

Series Nutrunner

USER CONSOLE INSTRUCTION MANUAL

Version 1.1

URYUSEISAKU,LTD.

Revision History

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Cover page

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Chapter 1 Introduction

1-1. How to use this book

This book will tell you setting method of <u>G-type user console</u>, its connection method to <u>G-Unit (Spindle Unit)</u> with <u>G-Tool (Motor)</u>, and handling method of each menu of <u>G-Consol system</u>. Hereafter the under-lined terms will be referred to as *G-Console*, *G-Unit*, *G-Tool* and *G-System*. G-Console is a software for PC to help users make Easy G-System parameter edit and fastening result data torque curve monitor. Enjoy quick and all at once setting multi G-Unit with G-Console by your PC instead of every single spindle separate setting. This book consists of the following chapters.

Chapter	ltems	Contents	
1	Introduction	Connection to G-Unit and G-Console setting	
2	General operation	How to use Toolbar, Menu bar and setup bar	
3	Communication menu	Communication and the setting	
4	File menu	Read and save File contents plus printing	
5	G-Unit menu	G-Unit and connected G-Tool general information	
6	G-Tool menu	G-Tool operation setting	
7	Fastening parameter	Fastening control method and the process	
8	Main menu	Eight (8) pull-down menus of main menu	
9	Monitor menu	Save result monitoring progress by respective method	
10	Software setting	Software setting	



This book does not include G-Unit instruction manual. Refer to relevant instruction manuals.

Relevant manuals

G-Unit Instruction manual

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1-2. Main features

- Parameter editing is possible on tabular screen.
- G-Console displays fastening result data and torque curve waveform.
- G-Console saves every data in a file and print out the same.
- G-Console saves and prints out fastening result data and torque curve file.
- G-Console reads, writes and verifies every setting value.
- G-Console communicates with up to 32 G-Units at the same time.
- ♦ G-Console makes wide variety of fastening MODE setting and ID code input (RS232C).
- ◆ Available up to 32 different each sequence setting and fastening parameter setting.

1-3. Operating environment

Operation-confirmed OS

We recommend to use G-Console under Microsoft Windows ® or 10 Windows ® 7 environment. Supported languages are Japanese and English.



- Windows 10 Windows 7
- ♦ Required capacity for G-Console
 - ·Pentium 1GHz or greater, or RAM 512MB or greater
- Required spare capacity of Disk
 - ·32bit type-850MB ·64bit type-2GB
- G-Console can fail normal performance when Windows power saving or screen-saver is active. Deactivate both settings (see page 1-12).

1-4. Connection to G-Unit

Use commercially available LAN cross or straight cable to connect LAN socket of PC direct or via hub to Ethernet socket of G-Unit.



Modify PC side setting when you have first-time PC to G-Unit connection as G-Unit has factory-configured TCP/IP. TCP/IP setting is visible during G-Unit system setting MODE PAR No. SYS D-No. 011~0.16.

IP Address	192.168.11.10 (Factory-onfigured)
Subnet mask	255.255.255.0 (Factory-onfigured)
Default gateway	192.168.11.1 (Factory-configured)
Communication protocol	IEEE 802.3-compliant
Ethernet standard	100BASE-T
Communication speed	100Mbps
Cable	Category 5 or above (We recommend 5.)
Connector type	RJ-45

●PC and G-Unit one for one direct communication



Make G-Unit to G-Unit communication AXIS LINK OUT socket to AXIS LINK IN socket using axis cable like serial beads. Plug AXIS LINK IN socket of top G-Unit and AXIS LINK OUT socket of serial end G-Unit with G-End connector.



• Do not connect IN to each other or OUT to each other as doing so disables G-Unit to G-Unit communications because 1 and 2 pins of IN and OUT socket do not share signal name.

 Be sure not to connect axis cable (G-Unit to G-Unit connection cable) to Ethernet socket.

<4 SPINDLES CONFIGURATION EXAMPLE>



incorporate I/O (PLC) in a G-Unit, and it will control other G-Units connected in series. G-Unit direct communication with PC or Fieldbus is MASTER unit, and other G-Units receiving command from MASTER are SLAVE unit.

1-5. G-Console installation in PC



· .NET Framework 4.0 installation will start before and after of G-Console installation if .NET Framework 4.0 or above version is not available in your PC. Carry out .NET Framework 4.0 installation following the procedure.

Insert G-Console CD into CD drive, and setup:exe will appear on PC screen. 1. Double-click setup:exe on the file to open it.

2. appears on PC screen.

Click [NEXT], and the setup will start. Click [YES] if USER ACCOUNT CONTROL

	78
👹 G Series System - 🗌 🗙	i G Series System - X
Welcome to the G Series System Setup Wizard	Select Installation Folder
The installer will guide you through the steps required to instal G Series System on your computer.	The installer will install G Series System to the following folder. To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
	Folder:
	C. #Program Files (x86)#GSERIES SYSTEM#GSeries System¥ Browse
	Install G Series System for yourself, or for anyone who uses this Disk Cost computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.	● Everyone ◯ Just me
Cancel <back next=""></back>	Cancel < Back Next>
	Installation Complete → ×
The installer is ready to install G Series System on your computer.	G Series System has been successfully installed.
Click "Next" to start the installation	Click "Close" to exit
	Please use Windows Update to check for any critical updates to the .NET Framework.
Cancel < Back Next >	Cancel <back close<="" th=""></back>

Chapter 1 Introduction

Set TCP/IP of PC the same as factory-configured TCP/IP of G-Unit as follows. Make the change on PC seeing the same appearing on G-Unit front display under setting MODE PAR No. SYS D-No. 011~0.16.

Factory-configured set value (system parameter)

D-No. [[] 011,012] : IP Address	192.168.11.10 (Default)
D-No. [[] 013,014] : Subnet Mask	255.255.255.0 (Default)
D-No. ^[015,016] : Default gateway	192.168.11.1 (Default)

3. Select [CONTROL PANEL] on PC from [START MENU].

All Apps Documents Web More	•	₀ ⓑ ⋈		
Best match				
Control Panel				
Search the web		Control Panel		
Controll Panel - See web results		App		
		□* Open		
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		

# 4. Select [NETWORK STATUS & TASK DISPLAY] or [NETWORK SHARE] from CONTROL PANEL.



# 5. Click [LOCAL AREA CONTENTS] from [Network and Share Center].

$\rightarrow$ * $\uparrow$	💐 > Control	Panel > All Control Panel Items > Network a	el > All Control Panel Items > Network and Sharing Center				
Control Panel	Home	View your basic network info	rmation and set up connections				
Change adapt	er settings	View your active networks					
Change advanced sharing settings		Public network	Access type: Internet				
Media streami	ing options						

Chapter 1 Introduction -

6. Select [PROPERTY] under Ethernet status (Local area connected).

🥔 Ethernet Status	6		$\times$
General			
Connection IPv4 Connectivity IPv6 Connectivity Media State: Duration: Speed:	r: r:	No netwo	Internet ork access Enabled 08:03:54 1.0 Gbps
Details			
	Sent —	<b>-</b>	Received
Bytes:	75,575,462	378	3,048,170
Properties	Disable	Diagnose	
			Close

 Select [INTERNET PROTOCOL VERSION 4(TCP/IPv4)] from Ethernet property, and click [PROPERTY].

Ethernet Properties	$\times$
Networkins Sharins	
Connect using:	
Realtek USB GbE Family Controller	
Con figure	
This connection uses the following items:	
🗹 🏣 Microsoft Network Client	^
Microsoft Network File and Printer sharing	
QoS Backet Scheduler	
Internet Protocol Version 4 TCP/IPv4	
🗹 💵 Microsoft LLDP Protocol Driver	~
< >	
Install Uninstall Properties Description	
OK Cano	el 🛛

8. Select [USE IP ADDRESS] from [INTERNET PROTOCOL VERSION 4 (TCP/IPv4)], and select IP Address, Subnet Mask and Default Gateway.

Internet Protocol Version 4 TC	P/IPv4 Properties ×						
General You can get IP settings assigned auto this capability. Otherwise, you need t for the appropriate IP settings. Obtain an IP address automatica	Set antecedent 3 values by G-Unit's IP address.						
IP address:	120 . 0 . 11 . 11						
Subnet mask:	255 . 255 . 255 . 0						
Default gateway:	192 . 168 . 11 . 1						
Obtain DNS server address automatically							
Use the following DNS server ad	dresses:						
Preferred DNS server:	· · ·						
Alternate DNS server:							
Validate settings upon exit	Advanced						
	OK Cancel						

9. Click YES if TCP/IP pop-up appears on PC.

oft TCP/IP	$\times$
Warning - The default gateway is not on the same network segment (subnet) that is defined by the IP address and subnet mask. Do you want to save this configuration?	
Yes No	

(Good example: PC 192.168.11.<u>11</u> and G-Unit 192.168.11.<u>12</u>)

- **CAUTION** Set PC's Subnet Mask to the same subscribed to factory-configured G-Unit.
  - Make sure to save the data to memo paper before the change.

# <u>1-6. G-Console to G-Unit communication</u>

- Step 1. Select  $START \rightarrow ALL PROGRAMS \rightarrow URYU SEISAKU, LTD \rightarrow$ and Optimized GSeries System to start G-Console.
- Step 2. Start G-Console, and PC will automatically display communication setting screen. Select [COM] and [COM SETTING] also have communication setting screen displayed on PC.
- Step 3. Enter G-Unit TCP/IP in G-Console selecting [IP entry].
  - (1) Name Station name (up to 30 letters).
  - (2) Set IP Address (0~255 for 4 places).

•	COMMUNICATION SETUP							
	COMMUNICATION SETUP IP REGISTRY STATION							
	STATION NAME	IP ADDRESS				*		
	INITIAL SETUP	192	168	11	10	E		
	G SERIES SYSTEM	192	168	11	6			



Above setting is not effective unless Station name is named.

Step 4. Select station name set by Step 3 for IP select and turn on [CONNECT] returning to [COM SET].

•	COMMUNICATION SETUP
	COMMUNICATION SETUP IP REGISTRY STATION
	COMMUNICATION IP SELECT
	INITIAL SETUP [192.168.11.10]
	INITIAL SETUP [192.168.11.10]
	G SERIES SYSTEM [192.168.11.6]

Step 5. Succeed in connecting to G-Unit, and button display [CONNECT] will change to [OFF] with display [CONNECT] of IP address set by Step 3 at the lower left. [CONNECTION FAILED] to IP address set by Step 3 will appear if the connection failed.

[192.168.11.6]=[CONNECTED] [192.168.11.6]=[FAILED]



 PC screen will display [COM ERROR, CONFIRM COM STATUS] and another display [NO CONNECT] at the lower left if the G-Unit is already occupied by other PC.

# <u>1-7. G-Console Uninstallation</u>



 Choose not to overwrite G-Console because overwritten G-Consol can fail to function properly. Install a new version G-Console only after uninstalling already existing G-Console.

1. Select [CONTROL PANEL] searching the same from [START MENU].

All Apps Documents Web More 🕶	₀ 😮 🖉 …
Best match	
Control Panel	
Search the web	Control Panel
Controll Panel - See web results	Арр
	📑 Open

2. Select [PROGRAM UNINSTALL] or [PROGRAM and FUNCTION] from [CONTROL PANEL].



 Existing program list will appear on PC screen. Select and double-click [GSeries System]. Click [YES] if [USER ACCOUNT CONTROLE] appears on PC screen. Select [YES] against pop-up of Program & Function, and uninstallation will start.



# 1-8. Windows setting

#### 1-8-1. Windows harmonized setting

Ethernet is discontinued if PC enters sleep mode during G-Unit to G-Console communication was in process. Turn off PC's sleep mode if you use it connected to G-Unit status to monitor fastening result etc. for a long time.

1. Select [SYSTEM] from [SETTING] of [START MENU].



2. Select [POWER & SLEEP]. Set Never to both modes.

<ul> <li>← Settings</li> <li></li></ul>	Power & sleep Screen On battery power, turn off after
System	5 minutes V
🖵 Display	When plugged in, turn off after
ሳ») Sound	
Notifications & actions	Sleep
J Focus assist	On battery power, PC goes to sleep after
( ¹ ) Power & sleep	Never ~
□ Battery	When plugged in, PC goes to sleep after
📼 Storage	Never ~

# 1-8-2. Windows 7/Vista setting

G-Consol is not compatible with (Aero) functions.

There can remain a dust on PC screen if used under Aero function switched on status depending on the PC capacity. This is due to Windows OS question. Avoid the inconconveniece by the following method.

Make setting of [DISABLE DESKTOP COMPOSITION].

Right-click ICON. →PROPERTY							
ற GSeries System I	Properties	>	<				
Security General	Details Shortcut	Previous Versions Compatibility					
If this program isn't working correctly on this version of Windows, try running the compatibility troubleshooter.							
Run compatibility	/ troubleshooter						
How do I choose con	npatibility settings manu	all <u>v?</u>					
Compatibility mode	ım in compatibility mode	for:					
Windows 8		$\sim$					
Settings Reduced color 8-bit (256) color Run in 640 x Disable visua Disable desk Change hig	mode 480 screen resolutio I themes top composition h DPI settings ngs for all users	on					
	OK	Cancel Apply					

※[DISABLE DESKTOP COMPOSITION] of shortcut property is an option to keep from allowing Aero function to work only for G-Console. Display speed is fast and the operation is smooth.

# 1-9. G-Console start





# Chapter 2 General operation

# 2-1. Toolbar operation

Shortcut ICONs are given to frequently used operation items as per the following Toolbar list.

📕 🚽 🖉 🗠 🔗 축 👯 🏥 🚅 💾 📲 📈 드				₹ <b>*</b>			MB
---------------------------	--	--	--	------------	--	--	----

No.	Operation items	Contents				
	Read All Files	Read all setting files.	PAGE 4-3			
	Save All Files	Save all setting files.	PAGE 4-3			
	Print	Print fastening parameter, fastening sequence, G-Unit information, and the connected G-Tool information.	PAGE 4-5			
50	Tool Type Setting	Decide what G-Tool to connect to what G-Unit.	PAGE 6-2			
	CAL Setting	Set G-Tool's CAL value.	PAGE 6-3			
	Manual Reverse Speed Setting	Set G-Tool's manual reverse speed.	PAGE 6-3			
К. Ц.	Repeat Count Setting	Set repeat cycle of how many times per WORK. (WORK: 1~24)	PAGE 6-4			
	MODE Setting	Set MODE (fastening parameter combination). (MODE: 1~48 and PARAMETER: 1~96)	PAGE 7-2			
	PLC I/O Layout	Set PLC I/O layout. Signals go out from the I/O communicating with Fieldbus etc.	PAGE 8—28			
	RS232C Output Format	Set RS232C communication of output and the format.	PAGE 8—3			
	Setting Value UL/DL	Communicate setting values with G-Unit. (Download/Upload/Verify)	PAGE 3-5			
	Fastening Result Monitor	Makes monitor display and file saving the fastening result.	PAGE 9—2			
	Stat. Calculation	Makes stat. calculation, monitor display and file saving fastening record data. (Fastening record: 12,000 pieces, Error record: 500 pieces)	PAGE 9—10			
$\mathcal{M}$	Waveform Monitor	Displays and save torque curve.	PAGE 9-14			
	Windows Select	Select Windows during the display.				

# 2-2. Menu bar operation

Shortcut ICONs are given to frequently used operation items as per the following Toolbar list.

- FILE (E) UNIT (U) COMMUNICATION (C) MAIN (A) SETUP (I) MONITOR (M) SOFTWARE SETUP (S) DISPLAY (Y) WINDOW (W) HELP (H)
- <u>File (F)</u>····PAGE 4-1
  - Read all files
  - Save all files
  - Read parameter
  - Save parameter
  - Read sequence
  - Save sequence
  - Read RS232C I/O setting
  - Save RS232C I/O setting
  - Read Fieldbus setting
  - Save Fieldbus setting
  - Read Fieldbus Message setting
  - Save Fieldbus Messaga setting
  - Read PLC I/O layout
  - Save PLC I/O layout
  - > Print
  - ➤ End
- <u>Unit (U)</u>····PAGE 5-1
  - Unit information
  - Connected tool information
  - Date and hour setting
- <u>Communication (C)</u>····PAGE 3-1
  - Communication setting
  - Setting value UL/DL

# ● <u>Main (A)</u>····PAGE 8-1

- System cycle count
- RS232C output format
- RS232C input format/data input setting
- RS232C input setting clear
- Fieldbus setting
- Fieldbus message setting
- > Fieldbus message setting clear
- PLC I/O layout
- PLC I/O layout clear
- Information signal setting
- Information signal setting clear
- <u>Setting (T)</u>····PAGE 6-1
  - Tool type setting
  - CAL setting
  - Manual reverse speed setting
  - Repeat number setting
  - Mode setting
- Monitor (M) · · · PAGE 9-1
  - Fastening result monitor
  - Fastening stat. result
  - Waveform monitor
  - Waveform history
  - > I/O monitor
- Software setting (S) · · · PAGE 10-1
  - > Login
  - Account setting
  - Change history
  - Language setting
- <u>Window (</u>W)····Have current Windows title displayed.
- <u>Help (</u>H)···
  - Version information

# 2-3. Status bar

Status bar displays following contents.



# Connected IP address

This displays connection stauts of G-Console to G-Unit whose Ethernet connection was made by [COM SET] (page 3-2).

- [Connected] · · · G-Unit and Ethernet connection running
- [Connection failed] · · · G-Unit and Ethernet link failed.
- [Connect retry]····G-Unit and Ethernet communication ceased during [Connected] status due to LAN cable off etc.
- [Disconnect] · · · Ethernet connection is not carried out.

# Monitoring status

This bar lights while [Fastening result monitor (PAGE 9-2)] or [I/O monitor (Page 9-22)] is working. The bar stops lighting upon completion of the monitoring.

# Security level

This is current security level.

G-Console functions will be restricted as the security level changes.

Refer to PAGE 10-4 for the security level details.



Following pull-down menus are given to COMMUNICATION MENU.

- Communication setting
- Setting value UL/DL

# 3-1. Communication

Set communication and the station name of the connected G-Unit. Refer to PAGE 1-6 for communication method with G-Unit.

#### 3-1-1. Communication setting

Start G-Console or select [COM] and [COM SET] of menu bar, and PC screen will display following communication setting picture.

🖳 COMMUNICATION SETU	IP								<b>— X</b>
COMMUNICATION SETUP	IP RE	GIS	TRY	SI	ATIO	4			
COMMUNICATION IP SEL	.ect								
INITIAL SETUP [192.16	8.11.1	10]						•	CONNECT
MASTER SPINDLE IP SE	TUP	1		_				1	
IP ADDRESS	0	ŀ	0	ŀ	0	ŀ	0		INITIAL SETUP
SUBNET MASK	0	ŀ	0	ŀ	0	ŀ	0		
DEFAULT GATEWAY	0		0	].	0		0		DOWNLOAD
MAC ADDRESS									WRITE

#### •IP Select for communication

Click CONNECT button to start comminication with G-Unit after selecting destination IP from station name subscribed to registration tab. The selected station name will be displayed on Window's title if the connection was successful.

#### •Connect and drop

G-Unit to Ethernet communication starts and CONNECT button switches to DROP. Click DROP button, and G-Unit to Ethernet communication will end.



If the communication ceased during [Connected] status due to LAN cable off etc., G-Unit will automatically carry out connection retry until it is successful with Window's button change to [Connection retry]. Select [DROP] button, and the retrial will end.  IP select of Master G-Unit Ethernet connection setting for Master G-Unit is available.

• Default setting (Factory-configuration) **%**MAC address is unchangeable.

IP address	192.168.11.10
Subnet mask	255.255.255.0
Default gateway	192.168.11.1

#### Reading

Carry out Reading with Ethernet-connected status, and G-Console will display TCP/IP setting. MAC address is similarly read, and it will help users identify connected G-Unit details.

Writing

Carry out writing with Ethernet-connected status, and G-Console will change the connected G-Unit setting. The changed setting is effective when the G-Unit is restarted next time.

# 3-1-2. IP Registration

G-Console registers station name for G-Console (up to 29 types with 30 letters limitation ) and IP address, and carries out list file saving and reading.

STATION NAME	IP ADDRESS				<b>^</b>
INITIAL SETUP	192	168	11	10	E
G SERIES SYSTEM	192	168	11	6	
IP LIST FILE					Ŧ



This registration is not effective unless station name is named.

# 3-1-3. Station

🖳 COMMUNICATION SETUP	
COMMUNICATION SETUP IP REGISTRY STATION	
USE THIS STATION NAME	
G NR test	
SETUP VALUE HOLD	

#### •Use this station name.

Check this box, and G-Console will have station name displayed on Window's title. Check this box when station name is necessary without connection of G-Unit.

#### •Setting value maintenance

Check this box, and G-Consol will memorize setting value upon G-Console shutdown. Next start operation will restart G-Console by the setting value available at the last shut-down.

# 3-2. Setting value UL/DL

Search G-Tool, UL (upload), DL (download) and verify setting values.

Click Menubar, [COM], [Setting value UL/DL], or foolbar, and G-Console will have the below setting value UL/DL picture displayed on Windows.

•Do not do WRITING while RESET signal is switched on status with PLC because doing so will disturb normal writing due to unstable communication.

🖳 SET VALUE UL/DL	
SPINDLE UNIT	MAIN UNIT SELECT ALL CHECK CLEAR
1       9         2       10         3       11         4       12         5       13         6       14         7       15         8       16	172518261927PLC IN/OUT LAYOUT/INFORMATION SIGNAL SETUP2028FIELDBUS MESSAGE SETUP21292230FIELDBUS SETUP2331(POWER RECLOSING IS NECESSARY FOR WRITING)2432
SELECT ALL	CHECK CLEAR  AUTO BACK UP AT SETUP VALUE WRITING  ME  ME  AUTO BACK UP AT SETUP VALUE WRITING  VERIFY  VERIFY  VERIFY  CARRY OUT FILE VERSION

#### •G-Unit

#### Spindle number

G-Console will Download (hereafter DL), Upload (hereafter UL) and Verify checked spindle number as above mentioned.

#### · Check all (or Check clear)

Check all spindles 1~32, or clear all spindles 1~32.

#### Main Unit

Subscribe following settings only for MASTER spindle (G-Unit). Following settings and the verification are not available for SLAVE spindle (G-Unit).

• MODE setting and REPEAT number setting Carry out DL, UL and Verify MODE setting and REPEAT number setting.

#### RS232C I/O format

Carry out DL, UL and Verify RS232C I/O format.

- PLC I/O layout and information signal setting Carry out DL, UL and Verify PLC I/O layout and information signal setting.
- Fieldbus Message setting Carry out DL, UL and Verify Fieldbus Message setting.
- Fieldbus setting

Carry out DL, UL and Verify Fieldbus setting. Check in the box, and Windows will display Fieldbus type set in G-Console.

(Switch on G-Unit by reclosing operation after writing Fieldbus setting)

Check all (or Check clear)

Check all spindles, or clear all spindles.

# Automatic backup at setting value writing

This is to save setting value as parameter file (*.nrpar) on a designated folder when writing is in process. Check in the box, and G-Console will display folder's reference window. Select the saving destination. Saving file name:

¥YYYYMMDD_HHmmss_####.nrpar

Year Mont Day Hour Min. Sec Station name

# •Unit time setting

G-Console displays date and hour setting Windows PAGE 5-6.

### • Spindle search

Search spindle numbers (G-Unit) connected.

Reading

Read various setting values of searched Spindles (G-Unit).

Writing

Write various setting values in the checked Spindles (G-Unit).

Verify

Verify various setting values of checked Spindles by the same subscribed in G-Console.



# Chapter 4 File Menu

Following pull-down menus are given to File Menu.

- Read All Files
- Save All Files
- Read Parameter
- Save Parameter
- Read Sequence
- Save Sequence
- Read RS232C I/O Setting
- Save RS232C I/O Setting
- Read Fieldbus Setting
- Save Fieldbus Setting
- Read Fieldbus Message
- Save Fieldbus Message
- Read PLC I/O Layout
- Save PLC I/O Layout
- > Print
- ➤ End

# 4-1. Read and Save

#### •Read All Files

Read all setting files (*.nrpar / *.nrseq / *.nrpof / *.nrfcf / *.nrmes / *.nrpol). Click and G-Console will also display these setting files. Select intended setting file and click [O] to read it. (Simultaneously read files with same file names *.nrpar / *.nrseq / *.nrpof / *.nrfcf / *.nrmes / *.nrpol searching same directory)

# Attribute of files

Parameter (*.nrpar)
 Sequence (*.nrseq)
 ·RS232C I/O setting (*.nrpof)

• Fieldbus setting (nrfcf) • Fieldbus Message setting(*.nrmes)

·PLC I/O layout (*.nrpol)

# •Save all files

Save all setting files (*.nrpar / *.nrseq / *.nrpof / *.nrfcf / *.nrmes / *.nrpol).

Click Toolbar **I** and the same display will also appear on Windows.

Select intended file and click [S] to save it.

# Read parameter

Read parameter file (*.nrpar). Select intended parameter file and click [O] to read it.

# Save parameter

Save parameter file (*.nrpar). Select intended parameter file and click [S] to save it.

#### Read sequence

Read sequence file (*.nrseq). Select intended sequence file and click [O] to read it.

# Save sequence

Save sequence file (*.nrseq). Select intended sequence file and click [S] to save it.

# •Read RS232C I/O setting

Read RS232C setting file (*.nrpof). Select intended RS232C setting file and click [O] to read it.

# •Save RS232C I/O setting

Save RS232C setting file (*.nrpof). Select intended RS232C setting file and click [S] to save it.

# Read Fieldbus setting

Read Fieldbus setting file (*.nrfcf). Select intended Fieldbus setting file name and click [O] to read it.

# Save Fieldbus setting

Save Fieldbus setting file (*.nrfcf). Select intended Fieldbus setting file name and click [S] to save it.

# Read Fieldbus Message setting

Read Fieldbus Message file (*.nrmes). Select intended Fieldbus Message file name and and click [O] to read it.

# •Save Fieldbus Message setting

Save Fieldbus Message setting file (*.nrmes). Select intended Fieldbus Message setting file and click [S] to save it.

# •Read PLC I/O layout

Read PLC I/O file (*.nrpol). Select intended PLC I/O file name and click [O] to read it.

# Save PLC I/O layout

Save PLC I/O layout file (*.nrpol). Select intended PLC I/O file name and click [S] to save it.

# <u>4-2. Print</u>

Output hardcopy of setting value, G-Tool, and G-Unit information. Select [FILE] and [PRINT] from MENUBAR, or click from TOOLBAR, and PRINT Window will appear.

🖳 PRINT			
PRINTER IN USE       LBP441 E       TOOL TYPE	PAPER SIZE A4 PREVIEW PRINT		SCALE
	Document does not contain any pages.		
<			

#### •Printer used

Select printer for output.

#### •Paper size

Select paper size for printer.

#### Preview

Select [PREVIEW] after setting print requirements, and Windows will display

print image.

#### Print

Click [PRINT], and printer will output selected items.

# <u>4-3. END</u>

Shut-down G-Console.

WARNING			$\times$
	QUIT USER	CONSOLE ?	
	Yes	No	



# Chapter 5 Unit Menu

Following pull-down menues are given to FILE MENU.

- G-Unit information
- G-Tool information
- Date and hour setting

# 5-1. G-Unit information

G-Console displays version, cycle count and type of Fieldbus of all G-Units connected. Select [G-Unit] and [G-Unit Information] from MENUBAR.

•	UNIT IN	FORMATION				
	SPINDL	ROM VERSION	FUNCTION VERSION	SP STEP COUNT	FIELDBUS TYPE	FIELDBUS ver
	1	1.010	1.03	208	CC-LINK	1.08

#### •G-Unit Information table

Items	Contents	
Spindle No.	G-Unit number	
ROM version	Software version	
Function version	G-Unit function version	
Spindle step count	Executed step numbers of spindle	
Fieldbus type	Fieldbus type of extension unit 1	
Fieldbus version	Fieldbus version of extension unit 1	
# 5-2. G-Tool information

G-Console displays conneted G-Tool information. Select [G-Unit] and [G-Tool INFO] from MENUBAR.

## <u>5-2-1. G-Tool Name</u>

G-Console displays connected G-Tool information.

•	CONNECTED TOOL INFORMATION										
TOOL NAME ERROR HISTORY/REPAIR INFORMATION/COUNT DETAIL											
	SPINDL TOOL TYPE		TOOL TYPE	SERIAL NUMBER	SERIAL NUMBER   CAL TORQUE		ZERO VOLTAGE				
		▶ 1	UNR-G613-100NT	SSK103	10.20	3730	-15				
		2									
	3										
		4									

### •G-Tool information table

ltem	Contents
Spindle No.	G-Tool number
G-Tool type	Model name
Seria number	G-Tool serial number
CAL value	Connected G-Tool CAL number
Cal voltage	Connected G-Tool CAL voltage
ZERO voltage	Connected G-Tool ZERO voltage

### 5-2-2. Error history/Repair info/Count

G-Console displays connected G-Tool's Error history/Repair info/Count.

CC TO	ONNECT	TED TOOL INFO	ORMATION	PAIR INFORMATION/	COUNT DETAIL			
S	SPINDLE 1 V I TOOL STEP COUNT 208							
		DATE	TIME	TOOL STEP COUNT	ERROR CODE	ERROR CONTENTS		
	1	2020-03-06	15:08:05	103	5-1	SERVO ANSWER ERROR		
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
►	10							
	11							
- F	REPAIR 1: 2:	COMMENT		3:				

#### •Spindle No.

G-Console displays selected spindle's information.

#### •Error history

G-Console displays Error history.

#### •Repair comment

G-Console displays information at repair (Edition by user is unavailable).

### Count

- Error count ••• Count up Error numbers.
- G-Tool Step Count •• Count up Step numbers executed by the G-Tool.

### 5-2-3. Details

G-Console displays details of conneted G-Tool (edition by user is unavailable).

CONNECTED TOOL INFORMATION	
TOOL NAME ERROR HISTORY/REPAIR I	INFORMATION/COUNT DETAIL
SPINDLE 1 V	
SERIAL NUMBER	SSK103
TOOL TYPE UNR	l-G613-100NT
TORQUE DECIMAL POINT	2 ~
CAL TORQUE	10.20
CAL VOLTAGE	3730
ZERO VOLTAGE	-15
GEAR RATIO	8.33
ROTATING DIRECTION	0 ~

•Contents displayed by Detail Tab is factory-configured data. (Pre-amplifier data) Never edit it unless special reason is available.

#### •Spindle number

G-Console displays detail information of selected spindle number G-Tool.

## Reading

G-Console reads detail information of selected spindle number G-Tool.

### •G-Tool detail information table

ltem	Contents			
Serial number	Connected G-Tool serial number			
Tool type	Connected G-Tool model name			
Torque decimal point	Connected G-Tool decimal point location			
CAL torque	Connected G-Tool CAL torque			
CAL voltage	Connected G-Tool CAL voltage			
ZERO voltage	Connected G-Tool ZERO voltage			
Gear ratio	Connected G-Tool internal gear ratio			
Rotational direction	Connected G-Tool rotational direction			

## 5-3. Date and hour setting

Set G-Console date and hour synchronizing with the same of PC. Select [G-Unit] and [TIME SET] from MENUBAR, and G-Console will display Date and Hour Setting picture.

DATE TIME SETUP	
COMPUTER	
DATE 2020-12-14	TIME 17:00:01
SPINDLE CONNECT $\sim$	
DATE	TIME
	WRITE

## •Spindle No. (Connected spindles 1~32)

Select spindle number you are going to set Date and Hour.

Select [Connected Spindles], and intended spindles will be all connected spindles.

### Read

G-Console displays date and hour set to intended spindle.

X Date and hour display is unavailable if [Connected Spindles] are selected.

### Write

Write PC's date and hour in the intended spindle. Select [Connected Spindles], and G-Console will write its date and hour in all spindles conneted.



Chapter 6 G-Tool Menu

Following pull-down menus are given to FILE MENU.

- Setting (T)
  - G-Tool type setting
  - CAL setting
  - Manual reverse speed setting
  - Repeat cycle number setting
  - MODE setting

# 6-1. G-Tool type setting

Set type of G-Tool to be connected to G-Unit. Select [SETTING] and [TOOL TYPE] of MENUBAR, or click TYPE] picture will be on PC screen.

, and [TOOL

						_
🖳 TOOL	TYPE SETUP					×
SP NO.	TOOL TYPE		RATED STRAIN	MAX TORQUE	MAX SPEED	-
1	UNR-G613-50NT		11.5	5.0	5357	
2	UNR-G613-100NT		10.2	10.0	3000	
3	UNR-G613-200NT		44.0	20.0	1222	
4	UNR-G613-300NT		41.7	30.0	857	
5	UNR-G613-400NT		41.7	40.0	635	
6	UNR-G640-800NT		132.3	80.0	937	
▶ 7	UNR-G640-1000NT		132.3	100.0	757	Ξ
8	UNR-G640-1300NT	NO TO	OL CONNECTED	130.0	558	
9	UNR-G100-1900NT	UNR-G	613-50NT	190.0	718	
10	UNR-G100-2500NT	UNR-G	613-100NT	250.0	532	
11	UNR-G100-5400NT	UNR-G	613-200NT	540.0	249	
12		UNR-G	613-300NT			
13		UNR-G	613-400NT			
14		UNR-G	640-800NT			
15		UNR-G	640-1000NT			
16		UNR-G	640-1300NT			
17		UNR-G	100-1900NT			
18		UNR-G	100-2500NT			
19		UNR-G	100-3700NT			
20		UNR-G	100-5400NT			
21		UNR-G	100-7000NT			-
		UNR-G	100-10000NT			
		June of	200 20000111			

Select Spindle number, and search a G-Tool doing right-click to allocate G-Tool to the selected spindle. A single G-Tool type allocation to more than one spindle is possible because multi-spindle select is available.

## •G-Tool type

Select G-tool type.

#### •Torque sensor rated strain

This is rated strain of torque sensor mounted to G-Tool.

#### •MAX torque (speed)

This is selected G-Tool's MAX torque (speed).

## 6-2. CAL Setting

Set CAL value of G-Tool connected to G-Unit. Select [SETTING] and [CAL SET] of MENUBAR, or click [CAL SET] picture will be on PC screen.



of

🖳 CAL S	SETUP								
				_			WORK		
SF NO.	1	2	3	4	COP	(	7	8	9
▶ 1	11.5	11.5	11.5	11	PAST	Έ	11.5	11.5	11.5
2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2
3	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0
4	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7
5	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7
6	132.3	132.3	132.3	132.3	132.3	132.3	132.3	132.3	132.3
7	132.3	132.3	132.3	132.3	132.3	132.3	132.3	132.3	132.3
8	132.3	132.3	132.3	132.3	132.3	132.3	132.3	132.3	132.3

Adjust CAL value, and G-Unit calibration will be possible by an external measuring equipment.

Adjust CAL value for every spindle and every WORK number. [COPY] and [PASTE] of CAL value is possible per spindle and per WORK.

•CAL value calculation

Torque on external measuring equipment

× Current CAL value = New CAL value

G-Unit torque display

## 6-3. Manual reverse speed setting

Set manual reverse speed.

Select [SETTING] and [MANUAL SPEED] of MENUBAR, or click TOOLBAR, and [MANUAL SPEED] picture will be on PC screen.

A MANUAL REVERSE SPEED SETUP											
SP NO.											
	1	2	3	4		<u> </u>	7	8	9		
▶ 1	100	100	100		PASTE		100	100	100		
2	100	100	100				100	100	100		
3	100	100	100		100	100	100	100	100		
4	100	100	100	100	100	100	100	100	100		
5	100	100	100	100	100	100	100	100	100		
6	100	100	100	100	100	100	100	100	100		
7	100	100	100	100	100	100	100	100	100		
8	100	100	100	100	100	100	100	100	100		

Input REVERSE command in G-Unit, and G-Tool will rotate at REVERSE speed. Adjust MANUAL speed for every spindle and every WORK number. [COPY] and [PASTE] of MANUAL speed is possible per spindle and per WORK.

# 6-4. CYCLE number setting

### 6-4-1. CYCLE number setting screen

Set CYCLE NUMBER to repeat fastening. Select [SETTING] and [CYCLE NUMBER] of MENUBAR, or click and Cycle Numbers will be displayed on PC screen.

of TOOLBAR,

REPEAT COUNT SETUP									
WORK NO	). 1			REPET	ITION	3			
SP NO.	GROUP	1	2	3	4	5	6	7	8
1	0	M1	M2	0					
▶ 2	0	M1	0	M2					
MODE number									

•WORK number (setting range 1~24)

Available WORK numbers

### •CYCLE number (setting range 1~24)

Set CYCLE number (repeat number) for intended WORK.

### •GROUP (setting range 1~24)

Group spindles, and fastening by group will be possible.

### •MODE number (setting range M1~M48)

Set MODE that operates when CYCLE NUMBER is in action.



## •1 CYCLE fastening timing chart









• Maintain RESET & START singals switched "ON" longer than 500msec.

Have START signal interlocked with READY-STOP-RESET-REVERSE– ALARM signals.

- G-Unit does not carry out all action commands if there is ALARM signal.

CAUTION

 Turn on BYPASS input of PLC I/O, and G-Unit will switch on BYPASS output of PLC I/O. Also, OK and NOK output of PLC I/O are not switched ON under BYPASS switched on status.



# 7-1. MODE setting

## 7-1-1. SETTING SCREEN

### Set fastening MODE.

Select [SETTING] and [MODE SET] of MENUBAR, or click MODE setting picture will be displayed on PC screen.

of TOOLBAR, and

MODE SP NO. 1 1	MEMO				COPY TO ALL
SETUP ITEM		STEP 1	STEP 2	STEP 3	STEP 4
ACTION STATE		OFF	OFF	OFF	OFF
PARAMETER NUMBER					
ROTATE DIRECTION					

## •MODE numbers (range: 1~48)

This is fastening MODE setting numbers.

## • Spindle number (range: 1~32)

Select spindles that you allocate MODE number.

## •MEMO (up to 32 half-sized letters)

MEMO setting is available for every MODE.

## •Copy to all spindles

Copy setting MODE contents to all spindles.

## •STEP numbers (range: 1~20)

Set fastening actions to every STEP. G-Unit automatilly shift to next STEP upon satisfaction of a closing condition during operation.

# <MODE setting picture>

SETUP ITEM	STEP 1	STEP 2	STEP 3
ACTION STATE	ON	LAST	OFF
PARAMETER NUMBER	1	2	
ROTATE DIRECTION	cw	CW	
FASTENING DIRECTION	EASTEN	FASTEN	
	00000.0	00000.0	
	9999.9	9999.9	
MOTOR SPEED CONTROL	FIXED SPEED	FIXED SPEED	
INITIAL SPEED (rpm)	100	100	
FREE RUN SPEED (rpm)			
DECELERATION SPEED			
TORQUE SPEED (rpm)			
INITIAL ROTATE TIMER (sec)			
FREE RUN THREAD NUMBER			
SPEED CHANGE TOROUE (Nm)			
CONTROL METHOD	TOPOLIE	TOROUE	
	15.0	25.0	
SNUG TORQUE (NM)	15.0	35.0	
CUT TORQUE (Nm)	20.0	60.0	
TORQUE JUDGMENT	OFF	ON	
HIGH LIMIT TORQUE (Nm)		70.0	
LOW LIMIT TORQUE (Nm)		50.0	
FINAL HIGH LIMIT TORQUE (Nm)		70.0	
FINAL LOW LIMIT TORQUE (Nm)		50.0	
SNUG TORQUE JUDGMENT	OFF	OFF	
SNUG TOROUE HIGH LIMIT (Nm)			
CUT ANGLE			
	055	01	
	UFP	100.0	
HIGH LIMIT ANGLE (deg)	_	100.0	
LOW LIMIT ANGLE (deg)		0.0	
CYCLE JUDGMENT	OFF	OFF	
CYCLE TIMER (sec)	6.0	2.0	
INITIAL CROSS THREAD DETECT	ON	OFF	
INITIAL CROSS RHEAD TIMER	2.0		
START DELAY TIMER (sec)			
SPIN TIME MEASUREMENT TIMER (sec)			
	-	0.0	
SERVOLOCK		OFF	
		orr	
START TORQUE JUDGMENT	ON	OFF	
START TORQUE HIGH LIMIT (Nm)	10.0		
START TORQUE THREAD NUMBER	1.0		
THREAD NUMBER JUDGMENT	ON	OFF	
THREAD NUMBER HIGH LIMIT	10.0		
THREAD NUMBER LOW LIMIT	1.0		
INTER-SPINDLE SYNCHRONIZE	OFF	OFF	
SIGNAL OUTPUT	0	0	
WATTING INPUT SIGNAL	0	0	
	0.0	0.0	
WAITING SIGNAL TIMER (SEC)	0.0	0.0	
LAY OVER	0.0	0.0	
1P REVERSE	OFF	ON	
1P TORQUE (Nm)		5.0	
1P SPEED (rpm)		10	
1P TIMER (sec)		0.1	
NOK PROCESS MODE	END	END	
NOK GROUP SET			
JUMP STEP			
RETRY NUMBER TO PROCESS NOK			
GRADIENT DETECT TOPOLE (N=>)			
GRADIENT RATE (%)			
SLIP JUDGMENT ANGLE (deg)			
SLIP START TORQUE (Nm)			
SLIP END TORQUE (Nm)			
ANGLE RATE JUDGMENT	ON	OFF	
ANGLE VARIATION	2.0		
HIGH LIMIT ANGLE VARIATION (dea)	3.0		
LOW LIMIT ANGLE VARIATION (den)	1.0		
	OFF	OFF	
		<u></u>	
PEAK TORQUE MONITOR JUDGMENT ANGLE (deg)			
CURRENT HIGH LIMIT	24.0	24.0	
CURRENT LOW LIMIT	0.0	0.0	
ACCELERATE TIME	500	500	
DECELERATION SPEED UNDER NO LOAD (msec)	0	0	
REVERSE ACCELERATION TIME (msec)	500	500	

# 7-2. Fastening parameter

Setting items	Setting range	Contents
Action status	OFF/ON/NOK /LAST/REV END	Set STEP's action status
Parameter number	1-96	Set parameter number allocating to STEP.
Rotating direction	CW/CCW	Set motors' rotating direction
Fastening direction	Fasten/Open	Set fasten or open against rotating direction.
Motor torque limit	0.0~9999.9 Nm	Set when limiting fastening torque
Motor speed control	Constant/Auto	Select speed control method. Constant···Fixed speed Auto···Automaticaly change motor speed during a step depending on conditions.
Initial speed	1rpm to motor's max speed	Speed of a STEP under "Constant" setting. Or, initial speed at fastening start under "Auto" setting. Motors run at initial speed until initial rotating timer is up.
Free run speed	1rpm to motor's max speed	Motor speed following initial speed to just before bolt seating under "Auto" setting. Motor does not stop until motor finishes turning fastener for free run thread numbers.
Slow speed	1rpm to motor's max speed	Motor speed following free run speed at bolt seating under "Auto" setting. Motor runs at Slow speed until speed change torque is detected.
Torque speed	1rpm to motor's max speed	Motor speed applicable after speed change torque is detected.
Initial rotation timer	0.0~60.0 sec	How long time to drive motor at initial speed.
Free run thread numbers	0.0~60.0 threads	Thread numbers that a G-Tool fastens at free run speed.
Speed change torque	0.0~9999.9 Nm	Motor speed changes to torque speed when torque reaches Speed change torque.
Control method	<ul> <li>Torque</li> <li>Angle</li> <li>Plastic area angle</li> <li>Pre-load</li> <li>Pin-hole control</li> <li>Idle check</li> <li>Position align</li> </ul>	Select appropriate method.
Snug torque	0.0∼99999.9 Nm	Start angle measurement at this torque.
Cut torque	0.0~9999.9[Nm]	Stop motor at this torque under Torque method.

# Chapter 7 Fastening parameter -----

Setting items	Setting range	Contents
Torque judgment	OFF/ON	Select whether to use torque judgment.
Upper limit torque	0.0~9999.9 Nm	Set peak torque upper limit.
Low limit torque	0.0~9999.9 Nm	Set peak torque low limit.
Final torque upper limit	0.0~9999.9 Nm	Torque upper limit as the fastening has been completed.
Final torque low limit	0.0~9999.9 Nm	Torque low limit as the fastening has been completed.
Snug torque judgment	OFF/ON	Select whether to use snug torque judgment.
Snug torque upper limit	0.0 <b>∼</b> 99999.9 Nm	Set Snug torque upper limit.
Cut angles	0.0~9999.9 deg	Set target angles of a STEP when you select "Angle", "Plastic area angle", "Pin-hole control" or "Position align" method.
Angle judgment	OFF/ON	Select whether to use angle judgment.
Upper limit angle	0.0~9999.9 deg	Set upper limit angles.
Low limit angle	0.0~9999.9 deg	Set low limit of fastening angles.
Cycle judgment	OFF/ON	Select whether to have cycle judgment.
Cycle timer	0.0~60.0 sec	Set max operation time of a Step.
Initial trouble detection	OFF/ON	Select whether to detect initial trouble.
Initial trouble detection timer	0.0~60.0 sec	Provide initial trouble NOK if torque reaches CUT torque/angle before preset time is up.
Start delay timer	0.0~60.0 sec	Decide how long to delay measurement after START under Preload or Spin check setting. Measurement starts when this timer is up.
Spin check timer	0.0~60.0 sec	Measurement starts and ends when this timer is up under SPIN check setting.
Cut hold time	0.0~0.5 sec	Decide how long to hold approximately 95% of CUT torque application after reaching CUT torque at LAST step.
Servo lock	OFF/ON	Use this function, and the motor will lock at LAST step after fastening completion.

# Chapter 7 Fastening parameter ------

Setting items	Setting range	Contents
Start torque judgment	OFF/ON	Select whether to use start torque judgment.
Start torque upper limit	0.0~9999.9 Nm	Set start torque upper limit.
Start torque thread number	0.0~60.0 threads	Fastening is NOK if torque reaches Start Torque Upper Limit before rotation reaches Start Torque Thread numbers.
Thread number judgment	OFF/ON	Select whether to use thread number judgment.
Thread number upper limit	0.0~60.0 threads	Set thread number upper limit.
Thread number low limit	0.0~60.0 threads	Set thread number low limit.
Synchronize spindles	OFF/GROUP/ WORK	Have a spindle synchronized with others after a STEP so synchronized ones start together next.
Signal output	0~7	G-Unit outputs preset number STEP OUT signal at STEP completion to wait for fastening.
Input signal	0~7	Enter preset number STEP IN signal, and waiting STEP due to STEP OUT signal will restart.
Signal wait timer	0.0~60.0 sec	Waiting STEP waits for STEP IN signal until this timer is up. Waiting STEP will automatically start next STEP when this timer is up.
Waiting time	0.0~60.0 sec	Set time from STEP end to next STEP start.
1P Reverse	OFF/ON	Select whether to carry out 1P reverse at the end of STEP to avoid socket and work stuck.
1P Torque	0.0~9999.9 Nm	Set torque for 1P Reverse.
1P Speed	1rpm~Max of G-Tool	Set speed for 1P Reverse.
1P Timer	0.0~60.0 sec	Set time for 1P Reverse.
NOK Repair MODE	END/NOK JUMP OK JUMP/JUMP	Set repair option when NOK happens.
NOK Group set	OFF/Group/Work	Set NOK repair unit or group.
JUMP step	1~20	Set which STEP to carry out NOK repair.
NOK Retry number	0~10	Set cycles how many times to repeat NOK repair.

# Chapter 7 Fastening parameter ------

Setting items	Setting range	Contents	
Gradient detect torque	0.0~9999.9 Nm	Decide torque at what point to calculate torque gradient under Plastic Area Angle method.	
Gradient ratio	0~100%	Set upper limit of Gradient ratio under Plastic Area Angle method.	
Slip error judgment (bolt and nut co-rotation)	OFF/ON	Select whether to detect Slip error.	
Slip error judgment angle	0.0~9999.9 deg	Set upper limit of Slip error angles under Angle method and Plastic Area Angle method.	
Slip error start torque	0.0~9999.9 Nm	Set decline torque providing Slip error judgment.	
Slip end torque	0.0~9999.9 Nm	Set torque increase providing Slip recovery judgment.	
Angle rate judgment	OFF/ON	Select whether to use Angle rate judgment.	
Angle change quantity	0.0~9999.9 deg	Decide angle change quantity per 0.1 sec.	
Angle change quantity upper limit	0.0~9999.9 deg	Decide angle change quantity upper limit.	
Angle change quatity low limit	0.0~9999.9 deg	Decide angle change quantity low limit.	
Peak torque monitor judgment	OFF/ON	Select whether to use Peak torque monitor judgment.	
Peak torque monitor judgment angle	0.0~9999.9 deg	Decide angles for G-Unit to perform torque monitor after torque started declining.	
Current upper limit	0~Max [A] of G-Unit	Set current upper limit in operation. G-Unit outputs ALARM when current is over the limit.	
Current low limit	0~Max [A] of G-Unit	Set current low limit in operation. G-Uni outputs ALARM when current is lower than low limit.	
Acceleration time	100~5000 msec	Set acceleration time for G-Tool to reach MAX speed from 0 at STEP start.	
Speed reduction time under no load	0~5000 msec	Set time for G-Tool to reduce speed from MAX to 0 when STEP reaches Free Run Thread number.	
Acceleration time for reverse	100~5000 msec	Set time for G-Tool to reach 1P speed from 0 under reverse operation.	

# 7-3. Fastening setting

## 7-3-1. Action status

Set action status of STEP.

Action status	Contents
OFF	Before STEP setting status
ON	Carry out STEP's performance at fastening.
NOK	Repair STEP to fix NOK.
LAST	Last STEP ending one operation.
REV END	Set this to a STEP ending with opening at the end such as stud bolt.

## 7-3-2. Parameter number

Set parameter number of STEP (1~96).

G-Unit maintains torque etc. by parameters. Use the same parameter numbers for other MODE or STEP, and those MODE and STEP will carry out fastening with the same contents.



When a certain parameter is shared by multi STEP or MODE, editing parameter of one STEP or MODE will cover other STEP or MODE sharing the same parameter. Pay attention to parameter edition.

## 7-3-3. Rotating direction and fastening direction

• Set motor's rotating direction (CW/CCW)

Rotating Direction	Contents
CW	Rotate fastener to the right (clockwise)
CCW	Rotate fastener to the left (counterclockwise)

## • Set fastening or opening to rotating direction.

Setting	Contents
Fastening	Set fastening to rotating direction.
Opening	Set opening to rotating direction.

## 7-3-4. Motor speed control

Set speed change control of fastening step.

Fixed ··· Fastening is carried out by fixed speed which is maintained until one STEP comes to an end. Motor rotates at initial setting speed.

Auto · · · Change fastening condition, and speed change will be possible before

a STEP comes to an end.

•Auto setting contents

Parameter	Contents
Initial speed [rpm]	Initial speed at fastening start. Motor rotates at initial speed until initial rotate timer is up.
Free run speed [rpm]	This serves motor rotation just before bolt seating following the end of initial speed. Motor rotates at free run speed for free rurn thread numbers.
Slow speed [rpm]	This serves motor rotation up to speed change torque following the bolt seating. Motor rotates at slow speed until speed change torque is detected.
Torque speed [rpm]	This is speed after speed change torque detection.
Initial rotate timer [sec]	This is timer for initial speed.
Free run thread numbers	Set thread numbers which are rotated under free run speed.
Speed change torque [Nm]	Speed is shifted to torque speed upon detecting this torque.

•Motor speed control (setting example)

Parameter	Example	Parameter	Example
Initial speed	20 rpm	Initial rotate timer	1.0 sec
Free sur speed	400 rpm	Free run thread number	10 thread
Slow speed	100 rpm	Speed change torque	10.0 Nm
Torque speed	10 rpm	Cut torque	20.0 Nm

①At start, motor runs at [Initlal speed (20 rpm)] for [Initial rotate timer (1.0 sec)]

counting free run thread numbers.

CAUTION

②Shifting to [Free run speed (400 rpm)] as [Initial rotate timer (1.0 sec)] is up, motor continues running to turn fastener for [Free run thread (10)].

③Shifting to [Slow speed (100 rpm)] after serving [Free run thread (10)], motor continues running until torque reaches [Speed change torque (10.0 Nm)].

(4) Shifting to [Torque speed (10 rpm)] upon detecting [Speed change torque (10.0Nm)], motor continues running until torque reaches [Cut torque (20.0 Nm)].



 Motor automatically shift to [Torque speed] if [Speed change torque] is detected before [Free run thread] realization.

• Set [Free run thread number] so it is less than actual threads of bolt.

# 7-4. Control method

Select control method of fastening.

Control method	Contents
Torque method	Motor stops rotation when torque reaches CUT torque.
Angle method	Motor stops rotation when turning angles reach CUT angles from SNUG torque.
Plastic area angle method	In addition to Angle method, G-Unit serves torque increase gradient comparison between the same at STOP and DETECT point for judgment.
Pre-load	G-Unit drives motor to rotate for an intended period of time, and provides judgment if the peak torque overrun peak torque upper limit. Use this method to detect wrong assembly of crank shaft requiring stronger torque than normal resistance at trial turning.
Pin-hole control	Motor rotates and stops fastener at pre-determined CUT angles from pin-hole detection following SNUG torque detection. Angle display is counted angles from SNUG to halting point.
Idle check	In addition to Pre-load method, Idle check method has a function to check gear failure without detecting backlash torque.
Position adjust	Following SNUG torque detection, motor rotates fastener with CUT angles and stops from sensor switching point. Angle display is counted angles from sensor switching point.

-

## 7-4-1. Torque method

Use torque as the criterion of judgment.

G-Unit stops motor rotation when fastening torque reaches pre-determined CUT torque.

•Torque method setting example

Parameter	Example	Parameter	Example
Initial speed	10 rpm	Torque judgment	ON
Snug torque	7.0 Nm	(Final) Upper limit torque	12.0 Nm
Cut torque	10.0 rpm	(Final) Low limit torque	8.0 Nm
Cycle timer	10.0 sec		

①G-Tool fastens fastener up to [CUT torque (10.0Nm)] at [Initial speed (10 rpm)].

②G-Unit provides [Total OK] judgment if G-Tool stops rotation at [CUT Torque] and final torque was between Upper limit and low limit.

(G-Unit compulsory stops fastening with judgment provision against torque then available if [CYCLE timer (10.0 sec)] is up before [CUT torque] realization.)



## 7-4-2. Angle method

Use angle as the criterion of judgment.

G-Unit stops motor rotation when the motor finishes to turn fastener with pre-set angles from angle measurement start point (SNUG torque).

Parameter	Example	Parameter	Example
Initial speed	10 rpm	Angle judgment	ON
Snug torque	20.0 Nm	Angle upper limit	45.0 deg
Cut angle	40.0 deg	Angle low limit	35.0 deg
Cycle timer	10.0 sec		

•Angle method setting example

①G-Unit carries out torque control fastening up to [SNUG torque (20.0Nm)] at [Initial speed(10 rpm)].

②G-Unit carries out angle control fastening up to [CUT angle (40.0 deg.)] from SNUG torque detected point.

G-Unit provides judgment whether turned angle was between Upper and Low limit. (G-Unit compulsory stops fastening with judgment provision against angles then available if [CYCLE timer (10.0 sec)] is up before [CUT angle] realization.)



## 7-4-3. Plastic area angle method

Judgment criterion is angle same as angle method.

Angle method plus GRADE torque is Plastic area angle method. G-Unit makes elevation angle comparison at GRADE-A to GRADE-B how it is gentle. G-Unit provides Plastic Area Angle OK if GRADE ratio of B by A was smaller than pre-set ratio. Setting 17 check points at every 0.5 deg, G-Unit measures torque for 8 deg retroactive from GRADE torque for GRADE-A and also from CUT angle final for GRADE-B.



•GRADE calculation GRADE-A Mean a =20.4

Mean a' =24.4

	(											(					
Check point	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Angle	28.0	28.5	29.0	29.5	30.0	30.5	31.0	31.5	32.0	32.5	33.0	33.5	34.0	34.5	35.0	35.5	36.0
Torue	19.7	19.8	20.3	20.6	21.2	21.2	21.7	22.2	22.4	22.6	23.1	23.7	23.7	24.1	24.6	25.1	25.1
																-	

39.0

Mean b' =39.1

GRADE-B/									(								
Check point	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Angle	82.0	82.5	83.0	83.5	84.0	84.5	85.0	85.5	86.0	86.5	87.0	87.5	88.0	88.5	89.0	89.5	90.0
Torque	38.9	38.9	39.0	38.6	39.1	39.3	39.1	38.8	39.3	39.2	39.0	39.0	39.3	39.3	38.8	39.1	39.4

GRADE A= (Mean a – Mean a') / 12 = (20.4-24.4) / 12 = 0.333 GRADE B= (Mean b - Mean b') / 12 = (39.1-39.0) / 12 = 0.0083 GRADE ratio= (GRADE-B / GRADE A) x 100 = (0.0083 / 0.333) = 2.4%



 Calculate GRADE-A by 8 deg (17-point) retroactive from GRADE torque. Retroactive trace is not possible when back angle is 0 with NOK judgment. Set GRADE torque so turning angle from SNUG to GRADE torque is greater than 8 deg.

Study appropriate GRADE torque from final torque realized by Angle method 8 deg angle turning to CUT from SNUG torque. This will provide a guide line of GRADE torque.

GRADE ratio result is displayed on [Fastening result display (Page 9-2)].
 Refer to the same as a guide line of GRADE ratio setting.

## 7-4-4. Pre-load

G-unit drives motor to rotate for [CYCLE TIMER], and provides judgment if the peak torque remains below torque upper limit or overrun. Use this method to detect wrong assembly of crank shaft requiring stronger torque than normal resistance at trial turning.

•Pre-load (an example)



- ① G-Unit monitors if torque exceeds upper limit torque during [CYCLE TIMER].
- ② Resistance torque turning still object in motion can go above upper limit torque when you begin crank shaft idle operation. Set START delay timer, and G-Unit will pass up torque monitor until START Delay Timer is up.

## 7-4-5. IDLE CHECK

Same as Pre-load, G-Unit drives motor during [CYCLE TIMER] monitoring torque with judgment provision. Set IDLE timer, and G-Unit will take no account of torque spike caused by backlash at nutrunner stop. Use this function to detect gear failure of right angle nutrunners.

•IDLE check (an example)



- ① G-Unit monitors if torque overrun upper limit torque during CYCLE timer.
- ② Set START delay timer, and torque measurement will not start until START delay timer is up.
- ③ Set IDLE timer, and torque measurement will end before CYCLE timer maturity leaving backlash torque spike out of judgment.

### 7-4-6. Pin-hole control alignment

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Switch on G-Unit I/O SENSOR #12 pin, and motor will turn fastener up to CUT angles. This SENSOR is not switched on by the external signal alone until G-Unit detects SNUG torque. CUT angle control following SNUG torque is possible by an intended torque entry in SNUG torque. Both Pin-hole control and Position adjust use the same CUT angles, however, final angles associated with result (history) are different as mentioned below. Angles for Pin-hole is SNUG to final, but Position adjust is SENSOR on to final.

Control method	Angle count start point of display (history)
Pin-hole control	Angles from SNUG to halting point
Position adjust	Angles from SENSOR on to halting point

• Pin-hole control and Position adjudt parameter lay-out example



SENSOR monitors availability of external signal always.

If Pin-hole detection is synchronized with SNUG torque, G-Unit will let the first Pin-hole detection go by, and begin CUT angle turning after having second Pin-hole detection.

# 7-5. Fastening judgment

# 7-5-1. Torque judgment

G-Unit provides judgment if fastening torque was within upper and low limit.

Setting items	Range	Contents
Torque judgment	OFF/ON	Use or not torque judgment
Upper limit torque	0.0~9999.9 Nm	Set peak torque upper limit
Low limit torque	0.0~9999.9 Nm	Set peak torque low limit
Final upper limit torque	0.0~9999.9 Nm	Upper limit torque when a fastening comes to an end.
Final low limit torque	0.0~9999.9 Nm	Low limit torque when a fastening comes to an end.



## 7-5-2. SNUG Torque judgment

G-Unit judges if SNUG torque is less than SNUG torque upper limit.

Setting items	Range	Contents
SNUG torque judgment	OF/ON	Use or not SNUG torque judgment.
SNUG torque upper limit	0.0~9999.9 Nm	Set SNUG torque upper limit.



G-Unit monitors SNUG torque sampling at 1 msec interval.

If SNUG torque overrun the upper limit due to an abrupt torque spike, CAUTION G-Unit will provide SNUG torque upper limit error.

## 7-5-3. Angle judgment

G-Unit judges if turned angles are within upper and low limit range.

Setting items	Range	Contents
Angle judgment	OFF/ON	Use or not Angle judgment.
Upper limit angle	0.0~9999.9 deg	Set turning angle upper limit
Low limit angle	0.0~9999.9 deg	Set turning anle low limit.



## 7-5-4. CYCLE Judgment

G-Unit judges if a STEP is executed before CYCLE timer maturity.

Setting items	Range	Contents
CYCLE judgment	OFF/ON	Use or not CYCLE judgment.
CYCLE timer	0.0~60.0 sec	Set time limit for a STEP to be executed.



A STEP operates for CYCLE timer duration, and G-Unit provides various judgments of angle or torque available at CYCLE timer up even if they did not reach CUT angles or torque.

## 7-5-5. Initial trouble detect

CAUTION

This is to see stress at the time of STEP start monitoring torque by time progress. G-Unit detects abrupt torque spike due to cross thread or overlap with judgment.

Setting items	Range	Contents
Initial trouble detect	OFF/ON	Use or not Initial trouble detect.
Initial trouble timer	0.0~60.0[sec]	It is Initial trouble NOK if torque or angle reaches before this timer is up.



## 7-5-6. START torque judgment

This is to see stress at the time of STEP start monitoring torque by thread number progress. G-Unit detects abrupt torque spike in the same way as Initial trouble detect with judgment.

Setting items	Range	Contents
Start torque judge	OFF/ON	Use or not Start torque judgment.
Start torque upper limit	0.0~9999.9 Nm	Set Start torque upper limit.
Start torque thread numbers	0.0~60.0 thread	It is Start torque upper limit NOK if torque reaches its upper limit before thread number reaches limit threads.



## 7-5-7. Thread number judgment

This is to provide judgment if thread number is between the upper and low limit.

Setting items	Range	Contents
Thread number judgment	OFF/ON	Use or not thread number judgment.
Thread number upper limit	0.0~60.0 thread	Set upper limit of thread numbers.
Thread number low limit	0.0~60.0 thread	Set low limit of thread numbers.



## 7-5-8. SLIP judgment

Detecting torque decline due to bolt-nut corotation, G-Unit provides SLIP NOK judgment unless torque recovers SLIP end torque when elapsed angles come to SLIP angle. This is available for Angle method and Plastic area angle method.

Setting items	Range	Contents
SLIP judgment	OFF/ON	Use or not SLIP judgment.
SLIP angle judgment	0.0~9999.9 deg	Set SLIP angle.
SLIP start torque	0.0~9999.9 Nm	Set decline torque which G-Unit regards SLIP torque.
SLIP end torque	0.0~9999.9 Nm	Set increase torque which G-Unit regards SLIP end torque as recovery.

Example

Parameter	Example	Parameter	Example
SNUG torque	20.0 Nm	SLIP angle	50.0 deg
CUT angle	90.0 deg	SLIP torque	10.0 Nm
SLIP judgment	ON	SLIP end torque	10.0 Nm





When SLIP happened more than once, G-Unit makes SLIP judgment by cumulative decline angles. Similarly G-Unit provides judgment by cumulative fastening angles with decline angles exclusive.

## 7-5-9. Angle rate judgment

Set angle rate per 0.1sec, and G-Unit provides Angle judgment of within upper and low limit seeing angle change by the elapsed time.

Setting items	Range	Contents
Angle rate judgment	OFF/ON	Use or not Angle rate judgment.
Angle rate	0.0~999.9 deg	Set angle rate per 0.1 sec.
Upper angle rate	0.0~9999.9 deg	Set upper angle rate.
Low angle rate	0.0~9999.9 deg	Set low angle rate.

### •Example

Parameter	Example	Parameter	Example
Motor speed	Fixed	Angle rate	6.0 deg
Initila speed	10rpm	Angle rate upper limit	20.0 deg
Angle range judgment	ON	Angle rate low limit	20.0 deg



With angle rate 6 deg per 0.1sec, 60 deg change is estimated for 1.0 sec operation. OK range for 1.0 sec is 40~80 deg as angle upper and low limit are set  $\pm 20$  deg. OK range for 2.0 sec is 100~140 deg as angle upper and low limit are set  $\pm 20$  deg.



G-Unit provides Angle rate judgment after fastening is completed. Fastening continues even if Angle rate is out of OK range on the way.

## 7-5-10. Peak torque monitor judgment

Following torque peak out, G-Unit provides TORQUE DOWN NOK If torque ceased increase turning 30 deg from the peak.

Setting item	Range	Contents
Peak torque monitor judgment	OFF/ON	Use or not Angle rate judgment.
Peak torque monitor judgment angle	0.0~9999.9 deg	Set angle rate per 0.1sec



## 7-5-11. Current upper and low limit

Upon completion of fastening, G-Unit monitors if peak current was between upper and low limit. G-Unit provies CURRENT ERROR ALARM if peak current was out of the range.

Setting item	Range	Contents
Current upper limit	0~max A of G-Unit	G-Unit outputs alarm if current was above upper limit.
Current low limit	0~max A of G-Unit	G-Unit outputs alarm if current was lower than low limit.



- Current error alarm does not influence fastening judgment.
- Switch off CURRENT ALARM judgment if it is not necessary.
# 7-6. Action setting after STEP completion

# 7-6-1. Servo lock

G-Unit locks up motor to fix anvil of G-Tool so it may not rotate after LAST step. But the anvil can reverse only for an extent caused by gear part backlash or socket relaxation. Servo lock is cancelled by input signals ON for START, RESET, BYPASS, and OFF (longer than 1 sec) for PREPARATION of PLC I/O.

Setting items	Range
Servo lock	OFF/ON

# 7-6-2. Spindle synchronize

Adopt intended G-Tools which G-Unit carries out synchronized shiting to next

STEP at the same time for multi-spindle operation.

Setting items	Contents
OFF	No synchronization
GROUP	G-Tools bundled by SELECT WORK will be synchronized.
WORK	G-Tools sharing a MODE by SELECT WORK will be synchronized.

### 7-6-3. Signal Output · Input Signal Wait · Signal Wait Timer · Waiting

G-Unit is waiting as a STEP ends, and start next STEP by preset timing. Use STEP OUT signal during waiting, and PLC can take fastening judgment of preceding fastening judgment.

Setting items	Contents
Signal output	G-Unit is waiting as a STEP ends outputting preset STEP OUT signal.
Input signal wait	Input STEP IN signal in G-Unit for 0.5 sec, and G-Unit will start next STEP.
Signal wait timer	Set time to accept STEP IN signal during waiting. G-Unit will start next STEP when the timer is up.
Waiting	G-Unit will start next STEP waiting for preset time following last STEP end.



- Set waiting to all G-Tools by spindle synchronize when you have G-Tool to wait by STEP out signal.
- Enter "0" in Signal output, and this function will be cancelled.

### 7-6-4. 1P Reverse

Use 1P (one pulse) Reverse at a STEP end to avoid sticky socket.

Setting item	Contents	Default
1P Reverse	Use or not 1P Reverse (OFF/ON).	OFF
1P Torque	Set how much torque to drive 1P Reverse.	5.0Nm
1P Speed	Set reverse speed of 1P Reverse.	10rpm
1P Timer	Set how long time to drive 1P Reverse.	0.1sec



1P Reverse torque higher than fastening torque will open already fastened fastener.

We recommend to use Default setting first to carry out 1P Reverse.

### 7-6-5. NOK Repair Mode

How to repair NOK happened while STEP is in process.

Setting item	Option	Contents			
	END	No JUMP when a STEP ends.			
NOK Repair	NOK JUMP	JUMP when a STEP ends with NOK result.			
MODE	OK JUMP	JUMP when a STEP ends with OK result.			
	JUMP	JUMP regardless of result of a STEP.			
	OFF	JUMP only for spindles which satisfies NOK repair mode condition.			
NOK Group Set	GROUP	JUMP for Group having spindles satisfying NOK repair mode condition.			
	WORK	JUMP for all spindles within a WORK satisfying NOK repair mode condition.			
JUMP STEP	0~20	Set STEP number where to JUMP doing the repair.			
NOK Retry numbers	1~10	Set how many times to retry NOK repair.			



When you enclose spindles in GROUP and WORK, make also the Spindle synchronize the same. JUMP process can be impossible if this condition is not satisfied.

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### •NOK JUMP Setting example

JUMP STEP

RETRY NUMBER TO PROCESS NOK

Parameter	Step 3	Step 5
NOK Repair mode	NOK JUMP	JUMP
NOK GROUP Set	OFF	OFF
JUMP STEP	5	2
NOK Retry numbers		2

This terminates fastening by loosening NOK result spindles.

UE TORQU 	LAST 3 CW FASTEN 9 9999.9 PEED FIXED SPEED 10 FIXED SPEED FIXED SPEED 10 FIXED SPEED FIXED SPEED F	OFF	NOK 95 CW 0PEN 9999.9 FIXED SPEED 60
2 CW EN FASTE .9 9999. PEED FIXED SF 400 	3           CW           RASTEN           9         9999.9           PED         FIXED SPEED           10           2           10           2           10           2           10           2           10           2           10           2           10           2           10           2           11           12.0           20.0		95 CW OPEN 9999.9 FDED SPEED 60
EN FASTE .9 9999. PEED FIXED SF 400 	CW           N         FASTEN           9         9999.9           PEED         FIXED SPEED           10         10           2         10           2         10           2         10           2         10           2         10           2         10           2         10           2         10           2         10           2         10           2         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10           3         10		CW OPEN 9999.9 FDXED SPEED 60
EN FASTE .9 9999. PEED FIXED SF 400 UE TORQU 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Image: Participant state         FASTEN           9         9999.9           PEED         FIXED SPEED           10         10           2         10           2         10           2         10           2         10           2         10           2         10           2         10           2         10           2         10           2         10           2         12.0		OPEN 9999.9 FIXED SPEED 60 TORQUE
.9 9999. PEED FIXED SF 400 UE TORQU 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	9 9999.9 PEED FIXED SPEED 10 20 20 20 20 20 20 20 20 20 2		9999.9 FIXED SPEED 60 TORQUE
PEED FIXED SF 400 400 400 400 400 400 400 400 400 40	PEED FIXED SPEED 10 10 10 10 10 10 10 10 10 10		FIXED SPEED 60 TORQUE
UE TORQU 6.0 10.0	JE TORQUE 12.0 20.0		TORQUE
UE TORQU 6.0 10.0	JE TORQUE 12.0 20.0		TORQUE
UE TORQL 6.0 10.0 	JE TORQUE 12.0 20.0		TORQUE
UE TORQL 6.0 10.0 	JE TORQUE 12.0 20.0		TORQUE
UE TORQL 6.0 10.0	UE TORQUE 12.0 20.0		TORQUE
UE TORQL 6.0 10.0	JE TORQUE 12.0 20.0		TORQUE
UE TORQU 6.0 10.0 • OFF	JE TORQUE 12.0 20.0		TORQUE
UE TORQU 6.0 10.0 0 OFF	JE TORQUE 12.0 20.0		TORQUE 999.9
6.0 10.0 OFF	12.0 20.0		999.9
10.0	20.0		
OFF			999.0
	ON		
	30.0		
	10.0		
	30.0		
	0.0		
- OFF	OFF		
- OFF	ON		
	999.0		
	0.0		
- OFF	OFF		
5.0	2.0		5.0
OFF	OFF		
		(1)(3)	
	OFF OFF OFF OFF OFF	0.0 0.0 0FF OFF 0N 9999.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 OFF OFF OFF ON 999.0 0.0 0.0 0.0 0.0 0.0 0.0 0

- NOK goes on with STEP 3 torque judgment, it JUMP to STEP 5 due to NOK JUMP setting.
- ② The process is shifted to STEP 2 opening fastener by STEP 5.
- G-Unit repeats STEP 2 and 3 again. If NOK takes the place at STEP 3,
   G-Unit carries out STEP 5. NOK Repair is over after 2 times STEP 5 operation satisfying preset RETRY number 2.

# •JUMP Setting example

Opening process is the last STEP such as Stud bolt driving regardless of judgment.

Parameter	Step 3	Step 5
NOK Repair mode	JUMP	JUMP
NOK GROUP set	GROUP	OFF
JUMP STEP	5	2
NOK Retry numbers		2

SETUP ITEM	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
ACTION STATE	ON	ON	LAST	OFF	REVERSE END
PARAMETER NUMBER	1	2	3		96
ROTATE DIRECTION	CW	CW	CW		cw
FASTENING DIRECTION	FASTEN	FASTEN	FASTEN		OPEN
MOTOR TORQUE RESTRICTION	9999.9	9999.9	9999.9		9999.9
MOTOR SPEED CONTROL	FIXED SPEED	FIXED SPEED	FIXED SPEED		FIXED SPEED
INITIAL SPEED (rpm)	60	400	10		60
FREE RUN SPEED (rpm)					
DECELERATION SPEED					
TORQUE SPEED (rpm)					
INITIAL ROTATE TIMER (sec)					
FREE RUN THREAD NUMBER					
SPEED CHANGE TORQUE (Nm)					
CONTROL METHOD	TORQUE	TORQUE	TORQUE		TORQUE
SNUG TORQUE (Nm)	2.0	6.0	12.0		
CUT TORQUE (Nm)	5.0	10.0	20.0		
TORQUE JUDGMENT	OFF	OFF	ON		
HIGH LIMIT TORQUE (Nm)			30.0		
LOW LIMIT TORQUE (Nm)			10.0		
FINAL HIGH LIMIT TORQUE (Nm)			30.0		
FINAL LOW LIMIT TORQUE (Nm)			0.0		
SNUG TORQUE JUDGMENT	OFF	OFF	OFF		
SNUG TORQUE HIGH LIMIT (Nm)					
CUT ANGLE					
ANGLE JUDGMENT	OFF	OFF	ON		
HIGH LIMIT ANGLE (deg)			999.0		
LOW LIMIT ANGLE (deg)			0.0		
CYCLE JUDGMENT	OFF	OFF	OFF		
CYCLE TIMER (sec)	1.0	5.0	2.0		5.0
INITIAL CROSS THREAD DETECT	ON	OFF	OFF		
INITIAL CROSS RHEAD TIMER	0.5				(2)
START DELAY TIMER (sec)					
			<b>N</b> (1		
				/	
NOK PROCESS MODE	END	END	IIIMP		
NOK GROUP SET		LIND	OFF		
			5		
DETRY NUMBER TO BROCESS NOV					
CRADIENT DETECT TOPOLE (Nm)					
GRADIENT DETECT TORQUE (NIII)					

- The process is shifted to STEP 5 regardless of STEP 3 torque judgment. Spindles enclosed in WORK altogether will JUMP to STEP 5 because WORK is included by NOK GROUP SET.
- G-Unit makes opening process at speed 60 rpm for 5.0 sec at STEP 5.
   The process is completed after the opening is over.

# 7-6-6. Accelerate setting

Setting item	Contents	Default
Accelerate time [msec]	<ul> <li>Set constant accelerate time for motor to reach max speed from 0 rpm for fastening.</li> <li>This is applicable to following process.</li> <li>From STEP start to INITIAL SPEED or to FREE RUN SPEED.</li> <li>Reverse speed switched by input signal to PLC I/O [REVERSE].</li> </ul>	500
Speed reduction time under no load [msec]	Set speed reduction time G-Tool max speed to 0 rpm when thread number reached [FREE RUN THREAD].	0
Reverse accelerate time	Set speed acceleration time to reach 1P speed from 0 rpm under reverse process.	500



Use above default [Accelerate time], [Speed reduction time under no load], and [Reverse accelearate time] without adjustment unless otherwise required by special reasons.



# Chapter 8 "MAIN" menu

Following pull-down menus are given to MAIN MENU.

- Main (<u>A</u>)
  - System Cycle Count
  - RS232C Output Format
  - RS232C Input Format/Data Input Setting
  - RS232C I/O Setting Clear
     (ア)+Fieldbus Setting
  - Fieldbus Message Setting and Clear
  - PLC I/O Layout and clear
  - Information Signal Setting and Clear

# 8-1. System Cycle Count

Display and edit cycle count WORK by WORK Select MENU of MENUBAR, SYSTEM CYCLE COUNT, and following picture will appear.

🖳 SYSTEM CYCLE C	OUNT					[	- • -
	AUT	O COUNT UP		C	) PLC INPL	IT SIGNAL COUNT UP	
WORK 1	1	WORK 7	1	WORK 13	1	WORK 19	1
WORK 2	1	WORK 8	1	WORK 14	1	WORK 20	1
WORK 3	1	WORK 9	1	WORK 15	1	WORK 21	1
WORK 4	1	WORK 10	1	WORK 16	1	WORK 22	1
WORK 5	1	WORK 11	1	WORK 17	1	WORK 23	1
WORK 6	1	WORK 12	1	WORK 18	1	WORK 24	1
WORK S	ELECT WORKS	•	RESET	Do	+ WNLOAD	↓ → ¶ WRITE	A

### •AUTO Count up

Automatically count numbers per OK fastening.

### •PLC Input Signal Count up

Count numbers on CYCLE COUNT UP signal provision to PLC.

Download

Download G-Unit retaining data.

### Upload

Upload displayed count to G-Unit connected.

### Reset

Change selected WORK's count to [1]. (G-Unit data is not overwritten by the display unless upload is made to G-Unit)

# 8-2. RS232C Output format

Edit and confirm RS232C output format setting value Select BCD or ASII for RS232C output data type.

### 8-2-1. Communication setting

Set RS232C output data type and port contents. Select MAIN of MENUBAR  $\rightarrow$ RS232C OUTPUT FORMAT, or click



from TOOLBAR, and RS232C output format picture will be displayed.

### •Data type

Set RS232C output data type. Select BCD or ASCII.

Communication Setting Picture (Data type: BCD)

DATA TYPE	O ASCII			
PORT SETUP COMMUNICA DATA	38400 bps ▼ 8 BIT ▼	STOP BIT PARITY	2 BIT	INITIAL

### •Port setting for both BCD and ASCII

Set communication port contents. Select INITIAL SETTING, and G-Console will format COMMUNICATION SPEED, DATA LENGTH, STOP BIT and PARITY.

Port setting	Setting range	Default
Communication speed	9600bps / 19200bps / 38400bps	38400bps
Stop bit	1 bit/2 bit	2 bit
Data length	7 bit/8 bit	8 bit
Parity	Even/Odd/None	None

In case ASCII is selected, make Fastening Result Data Output Selection, Output Option setting, Output Format Header Printing condition.

Chapter 8 "MAIN" menu Communication setting screen (Data type: ASCII)) DATA TYPE BCD ASCII PORT SETUP INITIAL COMMUNICA 38400 bps STOP BIT 2 BIT Ŧ DATA 8 BIT PARITY NONE DATA SELECT OUTPUT OPTION 📝 OK DATA ADD STX, ETX. 📝 NOK DATA PAGE TURNING 📝 ALARM DATA GIVE PAGE NUMBER WHEN PAGE TURNED V BYPASS DATA HEADER 👿 STOP DATA PRINT OUT FOR EACH ACTION

# •DATA select (ASCII)

Select judgment condition that G-Unit outputs fastening result. G-Unit outputs data by RS232C when its judgment is found satisfactory to the judgment condition.

### •Output option (ASCII)

Set option setting when G-Unit outputs fastening result data. G-Unit outputs fastening result data with selected setting associated.

### •Header (ASCII)

Set conditions to output contets given to HEADER of output format.

Not print

Does not outut contents given to HEADER.

- Print at the time of turning on power switch only Outputs only when G-Unit is turned on.
- Print only for form feed

Outputs when turn over the page.

Print per fastening

Outputs when fastening is completed.

# 8-2-2. Main format / Spindle format (BCD)

Set RS232C output format by MASTER format tab and SLAVE format tab when BCD is selected for data type.

### MASTER format

Select output data that MASTER controls. Select MASTER format row, and set data items to output from MASTER appearing by right-click. Select blank, and the seleced data will be dropped.

COMMUNICATION SETUP MAIN FORMAT SPINDLE FORMAT



### MASTER format output items (BCD format)

Output itom	Byte	Fastening	MASTER format												
Oulput item	number	data	1 w	ord	2 w	ord									
WORK CYCLE COUNT	4	123456	00	12	34	56									
DATE	4	2018/9/28	20	18	09	28									
HOUR	4	12:34:56	12	34	56	00									
		NOK	00	01	-	-									
MASTER HIDGE	C	OK	00	02	-	-									
MAGTER JODGE	Z	ALARM	00	04	-	-									
		STOP	00	08	-	-									
WORK NO. (1~24)	2	2	00	02	-	-									

### •G-Unit format

Select output data that G-Unit controls. Select G-Unit format row, and set data items to output from G-Unit appearing by right-click. Select blank, and the seleced data will be dropped.



# - G-Unit format output items (BCD format) (1/2)

Sotting itom	Puto numbor	Fastening		G-Unit	format	
Setting term	Byte number	data	1w	ord	2w	ord
Peak Torque *1	4	123.4	00	12	34	01
Final Angle *1	4	123.4	00	12	34	01
Fastening Time *1	4	12.3	00	01	23	01
Gradient Rate	4	12.3	00	01	23	01
Snug Torque *1	4	123.4	00	12	34	01
Final Torque *1	4	123.4	00	12	34	01
Spindle number (1~32) *1	2	1	00	01	-	-
MODE (1~48)	2	2	00	02	-	-
PAR No.(1~96)	2	3	00	03	-	-
Spindle Step Count *2	4	123456	00	12	34	56
STEP Number	2	4	00	04	-	-
		NOK	00	01	-	-
		OK	00	02	-	-
Spindle judge	2	ALARM	00	04	-	-
		STOP	00	08	-	-
		BYPASS	00	00	-	-
Peak Current *1	4	12.3	00	01	23	01
Angle at Peak Current *1	4	123.4	00	12	34	01
Thread Numbers *1	4	12.3	00	01	23	01
CAL Voltage	4	3.512	00	35	12	03
ZERO Voltage	4	-0.123	00	01	23	13
NOK Code(BIN)	4	0000	00	00	00	00
Alarm Code (BIN)	4	5-1	05	01	00	00

- Chapter 8 "MAIN" menu -

# - G-Unit format output items (BCD format) (2/2)

Setting item	Byte	Fastening		G-Un	it forma	at
Setting item	number	data	1۱	word	2	word
Low limit torque for judgment *1	4	123.4	00	12	34	01
Upper limit torque for judgment *1	4	123.4	00	12	34	01
Low limit angle for judgment *1	4	123.4	00	12	34	01
Upper limit angle for judgment *1	4	123.4	00	12	34	01
Final low limit torque for judgment *1	4	123.4	00	12	34	01
Final upper limit torque for judgment *1	4	123.4	00	12	34	01
Upper limit SNUG for judgment *1	4	123.4	00	12	34	01

*1 : G-Unit outputs items' data in order of sign and digit number after decimal point by 2-word (4 bytes) and max 6-digit (no decimal point) display.

12 34	56 <u>0 2</u>
	(A)(B)
(A) Sign	(

(B) Digit numbers after decimal point

Display	Contents	Dispi ay	Contents
0	+value	0	None after decimal point
1	-value	1	Single digit after decimal point
		2	2-digit after decimal point
		3	3-digit after decimal point
		4	4-digit after decimal point
		5	5-digit after decimal point

2 : Spindle Step Count outputs up to 7 digits (millions digits).

### 8-2-3. Output format (ASCII)

When you select [ASCII] as the data type, set RS232C output format by output format tab. Setting is a byte of data per cell.

R	S232C OUTPUT FORMAT																																																															
С	OMMUNICATION SETUP OUTPUT FORMAT																																																															
Γ																																H	IE/	۱D	ER																													
	0	0	0	0	0	0	0	0	6	0	6	9 (	3	0	0	0	ē	ja (	9	0	0	0	ø	0	6	<b>B</b> (	9	0	0	0	0	0	0	0	0	6		9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	0	0	0	0	0	0	0	0	6	0	0	9	Ð	0	0	0	C	p (	a I	0	0	0	ø	0	6	<b>p</b> (	a	0	0	0	0	0	) @	0	0 @	6	a I	() ()	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<u>a</u>
	0	0	0	0	0	a	0	0	6	0	•	9	Ð	0	0	0	C	a (	<u>a</u>	0	0	0	0	0	6		3	0	0	0	0	0	• @	e	0	6		9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	0	0	0	0	0	0	0	0	6	0	0	9 (	9	0	0	0	6	a (	9	0	0	0	Ø	0	6		9	0	0	0	0	Ø	0	0	0	0	<u>a</u> 1	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
L	_	SPINDLE DATA																																																														
	0	0	0	a	a	a	a	a	e		n e	ຣ່	8	a	a	a	æ	a (	a.,	0	0	0	0	0	6	9	9	0	0	0	0	0	) @	0	0	6		a (	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	0	190	AIN															•		0	0	0	0	0	6	<b>p</b> (	a,	0	0	0	0	0	0	0	0	6	a I	() ()	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	0	BA	٩SI	CF	AS	TE	NI	١G	RE	SU	LT	DA	πA	ł				Þ		0	0	0	0	9	6	<b>B</b> (	9	0	0	0	0	0	) @	0	0 @	6		9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	0	Dł	ΞTA	IL	FA	ST	EN]	NG	R R	ESI	JLT	ΓD	AT.	Ά				•		0	0	0	Ø	0	6		9	0	0	0	0	0	0	0	0 @	6	<u>a</u> 1	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
		Н	[GH	A	ND	L	w	LI	мг	ר גע	JDI	GМ	ΕN	т	DA	ТA																F	=00	этι	ĒR																													
	0	De		20																0	0	0	0	6	6	•	9	0	0	0	0	0	) @	0	0	6		<b>a</b> 1	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	0	156		20														'		0	0	0	0	0	6	<b>p</b> (	ġ,	0	0	0	0	0	) @	0	0	9 6	ja I	() ()	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	0	C	DN1	rR(	ΣL	CC	DE	1										•		0	0	0	0	0	6	9	9	0	0	0	0	0	9	0	0	9 6		9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	0	C	DNT	IR(	DL	CC	DE	2										Þ		0	0	0	e	0	6		9	0	0	0	0	0	0	0	0	9 6	<u>a</u> 1	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
		D/	AT A	Eľ	١D														1																																													
	1	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_																																													

Output format sets 240 bytes each to [Header], [Spindle data], and [Footer]. Data output is made in order of [Header] $\rightarrow$ 1-Spindle's [Spindle Data] $\rightarrow$ 2-Spindle's [Spindle Data] $\rightarrow \cdot \cdot \cdot \rightarrow$ n-Spindle's [Spindle Data] $\rightarrow$ [Footer] of hooked up G-Tools.

Select Output Format Cell, right-click to have an intended menu displayed, and set items to output data. Or, enter half size alpha-numeral letters via keyboard.



# 8-2-4. Output format signal table (ASCII)

Output	Byte	Fastening				Ν	laster	forma	at			
items	numbers	data	1 w	ord	2 w	ord	3 w	ord	4 w	ord	5 w	ord
WORK CYCLE COUNT	8	123456	]	]	1	2	3	4	5	6		
Data	10	2013/5/28	2	0	1	3	/	0	5	/	2	8
Hour	8	12:34:56	1	2	:	3	4	:	5	6		
		NOK	Ν	0	К	]						
Master (Main) Judgment	4	OK	0	К		]						
ж1 [°]		ALARM	А	L	А	]						
		STOP	S	Т	0	Р						
WORK No. (1~24)	2	2	_	2								

•MASTER output items (ASCII format)

%1 : (20H) is space code (blank).

- Chapter 8 "MAIN" menu -

Output items     Bytes     Fastening data     G-Unit format       1word     2word     3word     4word     5word													
Output items	Bytes	data	1v	vord	2v	vord	3	word	4wo	rd	5wa	ord	
Peak Torque ※2	8 123			1	2	3		4	JUD				
Final Angle 2	8	123.4		1	2	3		4	JUD				
Fastening Time X2	6	12.3		1	2		3	JUD					
Gradient Rate	6	12.3			1	2		3					
SNUG Torque ※2	8	123.4		1	2	3		4	JUD				
Final Torque ※2	8	123.4		1	2	3		4	JUD				
Spindles (1~32)	2	1		1									
MODE (1~48)	2	2		2									
PARA No. (1~96)	2	3	l	3									
Spindle STEP count 3	8	123456	0	0	1	2	3	4	5	6			
STEP No.	2	4		4									
		NOK	Ν	0	К	ш							
		OK	0	Κ		ш							
Spindle judgment	4	ALARM	А	L	А	R							
		STOP	S	Т	0	Р							
		BYPASS	L	Γ									
Peak Current ※2	10	12.3		l			1	2		3	JUD	L	
Angles at Peak Torque 2	6	123.4		1	2	3		4					
Thread numbers 2	8	12.3		1	2		3	JUD	]	Ι			
CAL Voltage ※2	6	3.70		3		7	0	ш					
ZERO Voltage ※2	6	-0.123	-	0		1	2	3					
NOK Code (BIN)	4	0000	C	0 00	00	00							
ALARM Code (BIN)	4	5-1	C	0 00	05	01							
Low Limit Torque Judge	6	123.4		1	2	3		4					
Upper Limit Torque Judge	6	123.4		1	2	3		4					
Low Limit Angle Judge	6	123.4		1	2	3		4					
Upper Limit Angle Judge	6	123.4		1	2	3		4					
Final Low Limit Torque Judge	6	123.4		1	2	3		4					
Final Upper Limit Torque Judge	6	123.4		1	2	3		4					
SNUG Upper Limit Judge	6	123.4		1	2	3	1.	4					

3×2 : G-Unit outputs sign, result with decimal point, and judge code for items those who have setting value with upper and low limits.

Display

		1	Sign	②Judgment
isplay			Display	Contents
Space (20H)	+		Space (20H)	In limit, no alarm (Peak current)
- (2DH) —			H (48H)	Above upper limit, alarm(Peak current)
		-	L (4CH)	Below low limit, alarm (Peak current)

3 : "Spindle step count" outputs up to 7 digits (millions digits).

### •RS232C

Output items	byte number					S	Spir	ndl	e f	orn	nat		Print display
RS232C #1 data		D	Α	Т	Α		#	1				(10bytes)	E0H
RS232C #2 data	Variable	#	2									(3bytes)	E1H
RS232C #3 data	ЖЗ	#	3									(2bytes)	E2H
RS232C #4 data		4										(1byte)	E3H

3 : Up to 128 bytes setting is available for RS232C #1~#4 data.

### Data end

Carry out CARRIAGE RETURN [0DH] + LINE FED [0AH], and G-Unit will output next spindle data or footer.

•Control code

Code	Name	Contents	Mark
00H	NULL	Void	@
01H	START OF HEADING	Heading start	Α
02H	START OF TEXT	Start text	В
03H	END OF TEXT	End text	С
04H	END OF TRANSMISSION	End transmission	D
05H	ENQUIRY	Enquiry	E
06H	ANKNOWLEDGE	Receipt reply	F
07H	BELL	Bell	G
08H	BACK SPACE	Reverse	Н
09H	HORIZONTAL TAB	Horizontal tabulation	
0AH	LINE FEED	Line feed	J
0BH	VERTICAL TAB	Vertical tabulation	K
0CH	FORM FEED	New page	L
0DH	CARRIAGE RETURN	Return	М
0EH	SHIFT OUT	Shift out	N
0FH	SHIFT IN	Shift in	0
10H	DATA LINK ESCAPE	Transmit expand	Р
11H	DEVICE CONTOROL 1	Device control 1	Q
12H	DEVICE CONTOROL 2	Device control 2	R
13H	DEVICE CONTOROL 3	Device control 3	S
14H	DEVICE CONTOROL 4	Device control 4	Т
15H	NEGATIVE ACKOWLEDGE	No receipt reply	U
16H	SYNCHRONOUS IDLE	Synchronize signal	V
17H	END OF TRANSMISSON BLOCK	Transmit block end	W
18H	CANCEL	Cancel	Х
19H	END OF MEDIUM	Media end	Y
1AH	SUBSTITUTE	Replace	Z
1BH	ESCAPE	Expand	[
1CH	FILE SEPARATOR	Devide file	¥
1DH	GROUP SEPARATOR	Isolate in group	1
1EH	RECORD SEPARATOR	Isolate record	^
1FH	UNIT SEPARATOR	Isolate unit	

# 8-3. RS232C Input format/Data input setting

Input data into G-Unit via RS232C of extension unit or Fieldbus. Taking the input data, G-Unit saves and outputs the same as fastening data.

### 8-3-1. Input method setting

Set input method and port of RS232C. Select MAIN of MENUBAR $\rightarrow$ [RS232C Input format/Data Input Setting], and the below picture will appear on PC screen.

RS232C INPUT FORMAT/DATA INPUT SETUP	C
INPUT METHOD SETUP WORK SELECT SETUP RS232C INPUT FORMAT	
SELECT DATA INPUT METHOD	
O INPUT FROM FIELDBUS	
INPUT FROM EXTENSION RS232C	
ADD STX, ETX.	
PORT SETUP	
COMMUNICA 38400 bps - STOP BIT 2 BIT - INITIAL	
DATA 8 BIT - PARITY WITHOUT -	

# Data Input Method Select

Select data input type. Select from [Fieldbus] and [Extension RS232C].

Addition of STX and ETX (Extension RS232C)

Add STX (Text start) and ETX (Text end) to data input.

# •Port setting (Extension RS232C)

Set communication port contents. Select [INITIAL SETTING], and [COM SPEED], [DATA LENGTH], [STOP BIT] and [PARITY] will be initialized.

Port setting	Setting range	Default
Communication speed	9600bps / 19200bps / 38400bps	38400bps
Stop bit	1 bit/2 bit	2 bits
Data length	7 bits/8 bits	8 bits
Parity	Even/Odd/none	None

### 8-3-2. Work Select Setting

Set WORK select method. Select ID data input, and G-Unit will be able to set judgment objective letter string and the position (model name).

🖳 RS232C INPUT FORMAT/DATA INPUT	SETUP				- • ×
INPUT METHOD SETUP	SETUP	RS2320	INPUT FORMAT		
SELECT FROM PLC					
SELECT FROM INPUT ID					
TOP LETTER LOCATION (1-32)	1			MODEL NAME (MAX 5 A	
	-	•	WORK 1		
END LETTER LOCATION (1-32)	5		WORK 2		
			WORK 3		
			WORK 4		
		1		F	
SELECT FROM USER CONSOLE	W	ORK 1	-	REFLECT	
L					

WORK Select method is threefold choice. Select your option.

### •Input from PLC (Default)

Select WORK number from PLC.

### •Select from INPUT ID

Identify model type from MASTER G-Unit ID code, and select WORK number. Set max 5 ASCII letters to every WORK. If ID data and selected setting do not agree due to data unentry or already cleared, switch on [NUTRUNNER ERROR] of PLC output I/O at [START(REVERSE)] of PLC input I/O starting time.

If ID data by [Select from Input ID] does not agree to selected setting, ID data is not updated. Update is made and saved only when they agreed.

### •Select from G-Console

Select WORK number from G-Console direct.

 Rewrite [RS232C I/O Format] data by setting value UL/DL after above change is made.

Select WORK number via G-Console, and it will be WORK number not selected status at the time of G-Unit starting time.

### 8-3-3. RS232C Input Format

Set input data contents. G-Unit outputs the data from its RS232C port. Fastening result and waveform data will be associated by ID data information.

INPUT METHOD SETUP WORK SELECT SETUP RS232C INPUT FORMAT																	
	CONF	IRM	OUT	PUT	FOR	MAT	IF IN	PUT	FOR	XMAT	WA	S CH	IANG	ED.			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Þ	1	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
	2	00	RS232	С		•	00	00	00	00	00	00	00	00	00	00	00
	3	00	CONTR	ROL O	ODE 1	•	00	00	00	00	00	00	00	00	00	00	00
	4	00	CONTR	ROL O	ODE 2	+	00	00	00	00	00	00	00	00	00	00	00
	5	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
	6	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
	7	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
	8	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Select input data position, right-click to have Input Format Menu displayed for

setting.



### •RS232C

Output items	byte number	Print display
RS232C #1 data		E0H
RS232C #2 data	Variable	E1H
RS232C #3 data	<b>※</b> 1	E2H
RS232C #4 data		E3H

*1 Available byte number is 128 for total of RS232C #1~#4.

•RS	5232	2C S	etti	ng E	İxai	mpl	е							•.	i ap t	0.0		
			Γ	RS	232	2C #	<b>#1</b>	]			[	R	S23	32C	#2			
Г		1	2				5	6	7	8	9			11	12	13	14	15
-	1	U	R	Y	ι	ı 🗌		Ν	U	Т	R	l	J	Ν	Ν	Е	R	
	2	G	S	E	_ R	2	1	Е	S		S		<u> </u>	S	Т	E	Μ	
	R	S23	2C ‡	#3						RS2	232	C #	4					
RS232 NPUT M	RS 2C Inp ETHOD	S232 Dut Fo	2C #	<b>#3</b> t k sele	CT SE	TUP	RS232	C INPL	IT FOR	RS2	232	C #	4					
RS232 NPUT M	C Inp 2C Inp ETHOD	S232 Dut Fo SETUP	2C # ormat work	#3 t K SELE	CT SE	TUP I	rs232 NPUT				232 5 СН	C #	4 ED.					
RS232 NPUT M CON	C Inp 2C Inp ETHOD NFIRM 1	S232 Dut Fo SETUP	2C # ormat wor PUT	#3 t K SELE FOR	ct se MAT 5	TUP IF IN 6	R5232 NPUT 7	c inpl F FOF	IT FORI	MAT A	2320 5 CH	C #	4 ED. 13	14	15	16		
RS232 NPUT M CON	RS 2C Inp ETHOD NFIRM 1 #1	S232 Dut Fo SETUP 1 OUT 2 #1	2C # prmat wor PUT 3 #1	#3 t FOR 4 #1	CT SE MAT 5 00	TUP IF IN 6 #2	RS232	C INPL	IT FORI	MAT WAS	2320 5 CH 11 #2	C # ANG 12 #2	4 ED. 13 #2	14 #2	15	16 00		

# 8-4. RS232C In and Out Setting Clear

Clear RS232C In and Out format. Select MAIN from MENUBAR $\rightarrow$ [RS232C I/O Setting Clear] to have the below picture displayed.

D A T



DATA

Setting clear is to drop data retained by G-Console only. To change G-Unit setting, overwrite [RS232C In and Out Format] in G-Unit by CAUTION setting value UL/DL.

# 8-5. Fieldbus Setting

G-Unit carries out setting, writring and reading of Fieldbus.

### 8-5-1. Bus Setting/Communication

Selecting Fieldbus, G-Console makes writing and reading of G-Unit. Select MAIN of MENUBAR  $\rightarrow$ [Fieldbus Setting] and the below picture will appear.

🖳 FIEL	DBUS SETUP				<b>X</b>
BUS	SELECT/COMMUNICATION	CC-LINK			
	BUS TYPE SELECT		WRITE	VERIFY	
	SETUP FILE			REFERENC	



• Make sure to have back-ups when you modify Fieldbus setting of G-Unit.

#### •Bus type select

Select Bus type from the list. Select [READ], and G-Console will discriminate Bus type in G-Unit so it will conform to the selection.

### •Setting file

READ: Read stored Fieldbus setting. SAVE: Save Fieldbus setting to PC.

### Reading

Read Fieldbus setting written in G-Unit.

### Writing

Write Fieldbus setting in the connected G-Unit.

### Verification

Verify setting of G-Unit and G-Console.

# 8-5-2. CC-Link

This is extension Fieldbus CC-Link setting.

BUS SELECT/COMMUNICATION	CC-LINK		
SETUP			INITIAL
CHANNEL NUMBER	1	(1~64)	
COMMUNICATION SPEED	10M b	ps 🔻	
VERSION SELECT	OC-	LINK V2	CC-LINK V1
OCCUPIED CHANNEL NUMBER	RS 4 ▼		
ENHANCED CYCLIC SETUP	8 🔻	]	
INPUT_OUTPUT COUNTS (RX	(/RY) 896		
REGISTER COUNTS (RWW/R)	Nr) 72		
*RWr IS USED FOR 1 WORD	ERROR COD	E	

# •Default setting (Factory configuration)

- Station: 1
- Occupation: 4 Stations
- Communication speed:10Mbps
- Version select: CC-Link V2
- Extension cyclic setting: 8 times

### Station number

Range: 1~64

# Communication speed

Range: 156kbps、625kbps、2.5Mbps、5Mbps、10Mbps

Version information

Range: CC-Link V2、CC-Link V1

•Occupied station Range: 1~4 stations (4 stations are fixed to CC-Link V1)

# •Extension cyclic setting

Range:Single, Double, Quadruple, Octuple (Single is fixed to CC-Link V1)

### •Number of I/O point (RX/RY)

# •Register word numbers (RWw/RWr)

This automatically changes depending on occupied station numbers and extension cyclic setting.

### 8-5-3. Device Net

This is extension Fieldbus Device Net setting.

BUS SELECT/COMMUNICATION	DEVICENET			
SETUP				INITIAL
NODE ADDRESS	:	1 (0~	53)	
COMMUNICATION SPEE	ED I	500k bps $\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!$		
I/O SETUP				
PLC TO AXIS		12 Bytes 🗸 🗸		
AXIS TO PLC	:	32 Bytes 🗸 🗸		
MESSAGE BITE NUMBER S	ETUP			
PLC TO AXIS	[	32	(0~32)	
AXIS TO PLC		4096	(0~4096)	
MESSAGE BLOCK BITE	NUMBER	250 (1~)	250)	

### •Default setting (Factory configuration)

- Node address: 0
- Communication speed: 500kbps
- · I/O Setting data length [PLCtoAXIS] : 8byte [64bits]
- · I/O Setting data length [AXIStoPLC] : 32byte [256bits]
- Message data length [PLCtoAXIS] : 32byte [256bits]
- Message data length [AXIStoPLC] : 250byte [2000bits]
- Messsage block numbers : 250bytes

#### •Communication speed

Range: 156kbps、250kbps、500kbps

#### Node address

Range: 0~63

### I/O Setting

Data length [PLCtoAXIS] : 2~12bytes (16~96bits) Data length [AXIStoPLC] : 2~32bytes (16~256bits)

### Message byte number setting

Data length [PLCtoAXIS] : 0~32bytes (0~256bits) Data length [AXIStoPLC] : 0~4096bytes (0~32768bits)

# Message block byte numbers

Range: 1~250bytes

### 8-5-4. PROFIBUS DP-V1

This is extension Fieldbus PROFIBUS DP-V1 setting.

BUS SELECT/COMMUNICATION	PROFIBUS-DP V1	
SETUP		INITIAL
NODE ADDRESS	3 (0~125)	
I/O SETUP		
PLC TO AXIS	12 Bytes 👻	
AXIS TO PLC	32 Bytes 🔻	
MESSAGE BITE NUMBER SET	TUP	
PLC TO AXIS	32 (0~3)	2)
AXIS TO PLC	4096 (0~4)	)96)
MESSAGE BLOCK BITE N	UMBER 64 (1~64)	

# •Default setting (Factory configuration)

- Node address : 3
- · I/O Setting data length [PLCtoAXIS] : 12bytes [96bits]
- · I/O Setting data length [AXIStoPLC] : 32bytes [256bits]
- Message data length [PLCtoAXIS] : 32bytes [256bits]
- Message data length [AXIStoPLC] : 4096bytes [32768bits]
- Message block numbers : 64bytes

### Node address

Range : 0~125

### I/O Setting

Data length [PLCtoAXIS] : 2~12bytes (16~96bits) Data length [AXIStoPLC] : 2~32bytes (16~256bits)

### Message byte number setting

Data length [PLCtoAXIS] : 0~32bytes (0~256bits) Data length [AXIStoPLC] : 0~4096bytes (0~32768bits)

### •Message block byte number

Range : 1~64bytes

### <u>8-5-5. PROFINET I/O</u>

This is extension Fieldbus PROFINET I/O setting.

BUS SELECT/COMMUNICATION	PROFINET	. 1\0		
SETUP				INITIAL
NETWORK SETUP				
IP ADDRESS	0.0	. 0	. 0	
SUBNET MASK	0.0	. 0	. 0	
DEFAULT GATEWAY	0.0	. 0	. 0	
* MUST STATION NAME (1	L6 LETTERS	)		
PLC TO AXIS	1	2 Bytes	-	
AXIS TO PLC	З	2 Bytes	•	
MESSAGE BITE NUMBER SE	TUP			
PLC TO AXIS		32	(0~32	)
AXIS TO PLC		4096	(0~40	96)
MESSAGE BLOCK BITE N	IUMBER	250	(1~250)	

### •Default setting (Factory configuration)

Network setting

IP address	: 192.168.11.50
Subnet mask	: 255.255.255.0
Default gateway	: 192.168.11.1
<ul> <li>Station name</li> </ul>	: UECG400PRT1

- I/O Setting data length [PLCtoAXIS] : 12bytes [96bits]
- I/O Setting data length [AXIStoPLC] : 32bytes [256bits]
- Message data length [PLCtoAXIS] : 32bytes [256bits]
- Message data length [AXIStoPLC] : 4096bytes [32768bits]
- Message block numbers : 250bytes

### Network setting

IP address	: 0.0.0.0~255.255.255.255
Subnet mask	: 0.0.0.0~255.255.255.255
Default gateway	: 0.0.0.0~255.255.255.255

#### Station name

Range : ASCII (half size alpha-numeral, max 16 letters)

Use the same name as registered in PLC for station name failing which will CAUTION prevent PROFINET from connecting to PLC.

# •I/O Setting

Data length [PLCtoAXIS] : 2~12bytes (16~96bits) Data length [AXIStoPLC] : 2~32bytes (16~256bits)

# Message byte number setting

Data length [PLCtoAXIS] : 0~32bytes (0~256bits) Data length [AXIStoPLC] : 0~4096bytes (0~32768bits)

# Message block byte numbers

Range : 1~250bytes

### 8-5-6. EtherNet IP

This is extension Fieldbus EtherNet IP setting.

BUS SELECT/COMMUNICATIO	IN ETHERNE	TIP		
SETUP				INITIAL
NETWORK SETUP				
IP ADDRESS	192 16	8 11	50	
SUBNET MASK	255 255	5 . 255 .	0	
DEFAULT GATEWAY	192 . 16	8. 11.	1	
PLC TO AXIS	1	2 Bytes ,	•	
AXIS TO PLC	З	2 Bytes ,	•	
MESSAGE BITE NUMBER	SETUP			
PLC TO AXIS		32	(0~32)	
AXIS TO PLC		4096	(0~4096)	
MESSAGE BLOCK BITE	NUMBER	250 (1~	-250)	

# •Default setting (Factory configuration)

Network setting

IP address	: 192.168.11.50
Subnet mask	: 255.255.255.0
Default gateway	: 192.168.11.1

- · I/O Setting data length [PLCtoAXIS] : 12bytes [96bits]
- · I/O Setting data length [AXIStoPLC] : 32bytes [256bits]
- Message data length [PLCtoAXIS] : 32bytes [256bits]
- Message data length [AXIStoPLC] : 4096bytes [32768bits]
- Message block numers : 250bytes

### Network setting

IP address	: 0.0.0.0~255.255.255.255
Subnet mask	: 0.0.0.0~255.255.255.255
Default gateway	: 0.0.0.0~255.255.255.255

### •I/O Setting

Data length [PLCtoAXIS] : 2~12bytes (16~96bits) Data length [AXIStoPLC] : 2~32bytes (16~256bits)

### Message byte number setting

Data length [PLCtoAXIS] : 0~32bytes (0~256bits) Data length [AXIStoPLC] : 0~4096bytes (0~32768bits)

### Message block byte numbers

Range : 1~250bytes

# 8-6. Fieldbus Message Setting

Set Fieldbus Message, and Fieldbus connection will output fastening result. Select MAIN of MENUBAR→[Fieldbus Message Setting], and setting picture will appear. 8-6-1 Main format

# 8-6-1. Main format

Select output data type and allocate output contents on this screen.

•	FIELDBUS M	ESSAGE SETUP						
[	MAIN FORMAT	SPINDLE FORMAT	JUDGMENT DATA	ERROR DATA				
	- DATA TYPI							
	BCD	ASCII						
				MAIN F	-ORMAI			
	1		WORK CYCLE COUNT					
	2		DATE					
	3	TIME						
	4			MAIN JU	DGMENT			
	5			WOR	K No.			

### •Data type

Select [BCD] or [ASCII].

### •Main format output items (BCD)

Output items	byte number	Fastening data	Main format				
Work cycle count	4	123456	00	12	34	56	
Date	4	2013-5-28	20	13	05	28	
Hour	4	12:34:56	12	34	56	00	
		NOK	00	01	-	-	
Main judament	2	OK	00	02	-	-	
Main juugment	2	ALARM	00	04	-	-	
		STOP	00	08	-	-	
Work No. (1~24)	2	2	00	02	-	-	

### •Main format output items (ASCII)

Output items	byte number	Fastening data			Ма	ain fo	orma	t				
Work cycle count	8	123456	]	]	1	2	3	4	5	6		
Date	10	2018/09/28	2	0	1	8	/	0	9	/	2	8
Hour	8	12:34:56	1	2	:	3	4	-	5	6		
		NOK	Ν	0	Κ	[						
Main judgment	4	OK	0	К	]							
<b>※</b> 1	4	ALARM	Α	L	Α	]						
		STOP	S	Т	0	Р						
Work No. (1~24)	2	2	]	2								

%1 :(20H) is space code (blank).

# 8-6-2. Spindle format

# •Spindle format output items (BCD)

Output literat	Byte	Fastening	G-Unit format			
Output items	Number	Data	1w	ord	2w	ord
Peak torque 2	4	123.4	00	12	34	01
Final angle %2	4	123.4	00	12	34	01
Fastening time 2	4	12.3	00	01	23	01
Gradient Rate	4	12.3	00	01	23	01
SNUG torque※2	4	123.4	00	12	34	01
Final torque 2	4	123.4	00	12	34	01
Spindle number(1~32)	2	1	00	01	-	-
MODE No. (1~48)	2	2	00	02	-	-
PARA No.(1~96)	2	3	00	03	-	-
Spindle STEP count ※3	4	123456	00	12	34	56
STEP No.	2	4	00	04	-	-
Spindle Judge %4	4		1	2	3	00
Peak current %2	4	12.3	00	01	23	01
Angles at peak torque 2	4	123.4	00	12	34	01
Thread numbers %2	4	12.3	00	01	23	01
CAL voltage %2	4	3.512	00	35	12	03
ZERO Voltage ※2	4	-0.123	00	01	23	13
NOK code (BIN)	4	0000	00	00	00	00
ALARM code (BINS)	4	5-1	05	01	00	00
Low limit torque judge value 2	4	123.4	00	12	34	01
Upper limit torque judge value 2	4	123.4	00	12	34	01
Low limit angle judge value $X2$	4	123.4	00	12	34	01
Upper limit angle judge value $\%2$	4	123.4	00	12	34	01
Final low limit torque judge value $lpha 2$	4	123.4	00	12	34	01
Final upper limit torque judge value $leph$ 2	4	123.4	00	12	34	01
SNUG upper limit angle judge	4	123.4	00	12	34	01

For the output items with a set value in the upper and lower limit ranges, the result is output in the order of the sign, the result display (including the decimal point), the judgment code, and the first tightening NG item.

%3: "Spindle step count" outputs up to 7 digits (millions digits). (A) Sign

Display	Con- tents
0	+
1	—

(B) Digit after decimal point

Dis- play	Contents
0	No decimal point
1	1 digit after decimal
2	2 didit after decimal
3	3 dicit after decimal
4	4 digit after decimal
5	5 digit after decimal

**※**4 :

Set output contents of spindle judgment

by [Judge data] and [Error data] tab. G-Unit output ① [Judge data 1], ② [Judge data 2] and ③ [Error data].

# •Spindle format output items (ASCII)

	Byte	Fastening	G-Unit format									
Output Items	Number	Data	1w	vord	2w	2word		vord	4wc	ord	5word	
Peak torque %4	8	123.4		1	2	3		4	JUD			
Final angle %4	8	123.4	_	1	2	3		4	JUD			
Fastening time %4	6	12.3	]	1	2		3	JUD				
Gradient Rate	6	12.3	]	]	1	2		3				
SNUG torque %4	8	123.4	]	1	2	3		4	JUD	l		
Final torque %4	8	123.4	]	1	2	3		4	JUD	]		
Spindle(1~32)	2	1	]	1								
MODE(1~48)	2	2	]	2								
PARA No.(1~96)	2	3		3								
Spindle step count %5	8	123456	0	0	1	2	3	4	5	6		
STEP No.	2	4		4								
Spindle Judge %6	4		1	2	3	ப						
Peak current%4	10	12.3					1	2		3	JUD	]
Angles at peak torque %4	6	123.4	]	1	2	3		4				
Thread numbers %4	8	12.3		1	2	•	3	JUD		Ι		
CAL Voltage※4	6	3.70		3		7	0	<u></u>				
ZERO Voltage※4	6	-0.123	-	0		1	2	3				
NOK code (BIN)	4	0000	(	00 00	00	00						
ALARM code (BIN)	4	5-1	(	00 00	05	01						
Low limit torque judge value	6	123.4		1	2	3		4				
Upper limit torque judge value	6	123.4		1	2	3		4				
Low limit angle judge value	6	123.4		1	2	3		4				
Upper limit angle judge value	6	123.4	_	1	2	3		4				
Final low limit torque judge value	6	123.4		1	2	3		4				
Final upper limit torque judge value	6	123.4		1	2	3		4				
SNUG upper limit judge value	6	123.4		1	2	3		4				

 $\times \overline{4}$ : For the output items with a set value in the upper and lower limit ranges, the result is output in the order of the sign, the result display (including the decimal point), the judgment code, and the first tightening NG item.



①Sign

Display	
Space (20H)	+
- (2DH)	_

2 Judgment code

•	
Display	Contents
Space (20H)	Within upper & low limit, no alarm (Peak current)
H (48H)	Above upper limit, alarm (Peak current)
L (4CH)	Below low limit, alarm (Peak current)

%5 : "Spindle step count" outputs up to 7 digits (millions digits).

※6 : Set output contents of spindle judgment by [Judge data] and [Error data] tab. G-Unit output ① [Judge data 1], ② [Judge data 2] and ③ [Error data].

# 8-6-3. Judgment data

# Set spindle judgment data by 2bytes bit allocation.

Use [OR/AND] logic combination to change output data condition.

	JUDGMENT															
▶ LOGIC	OR															
FASTENING OK																
FASTENING NOK																
FASTENING ERROR	_															
BYPASS																
EMERGENCY STOP																
PEAK TOROUE HIGH LIMIT NOK																
PEAK TOROUE LOW LIMIT NOK																
FINAL ANGLE HIGH LIMIT NOK																
FINAL ANGLE LOW LIMIT NOK																
FINAL TOROUE HIGH LIMIT NOK																
FINAL TOROUF LOW LIMIT NOK																
SNUG TOROUE NOK																
PLASTIC AREA GRADIENT RATE NOK																
SUPNOK																
INITIAL CROSS THREAD NOK																
CYCLE NOK																
TOROUE DOWN NOK	_															
ANGE BATE HIGH LIMIT NOK																
ANGLE BATE LOW LIMIT NOK																
INFORMATION1																
INFORMATION2																
INFORMATION3																
INFORMATIONA																

Setting items	Contents
Logic	Set output information using OR and AND combination.
Fastening OK	Fastening result was within judgment range.
Fastening NOK	Fastening result was out of judgment range.
Fastening Error	Fastening went wrong or an error happened with the system.
BYPASS	Fastening was made with BYPASS option.
Emergency stop	Failed to continue fastening.
Peak torque upper limit NOK	Peak torque was above its upper limit.
Peak torque low limit NOK	Peak torque failed to reach its low limit.
Final angle upper limit NOK	Final angle was above its upper limit.
Final angle low limit NOK	Final angle was below its low limit.
Final torque upper limit NOK	Final torque was above its upper limit.
Final torque low limit NOK	Final torque was below its low limit.
SNUG torque NOK	Torque failed to reach SNUG torque.
Plastic area grade ratio NOK	Grade ratio did not satisfy required ratio.
SLIP NOK	Failed to realize necessary torque recovery.
Initial trouble NOK	Torque spike took the place at initial stage.
Cycle NOK	Torque failed to reach an intended value at CYCLE timer up point.
Torque down NOK	Torque failed to increase turning preset angles from peak torque.
Ange rate upper limit NOK	Angle rate was above its upper limit.
Angle rate low limit NOK	Angle rate was below its low limit.
Information 1~4	Information signal setting condition INFO 1~8 was satisfied. (See PAGE 8-34 Information signal)

### 8-6-4. Error Data

Set error data of spindle judgment by 1byte allocation. Error is indicated by ALARM numbers.

ſ	MAIN FORMAT SPINDLE FORMAT JUDGMENT DATA ERROR DATA									
			Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	•	ALARM 1								
		ALARM 3								
		ALARM 4								
		ALARM 5								
		ALARM 6								
		ALARM 8								
		ALARM 9								
		ALARM 10								

Setting item	Contents
ALARM 1	Torque transducer error
ALARM 3	Pre-amplifier error
ALARM 4	System memory error
ALARM 5	Servo response error
ALARM 6	Servo type error
ALARM 8	Servo amplifier error
ALARM 9	Setting data error
ALARM 10	Main signal error

# 8-7. Fieldbus Message Clear

Clear Fieldbus Message setting. Select MAIN of MENUBAR $\rightarrow$ [Fieldbus Message Setting Clear], and the below window will appear.



Setting clear is to drop data retained by G-Console only. To change G-Unit setting, overwrite [RS232C In and Out Format] in G-Unit by setting value UL/DL.

# 8-8. PLC I/O Layout

# 8-8-1. PLC I/O Layout Setting

Set PLC I/O layout. Select MAIN of MENUBAR→[PLC I/O Layout], or click of TOOLBAR, and PLC I/O 

picture will appear on screen.

	PLC IN/OUT	LAYOUT	
ſ	INPUT OUTP	UT	I/O Bank change tab
U	BANK 1	BANK 2 BANK 3 BANK 4	
	PIN NUMBER	SIGNAL NAMI	E
	▶ 1	OPERATION PREPAR	RATION
	2	RESET	
	3	REVERSE	
	4	FORWARD	
	5	START	
	6	CYCLE START	

•I/O Bank change tab

Select intended item for setting from [I/O] and [Bank].

# 8-8-2 PLC I/O Layout

Set PLC I/O layout except for Input BANK 1 as it is fixed allocation.

•Input BANK 1 Setting Contents

Setting items	Contents
Operation preparation	Prepared to operate on receipt of ON signal
RESET	Halt operation and turns off output signal
REVERSE	Motor reverses at speed set by selected WORK No.
NORMAL ROTATION	Motor rotates right at speed set by selected WORK No.
START	Start fastening by selected WORK No.
CYCLE START	Start CYCLE operation.
CYCLE COUNT UP	This is COUNT UP signal within CYCLE COUNTER. 1 COUNT is made by 100ms pulse.
CYCLE COUNT CLEAR	This is COUNT CLEAR signal within CYCLE COUNTER. COUNT CLEAR is made by 100ms pulse.
STEP IN (1~8)	STEP IN signal restarts waiting STEP suspended by STEP OUT signal.
WORK SELECT HI	This is to select WORK 9~16 (17~24).
WORK SELECT 1~8	Change to selected WORK number.
AUTO/EACH	Use this for AUTO fastening. (※Available only when FB is in use)
Auto Z/C OFF	Change to ON, and Auto Z/C will be cancelled.
ID DATA CLEAR	Clear ID Data.
Manual Z/C	Check torque sensor.
Data select 0~2	Change output BANK No. of signal contents assembling data select signals (see next page).

### - Chapter 8 "MAIN" menu

DATA SELECT 2 DATA SELECT 1 DATA SELECT 0 Output BANK **PIN 33 PIN 32** No. **PIN 34** 1 OFF OFF OFF OFF OFF ON 2 OFF 3 ON OFF OFF 4 ON ON ON OFF OFF 5 ON OFF ON 6 ON OFF 7 ON ON ON ON 8

Change output BANK No. of signal contents interchanging select signals of DATA SELECT 0~2 (effective only when extension IO unit is used).

Input BANK 2~4 setting

Input BANK 2~4 are free format setting.

Free allocation setting is possible.

Setting items	Contents
STEP START	Get STEP selected by EACH to work.
CYCLE START 1~24	Select what CYCLE and the numbers for operation under EACH option.
STEP SELECT 1~20	Select what STEP for operation under EACH option.
BYPASS 1~32	Select spindle numbers and place them under BYPASS status.

### 8-8-3. PLC Output layout

Set PLC output layout. Output BANKs 1~8 are free format. Allocate preferred setting to BANK freely.

🖳 PLC IN/OU	T LAYOUT			
INPUT OUTF	ਾ <b>ਗ 1: C</b>	Dutput uni	t select	2: Signal setting
BANK 1	BANK 2	BANK 4	BANK 5 BANK 6 BAN	K 7 BANK 8
PIN	SPINDLE		SIGNAL NAME	
NOMBER 1	MATH		TOTAL NOK	
	M WITHO	UT	TOTAL NOK	TOTAL NOK
	M MAIN		NR FATLURE	TOTALOK
4			READY	NR FAILURE
5	M course		WORKING	BEADY
6	M	NUAL SPINDLES >	END	READT
7	M NORMA	LON	CYCLE NOK JUDGMENT	WORKING
8	M NORMA	L OFF	CYCLE OK JUDGMENT	END
9	MAIN		Z/C NOK	CYCLE NOK JUDGMENT
10	MAIN		Z/C OK	CYCLE OK JUDGMENT
11	MAIN		BYPASS YES	ZCNOK
12	MAIN		WORK SELECT BIT 1 (9/17)	2/2 NOK
13	MAIN		WORK SELECT BIT 2 (10/18)	Z/C OK
14	MAIN		WORK SELECT BIT 3 (11/19)	BYPASS YES
15	MAIN		WORK SELECT BIT 4 (12/20)	WORK SELECT BIT 1 (9/17)
16	MAIN		STEP OUT1	WORK SELECT BIT 2 (10/18)
17	1 SPINDLE		NOK JUDGMENT	WORK SELECT BIT 3 (11/19)
18	1 SPINDLE		Step OK JUDGMENT	
19	1 SPINDLE		NR FAILURE	WORK SELECT BIT 4 (12/20)
20	1 SPINDLE		INITIAL CROSS THREAD NOK	WORK SELECT BIT 5 (13/21)
21	1 SPINDLE		CYCLE NOK	WORK SELECT BIT 6 (14/22)
22	1 SPINDLE		BYPASS	WORK SELECT BIT 7 (15/23)
23	1 SPINDLE		LOW LIMIT NOK	WORK SELECT BIT 8 (16/24)
24	1 SPINDLE		HIGH LIMIT NOK	WORK SELECT UI (0.16)
25	2 SPINDLE		NOK JUDGMENT	WORK SELECT HI (9-10)
26	2 SPINDLE		Step OK JUDGMENT	WORK SELECT HI (17-24)
27	2 SPINDLE		NR FAILURE	STEP OUT
28	2 SPINDLE		INITIAL CROSS THREAD NOK	CYCLE NUMBER NOK
29	2 SPINDLE		CYCLE NOK	
	2 SPINDLE		BYPASS	CURRENT VALUE ERROR ALARM
31	2 SPINDLE		LOW LIMIT NOK	CURRENT VALUE ERRUK ALARM
32	2 SPINDLE		HIGH LIMIT NOK	CAL VOLTAGE ERROR ALARM
<u></u>				ZERO VOLTAGE ERROR ALARM

•Output unit select

Select output unit from [Blank], [MAIN], [Spindle No.], [Normally ON], or [Normally OFF]

Setting items	Contents
Blank	Clear setting
MAIN	Output judgment provided by MAIN unit.
Spindle No.	Output judgment provided by selected Spindle No.
Normally ON	Output Normally ON.
Normally OFF	Output Normally OFF.

•Signal setting (MAIN)

Set signals that MAIN unit outputs.

Setting items	Contents
TOTAL NOK	When any spindle raised fastening NOK result.
TOTAL OK	When fastening ended with OK result from all units.
NR ERROR	When total system or individual spindle raised error during fastening.
READY	When system is operative. This is switched OFF if following happens: [Power ON in process], [ERROR], [EMERGENCY STOP], [RESET] and [CAL CHECK].
WORKING	When MAIN system is driving motors clockwise or counterclockwise.
END	When an operation driven by PLC comes to an end.
CYCLE NOK	When NOK happened at the end of CYCLE operation.
CYCLE OK	When fastening ended with OK of all units at the end of CYCLE operation.
Z/C NOK	When Zero/CAL check found an error.
Z/C OK	When Zero/CAL check confirmed OK.
BYPASS	When any spindle is BYPASS status.
WORK SELECT BIT1~8	Outputs selected WORK number.
WORK SELECT BIT HI	Outputs selected WORK number.
STEP OUT 1~7	Outputs selected STEP just used at the time of STEP end. Use this signal to do other job under the same STEP before shifting to next STEP.
CYCLE No**NOK	When NOK happened during preset number of CYCLE operation.
CYCLE No**OK	When fastening ended with OK from all units on preset CYCLE completion.
CURRENT ERROR	When any spindle raised current value error and output alarm.
CAL VOLTAGE ERROR	When any spindle raised CAL voltage error and output alarm.
ZERO VOLTAGE ERROR	When any spindle raised ZERO voltage error and output alarm.

•Signal setting (Spindle 1~32)

Signal names	Function & application				
NOK	Judges and outputs NOK when torque, angle, time, and thread numbers went outside upper and low limit during fastening.				
ОК	Judges and outputs OK when torque, angle, time, and thread numbers was within upper and low limit at last STEP end.				
STEP OK	Judges and out puts STEP OK when torque, angle, time, and thread numbers was within upper and low limit at each STEP end.				
NR ERROR	When total system or individual spindle raised error during fastening.				
READY	When system is operative on an external input. This is switched OFF if following happens: [Power ON in process], [ERROR], [EMERGENCY STOP], [POWER OFF], [RESET] and [CAL CHECK].				
WORKING	When G-Unit is driving motors clockwise or counterclockwise.				
BYPASS	When G-Unit is BYPASS status.				
INITIAL NOK	When torque (angle) reached [CUT TORQUE (ANGLE)] before [INITIAL ERROR] timer was up after STEP start.				
CYCLE NOK	Torque (angle) failed to reach CUT despite CYCLE time up after STEP start.				
Peak torque LOW NOK	Torque failed to exceed PEAK TORQUE LOW LIMIT.				
Peak torque HIGH NOK	Torque overrun PEAK TORQUE HIGH LIMIT.				
Final torque LOW NOK	Fastening result of final torque was judged LOW NOK.				
Final torque HIGH NOK	Fastening result of final torque was judged HIGH NOK.				
Angle LOW LIMIT NOK	When angle failed to reach Angle LOW LIMIT.				
Angle HIGH LIMIT NOK	When angle overrun Angle HIGH LIMIT.				
Torque LOW LIMIT NOK	When torque judgment was LOW NOK.				
Torque HIGH LIMIT NOK	When torque judgment was HIGH NOK.				
Information	Outputs signals allocated to Information signal setting.				
LOW LIMIT NOK	When fastening result was LOW NOK judgment.				
UPPER LIMIT NOK	When fastening result was HIGH NOK judgment.				
Timer NOK	Outputs when [INITIAL ERROR] or [CYCLE ERROR] was detected.				
STEP Output	Outputs running STEP by binary digit. (Example: Outputs 1 and 2 signals when STEP 3 is in process)				
NOK Output	Outputs allocated NOK combinations by NOK signals 1~8. Refer to next page for the details.				
Start torque upper limit NOK	Torque reached [START TORQUE] upper limit before [Start torque thread numbers] is turned following STEP start.				
Thread number NOK	When [Thread number upper/low limit] NOK was detected.				
Thread number low limit NOK	When revolution number was less than [Thread number] low limit.				
Thread number upper limit NOK	When revolution number was more than [Thread number] upper limit.				
Current value error Alarm	Current overrun its upper limit or fell its low limit.				
Current low limit Alarm	Current failed to go beyond current LOW limit.				
Current upper limit Alarm	Current overrun current HIGH limit.				
CAL voltage error Alarm	CAL voltage reached Alarm necessary level.				
ZERO voltage error Alarm	ZERO voltage reached Alarm necessary level.				
Step output	Step output	Step output	Step output	Step output	STEP in
-------------	-------------	-------------	-------------	-------------	---------
16	8	4	2	1	process
OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	ON	OFF	2
OFF	OFF	OFF	ON	ON	3
OFF	OFF	ON	OFF	OFF	4
OFF	OFF	ON	OFF	ON	5
OFF	OFF	ON	ON	OFF	6
OFF	OFF	ON	ON	ON	7
OFF	ON	OFF	OFF	OFF	8
OFF	ON	OFF	OFF	ON	9
OFF	ON	OFF	ON	OFF	10
OFF	ON	OFF	ON	ON	11
OFF	ON	ON	OFF	OFF	12
OFF	ON	ON	OFF	ON	13
OFF	ON	ON	ON	OFF	14
OFF	ON	ON	ON	ON	15
ON	OFF	OFF	OFF	OFF	16
ON	OFF	OFF	OFF	ON	17
ON	OFF	OFF	ON	OFF	18
ON	OFF	OFF	ON	ON	19
ON	OFF	ON	OFF	OFF	20

# ♦STEP signal output details

# ♦NOK CODE table details

No.	NOK CODE 8	NOK CODE 4	NOK CODE 2	NOK CODE 1	Output contents	
0	OFF	OFF	OFF	OFF	OFF	
1	OFF	OFF	OFF	ON	NR Error	
2	OFF	OFF	ON	OFF	INITIAL ERROR NOK	
3	OFF	OFF	ON	ON	CYCLE NOK	
4	OFF	ON	OFF	OFF	SNUG TORQUE NOK	
5	OFF	ON	OFF	ON	(SPARE)	
6	OFF	ON	ON	OFF	(SPARE)	
7	OFF	ON	ON	ON	ANGLE AREA GRADE RATIO NOK	
8	ON	OFF	OFF	OFF	SLIP NOK	
9	ON	OFF	OFF	ON	ANGLE HIGH NOK	
Α	ON	OFF	ON	OFF	ANGLE LOW NOK	
В	ON	OFF	ON	ON	ANGLE RATE HIGH NOK	
С	ON	ON	OFF	OFF	ANGLE RATE LOW NOK	
D	ON	ON	OFF	ON	P TORQUE MONITOR ANGLE NOK	
Ε	ON	ON	ON	OFF	(SPARE)	
F	ON	ON	ON	ON	(SPARE)	

#### •Convenient operation

1. Copy and paste

Right-click selecting necessary pin numbers' row, and G-Console will display MENU. Paste copied setting to an intended place.

	17	1 SPINDLE	NOK JUDGMENT
	18 1 SPINDLE		Step OK JUDGMENT
▶	19		NR FAILURE
	20	COPY	INITIAL CROSS THREAD NOK
	21	PASTE	CYCLE NOK

#### 2. Spindle number collective change

Right click selecting necessary spindle numbers' row, and G-Console will display MENU. Select spindle number under the situation, G-Console will change spindle numbers with signal names unchanged.

PIN NUMBER	SPINDL NOUMBE	VINDLE UMBER		SI	GNAL NAME		
1	1 SPIND	DLE	NOK JUDGMENT				
2	1 SPIND	DLE	Step OK JUDGMENT				
▶ 3	1 SPIND			L N	IR FAILURE		
4		WITHOUT					
5		MAIN					
6		SPINDLE NUMBER	•	1			
7		CONTINUAL SPINDLES		2			
8			,	-			
9		NURMAL UN		3			
10		NORMAL OFF		4			

# 8-9 PLC I/O Layout clear

Clear PLC I/O Layout. Select MAIN of MENUBAR $\rightarrow$ [PLC I/O Layout Clear], and the following picture will appear.

🖳 PLC IN OUT LAYOUT CLEAR	🖳 PLC INPUT LAYOUT CLEAR	GSERIES SYST
PLC INPUT LAYOUT	ALL BANKS	DELETED
DELETE CANCEL	DELETE	ок

Setting clear is to drop data retained by G-Console only.

CAUTION To change G-Unit setting, overwrite [RS232C In and Out Format] in G-Unit by setting value UL/DL.

# 8-10. Information signal setting

#### Set information signal.

Select MAIN of MENUBAR  $\rightarrow$  [INFO SIGNAL SETTING], and the below will appear.

- INFORMATION SIGNAL SETUP							_	
	Info 1	Info 2	Info 3	Info 4	Info 5	Info 6	Info 7	Info 8
LOGIC	OR							
PEAK TORQUE HIGH LIMIT NOK	0							
PEAK TORQUE LOW LIMIT NOK		0						
ANGLE HIGH LIMIT NOK			0					
ANGLE LOW LIMIT NOK				0				
FINAL TORQUE HIGH LIMIT NOK					0			
FINAL TORQUE LOW LIMIT NOK						0		
SNUG TORQUE NOK							0	
PLASTIC AREA GRADIENT RATE NOK								0
SLIP NOK								
INITIAL CROSS THREAD NOK								
CYCLE NOK								
TORQUE DOWN NOK								
ANGE RATE HIGH LIMIT NOK								
ANGLE RATE LOW LIMIT NOK								

#### •Logic select

Setting items	Contents		
OR	Outputs information signal if any of the conditions was satisfied.		
AND	Outputs information signal if all the conditions were satisfied.		

#### •Signal contents

Setting items	Contents		
PEAK TORQUE LOW LIMIT NOK PEAK TORQUE UPPER LIMIT NOK	PEAK torque result was out of setting range.		
ANGLE LOW LIMIT NOK			
ANGLE UPPER LIMIT NOK	Angle judgment result was out of preset range.		
FINAL TORQUE LOW LIMIT NOK FINAL TOROUE LIPPER	Torque judgment result was out of preset range.		
LIMIT NOK			
SNUG TORQUE NOK	SNUG torque judgment was NOK.		
PLASTIC AREA GRADE RATE NOK	Plastic area grade ratio result was NOK.		
SLIP NOK	SLIP judgment was NOK.		
INITIAL ERROR NOK	INITIAL ERROR judgment was NOK.		
CYCLE NOK	CYCLE judgment was NOK.		
TORQUE DOWN NOK	TORQUE DOWN NOK happened.		
ANGLE RATE UPPER LIMIT NOK ANGLE RATE LOW LIMIT NOK	Angle rate judgment was out of preset range.		

# 8-11. Information signal setting clear

Clear information signal setting. Select MAIN of MENUBAR  $\rightarrow$  [INFO SIGNAL SETTING CLEAR], and the below will appear.



Setting clear is to drop data retained by G-Console only.

To change G-Unit setting, overwrite [RS232C In and Out Format] in G-Unit by CAUTION setting value UL/DL.



# Chapter 9 Monitor menu

Following pull-down menus are given to MONITOR Menu.

- MONITOR (M)
  - Fastening result monitor
  - Stat. calculation result
  - Waveform monitor
  - Waveform history
  - > I/O Monitor

## 9-1. Fastening result monitor

Display fastening data collected at the end of fastening, and also keep it by file saving. Select MONITOR of MENUBAR→[FASTENING RESULT MONITOR], or click of TOOLBAR, and the following [FASTENING RESULT MONITOR] will appear.

#### 9-1-1. Display setting

MONITOR START	100 (1 - 500)			
NO SCROLL TO LATEST	DATA WHEN READING			
UPDATE TIME WHEN M	ONITOR STARTS			
UPDATE TIME WHEN D	ST SWITCHED			
CREATE FILE FOR DATA	BASE			
MONITOR STARTS AS U	SER CONSOLE LAUNCHED			
SAVE FASTENING RESU				
	LINE NUMBERS SAVED TO FILES	FILE NUMBERS SAV	ED TO FOLDER	
) UPDATE BY LINE	100 (1 - 10000)	100	(1 - 10000)	
UPDATE BY TIME	0			
ILE OF ALL DATA				
IG/ERROR FILE				

•Monitor start (monitor in process)

Select [Monitor start], and it will be [MONITORING] starting data collection. Screen is [Fastening result display] tab, and displays fastening data when the fastening is completed. Select [MONITORING], and data collection will be cancelled.

*Fastening result monitor screen is not closed unless data collection is cancelled.

Status bar on the bottom right operates under data collection status.

[192.168.11.10] = [CONNECT]

SECURITY LEVEL:2

Max number of lines

G-Unit displays fastening result up to max number of lines (500 lines). G-Unit drops data in chronological order if just completed fastening data makes the

total larger than preset line numbers.

•Do not scroll to latest data when data reading

Auto scroll does not operate at fastening completion while doing [Fastening

Result Display].

- •Change time at monitor start G-Console write date and hour of PC in Master spindle at monitor starting time.
- •Change time due to summer time and winter time switching Write date and hour of PC at summer or winter switching under data collection status.
- •Create file for data base

In parallel with usual fastening result file, G-Unit creates individual files for every fastening at each fastening end. Use this result file when you read fastening result with other application.

- Have monitoring started when G-Console is started Conducting auto spindle search at G-Console starting time, G-Console starts [Fastening Result Monitor]. (G-Console carries out hook up to IP address which G-Console last succeeded in connection)
- •Fastening result saving
  - Update by saving numbers

Select [Update by saving number] if you gather up files by saving numbers. G-Unit continues line saving until it is designated lines (1~10,000) in one file.

G-Unit automatically creates a new file when line reaches designated numbers.

Files are stored in designated folders (1~10,000).

G-Unit automatically creates a new folder when file reaches designated numbers.

# File Name: Base Folder ¥Input File Name *¥Input File Name_####.tsv

#### : 4-digit sequential number of saved file

- * : Sequential number of created folder
- Update by time

Select [Update by time] if you sort file by time. Creat a new file by designated time (at five minites intervals).

## File name:

Base Folder ¥Input File Name ¥Input File Name_YYYYMMDDHHmm.tsv

#### File Saving Method of Fastening Result Data

1. Check [Save Fastening Result], and G-Console will display [Candidate]

destination to save.

🔞 SAVE FASTENING RESULT	×
$\leftarrow \rightarrow \checkmark \uparrow$ $\blacksquare \Rightarrow$ This PC $\Rightarrow$ Desktop $\Rightarrow$ $\checkmark$ $\textcircled{O}$ $\checkmark$ Search Desktop	
Organize 🔻 New folder	?
<ul> <li>This PC</li> <li>3D Objects</li> <li>Desktop</li> <li>Documents</li> <li>Downloads</li> <li>Music</li> <li>Pictures</li> <li>Videos</li> </ul>	~
> L Windows (C:)	~
> Recovery Image V K	>
File name: G SYSTEM NR FASTENING RESULT SAVE Save as type: tsvFILE(*.tsv)	~
∧ Hide Folders Save Cancel	

- 2. Specify destination, and select [SAVE] designating [File Name].
- 3. Select [Monitor Start] to start Fastening Result Monitor.
- 4. Save [Fastening Result] with file name whose data contents were designated at the time of fastening end.

Extract saved file into Microsoft Excel.

 Fastening result under monitor is not saved unless [Fastening Result Save] is checked.

- G-Console automatically creates File and Folder for every updata at the time of fastening end.
- Fastening result data saving can fail due to extreme short CYCLE TIME and system with a lot of spindles.

## 9-1-2. Fastening Result Display NOK/ERROR RESULT

G-Console displays Fastening Result at the time of fastening end during monitor. G-Console displays Fastening NOK and Error Result for NOK/Error Result.

1. Select [<] in Tab of [Fastenng Result Display], and [Data Item Select] menu.



2. Screen displays collected data for checked items.

FASTENING RESULT MONITOR	
DISPLAY SETUP FASTENING RESULT DISPLAY NG/ERROR RESULT HISTORY READ	LAMP DISPLAY
	VIRTUAL SPINDLE No.
×	< Þ

3. Screen displays fastening result data of selected items during data collection.

G-Console saves data of all items under fastening data saving regardless

- Chapter 9 Monitor menu -

Data items	Contents
Date	Date of fastening conducted (G-Unit setting date)
Hour	Time of fastening conducted (G-Unit setting date)
ID	Up to 32 letters (Blank if not entered)
WORK No.	WORK Number operated
MAIN judge	Total judgment result of fastening operation
WORK cycle count	Cycle count of WORK operation
Spindle No.	Spindle number that conducted fastening
PARA No.	Parameter number that conducted fastening
MODE No.	MODE number that conducted fastening
STEP No.	STEP number that conducted fastening
CYCLE No.	Number of cycles repeated by the same parameter
Virtual Spindle No.	Virtual spindle number conducted fastening
Spindle judgment	Judgment result of spindles that conducted fastening
NOK code	Code numbers for NOK. Refer to page 8-29 for the details.
Spindle step count	Step count numbers of Spindle
Peak Torque	Highest torque value ever generated during the operation
Final torque	Final torque detected at the time of fastening end
SNUG torque	SNUG torque detected
Final angle	Final angle detected at the time of fastening end
GRADE rate	GRADE rate under [Plastic Area Angle Method]
Fastening time	Elapsed time of STEP used for fastening
Peak current	Highest current value ever generated during the operation
Angles under peak	Angles when peak current was measured
Thread number	Total thread numbers turned from fastening start
ZERO voltage	Voltage under no load
CAL voltage	Voltage under MAX torque application
Load factor	Peak load factor during fastening
Current at shut-down	Current at the time of fastening end
TOOL STEP count	G-Tool's step count numbers

#### 9-1-3. History reading

Read, save ad clear of [Fastening Result History] stored by G-Unit.

🔞 UEC GSERIES SYSTEM Ver.1.010 - [FASTENING RESULT MONITOR]	- 🗆 X
EILE (F) UNIT (U) COMMUNICATION (C) MAIN (A) SETUP (T) MONITOR (M) SOFTWARE SETUP (S) DISPLAY (V)	_ 8 ×
🗼 🔜 🥔 🗠 😚 주 📰 📾 🚅 🖻 📑 📈 🚍	
DISPLAY SETUP FASTENING RESULT DISPLAY NG/ERROR RESULT HISTORY READ LAMP DISPLAY	
DATA NUMBERS READ START NUMBE READ END NUMBER DATA DISPLAY RANGE SELECT Y ACCORDING TO JUDGMENT	
0 1 - 1000 V ALL V	
DATA SEARCH DOWNLOAD SAVE DELETE	
DATE TIME ID WORK No. MAIN JUDGMENT WORK CYCLE COUNT SPINDLE N	^
a 🖓	
WORK NO	
	GMENT
> WWORK CY	CLE COUNT
	No.
	ER No.
STEP NO.	
	0.
	SPINDLE No.
SPINDLE	UDGMENT V

#### Data search

Load number of items of fastening result history from G-Unit. Update data numbers, read in start number, and read in end number.

●Read

Read [Fastening Result History] from G-Unit. Read does not operate unless data search is selected.

Save

Save the read [Fastening Result History] by tsv form file.

Clear

Initialize [Fastening Result History] of G-Unit.

## Data numbers

Display item numbers of [Fastening Result History] stored in G-Unit. Max item numbers change depending on spindle number setting.

Spindle numbers	1	2	3	4	5	6	7	8	9	10
Max items	5880	3936	2952	2376	1968	1704	1488	1320	1176	1080
Spinde numbers	11	12	13	14	15	16	17	18	19	20
Max items	984	912	840	792	744	696	648	624	576	552
Spindle numbers	21	22	23	24	25	26	27	28	29	30
Max items	527	503	479	455	455	431	407	407	383	383
Spindle numbers	31	32								
Max items	359	359								

*Max item numbers have a margin of error depending on fastening method and conditions.

•Read Start Number and Read End Number

Update these numbers when data search operates. G-Unit displays [Fastening Result Data] in designated range when reading is in process.

•Data Display Range Select

Select range of [Fastening Result Data] to be displayed when reading.

%If the selection for display is out of Read Start to Read End range, data display does not operate despite data availability in G-Unit.

#### 9-1-4. Lamp Display

Have MAIN judge/Peak Torque/Final Angle/Spindle Judge/ID displayed on G-Console screen as if it were a dedicated display unit. Lamp display is updated on collection of fastening data.

ed FASTENING RESULT MONITOR	- • •
DISPLAY SETUP FASTENING RESULT DISPLAY NG/ERROR RESULT HISTORY READ LAMP DISPLAY	
LAMP DISPLAY CONTENTS OK NOK STOP BYRASS ALARM NO JUDGMEN WORK 1 P 2 PEAK TORQUE V FINAL ANGLE V SPINDLE JUDGMENT WORK JUDGMENT ID V PEAK TORQUE V FINAL ANGLE V SPINDLE JUDGMENT WORK ID : SP 1 PTQ SP 1 FANG SP 2 PTQ SP 2 FANG SP1	

•Edit WORK

Select WORK number for lamp display.

Edit Spindle number

Select Spindle number you are going to allocate LAMP.

- •Display Size Set LAMP size.
- •Background Image

Select the image for display. Select image file from jpg/bmp/png.

- •WORK Judge/ID/Peak Torque/Final Angle/Spindle Judge Check necessary items, and LAMP will be displayed.
- Clear

Initialize LAMP displayed.

Save (Floppy icon)

Save and memorize the LAMP display status to reproduce it for next starting operation . Clear, and the memory will be initialized.

# 9-2. Stat. Calculation Result

Display and file saving of [Fastening History Data] memorized by G-Unit are available. Select MONITOR of MENUBAR→[STAT. CALCULATION RESULT], or click _______, and [STAT. CALCULATION RESULT] screen will appear.

# 9-2-1. Stat. Calculation Data

IAT DI	ICS CULCULATE RE	SULT											
ATISTIC	AL CALCULATION D	ATA TROUBLE	DATA DISPLAY										
SPIN	DLE		RECORD										
1-5P RECORD DATA OPEN DISPLAY DATA CLEAR													
6-3	SP + REC	ORD DATA SAVI	E		DATA	READINGCANCEL							
		VE ALL								DET	ECT DATA-		
CHEC	K CLEAR	データ表示範囲	選択	DATE		W	ORK NoN	10DE No.	STEP No.	۲	ALL AI	L COUNT	12000
		1 - 1000		- 202	20 / 10	/ 16 1	-	1 🔻	1 -	0	OK OI	COUNT	12000
REA	ID DATA DETECT							· · · ·			NOK NO	DK COUNT	0
15-SP 16-SP 17-SP 18-SP 19-SP 20-SP 21-SP 22-SP 23-SP 24-SP 25-SP 26-SP 27-SP 28-SP													
9-SP 3	30-SP 31-SP 32-S	SP					COMPT	E STATISTIC	~				
1-SP 2	-SP 3-SP 4-SP	5-SP 6-SP	7-SP 8-SP	9-SP   10-SP	11-SP   12-SP	13-SP 14-SP	COMPI	E OTMILOTIC					
NO.	SP STEP COUNT	WORK No.	REPETITION	MODE No.	STEP No.	PAR No.	SP NO.	NUMBER	AVERAGE	σ	3σ/AVE	CP	CPK 🔺
2	26819	1	1	1	19	4	1-SP	602	0.000	0.000	0.000		
3	26818	1	1	1	18	3	3-SP	002	0.000	0.000	0.000		=====
4	26817	1	1	1	17	2	4-SP						
5	26816	1	1	1	16	1	5-SP	-					
6	26815	1	1	1	15	5	7-SP	-					
7	26814	1	1	1	14	4	8-SP						
8	26813	1	1	1	13	3	9-SP 10-SP						
	26812	1	1	1	12	2	. 11-SP						
9			-	-	+		12-SP						-
▶ 9 ∢						P							

#### SPINDLE SPINDLE S-SP 3-SP 4-SP 5-SP 6-SP 7-SP APPLY CHECK CLEAR

DATA READING

•Spindle search

Set spindle number to read history data.

- •Communication spindle set Set connected G-Unit with the spindle number.
- Check clear
   Clear spindle search setting.
- Read G-Unit history Read G-Unit history (12,000 steps).
  %Carry out [Read History Search] to have the history displayed.
- Read History saved in PC Read History saved in PC.
- RECORD DATA SAVE

RECORD DATA OPEN

•Save the read History (Save all) Save the read History. Saving objective is searched read history data. To save all data, select save all.

		Chapter 9 Monitor menu —
RECORD DATA DELETE	<ul> <li>Clear history saved in G-Unit Initialize saved history in G-Unit.</li> </ul>	
DISPLAY DATA CLEAR	<ul> <li>Clear display</li> <li>Clear search result display of search</li> </ul>	ed [Read History].
READ DATA DETECT	<ul> <li>Read History Detect</li> <li>Detect history downloaded from G-U</li> <li>Detection result is displayed on [Detection]</li> </ul>	Init. ect Result] part.
1 - 1000 ▼	<ul> <li>Data display range select</li> <li>Set history detect range.</li> <li>Select all or by the thousand.</li> </ul>	
DATE 2020 / 10 / 16	<ul> <li>Date</li> <li>Designate date of data detection and G-Console will detect all unless desi</li> </ul>	d stat. calculation. gnation is made.
WORK No. MODE No. STEP No.	<ul> <li>WORK/MODE/ STEP</li> <li>Designate parameter of data for determined</li> </ul>	ection and stat. calculation.
OETECT DATA     O ALL ALL COUNT 12000     OK OK COUNT 12000     NOK NOK COUNT 0	<ul> <li>Detect data</li> <li>Designate judgment of data for detection</li> </ul>	ction and stat. calculation.
COMPILE STATISTICS	<ul> <li>Stat. calculation</li> <li>Make stat. calculation history read fr</li> <li>Calculation result is displayed on [St</li> </ul>	om G-Unit. at. Calculation] part.

#### 9-2-2. Error Data Display

<b></b> 5	STATISTICS CULCULATE RESULT														
s	TATISTICA	L CALCULATION I	DATA TROUBL	E DATA DISPLAY											
	SPINDLE														
	1-SP _ ERROR DATA READING ERROR DATA DELETE														
	4-5P														
	6-SF	EF	ROR DATA SAV	/E		ERROR D	ATA READINGCA	NCEL							
	📄 7-SF														
	AP	PLY	_		_	_		ERROR							
	CHECK	CLEAR	DATE -			WORK No	MODE No.	NUMBE	R NÜ	MBERS					
	READ	DATA DETECT	2020	1 / 10 /	16	1 🔹	1 •		0	0					
	1-SP 2-8	SP 3-SP 4-SP	P 5-SP 6-SP	9 7-SP 8-SP	9-SP   10-SP	11-SP   12-SP   1	3-SP 14-SP 1	5-SP 16-SP 17	2-SP   18-SP   1	9-SP 20-SP 21	-SP 22-SP 23-	SP 24-SP 25-	SP 26-SP 27-S	SP 28-SP 29-S	SP 30-SP 31-SF
	NO.	DATE	TIME	SP STEP COUNT	WORK No.	REPETITION	MODE No.	STEP No.	PAR No.	PEAK TORQUE	FINAL ANGLE	SNUG TQ	FASTEN TIME	JUDGMENT	ID DATA
	1	2018-10-04	14:35:48	3456	0	0	0	0	0	0.0	0.0	0.0	0.0	ALARM 3-2	
	2	2018-10-04	13:10:51	3456	0	0	0	0	0	0.0	0.0	0.0	0.0	ALARM 3-2	
	3	2018-05-08	09:29:54	3332	0	0	0	0	1	0.0	0.0	0.0	0.0	ALARM 3-2	
	4	2018-05-08	09:29:50	3332	0	0	0	0	1	0.0	0.0	0.0	0.0	ALARM 3-2	
	5	2018-05-08	09:29:47	3332	0	0	0	0	1	0.0	0.0	0.0	0.0	ALARM 3-2	
	6	2018-05-08	09:29:42	3332	0	0	0	0	1	0.0	0.0	0.0	0.0	ALARM 3-2	
	7	2018-05-08	09:29:33	3332	0	0	0	0	1	0.0	0.0	0.0	0.0	ALARM 3-2	
	8	2018-04-26	16:24:46	1156074	0	0	0	0	0	0.0	0.0	0.0	0.0	ALARM 3-2	
	9	2018-04-26	16:05:56	1156074	0	0	0	0	0	0.0	0.0	0.0	0.0	ALARM 3-2	
	10	2018-04-26	16:05:54	1156074	0	0	0	0	0	0.0	0.0	0.0	0.0	ALARM 3-2	
	11	2018-04-20	16:41:53	1156074	0	0	0	0	0	0.0	0.0	0.0	0.0	ALARM 3-2	
	12	2018-04-20	16:11:08	1156074	0	0	0	0	0	0.0	0.0	0.0	0.0	ALARM 3-3	
	▶ 13	2018-04-20	16:11:05	1156074	0	0	0	0	0	0.0	0.0	0.0	0.0	ALARM 3-3	

- •Detect spindle Set spindle number to read history data.
- •Communication spindle set Set connected G-Unit with the spindle number
- •Check clear Clear spindle search setting.
- •Read G-Unit history Read G-Unit error history (500 items).
- •Read history saved in PC Read G-Unit history saved in PC.
- •Save the read history Save the read history.
- •Clear history saved in G-Unit Initialize history data recorded in G-Unit.
- •Clear display Clear detect result display of read-in history detect.
- Read history detect
   Detect again history read from G-Unit.
   Detect result is displayed on [Detect Result Display] part.

#### Date

Designate date of data detection and stat. calculation. G-Console will detect all unless designation is made.

## •WORK/MODE

Designate parameter of data for detection and stat. calculation. G-Console will detect all unless designation is made.

## •Error numbers

G-Console displays number of errors recorded.

#### Chapter 9 Monitor menu

### 9-3. Waveform monitor

Collecting fastening torque, G-Console displays its waveform on screen. G-Console prints out and save the recorded waveform.

Select MONITOR of MENUBAR→[WAVEFORM MONITOR] or click M , and [Waveform

Monitor] screen will be displayed.

#### 9-3-1. Waveform



Click [>] inwalled by red frame, and right side MENU will change display and hide.

#### •XY Items

Select angle or time for x-axis.

- Select angle for x-axis, and G-Console will retroactively read angles from final angle for the scale configured by setting. In this case, torque detected at 0.0deg is SNUG torque.
- Select time for x-axis, and G-Console will retroactively read elapsed time from fastening end for the time configured by setting. In this case, Final STEP start time is 0.0sec retroactively back from fastening end.

Select torque or current for y-axis.

## •Select Reading Range

Select waveform reading range.

Angle waveform

Scale	Sampling interval
180 deg	
360 deg	
540 deg	
720 deg	0.5 deg
1080 deg	
1440 deg	
1980 deg	

Time waveform

Scale	Sampling interval
2 sec	
4 sec	
6 sec	
8 sec	10 msec
10 sec	
20 sec	
40 sec	

Peak torque on the graph is not necessarily correspond to the same of fastening result, because torque-time waveform drawing is affected by sampling intervals.

- Read waveform
  - Read waveform.

Designate Spindle number by Utility (PAGE 9-16).

• Display whole waveform

G-Console displays whole waveform doing auto adjustment.

Clear

Clear displayed waveform.

•Drawing range adjustment

Adjust waveform display width.

Select [WHOLE DISPLAY], and G-Console will display whole waveform doing auto adjustment at reading.

- •Each spindle fastening result G-Console displays fastening result of selected spindle.
- •Cursor reference value

G-Console displays cursor reference value when it is around on waveform display part.

#### 9-3-2. Utility

Set spindle number, waveform line color and thickness. Print out waveform. Save waveform data in file.

WAVEFORM	UTILITY	DR	AWING J	UDGMENT	LINE AU	TO READ S	SETUP	
WAVEFOR	M DISPLA	Y SETUP				APPLY		CHECK CLEAR
	1		9		17		25	
	2		10		18		26	
	3		11		19		27	
	4		12		20		28	
	5		13		21		29	
	6		14		22		30	
	7		15		23		31	
	8		16		24		32	
	PICTURE	LINE TH	ICKNES	S SETUP	Ģ	1	1	1
PRINT PRINT TIT	LE (UP TO	) 32 LET	TERS)					
PRINTER	IN USE				PAPER SI	ZE		
LBP441 E				-	A4		•	PRINT
FILE								
SING FORM OPE	LE AT N	SING FORM SAV	ile IAT 'E	FORM. OPEI	TI AT N	MULTI FORMA SAVE	т	TSV FORMAT SAVE

•Waveform display setting

· Display spindle

Select checkbox of intended spindle number for waveform display. G-Console neither display nor save waveform if the spindle is not selected.

Color

Select waveform line color. Select spindle number, and windows screen will appear.

- Communication spindle
   Select checkbox of spindle selected by UL/DL value setting.
- Clear check
   Cancell checkbox of all spindles.
- Drawing line thickness
   Set drawing line thickness.

Print

- Print style
  - Enter print title (max 32 letters).
- Printer and paper size

Select printer and paper size.

Print

Print out waveform displayed on screen.

#### File

- Open waveform of single spindle on screen
   Read waveform saved in single spindle file (*.nrcur).
   Click [OPEN] selecting the file name.
- Save 1-spindle waveform
   Save displayed waveform as single spindle waveform file.
   Click [SAVE(S)] selecting file name.
   When waveforms of multi spindles are displayed on screen, G-Console

creates as many single spindle files as displayed spindle numbers.

- Open waveform of multi-spindle on screen
   Read waveform saved in multi-spindle waveform file (*.nracd).
   Click [OPEN] selecting the file name.
- Save multi-spindle waveform
   Save displayed waveform as multi-spindle waveform file.
   Click [SAVE(S)] selecting file name.
- Save as TSV
  - Save displayed waveform as TSV file (*.tsv). Click [SAVE(S)] selecting file name.

#### 9-3-3. Judgment line drawing

Draw lines of [Torque Upper & Low Limit] and [Angle Upper & Low Limit] on Waveform screen.

V CUT TORQUE	LOW LIMI	7 VALUE 20.00	HIGH LIMIT VALUE
V TORQUE	10.00		30.00
V FINAL TORQUE	0.00		30.00
CUT ANGLE		0	
V ANGLES	10.0		20.0
V SNUG TORQUE		15.00	
-REFLECT DESIGNATED PARAMETER	AMETER 1	•	REFLECT

#### •Drawing item

Click checkbox of parameter items for their line drawing on screen.

Windows will display checked items on screen. Enter intended values in upper and low limit of torque and angles.

#### •Reflect checked parameter

Configure parameters on G-Console to drawing items.

Click [EXEC] on screen selecting parameter number, and the configuration will be done.

#### 9-3-4. Auto read setting

Auto waveform display and save are available along with [Fastening Result Monitor] (PAGE 9-2).

WAVEFORM	UTILITY	DRAWING JUDGMENT LINE AUTO READ SETUP								
📝 READ R	READ RESULT AND WAVEFORM SIMULTANEOUSLY									
	AUTO SAVE WAVEFORM WHEN READING									
	AUTO SAVE WAVEFORM WHEN READING									
SAVE B	OTH TIME BAS	E AND ANGLE BASE								
JUDGME	NT SELECT-	SELECT ALL CHECK CLEAR								
🗸 ок										
V NC	к									
V AL	ARM									
J BY	PASS									
V ST	OP									

•Do result reading and waveform reading at the same time.

G-Console reads waveform at the time of fastening end with the display on [Waveform] tab.



 Auto waveform collection is effective while fastening result monitor is in process (PAGE 9-2).

 Auto waveform collection is cancelled when next fastening starts even if the collection is incomplete.

Auto save waveform when reading

Save waveform read at the time of fastening end by multi-spindle file (*.nracd). Save waveform in the destination set by checkbox clicked earlier. File name: Select folder ¥YYYY-MM¥DD_HHmmss_##.nracd

•Save both time base and angle base

G-Console saves both time angle waveform regardless of angle or time for x-axis under auto saving.

Judgment item

Specify what judgment data to make auto saving.

## 9-4. Waveform history

Display and save fastening waveform history saved in G-Console.

Select MONITOR of MENUBAR→[Waveform History], and G-Console will display waveform bistory

waveform history.

G-Unit retains waveform history newest to retroactive total 100 steps, and another 100 NOK judgment steps.

Switch off G-Unit, and those memory will be gone.

Saving form: Torque-angle (540 deg)

#### 9-4-1. Waveform history and fastening history

•	WAVEFORM HISTORY:FASTENING HISTORY											
S	SPINDLE NOUMBER READ DATA CHANGE DATA NUMBERS READ START NUME READ END NUMBER											
1	3PINDLE 1 VAVEFORM HISTORY V											
	SEARCH											
ſ		DATE	TIME	SPINDLE No.	PARAMETER No.	MODE No.	STEP No.	REPEAT No.	SPINDLE JUDG	1ENT	[	🚺 DATE
	▶ 1	2018-04-27	09:56:13	1	5	1	5	1	οκ		8	7 TIME
	2	2018-04-27	09:56:12	1	4	1	4	1	OK		ſ	ID
	3	2018-04-27	09:56:11	1	3	1	3	1	ОК			WORK No
	4	2018-04-27	09:56:10	1	2	1	2	1	ОК			
	5	2018-04-27	09:56:09	1	1	1	1	1	οκ		>	MAIN JUDGMENT
	6	2018-04-27	09:56:06	1	5	1	5	1	οκ		1	WORK CYCLE COUNT
	7	2018-04-27	09:56:05	1	4	1	4	1	οκ			SPINDLE No.
	8	2018-04-27	09:56:04	1	3	1	3	1	οκ			PARAMETER No.
	9	2018-04-27	09:56:03	1	2	1	2	1	οκ		E E	
	10	2018-04-27	09:56:02	1	1	1	1	1	ок			PRODE NO.
L	•									•	•	4 111

•Spindle number

Select spindle to read fastening result history.

•Reading data change

Select history type from [Waveform Histrory] and [NOK Waveform history].

•Data numbers

G-Unit displays its retaining history numbers.

Data search

Detect G-Unit to see how many [Fastening result History] are retained. Update data number, read start number, and read end number.

•Read start number and Read end number

G-Unit displays retaining history data number when data search is made. Change the number, and it will be designated range of history numbers for reading.

Reading

Read fastening result data.

Have waveform data displayed on screen exracting the same from readings. %Carry out data search before reading.

#### Open

Open [Waveform History File] (*.nrswd).

Save

Save the read [Waveform History File]. Save the file separating into 4 types.

- Waveform history display file (*.nrswd)
- Waveform history parameter file (*.Parameter.tsv)
- Waveform history result file (*.Result.tsv)
- Waveform history waveform file (*.Wave.tsv)

### Clear

Clear waveform history in G-Unit. Clearance is made only for the selected spindles.

## 9-4-2. Waveform history and waveform display

Display waveform data taken from history data of fastening history.

Select one waveform from (1~8) right-clicking intended history. Max 8 items waveforms are available for simultaneous waveform display selection.



# 9-5. I/O Monitor

Monitor items set by PLC I/O layout. Select MONITOR of MENUBAR→[I/O MONITOR] and the windows will be displayed.

MONITOR START			
OUTPUT BANK1			
1	MAIN	TOTAL NOK	
2	MAIN	TOTAL OK	
3	MAIN	NR FAILURE	
4	MAIN	READY	

•Monitor start (Monitor in operation)

Select [Monitor start], and I/O Monitor will start with green light on items whose signal is ON position. Compulsory Signal change of output bank is possible during I/O monitoring. Right click intended signal, and select the action. Select [Compulsory Cancel], and the change will be cancelled. Or, the Compulsory Change will be cancelled when Monitor Screen ends.

Contents	Lamp color
Signal OFF	White
Signal ON	Green
Compulsory ON	Red
Compulsory OFF	Yellow

Monitoring screen

		OUTPUT BANK1	OUTPUT BANK2	
1	MAIN	TOTAL NOK		
2	MAIN	TOTAL OK		
3	MAIN	NR FAILURE		
4	MAIN	READY		
5	MAIN	WORKING		

• G-Console does not display input banks unless Extension Unit is installed.



# Chapter 10 Software setting

Following pull-down menus are given to Soft Setting (S).

- Soft Setting (S)
  - > Login
  - Account set
  - History change
  - Language set

# <u>10-1. Login</u>

Select [SOFT SET] of MENUBAR→[LOGIN], and the Password Entry screen will appear.

🖳 LOGIN	<b>X</b>
USER NAME	
G SYSTEM	
PASSWORD	
****	
LOGIN	LOGOUT

•User name and Password

Enter user name and password registered by [Account Setting].

Login and Logout

Login and logout by the entered user name.

Security level is 2 when login. Security level is 1 when logout.

G-Console starts by security level 2 if user name and password are not caution registered by account register (PAGE 10-3).

# 10-2. Account register

Select [SOFT SET] of MENUBAR $\rightarrow$ [ACCOUNT], and Account screen will appear. Account is for one person only.

ACCOUNT SET				
USER NAME	ACCOUNT REGIST			
PASSWORD	ACCOUNT DELETE			
URYU	CLOSE			

#### •User name

Enter user name for Account registration (max 20 letters).

%Half size alpha-numeral letters are acceptable. Small letters and capital letters are

usable.

Password

Set password to login.

%Half size alpha-numeral letters, small letters, and capital letters.

•Account register

Register the written user name and password with Account.

Account clear

Unregister user name and password from Account.



• New Account registration automatically clears old Account.

 Carry out user name and password management very carefully.
 If you forget the password or user name, re-installation of G-Console is necessary (PAGE 1-6).

### 10-2-1. Security level

Setting change is restricted depending on security level.

Security	1	2
READ SETTING FILE	0	0
WRITE SETTING FILE	×	0
REGISTRATE IP ADDRESS	×	0
READ SETTING IN G-UNIT	0	0
WRITE SETTING IN G-UNIT	×	0
CHANGE SETTING CONTENTS	×	0
COPY SETTING CONTENTS	×	0
CLEAR SETTING CONTENTS	×	0
START FASTENING RESULT MONITOR	0	0
END FASTENING RESULT MONITOR	×	0
CHANGE FASTENING RESULT MONITOR	×	0
CLEAR HISTORY OF G-UNIT	×	0
CHANGE WAVEFORM AUTO SAVE SETTING	×	0
START (END) OF I/O MONITOR	0	0
COMPULSORY CHANGE I/O MONITOR SIGNAL I/O	×	0
CHANGE ACCOUNT REGISTRATION	×	0
DISPLAY CHANGE HISTORY	×	0
CHANGE LANGUAGE SETTING	×	0

#### •Security level 1 restriction

Setting change of fastening result monitor is restricted.

•	FASTENING RESULT MONITOR			
	DISPLAY SETUP FASTENING RESULT DISPLAY NG/ERROR RESULT			
	MAX NUMBER OF LINES 100 (1 - 500)			
	NO SCROLL TO LATEST DATA WHEN READING			
	UPDATE TIME WHEN MONITOR STARTS			
	UPDATE TIME WHEN DST SWITCHED			
	CREATE FILE FOR DATA BASE			
	MONITOR STARTS AS USER CONSOLE LAUNCHED			

# 10-3, Change history

Display change history of data. Display contents are 1,000 items. Select [SOFT SET] of MENUBAR $\rightarrow$ [CHANGE HISTORY], and the following display will appear.

UPDATE HISTORY					
				UP TO DESKTOP	
2020-10-09	15:45:59	Administrator	PLC INPUT LAYOUT ALL BANKS CLEAR	*	
2020-10-09	15:47:05	Administrator	PLC OUTPUT LAYOUT ALL BANKS CLEAR		
2020-10-09	15:47:09	Administrator	PLC OUTPUT LAYOUT ALL BANKS CLEAR		
2020-10-09	15:47:11	Administrator	PLC OUTPUT LAYOUT ALL BANKS CLEAR		
2020-10-09	15:48:12	Administrator	INFORMATION SIGNAL SETUP Info1 PEAK TORQUE HIGH LIMIT NOK O		
2020-10-09	15:48:12	Administrator	INFORMATION SIGNAL SETUP Info2 PEAK TORQUE LOW LIMIT NOK O		
2020-10-09	15:48:13	Administrator	INFORMATION SIGNAL SETUP Info3 ANGLE HIGH LIMIT NOK O		
2020-10-09	15:48:14	Administrator	INFORMATION SIGNAL SETUP Info4 ANGLE LOW LIMIT NOK O		
2020-10-09	15:48:15	Administrator	INFORMATION SIGNAL SETUP Info5 FINAL TORQUE HIGH LIMIT NOK O		
2020-10-09	15:48:16	Administrator	INFORMATION SIGNAL SETUP Info6 FINAL TORQUE LOW LIMIT NOK O		
2020-10-09	15:48:19	Administrator	INFORMATION SIGNAL SETUP Info7 SNUG TORQUE NOK O		
2020-10-09	15:48:20	Administrator	INFORMATION SIGNAL SETUP Info8 PLASTIC AREA GRADIENT RATE NOK O		
2020-10-09	15:57:09	Administrator	INFORMATION SIGNAL SETUP CLEAR		
2020-10-09	15:58:21	Level1 User	ACCOUNT REGIST SECURITY LEVEL:1		
2020-10-09	16:00:49	G SYSTEM	LOGIN SECURITY LEVEL:2		
2020-10-09	16:01:58	G SYSTEM	LOGIN SECURITY LEVEL:2	-	

# 10-4. Language setting

Change language setting.

Select [SOFT SET] of MENUBAR  $\rightarrow$  [LANGUAG SET], and the following display will appear.

🖳 LANGUAGE SETUP	<b>—</b>
English 👻	APPLY