DATA SHEET

LG Programmable Logic Controller
MASTER-K200S CPU Module
K3P-07AS
K3P-07BS
K3P-07CS

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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

❑ 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 200S CPU module. 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

- Don 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 Precautions

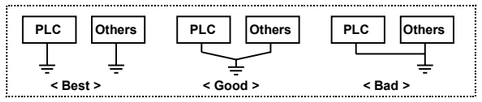
⚠ Caution

- 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

- Make sure that FG the terminal is grounded with class 3 grounding which is dedicated to the PLC. Otherwise, it can cause disorder or malfunction of 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 applied. It can cause malfunction.
- When cleaning or driving a terminal screw, perform them after the power has been turned off.

⚠ Caution

- Do not separate the module from the printed circuit board, 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 change battery while power is off. It can cause loss of data.

❑ Waste Disposal Precaution

⚠ Caution

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

1. Introduction

This data sheet provides brief information about characteristics, configuration, and usage of MASTER-K200S CPU modules (K3P-07AS, K3P-07BS, K3P-07CS).

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					

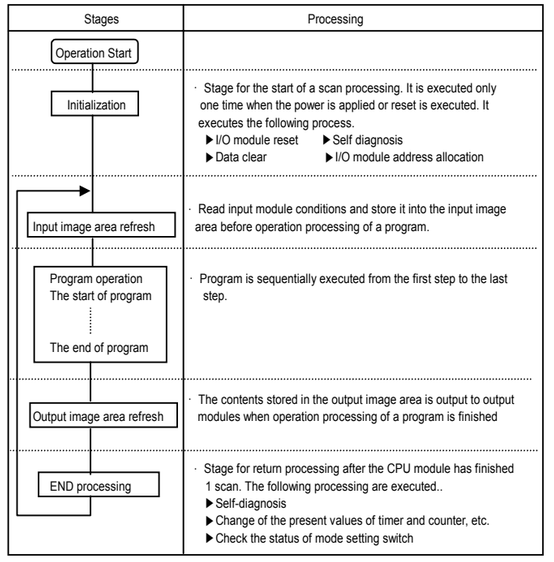
3. Performance Specifications

Items		Specifications	Remark
		K3P-07AS, K3P-07BS, K3P-07CS	
Operation method		Cyclic operation of stored program Time driven operation, Interrupt operation	
I/O control method		Scan synchronized batch processing method (Refresh method)	
Programming Language		Ladder Diagram (LD) Instruction List (IL)	
Numbers of instructions	Basic instructions	30	
	Application instructions	218	
Execution Time		0.5 ㎲/step	
Program memory capacity		7k steps	
Max. I/O points		256 points	
Memory Device	P(I/O Relay)	P000 ~ P15F (256 points)	
	M(Auxiliary Relay)	M0000 ~ M191F (3,072 points)	
	K(Keep Relay)	K000 ~ K31F (512 points)	
	L(Link Relay)	L000 ~ L63F (1,024 points)	
	F(Special Relay)	F000 ~ F63F (1,024 points)	
	T(Timer)	T000 ~ T255 (256 points)	
	C(Counter)	C000 ~ C255 (256 points)	
	S(Step Controller)	S00.00 ~ S99.99 (100 x 100 steps)	
	D(Data Register)	D0000 ~ D4999 (5000 words)	
Timer (5 type)		On Delay, Off Delay, Integrating, Monos-table ,Retriggerable	
Counter (6 type)		Up, Down, Up-Down, Ring	
Operation mode		RUN,STOP,PAUSE,DEBUG	
Self-diagnostic functions		Memory error detection, I/O error detection, Operation delay monitoring etc.	
Internal current consumption		0.17A	
Weight (㎏)		0.11	

4. Operation Processing Method

1) Cyclic operation

A PLC program is sequentially executed from the first step to the last step, which is called scan. This sequential processing is called cyclic operation. Cyclic operation of the PLC continues as long as conditions do not change for interrupt processing during program execution.



2) Time driven interrupt operation method

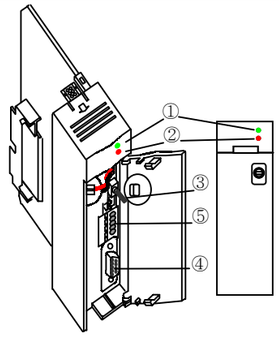
In time driven interrupt operation method, operations are processed not repeatedly but at every preset interval. In the K200S CPU module, interval can be set to between 0.01 ~ 600 second. This operation is used to process operation with a constant cycle

3) Event driven interrupt operation method

If a situation occurs which is requested to be urgently processed during execution of a PLC program, this operation method processes immediately the operation which corresponds to interrupt program. The signal which informs those urgent conditions to the CPU module is called interrupt signal. The K200S CPU module has two kind of interrupt operation methods, which are internal and external interrupt signal methods.

5. Parts Names and Descriptions

The following describes the names and functions of parts of the CPU module.

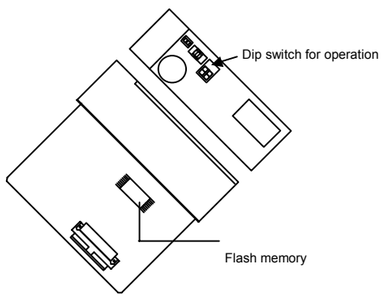


No.	Name	Function
1	RUN LED	Indicates the operation status of the CPU module. • On : when the CPU module operates with the mode setting switch in the local or remote RUN state. • Off : when the followings occur The voltage is not normally supplied to the CPU module. The mode setting switch is in the STOP or PAU/REM state. An error which makes operation stop is detected.
2	STOP LED	• On : when the mode setting switch is in the local or remote STOP state. • Off : when the followings occur The mode setting switch is in the local RUN or local PAUSE state. The operation state is in the RUM/PAUSE/DEBUG state. • Flickering : when an error is detected by self-diagnosis during operation.
3	Mode setting switch	Sets the operation mode of the CPU module. . • RUN : Program operation is exeicuted. • STOP : Program operation is temporarily stopped. • PAU/REM : PAUSE : Program operation is temporarily stopped. REMOTE: Used for the remote operation
4	RS-232C connector	9-pin connector for KGL-WIN and Cnet (RS-232C)
5	RS-422 and HSC terminal (B/C type only)	Pin No / RS-422/485 / High Speed Counter 1 / RDA / A phase input 2 / RDB / B phase input 3 / SDA / A/B phase common 4 / SDB / Preset input (+24V) 5 / S.G / Preset common (0V)

6. Using The User Program in Flash Memory

This chapter describes how to store and operate user program with the flash memory . Flash memory is used to store a user program and installed in PLC.

1) Structure



Read / Write is available to flash memory in accordance with selection of DIP switch.

Selection of DIP switch for flash memory	Operation
	PLC is operated by the program in flash memory when power on or PLC reset.
	PLC recognize that no program is in flash memory.

(Caution : Lower switch should be at the off position.)

User program can be written to flash memory at the PLC stop mode and then the selection of switch is ignored.

7. Power Supply Modules

This chapter describes type and specifications of the power supply modules

1) Selection of power supply module

Selection of the power supply module is determined by the total current consumption of digital input modules, special modules and communications modules, etc. whose powers are supplied by the power supply module.

If total load overrun the rated output capacity, the system will not normally operate. When configuring a system, select a power supply module with due consideration of current consumption of each module.

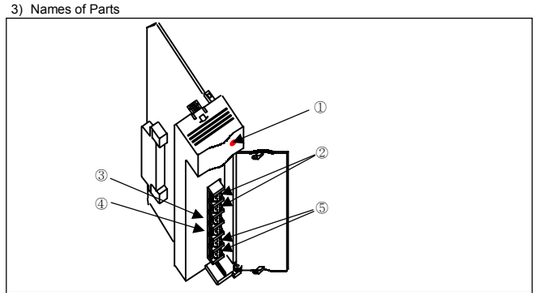
Current Consumption of K200S Series Modules (Unit:㎃)

Module	Model Name	Current Consumption	Module	Model Name	Current Consumption
CPU	K3P-07AS	170	Transistor Output	K3Y-303S	140
	K3P-07BS	210		K3Y-304S	145
	K3P-07CS	170	A/D Module	K3F-AD2A	50
DC 12/24V Input	K3X-110S	40	D/A Module	K3F-DV2A	50
	K3X-210S	70		K3F-DI2A	50
	K3X-240S	70	High Speed Counter	K3F-HSCA	220
	K3X-310S	75	Positioning module	K3F-POPA	345
	K3X-340S	75	Computer link module (Cnet)	K3F-CU2A	140
AC110V Input	K3X-120S	35		K3F-CU4A	180
AC220V Input	K3X-130S	35	Fnet I/F module	K3F-FUEA	215
Relay Output	K3Y-101S	210		K3F-RBEA	215
	K3Y-201S	400			
Triac Output	K3Y-102S	190			
Transistor Output	K3Y-203S	180			
	K3Y-204S	170			

2) Specification

Item		K3S-302S	K3S-304S	K3S-012S	K3S-014S
Input	Voltage	AC100 ~ 240V (85~264V)		DC12 ~ 24V	
	Frequency	50/60Hz(47~63 Hz)		-	
	Current	0.7/0.35A		0.7 / 1.8A	
	Inrush Current	30A or less		40A or less	
	Efficiency	65% or more (Normal load)		60% or more (normal load)	
	Fuse Type	250VAC / 2A		250VAC/ 3A	
	Dropout Tolerance	20ms or less		1ms or less	
Output	Voltage	DC5V DC24V	DC5V DC+15V DC-15V	DC5V	DC5V DC+15V DC-15V
	Current	DC5V:2A DC24V:0.3A	DC5V:2A DC+15V:0.5A DC-15V:0.2A	DC5V : 2A	DC5V:2A DC+15V:0.5A DC-15V:0.2A
	Over-current Protection	DC5V:2.2A DC24V:0.33A	DC5V:2.2A DC+15V:0.55A DC-15V:0.22A	DC5V : 2.2A	DC5V:2.2A DC+15V:0.55A DC-15V:0.22A
LED Indication		On : The output voltage is normal			
Allowable Cable Specification		0.75~2mm²			
Weight (kg)		0.32			

3) Names of Parts



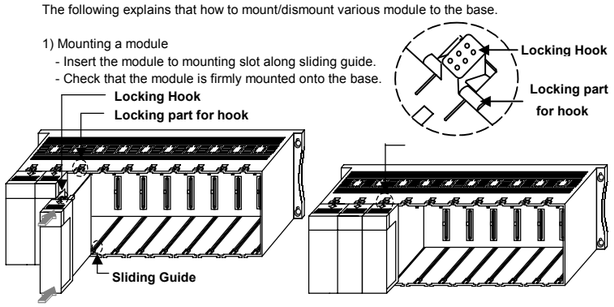
Ic	Name	Description
1	Power LED	* The LED indicator for DC5V power
2	Power Input Terminal	* The terminal to connect 100~240VAC power
3	LG Terminal	* Line ground
4	FG Terminal	* Frame ground
5	DC24V Terminal DC24VGTerminal	* Supply DC24V power to the other modules (K3S-302S) * No Connection(K3S-304S, K3S-012S, K3S-014S)

8. Mounting and Dismounting of Module

The following explains that how to mount/dismount various module to the base.

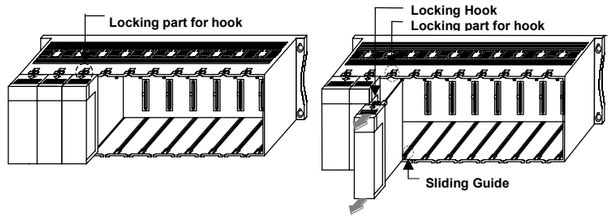
1) Mounting a module

- Insert the module to mounting slot along sliding guide.
- Check that the module is firmly mounted onto the base.



2) Dismounting a module

- First, push the locked hook (①) and pull the module with direction of arrow (②).

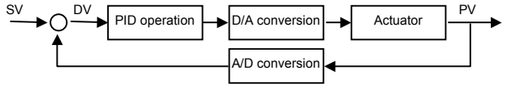


9. PID control function (K3P-07BS / K3P-07CS)

K3P-07BS and K3P-07CS module include PID (Proportional Integral Differential) function, and no external PID module is required.

1) Characteristics of K200S PID function

a) PID function is included in the CPU module, and no PID module is required.
b) User can select forward or reverse operation.
c) P, PI, PID or On/Off operation modes are available.
d) Manual output (user-defined output) is available.
e) Sampling time can be varied for flexibility of control system.



2) Programming of PID control function

- Refer the MASTER-K Programming manual for details

10. RS-422/485 master function (K3P-07BS)

1) Introduction

The K3P-07BS module has RS-422/485 master function and can operate as master station of 1:N network.

2) Functions

a) User can define a data access block and set time-out value at each blocks. The maximum size of block is 64 words.
b) Maximum station number is 32 stations.
c) According to the parameter setting, the operation mode and error code of slave stations is stored at the relevant flag.
d) The communication status can be monitored with the monitoring function of KGL-WIN software.

11. Built-in high speed counter (K3P-07CS)

1) Introduction

The K3P-07CS module includes a built-in high speed counter, and it can count a fast pulse input that are generated by encoder or pulse generator.
The built-in HSC has following functions;

- 3 counter functions as followings
  - 1-phase up / down counter : Up / down is selected by user program
  - 1-phase up / down counter : Up / down is selected by external B phase input
  - 2-phase up / down counter : Up / down is automatically selected by the phase difference between phase A and B.
- Multiplication (1, 2, or 4) with 2-phase counter
  - 2-phase pulse input multiplied by one : Counts the pulse at the leading edge of phase A.
  - 2-phase pulse input multiplied by two : Counts the pulse at the leading / falling edge of phase A.
  - 2-phase pulse input multiplied by four : Counts the pulse at the leading / falling edge of phase A and B

2) Performance specifications

Items		Specifications
Input signal	Types	Phase A, Phase B, Preset
	Rated level	24VDC (13mA)
	Signal type	Voltage input
Counting range		0 ~ 16,777,215 (Binary 24 bits)
Max. counting speed		50k pps
Up / Down selection	1-phase	Sequence program or B-phase input
	2-phase	Auto-select by phase difference of phase A and B
Multiplication		1, 2, or 4
Preset input		Sequence program or external preset input

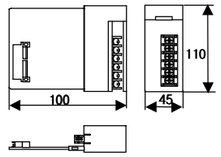
12. Troubleshooting

1) Error code

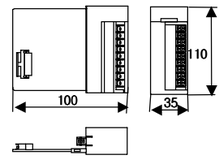
Error code	Message Description	Error Cause	Operation status	Corrective Action
h0001	System error	Internal H/W fault	STOP	Contact A/S center
h0002	OS ROM error	Internal H/W O/S ROM fault	STOP	Contact A/S center
h0003	OS RAM error	Fault of RAM for internal system	STOP	Contact A/S center
h0004	Data RAM error	Fault of RAM for internal data	STOP	Contact A/S center
h0005	Program RAM error	Fault of RAM for internal program	STOP	Contact A/S center
h0006	G/A error	Internal Gate Array(G/A) fault	STOP	Contact A/S center
h0007	Expansion base power fault	It is down or fault to power for the expansion base	STOP	Check the power of expansion base center
h0008	CPU WDT error	It is over to the monitoring time for operation delay of CPU	STOP	Contact A/S center
h0009	Special RAM error	Internal special RAM fault	RUN/STOP	Contact A/S center
h000A	Fuse error	It is opened to fuse to be used for the I/O module	STOP	Contact A/S center
h000B	Instruction code error	It is to be used instruction code which is impossible to decode	STOP	Contact A/S center
h000C	Flash memory error	It is fault to flash memory to be used	STOP	Confirm flash memory or replace
h000D	I/O error	Module dismounting or additional mounting during run, bad contact, I/O fault, expansion cable fault	STOP	Confirm I/O module or expansion cable
h0011	Maximum I/O slot error	It is over maximum I/O points to the I/O module mounted(Fnet, Cnet)	STOP	Replace I/O module
h0012	Special function module error	Special function module interface part fault	STOP	Contact A/S center
h0020	Parameter error	Specified parameter fault	STOP	Resetting parameters
h0021	Specified I/O error	It is different to I/O parameters specified and I/O module mounted	STOP	Correct the parameters or replace the I/O module
h0022	Maximum I/O slot error	It is over maximum I/O points to the I/O module mounted	STOP	Replace the I/O module
h0030	Operation error	Use of the improper operand when it is used BCD conversion instruction (except for 0~9) In case of over in the domain of #D	RUN/STOP	Correct the program
h0031	WDT error	The scan time is over monitoring time	STOP	Increment the scan time in parameters or add WDT instruction
h0040	Code check error	It is used to the instruction which is impossible to decode	STOP	Correct the program
h0049	Syntax error	Improper program input condition or error of LOAD Instruction overused	STOP	Correct the program
h0050	Battery error	Dismounted battery or abnormal voltage	RUN	Replace the battery

13. Dimension (mm)

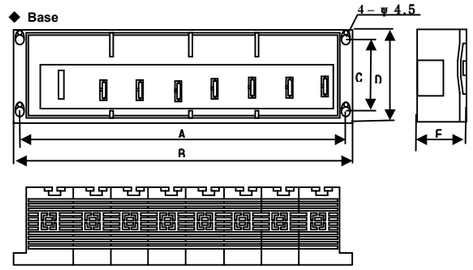
◆ Power Supply Module



◆ CPU & I/O Module



◆ Base



Slot Type	A	B	C	D	E
4 slots	230.5	244	92	110	62
6 slots	300.5	314	92	110	62
8 slots	370.5	384	92	110	62