User's Manual

LG Programmable Logic Controller

# GLOFA G6F – DA2V G6F – DA2I

LG Industrial Systems

# ◎ CONTENTS ◎

## Chapter 4. FUNCTION BLOCK



## Chapter 5. PROGRAMMING



## Chapter 6. DIMENSIONS

# SAFETY PRECAUTIONS

Be sure to read carefully the safety precautions given in data sheet and user's manual before operating the module and follow them.

The precautions explained here only apply to the G6F-DA2V, G6F-DA2I (hereafter, called D/A conversion module)

For safety precautions on the PLC system, see the GLOFA GM6 User's Manuals.

A precaution is given with a hazard alert triangular symbol to call your attention, and precautions are represented as follows according to the degree of hazard.

**WARNING** ⇨ If not provided with proper prevention, it can cause death or fatal injury or considerable loss of property.

**CAUTION** ⇨ If not properly observed, it can cause a hazard situation to result in severe or slight injury or a loss of property.

However, a precaution followed with **CAUTION** can also result in serious conditions.

Both of two symbols indicate that an important content is mentioned, therefore, be sure to observe it.

Keep this manual handy for your quick reference in necessary.

## Design Precautions

**CAUTION**

▶ Design a safety circuit in the outside of the PLC for system safety in case of disorder of the external power or PLC module body. Otherwise, it can cause injury due to wrong output or malfunction.

1) The following shows analog output states according to various settings of functions that control analog output. When setting an output state, be cautious for safety.

| Channel Setting / State | Channel Specification | |
|---|---|---|
| | Used | Unused |
| PLC CPU in RUN state. | A D/A conversion value is output. | Voltage: 0 V Current: 4mA |
| PLC CPU in STOP state | Voltage : 0V, Current : 4mA | |
| PLC CPU in Error state | Previous value will be output. | |

2) Sometimes, fault of output device or internal circuit can make output abnormal. Design a supervising circuit in the outside for output signals which can cause serious accidents.

**CAUTION**

▶ Do not run I/O signal lines near to high voltage line or power line. Separate them as 100 mm or more as possible. Otherwise, noise can cause module malfunction.

## Installation Precautions

**CAUTION**

- Operate the PLC in the environment conditions given in the general specifications.
- If operated in other environment not specified in the general specifications, it can cause an electric shock, a fire, malfunction or damage or degradation of the module
- Make sure the module fixing projections is inserted into the module fixing hole and fixed.
- Improper installation of the module can cause malfunction, disorder or falling.

## Wiring Precautions

**CAUTION**

- When grounding a FG terminal, be sure to provide class 3 grounding which is dedicated to the PLC.
- Before the PLC wiring, be sure to check the rated voltage and terminal arrangement for the module and observe them correctly.
  If a different power, not of the rated voltage, is applied or wrong wiring is provided, it can cause a fire or disorder of the nodule.
- Drive the terminal screws firmly to the defined torque.
  If loosely driven, it can cause short circuit, a fire or malfunction.
- Be careful that any foreign matter like wire scraps should not enter into the module.
  It can cause a fire, disorder or malfunction.

## Test Run and Maintenance Precautions

**WARNING**

- Do not contact the terminals while the power is applied.
  It can cause malfunction.
- When cleaning or driving a terminal screw, perform them after the power has been turned off
- Do not perform works while the power is applied, which can cause disorder or malfunction.

**CAUTION**

- Do not separate the module from the printed circuit board(PCB), or do not remodel the module.
  They can cause disorder, malfunction, and damage of the module or a fire.
  When mounting or dismounting the module, perform them after the power has been turned off.
- Do not perform works while the power is applied, which can cause disorder or malfunction.

## Waste Disposal Precautions

**CAUTION**

- When disposing the module, do it as an industrial waste.

# Chapter 1. INTRODUCTION

The G6F-DA2V and the G6F-DA2I are digital/analog conversion modules for use with the GLOFA PLC GM6 series CPU module. (Hereafter the G6F-DA2V and G6F-DA2I are called the D/A conversion module)
The D/A conversion module is to convert a 16-bit, signed BIN digital value into an analog output signal (voltage or current).

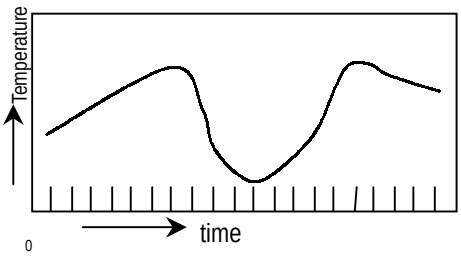
## 1.1 Features

1) Allows digital to Analog conversion for 4 channels per a module.
G6F-DA2V: 1 module can be performed for D/A conversion (voltage output) of 4 channels.
G6F-DA2I: 1 module can be performed for D/A conversion (current output) of 4 channels.

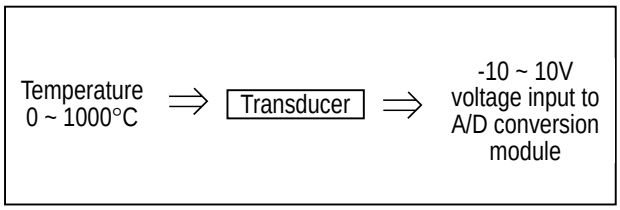
2) The number of the analog module including G6F-AD2A, G6F-DA2V and G6F-DA2I used on a base unit is limitless. But the number of analog module is limited by the ±15VDC capacity of the power supply module(GM6-PAFB).

## 1.2 Glossary

### 1.2.1 A - Analog Value




**[Fig 1.1] Analog Value**

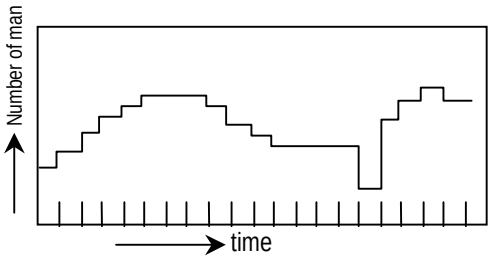



**[Fig 1.2] Example of Transducer**

Analog value is a sequentially changing value such as voltage, current, temperature, speed, pressure, flux, etc.

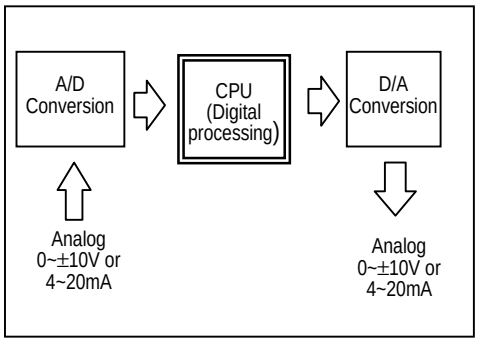
Temperature, for example, is sequentially changing according to the time. Because this temperature is not inputted on the PLC directly, the same analog value of DC voltage (0 to ±10V) or current (4 to 20mA) in accordance with the temperature should be input on the PLC through transducer.

### 1.2.2 D - Digital Value




Digital value is non-sequentially changing value written as the number like 0, 1, 2, 3. The signal of on or off is written as digital value of 0 or 1. There are BCD value and binary value in the range of digital value.

**[Fig. 1.3] Digital quality**

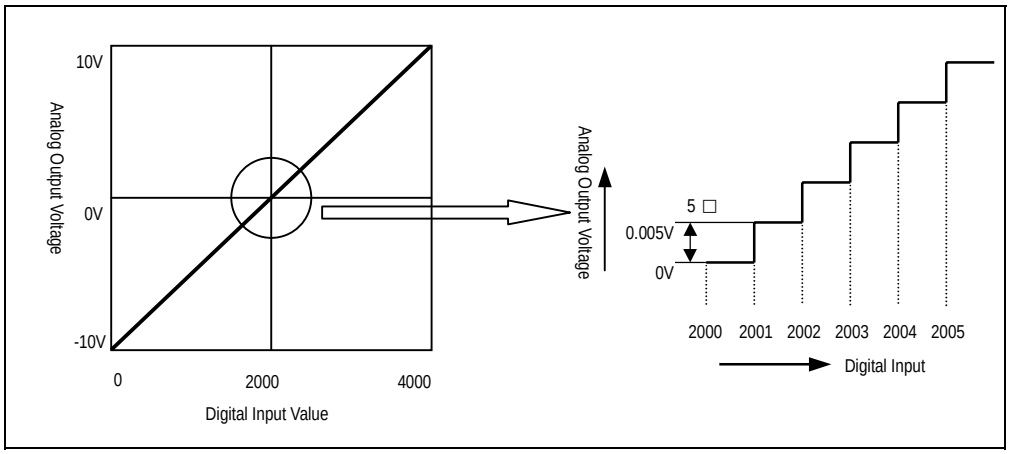



Analog value isn't written directly on the CPU. For analog input to the CPU operation, analog converted to digital value has to be input on the CPU. and for analog output, the digital of CPU should be converted to analog.

**[Fig. 1.4] conversion processing in the PLC**

### 1.2.3 Digital/ Analog Conversion Characteristics

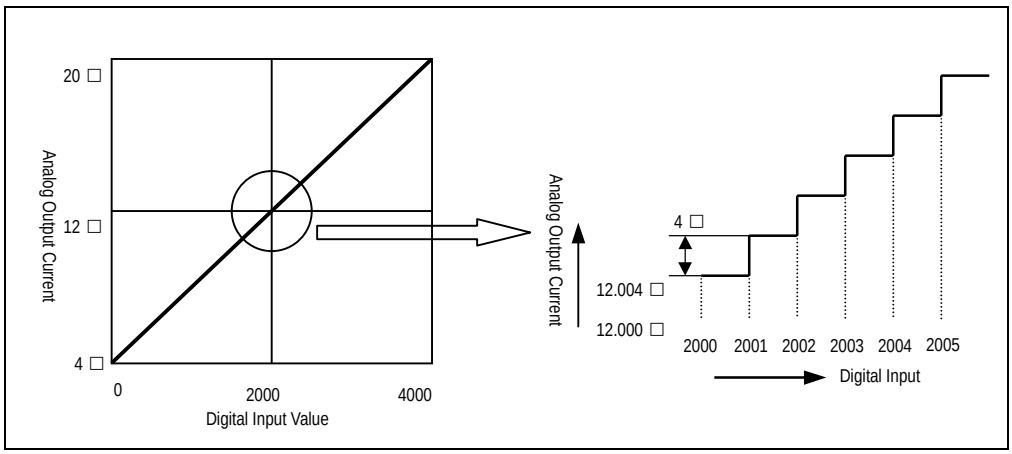
1) Voltage output - G6F-DA2V




**[Fig 1.5] D/A conversion characteristics(Voltage output)**

Digital/analog conversion module allows digital value of the CPU to be converted into an analog value and to be output externally. Digital input value of 0 leads to analog output value of -10V and 4000 leads to 10V. Digital input value of 1 is equal to 5mV.

2) Current output – G6F-DA2I




**[Fig 1.6] D/A conversion characteristics(Current output)**

On current output, digital value of 0 is to be converted into 4mA and 4000. into 20mA. Digital input of 1 is equal to 4 ㎂.

# Chapter 2. SPECIFICATIONS

## 2.1 General Specifications

Table 2.1 shows the common specifications of GLOFA GM series.

<table>
<tr><th>No</th><th>Items</th><th colspan="6">Specifications</th><th>Reference Specification</th></tr>
<tr><td>1</td><td>Operating ambient temperature</td><td colspan="6">0 ~ 55℃</td><td></td></tr>
<tr><td>2</td><td>Storage ambient temperature</td><td colspan="6">-25 ~ 70℃</td><td></td></tr>
<tr><td>3</td><td>Operating ambient humidity</td><td colspan="6">5 ~ 95%RH, non-condensing</td><td></td></tr>
<tr><td>4</td><td>Storage ambient humidity</td><td colspan="6">5 ~ 95%RH, non-condensing</td><td></td></tr>
<tr><td rowspan="8">5</td><td rowspan="8">Vibration</td><td colspan="6">Occasional vibration</td><td rowspan="8">IEC 1131-2</td></tr>
<tr><td>Frequency</td><td>Acceleration</td><td colspan="2">Amplitude</td><td>Sweep count</td></tr>
<tr><td>10≤f∠57 Hz</td><td>-</td><td colspan="2">0.075mm</td><td rowspan="5">10 times in each direction for X, Y, Z</td></tr>
<tr><td>57 ≤f≤150 Hz</td><td>9.8 m/s$^2$ {1G}</td><td colspan="2">-</td></tr>
<tr><td colspan="4">Continuous vibration</td></tr>
<tr><td>Frequency</td><td>Acceleration</td><td colspan="2">Amplitude</td></tr>
<tr><td>10≤f∠57 Hz</td><td>-</td><td colspan="2">0.035mm</td></tr>
<tr><td>57≤f≤150 Hz</td><td>4.9 m/s$^2$ {0.5G}</td><td colspan="2">-</td></tr>
<tr><td>6</td><td>Shocks</td><td colspan="6">•Maximum shock acceleration: 147 m/s$^2$ {15G}<br>•Duration time :11ms<br>•Pulse wave: half sine wave pulse( 3 times in each of X, Y and Z directions )</td><td>IEC 1131-2</td></tr>
<tr><td rowspan="6">7</td><td rowspan="6">Noise immunity</td><td colspan="2">Square wave impulse noise</td><td colspan="4">±1,500 V</td><td>LGIS Standard</td></tr>
<tr><td colspan="2">Electrostatic discharge</td><td colspan="4">Voltage :4kV(contact discharge)</td><td>IEC 1131-2<br>IEC 801-2</td></tr>
<tr><td colspan="2">Radiated electromagnetic field</td><td colspan="4">27 to 500 MHz, 10V/m</td><td>IEC 1131-2<br>IEC 801-3</td></tr>
<tr><td rowspan="2">Fast transient & burst noise</td><td>Severity Level</td><td>All power modules</td><td>Digital I/Os(Ue≥ 24 V)</td><td colspan="2">Digital I/Os (Ue < 24 V) Analog/Os communication I/Os</td><td rowspan="2">IEC 1131-2<br>IEC 801-4</td></tr>
<tr><td>Voltage</td><td>2kV</td><td>1kV</td><td colspan="2">0.25kV</td></tr>
<tr><td>8</td><td>Operating atmosphere</td><td colspan="6">Free from corrosive gases and excessive dust</td><td></td></tr>
<tr><td>9</td><td>Altitude for use</td><td colspan="6">Up to 2,000m</td><td></td></tr>
<tr><td>10</td><td>Pollution degree</td><td colspan="6">2 or lower</td><td></td></tr>
<tr><td>11</td><td>Cooling method</td><td colspan="6">Self-cooling</td><td></td></tr>
</table>

**[Table 2.1 ] General Specifications**

**REMARK**

1) IEC(International Electrotechnical Commission)
:The international civilian organization which produces standards for electrical and electronics industry..

2) Pollution degree
:It indicates a standard of operating ambient pollution level.
The pollution degree 2 means the condition in which only non conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation shall be expected.

## 2.2 Performance Specifications

Table 2..2 shows performance specification of D/A conversion module.

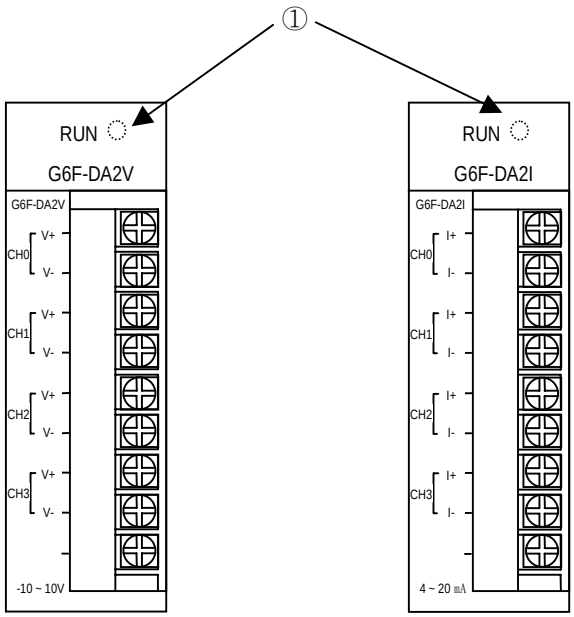
| Items | | Specifications | |
|---|---|---|---|
| | | G6F-DA2I | G6F-DA2V |
| Digital input | | 16bit(data part :12bits)signed binary | |
| Analog output | | DC 4～20mA<br>(External load resistance less than 510Ω) | -10～10 VDC<br>(External load resistance :2KΩ～1MΩ) |
| Max. resolution | | 4μA(1/4000) | 5 mV(1/4000) |
| Accuracy | | ±0.5% [Full Scale] | |
| Max. conversion speed (ms/channel) | | 10ms/ 4 channels | |
| Max. absolute input | | DC 24mA | 15 VDC |
| Analog output points | | 4 channels/1module | |
| Isolation | | Between input terminals and the PLC: Photo-coupler isolation | |
| Terminals connected consumption | | 9-point terminal block | |
| *1 Internal Current Consumption | DC+5V | 40mA | 40mA |
| | DC+15V | 120mA | 80mA |
| | DC-15V | 25mA | 60mA |
| Weight | | 200 g | 200 g |

**[Table 2.2] Performance Specifications**

## 2.3 Names of Parts and Functions

Names of parts and functions are shown as below.

**G6F-DA2V / G6F-DA2I**



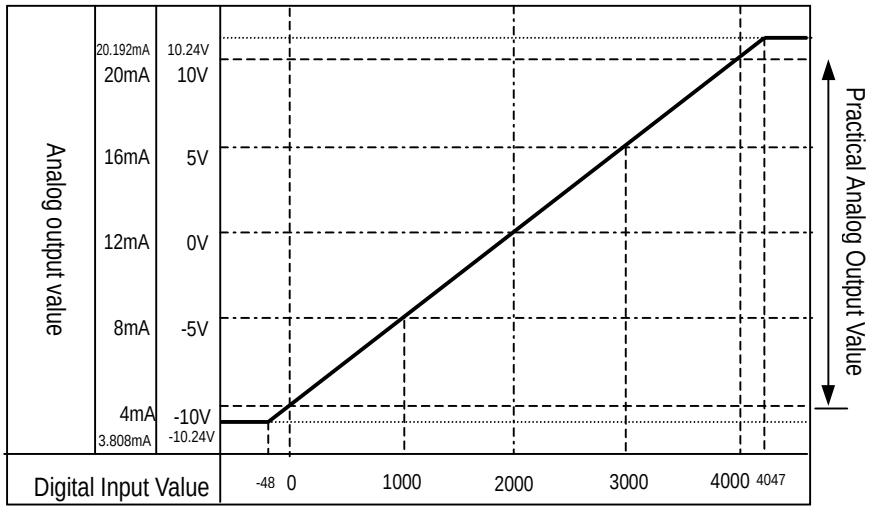

| No. | Descriptions |
|---|---|
| ① | RUN LED<br>Indicates the operating condition of the D/A conversion module<br>* On: Normal operation<br>* Off : 5 VDC power off or D/A conversion module fault |

## 2.4 Input/Output Conversion Characteristics

I/O characteristics are displayed as a slant of the line connecting offset value and gain value in converting an digital signal from the external PLC into an analog signal(voltage or current).

Offset value and Gain value of D/A converter are fixed and should not be modified.

Input/ output conversion characteristic example is shown on Fig 2.1




**[Fig 2.1] Input/ output conversion characteristic example**

G6F-DA2V : Digital input value of 1 is equal to 5mV.

G6F-DA2I : Digital Input value of 1 is eaqual to 4 ㎂.

## 2.5 D/A Conversion Speed

Conversion speed indicates the period of time between D/A conversion processing and changing analog value to set value.

Conversion speed of each D/A conversion module is like value in the table 2.2

| Products | Conversion speed |
|---|---|
| G6F-DA2I | 10 ms/ All channel |
| G6F-DA2V | 10 ms/ All channel |

**[Table 2.3] Conversion Speed**

That is, conversion speed of each D/A conversion module is constant regardless of used channels.

# CHAPTER 3. INSTALLATION AND WIRING

## 3.1 Installation

### 3.1.1 Installation Environment

This module has high reliability regardless of its installation ambience. But check the following for system in higher reliability and stability.

1) Ambience requirements

Avoid installing this unit in locations which are subjected or exposed to :

- Water leakage and a large amount of dust, power and other conductive powder, oil mist, salt, of organic solvent
- Mechanical vibrations of impacts transmitted directly to the module body
- Direct sunlight.
- Dew condensation due to sudden temperature change.
- High or low temperatures (outside the range of 0-55°C)

2) Installation and wiring

- During wiring or other work, do not allow any wire scraps to enter into the PLC.
- Install it on locations that are convenient for operation.
- Make sure that it is not located near high voltage equipment on the same panel.
- Make sure that the distance from the walls of duct and external equipment be 50 mm or more.
- Be sure to be grounded to locations that have good noise immunity.

### 3.1.2 Installation Precautions

From unpacking to installation of the D/A conversion module, be sure to check the following:

1) Do not drop it off, and make sure that strong impacts should not be applied.
2) Do not dismount printed circuit board(PCB) from the case. It can cause malfunctions.
3) During wiring, be sure to check any foreign matter like wire scraps should not enter into the upper side of the PLC, and in the event that foreign matte entered into it, always eliminate it.
4) Be sure to disconnect electrical power before mounting or dismounting the module.

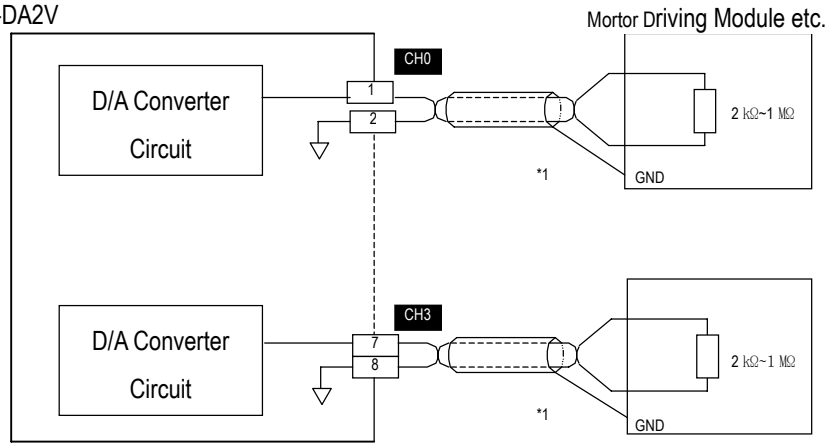
## 3.2 Wiring

### 3.2.1 Wiring Precautions

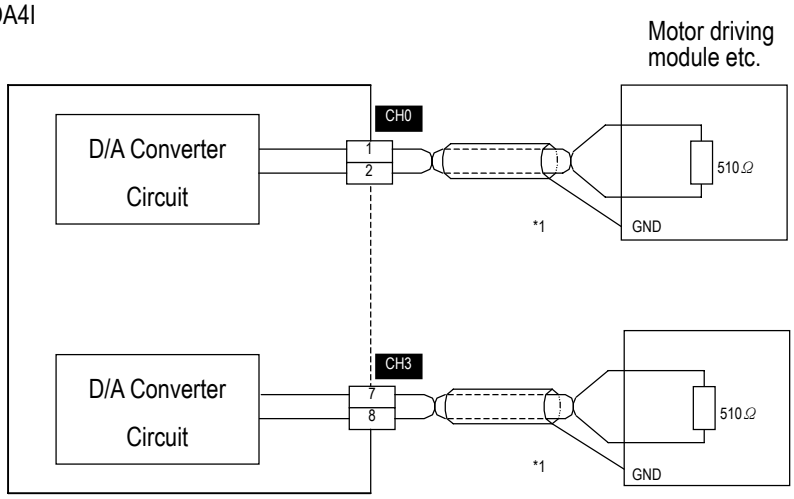
1) Separate AC and external input signal of D/A conversion module wiring not to be affected by surge or induced noise in the AC.
2) External wiring has to be at least AWG22(0.3 ㎟) and be selected in consideration of operating ambience and/or allowable current.
3) Separate wiring from devices and/or substances generating intense heat, and oil not to make short-circuit which leads to damage and/or mis-operation.
4) Identify the polarity of terminal block before external power supply is made connected.
5) Separate external wiring sufficiently from high voltage and power supply cable not to cause induced failure and/or malfunction.
6) Don't put the power cable in front of the LED display ( To read the digital value on the LED correctly)

### 3.2.2 Wiring Examples

1) G6F-DA2V




2) G3F-DA4I




*1 For the cable, use a two-core twisted shielded wire.

# Chapter 4. FUNCTION BLOCK

This chapter shows function block for the D/A conversion module on the GMWIN.

A kind of function block is as follows

| NO. | G6F-DA2V, G6F-DA2I | Function |
|---|---|---|
| 1 | DA2AWR | Writing D/A conversion (Array type) |
| 2 | DA2WR | Writing D/A conversion (Single type) |

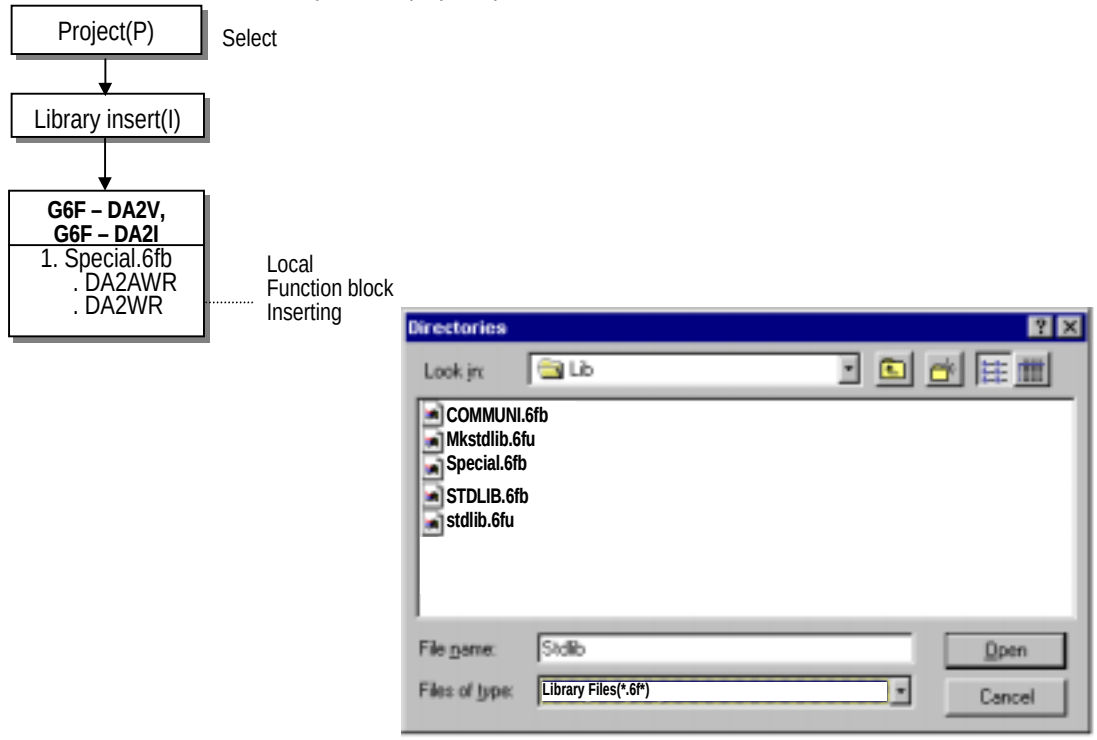
**REMARK**

Function block of the G6F-DA2V and G6F-DA2I are same

## 4.1 Insertion of the Function Block for D/A Conversion Module on the GMWIN

A function block can be inserted during the execution of the GMWIN according to the following procedure..

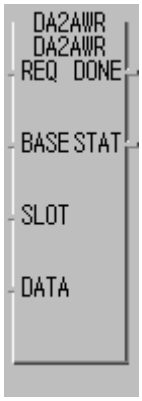
A function block can be inserted only when a project opens.



## 4.2 Function Blocks for Local

### 4.2.1 Module Write_ Array Type (G6F-DA2V / G6F-DA2I : DA2AWR)

Module write function block of the Array type is a program for the use in performing for every channel in block and setting a digital value to be converted into a D/A conversion.

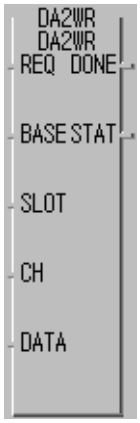
| Function Block | I/O | Variable | Data Type | Descriptions |
|---|---|---|---|---|
| G6F-DA2V<br>G6F-DA2I<br>  | input | REQ | BOOL | Function Block Execution Request Area<br>-The execution of function block initialization is requested in this area.<br>-If the status connected with this area is satisfied on the program execution and 0 is changed to 1, function block for the module is executed. |
| | | BASE | USINT | Base Location Number Area<br>-The base No. on which D/A conversion module is mounted is written on this area.<br>-Setting range : 0 to 1 |
| | | SLOT | USINT | Slot Location Number Area<br>-The slot No. on which D/A conversion module is mounted is written on this area.<br>-Setting range: 0 to 7 |
| | | DATA | INT[4]<br>*Note1 | Input Data Type Specification Area<br>-Input digital data type for each channel is specified in this area.<br>-Setting range:-48 ~ 4047 |
| | output | DONE | BOOL | Function Block Execution Complete Area<br>- When function block has been completed with no error, 1 is written and until next execution, 1 is continuing. When error occurs, 0 is written and operation come to stop. |
| | | STAT | USINT | Error Code Display Area<br>- When error occurs during function block processing, the error code number is written.<br>- For error code, refer to Manual 4.3. |

**REMARK**

* Note 1: USINT[4] of data type means that the number of element is 4, and also this means the whole number of channels and channel number.

### 4.2.2 Module Write_Single Type(G6F-DA2V / G6F-DA2I : DA4WR)

Module write function block of the Single type is a program for the use in performing for a channel of D/A conversion module and setting a digital value to be converted into a D/A conversion.

| Function block | I/O | Variable | Data type | Descriptions |
|---|---|---|---|---|
| G6F-DA2V<br>G6F-DA2I<br>  | input | REQ | BOOL | Function Block Execution Request Area<br>-The execution of function block is requested in this area.<br>- If the status connected with this area is satisfied on the program execution and 0 is changed to 1, function block for the module is executed. |
| | | BASE | USINT | Base Location Number Area<br>- The base No. on which D/A conversion module is mounted is written on this area.<br>- Setting range : 0 to 1 |
| | | SLOT | USINT | Slot Location Number Area<br>- The slot No. on which D/A conversion module is mounted is written on this area.<br>- Setting range: 0 to 7 |
| | | CH | USINT | Available Channel Specification Area<br>- Available channels are specified in this area.<br>-Range:0～3 |
| | | DATA | INT | Input Data Type Specification Area<br>-Input digital data type for each channel is specified in this area.<br>-Setting range: -48 ~ 4047 |
| | output | DONE | BOOL | Function Block Execution Complete Area<br>- When function block has been completed with no error, 1 is written and until next execution, 1 is continuing. When error occurs, 0 is written and operation come to stop. |
| | | STAT | USINT | Error Code Display Area<br>- When error occurs during function block processing, the error code number is written.<br>- For error code, refer to Manual 4.3. |

## 4.3 Errors on Function Block

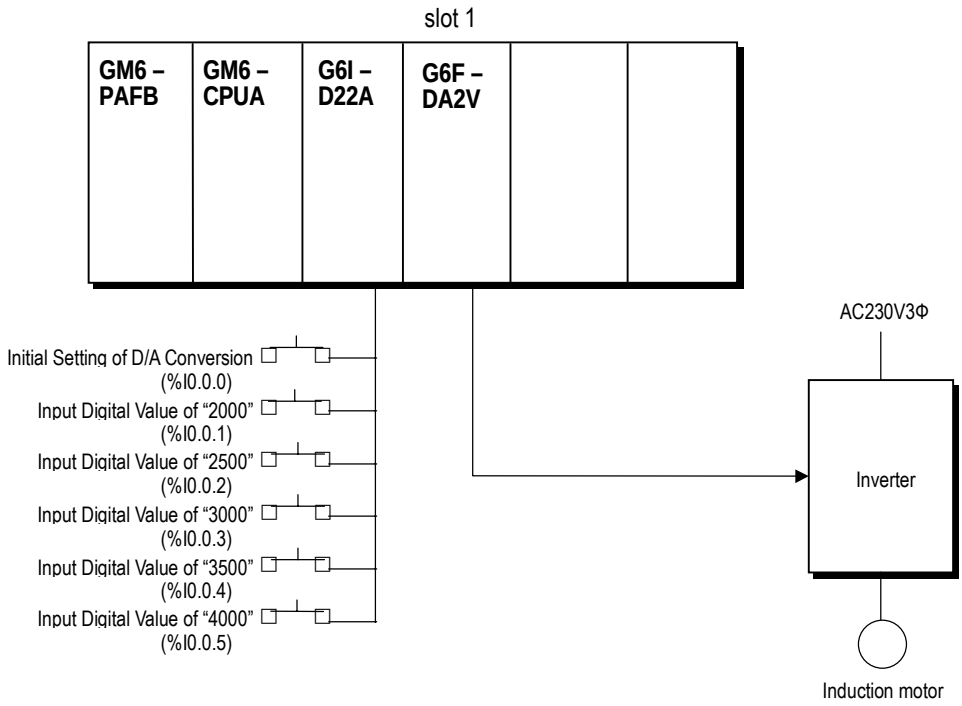
This shows the errors on the output variable “STAT” of variables and the resolutions in accordance with them.

| STAT No. | Descriptions | Function Block | | Resolutions |
|---|---|---|---|---|
| | | Array type | Single type | |
| 0 | Operating with no fault | O | O | - |
| 1 | The base location number is exceeding the proper setting range | O | O | Correct the number in accordance with the proper range (See Manual 4.2) |
| 2 | H/W error of the base | O | O | Contact the service station. |
| 3 | The slot location number is exceeding the proper setting range | O | O | Set the right number to the slot mounting the D/A conversion module |
| 4 | The D/A conversion module on the slot is empty | O | O | Mount the D/A conversion module to the specified slot |
| 5 | The module loaded isn't the D/A module | O | O | Mount the D/A conversion module to the specified slot |
| 6 | The channel number is exceeding the proper range | - | O | Specify the available channel correctly |
| 7 | H/W error of the D/A conversion module | O | O | Contact the service station. |
| 8 | The D/A conversion module's shared memory error | O | O | Contact the service station. |

# Chapter 5. PROGRAMMING

## 5.1 Programming for Controlling Inverter Speed with 5 Step Analog Output Voltage

**1) System Configuration**




**2) Initial Settings**

(1) Enabled channel : channel 0

**3) Descriptions of the Program**

(1) %I0.0.0 turning On leads to write digital value to D/A conversion module.

(2) %I0.0.1 turning On leads to output of "2000"(0 V) on channel 0.

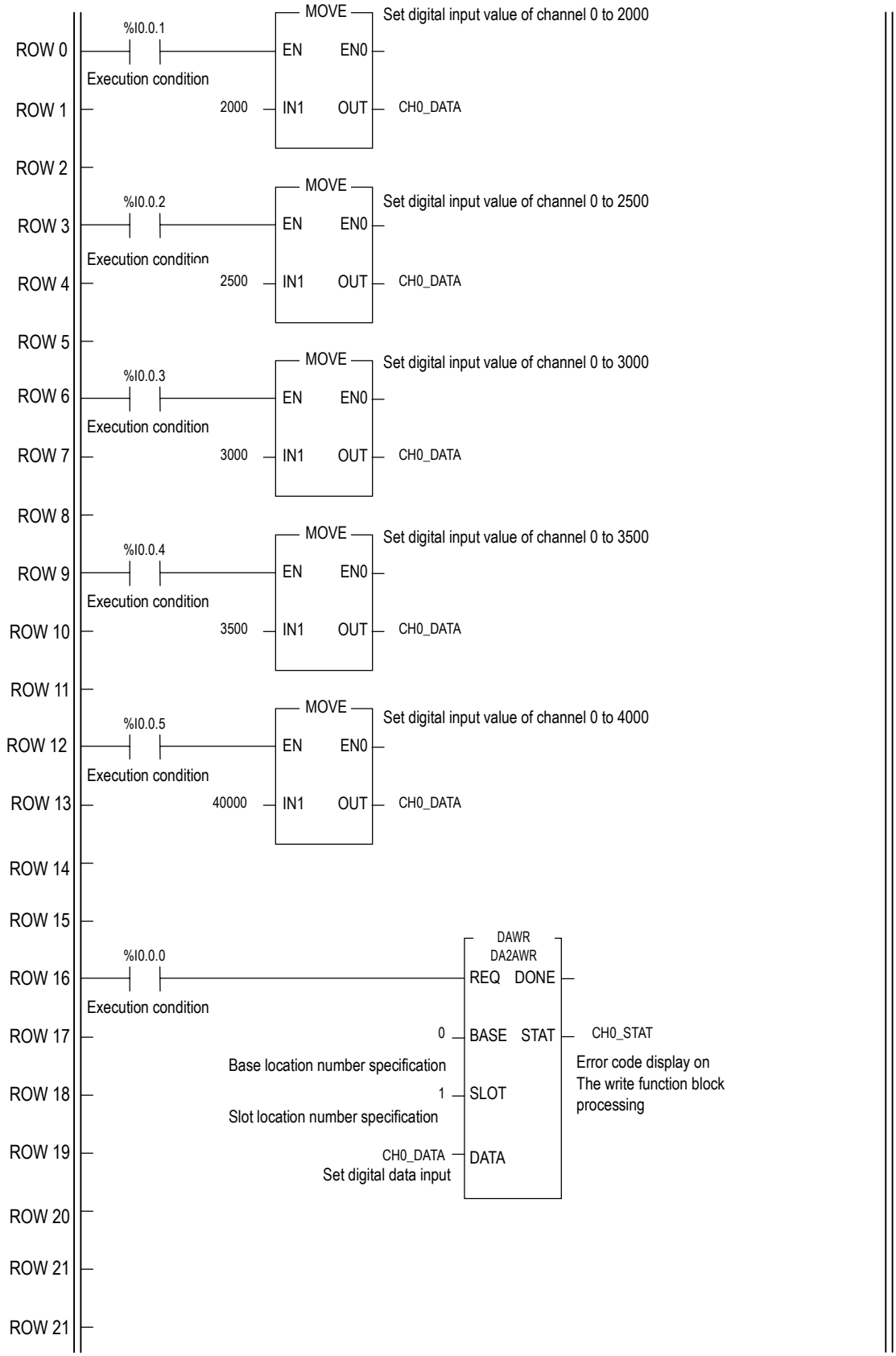
(3) %I0.0.2 turning On leads to output of "2500"(2.5 V) on channel 0

(4) %I0.0.3 turning On leads to output of "3000"(5 V) on channel 0.

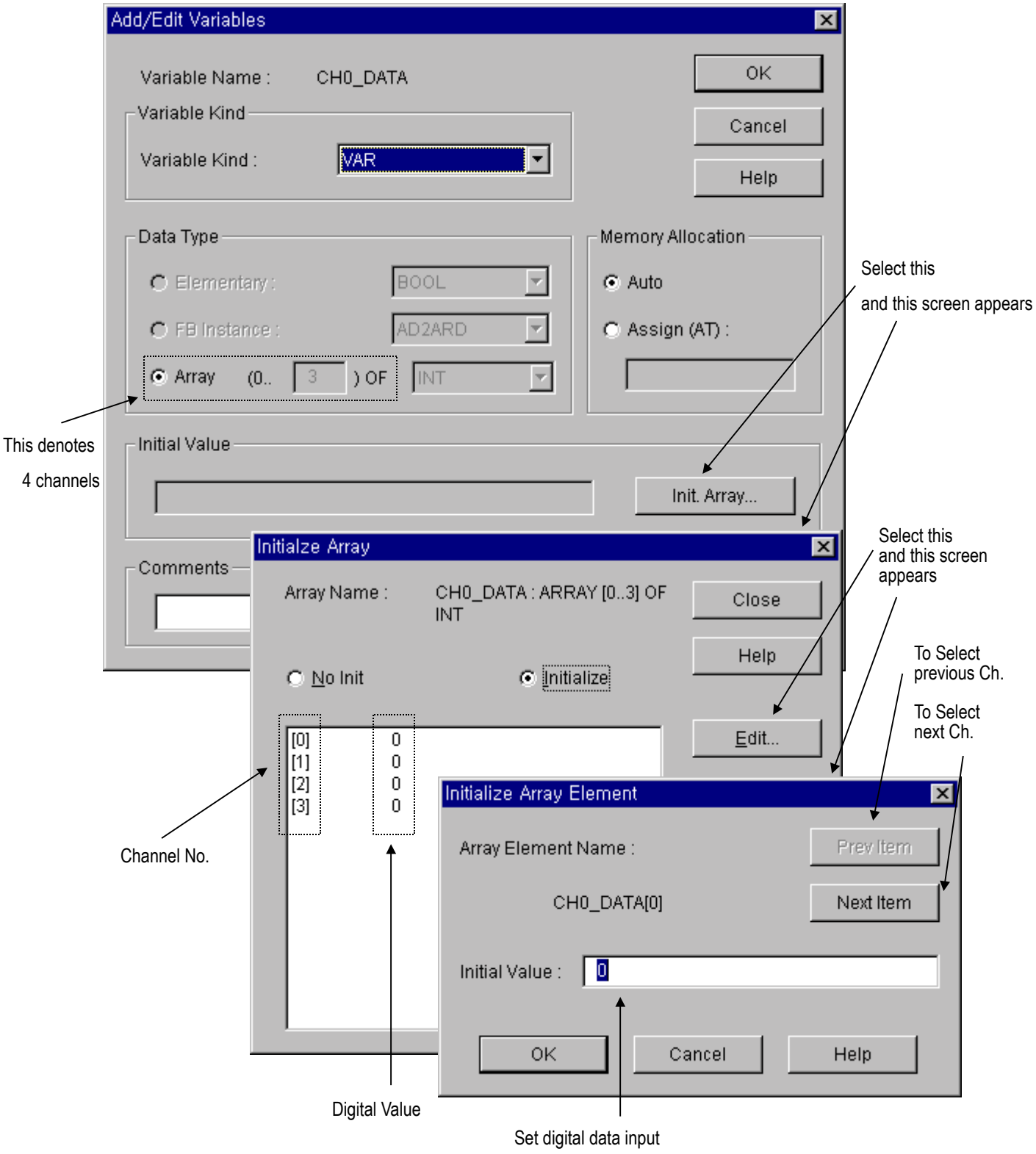
(5) %I0.0.4 turning On leads to output of "3500"(7.5 V) on channel 0.

(6) %I0.0.5 turning On leads to output of "4000"(10 V) on channel 0.

**4) Program**


ROW 0
%I0.0.1
MOVE
Set digital input value of channel 0 to 2000
EN
EN0
Execution condition
ROW 1
2000
IN1
OUT
CH0_DATA
ROW 2
ROW 3
%I0.0.2
MOVE
Set digital input value of channel 0 to 2500
EN
EN0
Execution condition
ROW 4
2500
IN1
OUT
CH0_DATA
ROW 5
ROW 6
%I0.0.3
MOVE
Set digital input value of channel 0 to 3000
EN
EN0
Execution condition
ROW 7
3000
IN1
OUT
CH0_DATA
ROW 8
ROW 9
%I0.0.4
MOVE
Set digital input value of channel 0 to 3500
EN
EN0
Execution condition
ROW 10
3500
IN1
OUT
CH0_DATA
ROW 11
ROW 12
%I0.0.5
MOVE
Set digital input value of channel 0 to 4000
EN
EN0
Execution condition
ROW 13
40000
IN1
OUT
CH0_DATA
ROW 14
ROW 15
ROW 16
%I0.0.0
DAWR
DA2AWR
REQ
DONE
Execution condition
ROW 17
0
BASE
STAT
CH0_STAT
Base location number specification
Error code display on
The write function block
processing
ROW 18
1
SLOT
Slot location number specification
ROW 19
CH0_DATA
DATA
Set digital data input
ROW 20
ROW 21
ROW 21

**5) Digital value setting of I/O Variables**

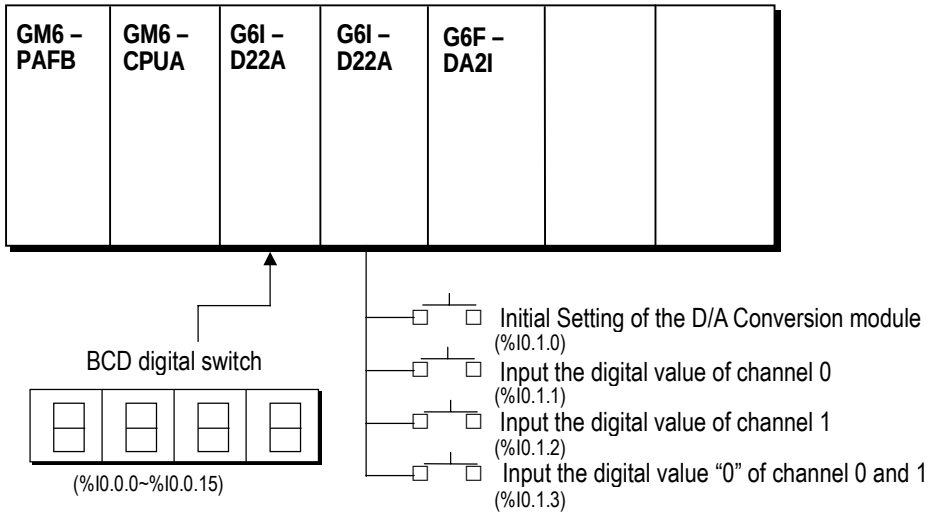


**6) I/O Variables on Program**

| Variable name | Var_Kind | Data Type | (AT Address) (Initial Value) |
|---|---|---|---|
| CH0_DATA | : VAR | : ARRAY[0..3] OF INT | : = {0,0,0,0} |
| CH0_STAT | : VAR | : USINT | |
| DAWR | : VAR | : FB Instance | |

## 5.2 Programming for Displaying D/A Conversions which is Set by Digital Switch

**1) System Configuration**




**2) Initial Settings**

(1) Enabled channel : channel 0, 1

**3) Descriptions of the Program**

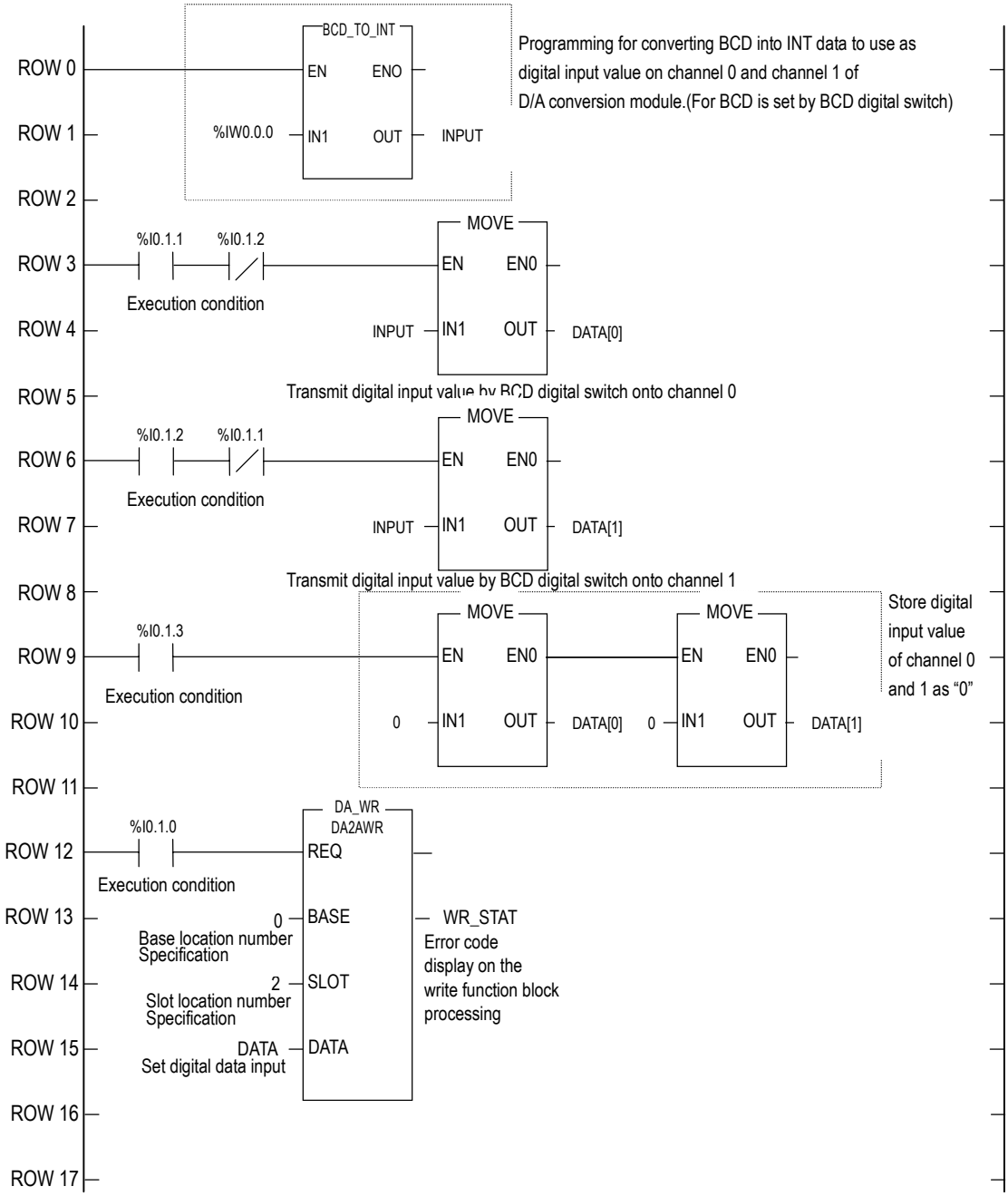
(1) %I0.1.0 turning On leads to write the digital value to D/A conversion module.

(2) %I0.1.1 turning On leads to output of the values by digital switch on channel 0 of D/A module.

(3) %I0.1.2 turning On leads to output on channel 1.

(4) %I0.1.3 turning On leads to initialization of digital input value to "0" on channel 0 and channel 1.

**4) Program**


ROW 0
ROW 1
ROW 2
ROW 3
ROW 4
ROW 5
ROW 6
ROW 7
ROW 8
ROW 9
ROW 10
ROW 11
ROW 12
ROW 13
ROW 14
ROW 15
ROW 16
ROW 17
BCD_TO_INT
EN
ENO
%IW0.0.0
IN1
OUT
INPUT
Programming for converting BCD into INT data to use as digital input value on channel 0 and channel 1 of D/A conversion module.(For BCD is set by BCD digital switch)
%I0.1.1
%I0.1.2
Execution condition
MOVE
EN
EN0
INPUT
IN1
OUT
DATA[0]
Transmit digital input value by BCD digital switch onto channel 0
%I0.1.2
%I0.1.1
Execution condition
MOVE
EN
EN0
INPUT
IN1
OUT
DATA[1]
Transmit digital input value by BCD digital switch onto channel 1
%I0.1.3
Execution condition
MOVE
EN
EN0
0
IN1
OUT
DATA[0]
MOVE
EN
EN0
0
IN1
OUT
DATA[1]
Store digital input value of channel 0 and 1 as “0”
%I0.1.0
Execution condition
DA_WR
DA2AWR
REQ
0
Base location number Specification
BASE
2
Slot location number Specification
SLOT
DATA
Set digital data input
DATA
WR_STAT
Error code display on the write function block processing

**5) I/O Variables on Program**

| Variable name | Var_Kind | Data Type | (AT Address) (Initial Value) |
|---|---|---|---|
| INPUT | : VAR | : DINT | |
| OUTPUT | : VAR | : INT | |
| DA_WR | : VAR | : FB Instance | |
| WR_STAT | : VAR | : USINT | |
| DATA | : VAR | : ARRAY[0..3] OF INT | : = {0,0,0,0} |

# Chapter 6. DIMENSIONS

(Unit : mm)