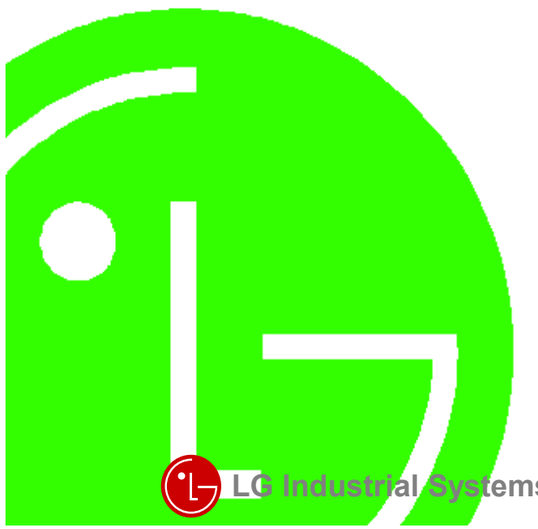
DATA SHEET

LG Programmable Logic Controller
Digital to Analog Conversion Module
MASTER-K K7F-DV4A K7F-DI4A



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702006288

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-DA1A/K7F-DV4A/K7F-DI4A Manual	702006459

Name	Code
MASTER-K K7F-DV4A / K7F-DV4I Data Sheet	702006288

❑ 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-DV4A , K7F-DI4A.
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

▶ 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.

Setting State \ Channel	Channel Specification	
	Used	Unused
PLC CPU in RUN state.	The D/A conversion value is output.	K7F-DV4A : 0 V K7F-DI4A : 12mA
PLC CPU in STOP state	The 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.

❑ 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

⚠

▶ 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-DV4A, K7F-DI4A is digital/analog conversion module for use with the MASTER-K K1000S 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					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	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

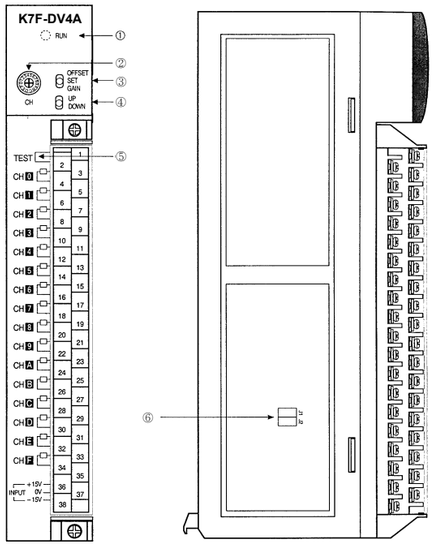
Items		Specifications	
		K7F-DI4A	K7F-DV4A
Digital input		• 16bit(data part :14bits)signed binary • May be set per channel by setting input data. ("0" : 0~16000, "1" : -8000～8000)	
Analog output		DC 4～20mA (External load resistance less than 510Ω)	-5～5 VDC : (External load resistance :2KΩ ～1MΩ) -10～10 VDC : (External load resistance :2KΩ ～1MΩ)
Max. resolution		1 ㎂(1/16000)	-5～5 VDC : 0.625 mV(1/16000) -10～10 VDC : 1.25 mV(1/16000)
Accuracy		±0.3% [Full Scale]	
Max. conversion speed		15ms/ 16 channels	
Max. absolute input		DC 24mA	15 VDC
Analog output points		16 channels/1module	
Isolation		Between input terminals and the PLC: Photo-coupler isolation	
Terminals connected consumption		38-point terminal block	
Internal current Cconsumption		0.25 A	
External Power supply	Voltage	15 VDC / - 15 VDC	
	Current	15 VDC : 0.5 A -15 VDC : 0.1 A	15 VDC :0.5 A -15 VDC :0.3 A
Weight		610 g	630 g

CAUTION

The adjusted value of K7F-DV4A 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.
The power supply for D/A module :
K7S-124S(for 110VAC), K7S-134S(for220VAC)

4. Parts Name and Functions

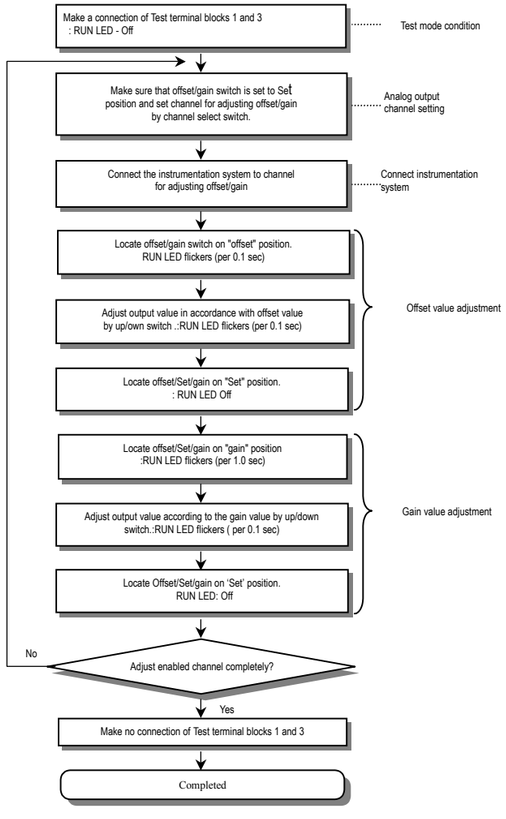
This following shows the names of parts and functions.



No.	Descriptions
①	RUN LED Indicates the operating condition of the D/A conversion module * On: Normal operation * Flickering: An error has occurred. (For more information, see the General Section 4.1) * Off : 5 VDC power off or D/A conversion module fault
②	Channel select switch Used to set the channel of which digital value is displayed on LED display. Setting range: 0～F
③	Offset/gain select switch Used to select Offset/Set/Gain . *Offset position: offset value adjustment mode *Gain position: gain value adjustment mode *Set position: the mode which stores offset/gain value. (When the switch is changed to "set" position from "Offset/ Gain" position, offset/gain value is stored in the memory of D/A conversion module.)
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 : K7F-DI4A - Add or fall of 1 ㎂/1 time K7F-DV4A-Add or fall of 1.25 mV/1 time *Up/down location of more than 2 sec : K7F-DI4A-Add or fall of 10 ㎂/ 0.2 sec. K7F-DV4A Add or fall of 12.5 mV/0.2 sec
⑤	Test terminal block Test mode is to be a connection of terminal block 1 and 2 Normal mode is to be a disconnection of terminal block 1 and 2
⑥	Output range select switch It's only for the K7F-DV4A. DC -10V ~ +10V / DC -5V ~ +5V * Factory set is made to -10～10 VDC.

5. Procedure of Setting Offset/ Gain

Offset/ Gain value is adjusted for each channel.



6. Handling Precautions

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

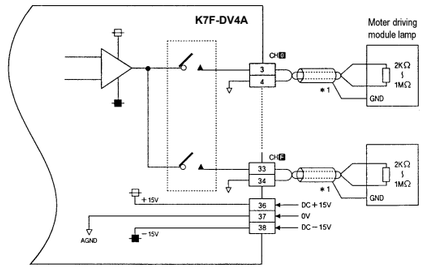
1) Do not drop it off, and make sure that strong impacts should not be applied.
2) Do not dismount printed circuit boards from the case. It can cause malfunctions.
3) During wiring, be sure to check any foreign matter like wire scraps should not enter into the upper side of the PLC, and in the event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

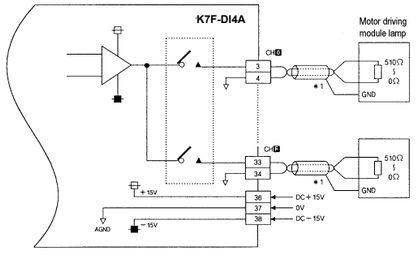
7. Wiring

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 ㎜²) 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 For the cable, use a two-core twisted shielded wire.

8. External Power Supply

Be sure to check the following specification of ± 15VDC from external power supply.

Items	Specification	
	K7F-DI4A	K7F-DV4A
Voltage	+15VDC ± 3%(14.55V ~ 15.45V)	
	-15VDC ± 3%(-15.45V ~ 14.55V)	
Current * Consumption	0.5A / +15VDC	0.5A / +15VDC
	0.1A / -15VDC	0.3A / -15VDC
Ripple	Less than 50mVp-p	
Peak	Less than 100mVp-p	
Transient output	Less than ± 1V	

* Current consumption is applicable to a piece of D/A module.

9. Dimension

unit : mm