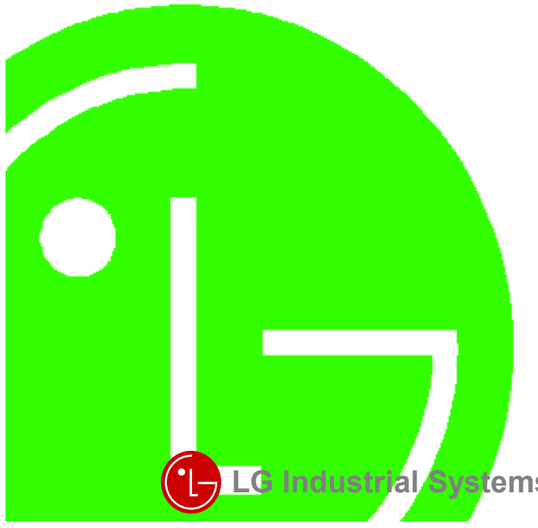
DATA SHEET

LG Programmable Logic Controller
Analog to Digital Conversion Module
MASTER-K K7F-AD4A



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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 KGL-WIN (Programming Software)	702005036
MASTER-K (Instructions & programming)	702006539
MASTER-K CPU User's Manual	702006391
MASTER-K K4F-AD2A/K7F-AD4A Manual	702006437

Name	Code
MASTER-K K7F-AD4A Data Sheet	702006255

❑ 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 K7F-AD4A

For safety precautions on the PLC system, see the MASTER-K CPU 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 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

▶ 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 K7F-AD4A is analog/digital conversion module for use with the MASTER-K PLC K1000S series CPU modules. The A/D conversion module is to convert an analog input signal (voltage or current) from external sensors into a 16-bit signed Binary digital value.

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				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 noise	± 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
			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
input	Voltage	–5 ~ 5 VDC (input resistance 560㏀) –10 ~ 10 VDC (input resistance 560㏀)
	Current	DC –20 ~ 20 mA (input resistance 250Ω)
	Voltage/Current selection	*. Select with the Input conversion switch on the side of the module (on: current, off: voltage) *. When current input is used, set the Input range switch to V1 / I.
Digital output		*. 16-bit (data: 14bit)signed binary *. May be set per channel by setting output data "0": -192 to 16191 "1": -8192 to 8191
Maximum resolution	-5 ~ 5 VDC	0.625 mV (1/16000)
	-10 ~ 10 VDC	1.25 mV (1/16000)
	DC -20 ~20 mA	0.0025 mA (1/16000)
Overall Accuracy(%)		± 0.5% or lower (accuracy to full scale) (± 0.3% at ambient temperature 25℃)
Maximum conversion speed (ms/channel)		3.0
Maximum absolute input		Voltage(V):± 12, Current (mA):± 25
Number of analog input point		16 channels/module
Isolation		Between input terminals and PLC: Photo coupler isolation (Between channels : Non-isolated)
Terminals connected		38-point terminal block
Internal current consumption(A)		0.7 A
Weight (g)		630

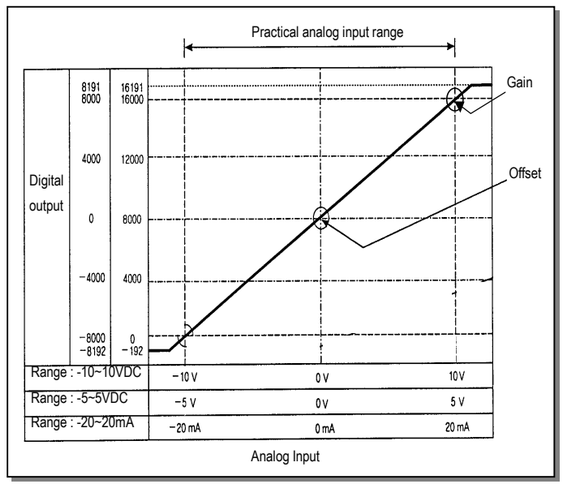
⚠CAUTION

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

4. Conversion Characteristics

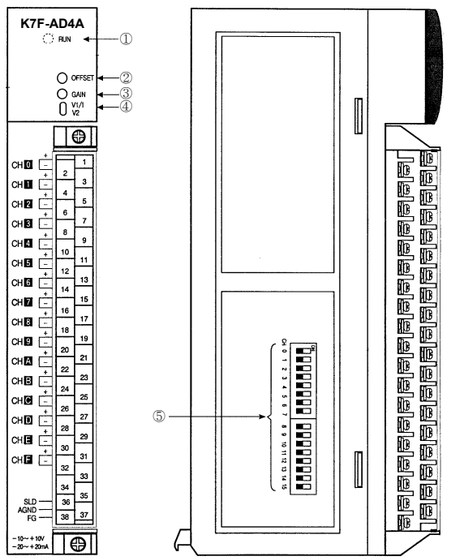
Input / Output (hereafter I/O) conversion characteristics are expressed by the angle of the line connecting the offset value and gain value used to convert the analog signals, input to the PLC into digital values.

The I/O conversion characteristics of the A/D conversion module are shown as below.



5. Parts Name and Functions

This following shows the names of parts and functions of K7F-AD4A module.



No	Descriptions
①	RUN LED Indicates the operating status of the K7F-AD4A (1) On : Normal operation (2) Flicker : An error has occurred. (For more information, see the General Section 4.1) (3) Off : DC 5 V power-off or K7F-AD4A module fault.
②	Offset Trimmer Used to make micro adjustment of an offset value.
③	Gain Trimmer Used to make micro adjustment of a gain value.
④	Input range switch -On factory set, the current range has to be set to from -20 to 20 ㎃ (1) Set to voltage ↑ V1 : Voltage range -5 ~ 5 VDC ↓ V2 : Voltage range -10 ~ 10 VDC (2) Set to current ↑ I : Current range -20 ~ 20 mA ↓ : Unusable
⑤	Input select switch (1) Used to select the analog input(voltage or current input) of each channel -Set to OFF to use voltage input. -Set to ON to uses current input. (2) On factory set, it has to be set to current input condition. (Every Dip Switch is on.)

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.

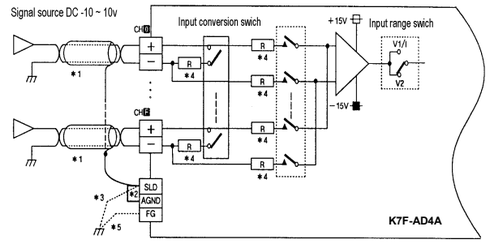
7. Wiring

7.1 Wiring Precaution

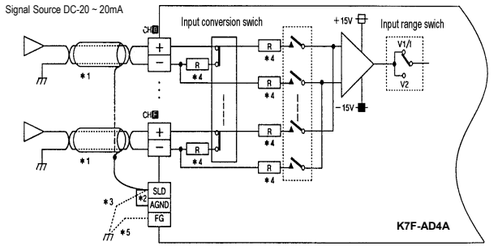
1) Separate AC and external input signal of A/D conversion module wiring not to be affected by surge or induced noise in the AC.
2) External wiring has to be at least AWG22(0.3 ㎟) and be selected in consideration of operating ambiance and/or allowable current.
3) Separate wiring from devices and/or substances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

7.2 Wiring example

1) Voltage Input



2) Current Input



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

*2 The SLD terminal and AGND terminal has to be connected.

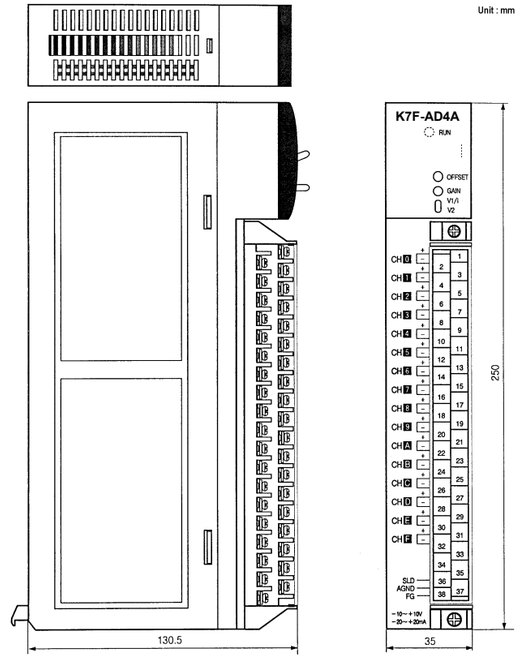
*3 When there is much noise, the SLD terminal and FG terminal has to be grounded.

*4 Input resistance has been shown.

*5 When there is much noise, FG of the power supply module must be grounded.

8. Dimension

Unit : mm



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