# Chapter 2 . SPECIFICATIONS

## 2.1 General Specifications

Table 2.1 shows the general specifications of GLOFA GM series.

<table>
<tr><th>Item</th><th colspan="7">Specifications</th><th>Standard</th></tr>
<tr><td>Operating ambient temperature</td><td colspan="7">0 ~ 55℃</td><td></td></tr>
<tr><td>Storage ambient temperature</td><td colspan="7">-25 ~ 70℃</td><td></td></tr>
<tr><td>Operating ambient humidity</td><td colspan="7">5 ~ 95%RH, non-condensing</td><td></td></tr>
<tr><td>Storage ambient humidity</td><td colspan="7">5 ~ 95%RH, non-condensing</td><td></td></tr>
<tr><td rowspan="8">Vibration</td><td colspan="3">In case of occasional vibration</td><td colspan="3">Sweep count</td><td rowspan="8">IEC 1131-2</td></tr>
<tr><td>Frequency</td><td>Acceleration</td><td colspan="2">Amplitude</td><td colspan="2" rowspan="6">10 times in each direction for X, Y, Z</td></tr>
<tr><td>10≤f∠57 Hz</td><td>-</td><td colspan="2">0.075 mm</td></tr>
<tr><td>57≤f≤150 Hz</td><td>9.8㎨ (1G)</td><td colspan="2">-</td></tr>
<tr><td colspan="4">In case of continuos 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">0.035 mm</td></tr>
<tr><td>57≤f≤150 Hz</td><td>4.9㎨(0.5G)</td><td colspan="2">-</td></tr>
<tr><td>Shocks</td><td colspan="7">*Maximum shock acceleration: 147㎨ {15G}<br>*Duration time :11 ms<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="5">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 ~ 500 MHz, 10 V/m</td><td>IEC 1131-2<br>IEC 801-3</td></tr>
<tr><td colspan="2" rowspan="2">Fast transient & burst noise</td><td>Modules</td><td>All power modules</td><td>Digital I/Os ( Ue≥ 24 V)</td><td>Digital I/Os (Ue < 24 V) Analog I/Os communication I/Os</td><td rowspan="2">IEC 1131-2<br>IEC 801-4</td></tr>
<tr><td>Voltage</td><td>2 kV</td><td>1 kV</td><td>0.25 kV</td></tr>
<tr><td>Operating atmosphere</td><td colspan="7">Free from corrosive gases and excessive dust</td><td></td></tr>
<tr><td>Altitude for use</td><td colspan="7">Up to 2,000m</td><td></td></tr>
<tr><td>Pollution degree</td><td colspan="7">2 or lower</td><td></td></tr>
<tr><td>Cooling method</td><td colspan="7">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 normally, 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 specifications of A/D conversion module.

| Items | | Specifications |
|---|---|---|
| Analog input | Voltage | 1 ~ 5 VDC (input resistance 1㏁)<br>0 ~ 10 VDC (input resistance 1㏁)<br>-10 ~ 10VDC (input resistance 1㏁) |
| | Current | DC4 ~ 20 mA (input resistance 250Ω) |
| | Voltage/Current selection | - Selection with Terminal<br>( It has to be connected between V and I terminal to select current. )<br>- Selection of voltage range by switch on the side of module |
| Digital output | | - 12 bit binary value(-48 ~ 4047, -2048 ~ 2047)<br>- Digital output value is selected by program. |
| Maximum resolution | 1 ~ 5VDC | 1 mV (1/4000) |
| | 0 ~ 10VDC | 2.5 mV (1/4000) |
| | -10 ~10VDC | 5 mV (1/4000) |
| | DC 4 ~20mA | 4㎂ (1/4000) |
| Overall Accuracy | | ±0.5% (accuracy to full scale) |
| Max. conversion speed | | 5.0 ms/channel |
| Max. absolute input | | Voltage : 15V, Current : 25mA |
| Number of analog input point | | 4 channels/module |
| Isolation | | Between input terminals and PLC: Photo coupler isolation<br>(Between channels : Non-isolated) |
| Terminals connected | | 18-point terminal block |
| Current Consumption | +5VDC | 40mA |
| | +15VDC | 50mA |
| | -15VDC | 20mA |
| Weight | | 200g |

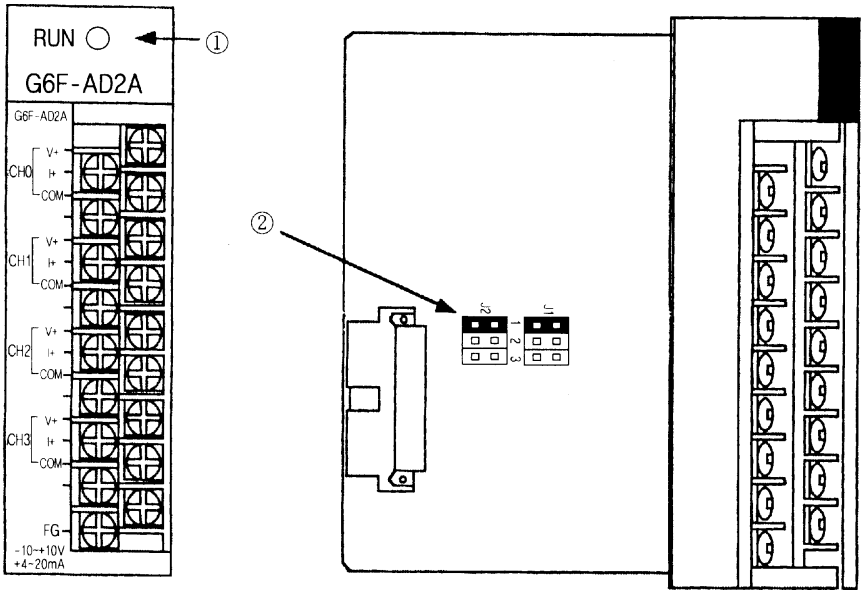
**[Table 2.2] Performance Specifications**

**! CAUTION**

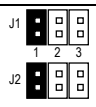
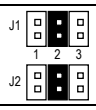
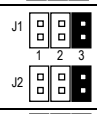
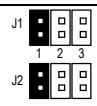
The factory-set value of A/D conversion module has been current input mode.

## 2.3 Names of Parts and Functions

The names of parts and functions of the A/D conversion module are shown as below.

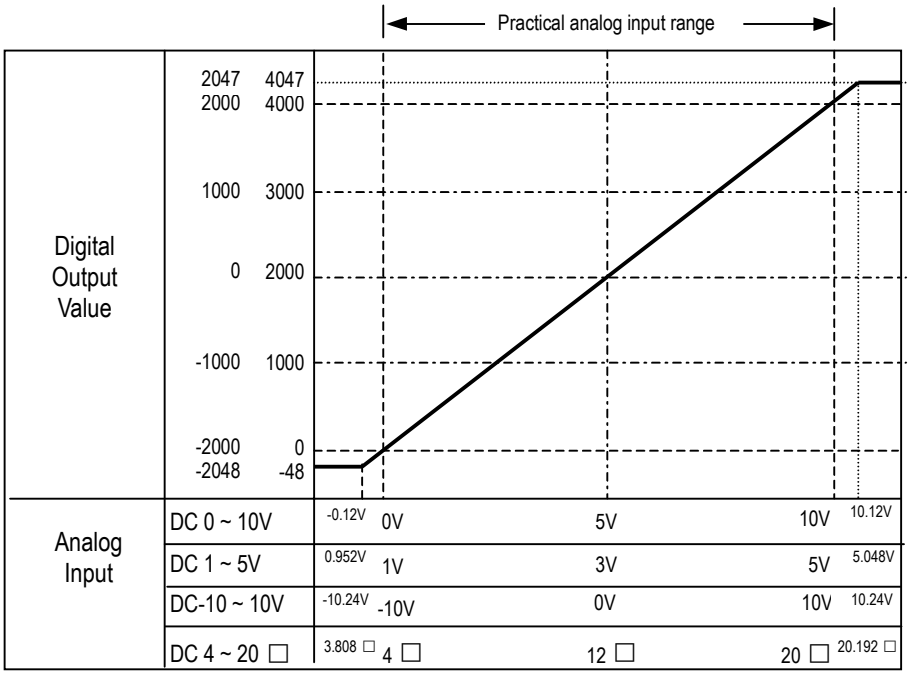



| No | Description |
|---|---|
| ① | RUN LED<br>Indicates the operating status of the G6F-AD2A. |
| ② | Selection switch of voltage/current |

| Analog Input | | Input Range Selection Switch |
|---|---|---|
| Voltage | DC 1~5V |  |
| | DC 0~10V |  |
| | DC-10~10V |  |
| Current | DC 4~20mA |  |

## 2.4 I/O Conversion Characteristics

Input / Output (hereafter I/O) conversion characteristics is expressed with the angle of the line between analog input(voltage and current) and matched digital value.
The voltage or current input for a channel is selected by analog input selection switch and the value of Offset / Gain can not be changed because it is fixed.




**[Fig 2.1] I/O Conversion Characteristics**

**REMARK**

1. The analog output value of over 4047 or –48 is fixed as 4047 or –48.
2. Keep the input voltage and current not to exceed +15V and 25mA.

### 2.4.1 Voltage Input Characteristics

For voltage input, the corresponding input is selected by selection switch and selected input voltage range is same through whole channels.

**1) Voltage input range** : DC 1 ~5V

Digital output value for input voltage is shown as follows.

| | Analog input voltage (V) | | | | | | | Input range selection switch |
|---|---|---|---|---|---|---|---|---|
| | 0.952 | 1 | 2 | 3 | 4 | 5 | 5.048 | J1 1 2 3 / J2 |
| Digital output value | -48 | 0 | 1000 | 2000 | 3000 | 4000 | 4047 | |
| | -2048 | -2000 | -1000 | 0 | 1000 | 2000 | 2047 | |

2) **Voltage input range :** DC 0 ~ 10V

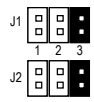
Digital output value for input voltage is shown as follows.

| | Analog input voltage (V) | | | | | | | Input range selection switch |
|---|---|---|---|---|---|---|---|---|
| | -0.12 | 0 | 2.5 | 5 | 7.5 | 10 | 10.12 |  |
| Digital output value | -48 | 0 | 1000 | 2000 | 3000 | 4000 | 4047 | |
| | -2048 | -2000 | -1000 | 0 | 1000 | 2000 | 2047 | |



3) **Voltage input range :** DC -10 ~ 10V

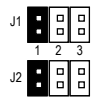
Digital output value for input voltage is shown as follows.

| | Analog input voltage (V) | | | | | | | Input range selection switch |
|---|---|---|---|---|---|---|---|---|
| | -10.24 | -10 | -5 | 0 | 5 | 10 | 10.24 |  |
| Digital output value | -48 | 0 | 1000 | 2000 | 3000 | 4000 | 4047 | |
| | -2048 | -2000 | -1000 | 0 | 1000 | 2000 | 2047 | |



## 2.4.2 Current Input Characteristics

Digital output value for input voltage is shown as follows.

| | Analog input current (mA) | | | | | | | Input range selection switch |
|---|---|---|---|---|---|---|---|---|
| | 3.808 | 4 | 8 | 12 | 16 | 20 | 20.192 |  |
| Digital output value | -48 | 0 | 1000 | 2000 | 3000 | 4000 | 4047 | |
| | -2048 | -2000 | -1000 | 0 | 1000 | 2000 | 2047 | |



It has to be connected between V and I terminal to select current.

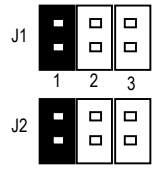
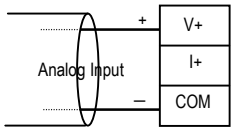
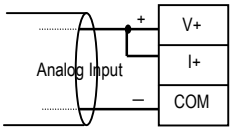
## 2.4.3 Simultaneous Voltage and Current Input Characteristics

For simultaneous use of voltage and current input, the available input voltage rage is 0 ~ 5VDC only.

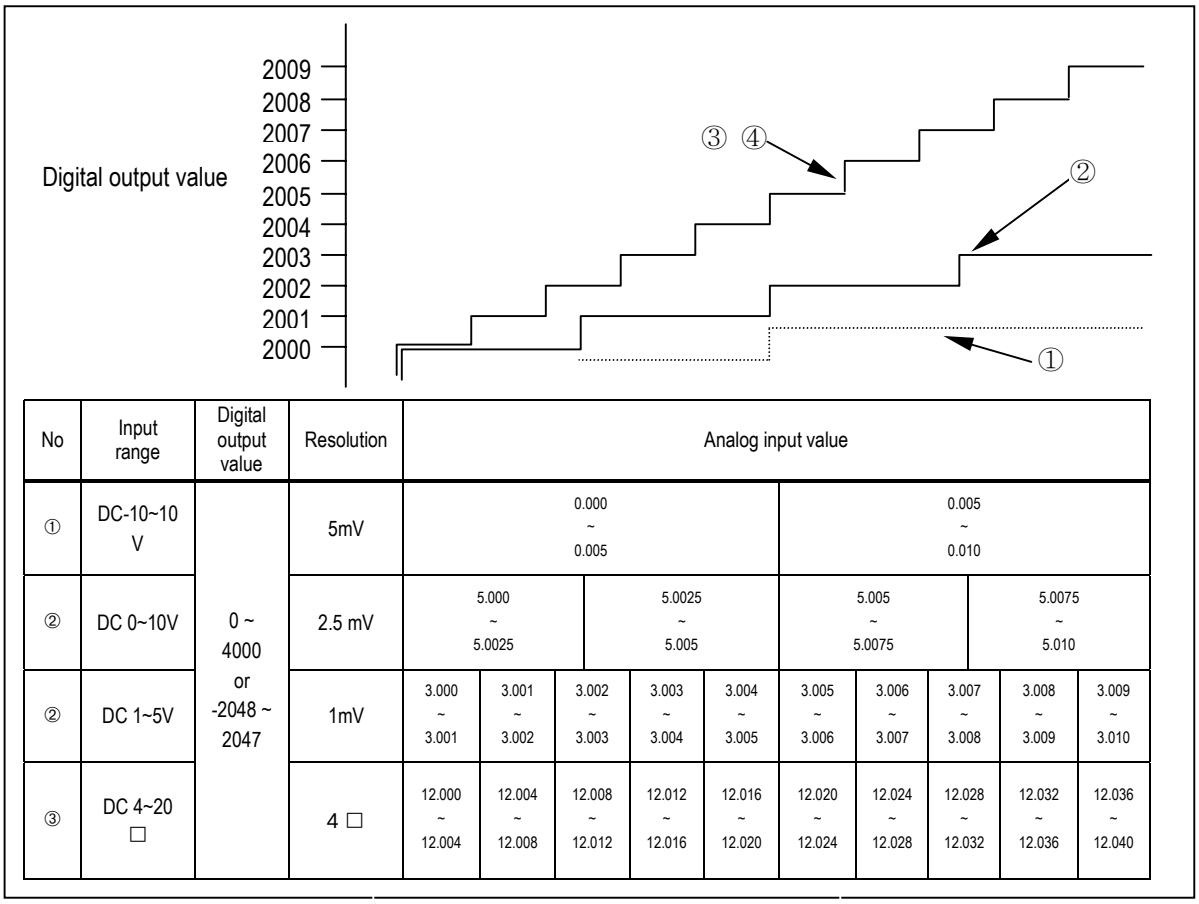
Digital output value for analog input is shown as follows..

| | Analog input | | | | | | |
|---|---|---|---|---|---|---|---|
| Voltage DC1~ 5V | 0.952 | 1 | 2 | 3 | 4 | 5 | 5.048 |
| Current DC4 ~ 20mA | 3.808 | 4 | 8 | 12 | 16 | 20 | 20.192 |
| Digital output value | -48 | 0 | 1000 | 2000 | 3000 | 4000 | 4047 |
| | -2048 | -2000 | -1000 | 0 | 1000 | 2000 | 2047 |

Ex) channel for voltage : 0, channel for current : 1

| Input Rage Selection Switch | Wiring Example | |
|---|---|---|
| | Voltage Input(Channel “0”) | Current Input(Channel ”1”) |
|  |  |  |

### 2.4.4 Analog input and Digital output characteristics




| No | Input range | Digital output value | Resolution | Analog input value | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ① | DC-10~10 V | 0 ~ 4000 or -2048 ~ 2047 | 5mV | 0.000 ~ 0.005 | | | | | 0.005 ~ 0.010 | | | | |
| ② | DC 0~10V | | 2.5 mV | 5.000 ~ 5.0025 | | | 5.0025 ~ 5.005 | | 5.005 ~ 5.0075 | | | 5.0075 ~ 5.010 | |
| ② | DC 1~5V | | 1mV | 3.000 ~ 3.001 | 3.001 ~ 3.002 | 3.002 ~ 3.003 | 3.003 ~ 3.004 | 3.004 ~ 3.005 | 3.005 ~ 3.006 | 3.006 ~ 3.007 | 3.007 ~ 3.008 | 3.008 ~ 3.009 | 3.009 ~ 3.010 |
| ③ | DC 4~20 □ | | 4 □ | 12.000 ~ 12.004 | 12.004 ~ 12.008 | 12.008 ~ 12.012 | 12.012 ~ 12.016 | 12.016 ~ 12.020 | 12.020 ~ 12.024 | 12.024 ~ 12.028 | 12.028 ~ 12.032 | 12.032 ~ 12.036 | 12.036 ~ 12.040 |

Analog input and Digital output

## 2.5 Averaging Process

G6F-AD2A has a average processing function of the number of times to stabilize the system control from the abnormal analog input or external noise.

1) Setting range : 2 ~ 255
2) The processing time to write averaged digital value to buffer memory is changed according to the number of channel.

Processing time = Setting times X Number of enabled channel X Conversion speed

Example) using channels : 4, setting times : 50

Processing time = 50 X 4 X 5 = 1000□