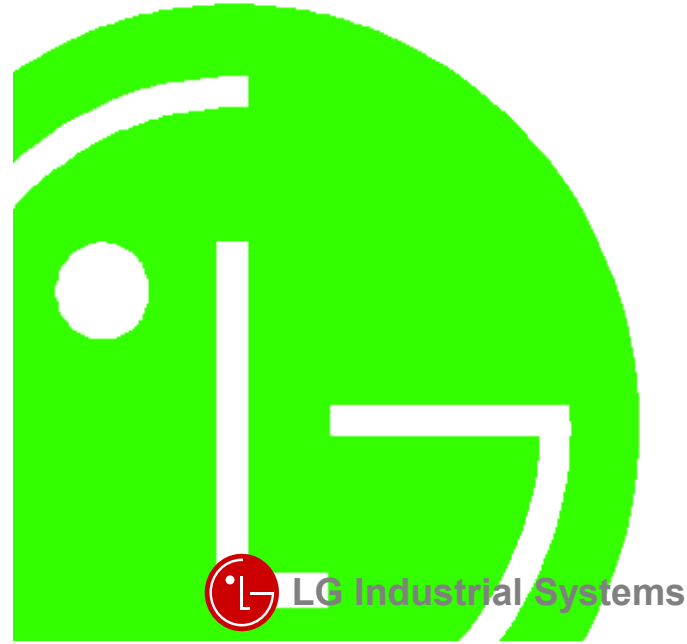


DATA SHEET

LG Programmable Logic Controller Positioning Module

**MASTER-K K3F-POPA
K4F-POPB**



| | |
|---|---|
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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 Position Control(pulse type) Manual | |

| Name | Code |
|---|------|
| MASTER-K K3F-POPA / K4F-POPB Data Sheet | |

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 K3F-POPA/K4F-POPB.

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 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 module.
- ▶ 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 dismantling 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.

K3F-POPA and K4F-POPB modules are linked to various servo controlling driver systems or a stepping motor 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 | | |
| | Frequency | Acceleration | Amplitude |
| | 10: f: 57 Hz | - | 0.075 mm |
| | 57 ≤ f: 150 Hz | 9.8m/s ² (1G) | - |
| | Continuous vibration | | |
| | Frequency | Acceleration | Amplitude |
| 10: f: 57 Hz | - | 0.035 mm | |
| 57 ≤ f: 150 Hz | 4.9m/s ² (0.5G) | - | |
| Shocks | *Maximum shock acceleration: 147m/s ² (15G) | | IEC 1131-2 |
| | *Duration time : 11 ms *Pulse wave: half sine wave pulse(3 times in each of X, Y and Z directions) | | |
| Noise immunity | Square wave immunes noise | ± 1,500 V | |
| | Electrostatic discharge | Voltage :4kV(contact discharge) | |
| | Radiated electromagnetic noise | 27 ~ 500 MHz, 10 V/m | |
| | Fast transient burst noise | Severity Level | All power modules (Ue ≥ 24 V) |
| 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

| Item | Specifications | |
|----------------------------------|---|--|
| | K3F-POPA | K4F-POPB |
| Number of I/O points | 64 | |
| Output type | Pulse output (A/B type) | |
| Number of control axis | Two (simultaneous or independent) | |
| Interpolation | Linear interpolations | |
| 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 address | - 16,744,447 to + 16,744,447 |
| | Speed | 10 to 200,000 (pulse/sec), 128 data per x and y axes (Index data), maximum 200Kpps |
| | Acceleration /deceleration | Operation pattern : 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 | |
| Homing | Constant access positioning with the determined positions | |
| | Homing differs by toggles of the zero point L/S. There exist 3 methods by toggles the upper/lower limit or zero point L/S | |
| M code function | 256 data (After/With mode) | |
| Zone setting function | 3 zones can be set. | |
| Manual Pulse Generator(MPG) | Not allowed | Allowed |
| Speed/Position Teaching | ROM/RAM Teaching | ROM Teaching |
| Connection connector | 37pin | 34pin |
| M code mode | With, After, None | |
| Speed Override | Setting unit : 1 ~ 99(unit:pulse) | |
| 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 | 137g / 5VDC 0.28A | 296g / 5VDC 0.35A |

4. External Interface I/O Specifications

| Signal Name | Rated input Voltage/Current | Input Voltage Range | On Voltage | Off Voltage | Input Resistance | Response Time |
|-------------|-----------------------------|---------------------|------------|-------------|------------------|---------------|
| Origin LIS | 24VDC/10mA | 20.4 ~ 26.4VDC | Min 16VDC | Max DC4V | 2.2kΩ | Max 1.8ms |
| Upper LIS | 24VDC/10mA | 20.4 ~ 26.4VDC | Min 16VDC | Max DC4V | 2.2kΩ | Max 1.8ms |
| Lower LIS | 24VDC/10mA | 20.4 ~ 26.4VDC | Min 16VDC | Max DC4V | 2.2kΩ | Max 1.8ms |
| EMG | 24VDC/10mA | 20.4 ~ 26.4VDC | Min 16VDC | Max DC4V | 2.2kΩ | Max 1.8ms |
| Origin | 24VDC/10mA | 20.4 ~ 26.4VDC | Min 16VDC | Max DC4V | 2.2kΩ | On:Max 0.1ms |
| MPG | 5VDC | 4.25 ~ 5.5VDC | Min 4VDC | Max 1VDC | 430Ω | Pulse width |
| | 12VDC | 10.8 ~ 13.2VDC | Min 8VDC | Max 2VDC | 430Ω | : Min 1ms |
| VTP | 24VDC/10mA | 20.4 ~ 26.4VDC | 16VDC | Max 4VDC | 2.2kΩ | On:Max 1.8ms |

| Signal Name | Rated load voltage | Load voltage range | Load current | On Voltage drop |
|--------------|--------------------|--------------------|--------------|-----------------|
| Pulse output | 5VDC | 4.75 ~ 5.25VDC | Max 70mA | Max 0.3VDC |
| | 24VDC | 20.4 ~ 26.4VDC | Max 70mA | Max 0.3VDC |

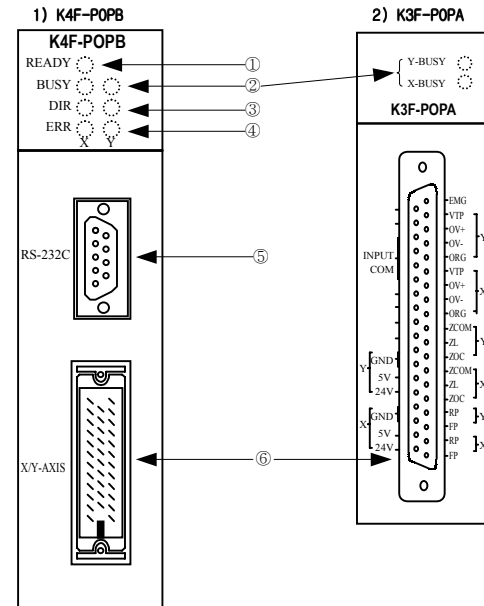
5. External Connection

| I/O | Internal Circuit | Pin No. | | Signal Name |
|--------------|------------------|------------|--|--|
| | | K4F-POPB | K3F-POPA | |
| PULSE OUTPUT | | 2 (13,14) | 20 | X_24V X-axis external incoming power supply of pulse output (DC 24V) |
| | | 24 (13,14) | 21 | X_5V X-axis external incoming power supply of pulse output (DC 5V) |
| | | 26 | 1 | X_FP X-axis forward direction pulse output |
| | | 4 | 2 | X_RP X-axis reverse direction pulse output |
| | | 1 | 22 | X_GND X-axis ground of pulse output |
| | | 23 | 23 | |
| ORIGIN INPUT | | 2 (13,14) | 24 | Y_24V Y-axis external incoming power supply of pulse output (DC 24V) |
| | | 24 (13,14) | 25 | Y_5V Y-axis external incoming power supply of pulse output (DC 5V) |
| | | 25 | 3 | Y_FP Y-axis forward direction pulse output |
| | | 3 | 4 | Y_RP Y-axis reverse direction pulse output |
| | | 1 | 26 | Y_GND Y-axis ground of pulse output |
| | | 23 | 27 | |
| ORIGIN INPUT | | 18 | 5 | X_ZOC X-axis Open Collector input of Z phase (DC 24V) |
| | | 28 | 6 | X_ZL X-axis Line Driver input of Z phase (DC 5V) |
| | | 6 | 7 | X_ZCOM X-axis Z phase input ground |
| | | 17 | 8 | Y_ZOC Y-axis Open Collector input of Z phase (DC 24V) |
| | 27 | 9 | Y_ZL Y-axis Line Driver input of Z phase (DC 5V) | |
| | 5 | 10 | Y_ZCOM Y-axis Z phase input ground | |

| | | | | |
|---------|--|----|----|--|
| X INPUT | | 21 | 12 | X_OV- External lower limit switch input (N.C) |
| | | 10 | 13 | X_OV+ External upper limit switch input (N.C) |
| | | 22 | 11 | X_ORG Origin limit switch input(N.O) |
| | | - | 14 | X_VTP Speed position conversion input(N.O) |
| Y INPUT | | 11 | 14 | INPUT COM Input signal Common |
| | | 20 | 16 | Y_OV- External lower limit switch input (N.C) |
| | | 9 | 17 | Y_OV+ External upper limit switch input (N.C) |
| | | 31 | 15 | Y_ORG Origin limit switch input(N.O) |
| EMG | | - | 18 | Y_VTP Speed position conversion input(N.O) |
| | | 11 | 33 | INPUT COM Input signal Common |
| | | 32 | 19 | EMG Emergency stop signal input : X / Y axis (N.C) |
| | | 11 | 33 | INPUT COM Input signal Common |
| MPG | | 30 | - | MPG_A MPG A Phase |
| | | 8 | - | MPG_AGND MPG A Phase Common |
| | | 29 | - | MPG_B MPG B Phase |
| | | 7 | - | MPG_BGND MPG B Phase Common |

*2 : K4F-POPB의 외부공급전원 (13,14)는 외부전원 5/24V Common 임.

6. Part Name



| No. | Descriptions |
|-----|---|
| ① | Ready signal Ready signal of positioning module |
| ② | Busy signal Turn On if each axis Busy signal turn on ▶ K3F-POPA : Flicker if error appear 1) 0.5sec interval flicker: Middle warning of pulse no output 2) 1.0sec interval flicker: Low warning of pulse output |
| ③ | DIR signal ▶ Turn On : Forward direction pulse output ▶ Turn Off : Reverse direction pulse output |
| ④ | ERR signal ▶ K4F-POPB: Turn On if error appear |
| ⑤ | RS-232C Connection Connector ▶ Connector connect with software package ▶ K3F-POPA is connected with communication port of CPU Module (here, CPU Module is to be STOP status) |
| ⑥ | External interface connector Connector connect with Drive Device |

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

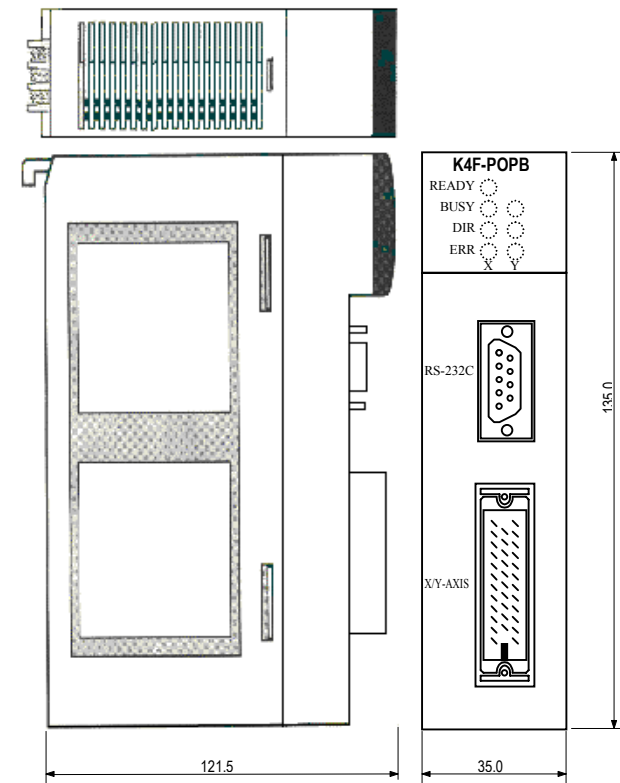
- 1) The cable length from the positioning module to the connected driver should be as short as possible (1 to 3 M)
- 2) When wiring I/O signal wires, separate the wires from the power line or circuit lines. (20 cm or more)
- 3) The connection cable length should be short as possible.

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)

9. Dimension

9.1 K4F-POPB



9.2 K3F-POPA

