DATA SHEET

LG Programmable Logic Controller
A/D · D/A Combination Module
G7F-ADHA

LG Industrial Systems

- **When using LGIS equipment, thoroughly read this datasheet and associated manuals introduced in this datasheet. Also pay careful attention to safety and handle the module properly.**
- **Store this datasheet in a safe place so that you can take it out and read it whenever necessary.**

• Head Office
LG Twin Towers East Bldg. 9th Floor, 20, Yoido-Dong Youngdungpo-Gu, Seoul 150-721, KOREA

• Domestic Sales Team

PLC sales team	TEL:+82-2-3777-4620~34	FAX:+82-2-3777-4622
Busan sales team	TEL:+82-51-310-6855~60	FAX:+82-51-310-6851
Deagu sales team	TEL:+82-53-603-7740~5	FAX:+82-53-603-7788
Gaungju sales team	TEL:+82-62-510-1885~91	FAX:+82-62-526-3262
Deajeon sales team	TEL:+82-42-820-4240~2	FAX:+82-42-820-4298

• Overseas Sales Team

PLC sales team	TEL:+82-2-3777-4640~7	FAX:+82-2-3777-4648~9

• Web site
http://www.lgis.co.kr (Korean)
http://www.lgis.com (English)

• Overseas Branches

USA	New Jersey Branch	+1-201-816-2985
China	Beijing Branch	+86-10-6462-3254~9
	Shanghai Branch	+86-21-6278-4370
	Guangzhou Branch	+86-20-8755-3429
Japan	Tokyo Branch	+81-3-3582-9128
Vietnam	Hanoi Branch	+84-4-882-0222

LG constantly endeavors to improve our products so that information in this datasheet is subjected to change without notice.

10310000195

∘ Safety Precautions

- Safety Precautions is for using the product safe and correct in order to prevent the accidents and danger, so please go by them.
- The precautions explained here only apply to the G7F-ADHA unit. For safety precautions on the PLC system, refer to the GLOFA-GM7 or MASTER-K80S User's manual.
- The precautions are divided into 2 sections, 'Warning' and 'Caution'. Each of the meanings is represented as follows.

⚠ Warning If violated instructions, it can cause death, fatal injury or considerable loss of property.

⚠ Caution If violated instructions, it can cause a slight injury or slight loss of products

- The symbols which are indicated in the PLC and User's Manual mean as follows

⚠ This symbol means paying attention because of danger of injury, fire, or malfunction.

⚠ This symbol means paying attention because of danger of electrical shock.

- Store this datasheet in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

⚠ Warning

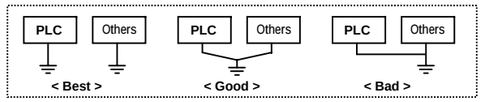
- Do not contact the terminals while the power is applied.
  Risk of electric shock and malfunction
- Protect the product from being gone into by foreign metallic matter.
  Risk of fire, electric shock and malfunction.

⚠ Caution

- Be sure to check the rated voltage and terminal arrangement for the module before wiring work.
  Risk of electric shock, fire and malfunction
- Tighten the screw of terminal block with the specified torque range.
  If the terminal screw looses, it can cause fire and electric shock.
- Use the PLC in an environment that meets the general specifications contained in this datasheet.
  Risk of electrical shock, fire, erroneous operation and deterioration of the PLC.
- Be sure that external load does not exceed the rating of output module.
  Risk of fire and erroneous operation.
- Do not use the PLC in the environment of direct vibration
  Risk of electrical shock, fire and erroneous operation.
- Do not disassemble, repair or modify the PLC.
  Risk of electrical shock, fire and erroneous operation.
- When disposing of PLC and battery, treat it as industrial waste.
  Risk of poisonous pollution or explosion.

Precautions for use

- Do not Install other places except PLC controlled place.
- Make sure that the FG terminal is grounded with class 3 grounding which is dedicated to the PLC. Otherwise, it can cause disorder or malfunction of PLC



- Connect expansion connector correctly when expansion module are needed,
- Do not detach PCB from the case of the module and do not modify the module.
- Turn off power when attaching or detaching module.
- Cellular phone or walkie-talkie should be farther than 30cm from the PLC
- Input signal and communication line should be farther than minimum 100mm from a high-tension line and a power line in order not to be affected by noise and magnetic field.

Before handling the product

Before using the product, read the datasheet and the User's manual through to the end carefully in order to use the product efficiently.

Materials for GLOFA-GM

Name	Code
GMWIN (Programming software)	10310000376
GLOFA-GM (Instruction & Programming)	10310000377
GLOFA-GM7 User's manual	10310000374

Materials for MASTER-K

Name	Code
KGL-WIN (Programming software)	10310000345
MASTER-K (Instruction & Programming)	10310000347
MASTER-K80S User's manual	10310000373

1. Introduction

The G7F-ADHA is A/D · D/A Combination module for use with the GLOFA GM7 and MASTER-K80S series. This module is to convert an analog input signal (voltage or current) from external sensors into a 12-bit signed Binary digital value, and convert digital internal data to analog value (Voltage or Current)

2. General Specifications

No	Item	Specifications				Standard
1	Operating temperature	0 ~ 55℃				
2	Storage temperature	-25 ~ 75℃				
3	Operating Humidity	5 ~ 95%RH, non-condensing				
4	Storage humidity	5 ~ 95%RH, non-condensing				
5	Vibration	Occasional vibration				IEC 61131-2
		Frequency	Acceleration	Amplitude	Sweep count	
		10≤f∠57 Hz	-	0.075 mm	10 times in each direction for X, Y, Z	
		57 ≤f≤150 Hz	9.8㎨ {1G}	-		
		Continuous vibration				
		Frequency	Acceleration	Amplitude		
		10≤f∠57 Hz	-	0.035 mm		
		57≤f≤150 Hz	4.9㎨{0.5G}	-		
6	Shocks	*Maximum shock acceleration: 147㎨ {15G} *Duration time :11 ms *Pulse wave: half sine wave pulse(3 times in each of X, Y and Z				IEC 61131-2
7	Noise immunity	Square wave impulse noise	±1,500 V			
		Electrostatic discharge	Voltage :4kV(contact discharge)			IEC 61131-2 IEC 1000-4-2
		Radiated electromagnetic field	27 ~ 500 MHz, 10 V/m			IEC 61131-2 IEC 1000-4-3
		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 61131-2 IEC 1000-4-4
			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				

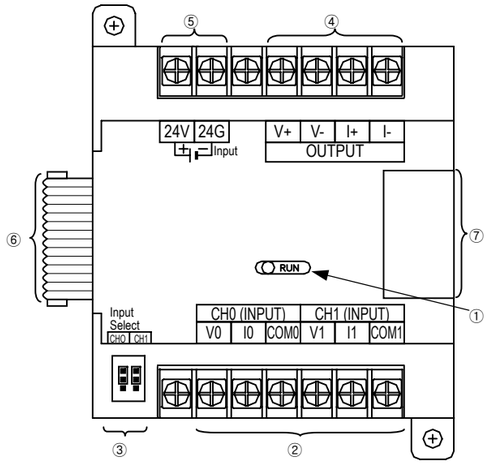
3. Performance Specifications

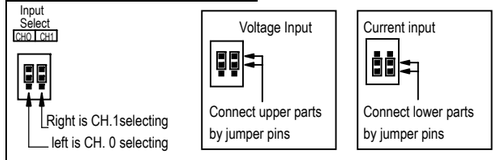
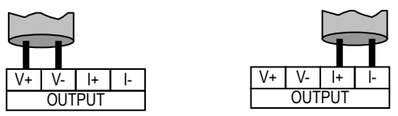
Item				
Analog Input	Input Range	Voltage	DC 0～10V (input resistance more than 1㏁)	
		Current	DC 0～20㎃ (input resistance 250Ω)	Classified by parameter
			DC 4～20㎃ (input resistance 250Ω)	
	Digital Output	12Bit(-48~4047)		
	Voltage/Current Selection	1.Setting by jumper pin for V/I selection on upper part of product (Up: voltage, Down: Current) 2. Voltage/current selected by the program 3. When current input is used, short the V and I terminal		
	No. of Channel	2Channels		
	Absolute max. input	Voltage	DC +12V	
		Current	DC +24㎃	
Analog Output	Output Range	Voltage	DC 0～10V (External load resistance 2㏀～1㏁)	
		Current	DC 0～20㎃ (External load resistance 510Ω)	Classified by parameter
			DC 4～20㎃ (External load resistance 510Ω)	
	Digital Input	12Bit(-48~4047)		
	Voltage/Current Selection	Separated from terminal		
	No. of Channel	1Channel		
	Absolute max. Output	Voltage	DC +12V	
		Current	DC +24㎃	
Common	Max. resolution	Voltage	DC0～10V	2.5㎷ (1/4000)
		Current	DC0～20㎃	5㎂ (1/4000)
			DC4～20㎃	6.25㎂ (1/3200)
	Accuracy	±0.5% [Full scale]		
	Max. conversion speed	2㎳/CH + scan time		
	Isolation	Photo coupler insulation between I/O terminals and PLC power supply (No isolation between channels)		
	Connect terminals	9 Points 2 terminals		
	Internal current Consumption	20㎃		
	External power supply	DC 21.6 ～ 26.4V, 80㎃		
	Weight(g)	240g		

Remark

1) Offset/gain value can't be changed, it is fixed.
2) Analog inputting is set the current since this is manufactured.
3) Extend to use max.2 Modules

4. Names of parts and functions



No	Contents
①	**RUN LED** Indicate the operating status the G7F-ADHA
②	**Analog input terminal** Voltage Input / Current input  ▶ When current input is used, short the V and I terminal.
③	**Jumper pin of analog input** 
④	**Analog output terminal** Voltage Output / Current Output  ▶ Only one type of output (Current or Voltage)is available on a module
⑤	**External power input terminal** ▶ Terminal supplies 24VDC
⑥	**Extension cable** ▶ This cable is used to connect while analog mixture module is used..
⑦	**Extension cable connector** ▶The connector connects extension cable when extended module is used.

5. Function Block (only GLOFA series)

5.1 Type of function block and function

Function block	Function	Remark
ADHA_RD	Reading A/D conversion value	DC 0～10V / DC 4～20 ㎃ Input only
AD420		DC 4～20 ㎃ current input only
DAHA_WR	Writing D/A conversion value	DC 0～10V / DC 4～20 ㎃ output only
DA420		DC 4～20 ㎃ current output only

5.2 Reading A/D conversion value (ADHA_RD, AD420)

Single type of function block for reading the module is performed for only one channel and the specified channel is used to read output variable of data displayed from A/D converted digital value.

Types of function block	Classification	Variable	Data type	Contents
ADHA_RD REQ DONE SLOT STAT CH DATA V_I	Input	REQ	BOOL	Execution request region of function block ● If connected condition on then region is completed and 0 turns to 1, then function block of reading module is executed while the program is performing
		SLOT	USINT	Location no. of slot ● Setting range:1 to 3
		CH	BOOL	Designation region of using channel ● Setting range:0to1
		V_I	BOOL	Designation region of Analog input type. ●Setting range:0 or 1(0: Current selecting, 1:Voltage selecting) ★ AD420 isn't used in function block.
AD420 REQ DONE SLOT STAT CH DATA	Output	DONE	BOOL	Indicating region of A/D conversion value. ● If reading function block is completed to execute without an error then 1 is output and maintains 1 until next execution comes, but if an error occurs, 0 is output and if becomes operation stop status.
		STAT	USINT	Area marking error status ● When error occurs, output error numbers.
		DATA	INT	Area outputting A/D conversion value ● Data output range: -48 ～ 4047

5.3 Writing D/A conversion value (DAHA_WR, DA420)

Type of function block	I/O	Variables	Data type	Contents
DAHA_WR REQ DONE SLOT STAT V_I DATA	Input	REQ	BOOL	Execution request region of function block ● If connected condition on this region is completed and 0 turns to 1 then function block of writing module is executed while the program is performing.
		SLOT	USINT	Location no. of slot ● Setting range:1 to 3
		V_I	BOOL	Designation region of analog output type ● Setting range:0 or 1(0: I selecting, 1: V selecting) ★ DA420 isn't used in function block.
		DATA	INT	Input region of D/A conversion ● Setting range:0 to 4000
DA420 REQ DONE SLOT STAT DATA	Output	DONE	BOOL	Indicating region of function block ● If writing function block is completed to execute without an error then 1 is output and maintains 1 until nest execution comes, but if an error occurs, 0 is output and it becomes operation stop status
		STAT	USINT	Area for marking error status, that outputs error number when error occurs in execution of function block.

6. Special data register (only MASTER-K series)

A/D conversion value stores special data register as following.

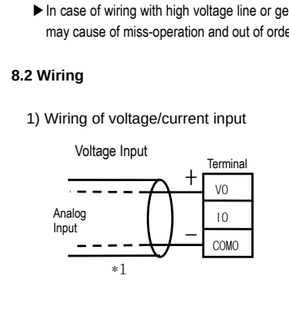
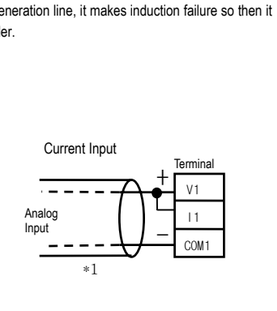
The table which is shown below is possible to use under the same or less than K80S CPU ROM V1.3.

Special data register	Explanation	remark
D4980	A/D conversion value of channel 1 stores	Expansion A/D module #1
D4981	A/D conversion value of channel 2 stores	
D4982	D/A conversion value set	
D4983	A/D conversion value of channel 1 stores	Expansion A/D module #2
D4984	A/D conversion value of channel 2 stores	
D4985	D/A conversion value set	

The table which is shown below is possible to use under the same or more than K80S CPU ROM V1.4.

Special data register	Explanation	remark
D4980	A/D conversion value of channel 1 stores	Expansion A/D module #1
D4981	A/D conversion value of channel 2 stores	
D4982	D/A conversion value set	
D4983	Not used	
D4984	A/D conversion value of channel 1 stores	Expansion A/D module #2
D4985	A/D conversion value of channel 2 stores	
D4986	D/A conversion value set	
D4987	Not used	

6.1 parameter setting

The same or less than KGLWIN V2.13	The same or more than KGLWIN V2.14
	

7. 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.

8. Wiring

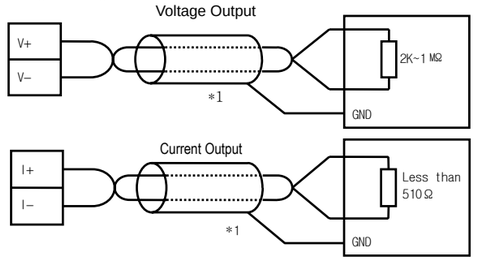
8.1 Caution for wiring

- ▶Make sure that external input signal of the mixture module of AC and analog I/O is not affected by induction noise or occurs from the AC through using another cable.
- ▶Wire is adopted with consideration about peripheral temperature and electric current allowance. Thicker than Max. size of wire AWG22 (0.3㎟) is better.
- ▶If wire is put near to high temp. radiated device or contacted with oil for a long time, it may cause of electric leakage so that it gets broken or miss-operation during wiring.
- ▶Be sure to connect with care of polarity while connecting to external 24V DC power supply.
- ▶In case of wiring with high voltage line or generation line, it makes induction failure so then it may cause of miss-operation and out of order.

8.2 Wiring

1) Wiring of voltage/current input

2) Wiring of voltage/current output



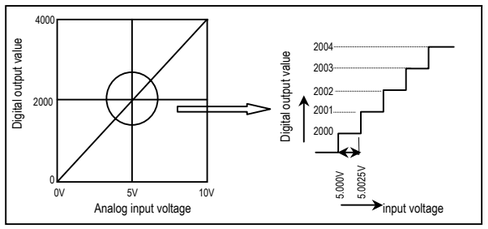
*1 : Be sure to use two-core twisted shield wire.

* Be careful to use that analog output is 1 channel.

9. I/O converstion characteristics

9.1 Analog input characteristics

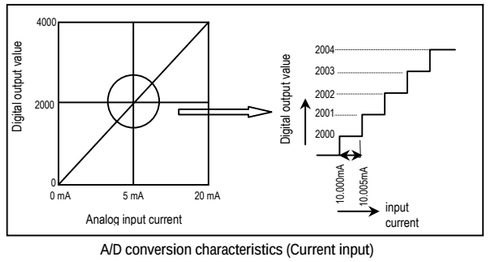
1) Voltage Input



A/D conversion characteristics (voltage input)

In voltage input, digital amount 0 is output by 0V input and 4,000 is output by 10V input. Therefore input 2.5mV equals to digital amount 1, but value less than 2.5mV can't be converted.

2) Current Input

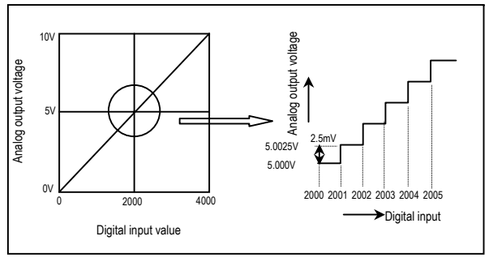


A/D conversion characteristics (Current input)

Current input 0mA becomes output 0, 10mA does 2000 and 20mA does 4000. therefore input 5 ㎂ equals to digital amount 1, but value less tan 5 ㎂ can't be converted. So abandon it.

9.2 Analog Output characteristics

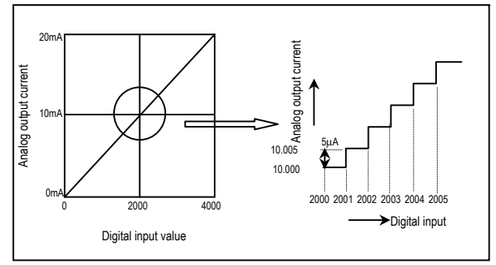
1) Voltage Output



D/A conversion characteristics (voltage output)

Input of digital amount 0 outputs analog amount 0V, 4000 does 10V. Digital input 1 equals to 2.5mV of analog amount.

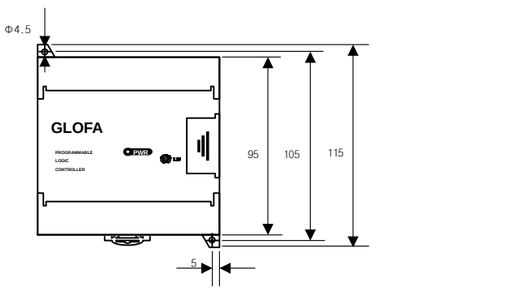
2) Current Output

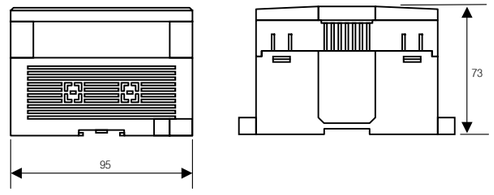


D/A conversion characteristics (Current output)

In current output, digital amount 0 exchanges to 0mA, and 4,000 does 20mA. Analog amount of digital input 1 equals to 5 ㎂.

10. Dimension (unit : mm)





11. Warranty

1. Warranty period

   LGIS provides an 18-month-warranty from the date of the production.

2. Warranty conditions

   For troubles within the warranty period, LGIS will replace the entire PLC or repair the troubled parts free of charge except the following cases.

   (1) The troubles caused by improper condition, environment or treatment except the instructions of LGIS.
   (2) The troubles caused by external devices.
   (3) The troubles caused by remodeling or repairing based on the user's own discretion.
   (4) The troubles caused by improper usage of the product.
   (5) The troubles caused by the reason which exceeded the expectation from science and technology level when LGIS manufactured the product.
   (6) The troubles caused by natural disaster.

3. This warranty is limited to the PLC itself only. It is not valid for the whole system which the PLC is attached to.