DATA SHEET

LS Programmable Logic Controller

XGB Module type

XGB **XBM-DR16S**
XBM-DN16S
XBM-DN32S

- When using LSIS 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.

LS constantly endeavors to improve our products so that information in this datasheet is subject to change without notice.

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■ Safety Precautions

- Safety Precautions is for using the product safely and correctly in order to prevent the accidents and danger, so please go by them.
- The precautions explained here only apply to this module. For safety precautions on the PLC system, refer to User's manual.
- The precautions are divided into 2 sections, 'Warning' and 'Caution'. Each of the meanings is represented as follows.

⚠ Warning If you violate instructions, it can cause death, fatal injury or a considerable loss of property

⚠ Caution If you violate instructions, it can cause a slight injury or a 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 electric 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

■ Handling Precautions

- Don't drop or make impact.
- Don't detach PCB from case. It may cause problem.
- When wiring, let no foreign material go into the module. If it goes into the module, remove it.
- Don't detach the module from slot while power is on

⚠ Warning

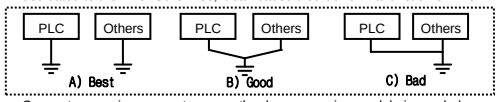
- **Do not contact the terminals while the power is applied.**
  Risk of electric shock and malfunction.
- **Protect the product from being gone into by foreign metallic matter.**
  Risk of fire, electric shock and malfunction.
- **Risk of fire, electric shock and malfunction.**
  Risk of injury and fire by explosion and ignition.

⚠ 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 is loose, 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 is 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 10cm from a high-tension and a power line in order not to be affected by noise and magnetic field.

Related Manual

Read this data sheet carefully prior to any operation, mounting, installation or start-up of the product.

Name	Item Code
XG5000 (Programming software)	10310000512
XGK/XGB (Instruction & Programming)	10310000510
XGB Series User's manual	10310000694
XGB analog	10310000920
XGB positioning	10310000927
XGB Cnet I/F	10310000736
XGB Enet I/F	10310000873

Revision History

Issued data	Version	Description
2006.04	V1.0	First edition
2010.03	V2.0	Applicable version is added
2011.05	V3.0	KOREAN/ENGLISH data sheet integrated CI Changed

Applicable version

For system configuration, the following version is necessary.

Item	Applicable version
XG5000	V3.4 or above

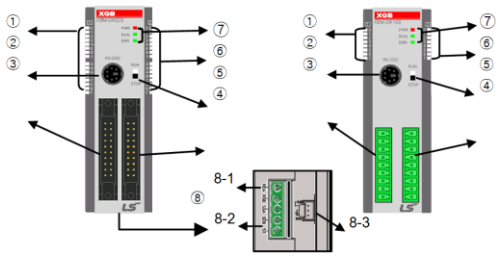
1. General Specifications

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 resistance	Occasional vibration				-
		Frequency	Acceleration	Amplitude	times	IEC61131-2
		10≤f＜57 Hz	-	0.075 mm	10 times in each direction for X, Y, Z	
		57 ≤f≤150 Hz	9.8㎨ (1G)	-		
		Continuou ibration				
		Frequency	Acceleration	Amplitude		
		10≤f＜57 Hz	-	0.035 mm		
		57≤f≤150 Hz	4.9㎨(0.5G)	-		
6	Shocks resistance	• Peak acceleration: 147 m/s2(15G) • Duration: 11ms • Half-sine, 3 times each direction per each axis				IEC61131-2
7	Noise resistance	Square wave impulse noise	AC: ±1,500V DC: ±900V			LSIS standard
		Electrostatic discharge	4kV (Contact discharge)			IEC61131-2 IEC61000-4-2
		Radiated electromagnetic field noise	80 ~ 1,000 MHz, 10 V/m			IEC61131-2 IEC61000-4-3
		Fast transient burst noise	Segment	Power supply module	Digital/analog input/output communication interface	IEC61131-2 IEC61000-4-4
			Voltage	2 kV	1 kV	
8	Environment	Free from corrosive gasses and excessive dust				-
9	Operating height	Up to 2,000 ms				-
10	Pollution degree	Less than equal to 2				-
11	Cooling	Air-cooling				-

2. Performance Specifications

Item		Specification			Remark
		XBM-DR16S	XBM-DN16S	XBM-DN32S	
Operation method		Reiterative operation, fixed cycle operation Interrupt operation, constant period scan			
I/O control method		Scan synchronized batch processing method (Refresh method) Direct method by instruction			
Programming Language		Ladder Diagram(LD), Instruction List (IL)			
Numbers of Instructions	Basic instructions	28			
	Application instructions	677			
Execution Time		Basic instructions: 0.16㎲/Step			
Program memory capacity.		10K step			
Max. I/O points		240 Points		256 Points	
Memory Device	P	P0000 ~ P127F (2,048 Points)			
	M	M0000 ~ M255F (4,096 Points)			
	K	K00000 ~ K2559F(40,960 Points)			
	L	L00000 ~ L1279F (20,480 Points)			
	F	F000 ~ F255F (4,096 Points)			
	T	100ms : T000 ~ T191(192 Points) 10ms : T192 ~ T250(59 Points) 1ms : T251 ~ T255(5 Points)			Parameter Setting (Variable)
	C	C000 ~ C255(256 Points)			
	S	S00.00 ~ S127.99			
	D	D0000 ~ D5119			
	U	U00.00 ~ U07.31			
	Z	Z000 ~ Z127			Index
	N	N0000 ~ N3935			Read Only
Operation Mode		RUN, STOP, DEBUG			
Numbers of program		128			
Task	Initialization task	1			
	Time driven task	8			
	External contact task	8(P000~P007)			
	Internal device task	8			
Self-diagnostic functions		Watchdog Timer, Memory error detection, I/O error detection, etc.			
Data keeping method at power failure		Setting to latch area at basic parameter			
Maximum expansion module		7			
Internal function	PID Control function	Controlled by instruction, Auto tuning, PWM Operation Manual output, Operation scan time setting Anti Windup, Delta MV, PV tracking Hybrid Operation, Cascade Operation			
	Cnet I/F	XGK Dedicated protocol support MODBUS protocol support User defined protocol support			
		Selects one port between RS-232C 1 port and RS-485 1 port by parameter			
	HSC count: speed	1 phase: 100kHz 4 Ch. / 20kHz 4 Ch. 2 phase: 50kHz 2 Ch. / 10kHz 2 Ch.			
	HSC count: Mode	4 counter modes are supported based on input pulse and INC/DEC method • 1 pulse operation Mode : INC/DEC count by program • 1 pulse operation Mode : INC/DEC count by phase B pulse input • 2 pulse operation Mode : INC/DEC count by input pulse • 2 pulse operation Mode : INC/DEC count by difference of phase			
	HSC count: Operation	32bit signed counter			
	HSC count: Function	Internal/External preset function Latch counter function Comparison output function Revolution number per unit time function			
	Pulse Catch	Pulse width: 10㎲ 4points(P000~P003) 50㎲ 4points(P004~P007)			
	Positioning: Basic	Control axis: 2axes Control method: PTP/ speed control Control units: pulse Positioning data: 80 data per axis Positioning mode: End/Keep/Continue, Single/Repeat			XBM-DN16S XBM-DN32S Only
	Positioning: Position-ing	Positioning method: Absolute/Incremental Positioning address:- 2,147,483,648~2,147,483,647 Speed: Max. 100kpps (Setting range:1 ~ 100,000) Accel./Decel. Method: Trapezoidal method			
	Positioning: Return to Origin	Origin detection when approximate origin turns off. Origin detection after declaration when approx. origin on Origin detection by approximate origin			
	Positioning: JOG	Setting range: 1 ~ 100,000(High/Low speed)			
	Positioning: Additional function	Inching operation, Speed synchronizing operation, Position synchronizing operation, linear interpolation operation etc.			
Input filter		Select for 1,3,5,10,20,70,100㎳ (For each module)			
Internal current consumption(mA)		400	250	280	
Weight(g)		140	100	110	

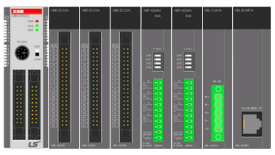
3. Parts Name and Descriptions



No	Name		Description
①	Input status LED		• Indicates input status.
②	RS-232C Connector		• RS-232C connector to connect with external device(XG5000)
③	Input connector / TB		• Input connector / Terminal Block
④	Output connector / TB		• Output connector / Terminal Block
⑤	RUN/STOP Mode Switch		• It sets the operation mode of XGB PLC. - STOP → RUN : Operation execution of program - RUN → STOP : Operation stop of program
⑥	Output status LED		• Indicates output status
⑦	Operation status LED		• Indicates the operation status of the CPU. - PWR(RED) : Indicates power status. • On : normal status • Off : abnormal status or off - RUN(GREEN) : RUN status • On : Run • Off : Stop - Error(RED) : Indicates an error status • Off : Normal • Flicker : An error is detected by self diagnostic during operation
⑧	8-1	RS-485 Connector	• RS-485 Connector RS-485 Connector for "+" , "-"
	8-2	RS-232C Connector	• RS-232C Connector RS-232C Connector for "TX" , "RX" , "SG"
	8-3	Power Connector	• Power Connector (DC24V)

4. I/O No. Allocation Method

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



Main unit Expansion module #1~7

Mounting Module	Maximum No. of module can be mounted
Expansion I/O module	7
Special module	7
Communication module	2

(2) The following is method I/O number allocation.

Item	Area		Remark
	Input	Output	
Main	P000 ~ P01F	P020 ~ P03F	64point fixed
Extension #1	P040~P07F		64point fixed (special /communication module)

-. I/O allocation for all expansion modules is fixed at 64points
(The unused area can be used as internal relay.)

5. Built-in High Speed Count Function

(1) Summary

The high-speed counter can count high frequency pulse which can not be processed with the CPU counting instructions. It can count pulse which occurs from encoder or pulse generator.

(2) Performance specifications

Item		Specification
Input Signal	Signal	A Phase, B Phase, Preset
	Signal level	DC24V
	Signal Type	Voltage Input
Counting Range		-2,147,483,648 ~ 2,147,483,647(Binary 32Bit)
Max. counting speed		1Phase : 20kHz 4ch. / 2Phase : 10kHz 2ch.
Count Method		Linear Count / Ring Count
Counter mode		1 pulse operation Mode : INC/DEC count by program 1 pulse operation Mode : INC/DEC count by phase B pulse input 2 pulse operation Mode : INC/DEC count by input pulse 2 pulse operation Mode : INC/DEC count by difference of phase (4 multiplication)
Additional function		Internal/External preset function Latch counter function Comparison output function Revolution number per unit time function

6. PID Control Function

The following describes the built-in PID function of XGB Series.(Max. 16 loops)

(1) The characteristics of PID function of XGB Series
- (a) 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.
- (b) CASCADE and Hybrid operation are available.
- (c) P operation, PI operation, PID operation and On/Off operation can be selected easily.
- (d) The manual output (the user-defined forced output) is available.
- (e) By proper parameter setting, stable operation can be achieved regardless of external disturbance.
- (f) The operation scan time (the interval that PID controller gets a sampling data from process) is changeable for optimizing to the system characteristics.
- (g) PWM operation is supported
- (h) SV-Ramp, Delta-MV function is supported

(2) Instructions for PID control

For the PID Operation of XGB Series, there are four instructions, as follow.

No.	Instruction	Function
1	PIDRUN	Perform the PID operation
2	PIDAT	Perform the auto tuning operation
3	PIDCAS	Perform the PID cascade operation
4	PIDHBD	Perform the PID hybrid operation

7. Positioning Function

(1) Summary

XBM-DN16S/XBM-DN/32S supports 2-axes of positioning function. The purpose of this function is to control moving object by setting speed from the current position and stop them on the setting position correctly.

This chapter describes the built-in positioning function of XGB Series

(2) Performance specifications

Item	Specification
Control axis	2axes
Control method	PTP, speed control
Control unit	Pulse
Positioning data	30 data per axis
Positioning method	Absolute / Incremental
Speed limit	Max. 100kpps, Min. 1pps(unit of 1pps)
Positioning address	-2,147,483,648 ~ 2,147,483,647
Acceleration/ Deceleration method	Trapezoidal method(0 ~ 10,000ms)
Bias speed	1 ~ 100,000 pps
Rated load voltage	DC 12V/24V
Operation mode	End / Keep / Continuous mode
Positioning function	Return to origin, JOG, Single Repeated operation, Linear interpolation

8. Built-in Communication Function

(1) Dedicated communication

XGB series has built-in Cnet communication function, and can communicate with various external devices without expansion Cnet I/F module.
By using LSIS's dedicated protocol, user can read, write, and monitor memory devices of XGB series.

Built-in Cnet of XGB series supports the following functions;
- Read single/continuous device
- Write single/continuous device
- Register monitoring device
- Execute monitoring
- 1:1 connection between LS PLCs

(2) User defined communication

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

(3) Modbus protocol

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

(4) P2P communication support

XGB series supports client function service with P2P form to above item.

Remarks

Please refer the chapter 10 of XGB Series user's manual for details of built-in Cnet I/F function of XGB series.

9. Other Built-in Function

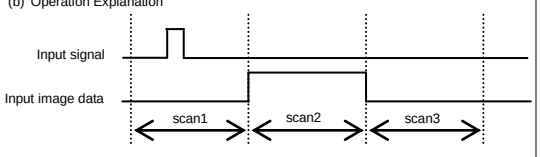
(1) Pulse Catch Function

In the main unit, 8 pulse catch input contact points(P000~P007) are internalized. Through using this contact point short pulse signal(min. 10 - 50㎲) which cannot be executed by general digital input can be taken.

(a) Usage

When narrow pulse signal is input which can not be executed by general digital input, the operation can not performed as user's intention. But in this case through pulse catch function even narrow pulse signal as 50㎲ min. can be executed.

(b) Operation Explanation



Step	Execution contents
Scan1	CPU senses input when pulse signal of min. 10 to 50㎲, 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

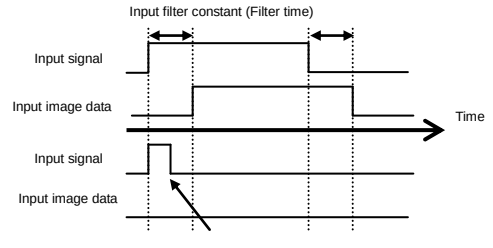
(2) Input Filter Function

The input filter function can be used to reject noises. The filter constant from the range of 1-100㎳ can be designated on the main unit and each expansion module independently.

(a) Usage

Input signal status affects to the credibility of system 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.

(b) Operation Explanation



Narrower width pulse than input filter constant is not considered as input signal.

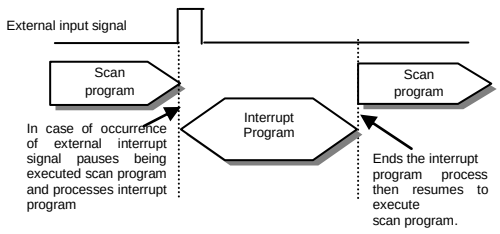
(3) External interrupts function

XGB PLC can perform max 8 points of external contact task by using input of main unit without special interrupt module

(a) Usage

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

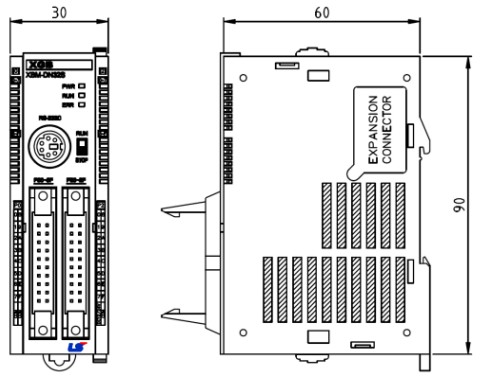
(b) Operation Explanation



(c) Function
- It can be use the max. 8 point input (P000 ~ P007).
- Input 8 points (P000 ~ P007) of XGB Compact Type Main Unit are shared for several functions as following table. Each of the functions can be disabled according to whether other functions are enabled.

Input Point	High Speed Counter	External Interrupt	Pulse Catch	Input Filter
P000	Ch0 Input	Unavailable	Unavailable	Available
P001	Ch1 Input	Unavailable	Unavailable	Available
P002	Ch2 Input	Unavailable	Unavailable	Available
P003	Ch3 Input	Unavailable	Unavailable	Available
P004	Ch4 Input	Unavailable	Unavailable	Available
P005	Ch5 Input	Unavailable	Unavailable	Available
P006	Ch6 Input	Unavailable	Unavailable	Available
P007	Ch7 Input	Unavailable	Unavailable	Available

10. Dimension (㎜)



11. Warranty

(1) Warranty period

LSIS provides an 18-month-warranty from the date of the production.

(2) Warranty conditions

For troubles within the warranty period, LSIS will replace the entire PLC or repair the troubled parts free of charge except the following cases.
- (a) The troubles caused by improper condition, environment or treatment except the instructions of LSIS.
- (b) The troubles caused by external devices.
- (c) The troubles caused by remodeling or repairing based on the user's own discretion.
- (d) The troubles caused by improper usage of the product.
- (e) The troubles caused by the reason which exceeded the expectation from science and technology level when LSIS manufactured the product.
- (f) The troubles caused by natural disaster.

(3) This warranty is limited to the PLC itself only. It is not valid for the whole system which the PLC is attached to.