DATA SHEET

LS Programmable Logic Controller
Cnet(Computer Link) I/F Module

XGB **XBL-C21A**
XBL-C41A

- **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

■ 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

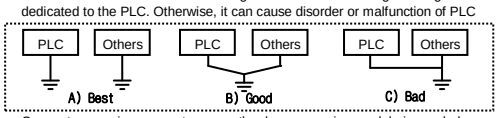
- **Do not contact the terminals while the power is applied.**
  Risk of electric shock and malfunction.
- **Protect the product from being gone into by foreign metallic matter.**
  Risk of fire, electric shock and malfunction.
- **Risk of fire, electric shock and malfunction.**
  Risk of injury and 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
XGB Hardware Manual	10310000693
XGB Hardware (IEC) Manual	10310001059
XBC Standard/Economic Manual	10310001091
XGK/XGB Instruction Manual	10310000510
XGI/XGR/XEC Instruction Manual	10310000833
XG5000 Manual	10310000821
XGB Cnet I/F User's manual	10310000816

Revision History

Date	Revision	Description
2006.11	V1.0	first edition
2008.02	V1.1	address updated Performance Spec. updated
2009.08	V2.0	Branch address changed
2011.05	V3.0	KOREAN/ENGLISH data sheet integrated CI Changed

Applicable version

For system configuration, the following version is necessary.

Item	Applicable version
XBL-C21A, XBL-C41A	V1.2 or above
XBC H Type	V2.02 or above
XBC S Type	V1.1 or above
XBC SU Type	V1.0 or above
XEC H Type	V1.1 or above
XGB Module Type(XBM)	V3.03 or above
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	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		Specifications	
		XBL-C21A	XBL-C41A
Serial Communication Channel		RS-232C 1 Channel	RS-422/485 1Channel
Operating Mode	P2P	Dedicated protocol for LS Industrial Systems Modbus ASCII/RTU protocol User-defined Protocol	
	Server	Dedicated protocol for LS Industrial Systems Modbus ASCII/RTU protocol	
Data Type	Data Bit	7 or 8	
	Stop Bit	1 or 2	
	Parity	Even / Odd / None	
Synchronization Type		Asynchronous type	
Communication speed (bps)		1200/2400/4800/9600/19200/38400/57600/115200	
Station No. Setting		Set by using XG-PD, Max. 32 stations are able to be set (from 0 to 255)	
Transmis-sion Distance	RS-232C	Max. 15m (Extendible with MODEM)	-
	RS-422 /485	-	Max. 500m
Terminator		-	120Ω(1/2W)
Diagnosis Function		Indication of operating status with 5 LEDs during operating.	
Current Consumption (mA)		100	
Weight(g)		60	55
Accessory		-	5Pin Terminal Block

3. Cable Specifications

(1) When using RS-422 or RS-485 communication channel, a twisted pair cable must be used with consideration of high-quality signal transmission and control characteristic.

(2) Table 4.1 describes recommended specifications of cable. Also when using another cable than recommended one, the cable conformed to characteristics of Table 4.1 shall be used.

Item: Low Capacitance LAN Interface Cable
Type: LIREV-AMESB
Size: 2P X 22AWG(D/0.254 TA)
Manufacturer: LS Cable Co., Ltd.

(3) Electrical characteristics

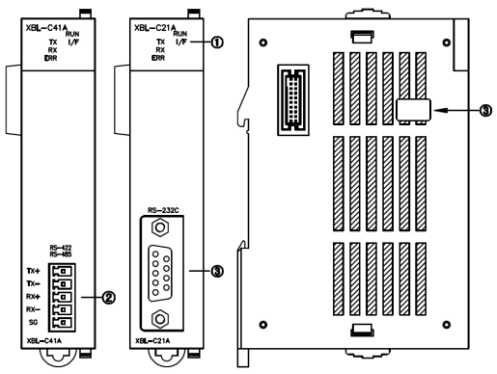
Item	Specified Value	Test Condition
Dielectric strength test	No break down	500V/1min
Insulation resistant test	Min. 1,000 ㏁,㎞	20 ℃
Capacitance	Max. 45 ㎊/M	1 ㎑
Characteristic Impedance	120 ± 5 Ω	10 ㎒

[Table 4.1] Specification of Cnet I/F module twisted pair cable

(4) Appearance characteristics

Item		Unit	Specified Value
Conductor	No. of pair	Pair	2
	Size	AWG	22
	Composition	No./㎜	7/0.254
	Diameter	㎜	0.76
Insulator	Thickness	㎜	0.59
	Diameter	㎜	1.94

4. Parts Name and Descriptions



No.	Name	Descriptions
①	LED Indicators	Shows the operation status
②	RS-232C Connector	The connector for external connection
③	RS-422/RS-485 Connector	The connector for external connection

No.	Switch status	Switch status descriptions
④	All on	Normal operating
	All off	OS Download Mode (If you want to OS Download, Please contact us)

LED Name	LED Descriptions	LED status	LED status descriptions
RUN	Cnet operation status	On	Normal operating
		Off	Abnormal operating of Cnet I/F Module
I/F	Interface Status with Main Unit	Blink	Normal operating
		Off	Interface error with Main Unit
TX	During frame transmission	On	During frame transmission
		Off	Frame transmission completed
RX	During frame receiving	On	During frame receiving
		Off	Frame receiving completed
ERR	Frame error	On	Frame Error
		Off	Normal frame

5. Installation and Wiring

(1) RS-232C Interface (XBL-C21A)
RS-232C channel uses 9-pin female connector for communication with external devices

Pin No.	Name	Function	Signal direction (Cnet<-->External device)	Description
1	CD	Carrier Detect	←	DCE(Note1) inform carrier detection to DTE
2	RxD	Received Data	←	Received data signal
3	TxD	Transmitted Data	→	Transmitted data signal
4	DTR	Data Terminal Ready	→	DTE(Note2) inform communication ready to DCE
5	SG	Signal Ground	—	Signal ground line
6	DSR	Data Set Ready	←	DCE inform communication ready to DTE
7	RTS	Request To Send	→	DTE require data transmission to DCE
8	CTS	Clear To Send	←	DCE inform ready to transmit to DTE
9	RI(Note3)	Ring	←	DCE inform receiving 'Ringing Tone' to DTE

[Pin assignment of RS-232C 9-pin connector]

This module can communicate with other device directly or through Modem for a long distance. The kind of the Modem is selected by using XG-PD.

Remarks
Note1) DCE: Data Communication Equipment
Note2) DTE: Data Terminal Equipment
Note3) RI: This Pin is not used in XBL-C21A
(This pin is not connected to the internal electric circuit of XBL-C21A)

(a) How to connect RS-232C connector to the external modem
Cnet I/F module can communicate with devices of long distance through a modem at this time modem and channel RS-232C must be connected as shown in below table

Cnet(9-PIN)		Connection No. and Signal Direction	Modem
Pin No.	Name		Name
1	CD	←	CD
2	RXD	←	RXD
3	TXD	→	TXD
4	DTR	→	DTR
5	SG	—	SG
6	DSR	←	DSR
7	RTS	→	RTS
8	CTS	←	CTS
9	RI	←	RI

(b) How to connect RS-232C connector in null modem mode.
In null modem mode, connector is able to be connected in 3-line (without handshake) type.

Cnet(9-PIN)		Connection No. and Signal Direction	Computer /Communication device
Pin No.	Name		Name
1	CD		CD
2	RXD	→	RXD
3	TXD	←	TXD
4	DTR		DTR
5	SG	—	SG
6	DSR		DSR
7	RTS		RTS
8	CTS		CTS
9	RI		RI

(2) RS-422/485 Interface (XBL-C41A)
RS-422 channel uses 5-pin terminal block for communication with external devices. The names and functions of pins, and data directions are as shown in the following table.

Pin No.	Name	Signal direction (Cnet<-->External device)	Function
1	TX+	→	Transmitted data (+)
2	TX-	→	Transmitted data (-)
3	RX+	←	Received data (+)
4	RX-	←	Received data (-)
5	SG	—	Signal ground line

[Pin assignment of RS-422 5-pin connector]

RS-422 channel makes connection external devices and RS-422 and RS-485(Multi-drop) possible. When RS-422 channel is used as multi-drop, set channel RS-422 to RS-485 communication in setting menu of RS-422 communication type of XG-PD, and connect the terminal of RS-422 as shown in the [RS-485 connection] table.

Cnet		Signal direction (Cnet<--->External device)	External device
Pin No.	Name		
1	TX+	→	RX+
2	TX-	→	RX-
3	RX+	←	TX+
4	RX-	←	TX-
5	SG	—	SG

[RS-422 connection]

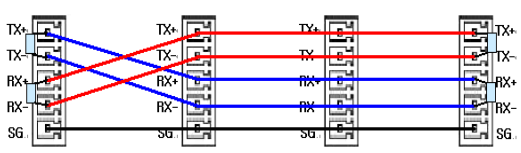
Cnet		Signal direction (Cnet<--->External device)	External device
Pin No.	Name		
1	TX+	↔	RX+
2	TX-	↔	RX-
3	RX+	↔	TX+
4	RX-	↔	TX-
5	SG	—	SG

[RS-485 connection]

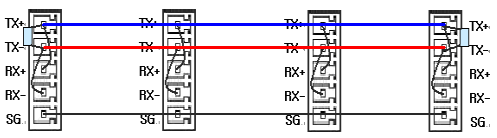
Above figure shows how to connect RS-485 multi-drop communication. In the case of RS-485 communication, the TX+ and RX+ terminals should be shortened and TX- and RX- terminals should be shortened, then connected to the other devices. At this time,RS-485 should be selected by using the XG-PD.

(3) Terminator (RS-422/485)
(a) When the communication via channel RS-422 terminal resistor from external must be connected.
(b) Terminal resistor has the function to prevent distortion of signal by reflected wave of cable when long distance communication, the same resistor (1/2W) as characteristic impedance of cable must be connected to terminal of network.
(c) When using the recommended cable in the section 3, connect terminal resistor of 120 to both ends of cable. Also, when using another cable than recommended one, the same resistor (1/2W) as characteristic impedance of cable must be connected to both ends of cable.

(d) How to connect terminal resistor [RS-422 connection]



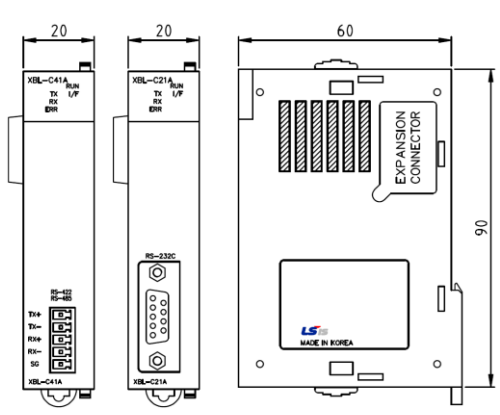
(e) How to connect terminal resistor [RS-485 connection]



6. Cautions for system and network connection

(1) All the stations in whole network should not have duplicated station number. Otherwise, it can cause serious communication error.
(2) Use cable complying with specification in this data sheet. Otherwise, it can cause a serious communication error.
(3) Make sure that communication cable does not break or short.
(4) Make sure that cable connector is fastened. Loose connection could cause serious communication error.
(5) Improper cable connection (snarled cable, redundant connection) can cause communication error.
(6) The communication type and parameter can be set with XG-PD.
(7) After the installation of the Cnet I/F module, refer to the section 5. Installation and Wiring for system configuration.
(8) While the power of the Main Unit is on, mounting/dismounting of module will cause system error and the CPU module halted. Therefore, turn the power off during replacing or repairing module.

7. Dimension (㎜)



8. 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.