DATA SHEET

LS Programmable Logic Controller

XGB Compact Standard Type

XGB XBC-DN20SU
XBC-DN30SU
XBC-DN40SU
XBC-DN60SU
XBC-DR20SU
XBC-DR30SU
XBC-DR40SU
XBC-DR60SU

- **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.**

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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

▪ Handing 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

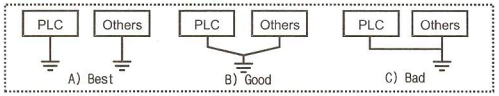
- **Do not contact the terminals while the power is applied.**
  Risk of electric shock and malfunction.
- **Protect the product from being gone into by foreign metallic matter.**
  Risk of fire, electric shock and malfunction.
- **Risk of fire, electric shock and malfunction.**
  Risk of injury and 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 than10cm from a high-tension and a power line in order not to be affected by noise and magnetic field.

Related Manual

Name	Code
XG5000 User's Manual(Programming software)	10310000512
XGK/XGB Instruction & Programming User's manual	10310000510
XGB Cnet I/F module User's Manual	10310000816
XGB Standard/Economic Hardware User's manual	10310001091
XGB FEnet I/F module User's Manual	10310000873
XGB Analog User's manual	10310000920
XGB Positioning User's manual	10310000927
XGB Positioning module User's manual	10310001008

Revision History

Date	Version	Updated Information
2011.05	V1.0	First Edition

Applicable version

For system configuration, the following version is necessary.

Item	Applicable version
XG5000	V3.61 or above

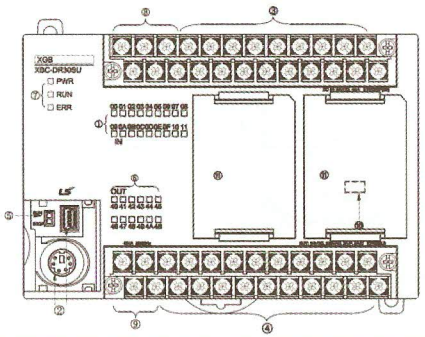
1.General Specifications

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	For discontinuous 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)	-		
		For continuous vibration				
		Frequency	Acceleration	Amplitude		
		10≤f＜57 Hz	-	0.035 mm		
		57≤f≤150 Hz	4.9㎨(0.5G)	-		
6	Shocks resistance	• Max. impact acceleration : 147 ㎨ (15G) • Authorized time : 11㎳ • Pulse wave : Sign half-wave pulse (Each 3 times in X,Y,Z directions)				IEC61131-2
7	Noise resistance	Square wave impulse noise	AC: ±1,500V DC: ±900V			LSIS standard
		Electrostatic discharge	Voltage: 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	Ambient conditions	No corrosive gas or dust				-
9	Operating height	2000m or less				-
10	Pollution degree	2 or less				-
11	Cooling type	Natural air cooling				-

2. Performance Specifications

Item		Specification				Ref.
		XBC-DN20SU / XBC-DN40SU	XBC-DR20SU / XBC-DR40SU	XBC-DN30SU / XBC-DN60SU	XBC-DR30SU / XBC-DR60SU	
Operation method		Reiterative operation, fixed cycle operation, Interrupt operation, constant period scan				
I/O control method		Scan synchronous batch processing (refresh method) Direct method by instruction				
Program language		Ladder Diagram, Instruction List				
No. of instruction	Basic	28				
	Application	687				
Operation speed (Basic instruction)		94㎱/Step				
Program memory		15kstep				
I/O points		244 points (main + 7 expansions)		254 points (main + 7 expansions)		
Data are	P	P0000 ~ P1023F (16,384 points)				
	M	M0000 ~ M1023F (16,384 points)				
	K	K0000 ~ K4095F (65,536 points)				
	L	L0000 ~ L2047F (32,768 points)				
	F	F0000 ~ F1023F (16,384 points)				
	T	100㎳, 10㎳, 1㎳: T0000 – T1023 (1,024 points) (Variable by parameter setting)				
	C	C0000 ~ C1023 (1,024 points)				
	S	S00.00 ~ S127.99				
	D	D0000 ~ D10239 (10,240 words)				Word
	U	U0.0 ~ U0A.31 (352 words, analog data refresh area)				Word
	Z	Z000~Z127 (128 words)				Word
	R	R0000~R10239(10,240 words)				Word
No. of programs		Max. 128				
Task	Initialization	1				
	Fixed cycle	Max. 8				
	External point	Max. 8				
	Internal device	Max. 8				
Operating mode		RUN, STOP, DEBUG				
Self-diagnosis		Delay of operation, abnormal memory, abnormal I/O				
Program port		RS-232C 1 channel ,USB 1 channel				
Data keeping method at power failure		Setting latch area at basic parameter				
Built-in Function	PID control	Control by instruction, auto-tuning, PWM output Forced output, Operation scan time setting, Antiwindup, Delta MV, PV tracking, Hybrid operation, Cascade operation				
	Cnet I/F function	Dedicated protocol, Modbus protocol User defined protocol				
		RS-232C 1 port and RS-485 1 port				
	High Speed Counter: Performance	1-phase : 100㎑ 2 channels, 20㎑ 6 channels 2-phase : 50㎑ 1 channel, 8㎑ 3 channels				
	High Speed Counter: Counter 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				
	High Speed Counter: Operation	• 32bit sighed counter				
	High Speed Counter: Function	• Internal/external preset • Latch counter • Compare output • No. of rotation per unit time				
	Positioning: Basic	Control axis: 2axes Control method: Position/ speed control Control units: pulse Positioning data: 80 data per axis (Operation step no.: 1~80) Operating mode: End/Keep/Continue Operating method: Single/Repeat				Supported at TR type
	Positioning: Positioning	Positioning method: Absolute/Incremental Positioning address:-2,147,483,648 ~ 2,147,483,647 Speed: Max. 100kpps(Setting range:1 ~ 100,000) Acc./Dec. Method: Trapezoidal method				
	Positioning: Home method	By DOG(Off) and Home signals By DOG(On) and Home signals By DOG signal				
	Positioning: JOG	Setting range: 1 ~ 100,000(High/Low speed)				
	Positioning: Function	Inching operation, speed synchronous operation, position synchronous operation, linear interpolation and etc.				
	Pulse catch	10㎲ 2 points (P0000~P0001), 50㎲ 6 points (P0002 ~ P0007)				
	External point interrupt	10㎲ 2 points (P0000~P0001), 50㎲ 6 points P0002 ~ P0007)				
	Input filter	Selects among 1,3,5,10,20,70,100㎳(Adjustable)				
Current consumption		252 mA 288 mA	478 mA 684 mA	310 mA 340 mA	626 mA 942 mA	
Weight		475g 578g	514g 594g	476g 636g	528g 804g	

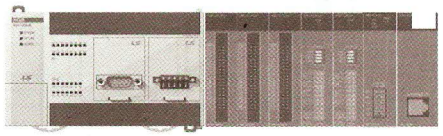
3. Parts names and Descriptions



No	N me	Description
①	Input status LED	■ Indicates input status.
②	PADT Connector	■ Connector to connect with XG5000 •RS-232 1 channel USB 1 channel
③	Input terminal block	■ Input Terminal Block
④	Output terminal block	■ Output terminal block
⑤	RUN/STOP Mode switch	■ Sets the operation mode of main unit. • STOP → RUN : Operation execution of program • RUN → STOP : Operation stop of program (In case of STOP, it can be changed to remote mode)
⑥	Output status LED	■ Indicates output status
⑦	Operation status LED	■ Indicates the operation status of the main unit • PWR(RED ON) : Indicates power status. • RUN(GREEN ON) : RUN mode • ERR(ED blink) : indicates error
⑧	Built-in Communication Terminal block	■ Terminal block for built-in RS-232C/485 communication
⑨	Power terminal block	■ Terminal block for power (AC 100~240V)
⑩	O/S mode dip switch	■ Dip switch for selecting Operation or O/S download mode •On: BOOT mode. Downloading O/S is available •Off: User mode. Downloading program by PADT is available
⑪	Option board holder	■ For connecting option board

4. I/O No. Allocation Method

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



Main unit Option module #1~2 Expansion module #1~7

Mounting module	No. of module can be mounted	Ref.
Expansion I/O module	7	Total 7 modules including Expansion/option module can be mounted
Special module (A/D, D/A)	7	
Communication module	2	
Option module	2	

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

Item	Area		Ref.
	Input	Output	
Main unit	P0000~P003F	P0040~P007F	Fixed
Expansion #1	P0080~P011F		64point fixed (including Special/Comm.)
Expansion #2	P0120~P015F		64point fixed (including Special/Comm.)
Option #1	P0400~P043F		64point fixed
Option #2	P0440~P047F		64point fixed

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

5. Built-in High Speed Counter Function

(1) Summary
The high-speed counter can count high frequency pulse which can not be processed with the input unit. It can count pulse which occurs from encoder or pulse generator.

(2) Performance Specification

Item		Specification
Input Signal	Signal	A Phase, B Phase
	Signal level	DC24V
	Signal Type	Voltage Input (Open collector)
Counting range		Signed 32 Bit (-2,147,483,648 ~ 2,147,483,647)
Counting speed		1-phase : 100kpps 2 channels / 20kpps 6 channels, 2-phase : 50kpps 1channel/ 8kpps 3channels
Counter format		Linear counter / Ring counter
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)
Function		Internal/External preset function / Latch counter function Compare output function / no. of rotation per unit time

6. PID Control Function

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

(1) The characteristics of PID function of XGB PLC
(a) The PID function is integrated into the CPU module. Therefore, PID control 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 PLC, 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
TR output type support 2-axes, 100kpps 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.

(2) Performance specifications

Item	Specification
Control axis	2axes
Control method	PTP, speed control
Control unit	Pulse
Positioning data	80 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	DC12/24V
Operation mode	End / Keep / Continuous mode
Positioning function	Return to origin, JOG, PWM output , Linear interpolation

8. Built-in Communication Function

(1) Dedicated communication
XGB Compact Type has built-in Cnet communication function, and can communicate with various external devices without expansion Cnet I/F module.
(XGB Compact Type Main Unit has built-in RS-232C and RS-485.)

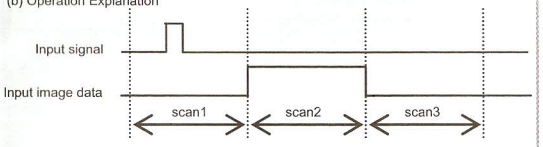
Built-in Cnet of XGB Main Unit supports the following functions;
(a) Read single/continuous device
(b) Write single/continuous device
(c) Register monitoring device
(d) Execute monitoring
(e) 1:1 connection system (LS link)
(2) User defined communication
User can define a user-defined protocol to communicate with other manufacturer's devices. By supporting user-defined protocol, XGB PLC can communicate with various devices which have their own protocol.
(3) Modbus protocol
XGB PLC includes Modbus protocol, and it is easy to connect to Modbus devices.
(It is not necessary to write Modbus protocol as user-defined protocol.)
(4) P2P communication support
XGB PLC supports client function service with P2P form to above item.

9. Other Built-in Function

(1) Pulse Catch Function
In the main unit, 8 pulse catch input contact points (P000~P007) are included. 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 (min. 10㎲) can be executed.

(b) Operation Explanation



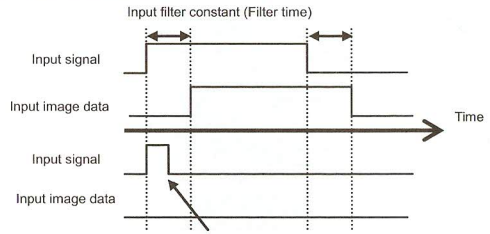
Step	Execution contents
Scan1	CPU senses input when pulse signal of min. 10~50㎲ is input, then saves the status.
Scan2	Turns on the region of input image.
Scan3	Turns off the region of input image

(Note1) P0000~P0001 : 10㎲, P0002~P0007(50㎲)

(2) Input Filter Function
The input filter function can be used to reject noises. The input filter constant from the range of 1-100㎳ can be designated.

(a) Usage
Input signal status affects 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, 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

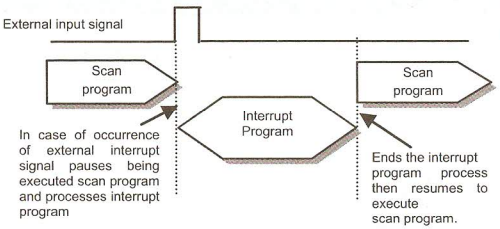


Narrower width pulse than input filter constant is not considered as input signal.

(3) External interrupts function
XGB PLC can perform max 8 external contact tasks by using input of main unit without special interrupt module

(a) Usage
This function is useful when you need to process operation related to external input signal fast without scan time.

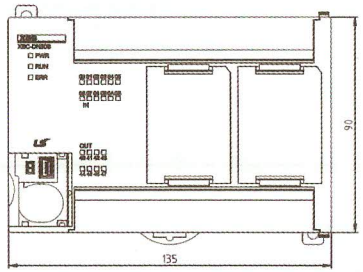
(b) Operation Explanation



(4) 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.