

DATA SHEET

LG Programmable Logic Controller Advanced Positioning Module

G6F-PP10
G6F-PP20
G6F-PP30
G6F-PP1D
G6F-PP2D
G6F-PP3D



LG Industrial Systems

- When using LGIS equipment, thoroughly read this datasheet and associated manuals introduced in this datasheet. Also pay careful attention to safety and handle the module properly.
- Store this datasheet in a safe place so that you can take it out and read it whenever necessary.

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◦ Safety Precautions

- ▶ Safety Precautions is for using the product safe and correct in order to prevent the accidents and danger, so please go by them.
- ▶ The precautions explained here only apply to the G6F-PP10~30, G6F-PP1D~3D module(APM). For safety precautions on the PLC system, refer to the GLOFA-GM6 or MASTER-K200S CPU User's manual.
- ▶ The precautions are divided into 2 sections, 'Warning' and 'Caution'. Each of the meanings is represented as follows.

Warning If violated instructions, it can cause death, fatal injury or considerable loss of property.

Caution If violated instructions, it can cause a slight injury or slight loss of products

- ▶ The symbols which are indicated in the PLC and User's Manual mean as follows

 This symbol means paying attention because of danger of injury, fire, or malfunction.

 This symbol means paying attention because of danger of electrical shock.

- ▶ Store this datasheet in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

Warning

- ▶ Do not contact the terminals while the power is applied.

Risk of electric shock and malfunction

- ▶ Protect the product from being gone into by foreign metallic matter.

Risk of fire, electric shock and malfunction.

Caution

- ▶ Be sure to check the rated voltage and terminal arrangement for the module before wiring work.

Risk of electric shock, fire and malfunction

- ▶ Tighten the screw of terminal block with the specified torque range.

If the terminal screw looses, it can cause fire and electric shock.

- ▶ Use the PLC in an environment that meets the general specifications contained in this datasheet.

Risk of electrical shock, fire, erroneous operation and deterioration of the PLC.

- ▶ Be sure that external load does not exceed the rating of output module.

Risk of fire and erroneous operation.

- ▶ Do not use the PLC in the environment of direct vibration

Risk of electrical shock, fire and erroneous operation.

- ▶ Do not disassemble, repair or modify the PLC.

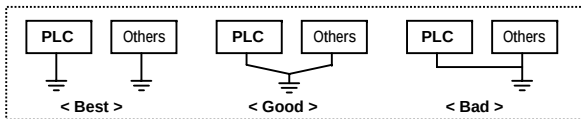
Risk of electrical shock, fire and erroneous operation.

- ▶ When disposing of PLC and battery, treat it as industrial waste.

Risk of poisonous pollution or explosion.

Precautions for use

- ▶ Do not Install other places except PLC controlled place.
- ▶ Make sure that the FG terminal is grounded with class 3 grounding which is dedicated to the PLC. Otherwise, it can cause disorder or malfunction of PLC



- ▶ Connect expansion connector correctly when expansion module are needed,
- ▶ Do not detach PCB from the case of the module and do not modify the module.
- ▶ Turn off power when attaching or detaching module.
- ▶ Cellular phone or walkie-talkie should be farther than 30cm from the PLC
- ▶ Input signal and communication line should be farther than minimum 100mm from a high-tension line and a power line in order not to be affected by noise and magnetic field.

Before handling the product

Before using the product, read the datasheet and the User's manual through to the end carefully in order to use the product efficiently.

Materials for GLOFA-GM

Name	Code
GMWIN (Programming software)	10310000376
GLOFA-GM (Instruction & Programming)	10310000377
GLOFA-GM6 User's manual	10310000344
APM (pulse type) Manual,G4/6F-PP1/2/3O,PP1/2/3D	10310000395

Materials for MASTER-K

Name	Code
KGL-WIN (Programming software)	10310000345
MASTER-K (Instruction & Programming)	10310000346
MASTER-K200/300/1000S User's manual	10310000347
APM (pulse type) Manual,G4/6F-PP1/2/3O,PP1/2/3D	10310000395

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. G6F-PP10~30, G6F-PP1D~3D modules are linked to various servo controlling driver systems or a stepping motor controlling 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				10 times in each direction for X, Y, Z IEC 61131-2
	Frequency	Acceleration	Amplitude	Sweep count	
	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) *Duration time :11 ms *Pulse wave: half sine wave pulse(3 times in each of X, Y and Z				IEC 61131-2
	Square wave impulse noise	± 1,500 V			
Noise immunity	Electrostatic discharge	Voltage :4kV(contact discharge)			IEC 61131-2 IEC 100-4-2
	Radiated electromagnetic field	27 ~ 500 MHz, 10 V/m			IEC 61131-2 IEC 100-4-3
	Fast transient burst noise	Severity Level	All power modules	Digital I/Os (Ue ≥ 24 V) Analog I/Os (Ue < 24 V) communication I/Os	IEC 61131-2 IEC 100-4-4
			Voltage 2 kV	1 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	G6F-PP10 G6F-PP1D	G6F-PP20 G6F-PP2D	G6F-PP30 G6F-PP3D
No. of control axis	1 axis	2 axis	3 axis
Interpolation function	N/A	2 axis linear interpolation 2 axis circular arcs interpolation	2/3 axis linear interpolation
Control method	Position control, Speed control, Speed/Position control, Position/Speed control		
Control unit	pulse, mm, inch, degree		
Positioning data	Each axis has 400 data range. (Operation step number 1 ~ 400) Available to set with software package or program		
Software package	Available (connected with RS-232C Port of CPU module)		
Back-up	Save the parameter, operation data in Flash ROM (No Battery)		
POSITIONING	Positioning method		
	Position address range	unit	Setting range
		mm	-214748364.8 ~ 214748364.7(μm)
		Inch	-21474.83648 ~ 21474.83647
		degree	-21474.83648 ~ 21474.83647
		pulse	-2147483648 ~ 2147483647
	Speed range	unit	Open collector
		mm	0.01 ~ 2000000.00(mm/min)
		Inch	0.001 ~ 200000.000(inch/min)
		degree	0.001 ~ 200000.000(degree/min)
		pulse	1 ~ 200,000(pulse/sec)
	Acceleration/deceleration process	Trapezoid type, S-type	
	Acceleration/deceleration time	1 ~ 65535 ms	
		Selection available from 4 types of acceleration/deceleration pattern	

Max. output pulse	G6F-PP10, G6F-PP20, G6F-PP30 : 200kpps G6F-PP1D, G6F-PP2D, G6F-PP3D : 1 Mpps		
Max. connection distance	G6F-PP10, G6F-PP20, G6F-PP30 : 2m G6F-PP1D, G6F-PP2D, G6F-PP3D : 10m		
Error indication	Indicated by LED		
Max. Encoder input	200kpps		
Connection connector	40 Pin connector		
Size of use cable	AWG #24		
I/O share points	32 points		
Consumable current(mA)	G6F-PP10 : 480 G6F-PP1D : 630	G6F-PP20 : 490 G6F-PP2D : 750	G6F-PP30 : 500 G6F-PP3D : 840
Weight(g)	G6F-PP1 : 125	G6F-PP2 : 145	G6F-PP3 : 151

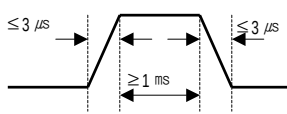
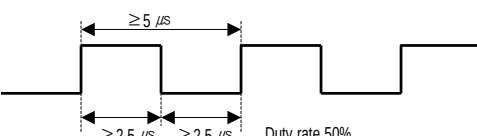
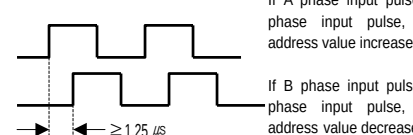
- ※ G6F-PP O : Pulse output is Open Collector type and shows the number of axis.
- G6F-PP D : Pulse output is Line Driver type and shows the number of axis.

Point

- ▶ When using GM6 CPUA,B,C module, ROM version should be more than V2.0 and GMWIN V3.63
- ▶ When using K200S CPUA,B,C module, ROM version should be more than V2.3 and KGL-WIN V3.3.
- ▶ It is available to use within the range that satisfies the capacity of power module

4. External Interface I/O Specifications

4.1 Input Specification

Signal name	Rated input oltage/curre	Use voltage range	On /oltage/current	Off Voltage/current	Input resistance	Response time
Approximate origin	DC 24V/4.7mA	DC 20.4 ~ 26.4V	≥ DC 16V/3.1mA	≤ DC 4V/1.0mA	Approx. 5.1kΩ	≤ 0.1ms
External high-limit	DC 24V/4.7mA	DC 20.4 ~ 26.4V	≥ DC 16V/3.1mA	≤ DC 4V/1.0mA	Approx. 5.1kΩ	≤ 0.1ms
External low-limit	DC 24V/4.7mA	DC 20.4 ~ 26.4V	≥ DC 16V/3.1mA	≤ DC 4V/1.0mA	Approx. 5.1kΩ	≤ 0.1ms
Emergency stop	DC 24V/4.7mA	DC 20.4 ~ 26.4V	≥ DC 16V/3.1mA	≤ DC 4V/1.0mA	Approx. 5.1kΩ	≤ 0.5ms
External stop	DC 24V/4.7mA	DC 20.4 ~ 26.4V	≥ DC 16V/3.1mA	≤ DC 4V/1.0mA	Approx. 5.1kΩ	≤ 0.1ms
External command	DC 24V/4.7mA	DC 20.4 ~ 26.4V	≥ DC 16V/3.1mA	≤ DC 4V/1.0mA	Approx. 5.1kΩ	≤ 0.1ms
Jog reverse direction	DC 24V/4.7mA	DC 20.4 ~ 26.4V	≥ DC 16V/3.1mA	≤ DC 4V/1.0mA	Approx. 5.1kΩ	≤ 0.1ms
Drive Ready	DC 24V/4.7mA	DC 20.4 ~ 26.4V	≥ DC 16V/3.1mA	≤ DC 4V/1.0mA	Approx. 5.1kΩ	≤ 0.1ms
External simultaneous start	DC 24V/4.7mA	DC 20.4 ~ 26.4V	≥ DC 16V/3.1mA	≤ DC 4V/1.0mA	Approx. 5.1kΩ	≤ 0.5ms
Origin	DC 24V/8.9mA	DC 20.4 ~ 26.4V	≥ DC 16V/6.0mA	≤ DC 4V/1.6mA	Approx. 2.7kΩ	On: ≤ 0.4ms Off: ≤ 0.4ms
	DC 5V/8.9mA	DC 4.25 ~ 5.5 V	≥ DC 2.5V/6.0mA	≤ DC 1V/1.9mA	Approx. 570Ω	On: ≤ 0.4ms Off: ≤ 0.4ms
Manual pulse Generator/ Encoder input						
						
Speed/Position switching signal						
	If A phase input pulse precedes B phase input pulse, the position address value increases. If B phase input pulse precedes A phase input pulse, the position address value decreases.					
Speed/Position switching signal	DC 24V/4.7mA	DC 20.4 ~ 26.4V	≥ DC 16V/3.1mA	≤ DC 4V/1.0mA	Approx. 5.1kΩ	≤ 0.1ms

4.2 Pulse Output Specification

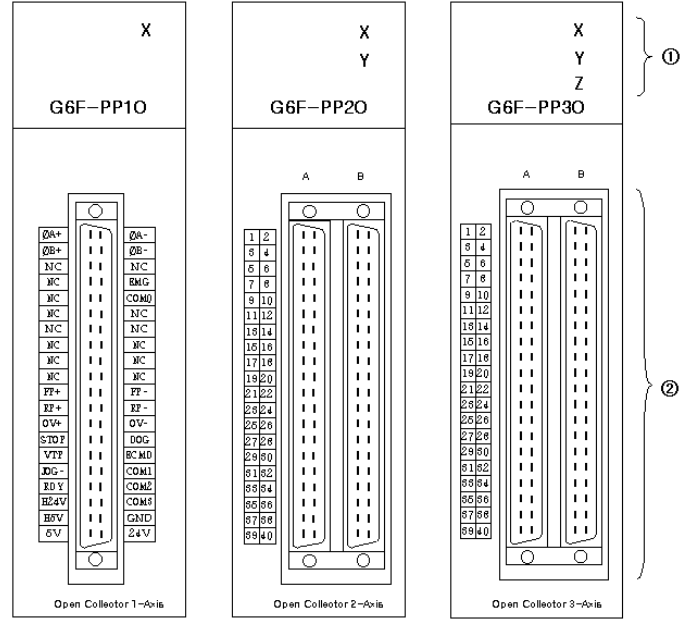
Signal Name	ated loac voltage	Use load /oltage range	Max.load current /Inrush current	Max.voltage Falling(ON)	Leakage urrent(OFF)	Response Time																																											
Pulse Output (CW/Pulse/A phase) Pulse Sign (CCW/Sign/B phase)	DC 5 ~ 24V	DC 4.75 ~ 26.4V	50mA(1point) /≤ 200mA, 10ms	≤ DC 0.5V	≤ 0.1mA	-																																											
	▷ Differential Line Drive based on Am26C31(only Line Drive pulse output type) ▷ CW/CCW type, Pulse/Sign type, A phase/B phase type can be selected from pulse output mode of basic parameter for program and S/W Package. ▷ The relation of Pulse output mode (setting from basic parameter of PLC program or S/W Package), Pulse output direction (setting from expansion parameter of PLC program or S/W Package) and Pulse output level (setting from common parameter of PLC program or S/W Package) is as follows. <table><tr><td rowspan="2">Pulse Output mode</td><td colspan="4">Selection of output signal level</td></tr><tr><td colspan="2">Forward direction</td><td colspan="2">Reverse direction</td></tr><tr><td></td><td>Forward</td><td>Reverse</td><td>Forward</td><td>Reverse</td></tr><tr><td>CW</td><td colspan="2"></td><td colspan="2"></td></tr><tr><td>CCW</td><td colspan="2"></td><td colspan="2"></td></tr><tr><td>Pulse Sign</td><td colspan="2"></td><td colspan="2"></td></tr><tr><td></td><td colspan="2">High Low</td><td colspan="2">High Low</td></tr><tr><td>A phase</td><td colspan="2"></td><td colspan="2"></td></tr><tr><td>B phase</td><td colspan="2"></td><td colspan="2"></td></tr></table>						Pulse Output mode	Selection of output signal level				Forward direction		Reverse direction			Forward	Reverse	Forward	Reverse	CW					CCW					Pulse Sign						High Low		High Low		A phase					B phase			
Pulse Output mode	Selection of output signal level																																																
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	High Low		High Low																																														
A phase																																																	
B phase																																																	

5.2 I/O Interface with External Equipment

lassificatic	Pin no.			Signal Name		Signal director APM externa
	X axis	Y axis	Z axis			
FUNCTION per AXIS	21A	1B	21B	FP+	Pulse output (differential +)	→
	22A	2B	22B	FP-	Pulse output (differential -)	→
	23A	3B	23B	RP+	Pulse sign (differential +)	→
	24A	4B	24B	RP-	Pulse sign (differential -)	→
	25A	5B	25B	OV+	High limit	←
	26A	6B	26B	OV-	Low limit	←
	27A	7B	27B	STOP	External stop signal	←
	28A	8B	28B	DOG	Approximate origin	←
	29A	9B	29B	VTP	Speed/Position switching signal	←
	30A	10B	30B	ECMD	External Command	←
					Skip	←
					JOG+(Forward operation)	←
	31A	11B	31B	JOG-	JOG reverse operation	←
	32A	12B	32B	COM	Common (OV+, OV-, STOP, DOG, VTP, ECMD, JOG-)	↔
	33A	13B	33B	DRVIN	drive Unit Ready signal	←
	34A	14B	34B	DRVIN COM	drive Unit Ready signal Common	↔
	35A	15B	35B	HOME +24V	Zero signal (+24V)	←
	36A	16B	36B	HOME COM	Zero signal(+24V, +5V) Common	↔
	37A	17B	37B	HOME +5V	Zero signal (+5V)	←
	38A	18B	38B	P COM	External 5V, 24V GND (no use in case of Line Drive output)	↔
	39A	19B	39B	5V	External 5V Power Input (no use in case of Line Drive output)	←
	40A	20B	40B	24V	External 24V Power Input (no use in case of Line Drive output)	←
COMMON FUNCTION	1A		MPG A+	Manual pulse generator/Encoder A+ input	←	
	2A		MPG A-	Manual pulse generator/Encoder A- input	←	
	3A		MPG B+	Manual pulse generator/Encoder B+ input	←	
	4A		MPG B-	Manual pulse generator/Encoder B- input	←	
	5A		NC	No use		
	6A		NC	No use		
	7A		CON	External simultaneous start (no use in case of 1 axis APM)	←	
	8A		EMG	Emergency stop	←	
	9A		NC	No use		
	10A		COM	(CON, EMG)Common	↔	
	11A, 12A, 13A, 14A, 15A, 16A, 17A, 18A, 19A, 20A		NC	No use		

5. Part Name

5.1 The name and function of each part



№	Name	Description
①	Operation Indication LED	1. Operation indication ▶Light-On : In operation of the corresponding axis ▶Light-Off: When the corresponding axis stops 2. Error indication ▶Light-On : In normal operation ▶Blink : Error of the corresponding axis
②	External Wiring Connector	Connector to connect with drive machine, machine field input, manual pulse generator etc.

8. Function Block (only GLOFA series)

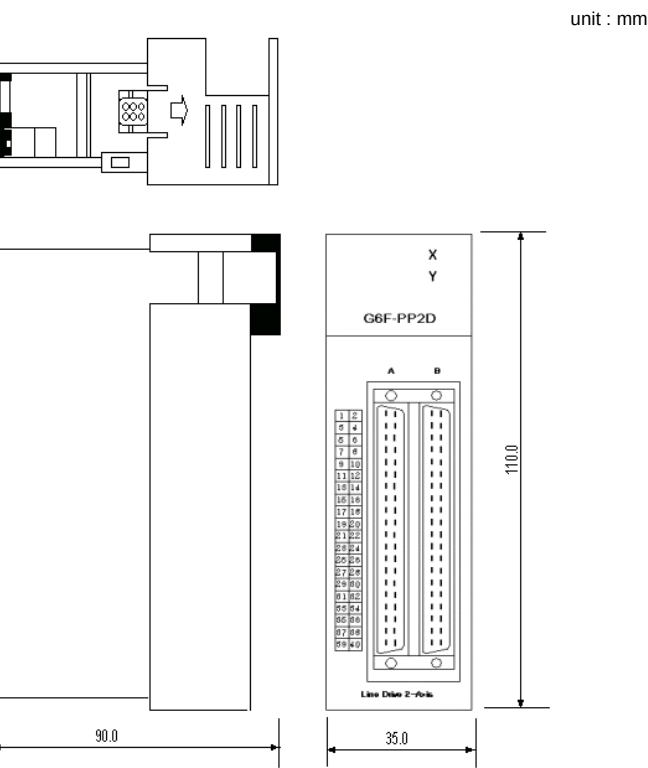
Nc	lassificatic	Function Block Name	Description	Action Conditior
1	Module Information	APM_CRD	Operation status code information read	Level
2		APM_SRD	Operation status bit information read	Level
3	Parameter setting	APM_SBP	Basic parameter setting	Edge
4		APM_SEP	Extended parameter setting	Edge
5		APM_SCP	Common parameter setting	Edge
6		APM_SHP	Homing parameter setting	Edge
7		APM_SMP	Manual operation parameter setting	Edge
8	Operation data	APM_SMD	Operation data setting	Edge
9	Automatic operation	APM_ORG	Origin return start	Edge
10		APM_DST	Direct start	Edge
11		APM_IST	Indirect start	Edge
12		APM_LIN	Linear interpolation start	Edge
13		APM_CIN	Circular interpolation start	Edge
14		APM_SST	Simultaneous start	Edge
15	Manual operation	APM_PST	PTP start	Edge
16		APM_JOG	Jog start	Level
17		APM_INC	Inching start	Edge
18		APM_MPG	Manual pulse generator operation (or encoder)	Edge
19	Auxiliary operation	APM_RTP	Automatic operation position return start	Edge
20		APM_SSP	Position synchronous start	Edge
21		APM_SSS	Speed synchronous start	Edge
22		APM_POR	Position override	Edge
23		APM_SOR	Speed override	Edge
24		APM_PSO	Position speed override	Edge
25		APM_PTV	position/speed control	Edge
26		APM_VTP	Speed/position control	Edge
27		APM_SKP	Skip operation	Edge
28		APM_NMV	Next move	Edge
29		APM_SNS	Start step no. setting	Edge
30		APM_SRS	Start step no. setting in repeat operation	Edge
31		APM_STP	Stop	Edge
32	Teaching	APM_TEA	Position/speed teaching (ROM, RAM)(Single)	Edge
33		APM_ATEA	Position/speed teaching (ROM, RAM)(Array)	Edge
34	Error	APM_EMG	Emergency stop	Edge
35		APM_RST	Error reset /output inhibit release	Edge
36	Encoder	APM_ENCRD	Encoder read	Level
37		APM_EPRE	Encoder preset	Edge
38	Others	APM_ZONE	Zone output permitted	Edge
39		APM_MOF	M code Off	Edge
40		APM_PRS	Current position preset	Edge
41		APM_FLT	Floating point setting	Edge
42		APM_MDRD	Operation Data Read	Level

9. Buffer Memory (only MASTER-K series)

I/O signal of G6F-PP1/2/3O, G6F-PP1/2/3D(APM) contains total 32 points (Input :16 point, Output :16 point).

Axis	Signal Direction : PLC CPU←APM		Signal Direction : PLC CPU→APM	
	Input	Description	Output	Description
X	P0(n)0	X axis command receiving	P0(n+1)0	X axis start
	P0(n)1	X axis in operation	P0(n+1)1	X axis normal direction Jog
	P0(n)2	X axis error status	P0(n+1)2	X axis reverse direction Jog
	P0(n)3	X axis positioning completed	P0(n+1)3	X axis Jog high/low speed
	P0(n)4	X axis M code ON	P0(n+1)4	X axis MPG operation (or Encoder)
Y	P0(n)5	Y axis command receiving	P0(n+1)5	Y axis start
	P0(n)6	Y axis in operation	P0(n+1)6	Y axis normal direction Jog
	P0(n)7	Y axis error status	P0(n+1)7	Y axis reverse direction Jog
	P0(n)8	Y axis positioning completed	P0(n+1)8	Y axis Jog high/low speed
	P0(n)9	Y axis M code ON	P0(n+1)9	Y axis MPG operation (or Encoder)
Z	P0(n)A	Z axis command receiving	P0(n+1)A	Z axis start
	P0(n)B	Z axis in operation	P0(n+1)B	Z axis normal direction Jog
	P0(n)C	Z axis error status	P0(n+1)C	Z axis reverse direction Jog
	P0(n)D	Z axis positioning completed	P0(n+1)D	Z axis Jog high/low speed
	P0(n)E	Z axis M code ON	P0(n+1)E	Z axis MPG operation (or Encoder)
Common	P0(n)	Positioning module ready	P0(n+1)F	No use

10. Dimension



11. Warranty

- Warranty period
LGIS provides an 18-month-warranty from the date of the production.
- Warranty conditions
For troubles within the warranty period, LGIS will replace the entire PLC or repair the troubled parts free of charge except the following cases.

(1) The troubles caused by improper condition, environment or treatment except the instructions of LGIS.
(2) The troubles caused by external devices.
(3) The troubles caused by remodeling or repairing based on the user's own discretion.
(4) The troubles caused by improper usage of the product.
(5) The troubles caused by the reason which exceeded the expectation from science and technology level when LGIS manufactured the product.
(6) 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 to.