



User's Manual

LG Programmable Logic Controller

MASTER-K10S1



Installation Environment

1. Please avoid installing the PLC at following locations where;
 - temperature may experience ambient drops or rising.
(It should stay within 0 to 55 (32 ~ 131))
 - condensation may occur due to abrupt temperature changes.
 - vibration and shock are directly transmitted to the PLC.
 - the PLC is exposed to the direct rays of the sun.
 - the PLC is exposed to corrosive or inflammable gas.
 - the PLC is exposed to conductive powder.
2. Please install the PLC at least 50mm away from a duct or other devices.
3. Be sure to install the PLC in the cabinet which comply with IP54 or higher.
4. Be sure to place the PLC in the manufacturer's original packing while shipping or storing.

Warranty

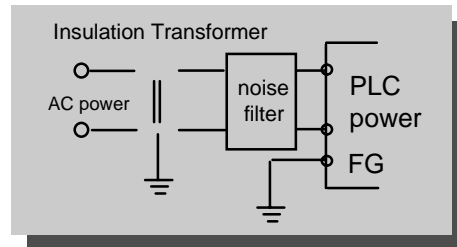
- LGIS provides an 18 months warranty from the date of production.
- For troubles within the warranty period, LGIS will replace the entire PLC or repair the troubled parts free of charge except the following cases;
 - the troubles caused by improper treatment or operation.
 - the troubles caused by external devices.
 - the troubles caused by remodeling or repairing based on user's own discretion.
 - the troubles caused by natural disaster.
- This warranty is limited to the PLC itself only. It is not valid for the whole system which the PLC is attached.

Characteristics

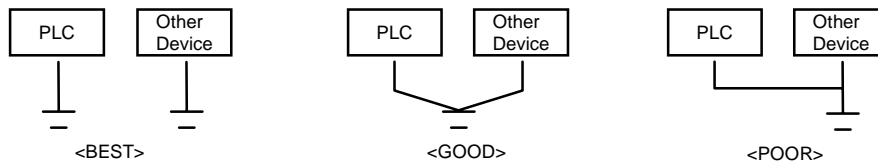
- The user program is stored in a EEPROM, and no battery back-up is required.
- Data communication through RS232C and RS485 is available.
- K10S1 includes a high speed counter being applicable for a simple positioning system.
- K10S1 series are suitable for the control of small machinery having I/O points less than 14 .

Power Supplying to the PLC

- To prevent the PLC from an improper operation caused by the external noise, place a insulation transformer and/or a noise filter as shown in the right figure.
- Always install AC power cable and signal or data lines in separate ducts or bunches.



- The fuse in the DC power supply may be blown when the DC power is supplied in reverse polarity.
- Be careful to connect power source cable to the correct terminal. Internal device of PLC may be damaged by the improper lead connections.
- Supplying power beyond rated voltage/frequency may damage internal devices.
- Grounding



⚠ Caution

When you supply power to external DC24V devices from the power unit of K10S1, be careful not to exceed the maximum capacity of power unit.

(of inputs simultaneously ON X 7mA) + (of outputs simultaneously ON X 8mA) + (current consumption of external DC24V devices)	<	The maximum capacity of power supply
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Note) The maximum capacity of power supply
K10S1 : 100mA

Specifications

• General Specifications

Power Supplies (47 ~ 63Hz) & Consumption	K10S1 : 100~240VAC(Free Voltage) 7.4W
Dropout Tolerance	1/2 Cycle
DC Supply Output	0.1A
Withstanding Voltage	DC 500V 10M
Grounding	Grounding resistance 100
Noise Immunity	2000V, 1 μs (Noise Simulator)
Vibration	KSC0903
Shock	KSC0905
Operation Temperature	0 ~ 55 (32 ~ 131)
Storage Temperature	-25 ~ 75 (-13 ~ 158)
Humidity	5 ~ 95% RH (Non-condensing), RH-2
Atmosphere	Free from corrosive gas
ESD Severity Level	Level ESD-3
Altitude	under 2000m

• Functional Specifications

Program control method	Cyclic execution of stored program
I/O Processing Method	Updated after each scan
No. of instructions	30 Basic instructions & 154 application instructions
Execution time	3.2~7.6 μs / step
Program capacity	800 steps
Memory device type	EEPROM (8kbyte)
Memory device range	P : I/O relay / P000 ~ P007 (8points for input) P010 ~ P015 (6points for output) M : Auxiliary relay / M000 ~ M15F (256points) K : Keep relay / K000 ~ K07F (128points) L : Link relay / L000 ~ L07F (128points) F : Special relay / F000 ~ F15F (256points) T : 100ms timer / T000 ~ T031 (32points) 10ms timer / T032 ~ T047 (16points) C : Counter / C000 ~ C015 (16points) D : Word(16bit) data register D000 ~ D063 (64word) S : Step controller / S00.00~S15.99(16X100steps)
Counter	Up-counter, Down-counter, Up/down-counter Ring Counter (preset range : 0 ~ 65535)
Timer	On delay-timer, Off delay-timer, Integrating timer, Monostable timer, Retriggerable timer (preset range : 0 ~ 65535)
High speed counter	1point, 8kppts, DC24V, Duty : 20 ~ 80%
Other functions	RS232C, RS485 communication

• I/O Specification

K10S1

Item	I/O	Input	Output
	Type	DC	Relay
Rated Voltage		DC24V	DC24V / AC110 ~ 220V
On : Operating Voltage		DC19V	-
Off : Operating Voltage		DC6V	-
Input Current		7± 2mA / point	-
Max. Output Current		-	1A / point, 3A / COM
On State Voltage Drop		-	3V
Off State Leakage Current		-	0.1mA
Off On Response Time		5ms	10ms
On Off Response Time		7ms	10ms
I/O Status Indicator		LED (Input : Green, Output : Red)	
Withstand Voltage		AC1500V, 1 minute	
Noise Immunity		2000Vpp, 1 μs (Noise Simulator)	
Insulation Device		Photo Coupler	

Note)

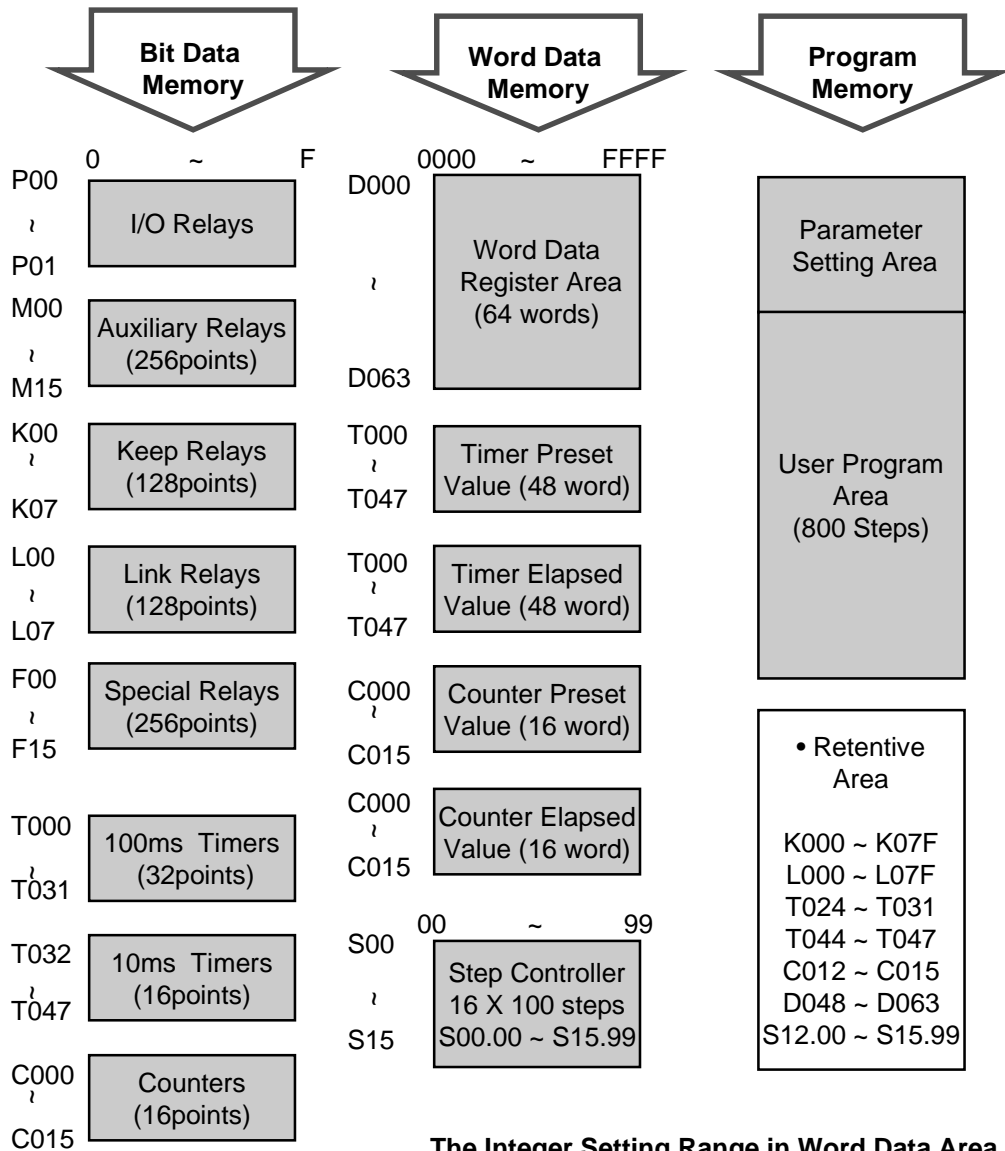
- The expected life span of relay

The relay used in MASTER-K10S1 is FUJI's RB1-E, and those manufacturer guarantee 10million times (mechanical) and 0.1 ~ 3million times (electrical) operation for their relays..

The durability of relay depends on the type of external load. Therefore, we highly recommend customers to connect an external relay or SSR between PLC and large inductive load for improved reliability and maintenance of PLC. The capacity of external relay or SSR should be at least twice larger than the capacity of the load.

- All outputs will be turned off when interruptions of CPU control, voltage drops / interruptions, and/or power up/down occur.
- Improper terminal connection or overloads on I/O may cause a damage on the internal devices.

Memory Map



The Integer Setting Range in Word Data Area

0 ~ 65535 (Decimal) or 0 ~ hFFFF(Hex)

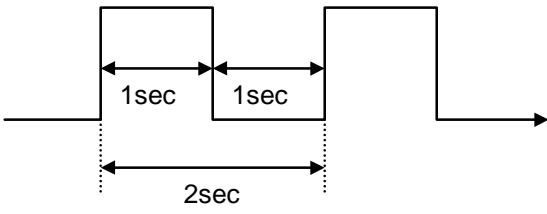
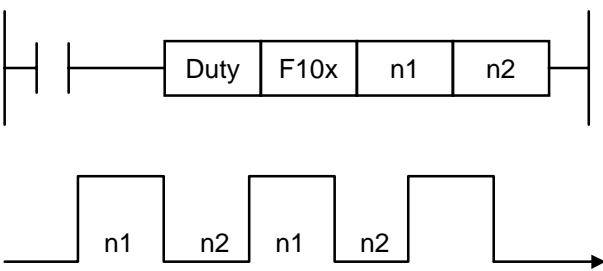
For Double Word Instruction,

0 ~ 4294967295 or 0 ~ hFFFFFFFF

Special Function Relay : F area

F relay is used as only input operand.

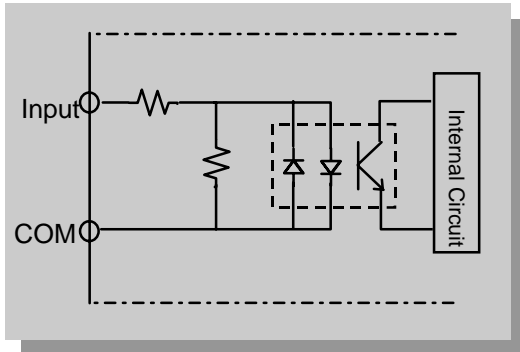
Relay	Name	Description
F000	RUN flag	Set when the PLC is on RUN mode.
F001	PGM flag	Set when the PLC is on PGM(program) mode.
F002	PAU flag	Set when the PLC is on PAU (pause) mode.
F010	Always on	Use as a dummy relay or initialization in user programs
F011	Always off	
F012	1 scan on	On during the first scan after PGM → RUN mode
F013	1 scan off	Off during the first scan after PGM → RUN mode
F014	Turnover per each scan	Repeat set / reset according to each scan during PLC is RUN mode.
F020 ~ F02F	Communication error information	<ul style="list-style-type: none"> •Related to SEND, RECV instructions only •Upper byte : The station No. where error occurred •Lower byte : error code •The error code of time out error : h20 •No error : h0000
F030	Serious error	Set in case of internal ROM error, 24V fail error.
F031	Light error	Set in case of WDT error, program error, I/O combination error, missing END/RET error.
F050 ~ F05F	Error code	<ul style="list-style-type: none"> • h0000 : No error • h0014 : I/O error • h0021 : Parameter error • h0025 : Missing RET error • h0023 : Code error • h0024 : Missing END error

Relay	Name	Description
F060 ~ F06F	The step No. where error occurred	<ul style="list-style-type: none"> The step No. where program error occurred in stored. In case of branch instruction error, the destination step No. is stored.
F070 ~ F077	High speed counter output register	<ul style="list-style-type: none"> HSCNT instruction : F070 ~ F077 HSC instruction : use only F070 bit
F080 ~ F08F	PLC model	<ul style="list-style-type: none"> K10S & K10S1 : h0031 K60S : h0036 K30S : h0033 K100S : h0035
F090	20ms clock	<p>There relays repeat On/Off with fixed time interval, and are operated only when the PLC is in RUN mode.</p> <p>Example) F094 : 2sec clock</p> 
F091	100ms clock	
F092	200ms clock	
F093	1sec clock	
F094	2sec clock	
F095	10sec clock	
F096	20sec clock	
F097	1 minute clock	
F100 ~ F103	<p>User defined clock</p> <p>F100 : Clock 0</p> <p>~</p> <p>F103 : Clock 3</p>	<p>These relays repeat On/Off based on a scan time. (Initial state = Off)</p> 

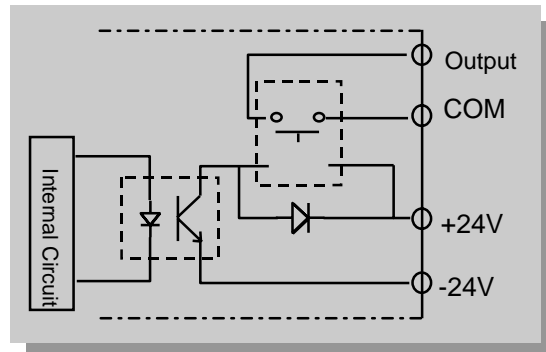
Relay	Name	Description
F110	Arithmetic error flag	Set when an arithmetic error occurred during operation
F111	Zero flag	Set when the result value is zero
F112	Carry flag	Set when carry / borrow occurs as a result of operation
F11A	On sending flag	These flags indicate the communication status when DIN / DOUT instructions are used.
F11C	On receiving flag	
F11E	Receive completion flag	
F11F	Communication error flag	<ul style="list-style-type: none"> • DIN, DOUT: Set when time-out error occurred. • SEND, RECV : Set when time-out error occurs or NAK message is detected.
F120	<	These relays are set according to the result of compare instructions. (CMP, CMPP, DCMP, DCMPP)
F121		
F122	=	
F123	>	
F124		
F125		
F130 ~ F135	AC power fail	The numbers of AC power fail occurred during RUN mode
F140 ~ F14F	Elapsed value of High speed counter	<ul style="list-style-type: none"> • HSCNT : The elapsed value of high speed counter is stored. • HSC : The low word of elapsed value of high speed counter is stored.
F150 ~ F15F	Preset value of High speed counter	<ul style="list-style-type: none"> • HSCNT : The preset value of high speed counter is stored. • HSC : The high word of elapsed value of high speed counter is stored.

I/O Circuit

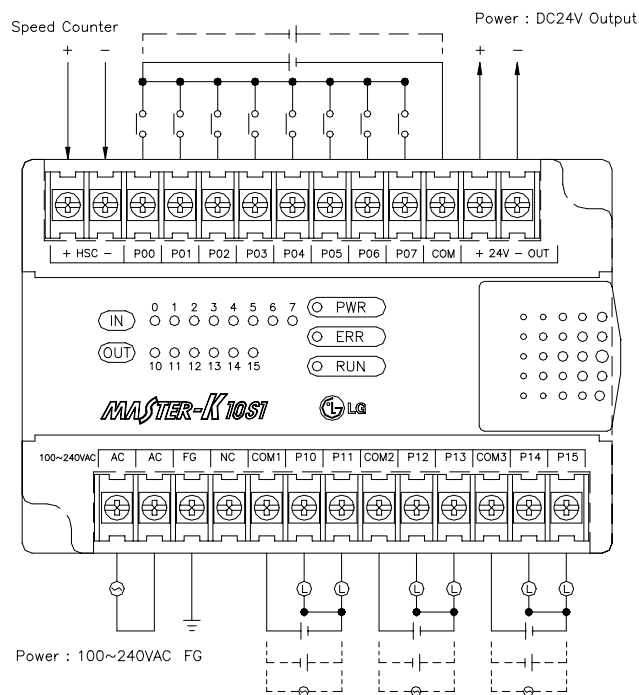
DC 24V Input



Relay Output



External Connection

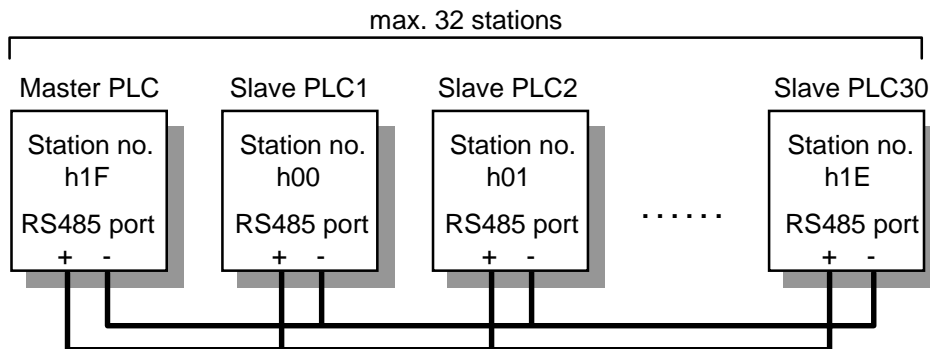


RS485 COMMUNICATION

• General Specification

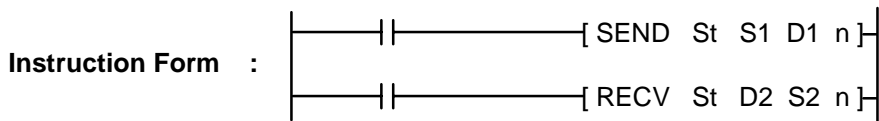
Instruction for RS485	SEND / RECV Above instruction is used in sequence program of only master PLC being designated as station no. h1F.
Communication Method	Asynchronous half duplex
Max. Linkable station number	32 stations(including self station)
Transmission speed	300 ~ 19200bps(selectable)
Transmission distance	Max. 1km(no repeater)
Preset of waiting time for Time Out Error	Preset address = D060 Preset value(x 10ms) = 0 ~ 255 (0ms ~ 2550ms) (Default preset value = 0(500ms), if preset value is equal or more than 255, waiting time is 2550ms.)

• Network System



• **Instruction**

SEND [FUN(159)] : Transmission data from master to slave
RCV [FUN(158)] : Receiving data from slave to master

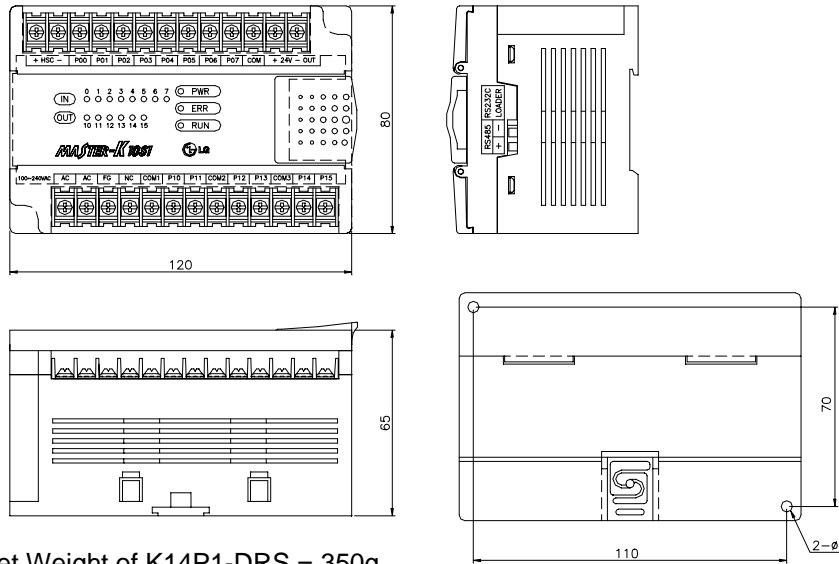


- St : Station number of slave PLC to communicate.(This of master PLC is always h1F.)
- S1 : Beginning address of word memory device of master PLC in which data to be transmitted to slave is stored.
- D1 : Beginning address of word memory device of slave PLC in which data to be received from master will be stored.
- S2 : Beginning address of word memory device of slave PLC in which data to be transmitted to master is stored.
- D2 : Beginning address of word memory device of master PLC in which data to be received from slave will be stored.
- n : The number of word data to be transmitted or received.(Hex. or Decimal)

Note

When the transmitted data from master PLC is stored to P area of slave directly, the output data of P area of slave PLC may clear during operation mode of slave PLC changing(PROGRAM mode RUN mode) according to PLC operation system. The range of address(D1, S2) of word memory device for slave PLC in the SEND/RCV can not be exceed that of master PLC.

Dimension and Weight



- Net Weight of K14P1-DRS = 350g

Other Technical Materials

- MASTER-K Programming Manual
- Graphic Loader (GSIKGL) User's Manual
- Handy Loader (KLD-150S) User's Manual
- MASTER-K / PMU Communication Technical Materials

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