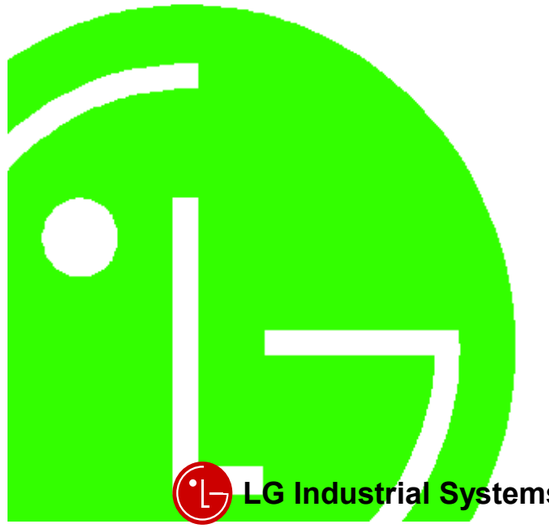
DATA SHEET

LG Programmable Logic Controller
High Speed Counter Module
MASTER-K K3F-HSCA



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702006233

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 K3F-HSCA/K4F-HSCA/K7F-HSCA Manual	702006246

Name	Code
MASTER-K K3F-HSCA Data Sheet	702006233

❑ 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 MASTER-K K3F-HSCA module.
For safety precautions on the PLC system, please 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 or 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 condition. 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 Precaution

⚠ CAUTION

- Do not run I/O signal lines near to high voltage line or power line. Separate them as 100mm or more as possible. Otherwise, noise can cause module malfunction

❑ Installation Precaution

⚠ CAUTION

- Operate the PLC in the environment conditions given in the general specifications
- If the PLC is operated in other environment not specified in the general specification, 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.
- Drive the terminal screws firmly to the defined torque. If loosely driven, it can cause short circuit, 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 applied. It can cause malfunction.
- When cleaning or driving terminal screws, perform them after the power has been turned off.
- Do not perform works while the power is applied. It can cause disorder or malfunction.

⚠ CAUTION

- Do not separate the PCB from the case of module, or do not remodel the module. They can cause disorder, malfunction, damage of the module or a fire.

❑ Waste Disposal Precautions

⚠ CAUTION

- When disposing the module, do it as an industrial waste.

1. Introduction

This datasheet contains the brief information about the characteristics, configurations, and operating of K200S high speed counter module.

2. General Specifications

No.	Item	Specification				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	IEC 1131-2
		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

Item	Specifications	
Number of Channels	1 channel	
Counter input signal	Signal	Phase A, Phase B or Phase Z
	Signal level	5 / 12 / 24 VDC (7mA)
	Signal type	Voltage input
Counting range	0 to 16,777,215 (24 Bits Binary)	
Counting speed	Maximum 50 Kpps	
Preset Operation	Set by connector signal or program	
Limit switch input	24 VDC	
Setting Increment /Decrement	1-phase input	Set by program or Phase B is set
	2-phase input	Set by difference of phase automatically
External output	Type	Out 1, Out 2(One among '>', '=' and '<' is selected)
	Signal type	Transistor output (open collector output, 10 to 30 V)
Multiplication	The multiplication factor for the input pulse may be set to 1, 2 or 4 (Selected by DIP Switch adjustment)	
Current consumption	5 VDC, 180 mA	
Weight	160 g	

4. I /O Specifications

1) Input Specifications

Item	Specifications	
Rated input voltage / current	5 VDC (7 ㎃)	
	12 VDC (7 ㎃)	
	24 VDC (7 ㎃)	
' On ' guarantee voltage	5 VDC	4.5 V or more
	12 VDC	11 V or more
	24 VDC	14 V or more
' Off ' guarantee voltage	5 VDC	0.8 V or less
	12 VDC	1.5 V or less
	24 VDC	2.5 V or less

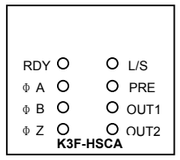
2) Limit Switch(L/S) and Preset(PSET) Input Specifications

Item	Specifications
Input voltage	24 VDC
' On ' guarantee voltage	19 VDC or more
' Off ' guarantee voltage	6 VDC or less
On Delay Time	1.5 ㎳ or less
Off Delay Time	2 ㎳ or less

3) Transistor Output Specifications

Item	Specifications
Rated output	24 VDC, 200 ㎃
Leakage current	50 ㎂ or less
Saturated voltage	1.3V
On Delay Time	50 ㎲ or less
Off Delay Time	50 ㎲ or less

5. Parts Name and Descriptions



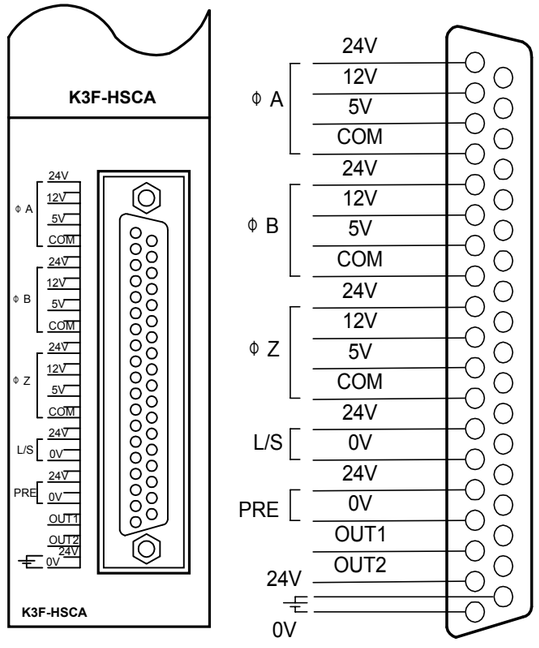
Description
Ready (RDY)
Turns on when the power is applied
Phase A Input (Φ A)
Turns on when voltage is applied to phase A input terminal.
Phase B Input (Φ B)
Turns on when voltage is applied to phase B input terminal
Phase Z Input (Φ Z)
Turns on when voltage is applied to phase B input terminal
Limit Switch Input (L/S)
Turns on when voltage is applied to limit switch input terminal
Preset Switch Input (PRE)
Turns on when voltage is applied to preset switch input terminal
Output 1 (OUT1)
Indicate the magnitude comparison result of CMP 1
Output 2 (OUT2)
Indicate the magnitude comparison result of CMP 2

2) DIP Switch Setting Part

The DIP Switch settings are used for phase-2/ phase-1 operation mode specification, Increment / Decrement count method specification at 1-phase operation, and multiplication specification at 2-phase operation.

Switch	Functions	
	Status	Descriptions
SW 1	ON	Specifies the 2 – phase pulse operation mode.
	OFF	Specifies the 1 – phase pulse operation mode.
SW 2	ON	Specifies the phase B pulse input mode as increment/decrement count method at 1 phase pulse inputs
	OFF	Specifies the program input mode as increment/decrement count method at 1 phase pulse inputs
SW 3 SW 4	ON ON	Specifies multiplication 1
	ON OFF	Specifies multiplication 2
	OFF ON	No multiplication is applied
	OFF OFF	Specifies multiplication 4

3) I/O terminal connector



6. Installation and Test Run

6.1 Ambiance Requirements

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

- Water leakage and dust a large amount of dust, powder and other conductive power, oil mist, salt, of organic solvent
- Mechanical vibrations of impacts 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℃)

6.2 Installing and Wiring

- During wiring or other work, do not allow any wire scraps to enter into it.
- 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 the distance from the walls of duct and external equipment be 50 mm or more.
- Be sure to be grounded to locations that have good noise immunity.

6.3 Test Run

REMARK

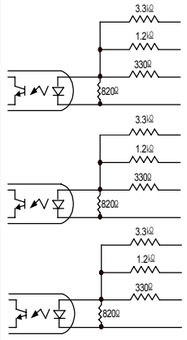
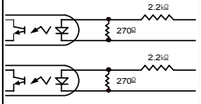
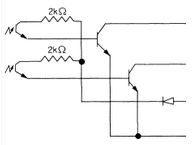
Please check the voltage level of input terminal is proper before the power is applied to the encoder.
For example, if 24 V is given for 5 V input, it can cause faults.

- **Check Items before the Power Is Applied.**

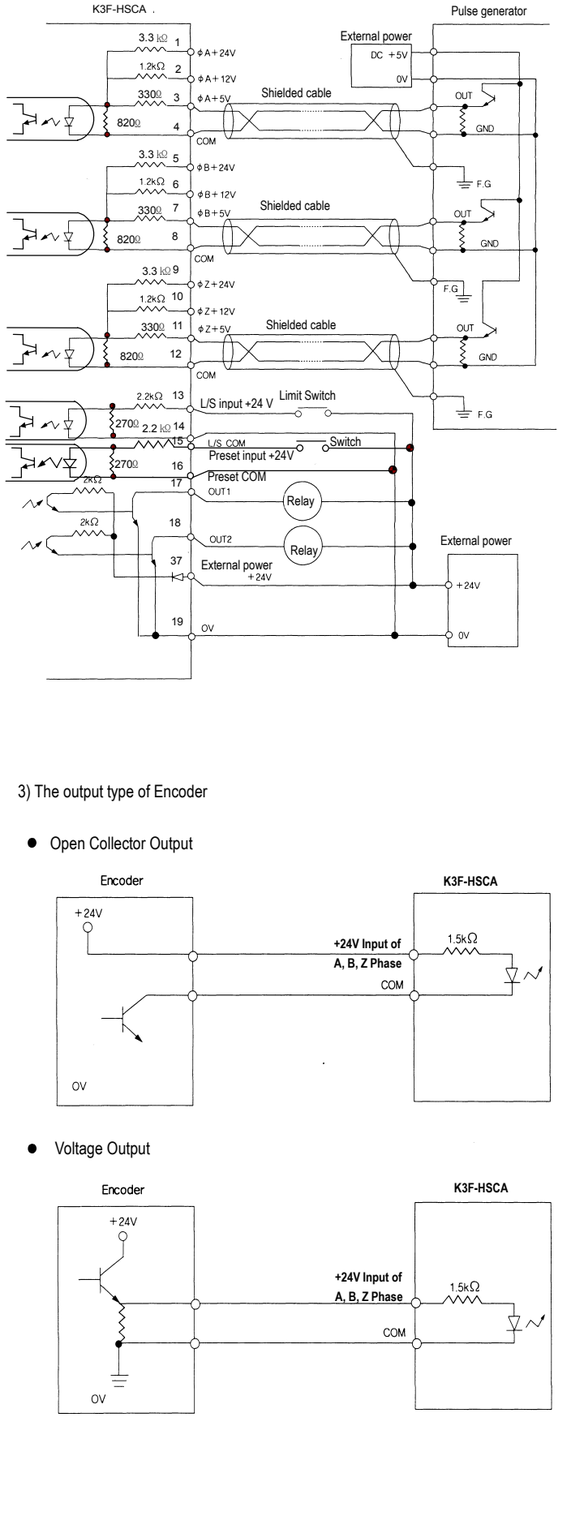
1. Check if the input signal is 1-phase, or 2-phase.
2. Check if the adjustment of DIP switch according to input signal type.
3. Check the wiring on terminal block is correct.
4. Check if the external power is correct.

7. Wiring

1) Connection with external device

I/O	Internal Current	erminal pin N	Signal Name	peratio	Input guarantied Voltage
Input		1	24 V, Phase A pulse input	ON	14~26.4 V
				OFF	2.5 V
		2	12 V, Phase A pulse input	ON	11~13.2 V
				OFF	1.5 V
		3	5 V, Phase A pulse input	ON	4.5~5.5 V
				OFF	0.8 V or less
		4	COM		
		5	24 V, Phase B pulse input	ON	14~26.4 V
				OFF	2.5 V
		6	12 V, Phase B pulse input	ON	11~13.2 V
				OFF	1.5 V
		7	5 V, Phase B pulse input	ON	4.5~5.5 V
				OFF	0.8 V or less
		8	COM		
		9	24 V, Phase Z pulse input	ON	14~26.4 V
				OFF	2.5 V
		10	12 V, Phase Z pulse input	ON	11~13.2 V
				OFF	1.5 V
		11	5 V, Phase Z pulse input	ON	4.5~5.5 V
				OFF	0.8 V or less
		12	COM		
Input		13	L/S input 24 V	ON	19~26.4 V
				OFF	6 V or less
		14	L/S COM		
		15	Preset input 24V	ON	19~26.4 V
				OFF	6 V or less
		16	L/S COM		
Output		17	Open collector output OUT1	Rated output: 24VDC, 200 mA Response time: OFF →ON50μ s or less ON→OFF 50μ s or less	
		18	Open collector output OUT2		
		37	External power supply output 24 V	Input voltage 10.2 ~ 30 V	
		19	External power supply COM 0 V		

2) Wiring Examples of the High-Speed Counter Module (VDC 5, Voltage Out)



3) The output type of Encoder

- Open Collector Output

- Voltage Output

8. Dimension

Unit : mm