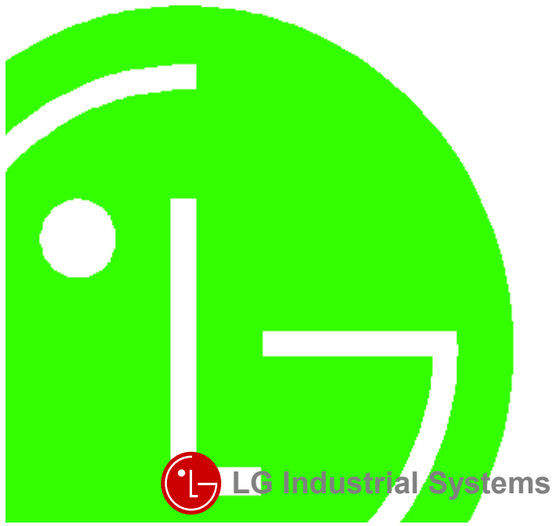
DATA SHEET

LG Programmable Logic Controller
Analog Input/Output Module
K56E-ADA



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Before handling the product

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

Materials for MASTER-K

Name	Code
Master-K S series User's Manual	702003789
Master-K / GLOFA-K Programming Manual	702004953
KGL-WIN (Programming software)	702005036
KLD-150S (Hand-held loader)	702005025

❑ 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 K56E-ADA.
For safety precautions on the PLC system, see the Master-K S series User's manual.
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 an important content is mentioned, therefore, be sure to observe it.
Keep this manual handy for your quick reference in necessary.

❑ Design Precautions

⚠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

⚠CAUTION

▶ 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 K56E-ADA is analog/digital conversion module for use with the MASTER-K 30S and 60S series. This module is to convert an analog input signal (voltage or current) from external sensors into a 10-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 1131-2
		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}	-		
		Continuos 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 directions)				IEC 1131-2
7	Noise immunity	Square wave impulse	± 1,500 V			
		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				

3. Performance Specifications

Items		Specifications		
A/D Part	Analog Input	Voltage	DC 0 ~ 5V DC 0 ~ 10V	. Selected by DIP switch
		Current	DC 0 ~ 20mA	
	Resolution	10 Bits		
	Voltage/Current Selection	. Selected by input terminal . Short the V and I terminal when current input used.		
	Analog Input Channels	2 Channel / Unit		
	Absolute Input Range	Voltage	DC 0 ~ +12V	
		Current	DC 0 ~ +25mA	
D/A Part	Resolution	10 Bits		
	Analog Output	Voltage	DC 0 ~ 10V (External Load Resistance : 2 ㏀ ~ 1 ㏁)	
		Current	DC 0~20mA (External Load Resistance : 500Ω or less)	
	Voltage/Current Selection	Selected by output terminal		
	Analog Output Channel	1 Channel / Unit		
	Absolute Output Range	Voltage	DC 0 ~ +12V	
		Current	DC 0 ~ +24mA	
Max. Resolution		DC 0 ~ 5V	5mV (1/1000)	
		DC 0 ~ 10V	10mV (1/1000)	
		DC 0 ~ 20mA	20 ㎂ (1/1000)	
Digital Data Scaling		0 ~ 1000		
Power Supply		External DC 24V		
Overall Accuracy		± 0.5% of full scale		
Conversion Time		1.5 msec/1 unit		
Insulation		Photo coupler insulation between input terminal and power supply (No insulation between channels)		
Terminal		12 Points Terminal Block		
Current Consumption		85 mA or less		
Weight		300g		

Note)
- This unit may be damaged by input voltage/current in excess of –0.5V ~ +15V / -2mA ~ 25mA. Please keep input voltage/current not to exceed –0.5V ~ +15V / -2mA ~ 25mA.
- To reduce ripple of voltage/current output, attach a capacitor (0.47 ~ 0.1uF) between external terminals.
- The offset and gain value is fixed as factory setting, so user can not change them
- Only one type of output (current or voltage) is available on a module.
- The K56E-ADA occupies 16bit of I/O interface. Therefore, Max. 1 module can be attached to K30S, and 2 modules to K60S.

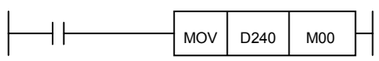
4. Data conversion area & Example program

1) Data Conversion Area

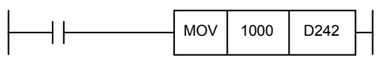
Unit \ Ch.	A/D Channel 0	A/D Channel 1	D/A
Analog Unit 1	D240	D241	D242
Analog Unit 2	D243	D244	D245

2) Example Program

- Read A/D data of channel 0 of the analog unit 1 from D240 to M00

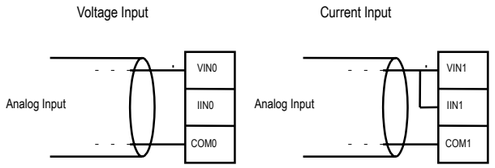


- Write data 1000 to the D/A channel of the analog unit 1

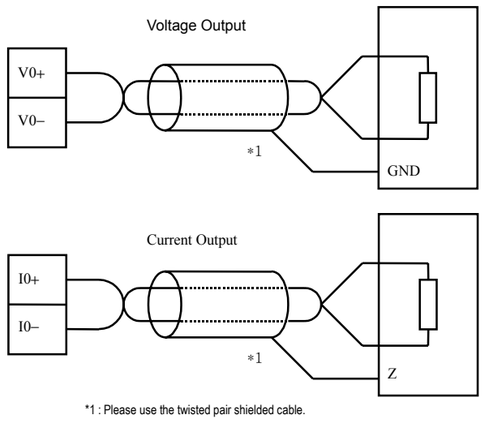


5. Wiring and switch selection

1) Wiring of voltage/current input

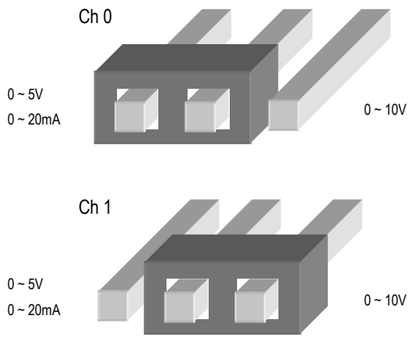


2) Wiring of voltage/current output



*1 : Please use the twisted pair shielded cable.

3) Jumper Selection



	Jumper Position	Channel Setting
CH0		0 ~ 5V 0 ~ 20mA
		0 ~ 10V
CH1		0 ~ 5V 0 ~ 20mA
		0 ~ 10V

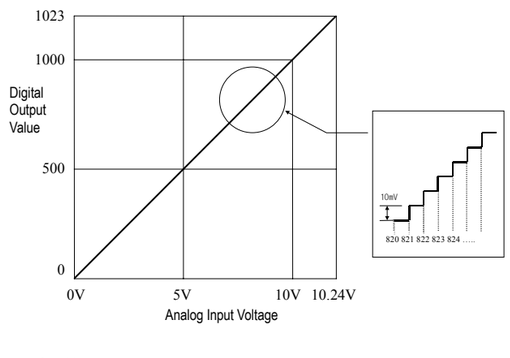
4) Wiring Precautions

1) Separate AC and external input signal of A/D 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 ambiance 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.

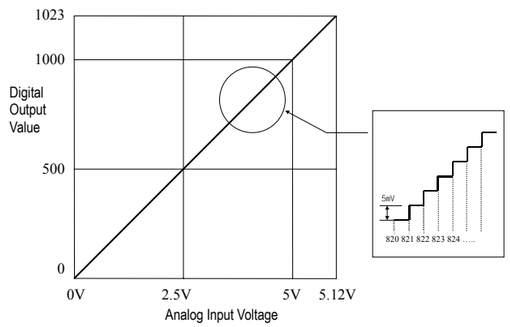
6. Input conversion characteristics

1) Voltage input

■ 0 ~ 10V range

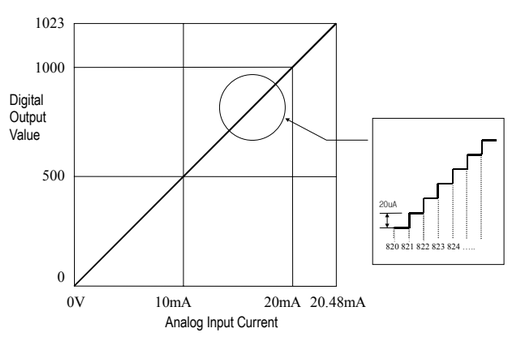


■ 0 ~ 5V range



2) Current Input

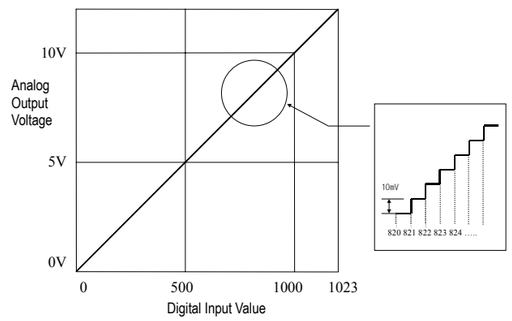
■ 0 ~ 20mA range



7. Output conversion characteristics

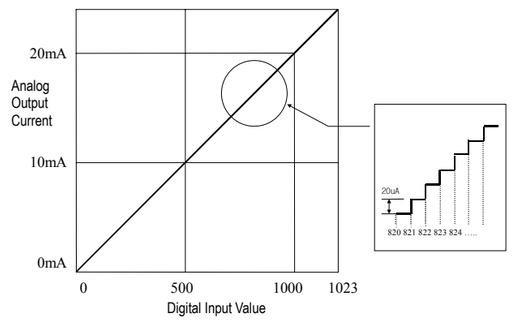
1) Voltage Output

■ 0 ~ 10V range



2) Current Output

■ 0 ~ 20mA range



8. Installation

1) Installation ambiance

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

a) Ambiance requirements

Avoid installing this module in locations, which are subjected or exposed to;

- Water leakage and a large amount of dust, conductive powder, oil mist, salt, or organic solvent exists.
- Mechanical vibrations of impacts are 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.

b) Installing and wiring

- During wiring or other work, do not allow any wire scraps to enter into module.
- 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 50mm or more.
- Be sure to be grounded to locations that have good noise immunity.

c) Handling precautions

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

- Do not drop it off, and make sure that strong impacts should net be applied.
- Do not dismount printed circuit boards from the case. It can cause malfunctions.
- 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.
- Be sure to disconnect electrical power before mounting or dismounting the module.

9. Dimension (unit : mm)