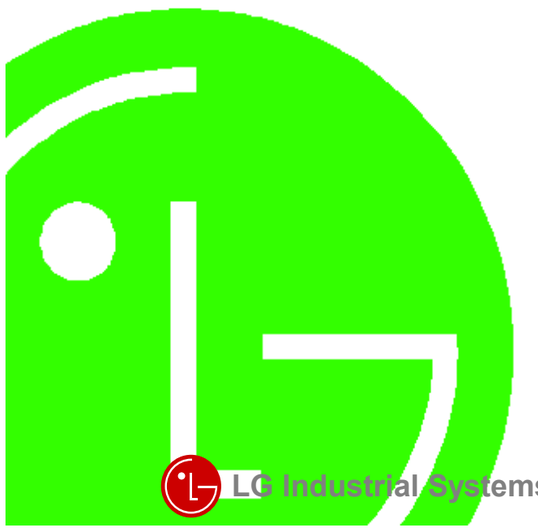
DATA SHEET

LG Programmable Logic Controller
Positioning Module
MASTER-K K4F-POPA
K7F-POPA
K7F-POAA



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702006313

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-POPA / K7F-POPA / K7F-POAA Manual	702006471

Name	Code
MASTER-K K4F-POPA / K7F-POPA / K7F-POAA Data Sheet	702006313

❑ 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-POPA/K7F-POAA/K4F-POPA.

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

⚠WARNING

▶To prevent over run, set stroke upper / lower limits in parameter, and attach mechanical upper / lower limit switches.

⚠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 on. 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

Positioning module, a special function module, positions a moving object (such as processed goods and tools) exactly at the place indicated by the current position, by moving the object at the setting speed. K7F-POAA are linked to various 'servo controlling driver systems' to provide high accuracy position controlling with output voltage signal for positioning.

K7F-POPA and K4F-POPA modules are linked to various servo controlling driver systems or a stepping motor controlling driver system to provide high accuracy position control with output voltage signal for positioning.

If altered for other applications, they can be widely used for a machine tool, a semi-conductor assembler, small sized machining center and a lifter.

2. General Specifications

Item	Specifications				Standard
Operating temperature	0 ~ 55℃				
Storage temperature	-25 ~ 70℃				
Operating Humidity	5 ~ 95%RH, non-condensing				
Storage humidity	5 ~ 95%RH, non-condensing				
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}	-		
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
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	
Atmosphere	Free from corrosive gases and excessive dust				
Altitude for use	Up to 2,000m				
Pollution degree	2 or lower				
Cooling method	Self-cooling				

3. Performance Specifications

[K7F-POAA]

Item		Specifications
Number of I/O points		64
Output type		Voltage output
Number of control axis		Two (simultaneous or independent; 8 simultaneous axes at synchronous operation)
Interpolation		Linear and circular interpolations
Positioning data	Capacity	150 points per axis
	Setting method	Input from S/W package
Positioning	Method	Absolute/incremental method can be selected for each axis
	Positioning command	The following 4 types can be selected by the command unit for each axis. -99,999,999 to +99,999,999 PLS (command unit : 1 PLS) Max. 999 m (command unit : 0.1 to 10 ㎛/PLS) Max. 999,999 inch (command unit : 0.00001 to 0.001 inch/PLS) Max. 999,999 deg (command unit : 0.00001 to 0.001 deg/PLS)
		The following 4 types can be selected by the command unit for each axis. 10 to 250,000 PLS/sec (command unit : 1 PLS) 10 to 150,000 mm/sec (command unit : 0.1 to 10 ㎛/PLS) 1 to 15,000 inch/min (command unit : 0.00001 to 0.001 inch/PLS) 1 to 15,000 deg/min (command unit : 0.00001 to 0.001 deg/PLS)
	Acceleration /deceleration	Trapezoidal, S type or exponential
	Backlash compensation	(10 to 9,900) × positioning command unit
	Zero point compensation	± 999 pulse
	Operation mode	Single positioning
		Repetitive positioning
		Automatic positioning
		Continuous positioning
		Random access positioning
		Random access positioning with the determined positions
Homing		Reducing time differs by toggles of the zero point L/S. There exist 3 methods by the time that the upper/lower limit or zero point L/S is reached.
M code function		256 data (After/With mode)
Zone setting function		3 zones can be set.
Manual operation function		Jog operation, Teaching Play Back
Floating zero point set function		This function changes the present position to an arbitrary position.

[K7F-POPA,K4F-POPA]

Item		Specifications	
		K7F-POPA	K4F-POPA
Number of I/O points		64	32
Output type		Pulse output (A/B type)	
Number of control axis		Two (simultaneous or independent)	One
Interpolation		Linear interpolations	None
Positioning data	Capacity	300 points per axis	
	Setting method	Input from S/W package	
Positioning	Method	Absolute/incremental method can be selected for each axis	
	Positioning command	- 16,744,447 to + 16,744,447	
	Speed	10 to 200,000 (pulse/sec), 128 pulses per x and y axes (Index data)	
	Acceleration /deceleration	Trapezoidal	
	Backlash compensation	0 to 999 pulses	
	Zero point compensation	± 999 pulses	
	Operation method	Single positioning	
		Repetitive positioning	
		Automatic positioning	
		Continuous positioning	
		Constant access positioning	
		Constant access positioning with the determined positions	
Homing		Reducing time differs by toggles of the zero point L/S. There exist 3 methods by the time that the upper/lower limit or zero point L/S is reached.	
M code function		256 data (After/With mode)	
Zone setting function		3 zones can be set.	
Manual operation function		Jog operation, Manual pulse operation, Inching and Teaching.	
Floating zero point set function		Setting the zero point by S/W at the point that the user wants to set.	
Present value Preset		This function changes the present position to an arbitrary position.	
Weight / Current consumption		530g / 5VDC 0.25A	305g / 5VDC 0.21A

4. External I/O Specifications

The K7F-POAA positioning module uses voltage as its output.

The K7F-POPA positioning module uses pulse as its output.

This section explains the specifications for external input /output.

4.1 External Input

1) Zero point limit (N.O), Upper/ lower limit (N.C), Emergency stop (N.C)

Item	Specifications
Rated input voltage	+ 24 VDC (- 15% to + 20%)
Rated input current	10 mA
On guarantee voltage	Minimum 16 VDC
Off guarantee voltage	Minimum 4 VDC
On delay time	2 ms or less
Off delay time	2 ms or less

2) Encoder feedback input signal (For the K7F-POAA only)

Item	Specifications
Open Collector (Phase A, B and Z)	Frequency : Max. 60 KPPS Pulse rising time : Max. 0.5 ㎲ Pulse falling time : Max. 0.5 ㎲ On guarantee voltage : Min. 2.7 V Off guarantee voltage : Max. 0.8 V
Line Driver (Phase A, B and Z)	Frequency : Max. 60 KPPS Pulse rising time : Max. 0.5 ㎲ Pulse falling time : Max. 0.5 ㎲

3) Zero point (Phase Z)

(For the K7F-POPA, K7F-POAA and K4F-POPA only)

Item	Specifications	Response time
Open Collector	+ 24 VDC (- 15 % to + 20%) 10 mA	0.1 ms or less
Line Driver	Same as the AM26LS31	

4) Manual Pulse Generator: For the K7F-POPA only

Item	Specifications	
Input voltage	+ 5 VDC (± 5%)	+ 12 VDC (± 5%)
On guarantee voltage	Min. 4 VDC	Min. 8 VDC
Off guarantee voltage	Max. 1 VDC	Max. 2 VDC
Pulse width	1 ms or more	

* N.O : Normal Open * N.C : Normal Closed

4.2 External Output

1) Servo On (Open Collector output) : For the K7F-POAA only

The Servo On signal is output to the servo driver

Item	Specifications
Load voltage	+ 4.75 VDC to 26.4 VDC
Load current	Maximum 10 mA
Maximum on voltage drop	Maximum 0.6 VDC
Off leakage current	Maximum 0.1 mA

2) Control voltage : For the K7F-POAA only

The control voltage is output to the servo driver : ± 3v, ± 6V, ± 10V

3) NPN open collector output : For the K7F-POPA and K4F-POPA only

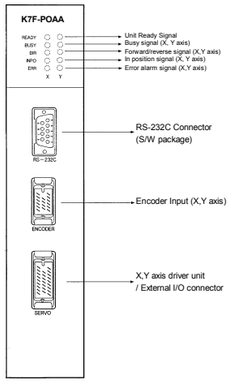
[Pulse string (FP, RP)]

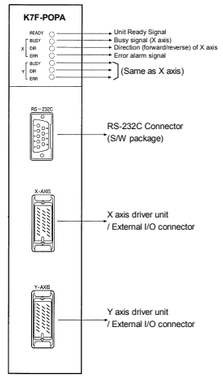
Item	Specifications
Max. On/off current	5 VDC, 150 mA 24 VDC, 150 mA
Min. On/off current	5 VDC, 2 mA 24 VDC, 2 mA
Maximum On voltage drop	0.3 V or less
Off leakage current	0.1 mA or less
External power supply	5 VDC (± 5%) 24 VDC(-15%~20%)

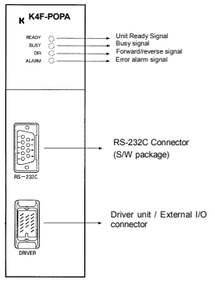
5. Part Name

1) K7F-POAA 2) K7F-POPA

3) K4F-POPA







6. INSTALLATION

The following explains the installation precautions are wiring for system reliability.

6.1 Installation precautions

1) Make sure that the module be firmly connected to the base module.
2) Follow the specifications of the module for operating environment.
3) Be sure to check that the driver is corrected connected to the connector.
4) Do not mount/dismount the module or the connector for driver while the power is being turned on.
5) When installing the module in a closed location use a heat prevention fan as possible.

7 Wiring

7.1 Wiring precautions

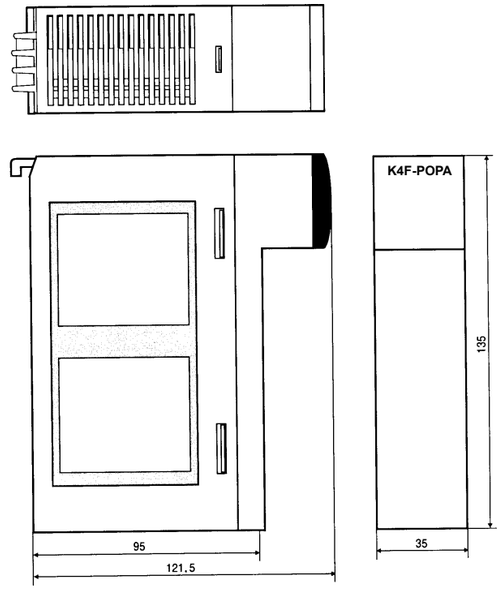
1) The cable length from the positioning module to the connected driver should be as short as possible (1 to 3 M)
2) When wiring I/O signal wires, separate the wires from the power line or circuit lines. (20 cm or more)
3) The connection cable length should be short as possible.

7.2 Wiring I/O signal wires

1) If it is thought that there's noise sources when wiring between the positioning module and drivers, use the twisted pair cable and shielded cable for input pulses from the positioning module to drivers.
2) When running I/O signal wires in piping, this should be guarded.
3) Use a stabilized external power supply (5VDC, 24VDC)

8. Dimension

[K4F-POPA] unit : mm



[K7F-POAA, K7F-POPA]

(These 2 modules have same dimensions) unit : mm