Panasonic

PROGRAMMABLE CONTROLLER

FP7 Analog Output Unit

User's Manual

WUME-FP7AOH-01

Safety Precautions

Observe the following notices to ensure personal safety or to prevent accidents.
To ensure that you use this product correctly, read this User's Manual thoroughly before use.
Make sure that you fully understand the product and information on safety.
This manual uses two safety flags to indicate different levels of danger.

WARNING

If critical situations that could lead to user's death or serious injury is assumed by mishandling of the product.

-Always take precautions to ensure the overall safety of your system, so that the whole system remains safe in the event of failure of this product or other external factor.
-Do not use this product in areas with inflammable gas. It could lead to an explosion.
-Exposing this product to excessive heat or open flames could cause damage to the lithium battery or other electronic parts.

CAUTION

If critical situations that could lead to user's injury or only property damage is assumed by mishandling of the product.

-To prevent excessive exothermic heat or smoke generation, use this product at the values less than the maximum of the characteristics and performance that are assured in these specifications.
-Do not dismantle or remodel the product. It could cause excessive exothermic heat or smoke generation.
-Do not touch the terminal while turning on electricity. It could lead to an electric shock.
-Use the external devices to function the emergency stop and interlock circuit.
-Connect the wires or connectors securely.
The loose connection could cause excessive exothermic heat or smoke generation.
-Do not allow foreign matters such as liquid, flammable materials, metals to go into the inside of the product. It could cause excessive exothermic heat or smoke generation.
-Do not undertake construction (such as connection and disconnection) while the power supply is on. It could lead to an electric shock.

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Introduction

Thank you for buying a Panasonic product. Before you use the product, please carefully read the installation instructions and the users manual, and understand their contents in detail to use the product properly.

Types of Manual

- There are different types of users manual for the FP7 series, as listed below. Please refer to a relevant manual for the unit and purpose of your use.
- The manuals can be downloaded on our website.

Unit name or purpose of use	Manual name	Manual code
FP7 Power Supply Unit	FP7 CPU Unit Users Manual (Hardware)	WUME-FP7CPUH
FP7 CPU Unit		
Instructions for Built-in COM Port FP7 Extension (Communication) Cassette	FP7 CPU Unit Users Manual (COM Port Communication)	WUME- FP7COM
Instructions for Built-in LAN Port	FP7 CPU Unit Users Manual (LAN Port Communication)	WUME-FP7LAN
FP7 Digital Input/Output Unit	FP7 Digital Input/Output Unit Users Manual	WUME-FP7DIO
FP7 Analog Input Unit	FP7 Analog Input Unit Users Manual	WUME-FP7AIH
FP7 Analog Output Unit	FP7 Analog Output Unit Users Manual	WUME-FP7AOH
FP7 Positioning Unit	FP7 Positioning Unit Users Manual	WUME-FP7POSP
PHLS System	PHLS System Users Manual	WUME-PHLS
Programming Software FPWIN GR7	FPWIN GR7 Introduction Guidance	WUME-FPWINGR7

Table of Contents

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Unit Functions and Restrictions

1.1 Unit Functions and Operation

■ Features of analog output unit

The analog output unit converts its internal data into analog values to be output to inverters or other analog-driven equipment.

- Equipped with six types of output ranges (i.e., voltage ranges of -10 to +10, 0 to +10, 0 to +5, and +1 to +5 and current ranges of 0 to +20 and +4 to +20 mA).
  Analog output unit: 4 channels
- A D/A conversion processing speed is as high as 25 μs/channel.
- Converts set digital values into analog data with up to 16 bit in a resolution range of 1/25,000 to 1/62,500.

1.2 Basic Operation of Analog Output Processing

1.2.1 Analog Output Processing

Analog output is processed as explained below.

■ **Operation of analog output unit**

(1) Writing digital data

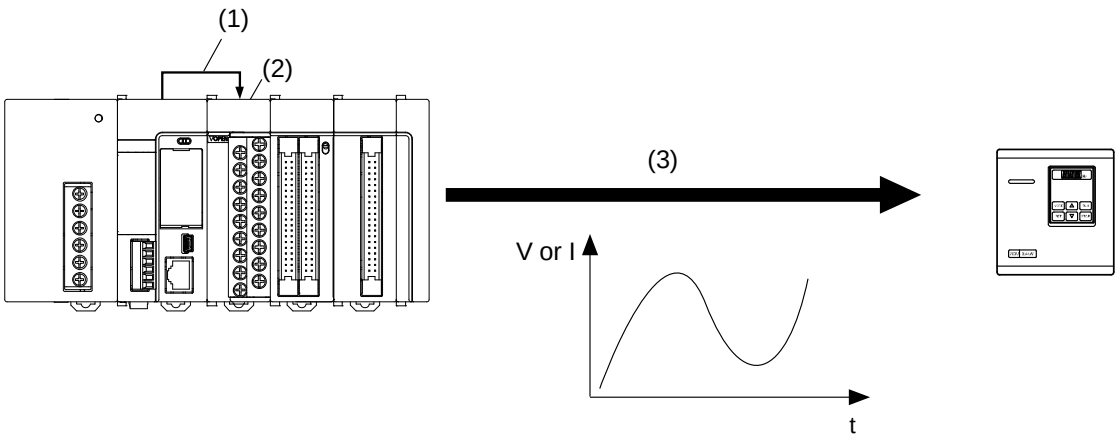
A user program is used to write digital data to the output relay area (WY) on a channel-by-channel basis so that the digital data will be output in analog form.

(2) Analog conversion processing

Data written to the unit is converted to an analog value in sequence automatically.

(3) Output to analog-driven equipment

Converted analog values are output to inverters or other analog-driven equipment.



■ **Option settings**

The following option setting functions are provided for analog output processing. Any of the option setting functions can be set, if necessary, by writing the function to the unit memory (UM) by using the configuration menu of the FPWIN GR7 or a user program.

- Offset/Gain processing
- Scale conversion
- Upper and lower output clipping
- Analog output hold while in PROG. mode

1.3 Restrictions on Units Combination

1.3.1 Limitations on the Power Consumption

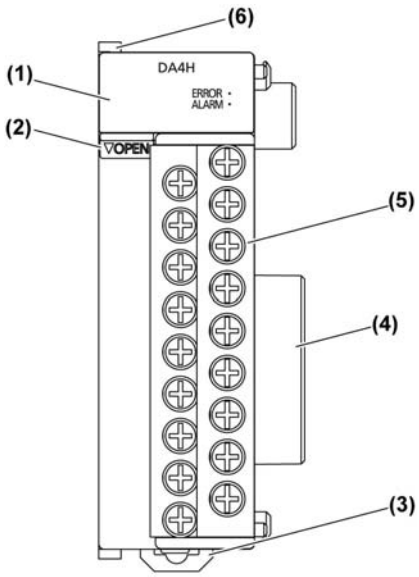
The FP7 analog output unit has the following internal current consumption. When the system is configured, the other units being used should be taken into consideration, and a power supply unit with a sufficient capacity should be used.

Name	Product no.	Current consumption
FP7 analog output unit	AFP7DA4H	250 mA or less

2

Names and Functions of Parts

2.1 Analog Output Unit



■ **Names and functions of parts**

(1) Operation monitor LEDs

LED Name	LED color	Contents
-	Blue	Lit when the CPU unit is turned on.
ERROR	Red	Lit if the configuration settings are beyond the allowable range.
ALARM	Red	Lit if the hardware has an error.

(2) Terminal block release lever

To remove the analog output terminal block, push the release lever downward.

(3) DIN rail attachment lever

This lever is used to fix the unit to the DIN rail.

(4) Unit connector

Connects with I/O units and high-function units.

(5) Analog output terminal block

The terminal block is removable. Remove the terminal block before wiring.
Solderless terminals for M3 can be used.

(6) Fixing hook

This hook is used to fix two or more units to be connected.

3
Wiring

3.1 Wiring of Terminal Block

■ **Suitable solderless terminals/wires**

M3 terminal screws are used for the terminal. The following suitable solderless terminals are recommended for the wiring to the terminals

■ **Suitable solderless terminals**

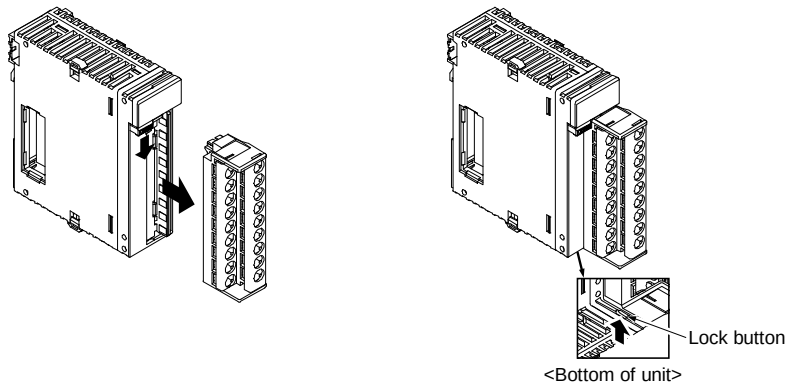
Manufacturer	Shape	Part no.	Suitable wires
J.S.T. Mfg Co., Ltd.	Round type	1.25-MS3	0.25 to 1.65 mm^2
	Fork type	1.25-B3A	
	Round type	2-MS3	1.04 to 2.63 mm^2
	Fork type	2-N3A	

■ **Suitable wires**

Suitable wires	Tightening torque
AWG22 to 14 (0.3 mm^2 to 2.0 mm^2)	0.5 to 0.6 N·m

■ **Connection to the terminal block**

Remove the terminal block before beginning the wiring operations. To remove the terminal block, push downward the release lever located at the top of the terminal block.



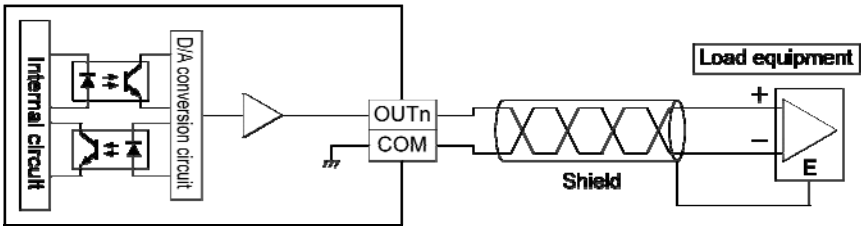
◆ **NOTE**

- **Install the terminal block by inserting it all the way to its original position and pressing the lock button on the bottom of the unit. Then confirm that the terminal block is securely attached and cannot be removed.**

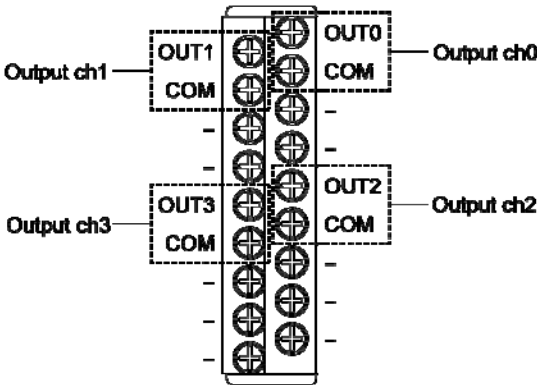
3.2 Analog Output Connections

3.2.1 Voltage Output (-10 to +10, 0 to +10, 0 to +5, and +1 to +5 V)

■ **Internal circuit diagram and connection diagram**

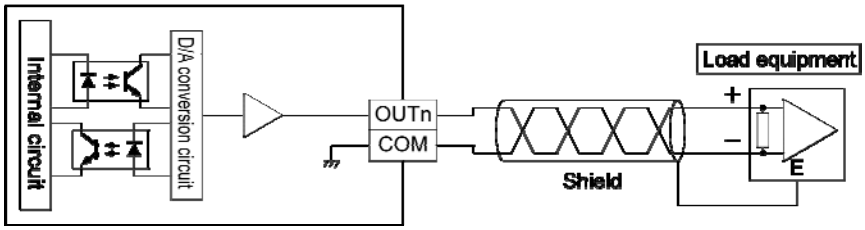


■ **Terminal layout**

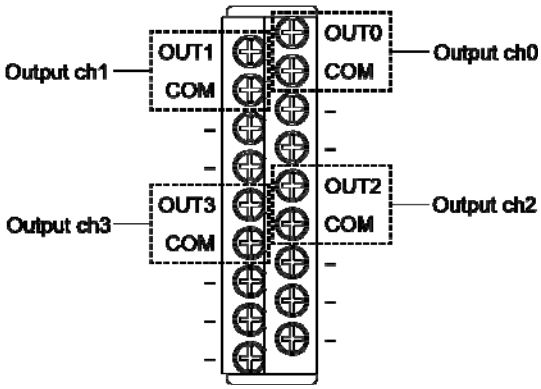


3.2.2 Current Output (0 to +20 and +4 to +20 mA)

■ **Internal circuit diagram and connection diagram**



■ **Terminal layout**



◆ **NOTES**

- **Use double-core twisted-pair shielded wires for analog output signals.**
- **Ground the shielding of the shielded wire on the load equipment side. However, depending on the conditions of the external noise, it may be better to ground the shielding externally or not to ground the shielding.**
- **Do not place the analog output wiring close to AC lines, high-tension lines, or load lines other than PLC wires or bundle the analog output and other wires together.**
- **The NC terminals of the analog output terminal block are unused. Do not use these terminals to relay wires because the terminals include those connected internally.**

4

Unit Settings and Data Writing

4.1 Confirming the I/O Number Allocations and First Word Number

4.1.1 Occupied I/O Area and I/O Allocations

In the FP7, digital data for analog output is allocated to the external output relay area and processed.
Furthermore, control I/O signals are allocated to the FP7 to process errors and clip upper and lower output limits.

■ **Input contact**

Address								Name	Description
CH0		CH1		CH2		CH3			
WX0	X0	WX1	X10	WX2	X20	WX3	X30	Error flag	Turns ON when an error is detected.
	X1		X11		X21		X31	Upper limit of upper and lower output clipping	Turns ON when the output exceeds the upper limit of output clipping, provided that the upper and lower limit function is active.
	X2		X12		X22		X32	Lower limit of upper and lower output clipping	Turns ON when the output drops below the lower limit of output clipping, provided that the upper and lower limit function is active.
	X3 to XF		X13 to X1F		X23 to X2F		X33 to X3F	Not used	Do not use.

■ **Output contact**

Address								Name	Description
CH0		CH1		CH2		CH3			
WY0	Y0 to YF	WY2	Y20 to Y2F	WY4	Y40 to Y4F	WY6	Y60 to Y6F	D/A conversion data (16 bits)	Set a digital value corresponding to the analog output. <Voltage range> -10 to +10 V: -31,250 to +31,250 0 to +10 or 0 to +5 V: 0 to +31,250 +1 to +5 V: 0 to +25,000 <Current range> 0 to +20 mA: 0 to +31,250 +4 to +20 mA: 0 to +25,000 * Apply a digital value within the set scale if scale conversion is set.
WY1	Y10	WY3	Y30	WY5	Y50	WY7	Y70	Upper and lower output clipping Function execution relay	The upper and lower output limit clipping function is executed with the relay turned ON. With the relay turned OFF, the upper limit flag (Xn1) for upper and lower output clipping limits and the lower limit flag (Xn2) for upper and lower output clipping limits are turned OFF.
	Y11 to Y1F		Y31 to Y3F		Y51 to Y5F		Y71 to Y7F	Not used	Do not use.

Note 1) The I/O numbers in the tables above show offset addresses. I/O numbers actually allocated are based on the first word number allocated to the unit. Example) If the first word number is 10, the D/A conversion data on CH0 and the error flag will be WY10 and X100, respectively.

4.1.2 Confirming the I/O Number Allocations

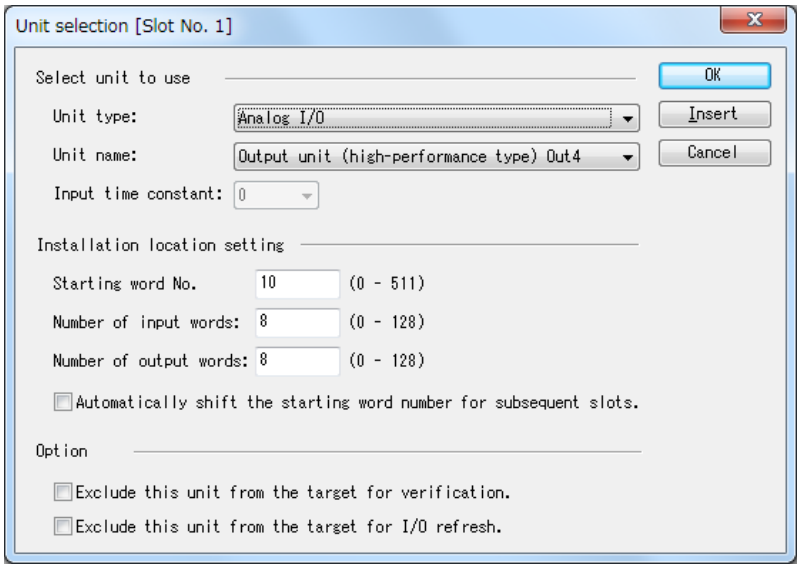
I/O numbers and base word numbers are always necessary when writing programs. Always check to see if the numbers match the design. I/O numbers allocated are determined by the first word number.

■ **Allocations to unit**

Take the following procedure to set the first word number.

◆ **PROCEDURE**

1. **Select "Options" → "FP7 Configuration" from the menu bar.**
2. **Select "I/O Map" from the field.**
3. **Double-click the target slot where the operating unit is to be inserted.**
4. **Select "Analog I/O" and "Output Unit" in the unit selection field.**



5. **Press the [OK] button.**

   The first word number specified is set.

4.2 Configuration Settings

4.2.1 Configuration of Analog Output Unit

Use the FPWIN GR7 configuration menu to make analog output unit settings, such as output range, offset, and gain settings.

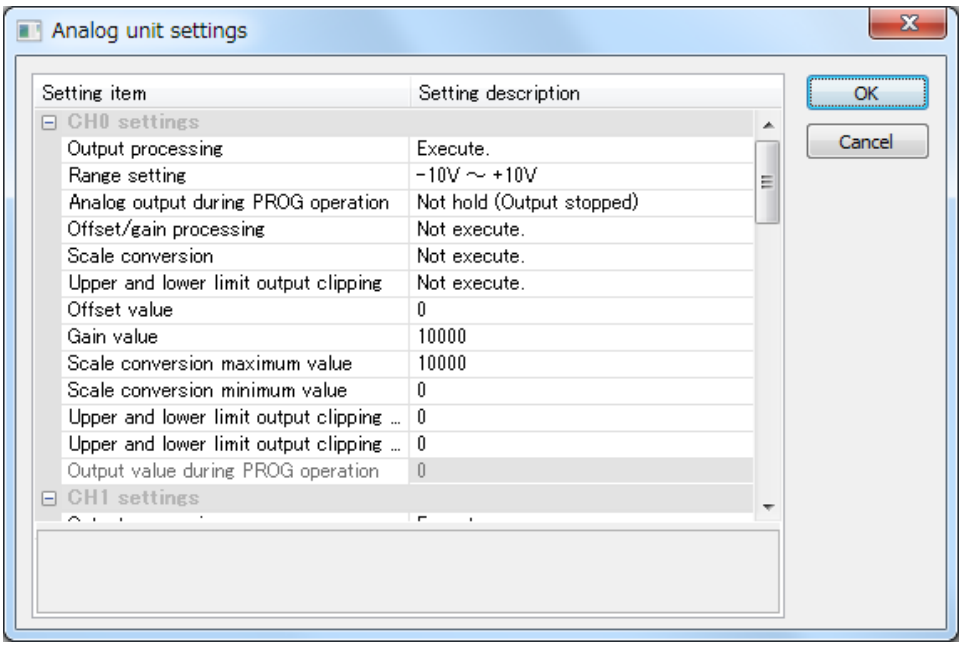
■ **Setting method**

The following steps are described on the condition that the analog output unit has been already allocated on the I/O map.

◆ **PROCEDURE**

1. **Select "Options" → "FP7 Configuration" from the menu bar.**
2. **Select "I/O Map" from the field.**
3. **Select the slot where the analog output unit is registered and press the [Set details] button.**

   The "Analog unit settings" dialog box is displayed.



4. **Select the output processing and range setting.**

   Select option setting as required.

5. **Press the [OK] button.**

   The set value will become effective when the set value is downloaded together with a corresponding program as a project.

■ Settings

Group	Setting item		Settings		Default
Basic setting items (per channel)	Output processing		Execute/Not execute		Execute
	Range setting		-10 to +10 V 0 to +10 V 0 to +5 V +1 to +5 V 0 to +20 mA +4 to +20 mA		-10 to +10 V
Option setting items (per channel)	Upper and lower output clipping limits		Execute/Not execute		Not execute
		Upper limit	-32,500 to +32,500		0
		Lower limit	-32,500 to +32,500		0
	Scale conversion		Execute/Not execute		Not execute
		Max. value	-30,000 to +30,000		10000
		Min. value	-30,000 to +30,000		0
	Offset/Gain processing		Execute/Not execute		Not execute
		Offset value	-3,000 to +3,000		0
		Gain value	+9,000 to +11,000		10000
	Analog output hold while in PROG. mode		Non-hold/Current value hold/Desired value hold		Non-hold
		A digital value corresponding to the desired analog output	-10 to +10 V	-32,500 to +32,500	0
			0 to +10 V 0 to +5 V 0 to +20 mA	0 to +32,500	
			+1 to +5 V +4 to +20 mA	0 to +25,000	

4.2.2 Unit Setting and Conversion Processing Time

Conversion time varies with the configuration setting conditions.

■ **Conversion processing execution/non-execution setting and conversion processing time**

Select the execution or non-execution of the conversion processing of analog output on a channel-by-channel basis. This can save the conversion time for channels that do not execute conversion processing. A conversion time of 25 μs is required per channel.

Example) Conversion time for four channels

Converted in the order of ch0→ch1→ch2→ch3→ch0→ch1→ch2→ch3→.... (1 cycle = 100 μs)

Example) Conversion time for two channels (with CH2 and CH3 excluded).

Conversion is executed in the order of ch0→ch1→ch0→ch1→ch0→ch1→ch0→ch1→...
and the conversion time for CH2 and CH3, which are excluded, is saved. (1 cycle = 50 μs)

4.3 Writing Analog Output Data

■ **Basic operation of analog output**

(1) Writing digital data

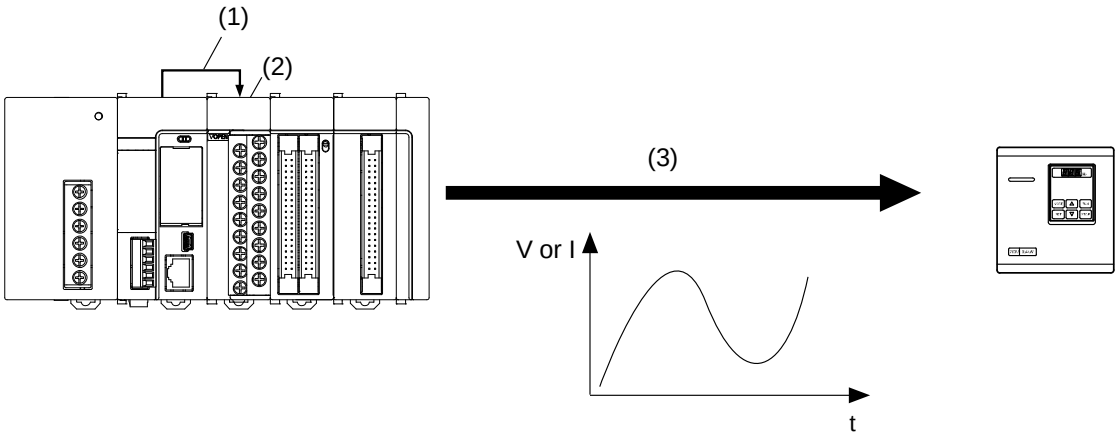
A user program is used to write digital data to the output relay area (WY) on a channel-by-channel basis so that the digital data will be output in analog form. The converted analog value varies with the setting of the range. The specified slot number varies depending on the installation position of the unit.

(2) Analog conversion processing

Data written to the unit is converted to analog values in sequence automatically.

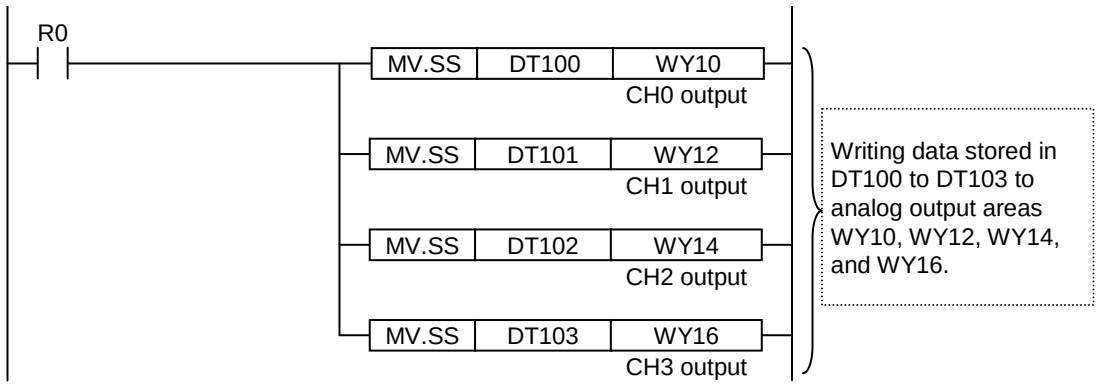
(3) Output to analog-driven equipment

Converted analog values are output to inverters or other analog-driven equipment.



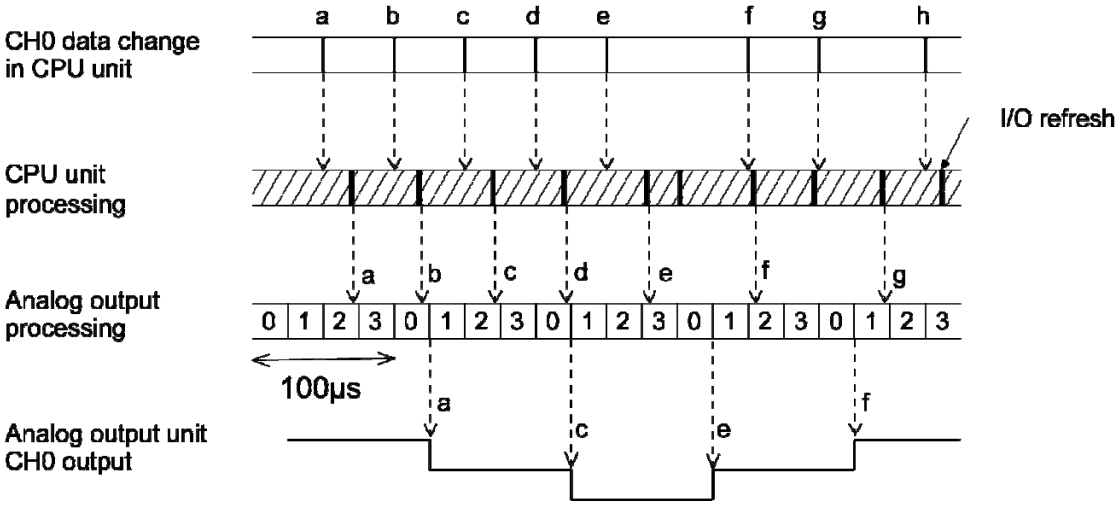
■ **Overview of program**

Writing data stored in DT100 to DT103 to analog output areas WY10, WY12, WY14, and WY16.



4.4 Timing Chart of Output Processing

- Data is written as output relay area data to the analog output unit at the I/O refreshing timing of the CPU unit.
- The processing of the analog output unit is not synchronized with the processing of the CPU unit. Therefore, the analog output unit converts the latest data from the CPU unit into an analog value and outputs it.
- The digital data conversion time of the analog output unit varies with the number of channels and the range of use.

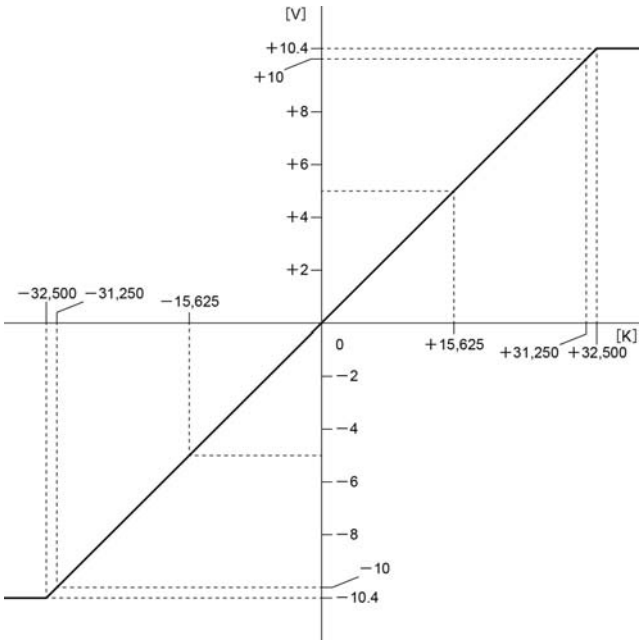


5

Conversion Characteristics of Analog Output

5.1 Voltage Range

5.1.1 Voltage Output Range: -10 to +10 V (0.32 mV, 1/62,500)



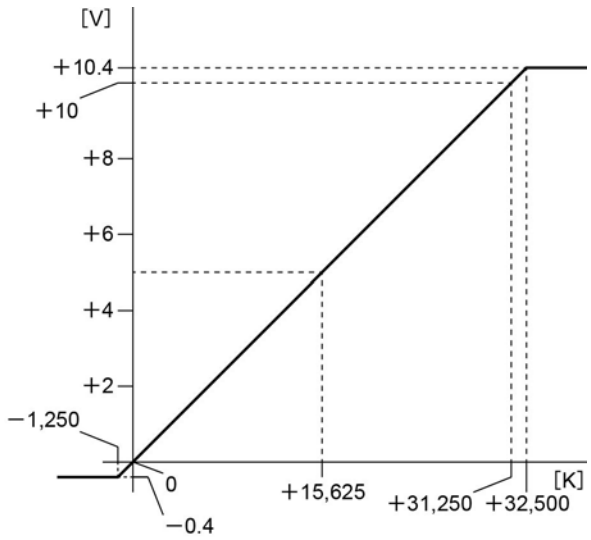
Output range: -10 to +10 V

Digital input value (K)	Analog output value (V)
+31,250	+10
+25,000	+8
+18,750	+6
+12,500	+4
+6,250	+2
0	0
-6,250	-2
-12,500	-4
-18,750	-6
-25,000	-8
-31,250	-10

When exceeding the rated range

Digital input value	Analog output value
+32,500 or more	Output at +10.4 V
-32,500 or less	Output at -10.4 V

5.1.2 Voltage Output Range: 0 to +10 V (0.32 mV, 1/31,250)



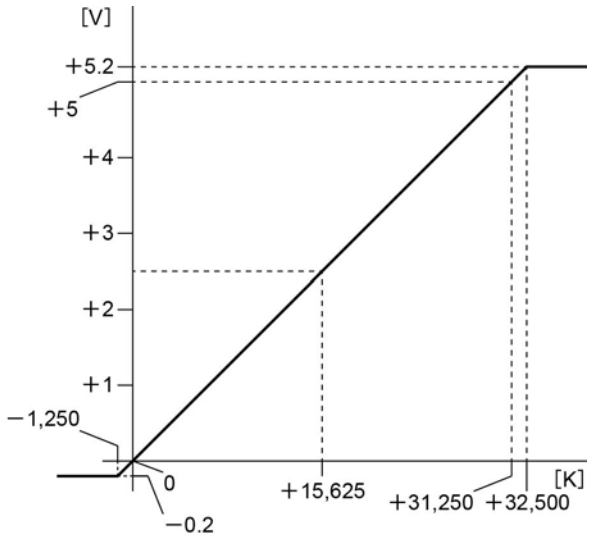
Output range: 0 to 10 V

Digital input value (K)	Analog output value (V)
+31,250	+10
+25,000	+8
+18,750	+6
+12,500	+4
+6,250	+2
0	0

When exceeding the rated range

Digital input value	Analog output value
+32,500 or more	Output at +10.4 V
-1,250 or less	Output at -0.4 V

5.1.3 Voltage Output Range: 0 to +5 V (0.16 mV, 1/31,250)



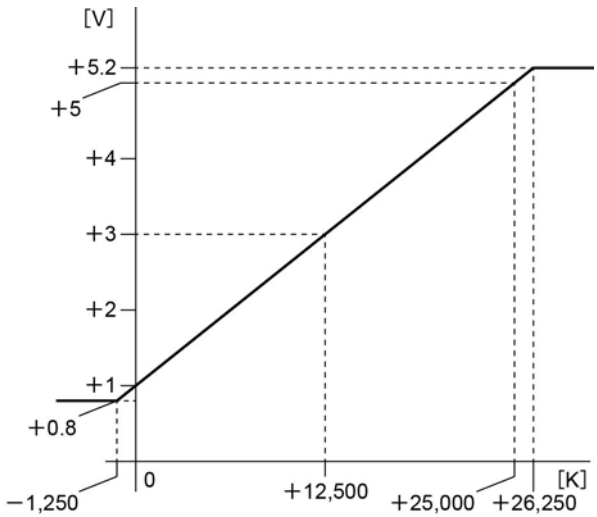
Output range: 0 to 5 V

Digital input value (K)	Analog output value (V)
+31,250	+5
+25,000	+4
+18,750	+3
+12,500	+2
+6,250	+1
0	0

When exceeding the rated range

Digital input value	Analog output value
+32,500 or more	Output at +5.2 V
-1,250 or less	Output at -0.2 V

5.1.4 Voltage Output Range: +1 to +5 V (0.16 mV, 1/25,000)



Output range: +1 to +5 V

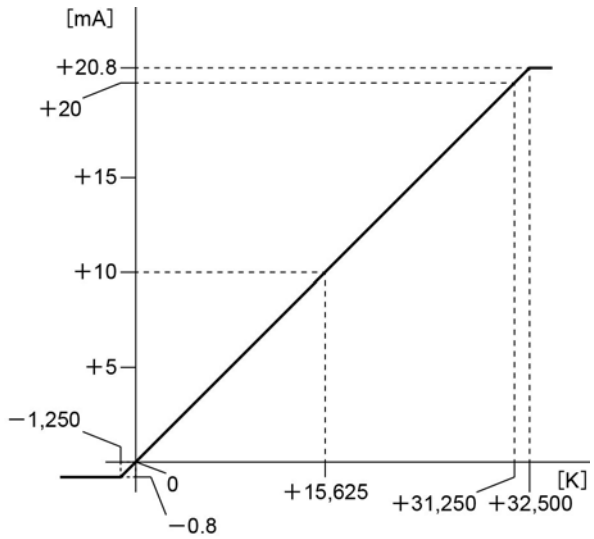
Digital input value (K)	Analog output value (V)
+25,000	+5
+18,750	+4
+12,500	+3
+6,250	+2
0	+1

When exceeding the rated range

Digital input value	Analog output value
+26,250 or more	Output at +5.2 V
-1,250 or less	Output at 0.8 V

5.2 Current Range

5.2.1 Current Output Range: 0 to +20 mA (0.64µA, 1/31,250)



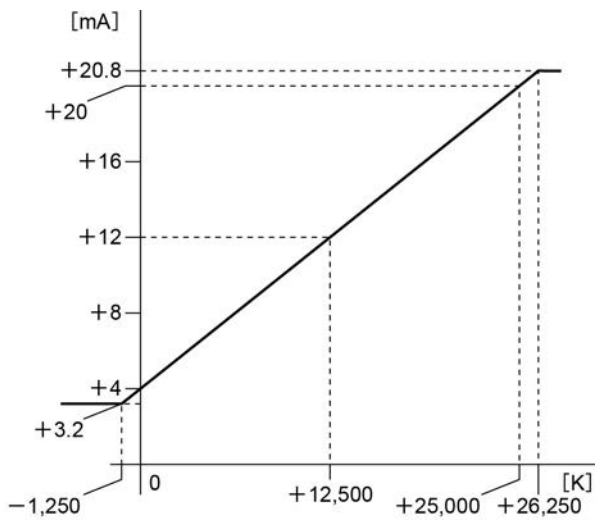
Output range: 0 to +20 mA

Digital input value (K)	Analog output value (mA)
+31,250	+20
+25,000	+16
+18,750	+12
+12,500	+8
+6,250	+4
0	0

When exceeding the rated range

Digital input value	Analog output value
+32,500 or more	Output at +20.8 mA
-1,250 or less	Output at -0.8 mA

5.2.2 Current Output Range: +4 to +20 mA (0.64µA, 1/25,000)



Output range: 4 to 20 mA

Digital input value (K)	Analog output value (mA)
+25,000	+20
+18,750	+16
+12,500	+12
+6,250	+8
0	+4

When exceeding the rated range

Digital input value	Analog output value
+26,250 or more	Output at +20.8 mA
-1,250 or less	Output at +3.2 mA

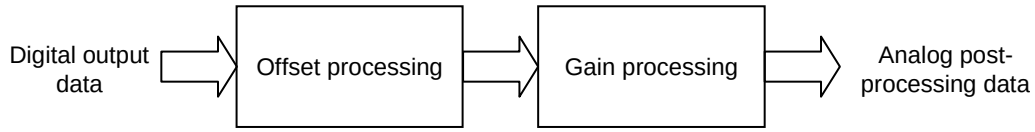
6

Option Settings for Analog Output

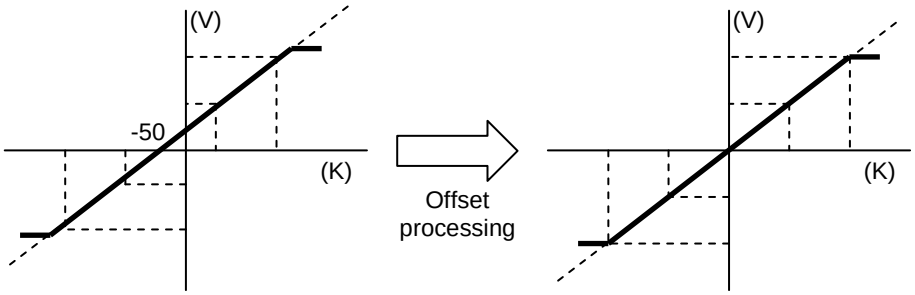
6.1 Offset/Gain Processing Settings

■ **Overview of functions**

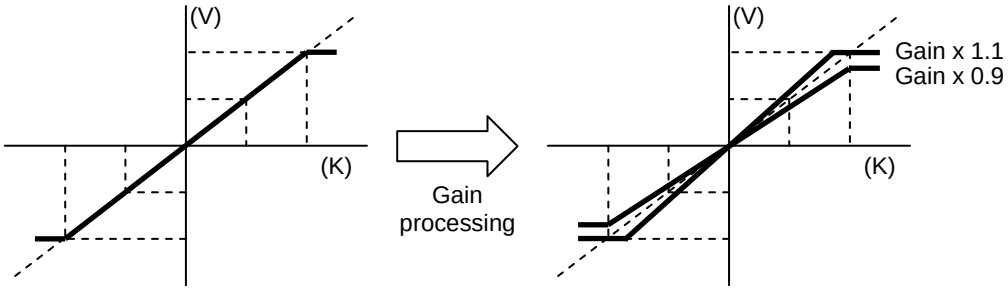
- Offset value (added correction) and gain value (magnification correction) adjustments are made to store processed data in the I/O area.



- Offset value settings are used as a function (zero-point adjustment) to make offset error adjustments between load devices. If the analog conversion value is V0 when the digital set value is K-50, the analog conversion data is corrected to 0 V based on K50 as an offset value.



- Gain value settings are used as a function to adjust delicate scale errors between load devices.



- Make offset and gain processing on a channel-by-channel basis.

■ **Configuration**

Name		Default	Setting range and description
Function setting	Offset/Gain processing	Not execute	Select “Execute.”
Offset value setting		K0	Set an offset value at the time of using the offset gain processing function. Setting range: -3,000 to +3,000 (Specified with a signed integer)
Gain value setting		K10,000	Set an offset value at the time of using the offset gain processing function. Setting range: +9,000 to +11,000 (0.9x to 1.1x: Specified with a signed integer)

◆ **NOTE**

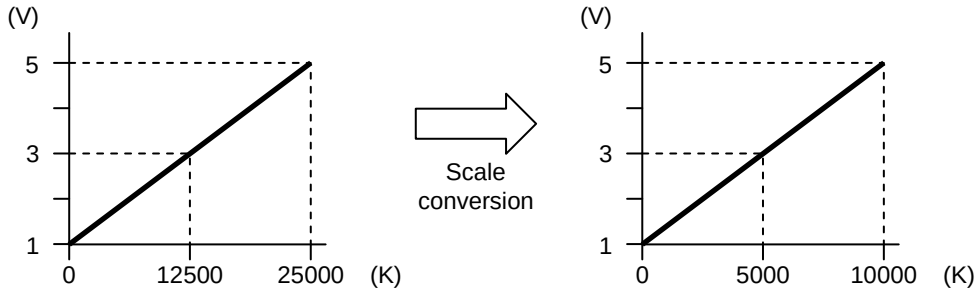
- **The offset value is corrected to a value corresponding to the resolution of the output range of the original value regardless of whether scale conversion is set or not.**

6.2 Scale Conversion Settings

■ **Overview of functions**

This function makes it possible to set an easy-to-use analog output range. D/A conversion is made in a scale of preset minimum and maximum values to store the data in the I/O area. This function is convenient if used for unit conversion.

- Scale conversion processing is performed for each channel.
- Digital input values to the analog output unit include fractions. Therefore, convert the values to easy-to-handle figures if needed.



■ **Configuration**

Name		Default	Setting range and description
Function setting	Scale conversion	No	Select “Yes.”
Scale conversion max. value		K10,000	Set the maximum value at the time of using the scale conversion function. Setting range: -30,000 to +30,000 (Specified with a signed integer)
Scale conversion min. value		K0	Set the minimum value at the time of using the scale conversion function. Setting range: -30,000 to +30,000 (Specified with a signed integer)

(Note 1) An error will occur and the function will be disabled if the minimum value of scale conversion is larger than the maximum value of scale conversion.

(Note 2) An error will occur and the function will be disabled if values outside the allowable range are set.

◆ **KEY POINTS**

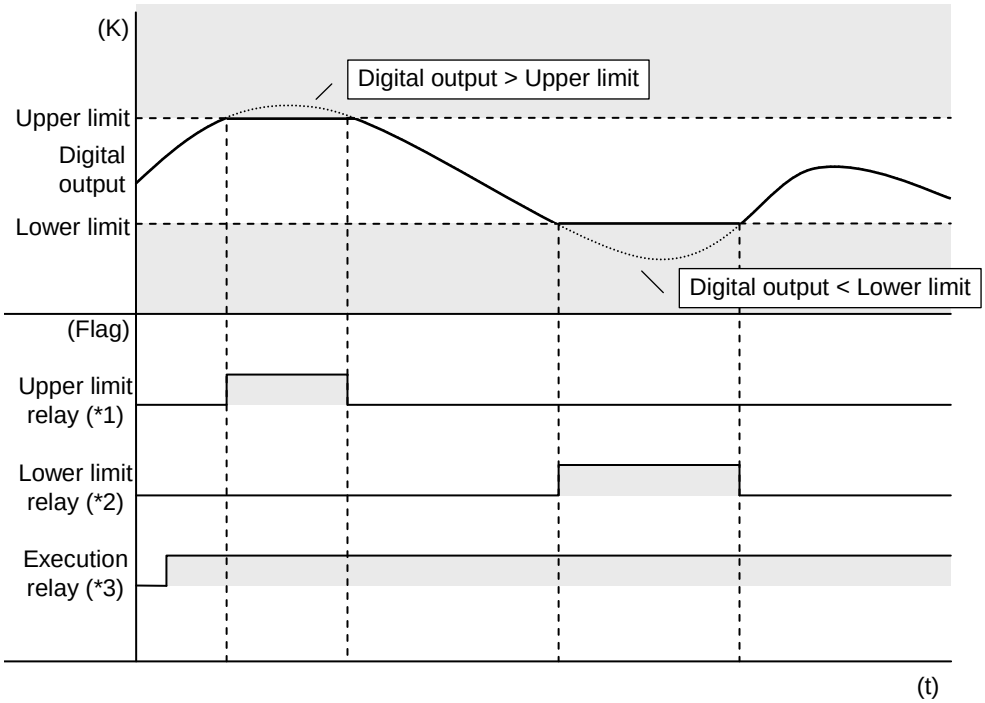
- **The output at the maximum and minimum values of scale conversion will be clipped if values outside the allowable range are set with the scale conversion function.**

6.3 Settings for Upper and Lower Output Clipping

■ Overview of functions

This function makes it possible to clip the output with specified values in excess of the upper and lower limit range if the specified values are set for digital output. This function makes it possible to prevent the wrong application of voltages or currents out of the specifications to equipment to be connected.

- Make output clipping settings for upper and lower limits on a channel-by-channel basis.
- The upper limit relay will turn ON if the digital output value is larger than the upper limit.
- The lower limit relay will turn ON if the digital output value is smaller than the lower limit.
- It is necessary to turn ON the execution relay with a user program in order to clip the upper and lower output limits.



■ I/O Allocation

The I/O numbers in the timing chart and program are shown on the condition that the first word number of the unit is 10. Actual I/O numbers allocated are determined by the first word number.

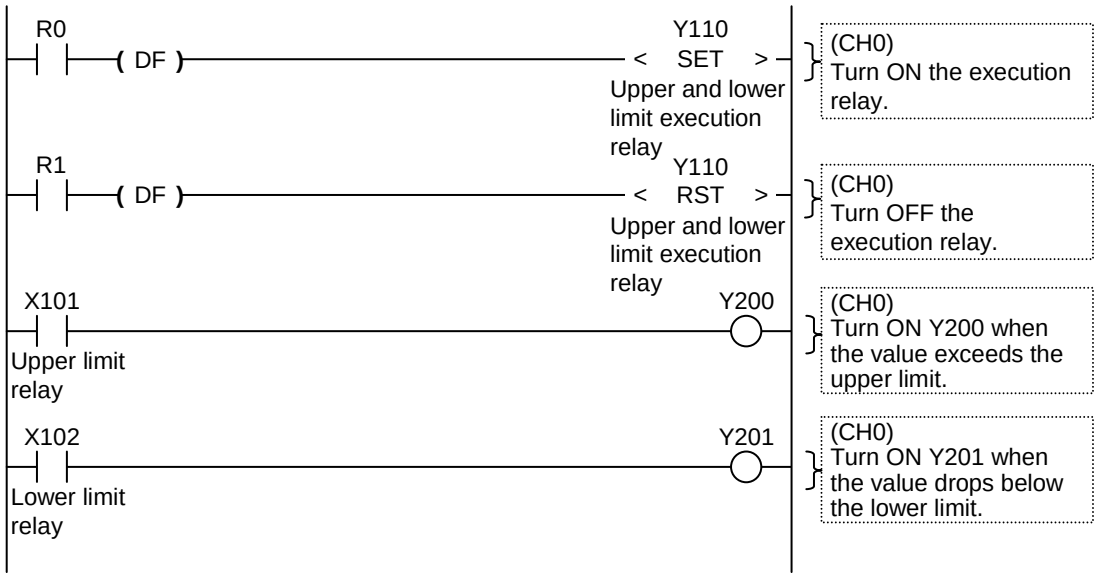
	CH0	CH1	CH2	CH3
*1 Upper limit of upper and lower limit clipping	X101	X111	X121	X131
*2 Lower limit of upper and lower limit clipping	X102	X112	X122	X132
*3 Function execution relay for upper and lower clipping	Y110	Y130	Y150	Y170

■ Configuration

Name	Default	Setting range and description
Upper limit of upper and lower output clipping	K0	Set the upper limit to turn ON the upper limit relay for the use of the function of clipping upper and lower output limits. Setting range: -32,500 to +32,500 (Specified with a signed integer)
Lower limit of upper and lower output clipping	K0	Set the lower limit to turn ON the lower limit relay for the use of the function of clipping upper and lower output limits. Setting range: -32,500 to +32,500 (Specified with a signed integer)

■ Sample program

Example) CH0 shows control examples for cases exceeding the upper and lower limits.



◆ **NOTE**

- **Upper and lower limit settings are used to clip the output according to the resolution of the original output range regardless of whether scale conversion is set or not.**

6.4 Analog Output Hold while in PROG. Mode.

■ Overview of functions

This function holds analog output when the PLC mode is switched from RUN to PROG..

- Make analog output hold settings on a channel-by-channel basis.
- The analog output value can be set to hold a desired value, the current value, or not to hold any value on a channel-by-channel basis.
  (Note) The converted digital value varies with the setting of the range if "Desired value hold" is set.

■ Configuration

Name		Default	Setting range and description
Function setting	Analog output in PROG. mode	Non-hold	Non-hold / Current value hold / Desired value hold
Analog output in PROG. mode *1		K0	Set a digital value corresponding to the analog output when a desired value is set for the analog output while in PROG. mode. Setting range: -31,250 to +31,250 (Specified with a signed integer)

*1 This configuration is enabled when "analog output hold settings" is set to "Desired value hold"

◆ **NOTES**

- **If no analog output is held, the output will be turned OFF (0 V or 0 mA) while in PROG. mode.**
- **The output will be turned OFF (0 V or 0 mA) if an error occurs.**

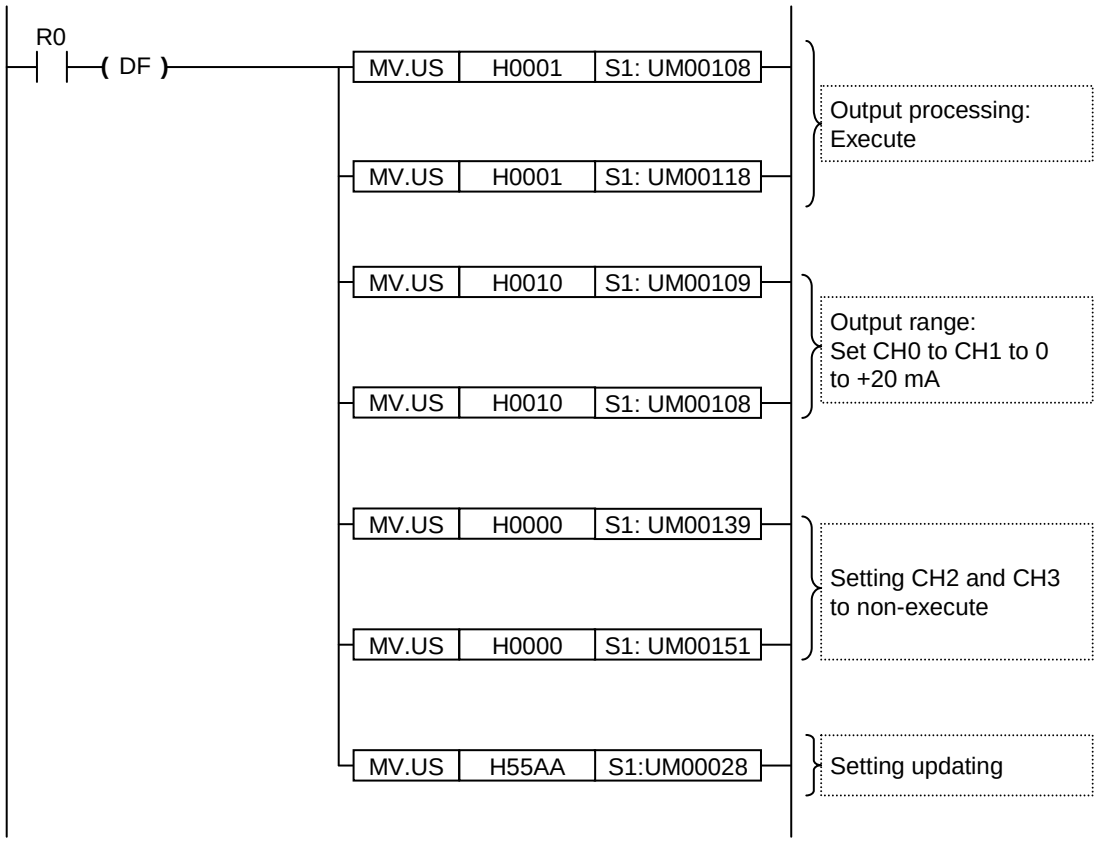
6.5 Configuration by Programming

■ Overview of functions

- The FP7 analog output unit makes it possible to overwrite the configuration information by programming.
- The configuration information is refreshed by writing “55AA” to unit memory UM 00028 after the value is stored in the unit memory where a desired parameter is set.
- The value of unit memory UM 00028 will be set to 0 when the configuration information is updated.

■ Sample program

Output processing: CH0 and CH1 are executed and CH2 and CH3 are non-executed for the implementation output range of 0 to +20 mA.



7

What to Do If an Error Occurs

7.1 What to Do If an Error Occurs

7.1.1 Unstable Analog Output Value

- Check if the shielded wire of the input device is grounded.
  However, depending on the conditions of the external noise, it may be better not to ground the shielding.
- Review the program again.

7.1.2 Unchanged Analog Output Value

- Check that the unit is in RUN mode.
- Check again that I/O allocations are correct.
- Check again the connections of the terminal block.
- Check that the impedance of the input device is 500 Ω or below if the current output range is set.
- Check that the output is not short-circuited.
- Check that the digital input value is within the range.
- Check the configuration settings.

8

Specifications

8.1 Specifications

■ General specifications

Items	Description	
Operating ambient temperature	0°C to +55°C	
Storage ambient temperature	-40°C to +70°C	
Operating ambient humidity	10% to 95% (RH) with no condensation (at 25°C)	
Storage ambient humidity	10% to 95% (RH) with no condensation (at 25°C)	
Breakdown voltage (Note)	Between I/O terminals and power supply terminals of CPU unit/function earth	500 V AC for 1 minute
	<Analog output unit> Between analog output terminal channels	200 V AC for 1 minute
Insulation resistance	Between I/O terminals and power supply terminals of CPU unit/function earth	100 MΩ (Test voltage: 500 V DC)
Vibration resistance	Conforming to JIS B 3502 and IEC 61131-2 5 to 8.4 Hz, 3.5-mm-wide single amplitude 8.4 to 150 Hz, acceleration 9.8 m/s^2 10-time sweeping in X, Y, and Z directions (1 octave/min.)	
Shock resistance	Conforming to JIS B 3502 and IEC 61131-2 147 m/s^2 or more., 3 times each in X, Y, and Z directions	
Noise resistance	1,000 V DC (p-p) with pulse width of 50 ns/1 μs (by using a noise simulator) (Applied to the power supply of the CPU unit)	
Environment	Free from corrosive gases and excessive dust.	
EU Directive applicable standard	EMC Directive: EN 61131-2	
Overvoltage category	Category II or lower	
Pollution degree	Pollution degree 2 or lower	

(Note) Cutoff current: 5 mA (Factory default setting)

■ Performance specifications

Items		Description
No. of output points		4 channels
Output range (resolution)	Voltage	-10 to +10 V DC (Resolution: 1/62,500) 0 to +10 V DC (Resolution: 1/31,250) 0 to +5 V DC (Resolution: 1/31,250) +1 to +5 V DC (Resolution: 1/25,000) (see note 3)
	Current	0 to +20 mA (Resolution: 1/31,250) +4 to +20 mA (Resolution: 1/25,000) (see note 3)
Conversion speed	Voltage input	25 µs/ch
	Current input	
Total accuracy		±0.1% F.S. max. (at +25°C) and ±0.3% F.S. max. (at 0°C to +55°C)
Output impedance (voltage output)		0.5Ω max.
Maximum output current (voltage output)		10 mA
Output allowable load resistance (current output)		500 Ω max.
Insulation system		Between input terminals and internal circuit: Photocoupler and isolated DC/DC converter Between channels: Non-isolated
Conversion execution/non-execution channel settings		Possible to make non-converted channel settings.
Function of upper and lower output clipping limits		Upper and lower output limits can be set for digital input values. Setting range: -32,500 to +32,500
Scale conversion settings		A desired value within the digital input range can be set. Setting range: -30,000 to +30,000
Offset/Gain settings		A desired value within the digital input range can be set for the offset value. Setting range: -3,000 to +3,000 A desired value within the digital input range can be set for the gain value. Setting range: +9,000 to +11,000 (90% to 110%)
Analog output hold (while in PROG. mode)		A desired output value while in PROG. mode can be set as a digital value. Setting range: -31,250 to +31,250

(Note 1) Set any of the following functions in the configuration menu of the tool software or a user program: Output range, conversion execution/non-execution channel, upper and lower output clipping, scaling processing, offset/gain, and (PROG. mode) analog output hold settings

(Note 2) If not all channels are used, the conversion speed can be saved by setting non-execution channels with the function of setting the conversion execution/non-execution channels used.

(Note 3) The full scale (F.S.) on the accuracy of an analog voltage output range from +1 to +5 V and that of an analog current output range from +4 to +20 mA are 0 to +5 V and 0 to +20 mA, respectively.

8.2 List of I/O Allocations

■ **Input contact**

Address								Name	Description
CH0		CH1		CH2		CH3			
WX0	X0	WX1	X10	WX2	X20	WX3	X30	Error flag	Turns ON when an error is detected.
	X1		X11		X21		X31	Upper and lower output clipping Upper limit	Turns ON when the output exceeds the upper limit of output clipping, provided that the upper and lower limit function is active.
	X2		X12		X22		X32	Upper and lower output clipping Lower limit	Turns ON when the output drops below the lower limit of output clipping, provided that the upper and lower limit function is active.
	X3 to XF		X13 to X1F		X23 to X2F		X33 to X3F	Not used	Do not use.

■ **Output contact**

Address								Name	Description
CH0		CH1		CH2		CH3			
WY0	Y0 to YF	WY2	Y20 to Y2F	WY4	Y40 to Y4F	WY6	Y60 to Y6F	D/A conversion data (16 bits)	Set a digital value corresponding to the analog output. <Voltage range> -10 to +10 V: -31,250 to +31,250 0 to +10 or 0 to +5 V: 0 to +31,250 +1 to +5 V: 0 to +25,000 <Current range> 0 to +20 mA: 0 to +31,250 +4 to +20 mA: 0 to +25,000
WY1	Y10	WY3	Y30	WY5	Y50	WY7	Y70	Upper and lower output clipping Function execution relay	The upper and lower output clipping function is executed with the relay turned ON. With the relay turned OFF, the upper limit flag (Xn1) for upper and lower output clipping and the lower limit flag (Xn2) for upper and lower output clipping are turned OFF.
	Y11 to Y1F		Y31 to Y3F		Y51 to Y5F		Y71 to Y7F	Not used	Do not use.

(Note 1) The I/O numbers in the tables above show offset addresses. I/O numbers actually allocated are based on the first word number allocated to the unit. If the first word number is 10, the D/A conversion data on CH0 and the error flag will be WY10 and X100, respectively.

8.3 List of Unit Memory

8.3.1 List of Unit Memory Numbers

There is no need to set unit memory values, because unit memory values will be written automatically if they are set in the configuration menu of the FPWIN GR7 tool software. In the case of making program settings, specify the desired unit memory numbers and write the corresponding values.

■ **Setting monitoring items and allocation of unit memory numbers**

Setting monitoring item		Unit memory number			
		CH0	CH1	CH2	CH3
Output processing		UM 00108	UM 00118	UM 00128	UM 00138
Output range		UM 00109	UM 00119	UM 00129	UM 00139
Function setting	Offset/Gain processing Scale conversion Upper and lower output clipping Analog output in PROG. mode	UM 0010A	UM 0011A	UM 0012A	UM 0013A
Offset value		UM 0010B	UM 0011B	UM 0012B	UM 0013B
Gain		UM 0010C	UM 0011C	UM 0012C	UM 0013C
Scale conversion	Max.	UM 0010D	UM 0011D	UM 0012D	UM 0013D
	Min. Value	UM 0010E	UM 0011E	UM 0012E	UM 0013E
Upper and lower output clipping	Upper limit	UM 0010F	UM 0011F	UM 0012F	UM 0013F
	Lower limit	UM 00110	UM 00120	UM 00130	UM 00140
Output value while in PROG. mode		UM 00111	UM 00121	UM 00131	UM 00141

8.3.2 List of Unit Memory Specifications in Detail

■ **Individual setting area per channel**

<table>
<tr><th>Unit memory number (Hex)</th><th>Name</th><th>Default</th><th>Setting range and description</th></tr>
<tr><td>UM 00108
UM 00118
UM 00128
UM 00138</td><td>Output processing</td><td>H1</td><td>Select “Execute” or “Not execute” conversion processing.
H0: Not execute
H1: Execute</td></tr>
<tr><td>UM 00109
UM 00119
UM 00129
UM 00139</td><td>Output range</td><td>H1</td><td>Select the desired output range.
H1: Voltage output -10 to +10 V
H2: Voltage output 0 to +10 V
H4: Voltage output 0 to +5 V
H8: Voltage output 1 to +5 V
H10: Current output 0 to +20 mA
H20: Current output +4 to +20 mA</td></tr>
<tr><td>UM 0010A
UM 0011A
UM 0012A
UM 0013A</td><td>Function setting
• Offset/Gain processing
• Scale conversion
• Upper and lower output clipping
• Analog output while in PROG. mode</td><td>H0</td><td>Select the function to be used.
<table>
<tr><th>Bit</th><th>Name</th><th colspan="2">Settings</th></tr>
<tr><td>3-0</td><td>Analog output while in PROG. mode</td><td>H0</td><td>Non-hold (Output OFF)</td></tr>
<tr><td></td><td></td><td>H1</td><td>Current value held</td></tr>
<tr><td></td><td></td><td>H2</td><td>Desired value held</td></tr>
<tr><td>7-4</td><td>Offset/Gain processing</td><td>H0</td><td>Not execute</td></tr>
<tr><td></td><td></td><td>H1</td><td>Execute</td></tr>
<tr><td>11-8</td><td>Scale conversion</td><td>H0</td><td>Not execute</td></tr>
<tr><td></td><td></td><td>H1</td><td>Execute</td></tr>
<tr><td>15-10</td><td>Upper and lower output clipping</td><td>H0</td><td>Not execute</td></tr>
<tr><td></td><td></td><td>H1</td><td>Execute</td></tr>
</table></td></tr>
</table>

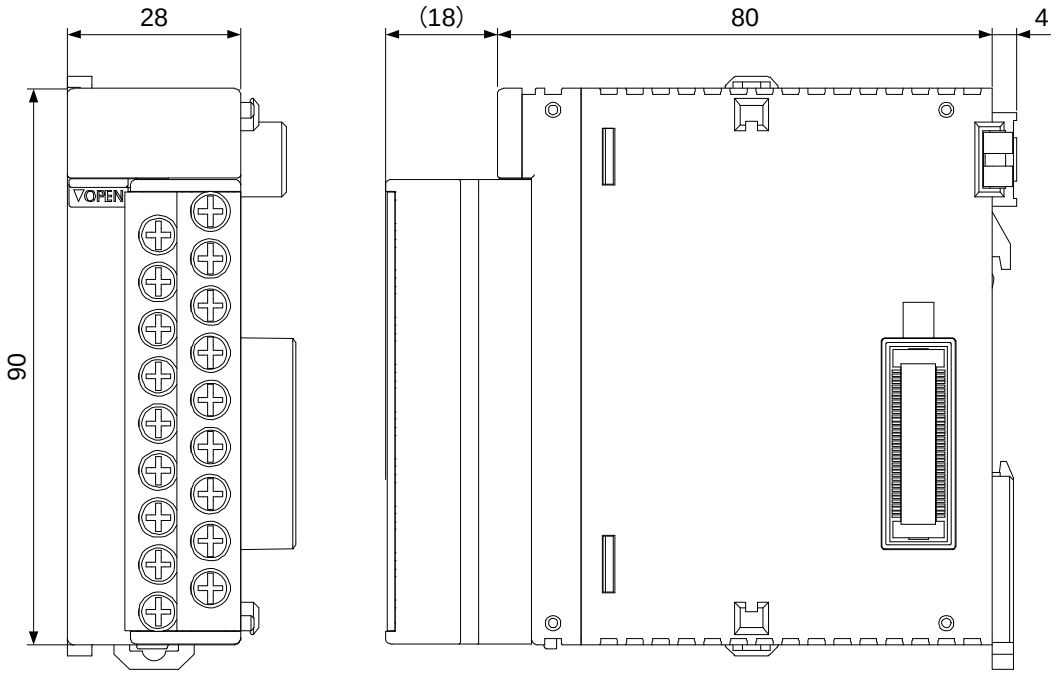
(Note) The unit memory numbers in the above table are listed for CH0, CH1, CH2, and CH3 in numerical order.

■ **Individual setting area per channel**

Unit memory number (Hex)	Name	Default	Setting range and description
UM 0010B UM 0011B UM 0012B UM 0013B	Offset value	K0	Set an offset value at the time of using the offset/gain processing function. Setting range: -3,000 to +3,000 (Specified with a signed integer)
UM 0010C UM 0011C UM 0012C UM 0013C	Gain value	K10,000	Set an offset value at the time of using the offset/gain processing function. Setting range: +9,000 to +11,000 (0.9x to 1.1x: Specified with a signed integer)
UM 0010D UM 0011D UM 0012D UM 0013D	Scale conversion max. value	K10,000	Set the maximum value at the time of using the scale conversion function. Setting range: -30,000 to +30,000 (Specified with a signed integer)
UM 0010E UM 0011E UM 0012E UM 0013E	Scale conversion min. value	K0	Set the minimum value at the time of using the scale conversion function. Setting range: -30,000 to +30,000 (Specified with a signed integer)
UM 0010F UM 0011F UM 0012F UM 0013F	Upper limit for upper and lower output clipping	K0	Set the upper limit to turn ON the upper limit relay for the use of the function of clipping upper and lower output. Setting range: -32,500 to +32,500 (Specified with a signed integer)
UM 00110 UM 00120 UM 00130 UM 00140	Lower limit for upper and lower output clipping	K0	Set the upper limit to turn ON the upper limit relay for the use of the function of clipping upper and lower output. Setting range: -32,500 to +32,500 (Specified with a signed integer)
UM 00111 UM 00121 UM 00131 UM 00141	Analog output while in PROG. mode	K0	Set a digital value corresponding to the analog output when a desired value is set for the analog output while in PROG. mode. Setting range: -31,250 to +31,250 (Specified with a signed integer)

(Note) The unit memory numbers in the above table are listed for CH0, CH1, CH2, and CH3 in numerical order.

8.4 Dimensions



Record of changes

Manual No.	Date	Record of Changes
WUME-FP7AOH-01	Mar.2013	First Edition