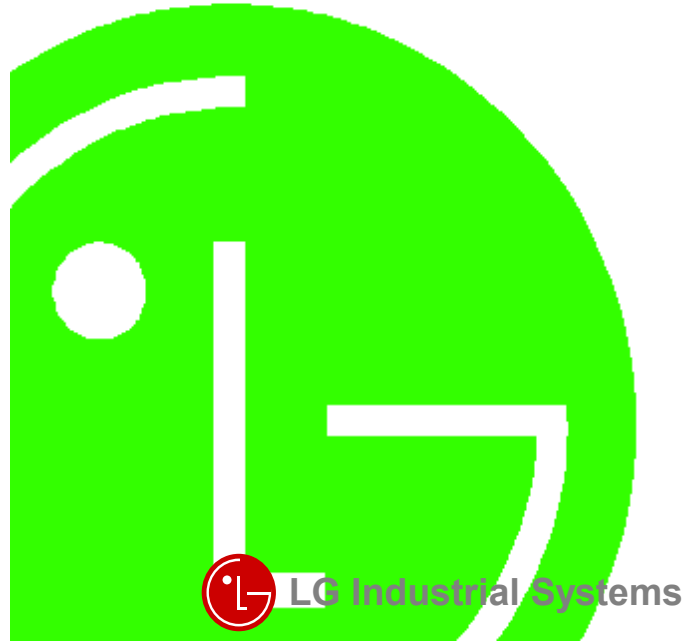


DATA SHEET

LG Programmable Logic Controller Digital to Analog Conversion Module GLOFA G4F-DA1A



Before handling the product

Read this data sheet carefully prior to any operation, mounting, installation or start-up of the product.

Materials for GLOFA GM

Name	Code
GLOFA GMWIN (Programming Software)	702005047
GLOFA GM (Instruction & programming)	702005058
GLOFA-GM3/4	702004919
GLOFA G3F-DA4I / G3F-DA4V / G4F-DA1A	702004851

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		Channel Specification	
Setting State		Used	Unused
PLC CPU in RUN state.		A D/A conversion value is output.	Voltage:0 V Current:12 mA
PLC CPU in STOP state		A value of the specified output state will be output. 0: Median value of the output range 1: Previous value 2: Max. value of the output range 3: Min. value of the output range	
PLC CPU in Error state			
Communication error of the Remote I/O station (When loaded on the remote I/O station)			

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.

Test RUN and Maintenance Precautions



- 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, damage of the module or a fire.
 - When mounting or dismantling 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.

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 G4F-DA1A.

For safety precautions on the PLC system, see the GLOFA GM3/4 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, 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.

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 module.
- 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.

1. Introduction

The G4F-DA1A is digital/analog conversion module for use with the GLOFA PLC GM4 series CPU modules. The D/A conversion module is to convert a 16-bit signed binary digital value to an analog output signal(Voltage or current).

2. General Specifications

No	Item	Specifications	Standard
1	Operating temperature	0 ~ 55 ℃	
2	Storage temperature	-25 ~ 70 ℃	
3	Operating Humidity	5 ~ 95%RH, non-condensing	
4	Storage humidity	5 ~ 95%RH, non-condensing	
5	Vibration	Occasional vibration Frequency Acceleration Amplitude Sweep count 10≤ f < 57 Hz - 0.075 mm 57 ≤ f < 150 Hz 9.8m/s² (1G) - Continuous vibration Frequency Acceleration Amplitude 10≤ f < 57 Hz - 0.035 mm 57≤ f < 150 Hz 4.9m/s² (0.5G) - 10 times in each direction for X, Y, Z	IEC 1131-2
6	Shocks	*Maximum shock acceleration: 147m/s² {15G} *Duration time :11 ms *Pulse wave: half sine wave pulse(3 times in each of X, Y and Z directions)	IEC 1131-2
7	Noise immunity	Square wave impulse noise ± 1,500 V Electrostatic discharge Voltage :4kV(contact discharge) Radiated electromagnetic field 27 ~ 500 MHz, 10 V/m Fast transient burst noise Severity Level All power modules Digital I/Os (Ue ≥ 24 V) Digital I/Os (Ue < 24 V) Analog I/Os communication I/Os Voltage 2 kV 1 kV 0.25 kV	IEC 1131-2 IEC 801-2 IEC 1131-2 IEC 801-3 IEC 1131-2 IEC 801-4
8	Atmosphere	Free from corrosive gases and excessive dust	
9	Altitude for use	Up to 2,000m	
10	Pollution degree	2 or lower	
11	Cooling method	Self-cooling	


- Beijing Branch**
LG Industrial Systems Elevator Co., Ltd.
T : +86-10-6462-3256
F : +86-10-6462-3255
- Bangkok Branch**
LG Industrial Systems (Thailand) Co., Ltd.
T : +66-2-381-8443
F : +66-2-381-8445
- Bogota Branch**
LG Industrial Systems de Colombia S.A.
T : +57-1-310-6077
F : +57-1-310-5831
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LG Industrial Systems Co., Ltd. Chicago Office
T : +1-708-692-4500
F : +1-708-692-4501
- Dalian Branch**
Dalian LG Industrial Systems Co., Ltd.
T : +86-411-281-2579
F : +86-411-281-2578
- Hanoi Branch**
LG Industrial Systems Co., Ltd. Hanoi Office
T : +64-4-821-0388
F : +64-4-821-0399
- Hong Kong Branch**
LG Industrial Systems (HK) Ltd.
T : +852-2598-6615
F : +852-2598-7105
- Shanghai Branch**
Shanghai LG Industrial Systems Co., Ltd.
T : +86-21-6248-2710
F : +86-216248-3236
- Singapore Branch**
LG Industrial Systems Co., Ltd.
T : +65-323-7361
F : +65-323-7362
- Taipei Branch**
LG Industrial Systems (Taiwan) Co. Ltd.
T : +886-2-516-5010
F : +886-2-516-5035
- Tokyo Branch**
LG Industrial Systems Co., Ltd. Tokyo Office
T : +81-3-3589-6362
F : +81-3-3588-1810

LG Industrial Systems Co., Ltd.

- Head Office**
LG Mullae Building 9th F, 10, Mullae-dong 6-ga, Yongdungpo-gu, Seoul, KOREA
Tel : +82-2-2006-3751~6 Fax : +82-2-2006-3951
Home page : <http://www.lgis.lg.co.kr/fa>

3. Performance Specifications

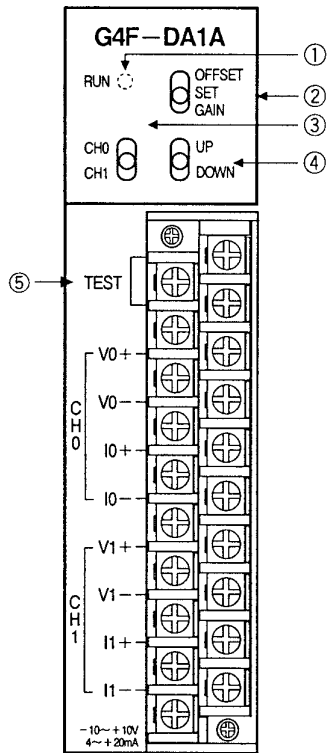
Items	Specifications
Digital input	<ul style="list-style-type: none">16bit(data part :14bits)signed binaryMay be set per channel by setting input data.("0" : -192 ~ 16191, "1" : -8192 ~ -8191)
Analog output	-5 ~ 5 VDC (External load resistance : 2K Ω ~ 1M Ω) DC-4 ~ 20 mA (External load resistance less than550 Ω)
Max. resolution	-10 ~ 10 VDC 1.25mV(1/16000) DC4 ~ 20 mA: 1 μ A(1/16000)
Accuracy	\pm 0.3% [Full Scale]
Max. conversion speed (ms/channel)	3ms/ 2 channels
Max. absolute input	Voltage: 15 VDC Current:DC 24 mA
Analog output points	2channels/1module
Isolation	Between input terminals and the PLC: Photo-coupler isolation
Terminals connected consumption	20-point terminal block
Internal current Cconsumption	0.45 A
Weight	370 g

 CAUTION

The adjusted value of A/D conversion module at manufacturer has been in the range of from -10 to 10 VDC, and in accordance with it, offset / gain values have already been set.

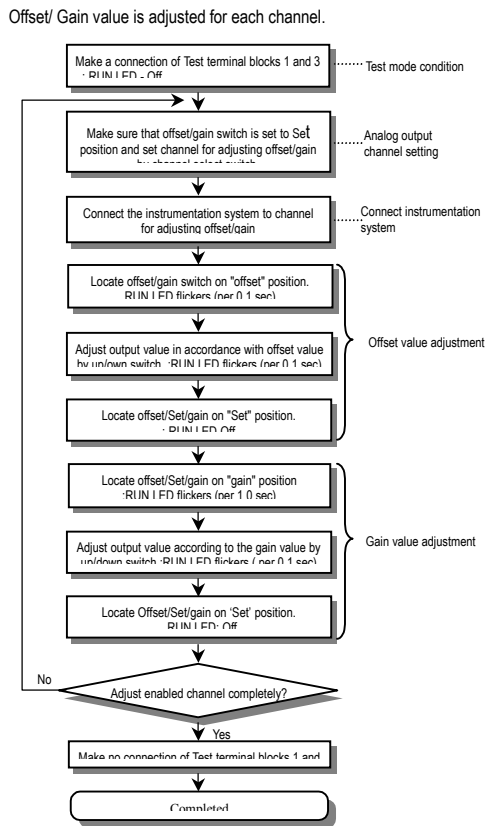
4. Parts Name and Functions

This following shows the names of parts and functions of G4F-DA1A module.



No.	Descriptions
①	RUN LED Indicates the operating status the G4F-DA1A *Normal mode -On: Normal operation -Flicker: error occurring -Off: 5 VDC power off or the G4F-DA1A module fault. *Test mode -Flicker(per 1.0 sec): Offset/Gain select switch is set to offset condition or gain condition. -Off: offset/gain select switch is set to Set condition.
②	Offset/ Set/Gain select switch *Offset position: Offset value control mode *Gain position: Gain value control mode *Set position: Offset/ Gain value set mode (When offset/gain position is changed to set position, offset/gain value is stored onto G4F-DA1A buffer memory.)
③	Channel select switch Used to select channel for adjusting offset/gain value on test mode. *CH0: enabled to adjust the offset/gain value on the CH0 *Neutral: disabled to adjust the offset/gain value *CH1 :enabled to adjust the offset/gain value on the CH1.
④	Up/Down switch -Used to make micro adjustment of offset/gain value. -Analog output value according to up/down location is changed as follows.: *Up/Down location of less than 2 sec : Add or fall of 1.25mA(voltage) / Add or fall of 1.0 μ A(current) *Up/Down location of more than 2 sec : Add or fall of 12.5mA(voltage) / Add or fall of 10 μ A(current)
⑤	Test terminal block Test mode is to be a connection of terminal block 1 and 3 Normal mode is to be a disconnection of terminal block 1 and 3

5. Procedure of Setting Offset / Gain



6. Handling Precautions

From unpacking to installation, be sure to check the following:

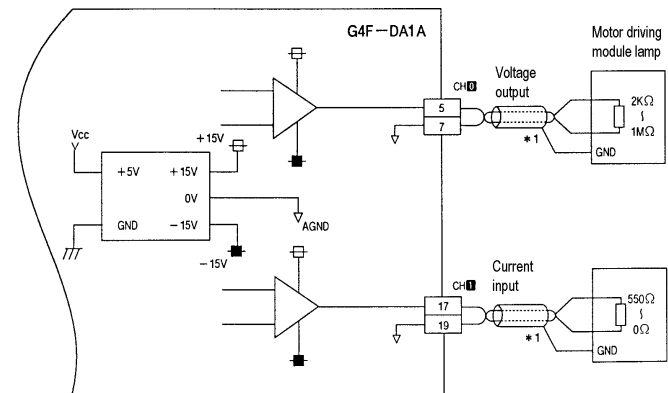
- 1) Do not drop it off, and make sure that strong impacts should not be applied.
- 2) Do not dismount printed circuit boards from the case. It can cause malfunctions.
- 3) During wiring, be sure to check any foreign matter like wire scraps should not enter into the upper side of the PLC, and in the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

7. Wiring

7.1 Wiring Precaution

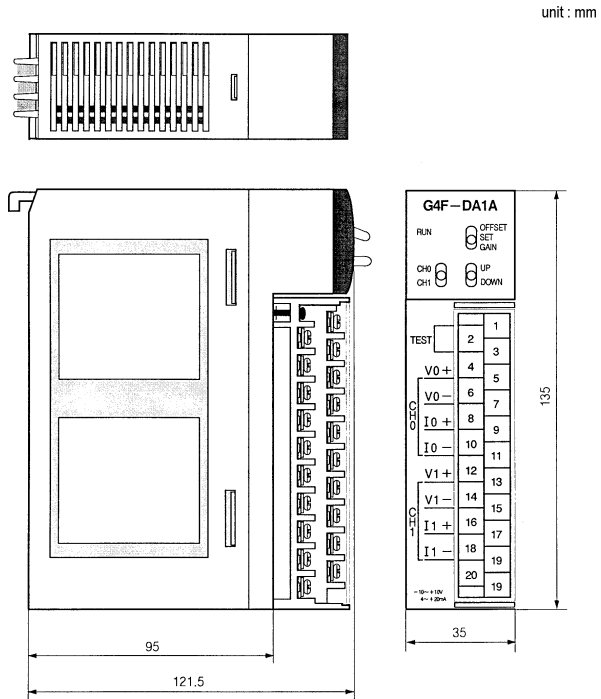
- 1) Separate AC and output signal of D/A conversion module wiring not to be affected by surge or induced noise of the AC.
- 2) External wiring has to be at least AWG22(0.3 mm²) and be selected in consideration of operating ambience and/or allowable current.
- 3) Separate wiring from devices and/or substances 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.

7.2 Wiring example



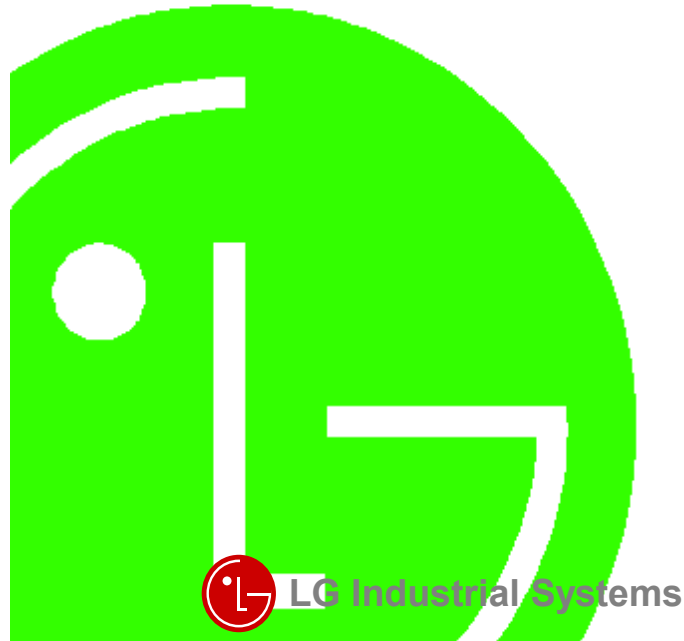
*1 For the cable, use a two-core twisted shielded wire.

8. Dimension



DATA SHEET

LG Programmable Logic Controller Digital to Analog Conversion Module GLOFA G4F-DA3V/G4F-DA3I G4F-DA2V/G4F-DA2I



Before handling the product

Read this data sheet carefully prior to any operation, mounting, installation or start-up of the product.

Materials for GLOFA GM

Name	Code
GLOFA GMWIN (Programming Software)	702005047
GLOFA GM (Instruction & programming)	702005058
GLOFA-GM3/4	702004919
GLOFA G4F-DA3V/DA2V /DA3I/DA2I	702005796

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 G4F-DA3V/G4F-DA2V and G4F-DA3I/G4F-DA2I. For safety precautions on the PLC system, see the GLOFA GM4 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, 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

WARNING

► 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.

State \ Channel Setting	Channel Specification	
	Used	Unused
PLC CPU in RUN state	A D/A Conversion value is output	Voltage : 0V Current : 4 mA
PLC CPU in STOP state	Voltage : 0V Current : 4 mA	
PLC CPU in Error state	Previous value	

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 pro-jections 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, 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.

1. Introduction

The G4F-DA3V/DA2V /DA3I/DA2I is digital/analog conversion module for use with the GLOFA PLC GM4 and GK4 series CPU modules. The D/A conversion module is to convert a 12-bit signed binary digital value to an analog output signal(Voltage or Current).

2. General Specifications

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

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● Tokyo Branch LG Industrial Systems Co., Ltd. Tokyo Office T : +81-3-3589-6362 F : +81-3-3588-1810	

LG Industrial Systems Co., Ltd.

● Head Office
LG Mullae Building 9th F, 10, Mullae-dong 6-ga, Yongdungpo-gu, Seoul, KOREA
Tel : +82-2-2006-3751~6 Fax : +82-2-2006-3951
Home page : <http://www.lgis.lg.co.kr/fa>

MEMO

3. Performance Specifications

Items		Specifications			
		G4F-DA3V	G4F-DA2V	G4F-DA3I	G4F-DA2I
Digital input		16bit(data part :12bits)signed binary (output range : -48 ~ 4047)			
Analog output		-10 ~ 10VDC (External load resistance : 2k Ω ~ 1M Ω)		4 ~ 20mADC (External load resistance : less than 510 Ω)	
Max. resolution		5 mV(1/4000)		4 μ A(1/4000)	
Accuracy		\pm 0.5% [Full Scale]			
Max. conversion speed (ms/channel)		15ms/8 channels	10ms/4 channels	15ms/8 channels	10ms/8 channels
Max. absolute input		15VDC		25 mA DC	
Analog output points		8channels	4channels	8channels	4channels
Isolation		Between input terminals and the PLC: Photo-coupler isolation			
Terminals connected consumption		20-point terminal block			
Internal current Consumption(DC5V)		700 mA	400 mA	60 mA	680 mA
External Power supply	Voltage			DC21.6~26.4V	
	Current			230 mA	
Weight		280g	260g	280g	260g

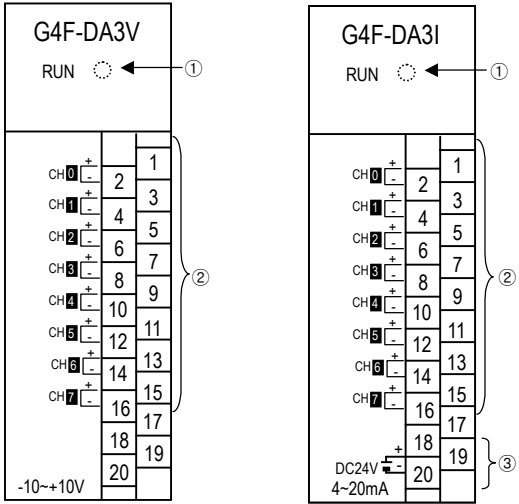


CAUTION

The adjusted value of D/A conversion module at manufacturer has been in the range of from -10 to 10 VDC or 4 ~ 20mA, and in accordance with it, offset / gain values have already been set.

4. Parts Name and Functions

This following shows the names of parts and functions of G6F-DA2V and G6F-DA2I module.



No.	Descriptions
①	<div>RUN LED</div> <div>Indicates the operating status the G4F-DA3V/G4F-DA2V and G4F-DA3I/G4F-DA2I</div> <div>*Normal mode</div> <div>-On : Normal operation</div> <div>-Off : 5 VDC power off or the G4F-DA3V/G4F-DA2V and G4F-DA3I/G4F-DA2I module fault.</div>
②	<div>Analog output terminal block</div> <div>Terminal block which is output D/A conversion value of each channel to external.</div> <div>(G4F-DA3V/G4F-DA3I : 8 channels</div> <div>G4F-DA2V/G4F-DA2I : 4 channels)</div>
③	<div>External Power supply terminal block</div> <div>External Power supply is connected in terminal block 19 and 20.</div> <div>(G4F-DA3I)</div>

5. Handling Precautions

From unpacking to installation, 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 boards 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 matter entered into it, always eliminate it.
- 4) Be sure to disconnect electrical power before mounting or dismounting the module.

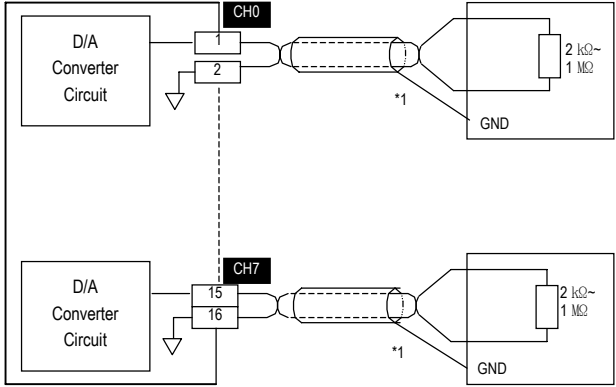
6. Wiring

6.1 Wiring Precaution

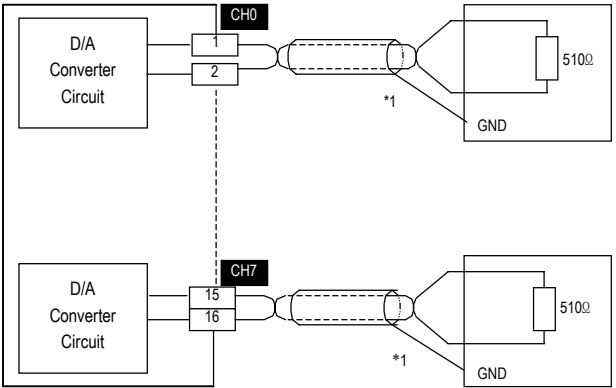
- 6) Separate AC and output signal of D/A conversion module wiring not to be affected by surge or induced noise of the AC.
- 7) External wiring has to be at least AWG22(0.3 mm²) and be selected in consideration of operating ambience and/or allowable current.
- 8) Separate wiring from devices and/or substances generating intense heat, and oil not to make short-circuit which leads to damage and/or mis-operation.
- 9) Identify the polarity of terminal block before external power supply is made connected.
- 10) Separate external wiring sufficiently from high voltage and power supply cable not to cause induced failure and/or malfunction.

6.2 Wiring example

1)G4F-DA3V/G4F-DA2V



2)G4F-DA3I/G4F-DA2I



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

7. Dimension

(Unit : mm)

