

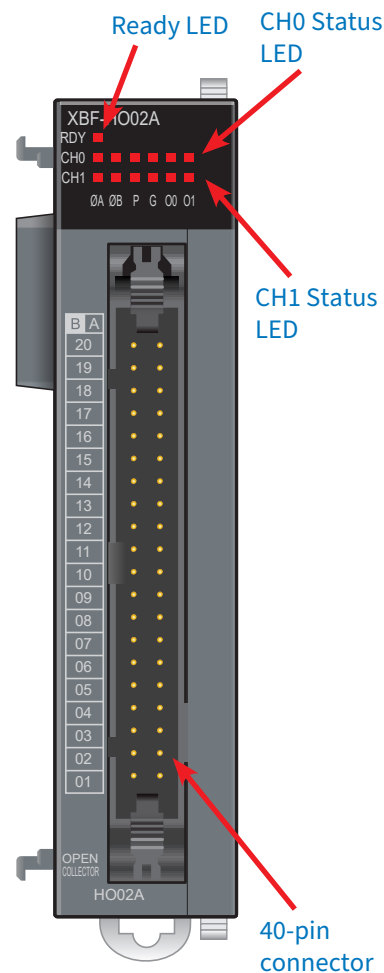


# XGB Motion Modules

## XBF-HO02A Counter Input Module

Part Number	Price	Classification	Description	# of Channels	Drawing
<b>XBF-HO02A</b>	\$176.00	Counter Input	LS Electric XGB counter input module, 200 kHz maximum switching frequency, 2 high-speed input point(s), 5-24 VDC, sinking, 2-channel, single-ended encoder input(s), 2 high-speed output point(s), 5-24 VDC, sinking, external 24 VDC required.	2	PDF

General Specifications		XBF-HO02A
Count Input Signal	Signal	A-phase, B-phase
	Input Type	Voltage input (Open Collector)
	Signal Level	5/12/24 VDC
Maximum Coefficient Speed		200kHz
Number of Channels		2
Coefficient Range		Signed 32-bit (-2,147,483,648 to +2,147,483,647)
Count Mode		Linear Count (when 32-bit range exceeded, carry/borrow occurs, the count value stopped)
		Ring Count (repeated count within setting range)
Input Pulse Mode		1-phase input
		2-phase input
		CW/CCW
Up/Down Setting	1-phase Input	Increasing/decreasing operation setting by B-phase input Increasing/decreasing operation setting by program
	2-phase Input	Automatic setting by difference in phase
	CW/CCW	A-phase input: increasing operation B-phase input: decreasing operation
Multiplication Function	1-phase Input	1/2 multiplication
	2-phase Input	1/2/4 multiplication
	CW/CCW	1-multiplication
Control Input	Signal	Preset instruction input, auxiliary mode instruction input
	Signal Level	5/12/24 VDC (by terminal selection) input type
	Signal Type	Voltage
External Output	Output Points	2-point/channel (for each channel): terminal output available
	Type	Select single-compared (>, ≥, =, ≤, <) or section compared output (included or excluded)
	Output Type	Open collector output (sink)
Operation Status Display	Input Signal	A-phase input, B-phase input, preset instruction input, auxiliary mode instruction input
	Output Signal	External output 0, external output 1
	Ready Status	Module Ready
Count Enable		Set through program (count available when enabled)
Preset Function		Set through terminal or program
Auxiliary Mode Function		Count clear, count latch, section count (time setting value: 0-60,000 ms), measurement of input frequency (for respective input phase), measurement of counts per hour (time setting value: 0-60,000 ms), count prohibited function
Terminal		40-pin connector
I/O Points Occupied		Fixed point: 512
Internal Consumed Current		200mA
Weight		90g



## XBF-HO02A Counter Input Module Wiring

XBF-HO02A Circuit Configuration					
Circuit Configuration	Internal Circuit Number	XTB-40H Terminal	Pin Number		Signal Name
			CH0	CH1	
	1	A24V	B20	A20	A phase pulse input 24V
	2	A12V	B19	A19	A phase pulse input 12V
	3	A5V	B18	A18	A phase pulse input 5V
	4	ACOM	B17	A17	A phase pulse input COM
	1	B24V	B16	A16	B phase pulse input 24V
	2	B12V	B15	A15	B phase pulse input 12V
	3	B5V	B14	A14	B phase pulse input 5V
	4	BCOM	B13	A13	B phase pulse input COM
	5	P24V	B12	A12	Preset input 24V
	6	P12V	B11	A11	Preset input 12V
	7	P5V	B10	A10	Preset input 5V
	8	PCOM	B09	A09	Preset input COM
	5	G24V	B08	A08	Auxiliary function input 24V
	6	G12V	B07	A07	Auxiliary function input 12V
	7	G5V	B06	A06	Auxiliary function input 5V
	8	GCOM	B05	A05	Auxiliary function input COM
	9	OUT0	B04	A04	Comp. output 0
	10	OUT1	B03	A03	Comp. output 1
	11	24V	B02	A02	External power input 24V
	12	24G	B01	A01	External power input GND

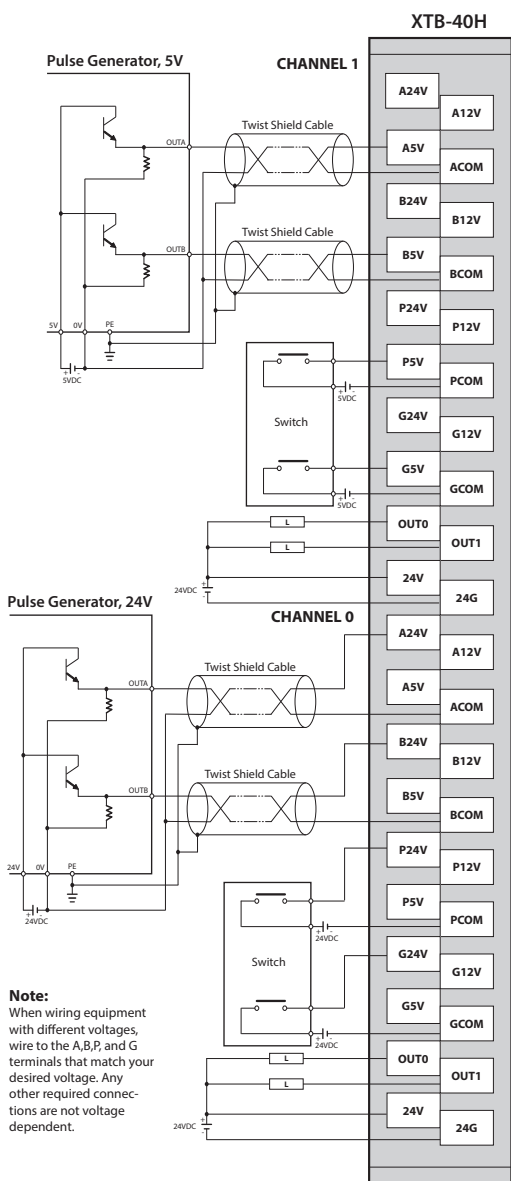
Note: External power (24V: A02, B02 / 24G: A01, B01) is the power source for output comparison output to terminal (A03, B03, A04, B04). Connect when using comparison output.

## XBF-HO02A Counter Input Module Terminal Wiring

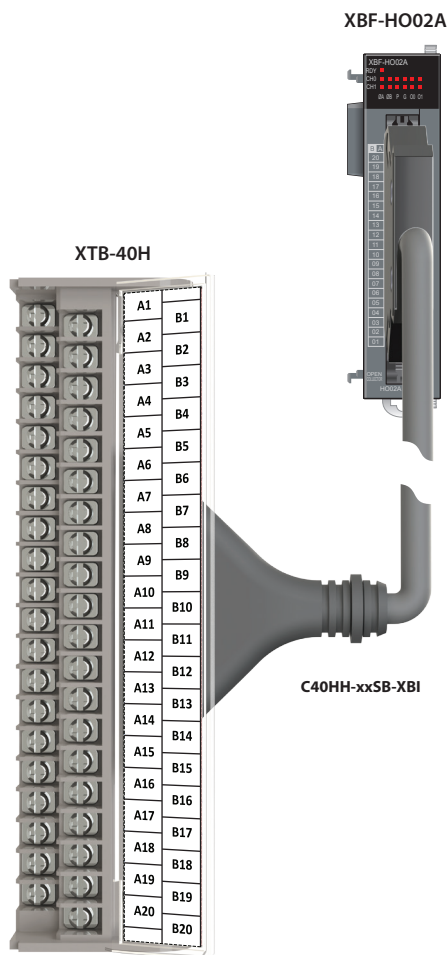
When connecting cable to your XBF-HO02A:

- Take precautions to shield high-speed input wiring from external noise sources.
- Use grounded twisted pair shielded cable (Class3)
- Keep input wiring clear of power or I/O wiring to prevent noise.
- For single-phase applications, connection only to the A-phase input points.
- Ensure wiring length does not exceed the maximum distance specified from the pulse generator.
- Download module specific XTB-40H Terminal Label Printouts here: [Download Printouts](#)

### Terminal Wiring



### Module Connection





# XGB Motion Modules

## XBF-HO02A Counter Input Module Configuration

Follow the Quick start video to learn how to Register and Configure this counter input module:

[High Speed Counter Setup - HO02A, HD02A Based](#)

### Direct Variables

XGB series high speed counter modules are assigned 32 words in the "U" memory area based on the slot number assignment. (%UW0.z.0 - %UW0.z.31, z= slot number). The actual memory address used within the 32 word block are specific to each module. See the table below for Direct Variable assignments.

For Direct Variable nomenclature explanation, see [Direct Variable User Programming Memory](#).

### Symbolic Variables

Symbolic variables for the analog module can be automatically created in XG5000 software by using the top MENU bar: Edit > Register Module Variable Comments.

Symbolic variables and direct variables for XBF-HO02A are as follows (z refers to module slot number (2 to 8)).

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GobalVariable	_000z_CH0_CNT	%UD0.z.1	DINT	HSC Module: CH0 Count Data
Tag	GobalVariable	_000z_CH0_LTH	%UD0.z.2	DINT	HSC Module: CH0 Latch Count Data
Tag	GobalVariable	_000z_CH0_RNG	%UD0.z.3	DINT	HSC Module: CH0 Sampling Count Data
Tag	GobalVariable	_000z_CH0_FRQ	%UD0.z.4	UDINT	HSC Module: CH0 Input Frequency Data
Tag	GobalVariable	_000z_CH0_RPU	%UD0.z.5	UDINT	HSC Module: CH0 Rev./Unit Time Data
Tag	GobalVariable	_000z_CH0_AUXEN	%UX0.z.371	BOOL	HSC Module: CH0 Auxiliary Function Request
Tag	GobalVariable	_000z_CH0_AUXING	%UX0.z.5	BOOL	HSC Module: CH0 Auxiliary Function Status
Tag	GobalVariable	_000z_CH0_BRW	%UX0.z.4	BOOL	HSC Module: CH0 Borrow Flag
Tag	GobalVariable	_000z_CH0_CMPEN	%UX0.z.372	BOOL	HSC Module: CH0 Enable Compare Function
Tag	GobalVariable	_000z_CH0_CMPOUT0	%UX0.z.6	BOOL	HSC Module: CH0 Compare 0 Output Status
Tag	GobalVariable	_000z_CH0_CMPOUT1	%UX0.z.7	BOOL	HSC Module: CH0 Compare 1 Output Status
Tag	GobalVariable	_000z_CH0_CNTEN	%UX0.z.368	BOOL	HSC Module: CH0 Enable Counter
Tag	GobalVariable	_000z_CH0_CRY	%UX0.z.3	BOOL	HSC Module: CH0 Carry Flag
Tag	GobalVariable	_000z_CH0_CRYBRW_RST	%UX0.z.378	BOOL	HSC Module: CH0 Carry/Borrow Reset Request
Tag	GobalVariable	_000z_CH0_DN	%UX0.z.0	BOOL	HSC Module: CH0 Count Direction Status
Tag	GobalVariable	_000z_CH0_DWNCNT	%UX0.z.370	BOOL	HSC Module: CH0 Count Direction Select
Tag	GobalVariable	_000z_CH0_EQ0RST	%UX0.z.374	BOOL	HSC Module: CH0 Compare 0 EQUAL Reset(Edge) Command
Tag	GobalVariable	_000z_CH0_EQ1RST	%UX0.z.375	BOOL	HSC Module: CH0 Compare 1 EQUAL Reset(Edge) Command
Tag	GobalVariable	_000z_CH0_ERR	%UX0.z.14	BOOL	HSC Module: CH0 Error Flag
Tag	GobalVariable	_000z_CH0_EXTAXX_EN	%UX0.z.380	BOOL	HSC Module: CH0 Enable Aux-Func Ext. Input
Tag	GobalVariable	_000z_CH0_EXTPRE	%UX0.z.1	BOOL	HSC Module: CH0 Preset Ext. Input Flag
Tag	GobalVariable	_000z_CH0_EXTPST_EN	%UX0.z.379	BOOL	HSC Module: CH0 Preset Ext. Input Enable
Tag	GobalVariable	_000z_CH0_EXTPST_RST	%UX0.z.381	BOOL	HSC Module: CH0 Preset Ext. Input Reset Request
Tag	GobalVariable	_000z_CH0_OUTEN	%UX0.z.373	BOOL	HSC Module: CH0 Enable Compare Output Signal
Tag	GobalVariable	_000z_CH0_PREEN	%UX0.z.369	BOOL	HSC Module: CH0 Enable Preset



# XGB Motion Modules

## XBF-HO02A Counter Input Module Configuration, *continued*

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GobalVariable	._000z_CH1_CNT	%UD0.z.6	DINT	HSC Module: CH1 Count Data
Tag	GobalVariable	._000z_CH1_LTH	%UD0.z.7	DINT	HSC Module: CH1 Latch Count Data
Tag	GobalVariable	._000z_CH1_RNG	%UD0.z.8	DINT	HSC Module: CH1 Sampling Count Data
Tag	GobalVariable	._000z_CH1_FRQ	%UD0.z.9	UDINT	HSC Module: CH1 Input Frequency Data
Tag	GobalVariable	._000z_CH1_RPU	%UD0.z.10	UDINT	HSC Module: CH1 Rev./Unit Time Data
Tag	GobalVariable	._000z_CH1_AUXEN	%UX0.z.387	BOOL	HSC Module: CH1 Auxiliary Function Request
Tag	GobalVariable	._000z_CH1_AUXING	%UX0.z.21	BOOL	HSC Module: CH1 Auxiliary Function Status
Tag	GobalVariable	._000z_CH1_BRW	%UX0.z.20	BOOL	HSC Module: CH1 Borrow Flag
Tag	GobalVariable	._000z_CH1_CMPEN	%UX0.z.388	BOOL	HSC Module: CH1 Enable Compare Function
Tag	GobalVariable	._000z_CH1_CMPOUT0	%UX0.z.22	BOOL	HSC Module: CH1 Compare 0 Output Status
Tag	GobalVariable	._000z_CH1_CMPOUT1	%UX0.z.23	BOOL	HSC Module: CH1 Compare 1 Output Status
Tag	GobalVariable	._000z_CH1_CNTEN	%UX0.z.384	BOOL	HSC Module: CH1 Enable Counter
Tag	GobalVariable	._000z_CH1_CRY	%UX0.z.19	BOOL	HSC Module: CH1 Carry Flag
Tag	GobalVariable	._000z_CH1_CRYBRW_RST	%UX0.z.394	BOOL	HSC Module: CH1 Carry/Borrow Reset Request
Tag	GobalVariable	._000z_CH1_DN	%UX0.z.16	BOOL	HSC Module: CH1 Count Direction Status
Tag	GobalVariable	._000z_CH1_DWNCNT	%UX0.z.386	BOOL	HSC Module: CH1 Count Direction Select
Tag	GobalVariable	._000z_CH1_EQ0RST	%UX0.z.390	BOOL	HSC Module: CH1 Compare 0 EQUAL Reset(Edge) Command
Tag	GobalVariable	._000z_CH1_EQ1RST	%UX0.z.391	BOOL	HSC Module: CH1 Compare 1 EQUAL Reset(Edge) Command
Tag	GobalVariable	._000z_CH1_ERR	%UX0.z.30	BOOL	HSC Module: CH1 Error Flag
Tag	GobalVariable	._000z_CH1_EXTAUX_EN	%UX0.z.396	BOOL	HSC Module: CH1 Enable Aux-Func Ext. Input
Tag	GobalVariable	._000z_CH1_EXTPRE	%UX0.z.17	BOOL	HSC Module: CH1 Preset Ext. Input Flag
Tag	GobalVariable	._000z_CH1_EXTPST_EN	%UX0.z.395	BOOL	HSC Module: CH1 Preset Ext. Input Enable
Tag	GobalVariable	._000z_CH1_EXTPST_RST	%UX0.z.397	BOOL	HSC Module: CH1 Preset Ext. Input Reset Request
Tag	GobalVariable	._000z_CH1_OUTEN	%UX0.z.389	BOOL	HSC Module: CH1 Enable Compare Output Signal
Tag	GobalVariable	._000z_CH1_PREEN	%UX0.z.385	BOOL	HSC Module: CH1 Enable Preset
Tag	GobalVariable	._000z_RDY	%UX0.z.15	BOOL	HSC Module: Ready Flag



# XGB Series PLC Family

## Environmental Specifications, all XGB Series Modules

Item		Specification	Reference	
Ambient Operating Temperature		0–55°C (32–131°F)	-	
Storage Temperature		-25–70°C (-13–158°F)		
Ambient Operating Humidity		5–95% relative humidity (non-condensing)		
Storage Humidity		5–95% relative humidity (non-condensing)		
Vibration <sup>1</sup>	Occasional Vibration	5 ≤ f < 8.4 Hz	IEC61131-3-2	
		8.4 ≤ f < 150Hz		
	Continuous Vibration	5 ≤ f < 8.4 Hz		
		8.4 ≤ f < 150Hz		
Shocks		Peak Acceleration		147 m/s <sup>2</sup> (15G)
		Duration		11ms
		Pulse Wave Type	Half-sine (3 times each direction per each axis)	
Noise Resistance	Square Wave Impulse Noise		1,500VAC 900VDC	LS Electric standard
	Electrostatic Discharge		Voltage: 4kV (contact discharge)	IEC61131-3-2 IEC61000-4-2
	Radiated Electromagnetic Field Noise		80–1,000 MHz, 10 V/m	IEC61131-3-2 IEC61000-4-3
	Fast Transient / Burst Noise	Classification	Voltage	IEC61131-3-2 IEC61000-4-4
		Power Supply	2kV	
Digital/Analog Input/Output Communication Interface		1kV		
Environment		Free from corrosive gases and excessive dust	-	
Attitude		Less than 2,000m		
Pollution Degree		Less than 2 (see note 2)		
Cooling Method		Air-cooling		

1 - Vibration of 10 times each direction (X, Y, and Z)

2 - Normally only nonconductive pollution occurs. Temporary conductivity caused by condensation is to be expected.



# XGB Series PLC Family

## Available I/O Modules

XGB Series I/O Modules									
Part Number	Price	Description	Digital Input	Digital Output	Analog Input	Analog Output	Motion	Bus Coupler Compatible	Smart Link Required
<b>Digital</b>									
<a href="#"><u>XBE-DC08A</u></a>	\$59.00	LS Electric XGB discrete input module, 8-point, 24 VDC, sinking/sourcing, 1 common(s), 8 point(s) per common. Removable terminal block included.	✓					✓	
<a href="#"><u>XBE-DC16A</u></a>	\$70.00	LS Electric XGB discrete input module, 16-point, 24 VDC, sinking/sourcing, 1 common(s), 16 point(s) per common. Removable terminal blocks included.	✓					✓	
<a href="#"><u>XBE-DC16B</u></a>	\$78.00	LS Electric XGB discrete input module, 16-point, 12-24 VDC, sinking/sourcing, 1 common(s), 16 point(s) per common. Removable terminal blocks included.	✓					✓	
<a href="#"><u>XBE-DC32A</u></a>	\$97.00	LS Electric XGB discrete input module, 32-point, 24 VDC, sinking/sourcing, 1 common(s), 32 point(s) per common. Requires XTB-40H terminal block and C40HH-xxSB-XBI cable.	✓					✓	✓
<a href="#"><u>XBE-AC08A</u></a>	\$88.00	LS Electric XGB discrete input module, 8-point, 120 VAC, 2 common(s), 4 point(s) per common. Removable terminal blocks included.	✓					✓	
<a href="#"><u>XBE-RY08A</u></a>	\$80.00	LS Electric XGB relay output module, 8-point, 125 VDC/250 VAC, (8) Form A, 1 common(s), 8 point(s) per common, 2A/point, 5A/common. Removable terminal block included.		✓				✓	
<a href="#"><u>XBE-RY08B</u></a>	\$95.00	LS Electric XGB relay output module, 8-point, 125 VDC/250 VAC, (8) Form A, 8 isolated common(s), 1 point(s) per common, 2A/point. Removable terminal blocks included.		✓				✓	
<a href="#"><u>XBE-RY16A</u></a>	\$110.00	LS Electric XGB relay output module, 16-point, 125 VDC/250 VAC, (16) Form A, 2 isolated common(s), 8 point(s) per common, 2A/point, 5A/common. Removable terminal blocks included.		✓				✓	
<a href="#"><u>XBE-TN08A</u></a>	\$60.00	LS Electric XGB discrete output module, 8-point, 12-24 VDC, sinking, 1 common(s), 8 point(s) per common, 0.5A/point, 2A/common. Removable terminal blocks included.		✓				✓	
<a href="#"><u>XBE-TN16A</u></a>	\$78.00	LS Electric XGB discrete output module, 16-point, 12-24 VDC, sinking, 1 common(s), 16 point(s) per common, 0.5A/point, 2A/common. Removable terminal blocks included.		✓				✓	
<a href="#"><u>XBE-TN32A</u></a>	\$109.00	LS Electric XGB discrete output module, 32-point, 12-24 VDC, sinking, 1 common(s), 32 point(s) per common, 0.2A/point, 2A/common. Requires XTB-40H terminal block and C40HH-xxSB-XBI cable.		✓				✓	✓
<a href="#"><u>XBE-TP08A</u></a>	\$62.00	LS Electric XGB discrete output module, 8-point, 12-24 VDC, sourcing, 1 common(s), 8 point(s) per common, 0.5A/point, 2A/common. Removable terminal blocks included.		✓				✓	
<a href="#"><u>XBE-TP16A</u></a>	\$88.00	LS Electric XGB discrete output module, 16-point, 12-24 VDC, sourcing, 1 common(s), 16 point(s) per common, 0.5A/point, 2A/common. Removable terminal blocks included.		✓				✓	
<a href="#"><u>XBE-TP32A</u></a>	\$93.00	LS Electric XGB discrete output module, 32-point, 12-24 VDC, sourcing, 1 common(s), 32 point(s) per common, 0.2A/point, 2A/common. Requires XTB-40H terminal block and C40HH-xxSB-XBI cable.		✓				✓	✓
<a href="#"><u>XBE-DN32A</u></a>	\$172.00	LS Electric XGB discrete combo module, Input: 16-point, 24 VDC, sinking/sourcing, Output: 16-point, 12-24 VDC, sinking, 0.2A/point, 2A/common. Requires XTB-40H terminal block and C40HH-xxSB-XBI cable.	✓	✓				✓	✓
<a href="#"><u>XBE-DR16A</u></a>	\$97.00	LS Electric XGB discrete combo module, Input: 8-point, 24 VDC, sinking/sourcing, Output: 8-point, 125 VDC/250 VAC, relay, (8) Form A (SPST) relays, 2A/point, 5A/ common. Removable terminal blocks included.	✓	✓				✓	
<b>Motion</b>									
<a href="#"><u>XBF-PN04B</u></a>	\$350.00	LS Electric XGB 4-axis positioning module, EtherCAT Master, 1 high-speed input point(s), sinking/line driver (differential), 1-channel, differential and single-ended encoder input(s), (1) Ethernet 100Base-TX (RJ45) port(s). For use with LS Electric XEM-DxxxHx PLCs.					✓		
<a href="#"><u>XBF-PN08B</u></a>	\$395.00	LS Electric XGB 8-axis positioning module, EtherCAT Master, 1 high-speed input point(s), sinking/line driver (differential), 1-channel, differential and single-ended encoder input(s), (1) Ethernet 100Base-TX (RJ45) port(s). For use with LS Electric XEM-DxxxHx PLCs.					✓		
<a href="#"><u>XBF-HO02A</u></a>	\$176.00	LS Electric XGB counter input module, 200 kHz maximum switching frequency, 2 high-speed input point(s), 5-24 VDC, sinking, 2-channel, single-ended encoder input(s), 2 high-speed output point(s), 5-24 VDC, sinking, external 24 VDC required.					✓	✓	✓
<a href="#"><u>XBF-HD02A</u></a>	\$253.00	LS Electric XGB counter input module, 500 kHz maximum switching frequency, 2 high-speed input point(s), 5-24 VDC, sinking, 2-channel, differential encoder input(s), 2 high-speed output point(s), 5-24 VDC, sinking, external 24 VDC required.					✓	✓	✓

Note: See "Smart Link I/O System" on page tLSE-131 for the XTB-40H terminal block and cables. See "XGB PLC Replacement Terminals" on page tLSE-149 for replacement removable terminal blocks.

Continued on next page





# XGB Accessories

## Smart Link I/O System

The Smart Link I/O system is a breakout wiring system used for high density I/O modules in the LS Electric XGB PLC series. The system is required for all modules with a 40-pin connection, and consists of a Smart Link cable with an XTB-40H terminal block.

Download module specific XTB-40H Terminal Label Printouts here: [Terminal Printouts](#)



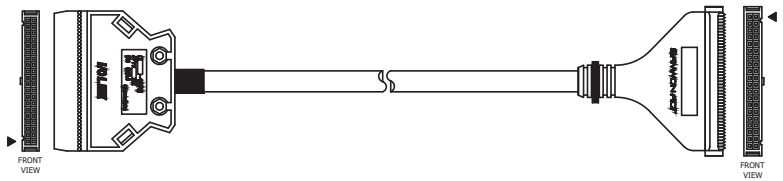
Part Number	Price	Description	Length	Compatible With
<a href="#"><u>XTB-40H</u></a>	\$20.00	LS Electric XGB terminal block, 40-pin screw type. For use with LS Electric XGB series high-density modules.	n/a	All LS XGB series PLCs and modules with 40-pin connectors
<a href="#"><u>XTB-40H-LABEL</u></a>	\$3.00	AutomationDirect terminal label sheet, printed with terminal names for LS Electric XGB series modules. Package of 8. For use with XTB-40H terminal block.	n/a	
<a href="#"><u>C40HH-05SB-XBI</u></a>	\$22.00	LS Electric XGB PLC I/O cable, 1.6ft/0.5m cable length, 40-pin connector to 40-pin connector. For use with LS Electric XGB series high-density modules.	0.5 m	
<a href="#"><u>C40HH-10SB-XBI</u></a>	\$25.00	LS Electric XGB PLC I/O cable, 3.2ft/1m cable length, 40-pin connector to 40-pin connector. For use with LS Electric XGB series high-density modules.	1m	
<a href="#"><u>C40HH-15SB-XBI</u></a>	\$29.00	LS Electric XGB PLC I/O cable, 4.9ft/1.5m cable length, 40-pin connector to 40-pin connector. For use with LS Electric XGB series high-density modules.	1.5 m	
<a href="#"><u>C40HH-20SB-XBI</u></a>	\$36.00	LS Electric XGB PLC I/O cable, 6.5ft/2m cable length, 40-pin connector to 40-pin connector. For use with LS Electric XGB series high-density modules.	2m	
<a href="#"><u>C40HH-30SB-XBI</u></a>	\$42.00	LS Electric XGB PLC I/O cable, 9.8ft/3m cable length, 40-pin connector to 40-pin connector. For use with LS Electric XGB series high-density modules.	3m	

XTB-40H Specifications		
Number of Pins	40 pin	
Terminal Pitch	7.0 mm	
Connector Type	MIL-C-83503 (50P polarity guide: 2EA)	
Applicable Wires	AWG22-16 (1.5mm <sup>2</sup> /MAX)	
Insulation Resistance	100MΩ (500VDC)	
Dielectric Strength	500VAC 1 minute	
Screw	M3 x 8L	
Screw Torque	1.2N•m (12kgf•cm)	
Ambient Temperature	-10°C to +50°C (no freezing)	
Material	Case	Modified PPO
	Protective Cover	Polycarbonate
	PCB	Epoxy 1.6t



## Smart Link I/O System, Terminals and Cable Connections

Module to Cable to Terminal Pinouts		
Module Pins	C40HH-xxSB-XBI	XTB-40H Terminal
B20	<p>HIROSE HIF3BA-40D-2.54R</p>	A1
B19		B1
B18		A2
B17		B2
B16		A3
B15		B3
B14		A4
B13		B4
B12		A5
B11		B5
B10		A6
B09		B6
B08		A7
B07		B7
B06		A8
B05		B8
B04		A9
B03		B9
B02		A10
B01		B10
A20	A11	
A19	B11	
A18	A12	
A17	B12	
A16	A13	
A15	B13	
A14	A14	
A13	B14	
A12	A15	
A11	B15	
A10	A16	
A09	B16	
A08	A17	
A07	B17	
A06	A18	
A05	B18	
A04	A19	
A03	B19	
A02	A20	
A01	B20	



HIROSE HIF3BA-40D-2.54R

