settings.
- OK button
  Establishes the modification and returns to the DETAILED SETTING screen.
- Cancel button
  Cancels the modification and returns to the DETAILED SETTING screen.
- Rotational Direction
  Enter a rotational direction.
- Delete button
  Deletes the settings for the specified setting number.
- Operation
  Without Torque Evaluation: You cannot enter the upper and lower torque limits and the fitting torque.
  With Torque evaluation: You cannot enter the fitting torque.
  Fitting: You cannot enter the upper and lower torque limits.
- Overtime (1 to 60)
  Enter the overtime.
- Cut Angle (0 to 9999)
  Enter the cutting angle.
- Speed (0 to 9999)
  Enter the speed.
- Upper Torque Limit (0 to 999.9)
  Enter the upper torque limit. Note: This value may be entered when “With Torque Evaluation” is selected in Operation.
- Lower Torque Limit (0 to 999.9)
  Enter the lower torque limit. Note: This value may be entered when “With Torque Evaluation” is selected in Operation.
- Fitting Torque (0 to 999.9)
  Enter the fitting torque. Note: This value may be entered when “Fitting” is selected in Operation.
- Prerotation Time (0 to 9999)
  Enter the prerotation time.

MOM.T SET screen allows you to check the input under the following conditions.
Setting against the input rule is not allowed.

- Overtime ≧ 1
- When the action is “Torque determination is ON.”
- Upper Torque Limit > Lower Torque Limit

4-4. PRE.T SET

The PRE-T SET screen allows you to modify the pretightening settings.




Print : Prints out the current screen as it is.


Undo : Undoes the last entered data.


Copy : Copies the settings for each axis number.


Paste : Pastes the copied data to the specified setting number.

Fig. 4-4-1. PRE-T SET screen

- Setting No.
  Select the setting number for which settings are to be modified.
- Establish button
  Establishes the modification.
- Read button
  Displays the PRE.T SET READ screen.
- Write button
  Displays the PRE.T SET WRITE screen.
- Preview button
  Displays the print preview for the pretightening settings.
- Print button
  Prints out the pretightening settings.
- OK button
  Establishes the modification and returns to the DETAILED SETTING screen
- Cancel button
  Cancels the modification and returns to the DETAILED SETTING screen.
- Upper Torque Limit (0 to 999.9)
  Enter the upper torque limit.
- Lower Torque Limit (0 to 999.9)
  Enter the lower torque limit.
- Overtime (1 to 60)
  Enter the overtime.
- Speed 1 (0 to 9999)
  Enter speed 1.
- Moving Angle (0 to 9999)
  Enter the moving angle.
  It will be unconditionally the third speed after the specified angle.
- Speed 3 (0 to 200)
  Enter Speed 3.
- Delete button
  Deletes the settings for the specified setting number.
- Speed 2 Select Angle (0 to 9999)
  Enter Speed 2 Select Angle.
- Speed 2 Select Torque (0 to 999.9)
  Enter Speed 2 Select Torque.
- Speed 2 (0 to 500)
  Enter Speed 2.
- Cutting torque (0 to 999.9)
  Enter a cutting torque.
- Time Before Pretightening (0 to 65500)
  Enter the time before pretightening.
- Monitoring time for no-torque (0 to 65500)
  Sets the monitoring time for no-torque condition.
- Change the premature tightening/monitoring time for no-torque (in the check box)
  Check in the check box to change the premature tightening determination angle/monitoring time for no-torque. It allows you to change the premature tightening determination angle/monitoring time for no-torque.
- Premature tightening determination angle
  Determines as the premature tightening NG if it reaches the cutting torque value within the specified angle.
  Change TQ1, TS1 (in the check box)
  TQ1: Pretightening sample start, TS1: Check in the box to change the pretightening cutting torque value.
  TQ1: Pretightening sample start, TS1: It allows you to change the pretightening cutting torque value.
- TQ1: Pretightening sample start (0 to 999.9)
  TQ1: Set the pretightening sample start.
- TS1: Pretightening cutting torque value (0 to 999.9)
  TS1: Enter the pretightening cutting torque value.
- AS1: Pretightening cutting angle (0 to 9999)

AS1: Set the pretightening cut angle.

- Change the previous time before pretightening (in the check box)

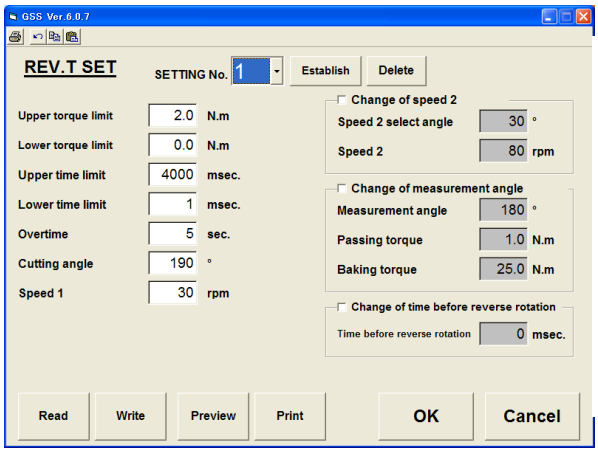
  Check to change the previous time. It allows you to change the previous time.

PRE-T SET screen allows you to check the input under the following conditions.
Setting against the input rule is not allowed.

- Overtime ≥ 1
- Upper torque limit > Lower Torque Limit
- Upper time limit > Lower time limit
- Moving Angle ≥ Speed 2 Select Angle
- TS1: Pretightening cut torque value > TQ1: Pretightening sample start
- Upper torque limit > TS1: Pretightening Cutting Torque > Lower Torque Limit

4-5. REV.T SET

The REV.T SET screen allows you to modify the reverse rotation settings.




Print : Prints out the current screen as it is.


Undo : Undoes the last entered data.


Copy : Copies the settings for each axis number.


Paste : Pastes the copied data to the specified setting number.

Fig. 4-5-1. REV.T SET screen

- Setting No.

  Select the setting number for which settings are to be modified.
- Read button

  Displays the REV.T SET READ screen.
- Preview button

  Displays the print preview for the reverse rotation settings.
- OK button

  Establishes the modification and returns to the DETAILED SETTING screen.
- Upper Torque Limit (0 to 999.9)

  Enter the upper torque limit.
- Overtime (1 to 60)

  Enter the overtime.
- Speed 1. (0 to 9999)

  Enter speed 1
- Baking torque (0 to 999.9)

  When the torque exceeds its preset value in the reverse rotation, it becomes “REV.T BAKING TORQUE NG”.
- Establish button

  Establishes the modification.
- Write button

  Displays the REV.T SET WRITE screen.
- Print button

  Prints out the reverse rotation settings.
- Cancel button

  Cancels the modification and returns to the DETAILED SETTING screen.
- Lower Torque Limit (0 to 999.9)

  Enter the lower torque limit.
- Cutting Angle. (0 to 9999)

  Enter the cutting angle
- Passing Torque. (0 to 999.9)

  When the step stops while no condition exists more than the specified value in the reverse rotation, it becomes “REV.T PASSING TORQUE NG”.
- Measurement angle (0 to 9999)

  Enter a measurement angle.

- Change Speed 2 (in the check box)
  Check in the check box to change Speed 2 Select Angle and Speed 2. It allows you to change Speed 2 Select Angle and Speed 2.
- Speed 2 Select Angle. (0 to 9999)
  Enter Speed 2 Select Angle.
- Delete button
  Deletes the settings for the specified setting number.
- Speed 2. (0 to 9999)
  Enter speed 2
- Change the measurement angle (in the check box).
  Check in the box to change the measurement angle, passing torque and baking torque.
  It allows you to change the measurement angle, passing torque and baking torque.

- Change the time before reverse rotation (in the check box).
  Check in the check box to change the time before reverse rotation. It allows you to change the time bore reverse rotation.
- Time Before Reverse Rotation (0 to 65500)
  Enter the time before reverse rotation

REV.T SET screen allows you to check the input under the following conditions.
Setting against the input rule is not allowed.

- Overtime ≧ 1
- Upper Torque Limit > Lower Torque Limit
- Upper Time Limit > Lower Time Limit
- Measurement Angle ≦ Cutting Angle
- Select Angle ≦ Cutting Angle

4-6. REA.T SET

The REA.T SET screen allows you to modify the final tightening settings.

Three types of tightening modes are provided for this product, which are the Torque Method, Angle Method and Yield Method. When the tightening mode is changed, the setting screen corresponding to the mode appears because the setting items are different in each mode respectively.

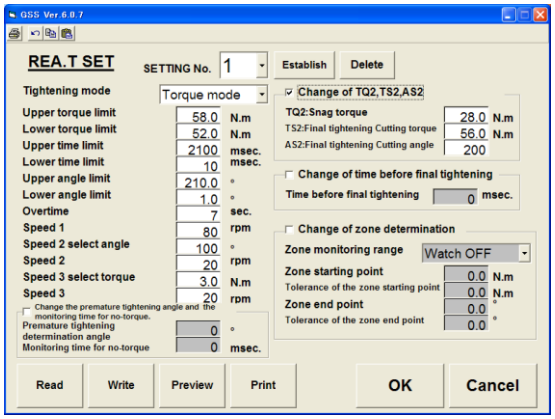


Fig. 4-6-1. REA.T SET screen

Each tightening mode common items

- Setting No.
  Select the setting number for which settings are to be modified.
- Read button
  Displays the REA.T SET READ screen.
- Preview button
  Displays the print preview for the final tightening settings.
- Establish button
  Establishes the modification.
- Write button
  Displays the REA.T SET WRITE screen.
- Print button
  Prints out the final tightening settings.

- OK button
  Establishes the modification and returns to the DETAILED SETTING screen.
- Cancel button
  Cancels the modification and returns to the DETAILED SETTING screen.
- Upper Torque Limit (0 to 999.9)
  Enter the upper torque limit.
- Lower Torque Limit (0 to 999.9)
  Enter the lower torque limit.
- Overtime (1 to 60)
  Enter the overtime.
- Speed 1 (0 to 9999)
  Enter speed 1.
- Speed 2 Select Angle (0 to 9999)
  Enter Speed 2 Select Angle.
- Speed 2 (0 to 999)
  Enter speed 2.
- Speed 3 Select Torque (0 to 999.9)
  Enter the speed 3 select torque.
- Speed 3 (0 to 999)
  Enter speed 3
- Change The Premature Tightening Angle/Monitoring Time for No-Torque (in the check box)
  Check in the check box to change the premature tightening angle/monitoring time for no-torque. It allows you to change the premature tightening angle/ monitoring time for no-torque.
- Premature tightening determination angle (0 to 9999)
  Enter the premature tightening angle.
- Monitoring time for no-torque (0 to 65500)
  Enter the monitoring time for no-torque.
- Change TQ2, TS2, AS2 (in the check box)
  Check to change TQ2: Snag torque, TS2: Final tightening cutting torque, AS2: Final tightening cutting angle.
  It allows you to change TQ2: Snag torque, TS2: Final tightening cutting torque, AS2: Final tightening cutting angle.
- TQ2: Snag torque (0 to 999.9)
  TQ2: Enter the snag torque.
- TS2: Final tightening cutting torque (0 to 999.9)
  TS2: Enter the final tightening cutting torque.
- AS2: Final tightening cutting angle (0 to 9999)
  AS2: Enter the final tightening cutting angle.
- Delete button
  Deletes the settings for the specified setting number.
- Change the time before final tightening (in the check box)
  Check to change the time before final tightening. It allows you to change the time before final tightening.
- Time Before Final Tightening (0 to 65500)
  Enter the time before final tightening.

Tightening mode: Torque method

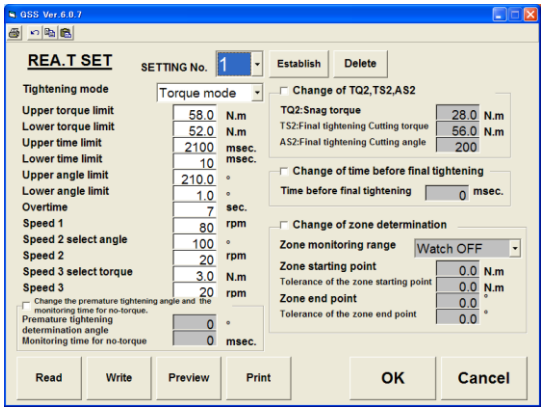


Fig. 4-6-2. Final tightening setting　Torque method

- Change the zone determination (in the check box)
  Check to change the zone determination. It allows you to change the zone determination.
- Zone monitoring range
  Enter the zone monitoring range.
- Zone starting point (0 to 999.9)
  Enter the zone starting point.
- Tolerance of the zone starting point (0 to 999.9)
  Enter the zone starting point tolerance.
- Zone end point (0 to 999.9)
  Enter the zone end point.
- Tolerance of the zone end point (0 to 999.9)
  Enter the zone end point tolerance.

Tightening mode: Angle method

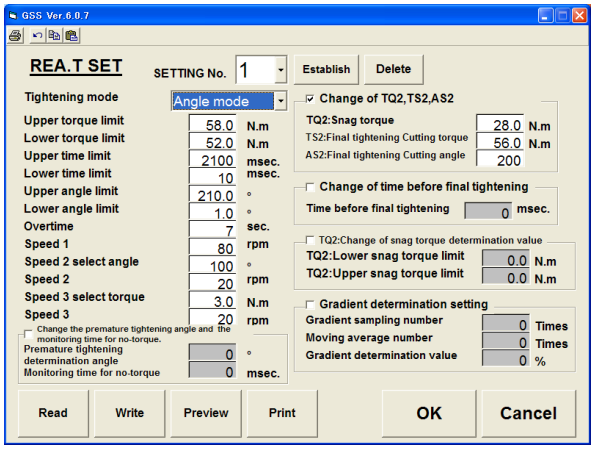
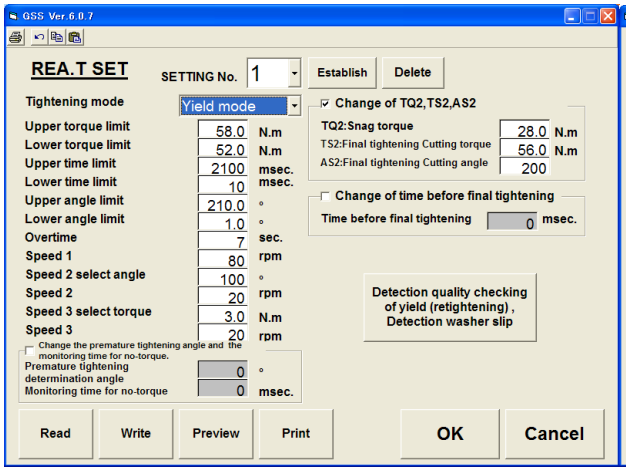


Fig. 4-6-3. Final tightening setting　Angle method

- TQ2: Change the snag torque determination value (in the check box).
  Check in the check box to change the snag torque determination value. It allows you to change the snag torque determination value.
- TQ2: Snag torque upper limit (0 to 999.9)
  TQ2: Enter the snag torque upper limit.
- TQ2: Snag torque lower limit (0 to 999.9)
  TQ2: Enter the snag torque lower limit.
- Gradient sampling number (0 to 99)
  Enter the gradient sampling number.
- Moving average number (0 to 199)
  Enter the moving average number.
- Gradient determination value (0 to 99)
  Enter the gradient determination value.

Tightening mode: Yield method



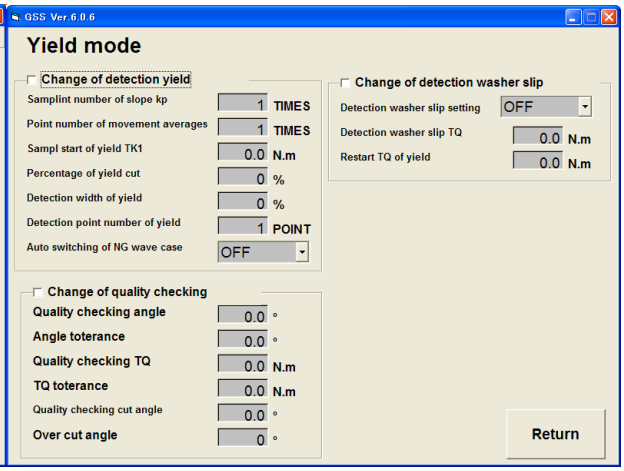


Fig. 4-6-4. Final tightening setting　Yield method -(1)

Fig. 4-6-5. Final tightening setting　Yield method -(2)

- Change the yield detection (in the check box).
  Check in the check box to change the yield detection. It allows you to change the yield detection.
- Gradient sampling number (0 to 99)
  Enter the gradient sampling number. Enter the moving average number (0 to 199).
- Yield sampling start (0 to 999.9)
  Enter the yield sampling start.
- Yield cutting ratio (0 to 100)
  Enter the yield cutting ratio.
- Yield detection width (0 to 100)
  Enter the yield detection width.
- Yield detection point (0 to 100)
  Enter the yield detection point.
- Automatic cutoff for the extraordinary waveform

Enter the automatic cutoff for the extraordinary waveform.

- Change the quality check (retightening) (in the check box).
  Check in the check box to change the quality check (retightening). It allows you to change the quality check (retightening).
- Quality check angle (0 to 999.9)
  Changes the quality check angle.
- Quality check torque (0 to 999.9)
  Changes the quality check torque.
- Quality checker cutting angle (0 to 999.9)
  Changes the quality checker cutting angle.
- Quality check angle tolerance (0 to 999.9)
  Changes the quality check angle tolerance.
- Quality check torque tolerance (0 to 999.9)
  Changes the quality check torque tolerance.
- Overcutting angle (0 to 9999)
  Changes the overcutting angle.
- Change the washer sip detection (in the check box).
  Check in the check box to change the washer slip detection. It allows you to input the washer slip detection.
- Enter the washer slip detection
  Enter the washer slip detection setting.
- Restart torque for the Yield method (0 to 999.9)
  Enter the restart torque for the Yield method.
- Washer slip detection torque (0 to 999.9)
  Enter the washer slip detection torque.

REA.T SET screen allows you to check the input under the following conditions.

Setting against the input rule is not allowed.

- Overtime ≧ 1
- Upper Torque Limit > Lower Torque Limit
- Upper Time Limit > Lower Time Limit
- Upper Angle Limit > Lower Angle Limit
- Speed 2 Select Angle ≦ Cutting angle for the reverse rotation setting 6

When the tightening mode is the “Torque Method”:

- Upper Torque Limit > TS2 : Final tightening cutting torque > Lower Torque Limit

When the tightening mode is the “Angle Method”:

- Upper Snag Torque Limit > Lower Snag Torque Limit
- Gradient Sampling Number ≧ 1
- Moving Average Number ≧ 1
- Gradient Determination Value ≧ 1

When the tightening mode is the “Yield Method”:

- Gradient Sampling Number ≧ 1
- Moving Average Number ≧ 1
- Yield Cutting Ratio ≧ 1
- Yield Detection Width ≧ 1
- Number of the yield detection points ≧ 1
- TQ2 : Snag torque ≦ TK1 : Yield Sampling Start
- TK1 : Yield Sampling Start < TS2 : Final Tightening Cutting Torque
- AS2 : Final Tightening Cutting Angle ≦ Overcutting Angle

4-7. Changing the setting from the torque waveform

Moves to each setting screen from the torque waveform.

When you click on any part of the torque waveform that you want to change, you can move to the specified setting screen.

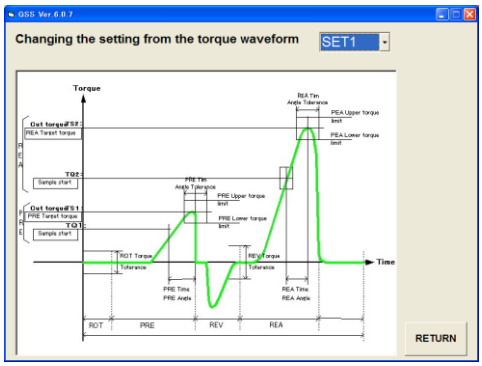


Fig. 4-7. Changing the setting from the torque waveform

- Setting

  If the setting number has been specified in advance, the specified setting number appears when you move to the specified setting screen.

- Return

  Returns to the setting menu.

4-8. Changing the setting from the speed waveform

Moves to each setting screen from the speed waveform.

When you click on any part of the speed waveform that you want to change, you can move to the specified setting screen.

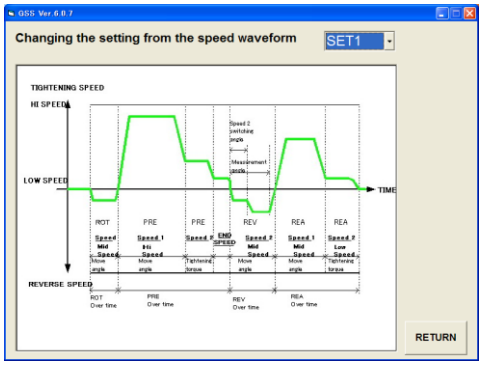


Fig. 4-8. Changing the setting from the speed waveform

- Setting

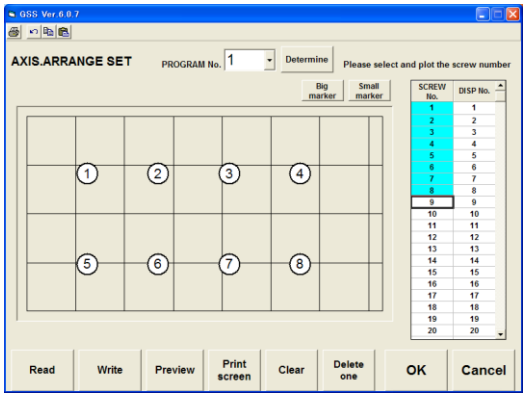
  If the setting number has been specified in advance, the specified setting number appears when you move to the specified setting screen.

- Return

  Returns to the setting menu.

4-9. AXIS.ARRANGE SET

The AXIS.ARRANGE SET screen allows you to enter axial arrangement data.




Print : Prints out the current screen as it is.


Undo : Undoes the last entered data.


Copy : Copies the settings for each axis number.


Paste : Pastes the copied data to the specified setting number.

Fig. 4-9-1 AXIS.ARRANGE SET screen

- Program No.
  Enter the desired program number.
- Screw No. Select
  Select screw numbers you want to plot.
- Axial Arrangement Form
  Determine the axial arrangement on the axial arrangement form by clicking on the left mouse button.
  Screw No. : Screw No. to determine
  Display No. : No. to display
- Big marker
  Marker on the screen appears in large size.
- Small marker
  Marker on the screen appears in small size.
- Read
  Displays the AXIS.ARRANGE SET READ screen.
- Write
  Displays the AXIS.ARRANGE SET WRITE screen.
- Preview button
  Displays a print preview of the AXIS.ARRANGE SET.
- Print the screen button
  Prints out the AXIS.ARRANGE SET.
- Clear
  Deletes all the axial arrangement data on the screen.
- Delete One
  Deletes the last entry of the axial arrangement.
- OK.
  Establishes the settings and returns to the SETTING screen
- Cancel
  Cancels the settings and returns to the SETTING screen.

4-10. PROGRAM SET

The PROGRAM SET screen allows you to change the program.

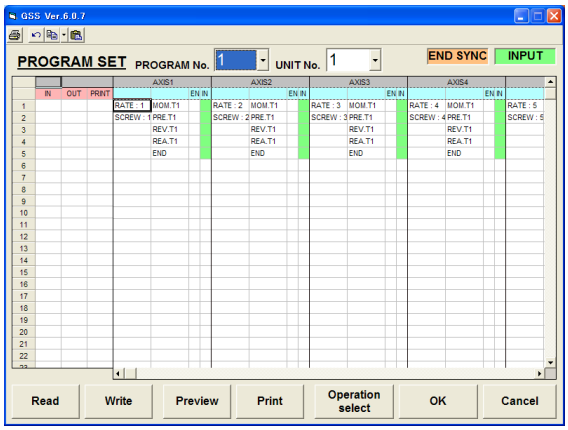
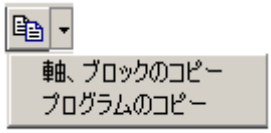


Fig. 4-10-1. PROGRAM SET screen

Print: Prints out the current screen as it is.

Undo: Undoes the last entered data.

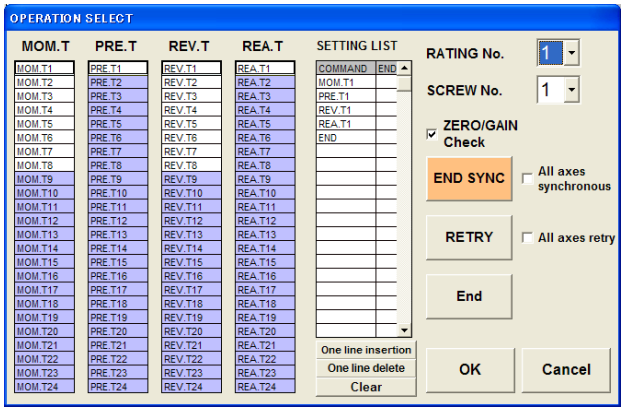


Copy: Copies the settings for each program number.
It allows you to copy in the axis unit/block unit/program unit. It can be selected in the drop down menu. When the button is clicked on, “Copy of the axis and block” will be made.

Paste: Pastes the copied data to the specified program number.

- Program No.
  Specify the program number you want to set up.
- Unit No.
  Specify the unit number.
- Program Sheet
  Displays the program selected with the specified program number or unit number.
  Also specifies IN/OUT/PRINT.
- Setting Read button
  Displays the PROGRAM SET READ screen.
- Setting Write button
  Displays the PROGRAM SET WRITE screen.
- Preview button
  Displays a print preview of the program settings.
- Print button
  Prints out the program settings.
- Operation Select button
  Select an area on the program sheet and then press this button, the PROGRAM OPERATION SELECT screen will be displayed.
- OK button
  Establishes the modification and returns to the SETTING screen.
- Cancel button
  Cancels the modification and returns to the SETTING screen.

4-10-1. OPERATION SELECT screen



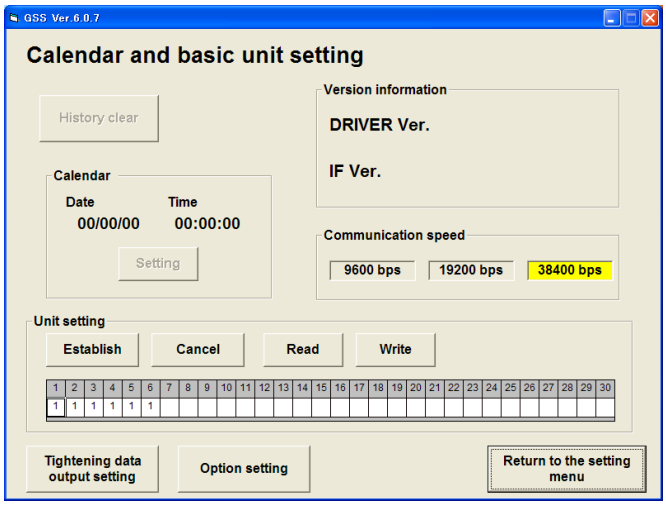
Note : In Rotation, Pretightening, Reverse, Final Tightening Select Lists, only the setting items in the white fields are available for the program

4-10-2. OPERATION SELECT screen

- Rotation, Pretightening, Reverse, Final Tightening Select List
  Clicking a setting item will add it to the setting list.
- Setting list
  Displays the programmed data.
- One line Delete button
  Deletes one line from the settings list.
- Rating number
  Sets the rating number.
- One line insertion button
  Inserts one line to the setting data list.
- Clear button
  Clears all the lines of the settings list.
- Tightening screw number
  Sets the tightening screw number.
- End synchronous button
  When a line is selected from the setting list and the end synchronous button is clicked on, the end synchronous is set. The end synchronous that has been synchronized for all axes can not release the setting of end synchronous when the mouse is clicked in the all axes synchronous check box. It can be released when the check mark in the all axes synchronous check box is removed.
- All axes synchronous check box
  Performs the end synchronous for all axes. The end synchronous that has been synchronized for all axes cannot be changed.
  To change it, remove the check mark in the end synchronous box.
- Retry button
  Adds a retry to the settings list. Inserts the retry to the same step of other axis even if the check mark in the all axes retry check box has been removed.
- All axes retry check box
  Adds a retry to all axes. Retry that has been retried to all axes cannot be changed.
  To change, remove the check mark in the all axes retry check box.
- End button
  Adds an End to the setting list.
- Cancel button
  Cancels the settings and returns to the PROGRAM SET screen.
- OK button
  Establishes the settings and returns to the PROGRAM SET screen.

4-11. CALENDAR AND BASIC UNIT SETTING

The CALENDAR AND BASIC UNIT SETTING screen allows you to set the calendar and basic units.



Note: To operate the history clear/calendar setting button, the password is required. (Password: 2003)

Fig. 4-11-1. CALENDAR AND BASIC UNIT SETTING screen

- History Clear button
  Clears the history on the controller.
- Calendar Display
  Displays the calendar information on the controller in real time.
- Calendar Setting button
  Sets the current date and time on the PC to those on the controller.
- Transmission Rate Display
  Displays the transmission rate with the controller.
- Establish button
  Establishes the entered unit data.
- Read button
  Displays the UNIT SETTING READ screen.
- Tightening data output setting
  Displays the TIGHTENING DATA OUTPUT SETTING screen.
- Return to SETTING screen
  Returns to the SETTING screen.
- Version Display
  Displays the version of the controller.
- Unit Setting
  Sets the unit to which each axis belongs.
- Cancel button
  Cancels the entered unit data.
- Write button
  Displays the UNIT SETTING WRITE screen.
- Option setting
  Displays the OPTION SETTING screen.

4-12. TIGHTENING DATA OUTPUT SETTING

Sets the tightening data output.

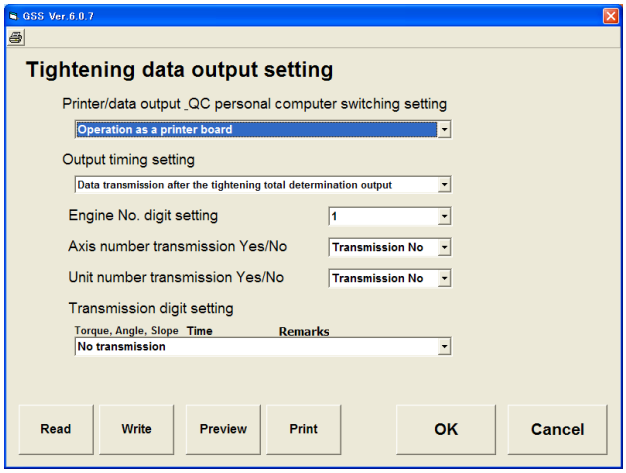


Fig. 4-12-1. TIGHTENING DATA OUTPUT SETTING screen

 Print : Prints out the current screen as it is.

- Read button

  Displays the TIGHTENING DATA OUTPUT SETTING READ screen.
- Write button

  Displays the TIGHTENING DATA OUTPUT SETTING WRITE screen.
- Preview button

  Displays the TIGHTENING DATA OUTPUT SETTING print preview.
- Print button

  Prints out the tightening data output setting.
- OK button

  Establishes the changed contents and returns to the CALENDAR AND BASIC UNIT SETTING screen.
- Cancel button

  Cancels the changed contents and returns to the CALENDAR AND BASIC UNIT SETTING screen.

4-13. OPTION SETTING

Sets an option

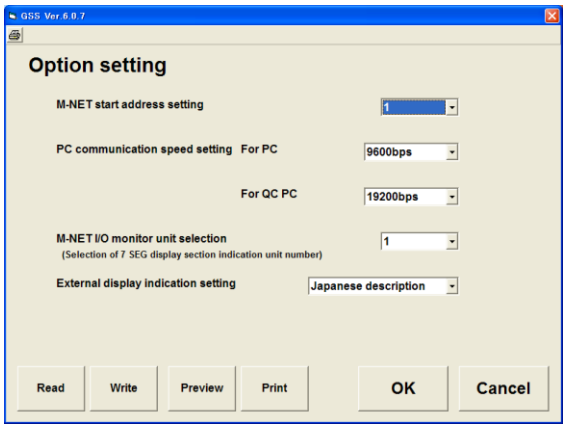


Fig. 4-13-1. OPTION SETTING screen

 Print : Prints out the current screen as it is.

- Read button

  Displays the OPTION SETTING READ screen.
- Write button

  Displays the OPTION SETTING WRITE screen.
- Preview button

  Displays the OPTION SETTING print preview.
- Print button

  Prints out the option setting.
- OK button

  Establishes the changed contents and returns to the CALENDAR AND BASIC UNIT SETTING screen.
- Cancel button

  Cancels the changed contents and returns to the CALENDAR AND BASIC UNIT SETTING screen.

4-14. SETTING READ AND WRITE ON SETTING SCREENS

Reads and writes the setting of setting screens about the rating, rotation, pretightening, reverse rotation, final tightening, axial arrangement, program, tightening data output and option. Similar setting screens are described in a lot.

4-14-1. Reading the rating,/rotation/pretightening/reverse rotation/final tightening/axial arrangement/program setting

Reads each setting from a file or the controller.

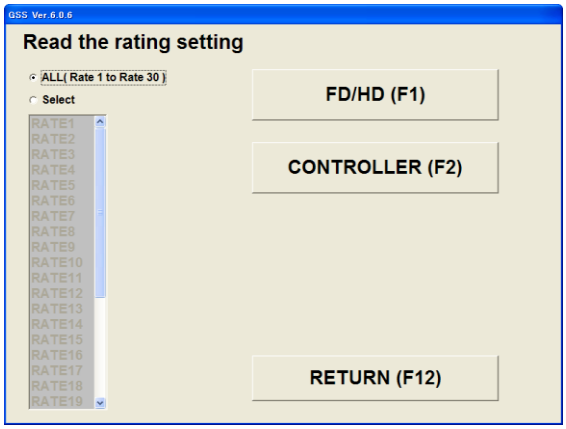


Fig. 4-14-1. SETTING READ screen

- All（Rating 1 to Rating 30）

  Set all items to read.
- Select

  Selects a setting to read. When the select option is specified, it allows you to select the list box of settings.
- FD/HD(F 1)

  Reads each setting from the file.
- Controller (F 2)

  Reads each setting from the GSS controller.

  To read the setting from the GSS controller, this requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.

  If they are not connected via the cable, the communication error occurs.

Fig. 4-14-2. Communication error

- Return (F12)

  Returns to each SETTING screen.

1. FD/HD

Reads each setting data from the FD (floppy disk), HD (hard disk) or other files on the media that is allowed to access in this FD/HD processing.

Setting file that saves each setting data will be saved with a file extension of each setting file.

(Rating: GST, Rotation: GSR, Pretightening: GSK, Reverse rotation: GSG, Final tightening: GSH, Axial arrangement: GSJ, Program: GSP, Unit: GSU, Tightening data output: OUT, Option: OPT)

To select the file to read, select a file with the extension for each file.

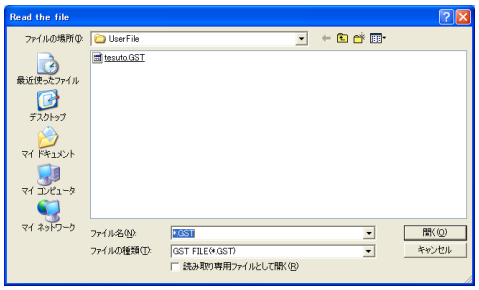


Fig. 4-14-3. READ FILE SELECT screen

Use the file select dialog to select each setting file to read.

When loading of each setting file is finished, the following message appears.

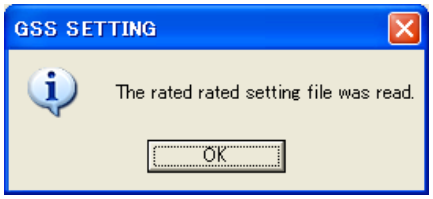


Fig. 4-14-4. Message for successful completion of loading the setting file

2. Controller

Reads each setting from the setting value saved in the GSS controller.

When the setting is read from the GSS controller, it requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.

If they are not connected via the cable, the communication error occurs.

Fig. 4-14-5. Communication error

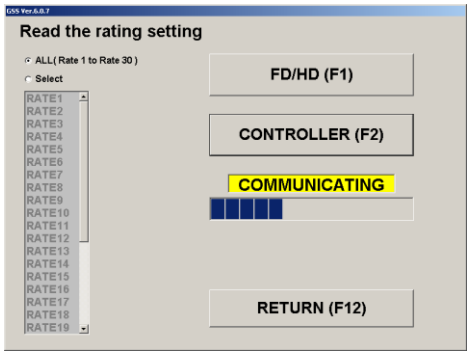


Fig. 4-14-6. Progress of reading from the controller

When loading from the controller is finished, the following message appears.

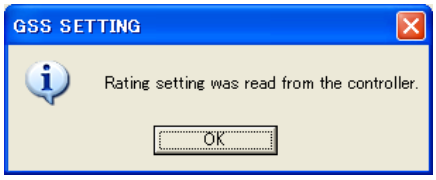


Fig.4-14-7. Message for successful completion of loading the data from the controller

3. Read select of each setting

If you want to read the specified setting only, choose the select option.

Select the specified setting because the options in the list box can be now selected.

When the FD/HD button is clicked on, only the specified setting is read from the file.

When the controller button is clicked on, only the specified setting is read from the GSS controller.

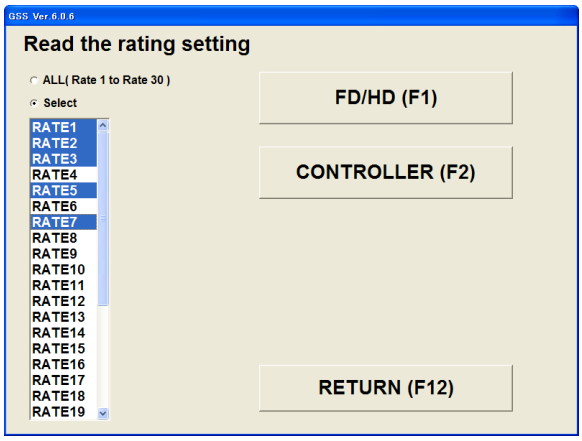


Fig. 4-14-8. Setting Select

4-14-2. Writing the rating/rotation/pretightening/reverse rotation/final tightening/axial arrangement/program setting

Writes each setting to a file or the controller.

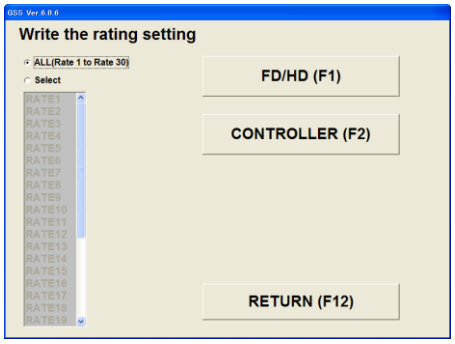


Fig. 4-14-9. SETTING WRITE screen

- FD/HD(F 1)

  Writes each setting to the file.

- Controller (F 2)

  Writes each setting to the GSS controller.

  When the setting is read from the GSS controller, it requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.

  If they are not connected via the cable, the communication error occurs.

Fig.4-14-10. Communication error

- Return (F 12)

  Returns to each setting screen.

1. FD/HD

   Writes each setting data to the FD (floppy disk), HD (hard disk) or other files on the media that is allowed to access in this FD/HD processing. Setting file that saves each setting data will be saved with a file extension of each setting file. (Rating: GST, Rotation: GSR, Pretightening: GSK, Reverse rotation: GSG, Final tightening: GSH, Program: GSP, Axial arrangement: GSJ, Unit: GSU, Tightening data output: OUT, Option: OPT)

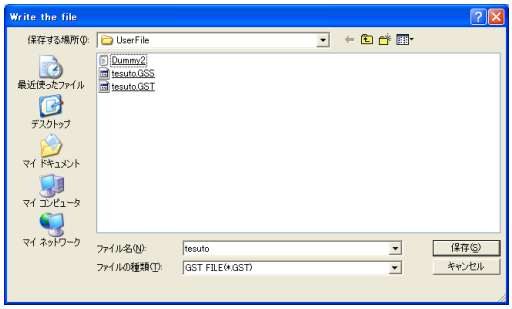


Fig. 4-14-11. Select the file to write

Use the file select dialog to select the setting file to write.

When writing the setting file is finished, the following message appears.

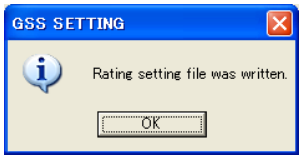


Fig. 4-14-12. Message for successful completion of writing the setting file

2. Controller

Writes each setting to the GSS controller.

To write to the GSS controller, it requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.

If they are not connected via the cable, the communication error occurs.

Fig. 4-14-13. Communication error

Password is required to write to the controller. (Password: 2003).

If your password is incorrect, you are not permitted to write to the controller.

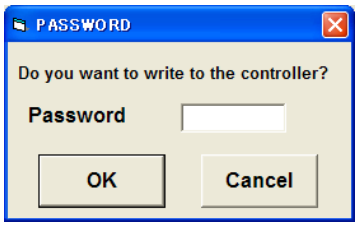


Fig. 4-14-14. Password check

Operation ready is forcibly turned OFF after checking the password.

Select “Yes” when the operation ready is allowed to be turned OFF.

If the operation ready is not turned OFF, you are not permitted to write.

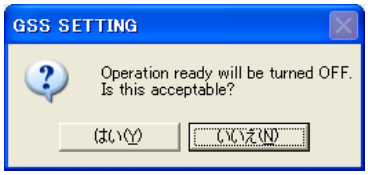


Fig. 4-12-15. Operation ready OFF check

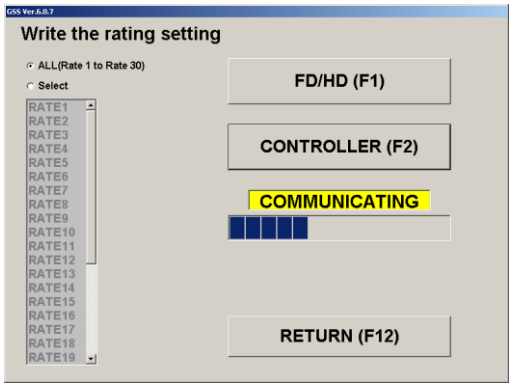


Fig. 4-14-16. Progress of writing to the controller

When writing to the controller is finished, the following message appears.

Fig. 4-14-17. Message for successful completion of writing the data to the controller

3. Read select of each setting

If you want to write the specified setting only, choose the select option.

Select the specified setting because the options in the list box can be now selected.

When the FD/HD button is clicked on, only the specified setting is written to the file.

When the controller button is clicked on, only the specified setting is written to the GSS controller.

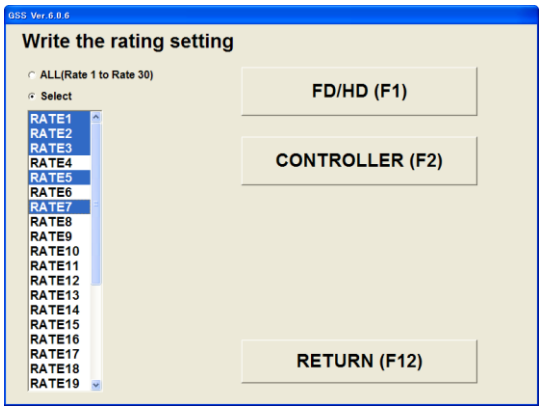


Fig. 4-14-18. Setting Select

4-14-3. Reading the unit/tightening data output/option setting

Reads each setting from a file or the controller.

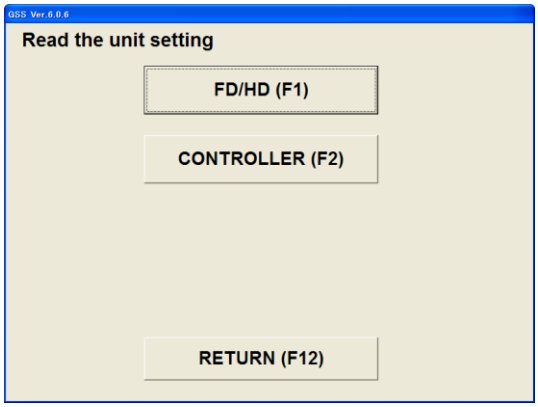


Fig. 4-12-19. SETTING READ screen

- FD/HD

  Reads each setting from the file.

- Controller

  Reads each setting from the GSS controller.

  When each setting is read from the GSS controller, it requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.

  If they are not connected via the cable, the communication error occurs.

Fig. 4-14-20. Communication error

- Return

  Returns to each setting screen.

1. FD/HD

   Reads each setting data from the FD (floppy disk), HD (hard disk) or other files on the media that is allowed to access in this FD/HD processing. Setting file that saves each setting data will be saved with a file extension of each setting file. (Rating: GST, Rotation: GSR, Pretightening: GSK, Reverse rotation: GSG, Final tightening: GSH, Program: GSP, Axial arrangement: GSJ, Unit: GSU, Tightening data output: OUT, Option: OPT)

   To select the file to read, select a file with the extension for each file.

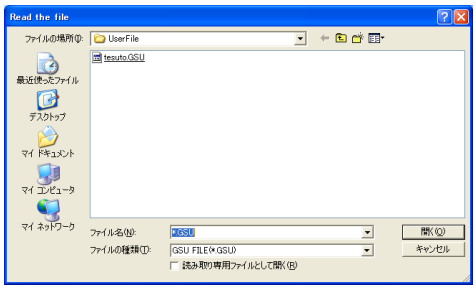


Fig. 4-14-21. Select the file to read

Use the file select dialog to select each setting file to read.

When writing of each setting file is finished, the following message appears.

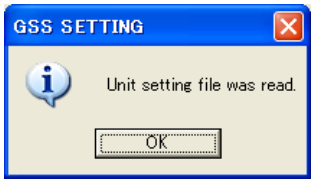


Fig. 4-14-22. Message for successful completion of loading the setting file

2. Controller

Reads each setting from the setting value saved in the GSS controller.

When the setting is read from the GSS controller, it requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.

If they are not connected via the cable, the communication error occurs.

Fig. 4-14-23. Communication error

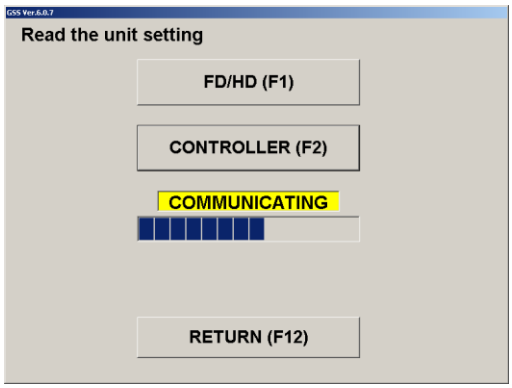


Fig. 4-14-24. Progress of reading

When reading from the controller is completed, the following message appears.

Fig. 4-14-25. Message for successful completion of loading the data from the controller

4-14-4. Writing of the unit/tightening data output setting

Writes each setting to the file or the controller.

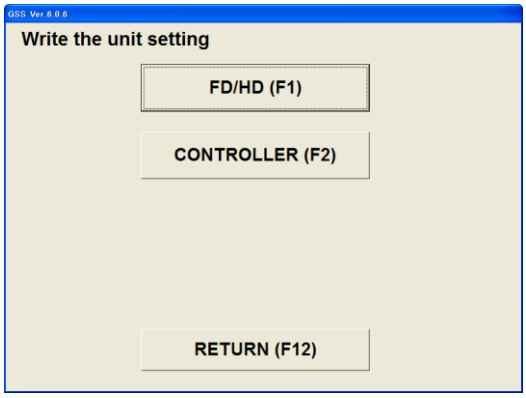


Fig. 4-14-26. SETTING WRITE screen

- FD/HD (F 1)

  Writes each setting to the file.

- Controller (F 2)

  Writes each setting to the GSS controller.

  When the setting is written from the GSS controller, it requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.

  If they are not connected via the cable, the communication error occurs.

Fig. 4-14-27. Communication error

- Return

  Returns to the unit setting.

1. FD/HD

Writes each setting data to the FD (floppy disk), HD (hard disk) or other files on the media that is allowed to access in this FD/HD processing. Setting file that saves each setting data will be saved with a file extension of each setting file. (Rating: GST, Rotation: GSR, Pretightening: GSK, Reverse rotation: GSG, Final tightening: GSH, Program: GSP, Axial arrangement: GSJ, Unit: GSU, Tightening data output: OUT, Option: OPT)

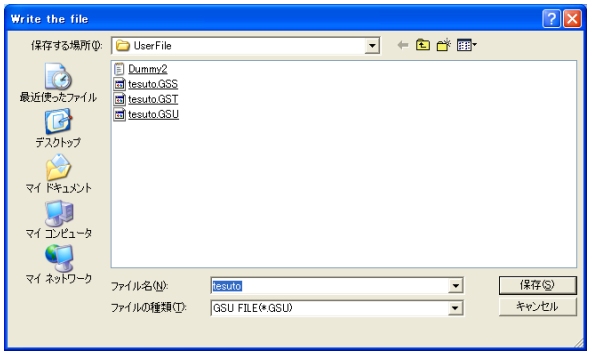


Fig. 4-14-28. Select the file to write

Use the file select dialog to select each setting file to write.

When writing of each setting file is finished, the following message appears.

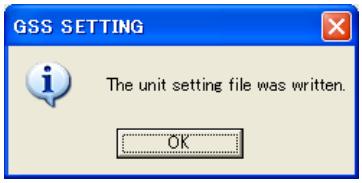


Fig. 4-14-29. Message for successful completion of writing the setting file

2. Controller

Writes the unit setting to the GSS controller.

When writing to the GSS controller, it requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.

If they are not connected via the cable, the communication error occurs.

Fig. 4-14-30. Communication error

Password is required to write to the controller. (Password: 2003).

If your password is incorrect, you are not permitted to write to the controller.

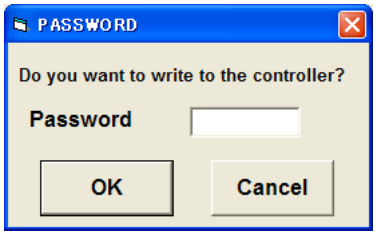


Fig. 4-14-31. Password check

Operation ready is forcibly turned OFF after checking the password.

Select “Yes” when the operation ready is allowed to be turned OFF.

If the operation ready is not turned OFF, you are not permitted to write.

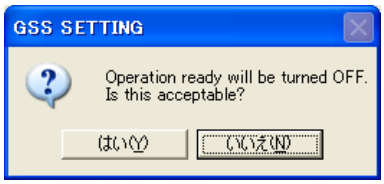


Fig. 4-14-32. Operation ready OFF check

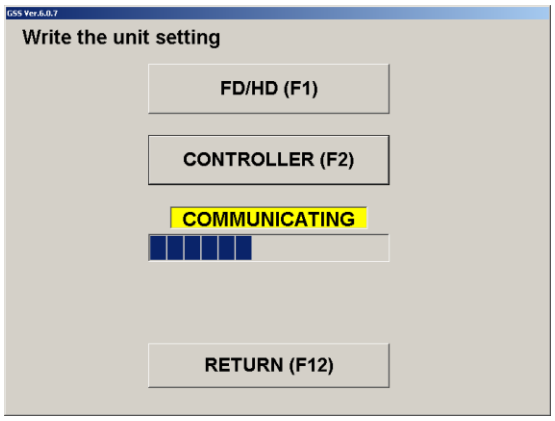


Fig. 4-14-33. Progress of writing to the controller

When writing to the controller is finished, the following message appears.

4-14-5. Writing the option setting

Writes the option setting to a file or the controller.

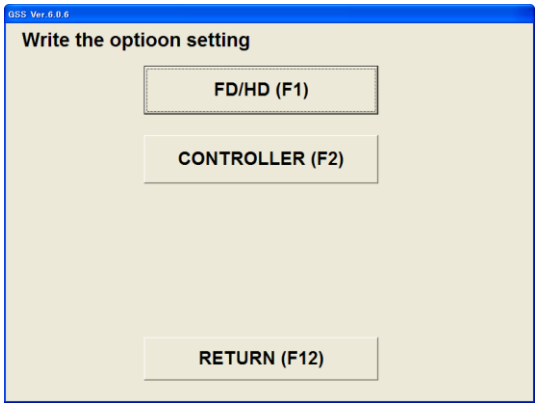


Fig. 4-14-35. SETTING WRITE screen

- FD/HD (F 1)

  Writes the option setting to the file.

- Controller (F 2)

  Write the option setting to the GSS controller.

  When the setting is written from the GSS controller, it requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.

  If they are not connected via the cable, the communication error occurs.

Fig. 4-14-36. Communication error

- Return

  Returns to the option setting.

1. FD/HD

Writes the option setting data to the FD (floppy disk), HD (hard disk) or other files on the media that is allowed to access in this FD/HD processing. Setting file that saves each setting data will be saved with a file extension of each setting file. (Rating: GST, Rotation: GSR, Pretightening: GSK, Reverse rotation: GSG, Final tightening: GSH, Program: GSP, Axial arrangement: GSJ, Unit: GSU, Tightening data output: OUT, Option: OPT)

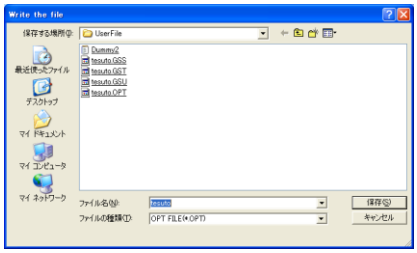


Fig. 4-14-37. Select the file to write

Use the file select dialog to select the option setting file to write.
When writing to the option setting file is finished, the following message appears.

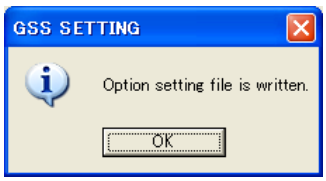


Fig. 4-14-38. Message for successful completion of writing the option setting file

2. Controller

Writes the option setting to the GSS controller.
When writing to the GSS controller, it requires that the GSS controller be previously connected to the personal computer using an RS-232C cable.
If they are not connected via the cable, the communication error occurs.

Fig. 4-14-39. Communication error

It is required to turn ON and OFF the power to the controller when the option setting is written to the controller.

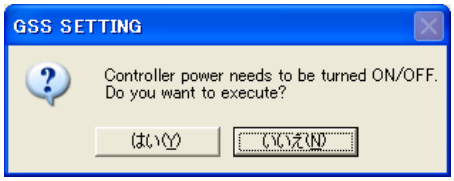


Fig. 4-14-40. Power ON/OFF check

Password is required to write to the controller. (Password: 2003)
If your password is incorrect, you are not permitted to write to the controller.

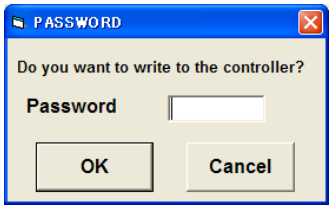


Fig.4-14-41. Password check

Operation ready is forcibly turned OFF after checking the password.
Select “Yes” when the operation ready is allowed to be turned OFF.
If the operation ready is not turned OFF, you are not permitted to write.

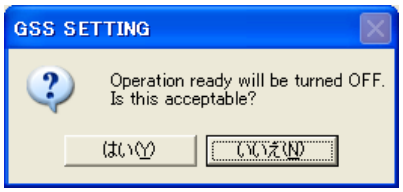


Fig. 4-14-42. Operation ready OFF check

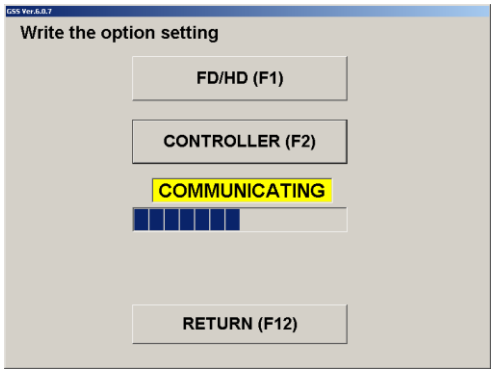


Fig. 4-14-43. Progress of writing to the controller

When writing to the controller is finished, the following message appears.

Fig. 4-14-44. Message for successful completion of writing the data to the controller

It is required to turn ON and OFF the power to the controller after writing.

Turn ON and OFF the power to the controller following the message.

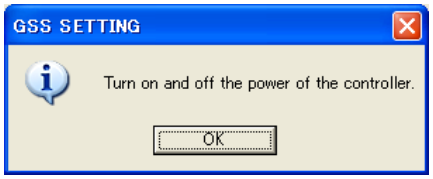


Fig.4-14-45. Controller power ON and OFF

Checks the communication after turning the power ON and OFF.

Fig. 4-14-46. Communication check confirmation

When an error occurred in the communication check, the error message appears.

Select “Yes” to retry.

Fig. 4-14-47. Communication check error

5. AUTO MEASUREMENT

The AUTO MEASUREMENT screen provides the auto measurement options.

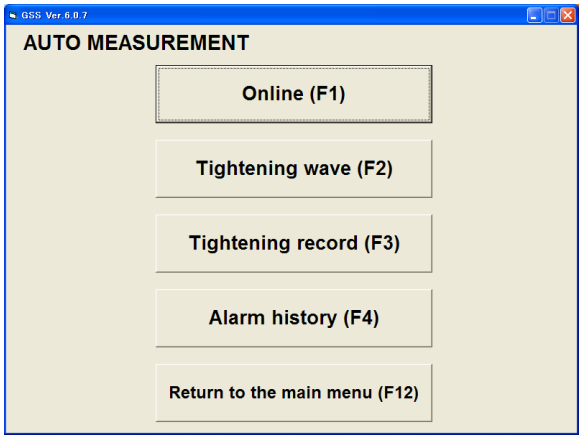


Fig. 5-1. Auto measurement options

- ONLINE

  Displays the ON LINE screen.

  Also it automatically saves the online information and zero magnification information.
- TIGHTENING WAVE

  Displays the TIGHTENING WAVE screen.

  Also it automatically saves the extension waveforms and zero magnification information.
- TIGHTENING RECORD

  Displays the TIGHTENING RECORD screen.
- ALARM HISTORY

  Displays the ALARM HISTORY screen.
- RETURN TO MAIN MENU

  Returns to the MAIN MENU

5-1. Using the ONLINE key

When the ONLINE key is clicked, the ON LINE screen is displayed.

This screen allows you to receive the online information as appropriate from the controller and display it.

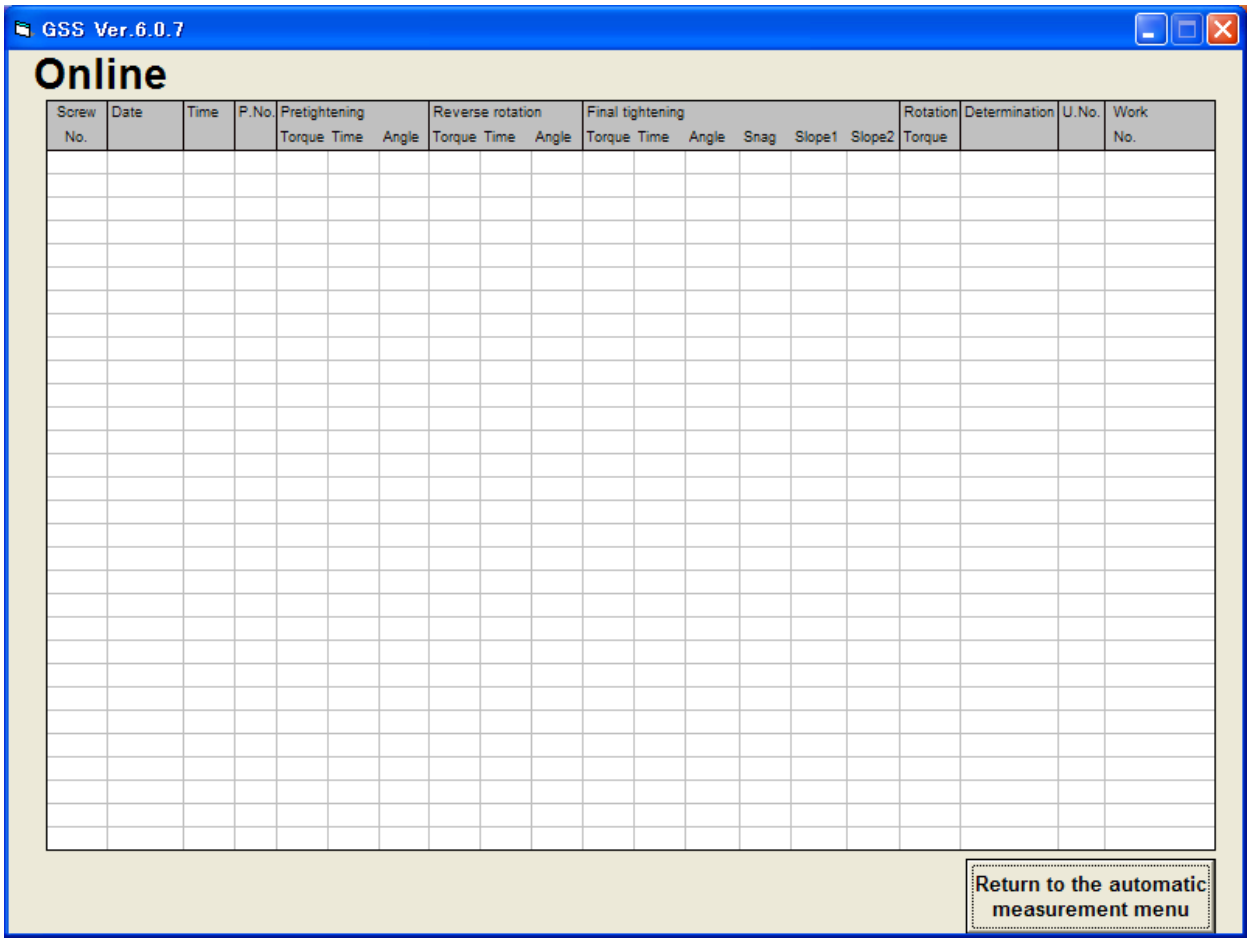


Fig. 5-2. ON LINE screen

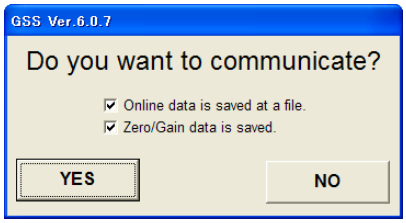


Fig. 5-3. Communication check

To automatically save the online information, tick the Save Online to File option.

To automatically save the zero magnification data, tick the Save Zero Magnification Data option.

- Return to AUTO MEASUREMENT screen

  Returns to the AUTO MEASUREMENT screen.

5-2. Using the TIGHTENING WAVE key

When the TIGHTENING WAVE key is clicked, the tightening waveform is displayed.

This operation also saves the extension waveform and zero magnification data automatically.

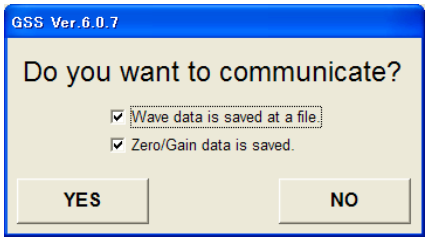


Fig. 5-4. Communication check

Do you want to communicate?

In the case of "Yes":

Displays the tightening waveform and extension waveform automatically.

When "Save the waveform data." is selected, the information of waveform is automatically saved in a file.

When "Save the zero magnification data." is selected, the data of zero magnification is automatically saved in a file.

In the case of "No":

Tightening waveform and extension waveform can be manually loaded from the controller.

The loaded waveform information can be manually saved in a file.

The saved waveform information file can be also read and the waveform can be displayed.

In the case of the automatic saving mode for the tightening waveform and extension waveform (When "Yes" is selected):

Sets the OK range per program that is shown by the waveform.

When the OK range setting has been finished, the product is activated in the automatic saving mode and communicates with the controller.

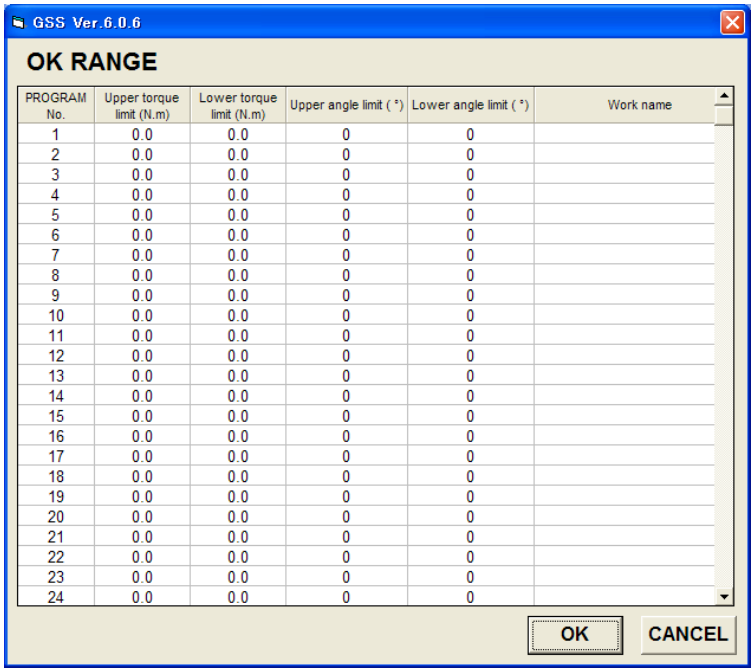


Fig. 5-5. Setting the OK range

- Upper torque limit

  Enter the upper torque limit in the OK range.
- Lower torque limit

  Enter the lower torque limit in the OK range.
- Upper angle limit

  Enter the upper angle limit in the OK range.
- Lower angle limit

  Enter the lower angle limit in the OK range.
- Work name

  Enter the work name.

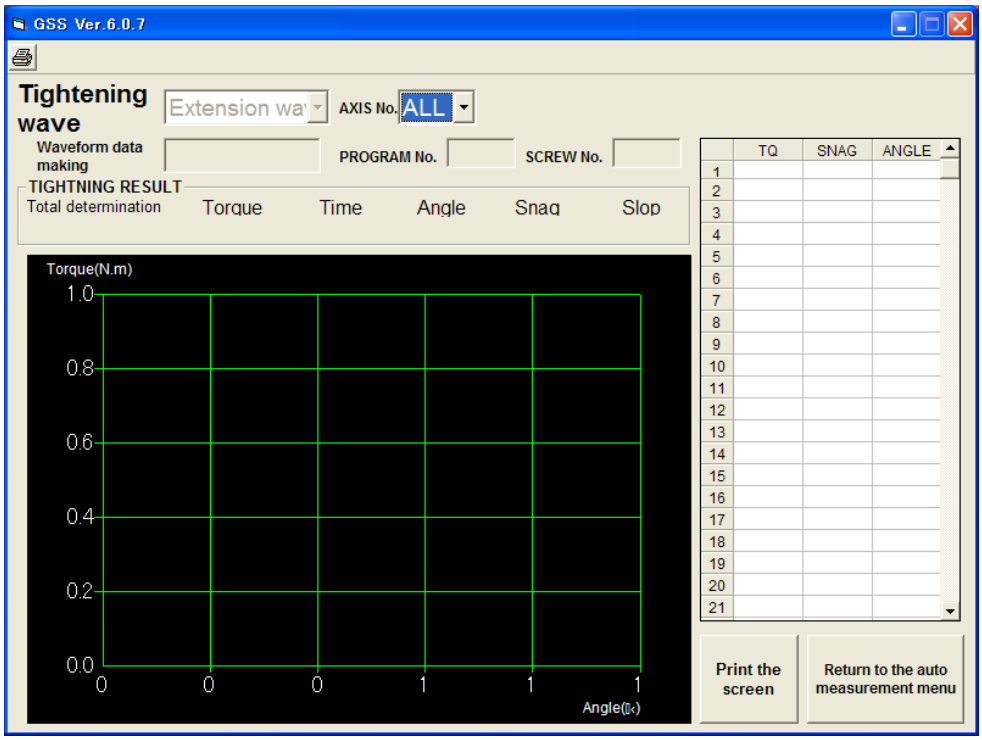


Fig. 5-6. Automatic saving of waveform

It is not allowed to read a file, to read from the controller and save in a file manually while saving the tightening waveform and extension waveform.

- Axis No.

  When “All axes” is selected, the graphs of all axes appear being overlapped.

  When each axis No. is selected, only the graph of each axis appears.
- Detailed data display

  When “All axes” is selected, the torque, snag and angle of each axis appear.

  The axis that causes error appears in red.

  When each axis No. is selected, the torque, time and angle of each axis appear.

 Print : Prints out the current screen as it is.

- Wave Mode

  Extension waveform: It is not allowed to select in the automatic saving mode.
- Axis No.

  Select the axis No. that you want to display the tightening waveform and extension waveform.

- Time of Tightening Data

  Displays the time and date when the tightening waveform information was obtained.
- Program No.

  Displays the program number for which the tightening waveform information was obtained.
- Screw No.

  Displays the screw number for which the tightening waveform information was obtained.
- Print button

  Prints out the currently displayed screen.
- Return to AUTO MEASUREMENT screen

  Returns to the AUTO MEASUREMENT screen.

In the case of manual saving mode for the tightening waveform (When “No” is selected)

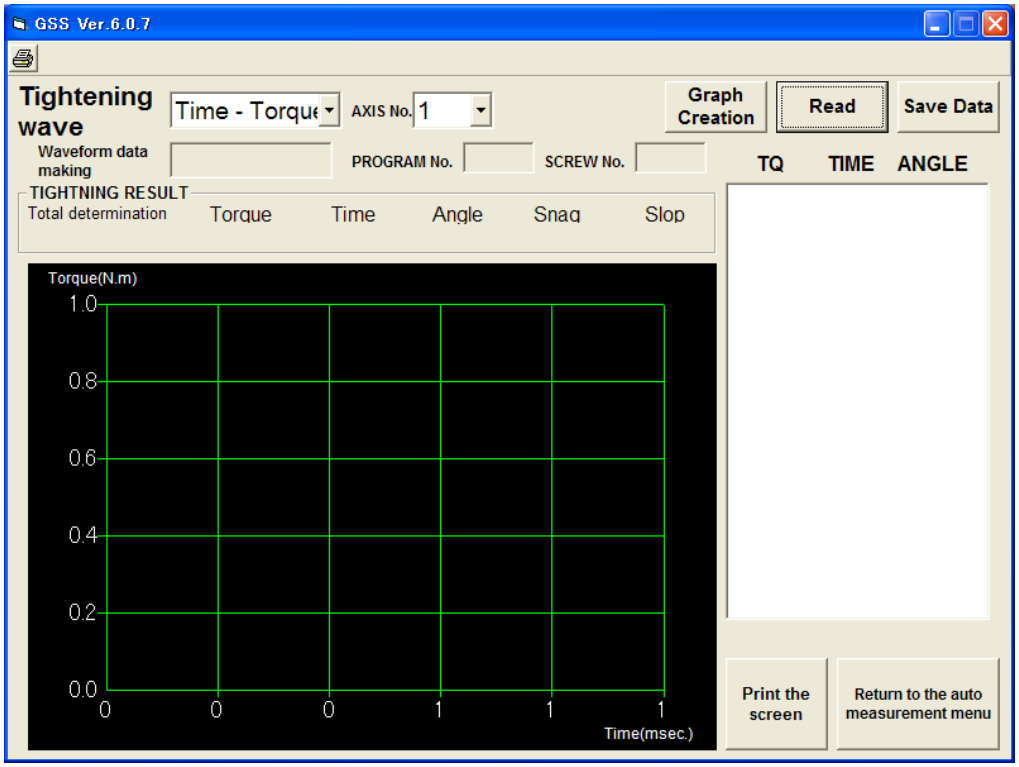


Fig. 5-7. TIGHTENING WAVE screen

 Print : Prints out the current screen as it is.

- Wave Mode

  Displays a graph for time vs. angle, time vs. torque, or angle vs. torque.
- Axis No.

  Enter the axis number for which the tightening waveform information is being obtained.
- Time of Tightening Data

  Displays the time and date when the tightening waveform information was obtained.
- Program No.

  Displays the program number for which the tightening waveform information was obtained.
- Screw No.

  Displays the screw number for which the tightening waveform information was obtained.
- Tightening Result

  Displays the information of the total determination, torque, time, angle, snag and gradient.

- Graph Creation button

  Creates a tightening result graph.
- Data Save button

  Saves the wave data loaded from the controller to a file.
- Read button

  Loads the tightening wave data for the specified axis number from the controller. This also allows you to load wave data from the saved file.
- Data Display

  Numerically displays the tightening result information.

  Select the displayed tightening result and then click the Graph Creation button. A graph will be created in an arbitrary data range.
- Graph Display

  Displays a graph from the tightening result information.
- Print button

  Prints out the currently displayed screen.
- Return to AUTO MEASUREMENT screen

  Returns to the AUTO MEASUREMENT screen.

5-3. Using the TIGHTENING RECORD button

When the TIGHTENING RECORD button is clicked, the tightening history is displayed.

The displayed TIGHTENING RECORD screen allows you to save the displayed tightening history to a file.

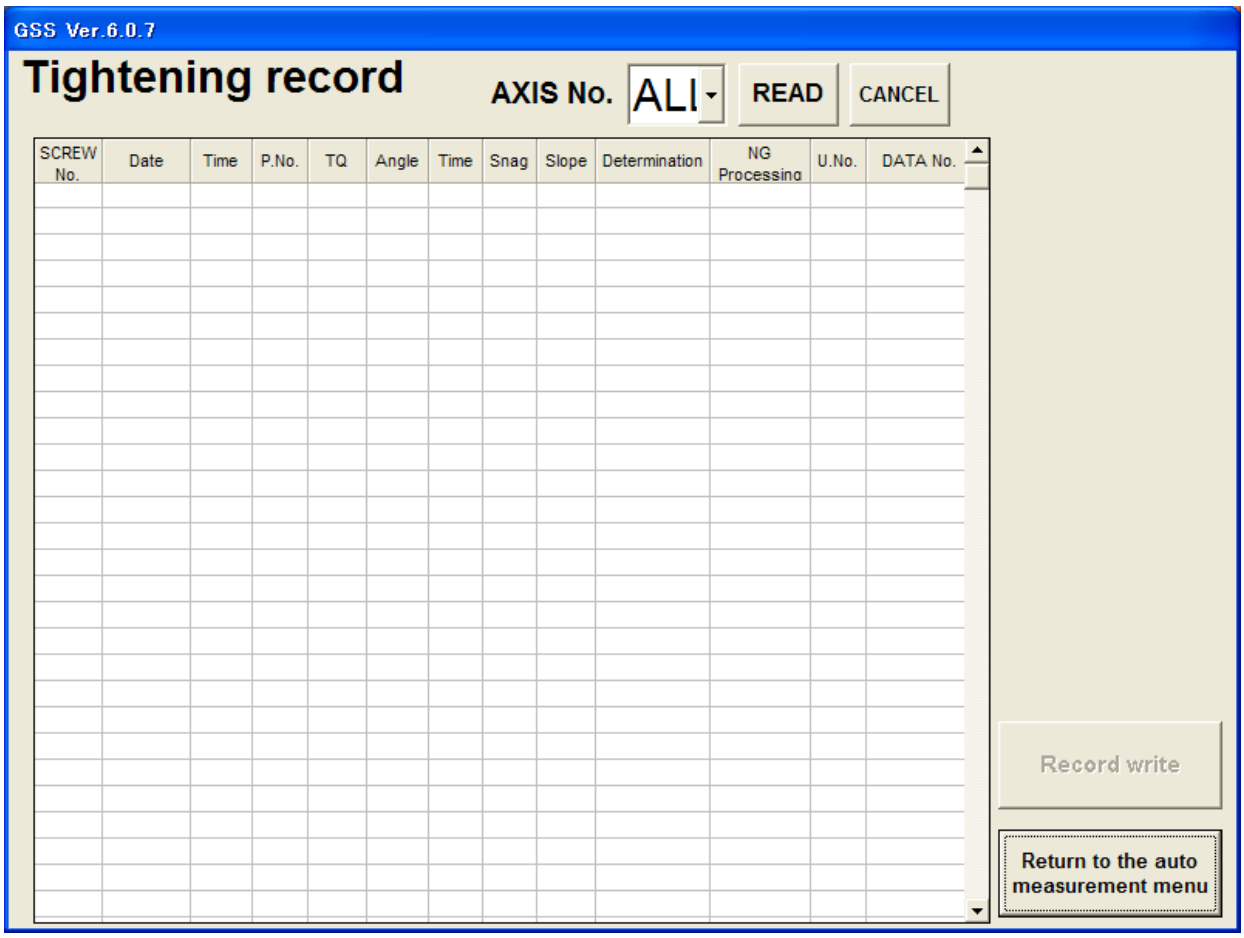


Fig. 5-8. TIGHTENING RECORD screen

- Axis No.

  Select the axis No. to read.
- Read button

  Executes reading.
- Cancel button

  Cancels reading.
- Record Write

  Saves the displayed history information to a file.
- Return to AUTO MEASUREMENT screen

  Returns to the AUTO MEASUREMENT screen.

5-4. Using the ALARM HISTORY button

When the ALARM HISTORY button is clicked, the alarm history is displayed.
The displayed the ALARM HISTORY screen allows you to save the displayed alarm history to a file.

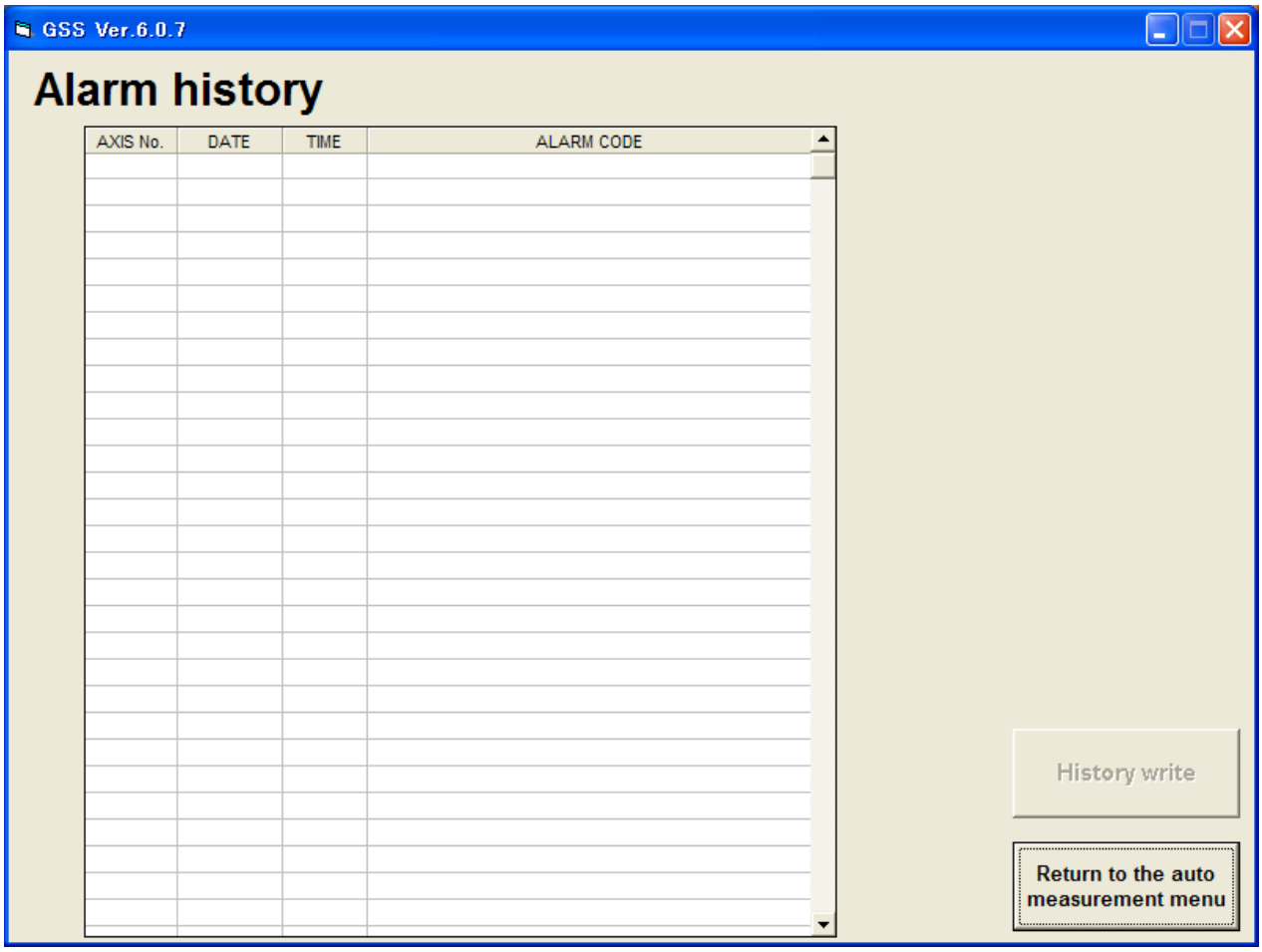


Fig. 5-9. ALARM HISTORY screen

- History Write
  Saves the displayed history information to a file.
- Return to AUTO MEASUREMENT screen
  Returns to the AUTO MEASUREMENT screen.

6. QUALITY CONTROL

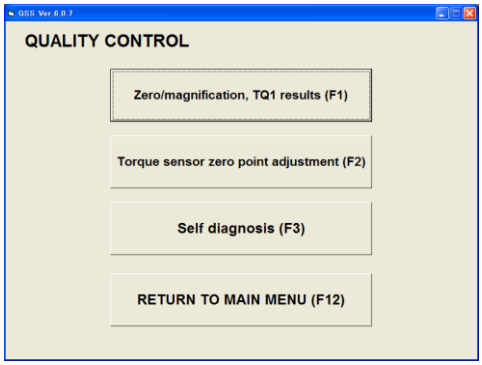


Fig. 6-1. QUALITY CONTROL menu

- Zero magnification, TQ1 result

  Displays the zero point, magnification and sample start toque result.
- Torque sensor zero point adjustment

  Adjusts the zero point of the torque sensor.
- Self diagnosis

  Displays the versions of the personal computer, IF unit, controller and display.

  Also checks whether all versions of controllers are same or not.
- Return to MAIN MENU

  Returns to the MAIN MENU.

6-1. Zero magnification, TQ1 result

Displays the zero point, magnification and sample start torque.

Zero point display

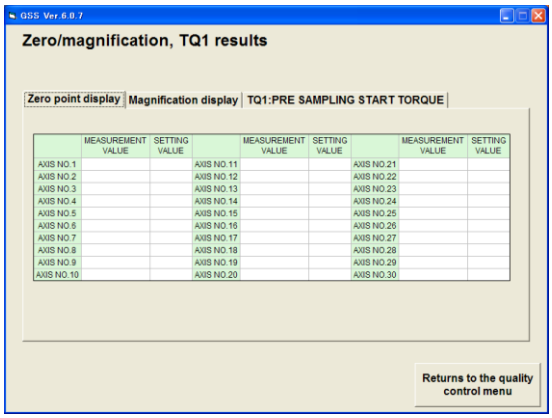


Fig. 6-2. Zero point display

- Zero point display

  Displays the measurement value and setting value of each axis.

- Return to QUALITY CONTROL screen

  Returns to the QUALITY CONTROL screen

Magnification display

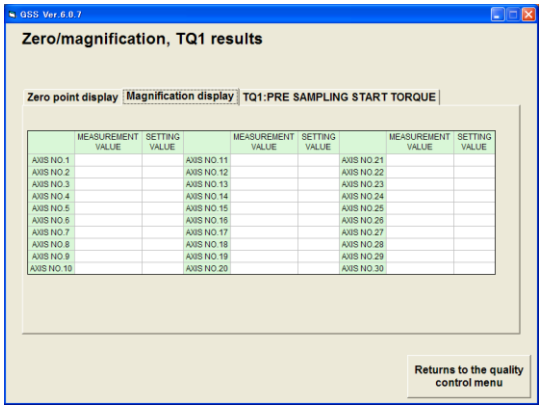


Fig. 6-3. Magnification display

- Magnification display

  Displays the measurement value and setting value of each axis.

- Return to QUALITY CONTROL screen

  Returns to the QUALITY CONTROL screen

TQ1: Pretightening sample start torque

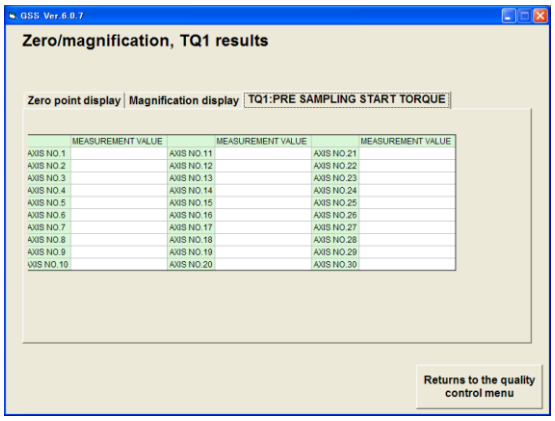


Fig. 6-4. PRETIGHTENING SAMPLING START TORQUE screen

- Magnification display

  Displays the measurement value of each axis.

- Return to QUALITY CONTROL screen

  Returns to the QUALITY CONTROL screen

6-2. Torque sensor zero point adjustment

Corrects the zero point of the torque sensor.

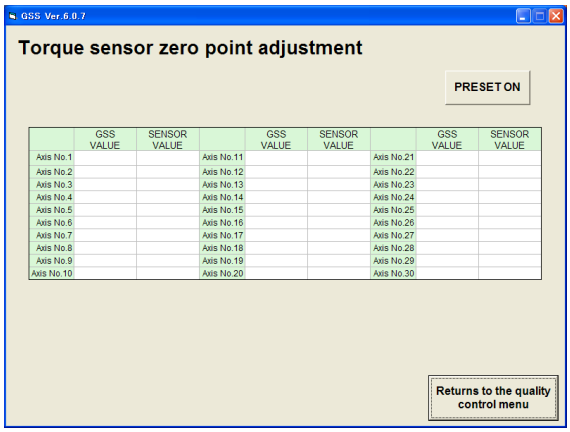


Fig. 6-5. Torque sensor zero point adjustment

- Zero point adjustment ON

  Select the axis number on the screen.

  Runs the zero point correction of the specified axis number.

- Return to QUALITY CONTROL screen

  Returns to the QUALITY CONTROL screen

6-3. Self diagnosis

Displays the versions of the personal computer, IF unit, controller and display.

Also checks whether all versions of controllers are same or not.

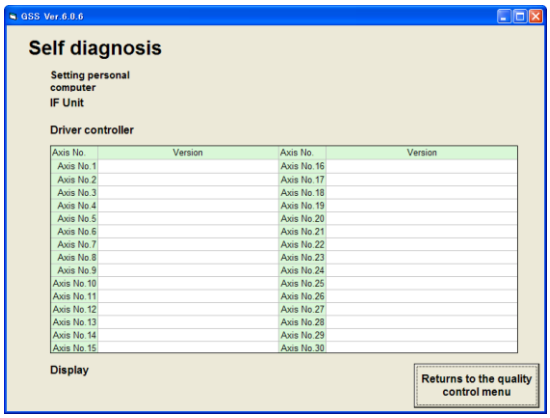


Fig. 6-6. Self diagnosis

- Return to QUALITY CONTROL screen

  Returns to the QUALITY CONTROL screen

7. PRINT

The PRINT screen is shown below:

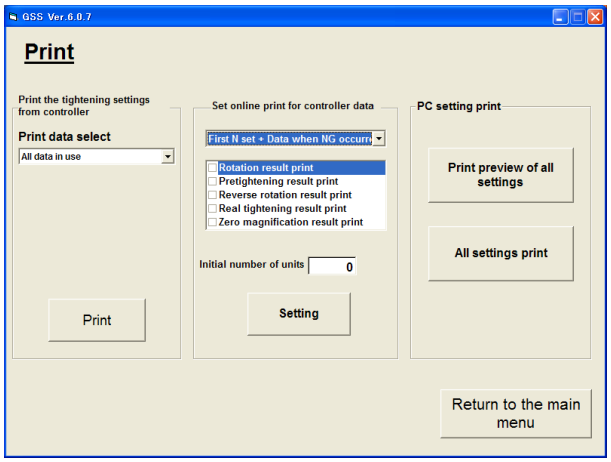


Fig. 7-1. PRINT screen

- Print Tightening Settings from Controller

  Prints out tightening settings from the printer connected to the controller.

- Print Data Select

  From Print Data Select, the following items may be selected:

  All settings used

  Program (1 to 24)

  Rotation settings (1 to 24)

  Pretightening settings (1 to 24)

  Reverse rotation settings (1 to 24)

  Final tightening settings (1 to 24)

  Rating settings (1 to 30)

  Axis arrangement settings (1 to 24)

  Final data on tightening (1 to 7)

- Number Select

  Enter the setting number you want to print out or the axis number.

  When any option other than the All Settings Used option is selected from Print Data Select, the selected settings are displayed on the screen.

- Print button

  Prints out the data in accordance with the settings in Print Data Select and Number Select.

- Set Online Print for Controller Data

  Allows you to set the controller to print out data.

- Print Mode Select

  Allows you to select any of the following options

  No Auto Print

  After Each Tightening

  When Rejection Occurs

  When Rejection Occurs After Initial N Units

  When the No Auto Print option is selected, Result Print Select and Initial Number of Units are not displayed.

- Result Print Select

  Allows you to select any of the following options:

  Rotation Result Print

  Pretightening Result Print

  Reverse Rotation Result Print

  Final Tightening Result Print

  Zero Magnification Result Print

- Initial Number of Units

  Enter the initial number of units.

  Initial Number of Units is only displayed when the print mode is “When Rejection Occurs After Initial N Units”.

- PC Setting Print

  Prints out settings from the personal computer.

- Print Preview of All Settings

  Displays a print preview of all the settings.

- All Settings Print

  Prints out all the settings.

8. I/O MONITOR

The I/O MONITOR screen is displayed below:

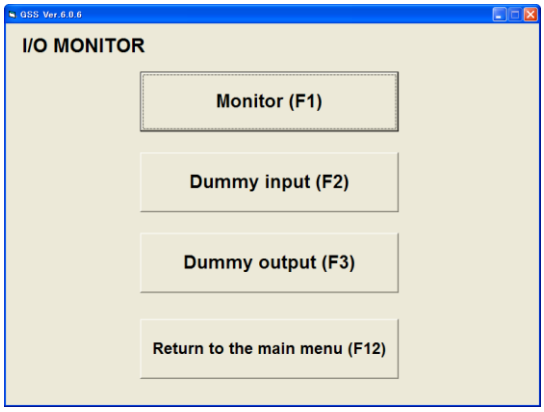


Fig. 8-1. I/O MONITOR screen

- MONITOR
  Displays the monitor screen.
- DUMMY INPUT
  Displays the DUMMY INPUT screen.
- DUMMY OUTPUT
  Displays the DUMMY OUTPUT screen.
- RETURNS TO MAIN MENU
  Returns to the MAIN MENU.

8-1. Using the MONITOR button

When the MONITOR button is clicked, the input/output of the controller will be monitored.

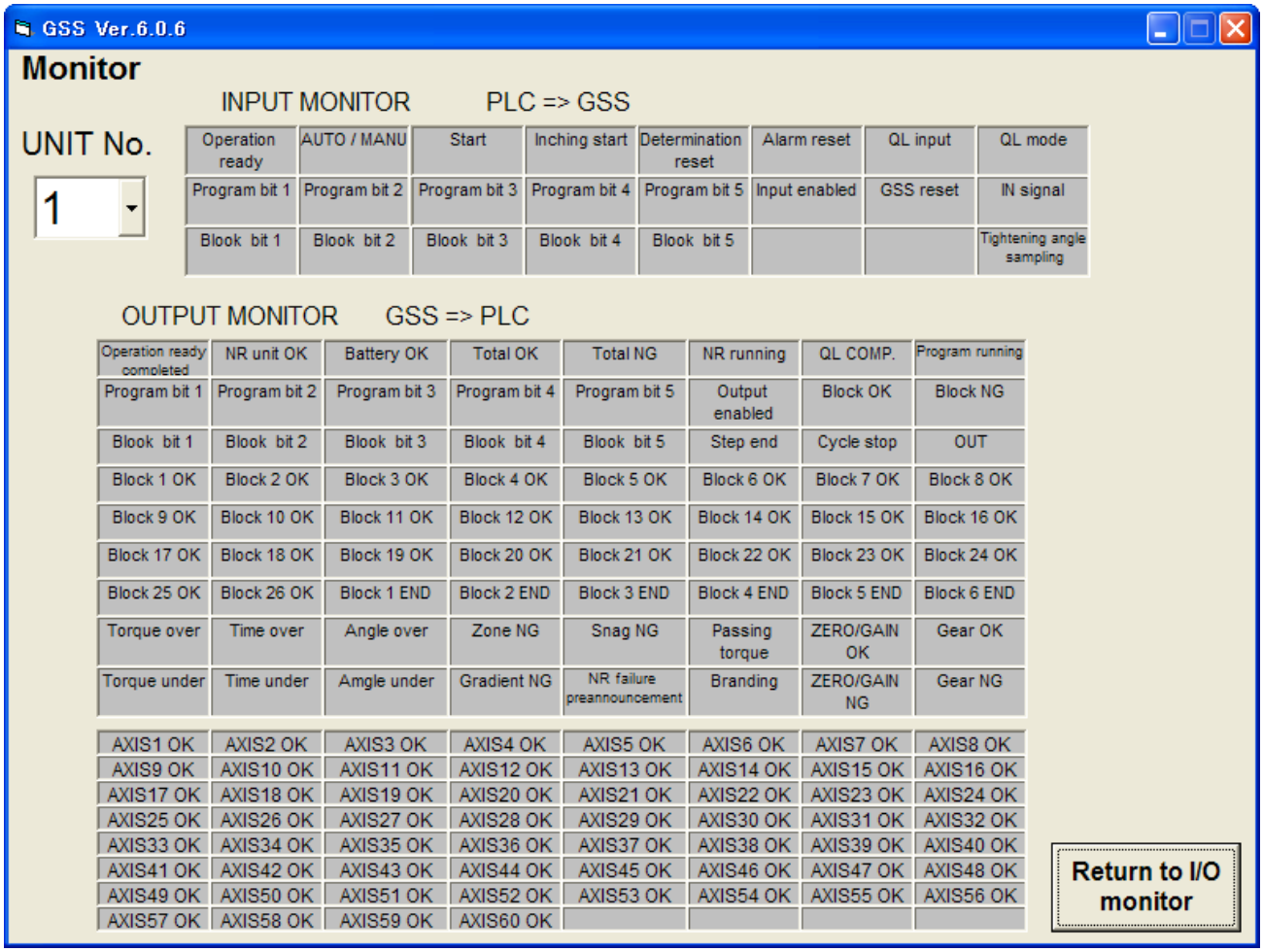


Fig. 8-2. Monitor screen

- Unit No.

  Specify the unit number to be monitored.
- Input Monitor

  Allows you to monitor the input to the controller.
- Output Monitor

  Allows you to monitor the output from the controller.
- Return to I/O MONITOR screen

  Returns to the I/O MONITOR screen.

8-2. Using the DUMMY INPUT button

When the DUMMY INPUT button is clicked, the dummy input is provided.

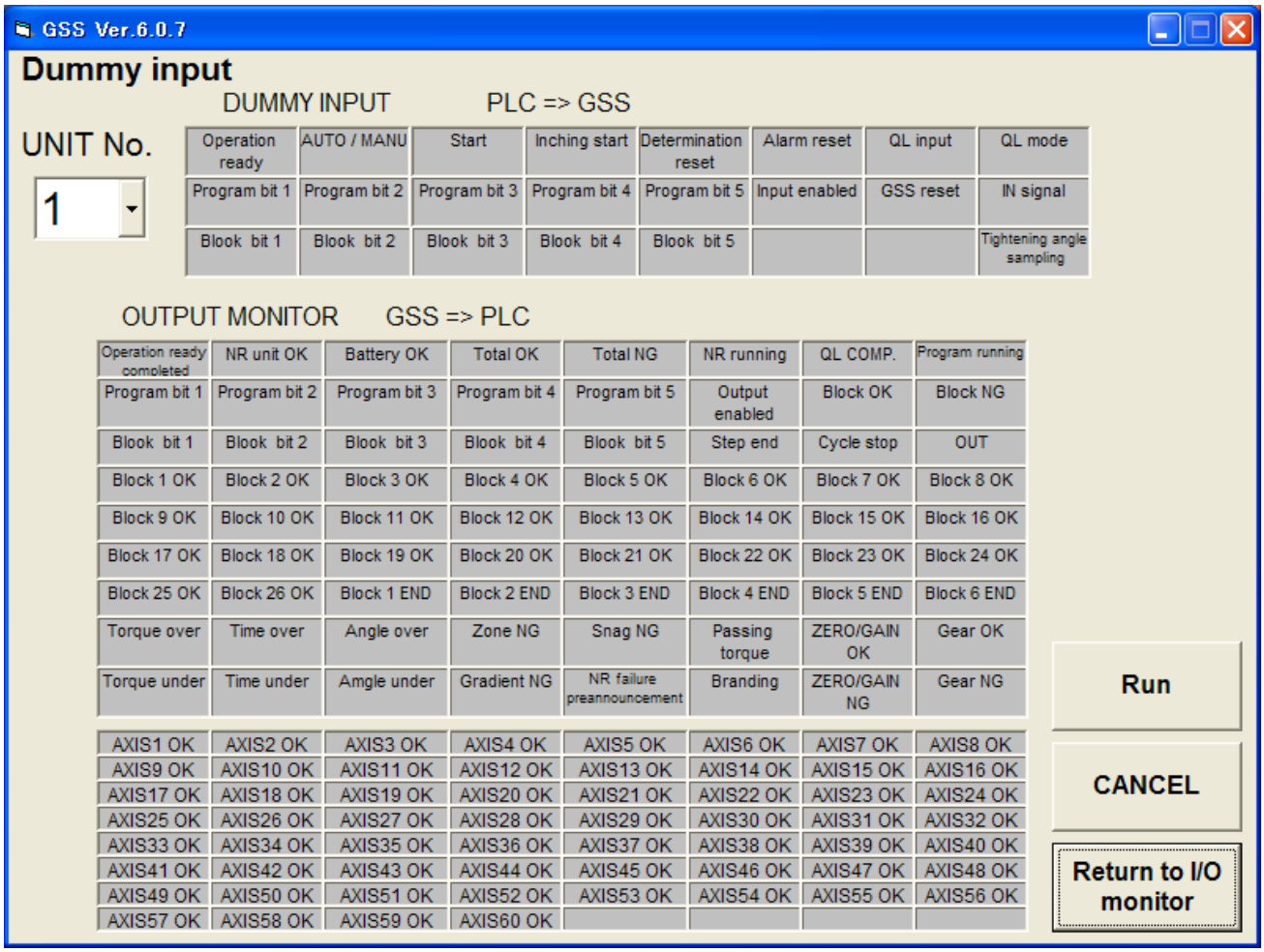


Fig. 8-3. DUMMY INPUT screen

- Unit No.

  Select the unit number for which you want to provide the dummy input.
- Dummy Input

  Click the signals you want to select for the dummy input.

  Multiple signals may be selected.

  When the Run button is clicked, the dummy input will be started.
- Output Monitor

  Allows you to monitor the output from the controller.
- Run button

  Sends the selected signals for the dummy input to the controller.

  This requires previously entering your password. (Pass word: 2003)
- Cancel button

  Cancels the selected signals for the dummy input.
- Returns to I/O MONITOR screen

  Returns to the I/O MONITOR screen.

8-3. Using the DUMMY OUTPUT button

When the DUMMY OUTPUT button is clicked, the dummy output is provided.

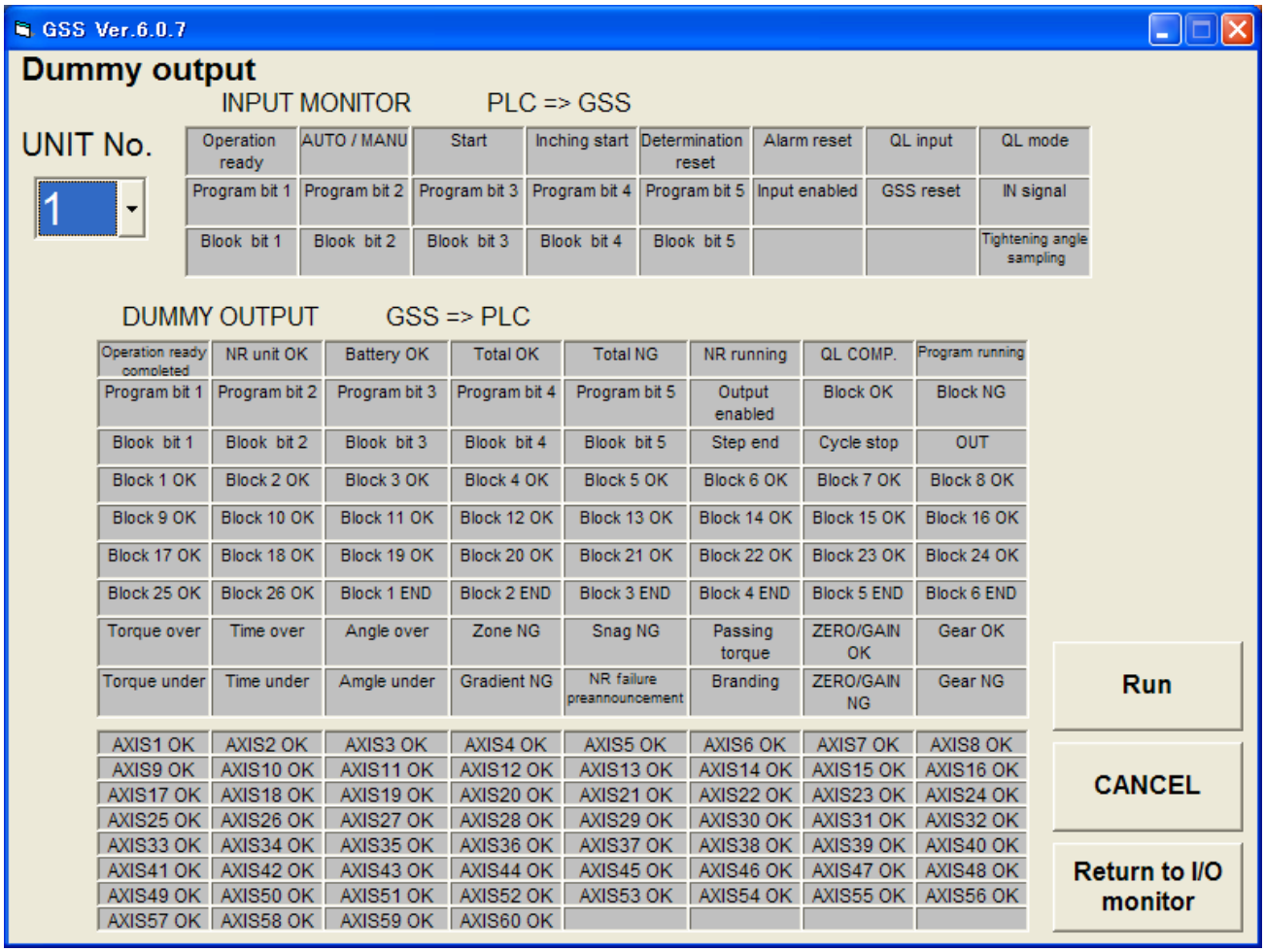


Fig. 8-4. DUMMY OUTPUT screen

- Unit No.

  Select the unit number for which you want to provide the dummy output.
- Input Monitor

  Allows you to monitor the output from the controller.
- Dummy Output

  Click the signals you want to select for the dummy output.

  Multiple signals may be selected.

  When the Run button is clicked, the dummy output will be started.
- Run button

  Sends the selected signals for the dummy output to the controller.

  This requires previously entering your password. (Pass word: 2003)
- Cancel button

  Cancels the selected signals for the dummy input.
- Returns to I/O MONITOR screen

  Returns to the I/O MONITOR screen

Glossary

UNIT:
Multiple axes control up to 30 axes can be treated as each axis to independently operate or as a group of several axes (a unit) to operate together. One interface unit can control the maximum 7 units. At least one controller belongs to one unit (maximum 30 axes control to one unit), and one input command is assigned to one unit and then all belonging axes start operation simultaneously. In SIO, different station numbers are assigned to each unit.

PROGRAM:
Screw tightening program can form the program from 1 to 24 on each axis. One program begins with the control flag (Zero magnification check is performed or not, etc.) and rating setting, and it is possible to set operation to maximum 50 steps. However, the end is treated as one step. At least one block should have been set in the program.

BLOCK:
A set of operations in tightening program. Block start begins from rating step and shows the set of steps to the end declaration. In automatic operation, one-time program start executes one block. It is also possible to start from the block on the way by designating the block number. The determination (Block OK/NG) against the operated block is output on the step in the block end declaration. If "NG" is determined on either step in the block, it becomes the "block NG" determination (excluding the case when there is a retry); the next step will not be executed.
After determination output, the program start initiates the next block.

STEP:
Each operation (Rotation, pretightening, reverse rotation and final tightening), block end declaration, and retry are called steps respectively. More than one block is needed in a program. Program is executed from the step 1 and finished by the end declaration at the final block. On the step of the final block end declaration, the total determination (Total OK/NG) is output.
Each axis in the unit operates by step synchronization and the axis in which step has been complete turns OFF the servo motor and waits for the step completion of other axes. When steps of all axes are complete, the next step will be operated.

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. 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.

RETRY:
It is possible to retry (try again) operation if NG occurred in each operation (rotation, pretightening, reverse rotation or final tightening) in the block. When the retry operation is set on the step, if NG occurred on the way from the block start declaration till the previous step of retry, the operation following the retry will be executed. If NG did not occur, the operation following the retry will not be executed.

ROTATION:
Used for screw pick up (a socket picks up a screw head) operation before tightening or preventive operation against socket-engagement after tightening.

PRETIGHTENING:
Operation to perform temporary tightening until a screw seats.

REVERSE ROTATION:
Operation to unfasten the seated screw by several turns. It is possible to determine the screw baking by monitoring the residual torque during this tightening operation.

FINAL TIGHTENING:
Final tightening operation of screws

APPLICABLE TO ID CONTROLLERS:
It is possible to transfer the engine number, set the calendar and transmit the result data by connecting the interface unit and ID controller via serial communication. (Exclusive use with a printer.)

APPLICABLE TO PRINTERS:
Connects with a printer through Centronics interface. Setting data and tightening result can be printed. (Exclusive use with a QC personal computer and ID controller.)

TIGHTENING ANGLE SAMPLING OPERATION:
Operation to rotate the screw in the tightening direction at a constant speed and then stop when it reaches the preset torque, in order to measure the screw length. This operation allows you to easily set the tightening program. (Executable only from a personal computer.)

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