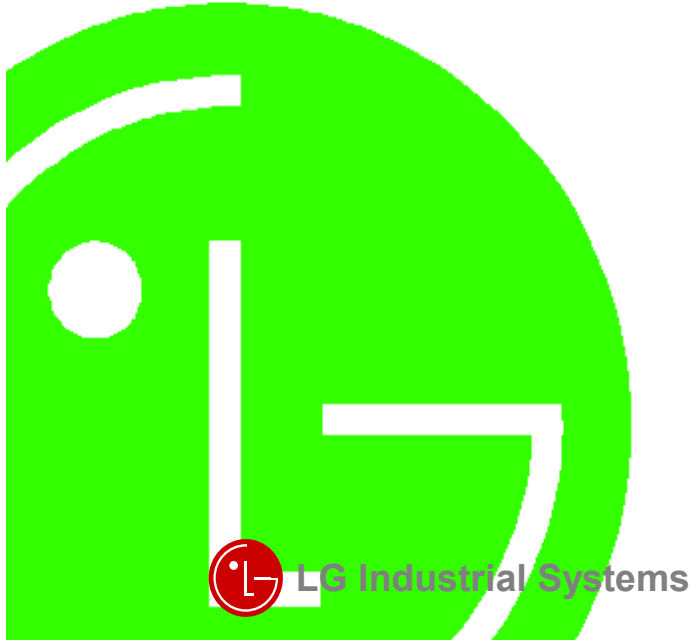


LG Programmable Logic Controller

MASTER-K80S Series

K7M-DR20/30/40/60S



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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
KGLWIN (Programming software)	702005036
MASTER-K (Instruction & programming)	702006539
MASTER-K80S 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 K80S CPU module. For safety precautions on the PLC system, see the K80S 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't 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 dismantling 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-K Series.

2. General Specifications

No	Item	Specifications	Standard			
1	Operating temperature	0 ~ 55°C (32 ~ 131°F)				
2	Storage temperature	-25 ~ 70°C (-13 ~ 158°F)				
3	Operating Humidity	5 ~ 95%RH, non-condensing				
4	Storage humidity	5 ~ 95%RH, non-condensing				
5	Vibration	Occasional vibration		10 times in each direction for X, Y, Z	IEC61131-2	
		Frequency	Acceleration			Amplitude
		10 ≤ f ≤ 57 Hz	-			0.075 mm
		57 ≤ f ≤ 150 Hz	9.8 m/s² {1G}			-
		Continuous vibration				
		Frequency	Acceleration			Amplitude
10 ≤ f ≤ 57 Hz	-	0.035 mm				
57 ≤ f ≤ 150 Hz	4.9 m/s² {0.5G}	-				
6	Shocks	*Maximum shock acceleration: 147 m/s² {15G} *Duration time :11 ms *Pulse wave: half sine wave pulse (3 times in each of X, Y and Z directions)	IEC61131-2			
7	Noise immunity	Square wave impulse noise	± 1,500 V			
		Electrostatic discharge	Voltage :4kV(contact discharge)	IEC61131-2 IEC1000-4-2		
		Radiated electromagnetic field	27 ~ 500 MHz, 10 V/m	IEC61131-2 IEC1000-4-3		
		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	IEC61131-2 IEC1000-4-4		
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

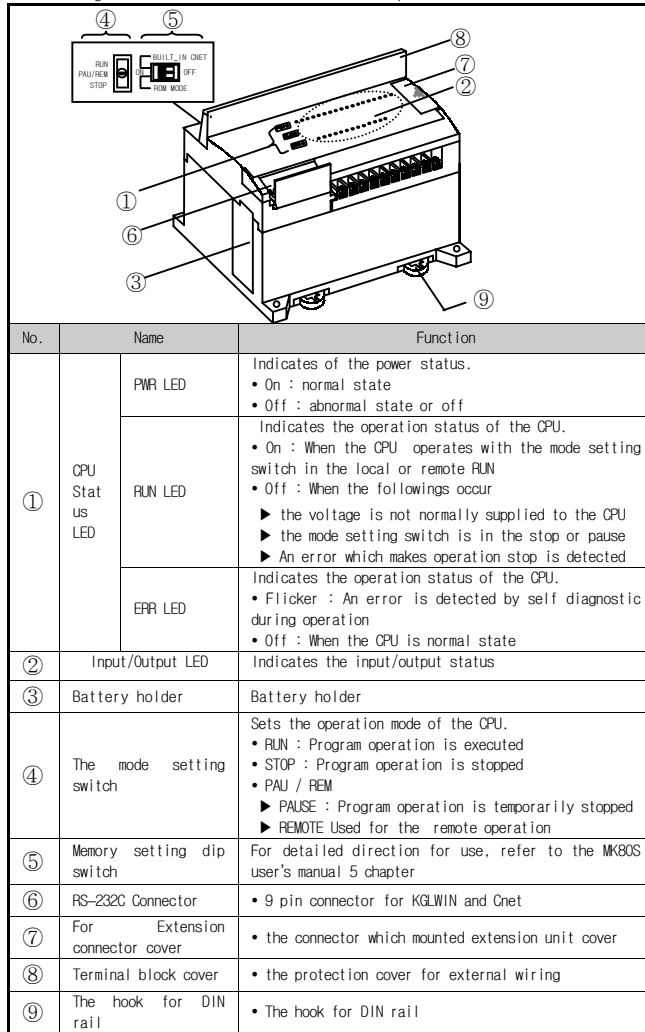
Item	Specifications				Remark
	K7M-DR20S	K7M-DR30S	K7M-DR40S	K7M-DR60S	
Operation method	Cyclic operation of stored program Interrupt task operation				
I/O Control method	Scan synchronized batch processing method (Refresh method) Direct method by instruction				
Program language	Ladder Diagram, Instruction List				
Number of Instruction	Basic	30			
	Application	218			
Processing Time	Basic Instruction : 0.5 μs/Step				
Program memory Cap.	7K Step				
I/O Points	20	30	40	60	
Data Area	P	P000 ~ P15F			I/O Relay
	M	M000 ~ M191F			Internal Relay
	K	K000 ~ K31F			Keep Relay
	L	L000 ~ L63F			Link Relay
	F	F000 ~ F63F			Special Relay
	T	100ms : T000 ~ T191(192 Point) 10ms : T192 ~ T255(64Point) Adjustable boundary area by parameter setting			Timer
	C	C000 ~ C255			Counter
	S	S00.00 ~ S99.99			Step Relay
	D	D0000 ~ D4999			Data Register
	Operating Mode	RUN, STOP, PAUSE, DEBUG			
Self-diagnostic functions	Watch dog timer, memory error detection, I/O error Detection, Battery error detection, Power error Detection, etc				
Memory backup at power down	Latch area setting by basic parameter				
Number of maximum extension	3				
Weight(g)	480	550	670	845	
Internal function	PID Control function	Auto tuning by instruction, control by forward and reverse actions 8 PID control loops			
	Cnet/I function	MASTER-K Dedicated protocol support MODBUS protocol support User defined protocol support			RS-232C 1 port Share a port With KGL-WIN
	High Speed Counter	speed	1 Phase 16 kHz , 2 Phase 8 kHz 1Channel		
		Function	1 pulse operation Mode(Increment/decrement count by program) 1 pulse operation Mode(Increment/decrement count by phase B pulse input) 2 pulse operation Mode(Increment/decrement count by difference of phase)		
	Multiplication	The multiplication factor for the input pulse may be set to 1,2 or 4			Selected by Special data Register D4999
	Pulse catch	Pulse width : 0.2 ms ,8 points			
Pulse output	2 kHz ,1 point			Transistor output only	
External Interrupt	8 Points : 0.4ms				
Input filter	0 ~ 15 ms				

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 interrupts operation method
In time driven interrupt operation method, operations are processed not repeatedly but at every preset interval. In the K80S CPU module, interval can be set to between 0.01 ~ 6 second. This operation is used to process operation with a constant cycle
- 3) Event driven interrupts 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 K80S CPU module has two kind of interrupt operation methods, which are internal and external interrupt signal methods.

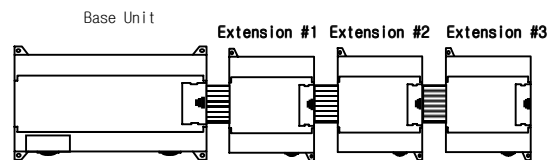
5. Parts Name and Descriptions

The following describes the name and functions of parts of the MK80S Series.



6. I/O No. Allocation Method

1) I/O No. Allocation is granting address to unit & module for output/input data



Mounting Module	Maximum No. of module can be mounted	Remark
Extension I/O module	2	
A/D conversion module	2	
Analog timer module	3	
Communication module	1	

3) The following is method I/O number allocation.

Item	Specification	Area	Remark
Base Unit	Input	P000 ~ P03F	64 Points Fixed
	Output	P040 ~ P07F	64 Points Fixed
Extension #1	Input	P080 ~ P0BF	16 Points Fixed
	Output	P090 ~ P09F	16 Points Fixed
Extension #2	Input	P100 ~ P10F	16 Points Fixed
	Output	P110 ~ P11F	16 Points Fixed
Extension #3	Special	None	No more points
Special		None	A/D, A/T, etc

-. Basically I/O allocation is fixed-point method and special module is not allocated

(The area which is not used can be used internal relay)

7. Internal High Speed Function

1) Summary

The high-speed counting can count high speed pulse which can not be proceed with The CPU counting instructions. It can be counting pulse witch occurs encoder or pulse generator.

Function	Description
Counter function	• 1 pulse operation Mode(Up/down count by program) • 1 pulse operation Mode(Up/down count by phase B pulse input) • 2 pulse operation Mode(Up/down count by difference of phase)
Multiplication	The multiplication factor for the input pulse may be set to 1,2 or 4(selected by special data register D4999)
Data comparison function	F170 is on when the current value reaches to the setting value
Preset operation	Sequence program or external preset input

2) Performance specifications

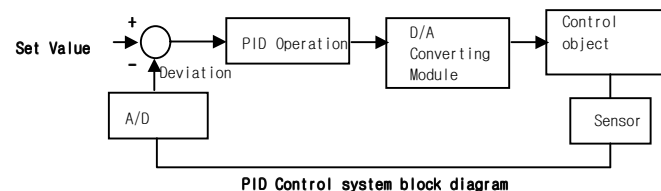
Item	Specification	
Input signal	signal	A Phase , B Phase , Preset
	Signal leve	DC24V
	Signal type	Voltage input
Counting range	0~16,777,2159(binary 24bits)	
Max. counting speed	1Phase 16 kHz or 2Phase 8 kHz	
Up/Down selection	1 Phase	Program or B-Phase input
	2 Phase	Auto-select by phase difference of A and B Phase
Multiplication	1,2 or 4	
Preset input	Program or external input	

8. PID Control Function

This chapter describes information about the built-in PID function of MK80S Series.(Max. 8 loops)

1) The characteristics of PID function of MK80S series as following

- The PID function is integrated into the CPU module. Therefore, all PID control action can be performed with instructions and parameter without any separated PID module.
- Forward/reverse operations are available.
- P operation, PI operation, PID operation and On/Off operation can be selected easily.
- The manual output (the user-defined forced output) is available.
- By proper parameter setting, It can be stable operation regardless of external disturbance.
- The operation scan time (the internal that PID controller gets a sampling data from actuator) is changeable for optimizing to the system characteristics.



2) Instruction for PID control

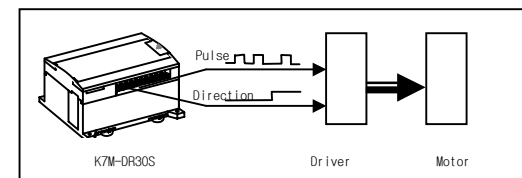
For the PID Operation of MK80S, there are two instructions, as follow.

No.	Instruction	Function
1	PIDB	Perform the PID operation
2	PIDBAT	Perform the auto tuning operation

9. Pulse Output

1) Introduction

In the transistor output type of MK80S, the pulse output function - maximum 2kpps - is internalized. By using this function with stepping motor or servo motor driver, MK80S is applicable to a positioning system.



2) Performance specification

Item	Specification
No. of output	1Point
Output type	Pulse
Output velocity	Max. 2kpps, Min. 50pps
Output pulse	0 ~ 4294967295
Execution type of the Increasing/decreasing velocity	Designation of acceleration
Type of the direction	Right/opposite direction pulse output
Load power supply	DC 12V/24V

10. Internal communication function

10.1 Dedicated communication

MK80S series has built-in Cnet communication function, and it is possible that communicate with various external devices without separated Cnet I/F module. By using LGIS's dedicated protocol, user can read, write, and monitor memory devices of K80S module.

Built-in Cnet of K80S supports the following functions:

- Read single/continuous device
- Write single/continuous device
- Read the CPU status
- Register monitoring device
- Execute monitoring
- 1:1 connection between LG PLCs

10.2 User defined communication

User can define a user-defined protocol to communicate with other manufacturer's devices. By supporting user-defined protocol, K80S series can communicate with various devices have their own protocol.

10.3 Modbus protocol

K80S series includes Modbus protocol, and it is easy to connect with Modbus devices. (You don't need to write Modbus protocol as user-defined protocol)

REMARK

1) Please refer the chapter 8 of K80S user's manual for details of built-in Cnet I/F function of K80S series.

11. Other Internal Functions

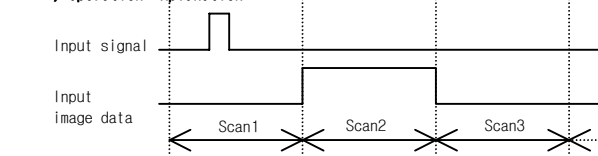
11.1 Pulse Catch Function

In the base unit, 8 points of pulse catch input contact points(P000-P007) are internalized. Through using this contact point short pulse signal, short as 0.2ms, can be taken which can not be executed by general digital input..

1) Usage

When narrow width of pulse signal is input, a trouble occurs which can not be executed by general digital input, so the operation does not perform as user's intention. But in this case through pulse catch function even narrow interval of pulse signal as 0.2ms min can be executed..

2) Operation Explanation



Step	Execution contents
Scan1	CPU senses input when pulse signal, min. 0.2ms, is input, then saves the status.
Scan2	Used to turn on the region of input image.
Scan3	Used to turn off the region of input image

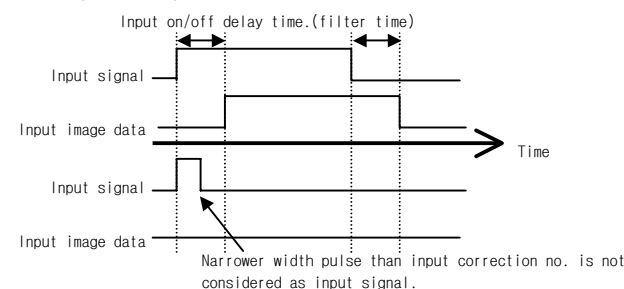
11.2 Input Filter Function

External input of MK80S selects input on/off delay time. From the range of 0-15ms. Credibility secured system may be established by adjustment of input correction no. through using environment.

1) Usage

Input signal status affects to the credibility of system in where noise occurs frequently or pulse width of input signal affects as a crucial factor. In this case the user sets up the proper input on/off delay time, then the trouble by miss operation of input signal may be prevented because the signal which is shorter than set up value is not adopted

2) Operation Explanation



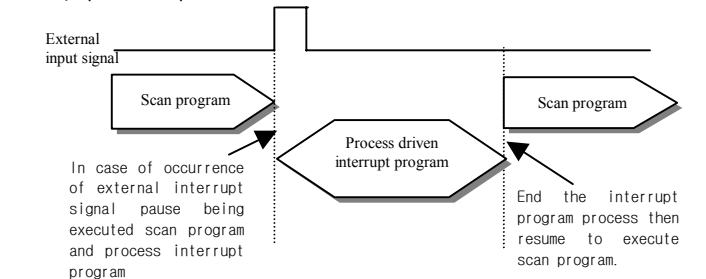
11.3 External interrupts function

In MK80S Series can perform max 8 points of external contact task by using input of base unit without special interrupt module.

1) Usage

This function is useful to execute a task program has been set to an external input signal.

2) Operation Explanation



3) Function

- Maximum 8 points can be used to external interrupt input within P000 ~ P007
- Inputting 8points of base unit are set functions like following.

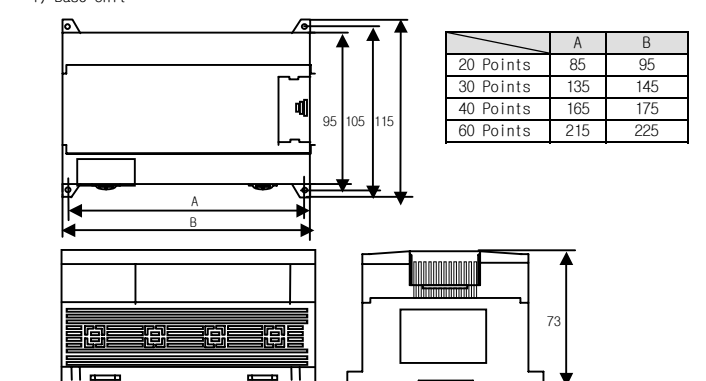
	00	01	02	03	04	05	06	07
High speed counter	A Phase	B Phase	Preset					
Process driven interrupt								
Time driven interrupt								

Can be used 8 points totally

- Max. 8points of external contact point task are available to use. But the no. of them is decreased by using other task.

12. Dimension (mm)

1) Base Unit



2) Extension Module

