

REMOTE I/O R80 SERIES
PC CONFIGURATOR SOFTWARE
Model: RCFG-R80CFG
Users Manual

CONTENTS

1. INTRODUCTION.....	4
2. GETTING STARTED.....	4
2.1 STARTING THE RCFG-R80CFG.....	4
2.1.1 SELECTING COM PORT	4
2.1.2 SELECTING SLOTS.....	4
2.2 MODIFYING PARAMETERS	5
2.2.1 READING PARAMETERS FROM DEVICE (UPLOAD).....	5
2.2.2 MODIFICATION EXAMPLE	5
2.2.3 WRITING NEW PARAMETERS (DOWNLOAD)	6
2.3 SAVING & READING PARAMETERS IN A FILE	6
2.3.1 READING PARAMETERS SAVED AS FILE	6
2.3.2 SAVING PARAMETERS IN A FILE.....	6
2.4 MONITORING I/O STATUS.....	7
2.4.1 FINE ZERO / GAIN ADJUSTMENT.....	8
2.4.2 SETTING SIMULATE I/O.....	8
2.5 DISPLAYING VERSION.....	9
3. PARAMETER DETAILS OF INTERFACE MODULE	10
3.1 R80NECT1 - EtherCAT INTERFACE MODULE, R80ND2 - DeviceNet POWER/NETWORK MODULE	10
3.1.1 CONFIRMING VERSION NO.	10
3.1.2 SETTING NO. OF I/O MODULES	10
3.2 R80NCIT1 - CC-Link IE TSN INTERFACE MODULE	11
3.2.1 CONFIRMING STATION ID	11
3.2.2 CONFIRMING MAC ADDRESS.....	11
3.2.3 CONFIRMING VERSION NO.	11
3.2.4 SETTING NO. OF I/O MODULES	11
3.3 R80NEIP1 - EtherNet/IP INTERFACE MODULE	12
3.3.1 DATA SIZE.....	12
3.3.2 IP ADDRESS / SUBNET MASK / DEFAULT GATEWAY	12
3.3.3 COMMUNICATION TIMEOUT	12
3.3.4 CONFIRMING VERSION NO.	12
3.3.5 SETTING NO. OF I/O MODULES	12
4. PARAMETER DETAILS OF I/O MODULES	14
4.1 R80DAT8A - DISCRETE INPUT MODULE, 8 POINTS, R80DAT16A2 - DISCRETE INPUT MODULE, 16 POINT	14
4.1.1 CONFIRMING VERSION NO.	14
4.1.2 SETTING SAMPLING RATE	14
4.1.3 SETTING SIMULATE INPUT.....	14
4.2 R80DCT4D and R80DCT8A - DISCRETE OUTPUT MODULE, 8 POINTS, R80DCT16A2 - DISCRETE OUTPUT MODULE, 16 POINTS	15
4.2.1 CONFIRMING VERSION NO.	15
4.2.2 SETTING OUTPUT AT OFFLINE	15
4.2.3 SETTING SIMULATE OUTPUT.....	15
4.2.4 SETTING OUTPUT AT POWER ON	15

4.3	R80UST4 - UNIBERSAL INPUT MODULE, 4 POINTS	16
4.3.1	UNUSED SETTING	16
4.3.2	INPUT TYPE.....	16
4.3.3	SETTING TEMPERATURE UNIT	17
4.3.4	SETTING ZERO / FULL BASES, FINE ZERO / GAIN ADJUSTMENTS, AND SCALED RANGE ZERO / SPAN.....	17
4.3.5	SETTING WIRING (RTD CONNECTION).....	19
4.3.6	SETTING BURNOUT	19
4.3.7	SETTING CJC	19
4.3.8	SETTING FIRST ORDER LAG FILTER.....	20
4.3.9	CONFIRMING VERSION NO.	20
4.3.10	SETTING SIMULATE INPUT	20
4.4	R80FST4NJ - DC VOLTAGE / CURRENT INPUT MODULE, 4 POINTS	21
4.4.1	SETTING UNUSED OUTPUT	21
4.4.2	SETTING OUTPUT RANGE	21
4.4.3	SETTING FINE ZERO / GAIN ADJUSTMENTS AND SCALED RANGE ZERO / SPAN	21
4.4.4	CONFIRMING VERSION NO.	22
4.4.5	SETTING SIMULATE INPUT	22
4.5	R80YST4N - DC CURRENT OUTPUT MODULE, 4 POINTS.....	23
4.5.1	SETTING UNUSED OUTPUT	23
4.5.2	SETTING FINE ZERO / GAIN ADJUSTMENTS AND SCALED RANGE ZERO / SPAN	23
4.5.3	SETTING OUTPUT AT OFFLINE OR POWER ON.....	24
4.5.4	CONFIRMING VERSION NO.	24
4.5.5	SETTING SIMULATE OUTPUT.....	24
4.5.6	SETTING OUTPUT AT OFFLINE	24
4.6	R80YVT4N - DC VOLTAGE OUTPUT MODULE, 4 POINTS	25
4.6.1	SETTING UNUSED OUTPUT	25
4.6.2	SETTING FINE ZERO / GAIN ADJUSTMENTS AND SCALED RANGE ZERO / SPAN	25
4.6.3	SETTING OUTPUT AT OFFLINE OR POWER ON.....	26
4.6.4	CONFIRMING VERSION NO.	26
4.6.5	SETTING SIMULATE OUTPUT.....	26
4.6.6	SETTING OUTPUT AT OFFLINE	26

5. REMARKS27

5.1	SETTING EXAMPLE OF FINE ADJUSTMENT	27
5.1.1	ONLY FINE ZERO ADJUSTMENT IS PERFORMED	27
5.1.2	FINE ZERO/GAIN ADJUSTMENT IS PERFORMED	27

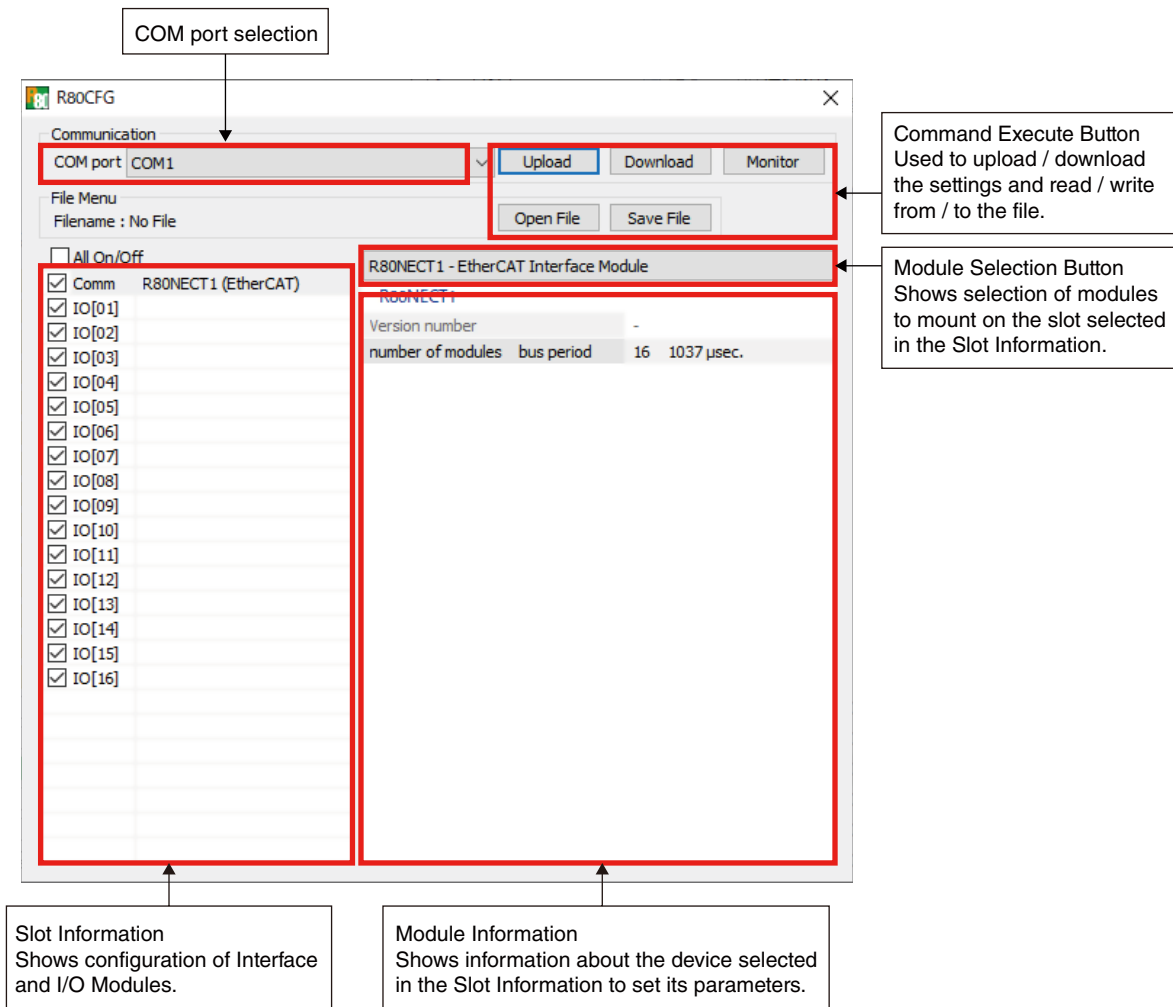
1. INTRODUCTION

The R80CFG is used to program parameters for the Interface and I/O Modules of the R80 Series Remote I/O (referred hereunder as 'device').

2. GETTING STARTED

2.1 STARTING THE RCFG-R80CFG

Open the RCFG program on the Windows PC and select the R80CFG. The following window appears on the screen.



2.1.1 SELECTING COM PORT

Select a COM port added in installing the Driver adequately. The added COM port depends on the PC.

2.1.2 SELECTING SLOTS

- 1) The slots with checkmarks are applicable to [Upload] and [Download] button.
- 2) [Monitor], [Open File] and [Save File] buttons are available with all slots, regardless of the checkmarks.

2.2 MODIFYING PARAMETERS

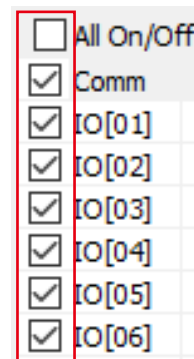
Whenever you need to modify parameters stored in a device, first read (upload) the present parameters from the device, modify whatever parameters you need, and then write (download) the new parameters to it.

2.2.1 READING PARAMETERS FROM DEVICE (UPLOAD)

- 1) Choose the COM port to which the device is connected.
- 2) Click on [Upload] button at the top of the window.
Then the program starts to communicate with the device to read the present parameters. If an error message appears, confirm the hardware connection and the setting again before retrying.
- 3) The device's present parameters are uploaded and shown on the screen.

NOTE

The parameters of the slots without the checkmarks are not uploaded.

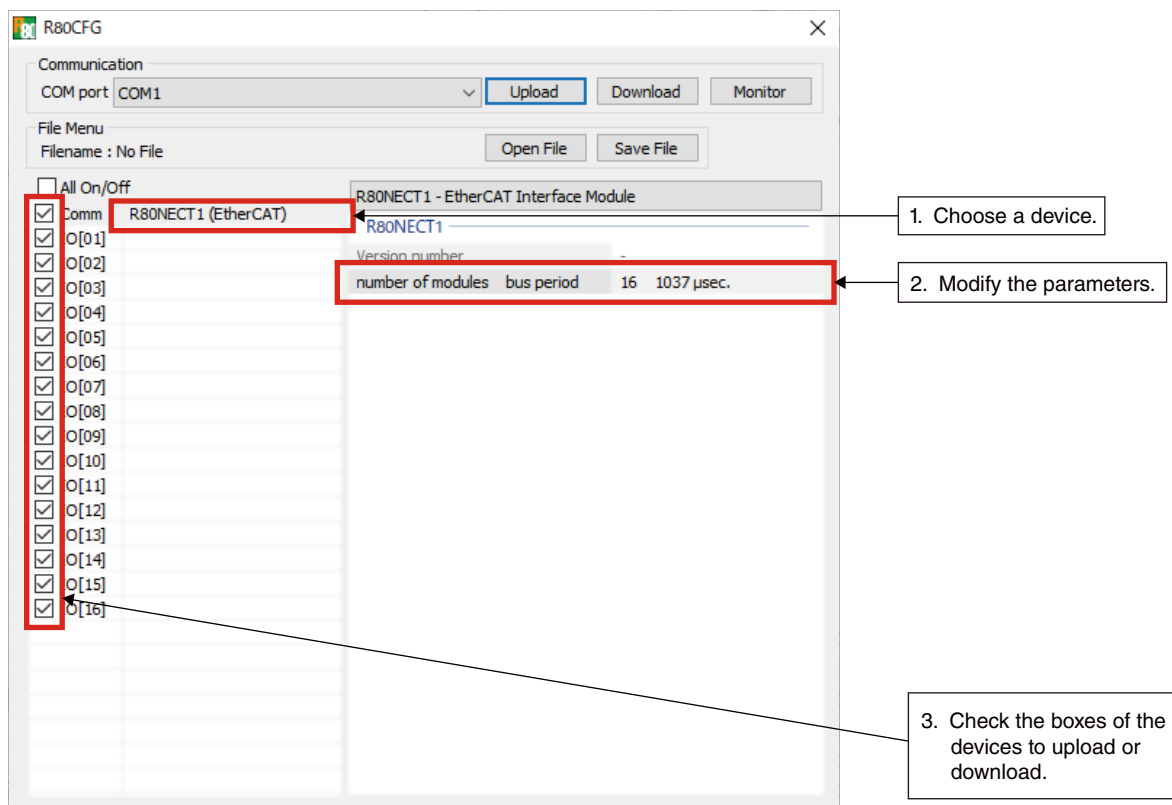


Checkmarks in the Slot Information

2.2.2 MODIFICATION EXAMPLE

The initial view is composed of the R80 module configuration to the left and the parameters of the selected module to the right.

The example below shows the R80NECT1 Interface Module, Discrete Input Module (slot 1) and Discrete Output Module (slot 2).



Parameters available to each type of module are explained in the later sections.

2.2.3 WRITING NEW PARAMETERS (DOWNLOAD)

- 1) Click on [Download] button at the top of the window.
- 2) When the indicator showing progress of the download reaches the right end without showing any error message, the new parameters are correctly updated, downloaded to the device, and immediately valid.
If the setting change of the number of I/O modules is downloaded to the interface module, turn OFF and ON the power supply to the interface module. Since the dialog box "Please Power OFF and Power ON" appears after the downloading, reboot the interface module and then click on [OK] button.

2.3 SAVING & READING PARAMETERS IN A FILE

Parameters edited on the screen can be saved as a file, and read out on the screen from the file. By combining [Upload] / [Download] functions with [Save File] / [Open File], a backup file of those presently used in the device can be created.

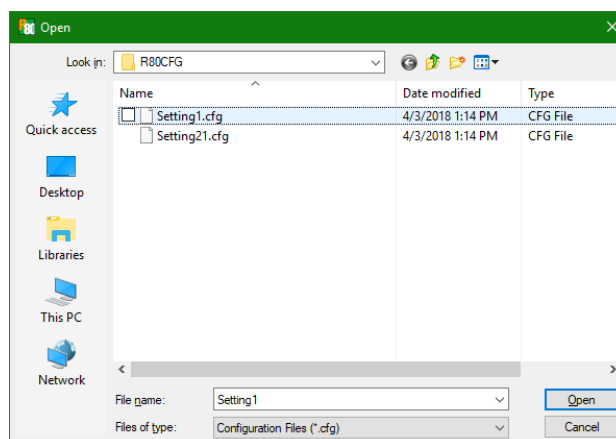
2.3.1 READING PARAMETERS SAVED AS FILE

Clicking on [Open File] button calls up the Windows-standard Open dialog box, depending on the PC's operating system on which the program is running.

NOTE

The dialog box is displayed in the language of the OS.

Select a parameter file and click on [Open] button to show a stored parameter setting.



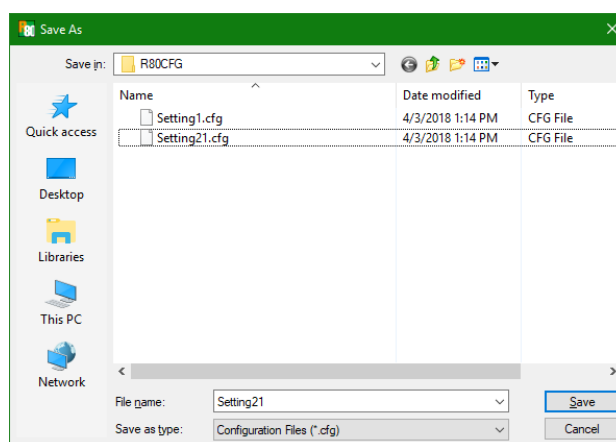
2.3.2 SAVING PARAMETERS IN A FILE

Clicking on [Save File] button calls up the Windows-standard Save dialog box, depending on the PC's operating system on which the program is running.

NOTE

The dialog box is displayed in the language of the OS.

Enter a desired file name to File Name field and click on [Save] button to store a parameter setting.



2.4 MONITORING I/O STATUS

The Monitoring function is used to show each I/O status on the window, conduct fine adjustments and set simulate I/O.

Click on [Monitor] button. When the communication is established, the following window appears on the screen.

The Monitor window displays a table of I/O modules and their status. Below the table are two panels: 'Adjust Parameter' and 'Simulate Data'.

No	Type	Ch 1	Ch 2	Ch 3	Ch 4
Comm	R80NECT1 (EtherCAT)				
IO[01]	R80US4S (AI4) data is simulating	Ch 1 5000	Ch 2 32767	Ch 3 5000	Ch 4 4999
IO[02]	R80YST4N (AO4)	Ch 1 -500	Ch 2 -500	Ch 3 -500	Ch 4 -500
IO[03]	R80FS4NJ (AI4)	Ch 1 5018	Ch 2 11500	Ch 3 5020	Ch 4 5015
IO[04]	R80DAT16A2 (DI 16)	In 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16			
IO[05]	R80DCT16A2 (DO 16)	Out 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16			
IO[06]					
IO[07]					
IO[08]					

Adjust Parameter

Input 3
 Fine zero adjustment: 0.00 (%)
 Fine gain adjustment: 1.0000

Input 4
 Fine zero adjustment: 2.38 (%)
 Fine gain adjustment: 1.0000

common
 simulate input: simulate input

Simulate Data

Ch 1: 5000, Ch 2: 32767, Ch 3: 5000, Ch 4: 4999

[SET] [close]

The following table explains the window above.

ITEMS	DESCRIPTION
(1) I/O	Shows the types of modules mounted on the base, followed by each I/O status of I/O values. Click on an I/O module to show (2) the fine adjustment and (3) the simulate I/O. Shows I/O values for analog module, and green when ON, and black when OFF for discrete module.
(2) Fine adjustment	Enable or disable the simulate I/O, and configure the zero/fine adjustment for analog I/O. The setting is immediately valid. When a channel of R80UST4 is set to thermocouple or RTD, be sure to set different values for each zero base and full base.
(3) Simulate I/O	To set the simulate I/O. Click [SET] after setting the value to validate the setting. When performing scaling setting, set the scaling value. Refer to the simulate input of users manual for each I/O module for setting range. For discrete I/O, put a check mark on the channel to ON.

*For R80DAT8A, R80DAT16A2 even when the simulate Input is set to ON, LED on the input module does not turn ON.

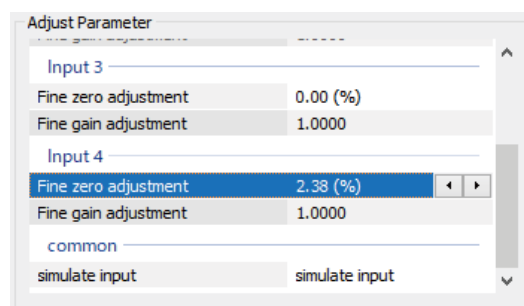
2.4.1 FINE ZERO / GAIN ADJUSTMENT

Click the [Fine zero adjustment] or [Fine gain adjustment] to display the  buttons.

Clicking the  button, the fine adjustment value will increase or decrease.

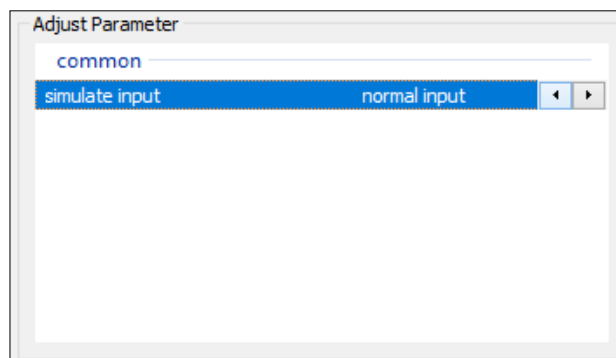
(For fine zero adjustment, increase/decrease in 0.01, and for fine gain adjustment, increase/decrease in 0.0001.)

When double-clicking, the value is configurable directly as shown in right figure.

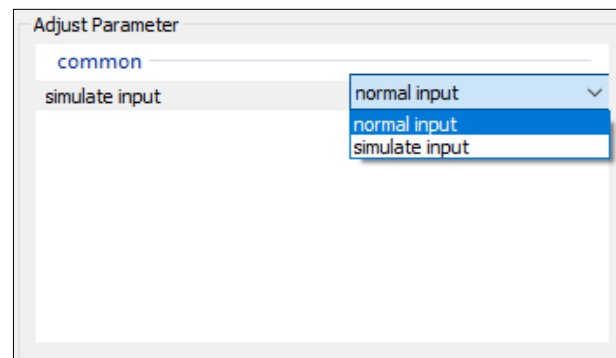


2.4.2 SETTING SIMULATE I/O

Click on [Simulate input] or [Simulate output] to display the  buttons. Click on the right arrow button to select the simulate I/O and the left to the normal.



Double-click on [Simulate input] or [Simulate output] to show the drop-down menu.



NOTE

Each time the simulate I/O is set on the Monitor screen, the program communicates and writes the settings to the device.

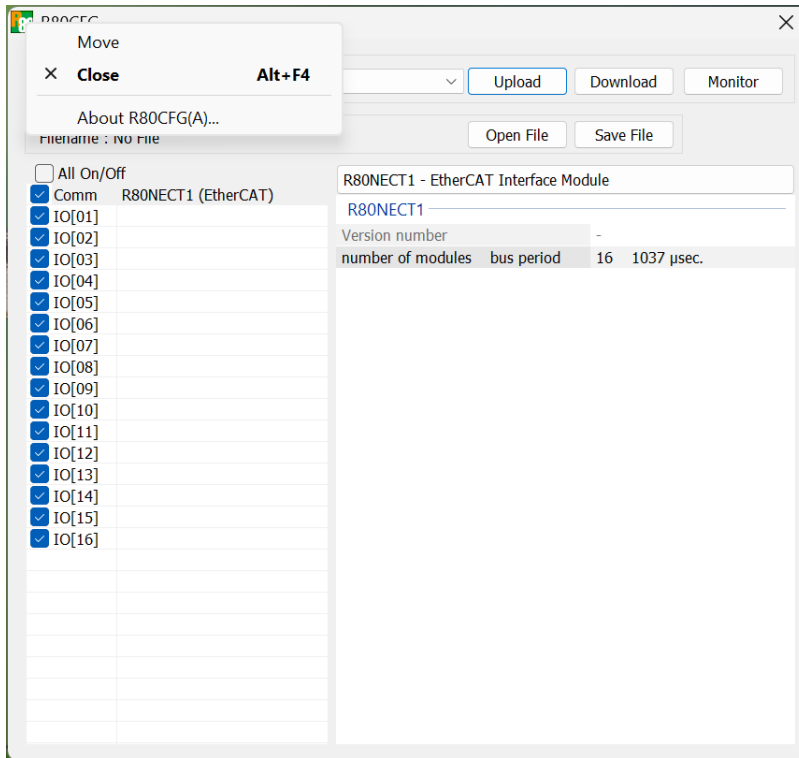
After closing the Monitor screen, the initial view still shows the previous settings. To reflect the new settings on the screen, click on [Upload] button.

* The simulate I/O setting returns to the normal I/O in starting up the device.

2.5 DISPLAYING VERSION

Confirm the RCFG-R80CFG version in the following step.

- 1) Right-click on the top of the window.
- 2) Click [About R80CFG(A)...] to display the version.



3. PARAMETER DETAILS OF INTERFACE MODULE

3.1 R80NECT1 - EtherCAT INTERFACE MODULE, R80ND2 - DeviceNet POWER/NETWORK MODULE

3.1.1 CONFIRMING VERSION NO.

Version number of the firmware is displayed. It is not available to set.

When not uploaded, “—” is displayed.

R80NECT1			
Version number		1.01.03	
number of modules	bus period	2	155 μ sec.

3.1.2 SETTING NO. OF I/O MODULES

Specify the number of I/O modules to mount.

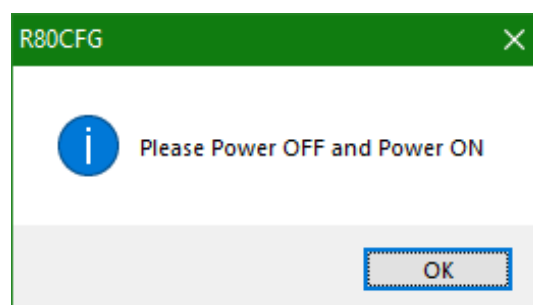
The internal bus period varies depending on the mounted number. With fewer modules the period is faster.

The mounted number and corresponding internal bus period are shown in the drop-down menu.

Setting range: 1 to 16 modules

R80NECT1			
Version number		1.01.03	
number of modules	bus period	16	1037 μ sec.
		1	102 μ sec.
		2	155 μ sec.
		3	209 μ sec.
		4	265 μ sec.
		5	322 μ sec.
		6	380 μ sec.
		7	440 μ sec.
		8	501 μ sec.
		9	563 μ sec.
		10	627 μ sec.
		11	692 μ sec.
		12	758 μ sec.
		13	826 μ sec.
		14	895 μ sec.
		15	965 μ sec.
		16	1037 μ sec.

When the setting change of the number of I/O modules is downloaded to the interface module, turn OFF and ON the power supply to the interface module. Since the dialog box “Please Power OFF and Power ON” appears after the downloading, reboot the interface module and then click on [OK] button.



NOTE

Please pay attention to the following items on the setting of the number of I/O modules. If there is setting error, they may not operate normally.

- Each I/O module Address is set with a rotary SW on them. Set the addresses in consecutive numbers, starting at '0' and not duplicating.
- When adding or reducing I/O modules, make sure to change the setting as instructed in “3.1.2 SETTING NO. OF I/O MODULES”.

3.2 R80NCIT1 - CC-Link IE TSN INTERFACE MODULE

3.2.1 CONFIRMING STATION ID

Station ID set by the R80NCIT1 is displayed.

It is not available to change.

When not uploaded, “—” is displayed.

CC-Link IE TSN	
Station ID	0001
MAC address	00-10-9C-00-FF-FE

3.2.2 CONFIRMING MAC ADDRESS.

MAC address of the R80NCIT1 is displayed.

It is not available to change.

When not uploaded, “—” is displayed.

CC-Link IE TSN	
Station ID	0001
MAC address	00-10-9C-00-FF-FE

3.2.3 CONFIRMING VERSION NO.

Version number of the firmware is displayed.

It is not available to set.

When not uploaded, “—” is displayed.

R80NCIT1	
Version number	1.01.06

3.2.4 SETTING NO. OF I/O MODULES

Specify the number of I/O modules to mount.

The internal bus period varies depending on the mounted number. With fewer modules the period is faster.

The mounted number and corresponding internal bus period are shown in the drop-down menu.

Setting range: 1 to 16 modules.

R80NCT1		
Version number	1.01.03	
number of modules	bus period	16 1037 μ sec.
		1 102 μ sec.
		2 155 μ sec.
		3 209 μ sec.
		4 265 μ sec.
		5 322 μ sec.
		6 380 μ sec.
		7 440 μ sec.
		8 501 μ sec.
		9 563 μ sec.
		10 627 μ sec.
		11 692 μ sec.
		12 758 μ sec.
		13 826 μ sec.
		14 895 μ sec.
		15 965 μ sec.
		16 1037 μ sec.

3.3 R80NEIP1 - EtherNet/IP INTERFACE MODULE

3.3.1 DATA SIZE

Specify the area size for input data and output data.
Select from 67-word (64+3) or 35-word (32+3).

EtherNet/IP	
Data size	67word (64 + 3) ▾
IP address	67word (64 + 3)
Subnet mask	35word (32 + 3)
Default gateway	192.168.0.100
Network failure detection time	3.0

3.3.2 IP ADDRESS / SUBNET MASK / DEFAULT GATEWAY

Network configurations for EtherNet/IP communication.

The setting range is 0.0.0.0 to 255.255.255.255.

EtherNet/IP	
Data size	67word (64 + 3)
IP address	192.168.0.1
Subnet mask	255.255.255.0
Default gateway	192.168.0.100
Network failure detection time	3.0

3.3.3 COMMUNICATION TIMEOUT

When there is no EtherNet/IP communication for the specified time period, the RUN LED turns off as an abnormal communication status. The setting range is 0.0 to 3200.0 (sec.).

EtherNet/IP	
Data size	67word (64 + 3)
IP address	192.168.0.1
Subnet mask	255.255.255.0
Default gateway	192.168.0.100
Network failure detection time	3.0

3.3.4 CONFIRMING VERSION NO.

Version number of the firmware is displayed.

It is not available to set.

When not uploaded, “—” is displayed.

R80NEIP1	
Version number	1.01.02

3.3.5 SETTING NO. OF I/O MODULES

Specify the number of I/O modules to mount.

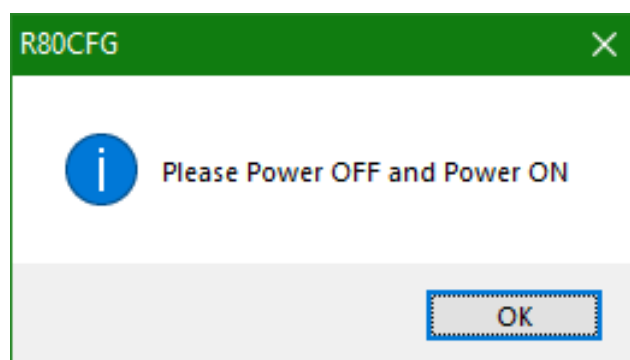
The internal bus period varies depending on the mounted number. With fewer modules the period is faster.

The mounted number and corresponding internal bus period are shown in the drop-down menu.

Setting range: 1 to 16 modules.

R80NEIP1		
Version number	1.01.02	
number of modules	bus period	16 1037 μsec. ▾
		1 102 μsec.
		2 155 μsec.
		3 209 μsec.
		4 265 μsec.
		5 322 μsec.
		6 380 μsec.
		7 440 μsec.
		8 501 μsec.
		9 563 μsec.
		10 627 μsec.
		11 692 μsec.
		12 758 μsec.
		13 826 μsec.
		14 895 μsec.
		15 965 μsec.
		16 1037 μsec.

When the setting change of the number of I/O modules is downloaded to the interface module, turn OFF and ON the power supply to the interface module. Since the dialog box “Please Power OFF and Power ON” appears after the downloading, reboot the interface module and then click on [OK] button.



NOTE

Please pay attention to the following items on the setting of the number of I/O modules. If there is setting error, they may not operate normally.

- Each I/O module Address is set with a rotary SW on them. Set the addresses in consecutive numbers, starting at '0' and not duplicating.
- When adding or reducing I/O modules, make sure to change the setting as instructed in “3.2.4 SETTING NO. OF I/O MODULES”.

4. PARAMETER DETAILS OF I/O MODULES

4.1 R80DAT8A - DISCRETE INPUT MODULE, 8 POINTS, R80DAT16A2 - DISCRETE INPUT MODULE, 16 POINT

4.1.1 CONFIRMING VERSION NO.

Version number of the firmware is displayed.

It is not available to set.

When not uploaded, “—” is displayed.

common

Version number	1.01.04
sampling rate	100 μ sec.
simulate input	normal input

4.1.2 SETTING SAMPLING RATE

Specify the sampling rate from among the following range.

Setting range: 100, 200, 400, 800 μ sec., 4, 8, 16, 40 msec.

common

Version number	1.01.04
sampling rate	4 msec.
simulate input	100 μ sec. 200 μ sec. 400 μ sec. 800 μ sec. 4 msec. 8 msec. 16 msec. 40 msec.

4.1.3 SETTING SIMULATE INPUT

Choose normal input or simulate input.

The setting is also available on the Monitor screen.

common

Version number	1.01.04
sampling rate	4 msec.
simulate input	normal input normal input simulate input

4.2 R80DCT4D and R80DCT8A - DISCRETE OUTPUT MODULE, 8 POINTS, R80DCT16A2 - DISCRETE OUTPUT MODULE, 16 POINTS

4.2.1 CONFIRMING VERSION NO.

Version number of the firmware is displayed.

It is not available to set.

When not uploaded, “—” is displayed.

common	
Version number	1.01.04
output at offline	clear
simulate output	normal output

4.2.2 SETTING OUTPUT AT OFFLINE

Specify the output value to be used when there is a problem in communication with the host or in R80's internal communication.

When clear is specified, all the outputs are turned OFF.

When hold is specified, the last value used during normal communication is output.

common	
Version number	1.01.04
output at offline	clear
simulate output	clear
	hold

4.2.3 SETTING SIMULATE OUTPUT

Choose normal output or simulate output.

The setting is also available on the Monitor screen.

common	
Version number	1.01.04
output at offline	clear
simulate output	normal output
	normal output
	simulate output

4.2.4 SETTING OUTPUT AT POWER ON

Specify output for the period from power on until output value is set.

Input 1	
output at Power ON	OFF
Input 2	OFF
	ON

4.3 R80UST4 - UNIBERSAL INPUT MODULE, 4 POINTS

4.3.1 UNUSED SETTING

Select CH enable / CH disable.

Set unused input for CH disable.

Unused	CH enable
Input type	CH enable
Unit	CH disable
Zero Base	0.000
Full Base	0.000
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
Wiring	3wire
Burnout	Up
CJC	Disable

4.3.2 INPUT TYPE

Select the input type to use.

Depending on the type of input, items that cannot be selected will be displayed in gray and cannot be edited.

- DC Current
 - 20 - +20 mA DC
- DC Voltage
 - 1000 - +1000 mV DC
 - 10 - +10 V DC
- Potentiometer
 - POT 0 - 4000 Ω
 - POT 0 - 2500 Ω
 - POT 0 - 1200 Ω
 - POT 0 - 600 Ω
 - POT 0 - 300 Ω
 - POT 0 - 150 Ω
- Resister
 - Resistance 0 - 4000 Ω
- RTD
 - RTD PT100
 - RTD PT500
 - RTD PT1000
 - RTD PT150
 - RTD JPT100
 - RTD Ni5084
 - RTD CU10
- Thermocouple
 - TC PR
 - TC K
 - TC E
 - TC J
 - TC T
 - TC B
 - TC R
 - TC S
 - TC C
 - TC N
 - TC U
 - TC L
 - TC P

Unused	CH enable
Input type	-10 - +10 V DC
Unit	-20 - +20 mA DC
Zero Base	-1000 - +1000 mV DC
Full Base	-10 - +10 V DC
Fine zero adjustment	POT 0 - 4000 Ω
Fine gain adjustment	POT 0 - 2500 Ω
Scaled range Zero	POT 0 - 1200 Ω
Scaled range Span	POT 0 - 600 Ω
Wiring	POT 0 - 300 Ω
Burnout	POT 0 - 150 Ω
CJC	Resistance 0 - 4000 Ω
First Order Lag filter	RTD PT100
Input 2	RTD PT500
Unused	RTD PT1000
Input type	RTD PT50
Unit	RTD JPT100
Zero Base	RTD Ni5084
Full Base	RTD CU10
Fine zero adjustment	TC PR
Fine gain adjustment	TC K
	TC E
	TC J
	TC T
	TC B
	TC R
	TC S
	TC C
	TC N
	TC U
	TC L
	TC P

4.3.3 SETTING TEMPERATURE UNIT

Choose the temperature unit from degC (Centi-grade), degF (Fahrenheit) and K (absolute temperature). This parameter is available only when a thermocouple or RTD is selected for the input type.

Input 1	
Unused	CH enable
Input type	TC K
Unit	degC
Zero Base	degC
Full Base	degF
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
Wiring	3wire
Burnout	Up
CJC	Disable
First Order Lag filter	0.0 (sec)

4.3.4 SETTING ZERO / FULL BASES, FINE ZERO / GAIN ADJUSTMENTS, AND SCALED RANGE ZERO / SPAN

Specify the setting values. The figure below shows an example for setting the scaled range Span.

If the same value is entered for the zero base and full base, the scaled values are not calculated but the engineering unit temperature values are returned for thermocouple and RTD inputs. Also, the input ranges corresponding to the individual input types are scaled for DC current, DC voltage, potentiometer and resistor inputs. (e.g. If “-10 - +10 V DC” is specified for the input type and “0” is entered for both the zero base and full base, the scaling calculation is conducted by regarding the zero base to be “-10.0” and full base “10.0.”)

Input 1	
Unused	CH enable
Input type	-10 - +10 V DC
Unit	degC
Zero Base	0.000
Full Base	0.000
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
Wiring	3wire
Burnout	Up
CJC	Disable
First Order Lag filter	0.0 (sec)

*1. Factory settings for the zero base and full base are “0.”

*2. If the zero base and full base parameters having the same value are downloaded and then uploaded, “0” is shown for the zero base and full base.

*3. If the zero base and full base parameters having the minimum and maximum values in the input range respectively are downloaded and then uploaded, “0” is shown for the zero base and full base. (e.g. When “-10 - +10 V DC” is specified for the input type, if the zero base and full base parameters having the values “-10.0” and “+10.0” respectively are downloaded and then uploaded, “0” is shown for the zero base and full base.

PARAMETER	DESCRIPTION	INPUT TYPE	AVAILABLE RANGE
Zero Base / Full Base	0% setting value / 100% setting value	-20 - +20 mA	-32.000 - +32.000
		-10 - +10 V	
		POT	-320.00 - +320.00
		-1000 - +1000 mV	-3200.0 - +3200.0
		RTD, TC (degC, K)	
		RTD, TC (degF)	-32000 - +32000
		0 - 4000 Ω	
Fine zero adjustment	Zero (bias) adjustment value	Independent from the input type	-320.00 - +320.00
Fine gain adjustment	Gain (span) adjustment value		-3.2000 - +3.2000
Scaled range Zero	Scaled value 0%		-32000 - +32000
Scaled range Span	Scaled value 100%		-32000 - +32000

NOTE

Calculation is carried out in the order of the zero base/full base, fine gain, fine zero, and scaled range Zero/Span.

- **Calculation example of zero base/full base**

Convert engineering unit value to 0 – 100% value

Zero base = -100.0 (°C), full Base = 100.0 (°C)

With the measured value 50.0 (°C),

$$\frac{\overbrace{(50.0 - (-100.0))}^{\text{Zero base (°C) Full base (°C)}}}{\underbrace{(100.0 - (-100.0))}_{\text{Zero base (°C)}}} \times \underbrace{10000}_{\text{Fixed value}} = \underbrace{7500}_{\text{0 - 100\% conversion value}} \text{ (75.00\%)}$$

Measured value (°C)

- **Calculation example of fine zero/gain adjustments**

Used for fine adjustment such as calibration.

Fine zero adjustment = 100.00 (%), fine gain adjustment = 2.0000

With the raw value 50.00% (with the 0 – 100% conversion value of the zero base/full base 50.00% for temperature),

$$\underbrace{50.00 \text{ (\%)}}_{\text{Fine gain adj.}} \times \underbrace{2.0000}_{\text{Fine zero adj.}} + \underbrace{100.00 \text{ (\%)}}_{\text{Calculated input value}} = \underbrace{200.00 \text{ (\%)}}_{\text{Calculated input value}}$$

- **Calculation example of scaled range Zero / Span**

Scaled range Zero = -10000, scaled range Span = 10000

With the measured value 50.00% (5000) after calculating the fine adjustments with the scaled range Zero 0 and Span 10000,

$$\frac{\overbrace{(10000 - (-10000))}^{\text{Scaled range Span}}}{\underbrace{(10000 - (-10000))}_{\text{Scaled range Zero}}} \times \underbrace{5000}_{\substack{\text{50.00 (\%)} \\ \text{(Scaled range Span - Scaled range Zero)} \\ \text{in measuring 50.00\%}}} + \underbrace{(-10000)}_{\text{Scaled range Zero}} = \underbrace{0}_{\text{Calculated scaled value}} \text{ (0.00\%)}$$

4.3.5 SETTING WIRING (RTD CONNECTION)

Choose “2wire” or “3wire” in accordance with the number of connection wires of the RTD or resistor. This parameter is available only for the input types of RTD and resistor.

Input 1	
Unused	CH enable
Input type	RTD PT100
Unit	degC
Zero Base	0.0
Full Base	0.0
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
Wiring	3wire
Burnout	2wire
CJC	3wire
First Order Lag filter	0.0 (sec)

4.3.6 SETTING BURNOUT

Specify the direction for the burnout.

This parameter is available only for the input types of thermocouple, RTD, potentiometer, and resistor.

Input 1	
Unused	CH enable
Input type	RTD PT100
Unit	degC
Zero Base	0.0
Full Base	0.0
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
Wiring	3wire
Burnout	Up
CJC	None
First Order Lag filter	Up

4.3.7 SETTING CJC

Specify whether or not to enable cold junction compensation when using a thermocouple.

This parameter is available only for the input types of thermocouple.

Input 1	
Unused	CH enable
Input type	TC K
Unit	degC
Zero Base	0.0
Full Base	0.0
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
Wiring	3wire
Burnout	Up
CJC	Disable
First Order Lag filter	Disable

Input 2	
Unused	CH enable
Input type	TC K
Unit	degC
Zero Base	0.0
Full Base	0.0
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
Wiring	3wire
Burnout	Up
CJC	Disable
First Order Lag filter	Eneable

4.3.8 SETTING FIRST ORDER LAG FILTER

Specify the time constant for the first order lag filtering.

Filtering is not performed when “0.0” is entered for this parameter.

Available range: 0.5 – 60.0 (seconds)

Input 1	
Unused	CH enable
Input type	TC K
Unit	degC
Zero Base	0.0
Full Base	0.0
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
Wiring	3wire
Burnout	Up
CJC	Disable
First Order Lag filter	0.0

4.3.9 CONFIRMING VERSION NO.

The firmware version is shown.

This is not editable.

“–” is shown when not uploaded.

common	
Version number	1.01.24
simulate input	normal input

4.3.10 SETTING SIMULATE INPUT

Choose normal input or simulate input.

The setting is also available on the Monitor screen.

Specify the simulate input value between -32000 and +32000. If entering a value under -32000, -32000 is set. If above +32000, +32000 is set.

common	
Version number	1.01.24
simulate input	normal input
	normal input
	simulate input

4.4 R80FST4NJ - DC VOLTAGE / CURRENT INPUT MODULE, 4 POINTS

4.4.1 SETTING UNUSED OUTPUT

Enable or disable each output.

Disable the unused outputs.

Input 1

Unused	CH enable
Input type	CH enable
Zero Base	CH disable
Full Base	-20.00 (mA)
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000

4.4.2 SETTING OUTPUT RANGE

Choose the output range for the enabled outputs.

- DC voltage
- -10 - +10 V DC
- DC current
- -20 - +20 mA DC

Input 1

Unused	CH enable
Input type	-20 - +20 mA DC
Zero Base	-10 - +10 V DC
Full Base	-20 - +20 mA DC
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000

4.4.3 SETTING FINE ZERO / GAIN ADJUSTMENTS AND SCALED RANGE ZERO / SPAN

Specify the setting values. The figure below shows an example of setting the scaled range Span.

Input 2

Unused	CH enable
Input type	-10 - +10 V DC
Zero Base	-10.00
Full Base	-5.00 (V)
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000

PARAMETER	DESCRIPTION	INPUT TYPE	AVAILABLE RANGE
Zero base	Setting value 0%	-10 - +10 V	-10.00 - +10.00
Full base	Setting value 100%	-20 - +20 mA	-20.00 - +20.00
Fine zero adjustment	Zero adjustment value	Independent from the input type	-320.00 - +320.00
Fine gain adjustment	Gain adjustment value		-3.2000 - +3.2000
Scaled range Zero	Scaled value 0%		-32000 - +32000
Scaled range Span	Scaled value 100%		-32000 - +32000

NOTE

Calculation is carried out in the order of the scaled range Zero/Span, fine zero, and fine gain.

- **Calculation example of scaled range Zero / Span**

Scaled range Zero = -10000, scaled range Span = 10000

With the output setting value 50% (5000),

$$\underbrace{(5000 - (-10000))}_{\text{Output setting value}} \times \underbrace{10000}_{\text{Scaled range Span}} / \underbrace{(10000 - (-10000))}_{\text{Scaled range Zero}} = \underbrace{7500}_{\text{Calculated scaled value (value converted to 0 - 10000 scale)}} \text{ (75.00\%)}$$

- **Calculation of fine zero/gain adjustments**

Used for fine adjustment such as calibration.

Fine zero adjustment = 5.00 (%), fine gain adjustment = 1.0100

With the output setting value (value converted to 0 - 10000 scale) 75.00%,

$$\underbrace{75.00 \text{ (\%)}}_{\text{Calculated output setting value}} \times \underbrace{1.0100}_{\text{Fine gain adj.}} + \underbrace{5.00 \text{ (\%)}}_{\text{Fine zero adj.}} = \underbrace{80.75 \text{ (\%)}}_{\text{Calculated output setting value}}$$

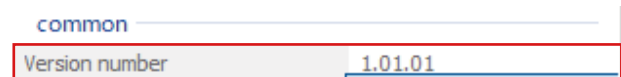
* The calculation of scaled range zero/span and fine zero/gain adjustment are calculated by signed 16 bit value. When the process or result of calculation overflows, it is calculated by replacing with upper limit or lower limit of signed 16 bit value. Therefore result may not be the value calculated by above mentioned calculation formula.

4.4.4 CONFIRMING VERSION NO.

The firmware version is shown.

This is not editable.

“—” is shown when not uploaded.

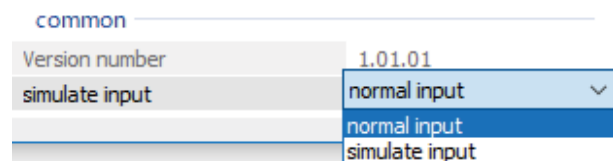


4.4.5 SETTING SIMULATE INPUT

Choose normal input or simulate input.

The setting is also available on the Monitor screen.

Specify the simulate input value between -32000 and +32000. If entering a value under -32000, -32000 is set. If above +32000, +32000 is set.



4.5 R80YST4N - DC CURRENT OUTPUT MODULE, 4 POINTS

4.5.1 SETTING UNUSED OUTPUT

Enable or disable each output.

Disable the unused outputs.

Output 1	
Unused	CH enable
Zero Base	CH enable
Full Base	CH disable
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
output at offline or Power ON	-5.00 (%)

4.5.2 SETTING FINE ZERO / GAIN ADJUSTMENTS AND SCALED RANGE ZERO / SPAN

Specify the setting values. The figure in right shows an example of setting the scaled range Span.

Output 1	
Unused	CH enable
Zero Base	0.00
Full Base	20.00 (mA)
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
output at offline or Power ON	-5.00 (%)

PARAMETER	DESCRIPTION	INPUT TYPE	AVAILABLE RANGE
Zero base	Setting value 0%	0 - 20 mA	0.00 - +20.00
Full base	Setting value 100%		
Fine zero adjustment	Zero adjustment value		-320.00 - +320.00
Fine gain adjustment	Gain adjustment value		-3.2000 - +3.2000
Scaled range Zero	Scaled value 0%		-32000 - +32000
Scaled range Span	Scaled value 100%		-32000 - +32000

NOTE

Calculation is carried out in the order of the scaled range Zero/Span, fine gain, fine zero, and Zero/Full base.

• Calculation example of scaled range Zero / Span

Scaled range Zero = -4000, scaled range Span = 20000

With the output setting value 12000,

$$\begin{array}{c}
 \text{Scaled range Zero} \qquad \qquad \qquad \text{Scaled range Zero} \\
 (12000 - 4000) \times 10000 / (20000 - 4000) = 5000 \rightarrow 50.00\% \\
 \text{Output setting value} \qquad \qquad \qquad \text{Scaled range Span} \qquad \qquad \qquad \text{Calculated scaled value} \\
 \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \text{(value converted to 0 - 10000 scale)}
 \end{array}$$

• Calculation of fine zero/gain adjustments

Used for fine adjustment such as calibration.

Fine zero adjustment = 5.00 (%), fine gain adjustment = 1.0100

With the output setting value (value converted to 0 - 10000 scale) 50.00%,

$$\begin{array}{c}
 50.00 (\%) \times 1.0100 + 5.00 (\%) = 55.5 (\%) \\
 \text{Fine gain adj.} \quad \text{Fine zero adj.} \quad \text{Calculated output setting value}
 \end{array}$$

• **Calculation example of Zero/Full base**

Converts calculated output setting value to engineering value.

$$\underbrace{(5550 / 10000)}_{\text{Output value}} \times \underbrace{(20.000 - (-4.000))}_{\text{Full base (mA)}} + \underbrace{4.000}_{\text{Zero base (mA)}} = \underbrace{12.88}_{\text{Output engineering value}} \text{ (mA)}$$

4.5.3 SETTING OUTPUT AT OFFLINE OR POWER ON

Specify output for the period from power on until output value is set.

Enter a percent data value.

Available range: -5.00 to +105.00

NOTE

Enter a percent data value even if the scaled ranges are specified.

If fine adjustments are specified, the value after adjustments is output.

Output 1

Unused	CH enable
Zero Base	0.00 (mA)
Full Base	20.00 (mA)
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
output at offline or Power ON	-5.00

4.5.4 CONFIRMING VERSION NO.

The firmware version is shown.

This is not editable.

“—” is shown when not uploaded.

common

Version number	1.01.08
simulate output	normal output
output at offline	Hold

4.5.5 SETTING SIMULATE OUTPUT

Choose normal output or simulate output.

The setting is also available on the Monitor screen.

Specify the simulate output value between -32000 and +32000. If entering a value under -32000, -32000 is set. If above +32000, +32000 is set.

common

Version number	1.01.08
simulate output	normal output
output at offline	normal output
	simulate output

4.5.6 SETTING OUTPUT AT OFFLINE

Specify the output value to be used when there is a problem in communication with the host or in R30's internal communication.

When “Hold” is specified, the last value used during normal communication is output. When “preset” is specified, the value entered in “4.5.3 SETTING OUTPUT AT OFFLINE OR POWER ON” is output.

Note that the fine zero/gain adjustments are valid.

common

Version number	1.01.08
simulate output	normal output
output at offline	Hold
	Hold
	preset

4.6 R80YVT4N - DC VOLTAGE OUTPUT MODULE, 4 POINTS

4.6.1 SETTING UNUSED OUTPUT

Enable or disable each output.

Disable the unused outputs.

Output 1	
Unused	CH enable
Zero Base	CH enable
Full Base	CH disable
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
output at offline or Power ON	0.00 (%)

4.6.2 SETTING FINE ZERO / GAIN ADJUSTMENTS AND SCALED RANGE ZERO / SPAN

Specify the setting values. The figure in right shows an example of setting the scaled range Span.

Output 1	
Unused	CH enable
Zero Base	-10.000
Full Base	10.000 (V)
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
output at offline or Power ON	0.00 (%)

PARAMETER	DESCRIPTION	INPUT TYPE	AVAILABLE RANGE
Zero base	Setting value 0%	-10.000 - +10.000 V	-10.000 - +10.000
Full base	Setting value 100%		
Fine zero adjustment	Zero adjustment value		-320.00 - +320.00
Fine gain adjustment	Gain adjustment value		-3.2000 - +3.2000
Scaled range Zero	Scaled value 0%		-32000 - +32000
Scaled range Span	Scaled value 100%		-32000 - +32000

NOTE

Calculation is carried out in the order of the scaled range Zero/Span, fine gain, fine zero, and Zero/Full base.

• Calculation example of scaled Zero/Span

Zero scale = -5000, Full scale = 5000

With the output setting value 30% (3000),

$$\underbrace{(3000 - (-5000))}_{\text{Output setting value}} \times \underbrace{10000 / (5000 - (-5000))}_{\text{Scaled range Span}} = \underbrace{8000}_{\text{Calculated scaled value (value converted to 0 - 10000 scale)}} \quad (80.00\%)$$

• Calculation example of fine zero/gain adjustment

Used for fine adjustment such as calibration.

Fine zero adjustment = 5.00 (%), fine gain adjustment = 1.0100

With the output setting value (value converted to 0 - 10000 scale) 80.00%,

$$\underbrace{80.00 (\%)}_{\text{Calculated output setting value}} \times \underbrace{1.0100}_{\text{Fine gain adj.}} + \underbrace{5.00 (\%)}_{\text{Fine zero adj.}} = \underbrace{85.8 (\%)}_{\text{Calculated output setting value}}$$

• Calculation example of Zero/Full base

Converts calculated output setting value to engineering value.

Zero base = -5 (V), Full base = 5 (V)

With output 0 - 100 % value 85.8%,

$$\underbrace{(8580 / 10000)}_{\text{Output value}} \times \underbrace{(5.000 - (-5.000))}_{\text{Full base (V)}} + \underbrace{(-5.000)}_{\text{Zero base (V)}} = \underbrace{3.58}_{\text{Output engineering value}} \text{ (V)}$$

4.6.3 SETTING OUTPUT AT OFFLINE OR POWER ON

Specify output for the period from power on until output value is set.

Enter a percent data value.

Available range: -5.00 to +105.00

NOTE

Enter a percent data value even if the scaled ranges are specified.

If fine adjustments are specified, the value after adjustments is output.

Output 1	
Unused	CH enable
Zero Base	-10.000 (V)
Full Base	10.000 (V)
Fine zero adjustment	0.00 (%)
Fine gain adjustment	1.0000
Scaled range Zero	0
Scaled range Span	10000
output at offline or Power ON	0.00

4.6.4 CONFIRMING VERSION NO.

The firmware version is shown.

This is not editable.

“—” is shown when not uploaded.

common	
Version number	1.02.11
simulate output	normal output
output at offline	Hold

4.6.5 SETTING SIMULATE OUTPUT

Choose normal output or simulate output.

The setting is also available on the Monitor screen.

Specify the simulate output value between -32000 and +32000. If entering a value under -32000, -32000 is set. If above +32000, +32000 is set.

common	
Version number	1.02.11
simulate output	normal output
output at offline	normal output
	simulate output

4.6.6 SETTING OUTPUT AT OFFLINE

Specify the output value to be used when there is a problem in communication with the host or in R30's internal communication.

When “Hold” is specified, the last value used during normal communication is output. When “preset” is specified, the value entered in “4.6.3 SETTING OUTPUT AT OFFLINE OR POWER ON” is output.

Note that the fine zero/gain adjustments are valid.

common	
Version number	1.02.11
simulate output	normal output
output at offline	Hold
	Hold
	preset

5. REMARKS

5.1 SETTING EXAMPLE OF FINE ADJUSTMENT

Fine zero/gain adjustment is used for fine adjustment of calibration.

5.1.1 ONLY FINE ZERO ADJUSTMENT IS PERFORMED

Change the fine zero adjustment value on the monitor screen to adjust.

For example, while applying the voltage equivalent to 0% from voltage source, adjust fine zero adjustment value so that monitor value becomes 0%. (When input type is thermocouple, cold junction compensation must be disabled during adjustment.)

5.1.2 FINE ZERO/GAIN ADJUSTMENT IS PERFORMED

Adjustment is available for any two points. Fine adjustment with two points such as Y0 %, Y1 %.

1)

- When input type is thermocouple, cold junction compensation must be disabled during adjustment.
- Set fine zero adjustment to "0.00", fine gain adjustment to "1.0000"
- Set scaled range zero to "0", scaled range span to 10000.

2) While applying the voltage equivalent to Y0 % from voltage source, record the monitor value (X0).

3) While applying the voltage equivalent to Y1 % from voltage source, record the monitor value (X1).

4) Calculate zero/gain adjustment value by following formula.

- Gain adjustment value = $(Y1 - Y0) / (X1 - X0)$
- Zero adjustment value = $Y0 - (X0 \times \text{gain adjustment value})$

5) Set zero/gain adjustment value obtained at step 4, confirm the monitor value after adjustment on the monitor screen.

E.g. Monitor value at 0% input is -85, monitor value at 100% input is 9810.

Y0 = 0, X0 = -0.85

Y1 = 100, X1 = 98.10

Gain adjustment value = $(100 - 0) / (98.10 - (-0.85)) \approx 1.0106$

Zero adjustment value = $0 - (-0.85 \times 1.0106) \approx 0.86$