LS ELECTRIC

XGB CPU Modules

LS XGB PLC

EtherCAT®



CPU Module (with embedded I/O)

- ***XEM-DR14H2***
- ***XEM-DN16H2***
- ***XEM-DP16H2***
- ***XEM-DN32H2***
- ***XEM-DN32HP***
- ***XEM-DP32H2***
- ***XEM-DP32HP***

The XEM CPU module from LS Electric is the anchor of the XGB PLC series. It is a high performance motion-capable PLC in a small package. The CPU module is equipped with a high performance microprocessor that controls up to 6 axis of position control, high speed I/O, and built in ethernet communications. Optional EtherCAT® motion modules allow control of up to 16 EtherCAT® servo drives.

The XEM CPU is a stand-alone block style PLC. Different CPU models provide options for low density 16-point I/O wired directly at the CPU terminal blocks, or high density 32-point I/O which requires one smart link cable and terminal block remotely mounted. The system supports 16 built-in PID loops and can be expanded with up to 7 modules.

I/O and memory are assigned direct variables. User-defined symbolic variables can be created for easy reference in the programming.

The PLC offers an advanced level of programming, featuring the IEC61131-3 standard capable of Ladder, Structured Text, Sequential Function Chart and Instruction List. Many advanced Function block instructions, including motion specific ones, are available for use in both Ladder and Structured Text programming.

Features

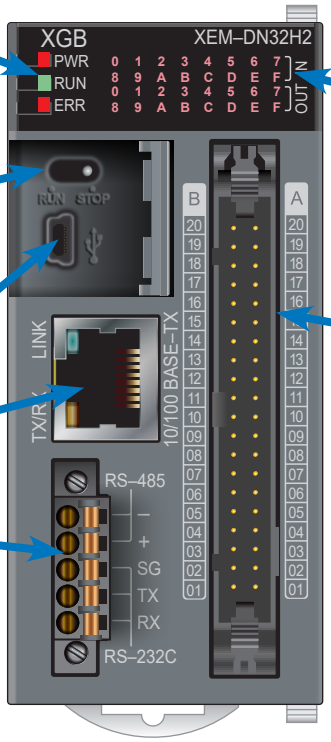
- 8 DC inputs, 6 relay outputs (XEM-DR14H2)
- 8 DC inputs, 8 DC outputs (XEM-Dx16H2 series)
- 16 DC inputs, 16 DC outputs (XEM-Dx32Hx series)
- (4) 200kHz high speed counters
- 2- or 6-axis motion control (high speed pulse outputs)
- Control up to 16 PID loops with auto tuning capabilities
- Expand I/O capability with up to 7 add-on modules
- 22 different option modules available to handle digital, analog, counter input, and communications
- EtherCAT® motion modules offer position control for up to 16 EtherCAT® servo drives
- XG5000 software with IEC 61131 programming languages: Ladder, Structured Text, SFC, and IL. Includes XG-PM software for table-based motion configuration and testing

PLC (CPU with I/O) Feature Breakdown

Part Number	Price	Built-in I/O			Max Option Cards	USB	Ethernet	RS-232C	RS-485	Memory Backup	Online Editing	Drawing
		Motion Axis	Inputs	Outputs								
XEM-DR14H2	$307.00	–	8 sink/source	6 relay	7	Yes (mini-B)	Yes (10/100Base-T)	Yes	Yes	Memory: Non-Volitale RAM RTC: 6 month backup (No battery)	Yes	PDF
XEM-DN16H2	$318.00	2		8 sink								PDF
XEM-DP16H2	$318.00	2		8 source								PDF
XEM-DN32H2	$329.00	2	16 sink/ source	16 sink								PDF
XEM-DP32H2	$329.00	2		16 source								PDF
XEM-DN32HP	$384.00	6		16 sink								PDF
XEM-DP32HP	$384.00	6		16 source								PDF

XGB CPU Modules

XEM 32-series Configuration



Status Indicators (See table below)

Run/Stop Mode switch Sets basic operation mode (see table below)

Mini-B USB Connector

Ethernet Port

Serial Communication Connector Built-in RS-232C/485 connector

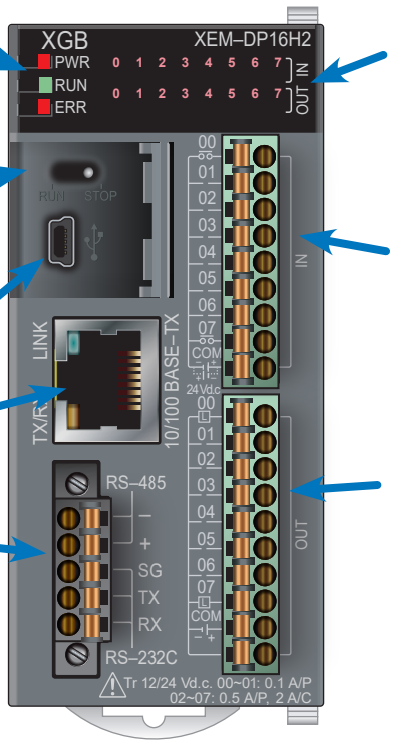
LED Display Displays ON/OFF status of input and output signals

I/O Connector Terminal block for input (B) and output (A) signals.

CPU Status Indicators	
PWR	Red LED is illuminated when power is on.
RUN	Green LED is illuminated when PLC is in RUN mode.
ERR	Red LED is illuminated to indicate program error(s).

CPU RUN/STOP Switch	
RUN position	Executes user program.
STOP position	Normal program load position. Allows for Remote Run from XG5000.

XEM 14/16-series Configuration



Status Indicators (See table below)

Run/Stop Mode switch Sets basic operation mode (see table below)

Mini-B USB Connector

Ethernet Port

Serial Communication Connector Built-in RS-232C/485 connector

LED Display Displays ON/OFF status of input and output signals

Input Connector Terminal block for input signals.

Output Connector Terminal block for output signals.

XGB Series PLC - Basic System Setup

Follow the steps below to select and configure the fundamental components needed to get your XEM CPU module up and running. You can also access several quick start video guides here: Building and Powering the LS PLC Rack

1 Select your XEM CPU module, and Smart Link cable/terminal block (for 32-series CPUs).

See "Smart Link I/O System" on page tLSE-131 for cable and terminal block part numbers.

Note: Cable and terminal block only required for XEM-DN32H2, XEM-DN32HP, XEM-DP32H2, and XEM-DP32HP.

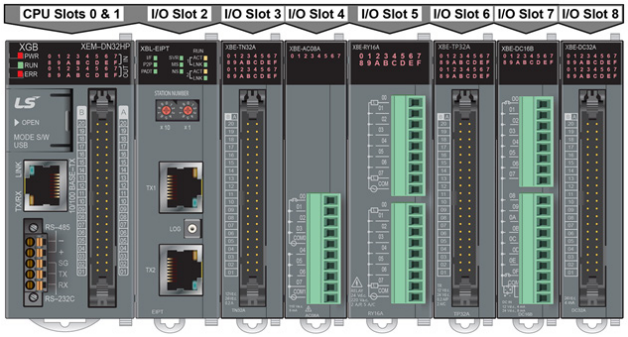


Note: Screwdriver size 04/2.5

2 Select and install up to seven option modules. 32-point I/O and counter input modules will require a Smart Link cable and terminal block.

EtherCAT modules must be added to Slot 2 and 3 only.

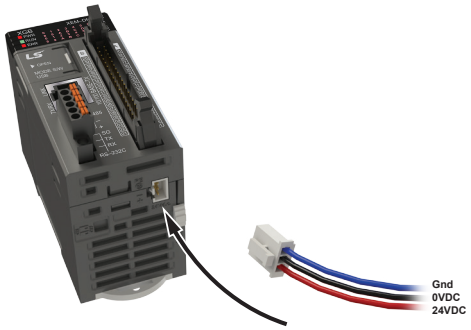
Use the Product Selector to help configure the PLC at automationdirect.com/ls/config.



Note: Screwdriver size 2.5 mm

3 Connect user-supplied 24VDC power. Connect power to the XEM module, then connect power to the XTB-40H terminal block and any installed I/O modules.

Note: XGB-CON-3PX cable pigtail is included with the CPU.



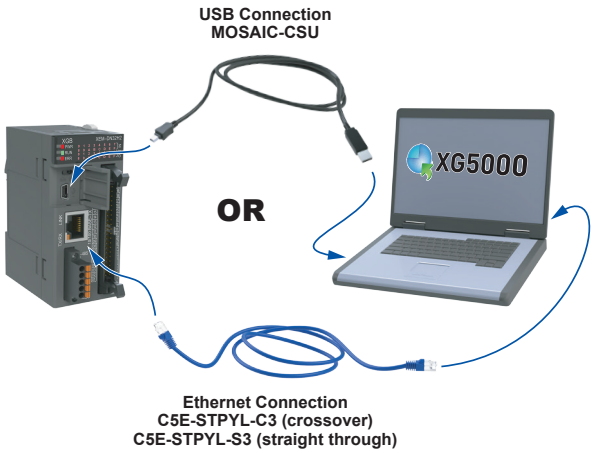
4 Choose programming cable, either a USB connection cable or Ethernet cable.

To connect via USB:

USB Connection to XEM CPU

To connect via Ethernet:

Ethernet Connection to XEM CPU



LS ELECTRIC

XGB CPU Modules

Performance Specifications

Specification			Part Number						
			XEM-DR14H2	XEM-DN16H2	XEM-DP16H2	XEM-DN32H2	XEM-DP32H2	XEM-DN32HP	XEM-DP32HP
Power Specifications	Input	Input Voltage Range	20.4–28.8 VDC (-15% to +20%)						
		Rated Input Voltage	24VDC						
		Input Current	1A or less						
		Efficiency	60% or more						
		Permitted Momentary Power Failure	1ms or less						
	Output	Rated Output Voltage	5VDC (±2%)						
		Output Current	2.0 A						
	Power Supply Status Indication		LED On when power supply is normal						
	Cable Specification		0.75–2 mm^2						
Program Control Method			Cyclic execution of stored program, time-driven interrupt, process-driven interrupt						
I/O Control Method			Batch processing by simultaneous scan (refresh method), directed by program instruction						
Programming Languages			LD (Ladder Diagram), ST (Structured Text), SFC (Sequential Function Chart), IL (Instruction List)						
Programming Instructions	Operator (LD only)		11						
	Extension (LD, ST, IL)		9 (Break, Call, End, For, Jmp, Next, Ret, Sbrt, Init_Done)						
	Function (LD, ST, IL)		400+ (295+ for Data Tpe Conversion)						
	Function Block (LD & ST)		300+ (80+ motion specific)						
	Sequential Function Chart		7						
Special Features/Instructions			User Defined Data Type, User Defined Functions/Function Blocks						
Processing Speed (Basic Instruction)			40ns/step						
Program Capacity			384kb						
Maximum Base Rack I/O Points			(PLC + 7 option cards), Digital=(PLC Built-in) + (32 point I/O x 7 slots), Analog=(8 point AI x 7 slots)						
			Digital: 238 total Analog: 56 total	Digital: 240 total Analog: 56 total		Digital: 256 total Analog: 56 total			
Data Area (User Assigned)	Symbolic Variable		64KB (retain selectable by individual variable)						
	Direct Variables	M	32KB (retain configurable - by block)						
		W	64KB (retain)						
Data Area (PLC Reserved)	Input Variables	I	2KB (%IX0.0.0–%IX15.15.63)						
	Output Variables	Q	2KB (%QX0.0.0–%QX15.15.63)						
	Flag Variables	F	4KB						
		K	8KB						
		L	8KB						
		U	0.5 KB						
	P2P Service Variables	N	20KB						
Total Program			256						
Task	Initialization Task		1						
	Cycle Time Task		Max 16						
	I/O Task		Max 8						
	Internal Device Task		Max 16						
	High Speed Counter Task		Max 4						
	Position Control Task		1						
Operation Mode			RUN, STOP, DEBUG						
Self-diagnosis Function			Detects errors of scan time, memory, I/O and power supply						
Program Port			USB Mini-B type, USB 1 channel						
Retain Area Setup			Retain area setting in basic parameter						
Internal Consumption Current			540mA						
Max Number of Comm. Modules			2						
Weight			150g (5.29 oz)	140g (4.94 oz)	140g (4.94 oz)	134g (4.73 oz)	140g (4.94 oz)	134g (4.73 oz)	140g (4.94 oz)

Built-in Functions

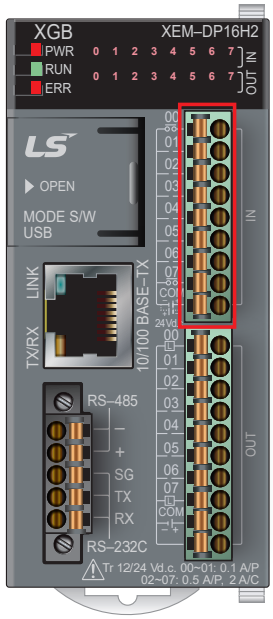
Specification			Part Number						
			XEM-DR14H2	XEM-DN16H2	XEM-DP16H2	XEM-DN32H2	XEM-DP32H2	XEM-DN32HP	XEM-DP32HP
Number of Motion Control Axis			–	2-axis				6-axis	
Interpolation Function			–	• 2-axis linear interpolation • 2-axis circular interpolation				• 2/3/4/5/6 axis linear interpolation • 2-axis circular interpolation • 3-axis helical interpolation	
High Speed Counter	Performance	1 phase	200kHz						
		2 phase	100kHz						
	Channels	1 phase	4 channels						
		2 phase	2 channels						
	Counter Mode		4 counter modes are supported: • Single pulse counter mode with 1 pulse input • Pulse and direction counter mode with 2 pulse inputs • CW/CCW counter mode with 2 pulse inputs • Quadrature (Phase A/B) counter mode with 2 pulse inputs						
	Function		Internal/external preset, Latch counter, Compare output, Number of rotations per unit time						
High Speed Pulse Output Motion Control	Basic Function	Control Method	n/a XEM-DR14H2 does not support motion control	Position control, Speed control, Speed/Position control, Position/Speed control					
		Control Unit		Pulse, mm, inch, degree					
		Position Data		400 steps for each axis (1–400)					
		Operation Mode		End, Keep, Continuous					
		Operation Method		Single, Repeat					
	Position	Control		Absolute method/Incremental method					
		Address Range		-2,147,483,648 – 2,147,483,647 (Pulse)					
		Speed		200kHz max					
		Acc/Dec Processing		Trapezoid-shaped, S-curve					
	Homing Method			DOG+HOME (Off), DOG+HOME (On), Upper/Lower limit + HOME, DOG, High speed, Upper/Lower limit, HOME					
	Jog Operation			Jog operation, Inching operation, Manual Pulse Generator operation					
Pulse Catch			10μs 4-point (%IX0.0.0–%IX0.0.3), 50μs 4-point (%IX0.0.4–%IX0.0.7)						
External Point Interrupt			10μs 4-point (%IX0.0.0–%IX0.0.3), 50μs 4-point (%IX0.0.4–%IX0.0.7)						
Input Filter			1,3,5,10,20,70,100 ms						
PID Control			Max. 16 PID loops, Control by instruction, Auto-tuning, PWM output, Forced output, Operation scan time setting, Antiwindup, Delta MV, SV lamp, Hybrid operation, Cascade operation						
Serial (Cnet)	Protocol		Modbus RTU/ASCII, XGT Dedicated, User-defined						
	Channel		1 RS-232C port, 1 RS-485 port						
Ethernet (FEnet)	Transfer Spec		Cable: 100Base-TX, Speed: 100Mpbs, Auto-MDIX[1], IEEE 802.3						
	Topology		Star						
	Diagnosis		Module information, Service condition						
	Protocol/Usage		Modbus TCP/IP Client and Server, Email (SMTP client), XGT dedicated, User Define frame, Programming/Online Monitoring						
	Channel		1 port 10/100MB Ethernet						
	Service		P2P, High Speed link, Remote connection, SMTP, SNTP, Auto scan						

1 - Auto-MDIX (Automation medium-dependent interface crossover) automatically detects whether the cable connected to the Ethernet port is peer-to-peer (straight) or crossover cable.

Digital Input Specifications, *XEM-DR14H2, XEM-DN/DP16H2*

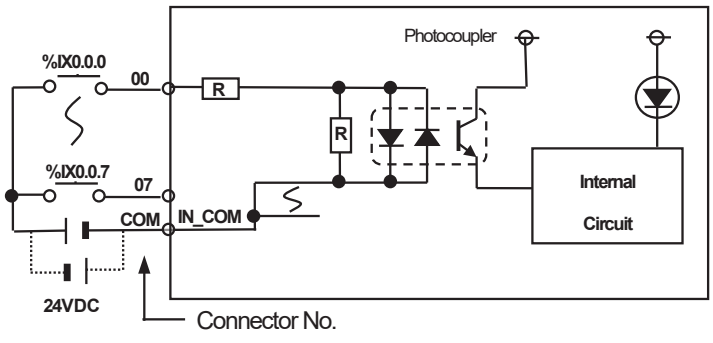
8-point 24VDC Input (Sink/Source Type) Specifications

Model		XEM-DR14H2	XEM-DN16H2	XEM-DP16H2
Input Point		8 point		
Insulation Method		Photocoupler Insulation		
Rated Input Volage		24VDC		
Rated Input Current		~4mA (Inputs 0–3 about 5mA)		
Operation Voltage Range		20.4–28.8 VDC (within ripple rate 5%)		
On Voltage		19VDC or higher		
On Current		3mA or higher (Inputs 0–3 about 3.5 mA or higher)		
Off Voltage		6VDC or less		
Off Current		1mA or less		
Input Resistance		About 5.6 kΩ (Inputs 0–3 about 4.7 kΩ)		
Response Time	Off → On	1/3/5/10/20/70/100 ms (set by I/O parameter) Default: 3ms		
	On → Off			
Insulation Pressure		AC850Vrms / 3 cycle (altitude 2000m)		
Insulation Resistance		10MΩ or more by MegOhmMeter		
Common Method		8 point / COM		
Proper Cable Size		0.3 mm^2		
Operation Indicator		LED On when Input On		
External Connection Method		9 point terminal block connector		



Note: Red box highlights pins of the CPU inputs.

8-point 24VDC Input (Sink/Source Type) Circuit Configuration

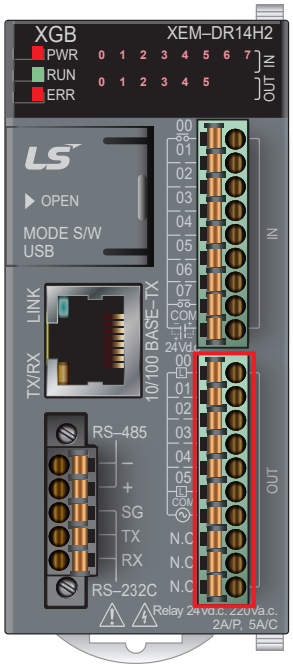


XEM Pin#	I/O Direct Variable	Description
00	%IX0.0.0	High Speed Counter Inputs 1 phase- 200kpps 4 channel 2 phase- 100kpps 2 channel or General Input
01	%IX0.0.1	
02	%IX0.0.2	
03	%IX0.0.3	
04	%IX0.0.4	Preset Input or General Input
05	%IX0.0.5	
06	%IX0.0.6	
07	%IX0.0.7	
COM	IN_COM	Common

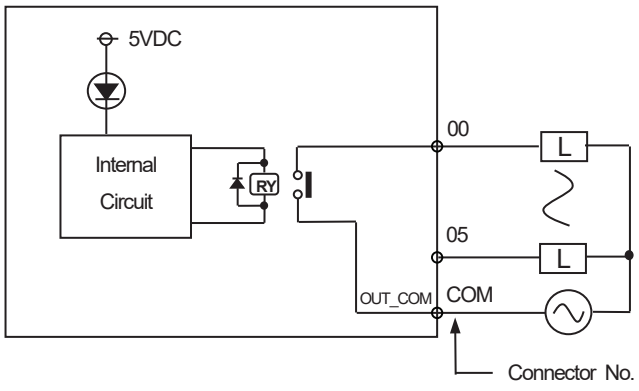
Digital Output Specifications, *XEM-DR14H2*

6-point Relay Output Specifications

Model		XEM-DR14H2
Input Point		6 point
Insulation Method		Relay Insulation
Rated Load Voltage		24VDC 2A (resistive load) / 220VAC 2A (COSθ =1), 5A/COM
Minimum Load Voltage/ Current		5VDC / 1mA
Max Load Voltage		250VAC, 125VDC
Off Leakage Current		0.1 mA or less (220VAC, 60Hz)
Max. On/Off Frequency		3,600 times/hr
Over Voltage Protection		None
Service Life	Mechanical	20 million times or more
	Electrical	Rated load voltage / current: 100,000 times or more
		200VAC/1.5 A, 240VAC/1A (COSθ=0.7): 100,000 times or more
		200VAC/1A, 240VAC/0.5 A (COSθ=0.35): 100,000 times or more
		24VDC/1A, 100VDC/0.1A (L/R=7ms): 100,000 times or more
Response Time	Off → On	10ms or less
	On → Off	12ms or less
Common Method		6 points / COM
Proper Wire Size		Stranded wire, 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
Current Consumption		385mA (when all points ON)
Operation Indicator		LED On when Output On
External Connection Method		10 point terminal block connector



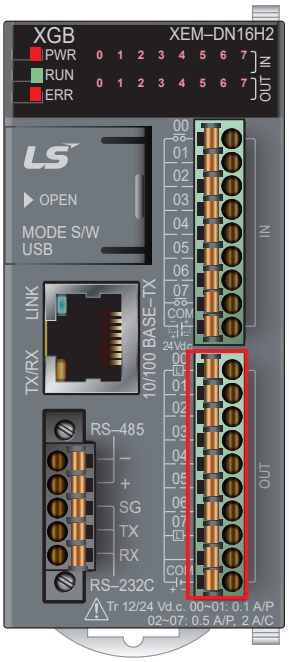
6-point Relay Output Circuit Configuration



XEM Pin#	I/O Direct Variable	Description
00	%QX0.0.0	Relay Output 2A/pt
01	%QX0.0.1	
02	%QX0.0.2	
03	%QX0.0.3	
04	%QX0.0.4	
05	%QX0.0.5	
COM	OUT_COM	Common
N.C	N.C.	Not used
N.C	N.C.	
N.C	N.C.	

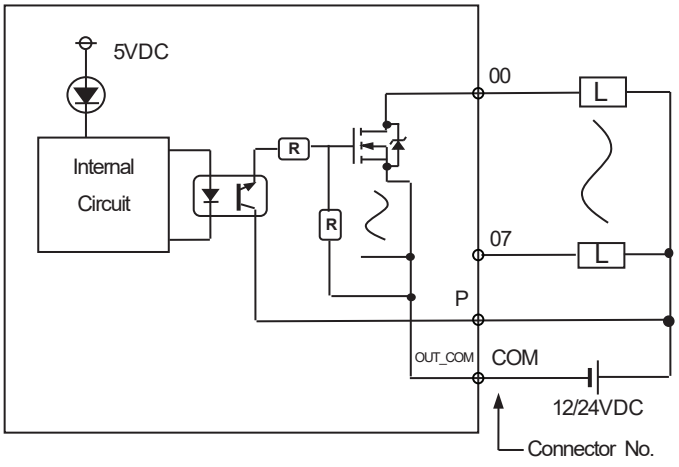
Digital Output Specifications, *XEM-DN16H2*

8-point Transistor Output (Sink Type)Specifications		
Model		***XEM-DN16H2***
Input Point		8 point
Insulation Method		Photocoupler Insulation
Rated Load Volage		12VDC / 24VDC
Operation Load Voltage Range		10.2–26.4 VDC
Max. Load Current		**%QX0.0.0,1:** 0.1A / 1-point, **%QX0.0.2–7:** 0.5 A/ 1-point, 2A / 1COM
Off Leakage Current		0.1 mA or less
Max. Inrush Current		4A / 10ms or less
Max. Voltage Drop when On		0.4 VDC or less
Over Voltage Protection		TVS diode
Response Time	***Off → On***	1ms or less
	On → Off	1ms or less (rated load, resistive load)
Common Method		8 point / COM
Proper Wire Size		Stranded wire, 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
External Power	***Voltage***	12VDC / 24VDC ± 10% (ripple voltage 4 Vp-p or less)
	Current	35mA or less (when connecting 24VDC)
Operation Indicator		LED On when Output On
External Connection Method		10 point terminal block connector



8-point Transistor Output (Sink Type) Circuit Configuration

Circuit Configuration

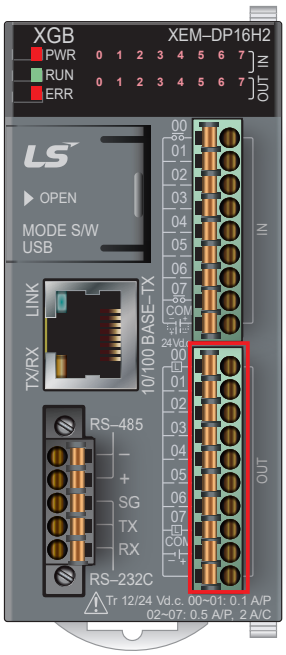


XEM Pin#	***I/O Direct Variable***	***Description***
00	%QX0.0.0	Pulse- Axis1 or General Output 0.1A/pt
01	%QX0.0.1	Pulse- Axis2 or General Output 0.1A/pt
02	%QX0.0.2	General Output 0.5A/pt
03	%QX0.0.3	
04	%QX0.0.4	
05	%QX0.0.5	
06	%QX0.0.6	Direction- Axis 1 or General Output 0.5A/pt
07	%QX0.0.7	Direction- Axis 2 or General Output 0.5A/pt
–	–	+24VDC from supply
COM	OUT_COM	0VDC from supply

Digital Output Specifications, *XEM-DP16H2*

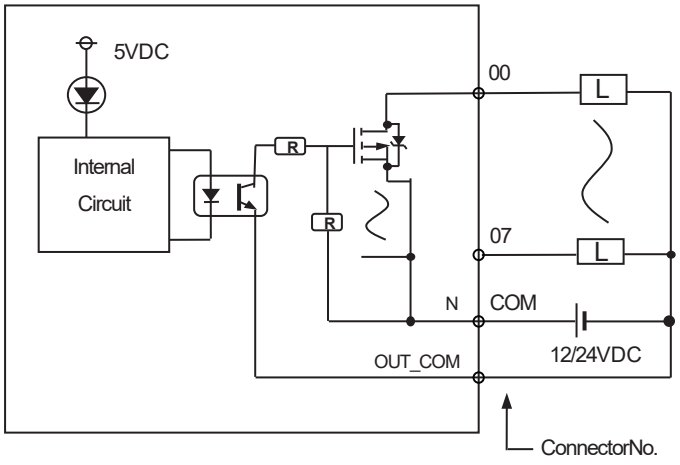
8-point Transistor Output (Source Type)Specifications

Model		XEM-DP16H2
Input Point		8 point
Insulation Method		Photocoupler Insulation
Rated Load Volage		12VDC / 24VDC
Operation Load Voltage Range		10.2–26.4 VDC
Max. Load Current		**%QX0.0.0,1:** 0.1A / 1-point, **%QX0.0.2–7:** 0.5 A/ 1-point, 2A / 1COM
Off Leakage Current		0.1 mA or less
Max. Inrush Current		4A / 10ms or less
Max. Voltage Drop when On		0.4 VDC or less
Over Voltage Protection		TVS diode
Response Time	Off → On	1ms or less
	On → Off	1ms or less (rated load, resistive load)
Common Method		8 point / COM
Proper Wire Size		Stranded wire, 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
External Power	Voltage	12VDC / 24VDC ± 10% (ripple voltage 4 Vp-p or less)
	Current	30mA or less (when connecting 24VDC)
Operation Indicator		LED On when Output On
External Connection Method		10 point terminal block connector



8-point Transistor Output (Source Type) Circuit Configuration

Circuit Configuration

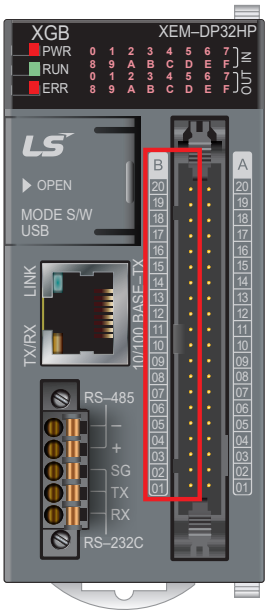


XEM Pin#	I/O Direct Variable	Description
00	%QX0.0.0	Pulse- Axis1 or General Output 0.1A/pt
01	%QX0.0.1	Pulse- Axis2 or General Output 0.1A/pt
02	%QX0.0.2	General Output 0.5A/pt
03	%QX0.0.3	
04	%QX0.0.4	
05	%QX0.0.5	
06	%QX0.0.6	Direction- Axis 1 or General Output 0.5A/pt
07	%QX0.0.7	Direction- Axis 2 or General Output 0.5A/pt
COM	OUT_COM	+24VDC from supply
–	–	0VDC from supply

Digital Input Specifications, *XEM-DN32H2/HP and XEM-DP32H2/HP*

16-point 24VDC Input (Sink/Source Type) Specifications

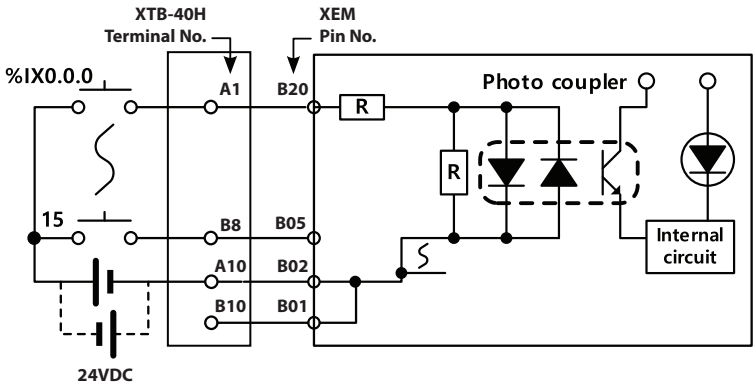
Model	XEM-DN32H2	XEM-DP32H2	XEM-DN32HP	XEM-DP32HP
Input Point	16 point			
Insulation Method	Photocoupler Insulation			
Rated Input Volage	24VDC			
Rated Input Current	~4mA (Inputs 0–3 about 7mA)			
Operation Voltage Range	20.4–28.8 VDC (within ripple rate 5%)			
On Voltage	19VDC or higher			
On Current	3mA or higher			
Off Voltage	6VDC or less			
Off Current	1mA or less			
Input Resistance	About 5.6 kΩ (Inputs 0–7 about 4.7 kΩ)			
Response Time (Off → On / On → Off)	1/3/4/10/20/70/100 ms (set by I/O parameter) Default: 3ms			
Insulation Pressure	AC560Vrms / 3 cycle (altitude 2000m)			
Insulation Resistance	100MΩ or more by MegOhmMeter			
Common Method	16 point / COM			
Proper Cable Size	0.3 mm^2			
Operation Indicator	LED On when Input On			
External Connection Method	40 point connector			



Note: Red box highlights pins of the CPU inputs.

16-point 24VDC Input (Sink/Source Type) Circuit Configuration

Circuit Configuration

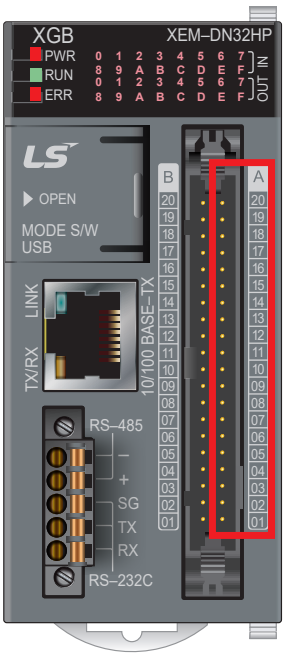


XTB-40H Terminal	XEM Pin#	I/O Direct Variable	Description
A1	B20	%IX0.0.0	High Speed Counter Inputs 1 phase- 200kpps 4 channel 2 phase- 100kpps 2 channel or General Input
B1	B19	%IX0.0.1	
A2	B18	%IX0.0.2	
B2	B17	%IX0.0.3	
A3	B16	%IX0.0.4	Preset Input or General Input
B3	B15	%IX0.0.5	
A4	B14	%IX0.0.6	
B4	B13	%IX0.0.7	
A5	B12	%IX0.0.8	General Input
B5	B11	%IX0.0.9	General Input
A6	B10	%IX0.0.10	General Input
B6	B09	%IX0.0.11	General Input
A7	B08	%IX0.0.12	General Input
B7	B07	%IX0.0.13	General Input
A8	B06	%IX0.0.14	General Input
B8	B05	%IX0.0.15	General Input
A9	B04	–	Not used (NC)
B9	B03	–	Not used (NC)
A10	B02	–	Common
B10	B01	–	Common

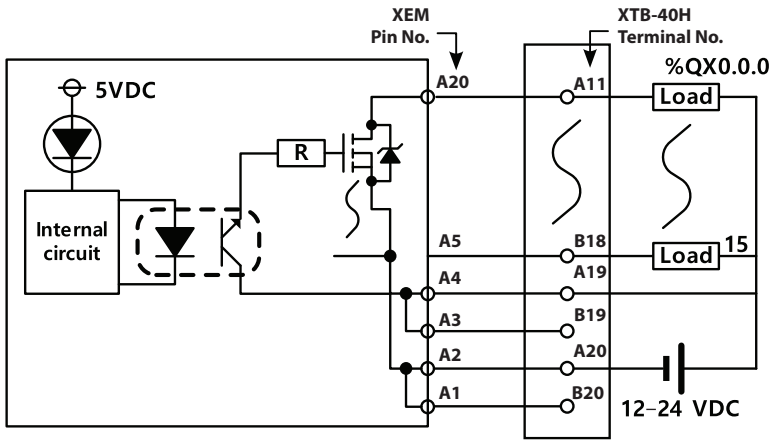
Digital Output Specifications, *XEM-DN32H2 and XEM-DN32HP*

16-point Transistor Output (Sink Type)Specifications

Model		XEM-DN32H2	XEM-DN32HP
Input Point		16 point	
Insulation Method		Photocoupler Insulation	
Rated Load Volage		12VDC / 24VDC	
Operation Load Voltage Range		10.2–26.4 VDC	
Max. Load Current		%QX0.0.0–11: 0.1A / 1-point, %QX0.0.12–15: 0.5 A/ 1-point, 2A / 1COM	
Off Leakage Current		0.1 mA or less	
Max. Inrush Current		4A / 10ms or less	
Max. Voltage Drop when On		0.4 VDC or less	
Over Voltage Protection		TVS diode	
Response Time	Off → On	1ms or less	
	On → Off	1ms or less (rated load, resistive load)	
Common Method		16-point / COM	
Proper Wire Size		Stranded wire, 0.3–0.75 mm^2 (external diameter 2.8 mm or less)	
External Power	Voltage	12VDC / 24VDC ± 10% (ripple voltage 4 Vp-p or less)	
	Current	80mA or less (when connecting 24VDC)	
Operation Indicator		LED On when Output On	
External Connection Method		40-point connector	



16-point Transistor Output (Sink Type) Circuit Configuration



XTB-40H Terminal	XEM Pin#	I/O Direct Variable	Description	
A11	A20	%QX0.0.0	Pulse- Axis1 or General Output 0.1A/pt	
B11	A19	%QX0.0.1	Pulse- Axis2 or General Output 0.1A/pt	
A12	A18	%QX0.0.2	Pulse- Axis3* or General Output 0.1A/pt	
B12	A17	%QX0.0.3	Pulse- Axis4* or General Output 0.1A/pt	
A13	A16	%QX0.0.4	Pulse- Axis5* or General Output 0.1A/pt	
B13	A15	%QX0.0.5	Pulse- Axis6* or General Output 0.1A/pt	
A14	A14	%QX0.0.6	Direction- Axis 1 or General Output 0.1A/pt	
B14	A13	%QX0.0.7	Direction- Axis 2 or General Output 0.1A/pt	
A15	A12	%QX0.0.8	Direction- Axis 3* or General Output 0.1A/pt	
B15	A11	%QX0.0.9	Direction- Axis 4* or General Output 0.1A/pt	
A16	A10	%QX0.0.10	Direction- Axis 5* or General Output 0.1A/pt	
B16	A09	%QX0.0.11	Direction- Axis 6* or General Output 0.1A/pt	
A17	A08	%QX0.0.12	General Outputs - 0.5A/pt	
B17	A07	%QX0.0.13	General Outputs - 0.5A/pt	
A18	A06	%QX0.0.14	General Outputs - 0.5A/pt	
B18	A05	%QX0.0.15	General Outputs - 0.5A/pt	
A19	A04	–	P (24VDC)	2.0A/common
B19	A03	–	P (24VDC)	
A20	A02	–	OUT_COM	
B20	A01	–	OUT_COM	

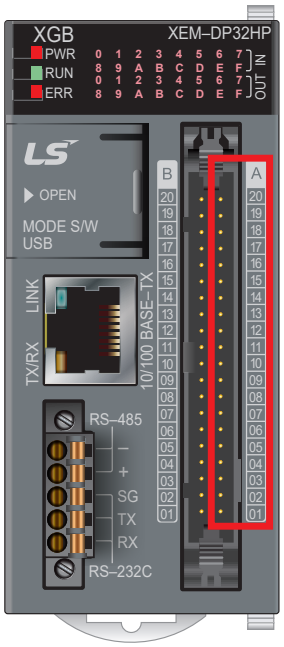
* Note: DN32HP module only

XGB CPU Modules

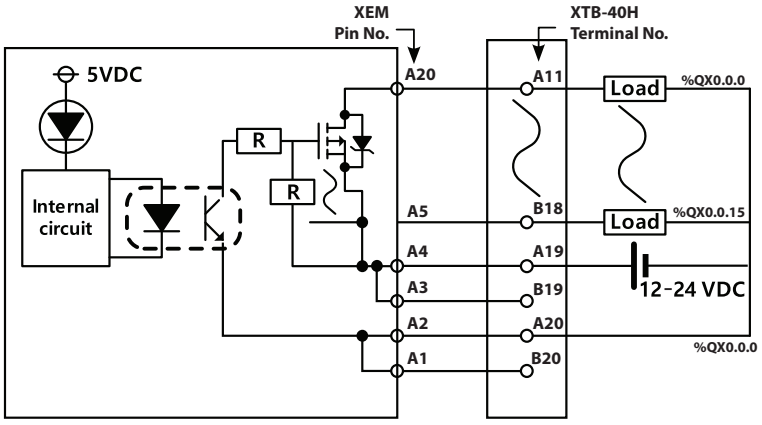
Digital Output Specifications, *XEM-DP32H2 and XEM-DP32HP*

16-point Transistor Output (Source Type) Specifications

Model		XEM-DP32H2	XEM-DP32HP
Input Point		16 point	
Insulation Method		Photocoupler Insulation	
Rated Load Volage		12VDC / 24VDC	
Operation Load Voltage Range		10.2–26.4 VDC	
Max. Load Current		**%QX0.0.0–11:** 0.1A / 1-point **%QX0.0.12–15:** 0.5 A/ 1-point, 2A / 1COM	
Off Leakage Current		0.1 mA or less	
Max. Inrush Current		4A / 10ms or less	
Max. Voltage Drop when On		0.4 VDC or less	
Over Voltage Protection		TVS diode	
Response Time	Off → On	1ms or less	
	On → Off	1ms or less (rated load, resistive load)	
Common Method		16-point / COM	
Proper Wire Size		Stranded wire, 0.3–0.75 mm^2 (external diameter 2.8 mm or less)	
External Power	Voltage	12VDC / 24VDC ± 10% (ripple voltage 4 Vp-p or less)	
	Current	50mA or less (when connecting 24VDC)	
Operation Indicator		LED On when Output On	
External Connection Method		40-point connector	



16-point Transistor Output (Source Type) Circuit Configuration



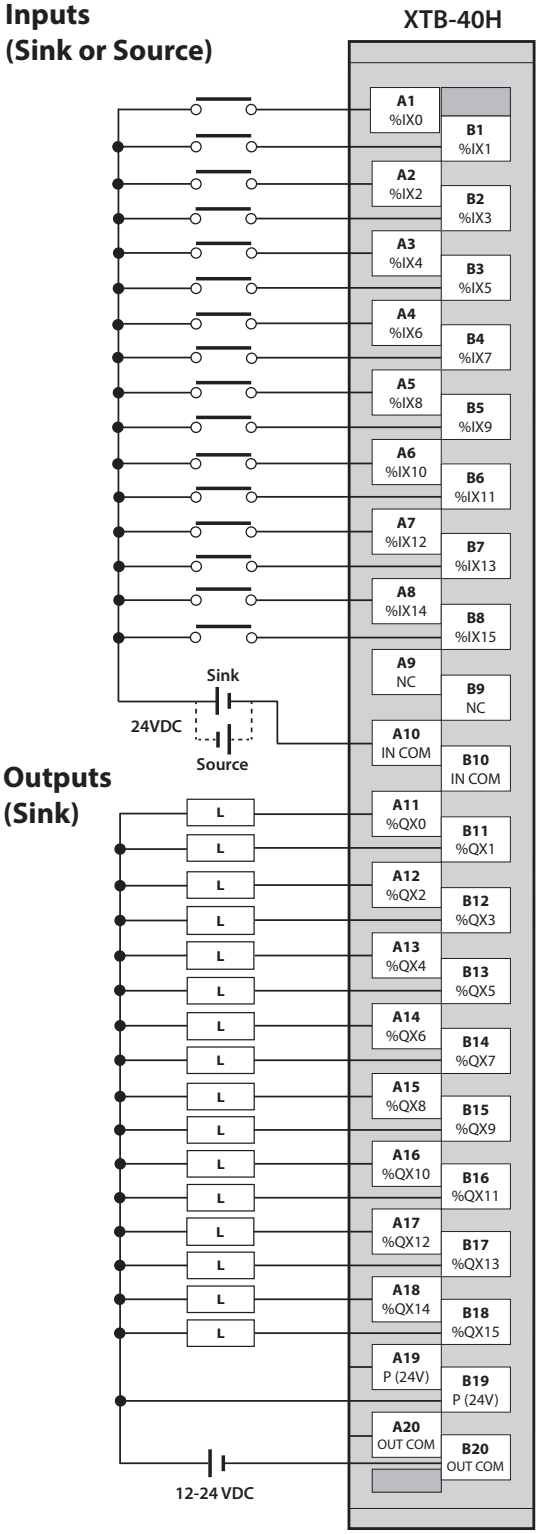
Circuit Configuration	XTB-40H Terminal	XEM Pin#	I/O Direct Variable	Description	
	A11	A20	%QX0.0.0	Pulse- Axis1 or General Output 0.1A/pt	
	B11	A19	%QX0.0.1	Pulse- Axis2 or General Output 0.1A/pt	
	A12	A18	%QX0.0.2	Pulse- Axis3* or General Output 0.1A/pt	
	B12	A17	%QX0.0.3	Pulse- Axis4* or General Output 0.1A/pt	
	A13	A16	%QX0.0.4	Pulse- Axis5* or General Output 0.1A/pt	
	B13	A15	%QX0.0.5	Pulse- Axis6* or General Output 0.1A/pt	
	A14	A14	%QX0.0.6	Direction- Axis 1 or General Output 0.1A/pt	
	B14	A13	%QX0.0.7	Direction- Axis 2 or General Output 0.1A/pt	
	A15	A12	%QX0.0.8	Direction- Axis 3* or General Output 0.1A/pt	
	B15	A11	%QX0.0.9	Direction- Axis 4* or General Output 0.1A/pt	
	A16	A10	%QX0.0.10	Direction- Axis 5* or General Output 0.1A/pt	
	B16	A09	%QX0.0.11	Direction- Axis 6* or General Output 0.1A/pt	
	A17	A08	%QX0.0.12	General Outputs - 0.5A/pt	
	B17	A07	%QX0.0.13	General Outputs - 0.5A/pt	
	A18	A06	%QX0.0.14	General Outputs - 0.5A/pt	
	B18	A05	%QX0.0.15	General Outputs - 0.5A/pt	
	A19	A04	–	OUT_COM	2.0A/common
	B19	A03	–	OUT_COM	
	A20	A02	–	N (0VDC)	
	B20	A01	–	N (0VDC)	

*** Note: DP32HP module only**

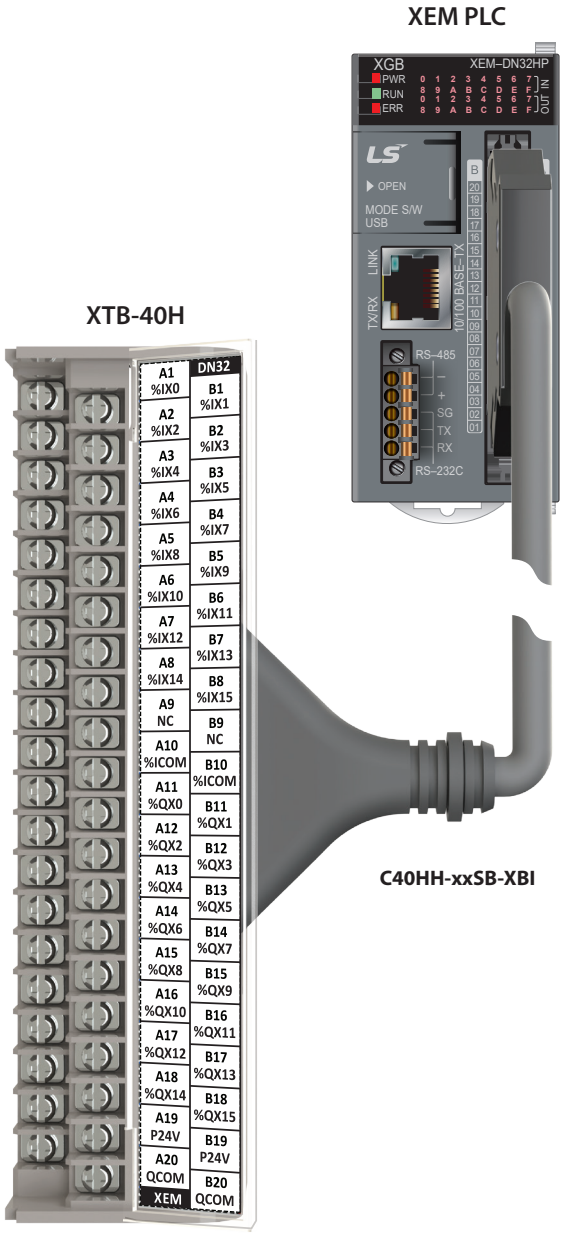
PLC I/O Wiring (Sinking Outputs), *XEM-DN32H2/HP*

Download module specific XTB-40H Terminal Label Printouts here: Download Printouts

Terminal Wiring



PLC Connection



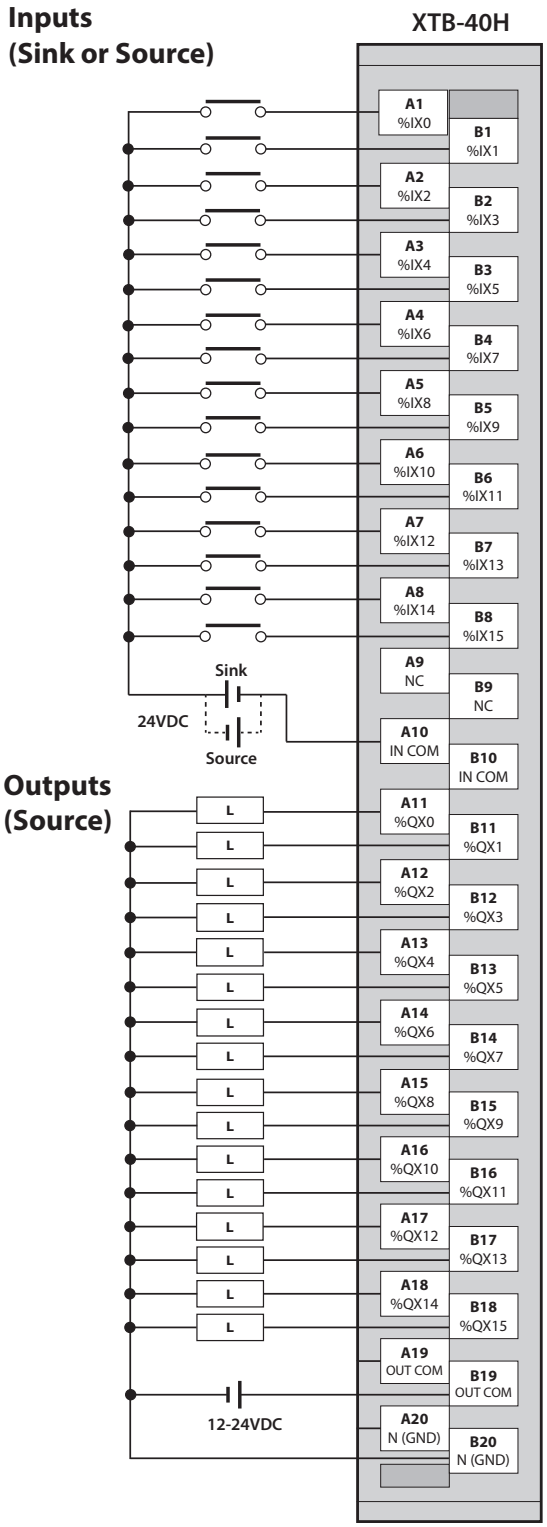
Note:

- Wiring: AWG22-16 (1.5mm^2/MAX)
- Screw: M3 X 8L
- Screw Torque: 1.2 N·m (12kgf·cm)

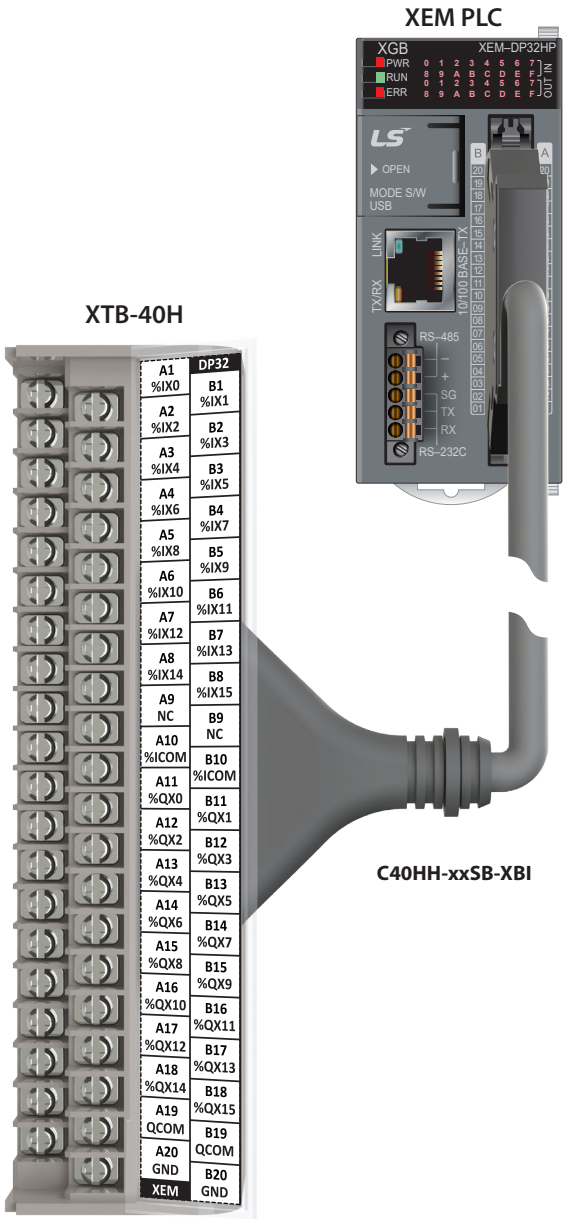
PLC I/O Wiring (Sourcing Outputs), *XEM-DP32H2/HP*

Download module specific XTB-40H Terminal Label Printouts here: Download Printouts

Terminal Wiring



PLC Connection

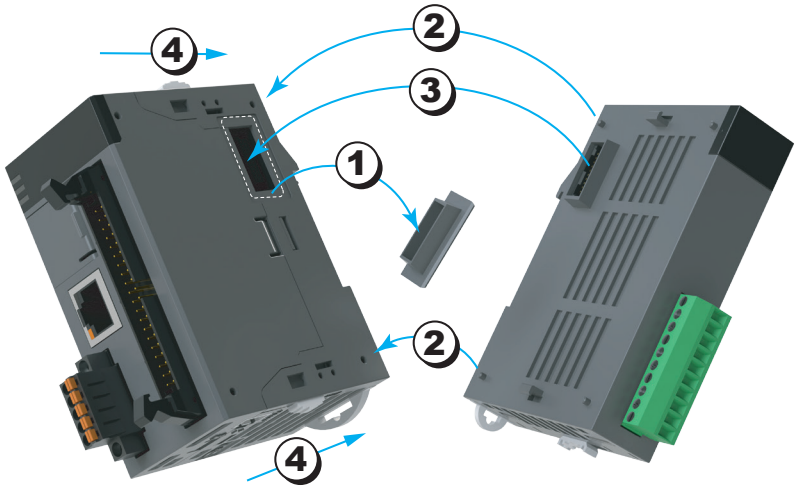


Note:

- Wiring: AWG22-16 (1.5mm^2/MAX)
- Screw: M3 X 8L
- Screw Torque: 1.2 N·m (12kgf·cm)

I/O Module Installation

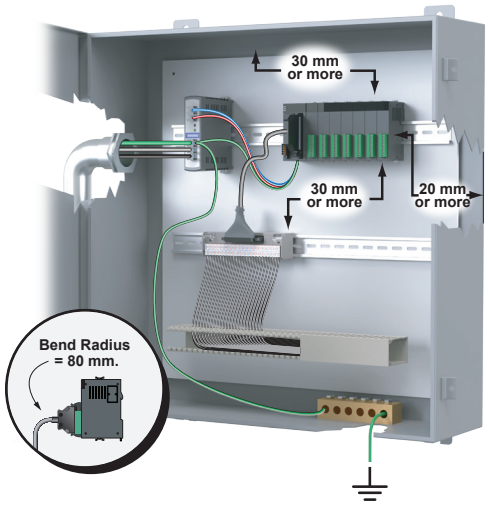
Attach each I/O module to the PLC per the diagram to the right. Up to seven modules can be attached by hooking in to each expansion module in the same manner. Any 32-point I/O and counter input module will require a Smart Link cable and terminal block. Use the online Product Selector to help configure the PLC at automationdirect.com/ls/config.



1. Remove expansion port cover.
2. Align tabs with corresponding holes.
3. Seat the expansion port connector.
4. Secure modules with top and bottom sliding lock.

Mounting the PLC

When mounting the completed PLC module to your structure, keep the distances shown in the diagram below to maintain proper ventilation and allow easy detachment and attachment.



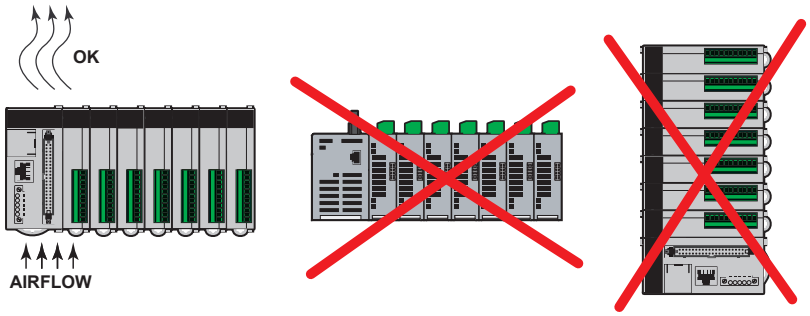
Additional Clearance Distances:

- Wire duct on the side requires 5mm or more
- Panel wall on the side requires 20mm or more
- Another device on the side requires 50mm or more

DIN Rail Mounting

The PLC has a hook for DIN rail mounting (35mm). To mount to DIN rail:

- Pull the hook as shown below at the bottom of module and install it at the DIN rail.
- Push the hook to fix the module to the rail after installing.



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[1]	Occasional Vibration	Frequency	$5 \le f < 8.4$ Hz	3.5 mm pulse width	IEC61131-3-2
			$8.4 \le f < 150$Hz	9.8 m/s^2 (1G)	
	Continuous Vibration		$5 \le f < 8.4$ Hz	1.75 mm pulse width	
			$8.4 \le f < 150$Hz	4.9 m/s^2 (0.5G)	
Shocks			Peak Acceleration	147 m/s^2 (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.

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
Digital									
XBE-DC08A	$65.00	LS Electric XGB discrete input module, 8-point, 24 VDC, sinking/sourcing, 1 common(s), 8 point(s) per common. Removable terminal block included.	✓					✓	
XBE-DC16A	$77.00	LS Electric XGB discrete input module, 16-point, 24 VDC, sinking/sourcing, 1 common(s), 16 point(s) per common. Removable terminal blocks included.	✓					✓	
XBE-DC16B	$86.00	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.	✓					✓	
XBE-DC32A	$107.00	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.	✓					✓	✓
XBE-AC08A	$97.00	LS Electric XGB discrete input module, 8-point, 120 VAC, 2 common(s), 4 point(s) per common. Removable terminal blocks included.	✓					✓	
XBE-RY08A	$95.00	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.		✓				✓	
XBE-RY08B	$105.00	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.		✓				✓	
XBE-RY16A	$121.00	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.		✓				✓	
XBE-TN08A	$66.00	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.		✓				✓	
XBE-TN16A	$86.00	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.		✓				✓	
XBE-TN32A	$120.00	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.		✓				✓	✓
XBE-TP08A	$69.00	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.		✓				✓	
XBE-TP16A	$97.00	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.		✓				✓	
XBE-TP32A	$103.00	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.		✓				✓	✓
XBE-DN32A	$190.00	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.	✓	✓				✓	✓
XBE-DR16A	$112.00	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.	✓	✓				✓	
Motion									
XBF-PN04B	$199.00	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.					✓		
XBF-PN08B	$229.00	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.					✓		
XBF-HO02A	$194.00	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.					✓	✓	✓
XBF-HD02A	$279.00	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

Available I/O Modules, *continued*

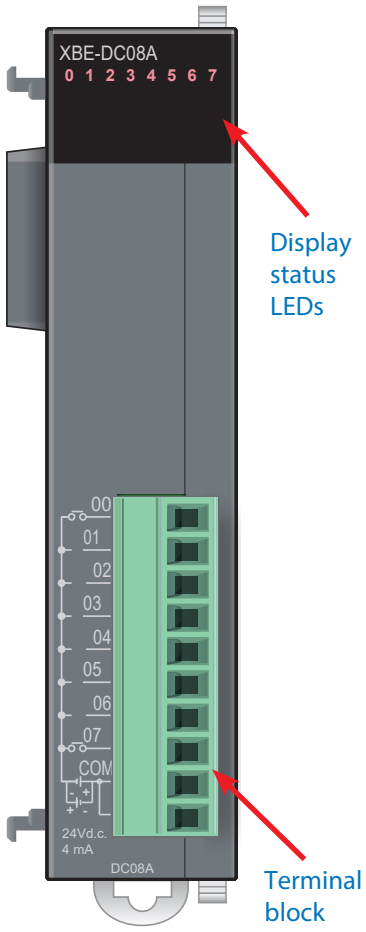
XGB Series I/O Modules									
Part Number	**Price**	**Description**	**Digital Input**	**Digital Output**	**Analog Input**	**Analog Output**	**Motion**	**Bus Coupler Compatible**	**Smart Link Required**
Analog									
XBF-AD04A	$176.00	LS Electric XGB analog input module, 4-channel, current/voltage, 12-bit, input current signal range(s) of 0-20 mA, 4-20 mA, input voltage signal range(s) of 0-10 VDC, external 24 VDC required.			✓			✓	
XBF-AD08A	$267.00	LS Electric XGB analog input module, 8-channel, current/voltage, 12-bit, input current signal range(s) of 0-20 mA, 4-20 mA, input voltage signal range(s) of 0-5 VDC, 1-5 VDC, 0-10 VDC, external 24 VDC required.			✓			✓	
XBF-AD04C	$255.00	LS Electric XGB analog input module, 4-channel, current/voltage, 14-bit, input current signal range(s) of 0-20 mA, 4-20 mA, input voltage signal range(s) of 0-5 VDC, 1-5 VDC, 0-10 VDC, +/- 10 VDC, external 24 VDC required.			✓			✓	
XBF-DV04A	$168.00	LS Electric XGB analog output module, 4-channel, voltage, 12-bit, output voltage signal range(s) of 0-10 VDC, external 24 VDC required.				✓		✓	
XBF-DV04C	$230.00	LS Electric XGB analog output module, 4-channel, voltage, 14-bit, output voltage signal range(s) of 0-5 VDC, 1-5 VDC, 0-10 VDC and +/- 10 VDC, external 24 VDC required.				✓		✓	
XBF-DC04A	$179.00	LS Electric XGB analog output module, 4-channel, current, 12-bit, output current signal range(s) of 0-20 mA and 4-20 mA, external 24 VDC required.				✓		✓	
XBF-DC04C	$230.00	LS Electric XGB analog output module, 4-channel, current, 14-bit, output current signal range(s) of 0-20 mA and 4-20 mA, external 24 VDC required.				✓		✓	
XBF-AH04A	$238.00	LS Electric XGB analog combo module, Input: 2-channel, current/voltage, 0-20 mA and 4-20 mA, 0-5 VDC, 1-5 VDC and 0-10 VDC, Output: 2-channel, current/voltage, 0-20 mA and 4-20 mA, 0-5 VDC, 1-5 VDC and 0-10 VDC.			✓	✓		✓	
XBF-LD02S	$299.00	LS Electric XGB load cell input module, 2-channel, voltage, 15-bit resolution, input voltage signal range(s) of 0-6 mV/VDC. For use with 5 VDC four- or six-wire load cells. Removable terminal blocks included.			✓			✓	
XBF-RD04A	$219.00	LS Electric XGB temperature input module, RTD, 4-channel, 14-bit resolution, input RTD type(s): Pt100 and JPt100. Removable terminal block included.			✓			✓	
XBF-TC04S	$219.00	LS Electric XGB temperature input module, thermocouple, 4-channel, 16-bit resolution, input thermocouple type(s): J, K, R, T. Removable terminal block included.			✓			✓	
Communication									
XBL-EIPT	$99.00	LS Electric XGB communication module, EtherNet/IP, 2 ports, (2) Ethernet 10/100Base-T (RJ45) port(s). For use with LS Electric XGB series PLCs.							
XBL-EMTA	$219.00	LS Electric XGB communication module, Modbus TCP and LS XGT protocol, 1 port, (1) Ethernet 10/100Base-T (RJ45) port(s). For use with LS Electric XGB series PLCs.							
XBL-C21A	$149.00	LS Electric XGB communication module, Modbus RTU, Modbus ASCII and LS XGT protocol, 1 port, (1) RS-232 (DB9 female) port(s). For use with LS Electric XGB series PLCs.							
XBL-C41A	$149.00	LS Electric XGB communication module, Modbus RTU, Modbus ASCII and LS XGT protocol, 1 port, (1) RS-422/RS-485 (5-pin terminal) port(s). For use with LS Electric XGB series PLCs. (1) 5-pin serial communication terminal block included.							
Bus Coupler									
XEL-BSSRT	$257.00	LS Electric XGB bus coupler, 24 VDC, (2) Ethernet (RJ45) and (1) USB B port(s), EtherNet/IP and Modbus TCP, 100/1000 Mbps. For use with LS Electric XGB series I/O modules.							
XEL-BSSCT	$219.00	LS Electric XGB bus coupler, 24 VDC, (2) Ethernet (RJ45) and (1) USB B port(s), EtherCAT Slave, 100 Mbps. For use with LS Electric XGB series I/O modules.							

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.

XBE-DC08A Digital Input Module

XBE-DC08A is a 24VDC 8-point discrete input module that supports sinking or sourcing inputs.

Part Number	Price	Classification	Description	Drawing
XBE-DC08A	$65.00	Digital Input Module	LS Electric XGB discrete input module, 8-point, 24 VDC, sinking/sourcing, 1 common(s), 8 point(s) per common. Removable terminal block included.	PDF



General Specifications		XBE-DC08A
Input Point		8 point
Insulation Method		Photocoupler insulation
Rated Input Voltage		24VDC
Rated Input Current		Approximately 4mA
Operation Voltage Range		20.4–28.8 VDC (ripple rate <5%)
On Voltage/Current		19VDC or higher / 3mA or higher
Off Voltage/Current		6VDC or less / 1mA or less
Input Resistance		Approximately 5.6 kΩ
Response Time	Off → On	1/3/5/10/20/70/100 ms (set by CPU parameter) Default: 3ms
	On → Off	
Insulation Pressure		560VAC rms / 3 Cycle (altitude 2000m)
Insulation Resistance		10MΩ or more by Megohmmeter
Common Method		8 point/ COM
Proper Cable Size		Stranded pair 0.3–0.75mm^2 (external diameter 2.8mm or less)
Current Consumption		40mA (when all point on)
Operation Indicator		Input On, LED On
External Connection Method		10-point terminal block connector
Weight		52g

XBE-DC08A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-DC08A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%IX0.z.0 – %IX0.z.7

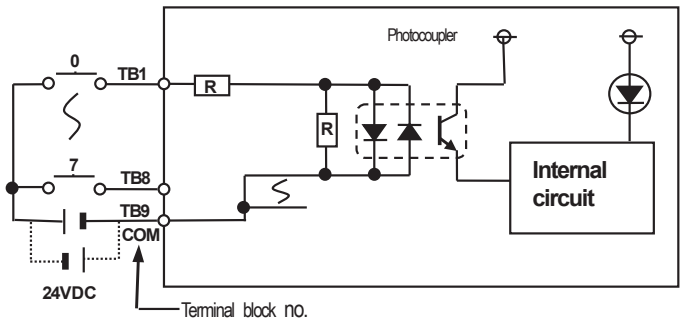
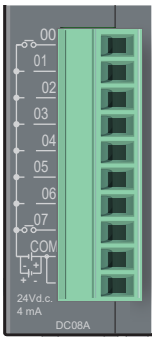
"z" denotes the module slot (2 to 8).

Follow the Quick start video to learn how to Register and Configure any Digital I/O Module here.

Digital Module Setup

XBE-DC08A Digital Input Module Wiring

XBE-DC08A Circuit Configuration

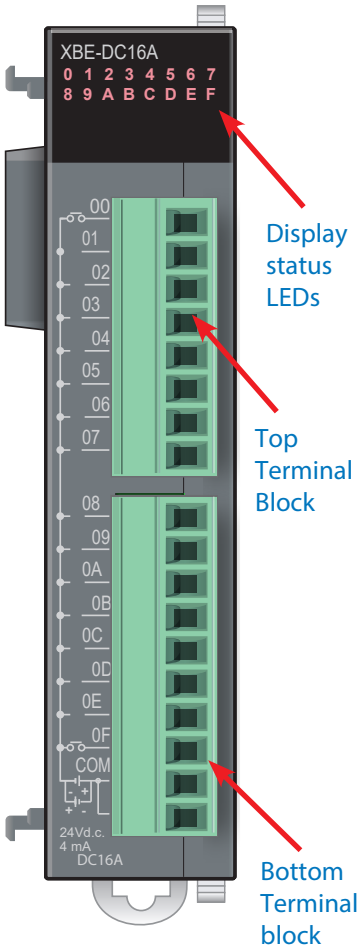
Circuit Configuration	Terminal Description	I/O Direct Variable	Terminal Block Image
	00	%IX0.z.0	
	01	%IX0.z.1	
	02	%IX0.z.2	
	03	%IX0.z.3	
	04	%IX0.z.4	
	05	%IX0.z.5	
	06	%IX0.z.6	
	07	%IX0.z.7	
	COM	n/a	
	24VDC	n/a	

Note: Can be wired sinking or sourcing. In the I/O Direct Variable name, z=slot number.

XBE-DC16A Digital Input Module

Part Number	Price	Classification	Description	Drawing
XBE-DC16A	$77.00	Digital Input	LS Electric XGB discrete input module, 16-point, 24 VDC, sinking/sourcing, 1 common(s), 16 point(s) per common. Removable terminal blocks included.	PDF

General Specifications		XBE-DC16A
Input Point		16 point
Insulation Method		Photo coupler insulation
Rated Input Voltage		24VDC
Rated Input Current		4mA
Operation Voltage Range		20.4–28.8 VDC (ripple rate <5%)
On Voltage/Current		19VDC or higher / 3mA or higher
Off Voltage/Current		6VDC or less / 1mA or less
Input Resistance		5.6 kΩ
Response Time	Off → On	1/3/5/10/20/70/100 ms (set by PLC parameter) Default: 3ms
	On → Off	
Insulation Pressure		560VACrms / 3 Cycle (2000m altitude)
Insulation Resistance		10MΩ or more by Megohmmeter
Common Method		16 point / COM
Proper Cable Size		Stranded cable 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
Current Consumption		40mA (when all point On)
Operation Indicator		Input On, LED On
External Connection Method		8-pin terminal block connector + 10-pin terminal block connector
Weight		53g



XBE-DC16A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-DC16A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%IX0.z.0 – %IX0.z.15

"z" denotes the module slot (2 to 8).

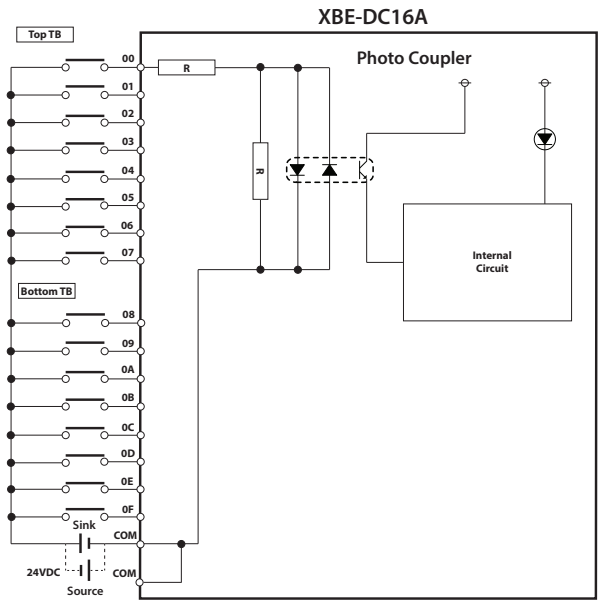
Follow the Quick start video to learn how to Register and Configure any Digital I/O Module here.

Digital Module Setup

XBE-DC16A Digital Input Module Wiring

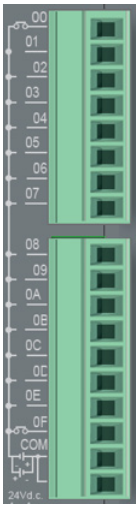
XBE-DC16A Circuit Configuration

Circuit Configuration



Top TB Description	*I/O Direct Variable*
00	%IX0.z.0
01	%IX0.z.1
02	%IX0.z.2
03	%IX0.z.3
04	%IX0.z.4
05	%IX0.z.5
06	%IX0.z.6
07	%IX0.z.7
Bottom TB Description	***I/O Direct Variable***
08	%IX0.z.8
09	%IX0.z.9
0A	%IX0.z.10
0B	%IX0.z.11
0C	%IX0.z.12
0D	%IX0.z.13
0E	%IX0.z.14
0F	%IX0.z.15
COM	n/a
COM	n/a

Terminal Block Image

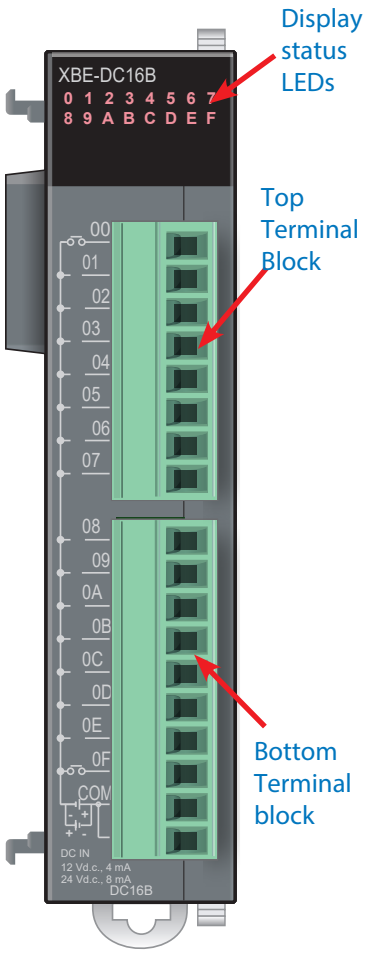


Note: Can be wired sinking or sourcing. In the I/O Direct Variable name, z=slot number.

XBE-DC16B Digital Input Module

Part Number	Price	Classification	Description	Drawing
XBE-DC16B	$86.00	Digital Input	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.	PDF

General Specifications		XBE-DC16B
Input Point		16 point
Insulation Method		Photo coupler insulation
Rated Input Voltage		12/24 VDC
Rated Input Current		4mA @ 12VDC / 8mA @ 24VDC
Operation Voltage Range		9.5–30 VDC (ripple rate <5%)
On Voltage/Current		9VDC or higher / 3mA or higher
Off Voltage/Current		5VDC or less / 1mA or less
Input Resistance		2.7 kΩ
Response Time	Off → On	1/3/5/10/20/70/100 ms (set by PLC parameter) Default: 3ms
	On → Off	
Insulation Pressure		560VACrms / 3 Cycle (2000m altitude)
Insulation Resistance		10MΩ or more by Megohmmeter
Common Method		16 point / COM
Proper Cable Size		Stranded cable 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
Current Consumption		40mA (when all point On)
Operation Indicator		Input On, LED On
External Connection Method		8-pin terminal block connector + 10-pin terminal block connector
Weight		53g



XBE-DC16B - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

FFor Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-DC16B	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%IX0.z.0 – %IX0.z.15

"z" denotes the module slot (2 to 8).

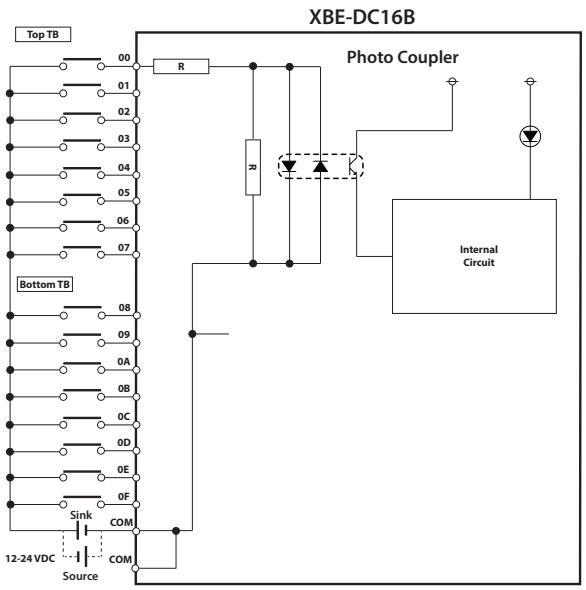
Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-DC16B Digital Input Module Wiring

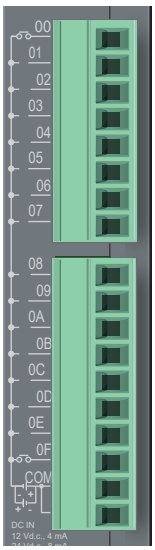
XBE-DC16B Circuit Configuration

Circuit Configuration



Top TB Description	*I/O Direct Variable*
00	%IX0.z.0
01	%IX0.z.1
02	%IX0.z.2
03	%IX0.z.3
04	%IX0.z.4
05	%IX0.z.5
06	%IX0.z.6
07	%IX0.z.7
Bottom TB Description	***I/O Direct Variable***
08	%IX0.z.8
09	%IX0.z.9
0A	%IX0.z.10
0B	%IX0.z.11
0C	%IX0.z.12
0D	%IX0.z.13
0E	%IX0.z.14
0F	%IX0.z.15
COM	n/a
COM	n/a

Terminal Block Image

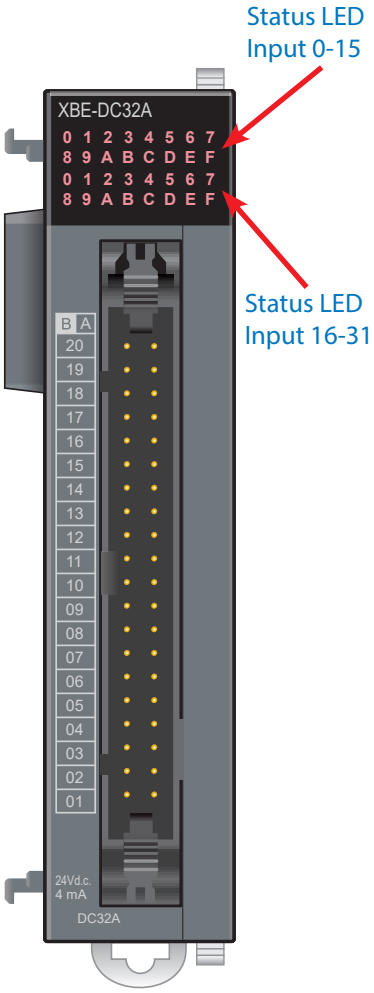


Note: Can be wired sinking or sourcing. In the I/O Direct Variable name, z=slot number.

XBE-DC32A Digital Input Module

Part Number	Price	Classification	Description	Drawing
XBE-DC32A	$107.00	Digital Input	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.	PDF

General Specifications		XBE-DC32A
Input Point		32 point
Insulation Method		Photo coupler insulation
Rated Input Voltage		24VDC
Rated Input Current		4mA
Operation Voltage Range		20.4–28.8 VDC (ripple rate <5%)
On Voltage/Current		19VDC or higher / 3mA or higher
Off Voltage/Current		6VDC or less / 1mA or less
Input Resistance		5.6 kΩ
Response Time	Off → On	1/3/5/10/20/70/100 ms (set by PLC parameter) Default: 3ms
	On → Off	
Insulation Pressure		560VACrms / 3 Cycle (2000m altitude)
Insulation Resistance		10MΩ or more by Megohmmeter
Common Method		32 point / COM
Proper Cable Size		Stranded cable 0.3 mm^2
Current Consumption		50mA (when all point On)
Operation Indicator		Input On, LED On
External Connection Method		40-pin connector
Weight		60g



XBE-DC32A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

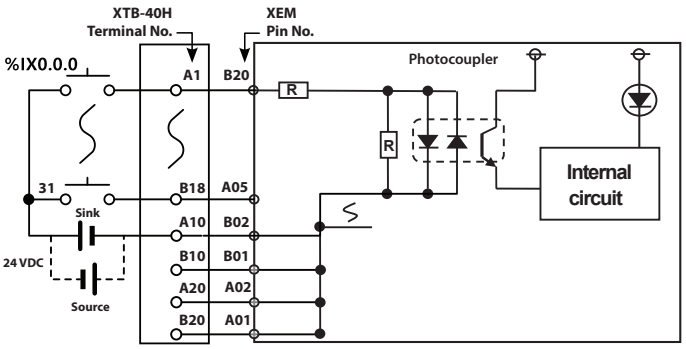
Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-DC32A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%IX0.z.0 – %IX0.z.31

"z" denotes the module slot (2 to 8).

Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-DC32A Digital Input Module Wiring



XBE-DC32A Circuit Configuration

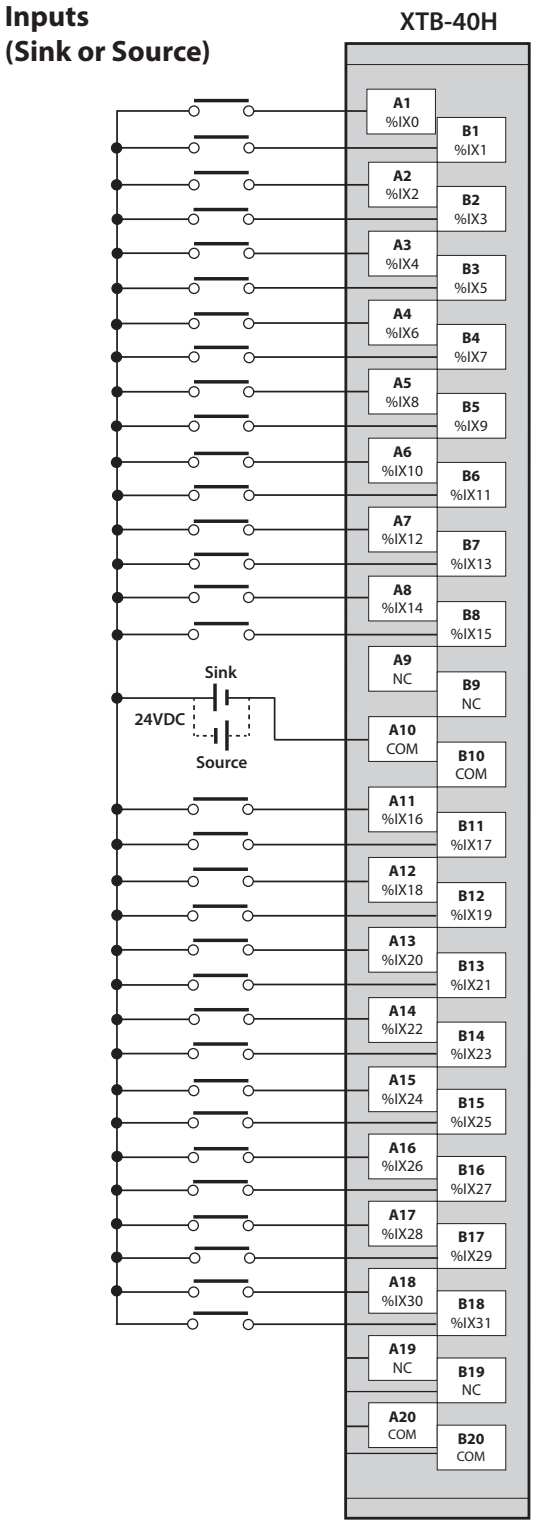
Circuit Configuration	Module Pins	XTB-40H Terminal	Direct Variable	Description
	B20	A1	%IX0.z.0	Input 0
	B19	B1	%IX0.z.1	Input 1
	B18	A2	%IX0.z.2	Input 2
	B17	B2	%IX0.z.3	Input 3
	B16	A3	%IX0.z.4	Input 4
	B15	B3	%IX0.z.5	Input 5
	B14	A4	%IX0.z.6	Input 6
	B13	B4	%IX0.z.7	Input 7
	B12	A5	%IX0.z.8	Input 8
	B11	B5	%IX0.z.9	Input 9
	B10	A6	%IX0.z.10	Input 10
	B09	B6	%IX0.z.11	Input 11
	B08	A7	%IX0.z.12	Input 12
	B07	B7	%IX0.z.13	Input 13
	B06	A8	%IX0.z.14	Input 14
	B05	B8	%IX0.z.15	Input 15
	B04	A9	–	NC
	B03	B9	–	NC
	B02	A10	–	COM
	B01	B10	–	COM
	A20	A11	%IX0.z.16	Input 16
	A19	B11	%IX0.z.17	Input 17
	A18	A12	%IX0.z.18	Input 18
	A17	B12	%IX0.z.19	Input 19
	A16	A13	%IX0.z.20	Input 20
	A15	B13	%IX0.z.21	Input 21
	A14	A14	%IX0.z.22	Input 22
	A13	B14	%IX0.z.23	Input 23
	A12	A15	%IX0.z.24	Input 24
	A11	B15	%IX0.z.25	Input 25
	A10	A16	%IX0.z.26	Input 26
	A09	B16	%IX0.z.27	Input 27
	A08	A17	%IX0.z.28	Input 28
	A07	B17	%IX0.z.29	Input 29
	A06	A18	%IX0.z.30	Input 30
	A05	B18	%IX0.z.31	Input 31
	A04	A19	–	NC
	A03	B19	–	NC
	A02	A20	–	COM
	A01	B20	–	COM

Note: Can be wired sinking or sourcing. In the I/O Direct Variable name, z=slot number.
Note 2: Input Ambient Temp Derating: Derate 5% for each degree above 50°C. Max 55°C (25% derating at 55°C).

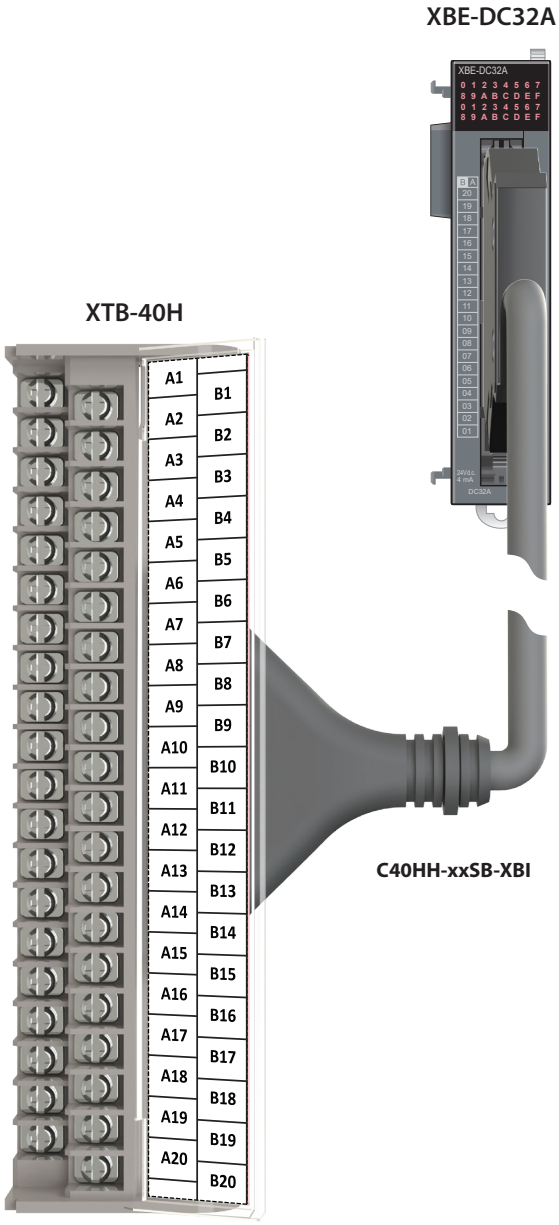
XBE-DC32A Digital Input Module Terminal Block Wiring

Download module specific XTB-40H Terminal Label Printouts here: Download Printouts

Terminal Wiring



PLC Connection



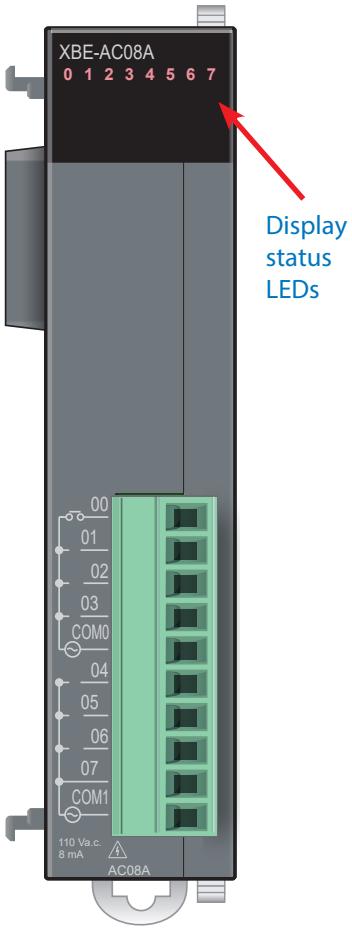
Note:

- Wiring: AWG22-16 (1.5mm^2/MAX)
- Screw: M3 X 8L
- Screw Torque: 1.2 N·m (12kgf·cm)

XBE-AC08A Digital Input Module

Part Number	Price	Classification	Description	Drawing
XBE-AC08A	$97.00	Digital Input	LS Electric XGB discrete input module, 8-point, 120 VAC, 2 common(s), 4 point(s) per common. Removable terminal blocks included.	PDF

General Specifications		XBE-AC08A
Input Point		8 point
Insulation Method		Photocoupler isolation
Rated Input Voltage		100-120 VAC (+10/-15%), 50/60 Hz (±Hz) (distortion rate <5%)
Rated Input Current		8mA at 60Hz, 7mA at 50Hz
Operation Voltage Range		82–132 VAC
On Voltage/Current		80VAC or higher, 5mA or higher 50/60 Hz
Off Voltage/Current		30VAC or lower, 1mA or lower 50/60 Hz
Input Resistance		12kΩ 60Hz, 15kΩ 50Hz
Response Time	Off → On	20ms or less (100VAC 50/60 Hz)
	On → Off	25ms or less (100VAC 50/60 Hz)
Insulation Pressure		560VACrms / 3 Cycle (2000m altitude)
Insulation Resistance		3000VACrms / 3 cycle (altitude 2000m), 10MΩ or more by Megohmmeter
Common Method		4 point/common
Proper Cable Size		0.05–1.5 mm^2 (30–16 AWG), Cu wire, PCB terminal block
Current Consumption		30mA (when all point On)
Operation Indicator		Input On, LED On
External Connection Method		10-point terminal block connector
Weight		70g



XBE-AC08A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-AC08A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%IX0.z.0 – %IX0.z.7

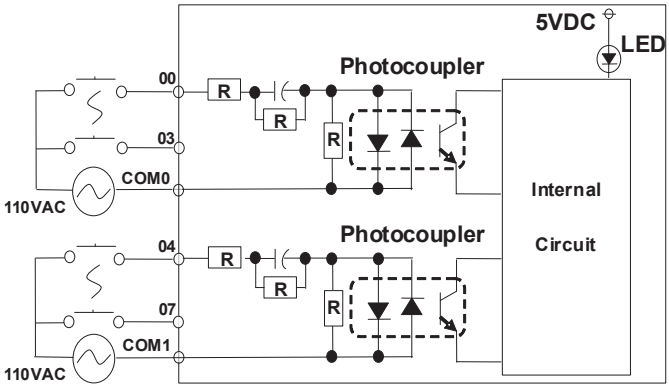
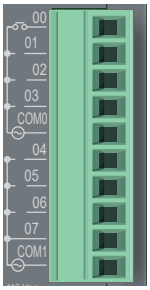
"z" denotes the module slot (2 to 8).

Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-AC08A Digital Input Module Wiring

XBE-AC08A Circuit Configuration

Circuit Configuration	*Terminal Block Description*	*I/O Direct Variable*	*Terminal Block Image*
	00	%IX0.z.0	
	01	%IX0.z.1	
	02	%IX0.z.2	
	03	%IX0.z.3	
	COM0	n/a	
	04	%IX0.z.4	
	05	%IX0.z.5	
	06	%IX0.z.6	
	07	%IX0.z.7	
	COM1	n/a	

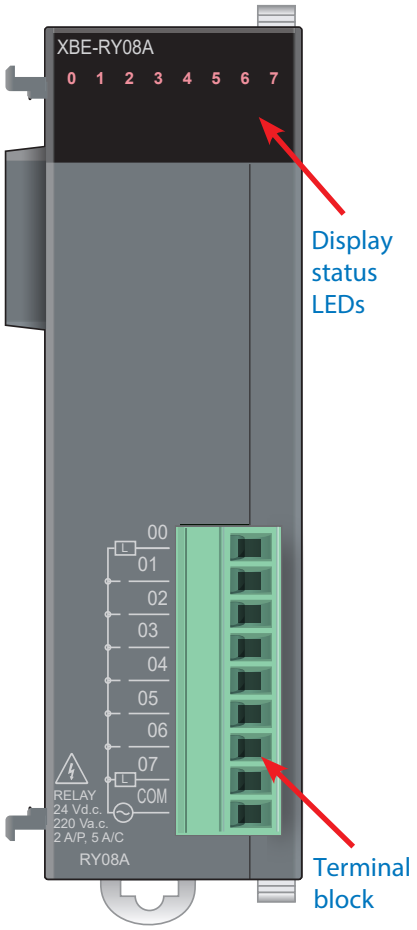
Note: In the I/O Direct Variable name, z=slot number.

XBE-RY08A Digital Output Module

XBE-RY08A is an 8-point relay output card where all outputs share 1 common.

Part Number	Price	Classification	Description	Drawing
XBE-RY08A	$95.00	Relay Output Module	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.	PDF

General Specifications		XBE-RY08A
Output Point		8 point
Insulation Method		Relay insulation
Rated Load Voltage		24VDC (resistive load) / 220VAC (COSΨ=1), 5A/COM
Rated Load Current		2A
Minimum Load Voltage/ Current		5VDC / 1mA
Maximum Load Voltage		250VAC, 125VDC
Off-leakage Current		0.1 mA (220VAC, 60Hz)
Maximum On/Off Frequency		3,600 times/hour
Over Voltage Protection		None
Service Life	Mechanical	20 million times or more
	Electrical	Rated load voltage / current 100,000 times or more
		200VAC / 1.5 A, 240VAC / 1A (COSΨ=0.7) 100,000 times or more
		200VAC / 1A, 240VAC / 0.5 A (COSΨ=0.35) 100,000 times or more
		24VDC / 1A, 100VDC / 0.1 A (L/R=7ms) 100,000 times or more
Response Time	Off → On	10ms or less
	On → Off	12ms or less
Common Method		8 point / COM
Proper Cable Size		Standard cable 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
Current Consumption		220mA (when all point ON)
Operation Indicator		Output ON, LED ON
External Connection Method		9 point terminal block connector
Weight		80g



XBE-RY08A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input direct variable assignments.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-RY08A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%QX0.z.0 – %QX0.z.7

"z" denotes the module slot (2 to 8).

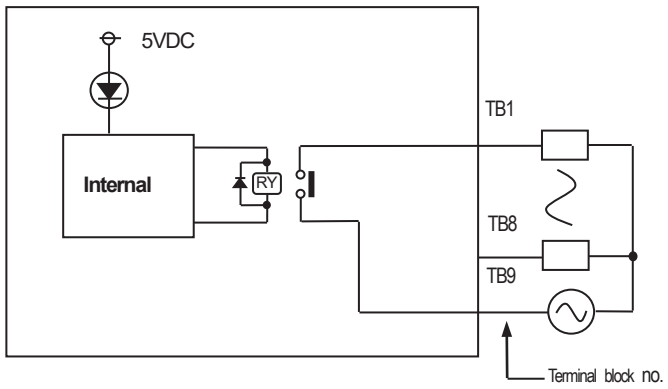
Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-RY08A Digital Output Module Wiring

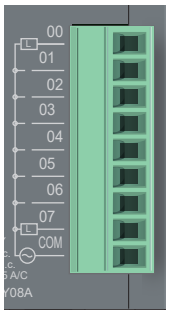
XBE-RY08A Circuit Configuration

Circuit Configuration



Terminal Description	*I/O Direct Variable*
00	%QX0.z.0
01	%QX0.z.1
02	%QX0.z.2
03	%QX0.z.3
04	%QX0.z.4
05	%QX0.z.5
06	%QX0.z.6
07	%QX0.z.7
COM	n/a

Terminal Block Image

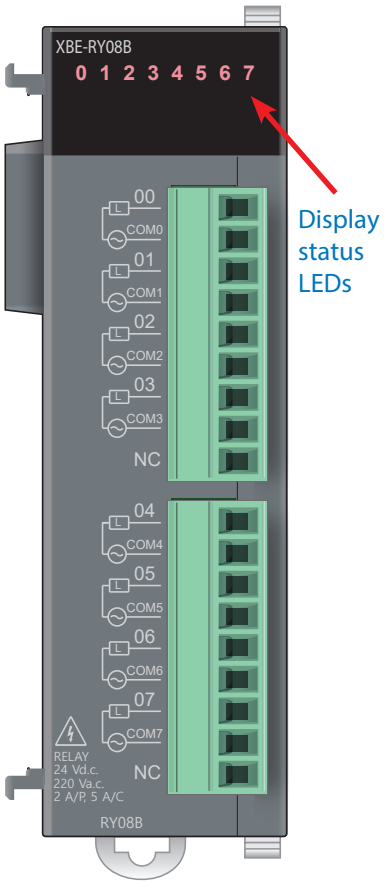


Note: In the I/O Direct Variable name, z=slot number.

XBE-RY08B Digital Output Module

Part Number	Price	Classification	Description	Drawing
XBE-RY08B	$105.00	Digital Output	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.	PDF

General Specifications		XBE-RY08B
Output Point		8 point
Insulation Method		Relay insulation
Rated Load Voltage		24VDC (resistive load) / 220VAC (COSΨ=1)
Rated Load Current		2A
Minimum Load Voltage/ Current		5VDC / 1mA
Maximum Load Voltage		250VAC, 124VDC
Off-leakage Current		0.1 mA (220VAC, 60Hz)
Maximum On/Off Frequency		3,600 times/hour
Over Voltage Protection		None
Service Life	Mechanical	20 million times or more
	Electrical	Rated load voltage / current 100,000 times or more
		200VAC / 1.5 A, 240VAC / 1A (COSΨ=0.7) 100,000 times or more
		200VAC / 1A, 240VAC / 0.5 A (COSΨ=0.35) 100,000 times or more
		24VDC / 1A, 100VDC / 0.1 A (L/R=7ms) 100,000 times or more
Response Time	Off → On	10ms or less
	On → Off	12ms or less
Common Method		1 point / COM
Proper Cable Size		Standard cable 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
Current Consumption		230mA (when all point ON)
Operation Indicator		Output ON, LED ON
External Connection Method		9 point terminal block connector x 2
Weight		81g



XBE-RY08B - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input direct variable assignments.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-RY08B	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%QX0.z.0 – %QX0.z.7

"z" denotes the module slot (2 to 8).

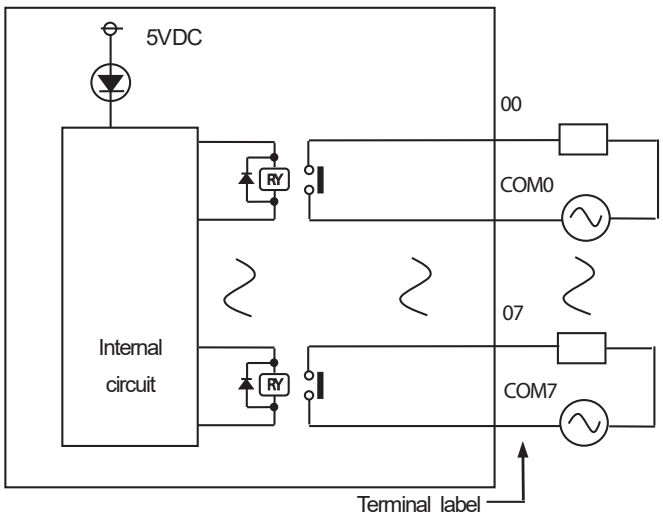
Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-RY08B Digital Output Module Wiring

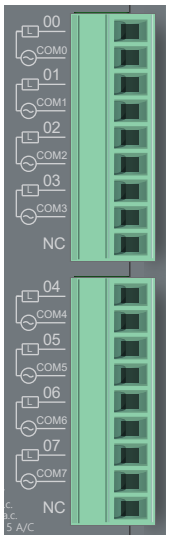
XBE-RY08B Circuit Configuration

Circuit Configuration



Top TB Description	*I/O Direct Variable*
00	%QX0.z.0
COM0	–
01	%QX0.z.1
COM1	–
02	%QX0.z.2
COM2	–
03	%QX0.z.3
COM3	–
NC	–
Bottom TB Description	***I/O Direct Variable***
04	%QX0.z.4
COM4	–
05	%QX0.z.5
COM5	–
06	%QX0.z.6
COM6	–
07	%QX0.z.7
COM7	–
NC	–

Terminal Block Image

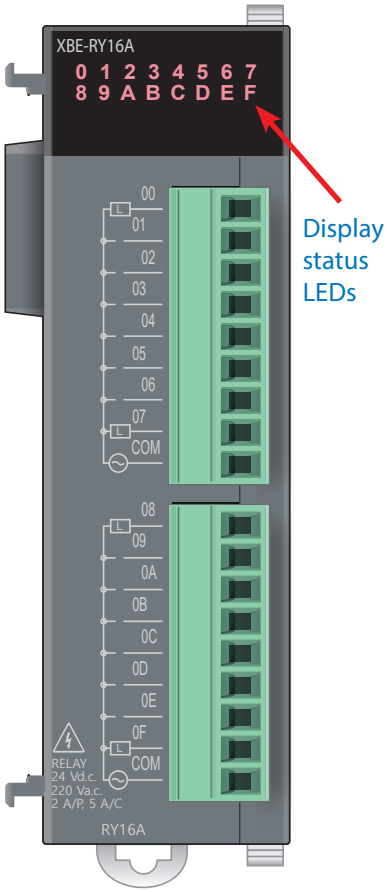


Note: In the I/O Direct Variable name, z=slot number.

XBE-RY16A Relay Output Module

Part Number	Price	Classification	Description	Drawing
XBE-RY16A	$121.00	Relay Output	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.	PDF

General Specifications		XBE-RY16A
Input Point		16 point
Insulation Method		Relay insulation
Rated Input Voltage		24VDC (resistive load), 220VAC (COSΨ=1)
Rated Input Current		2A/point, 5A/COM
Minimum Load Voltage/ Current		5VDC / 1mA
Maximum Load Voltage		250VAC, 125VDC
Off Leakage Current		0.1 mA (220VAC, 60Hz)
Maximum On/Off Frequency		3,600 times/hr
Over Voltage Protection		None
Service Life	Mechanical	20 million times or more
	Electrical	Rated load voltage / current 100,000 times or more
		200VAC / 1.5 A, 240VAC / 1A (COSΨ=0.7) 100,000 times or more
		200VAC / 1A, 240VAC / 0.5 A (COSΨ=0.35) 100,000 times or more
		24VDC / 1A, 100VDC / 0.1 A (L/R=7ms) 100,000 times or more
Response Time	Off → On	10ms or less
	On → Off	12ms or less
Common Method		8 point/COM
Proper Cable Size		Standard cable 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
Current Consumption		420mA (when all point ON)
Operation Indicator		Output ON, LED ON
External Connection Method		9 point terminal block connector x 2
Weight		130g



XBE-RY16A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-RY16A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%QX0.z.0 – %QX0.z.15

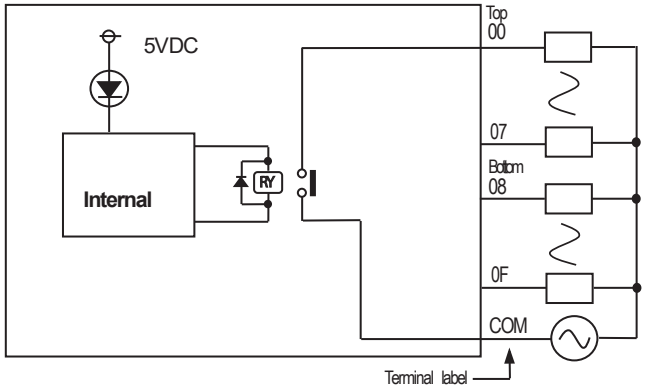
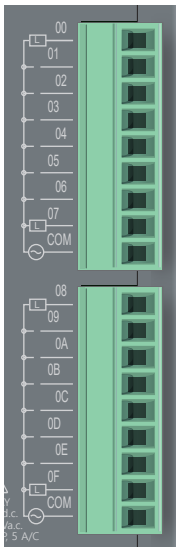
"z" denotes the module slot (2 to 8).

Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-RY16A Relay Output Module Wiring

XBE-RY16A Circuit Configuration

Circuit Configuration	Top TB Description	I/O Direct Variable	Terminal Block Image
	00	%QX0.z.0	
	01	%QX0.z.1	
	02	%QX0.z.2	
	03	%QX0.z.3	
	04	%QX0.z.4	
	05	%QX0.z.5	
	06	%QX0.z.6	
	07	%QX0.z.7	
	COM	n/a	
	Bottom TB Description	**I/O Direct Variable**	
	08	%QX0.z.8	
	09	%QX0.z.9	
	0A	%QX0.z.10	
	0B	%QX0.z.11	
	0C	%QX0.z.12	
	0D	%QX0.z.13	
	0E	%QX0.z.14	
	0F	%QX0.z.15	
	COM	n/a	

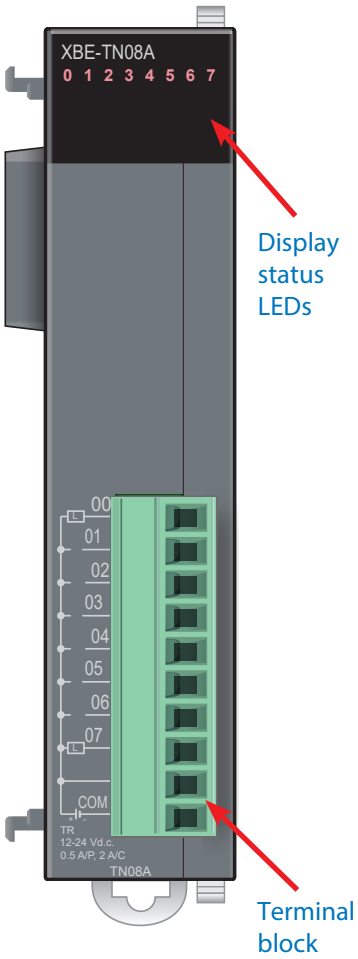
Note: In the I/O Direct Variable name, z=slot number.

XBE-TN08A Digital Output Module

XBE-TN08A is an 8-point sinking discrete output module that supports 12VDC – 24 VDC.

Part Number	Price	Classification	Description	Drawing
XBE-TN08A	$66.00	Digital Output Module	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.	PDF

General Specifications		XBE-TN08A
Input Point		8 point
Insulation Method		Photocoupler insulation
Rated Load Voltage		12/24 VDC
Load Voltage Range		10.2–26.4 VDC
Maximum Load Current		0.5 A /1 point
Off Leakage Current		0.1 mA or less
Maximum Inrush Current		4A/10ms or less
Maximum Voltage Drop (On)		0.4 VDC or less
Over Voltage Protection		Zener Diode
Response Time	Off → On	1ms or less
	On → Off	1ms or less (Rated load, resistive load)
Common Method		8 point/COM
Proper Cable Size		Stranded cable 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
Current Consumption		40mA (when all points On)
External Power Supply	Voltage	12/24 VDC ± 10% (ripple voltage 4 Vp-p or less)
	Current	10mA or less (24VDC connection)
Operation Indicator		Output ON, LED ON
External Connection Method		10 point terminal block connector
Weight		52g



XBE-TN08A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-TN08A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%QX0.z.0 – %QX0.z.7

"z" denotes the module slot (2 to 8).

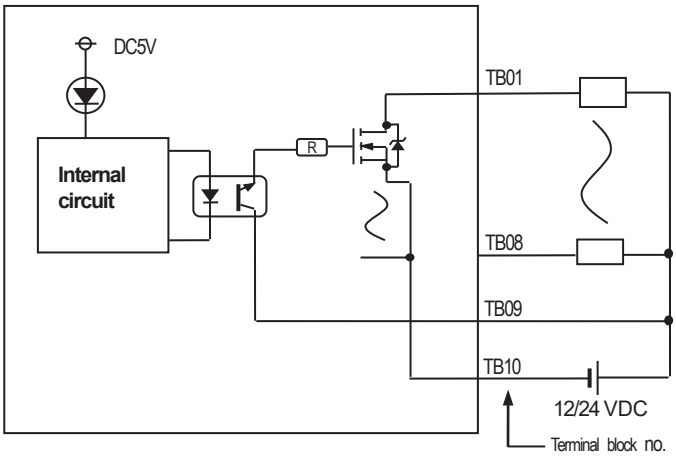
Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-TN08A Digital Output Module Wiring

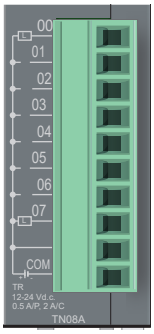
XBE-TN08A Circuit Configuration

Circuit Configuration



Terminal Description	*I/O Direct Variable*
00	%QX0.z.0
01	%QX0.z.1
02	%QX0.z.2
03	%QX0.z.3
04	%QX0.z.4
05	%QX0.z.5
06	%QX0.z.6
07	%QX0.z.7
(no label,12/24V)	n/a
COM	n/a

Terminal Block Image

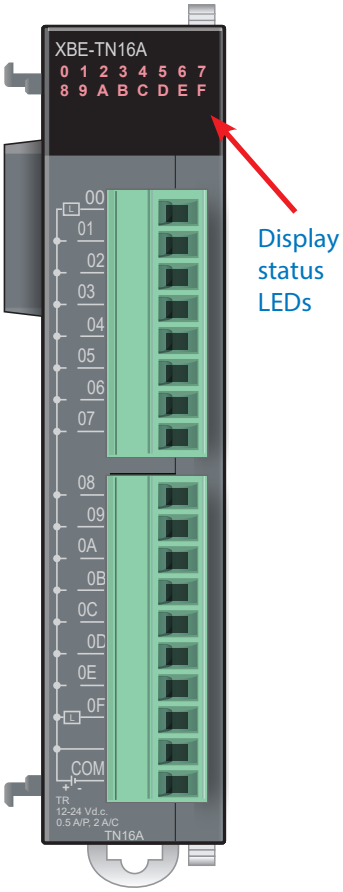


Note: In the I/O Direct Variable name, z=slot number.

XBE-TN16A Digital Output Module

Part Number	Price	Classification	Description	Drawing
XBE-TN16A	$86.00	Digital Output	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.	PDF

General Specifications		XBE-TN16A
Input Point		16 point
Insulation Method		Photo coupler insulation
Rated Load Voltage		12/24 VDC
Load Voltage Range		10.2 – 26.4 VDC
Maximum Load Current		0.5 A / 1 point, 2A / 1COM
Off Leakage Current		0.1 mA or less
Maximum Inrush Current		4A / 10ms or less
Mximum Voltage Drop (On)		0.4 VDC or less
Over Voltage Protection		Zener Diode
Response Time	Off → On	1ms or less
	On → Off	1ms or less (Rated load, resistive load)
Common Method		16 point / COM
Proper Cable Size		Standard cable 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
Current Consumption		60mA (when all point On)
External Power Supply	Voltage	12/24 VDC ± 10% (ripple voltage 4 Vp-p or less)
	Current	10mA or less (24VDC connection)
Operation Indicator		Output On, LED On
External Connection Method		8 pin terminal block connector + 10 pin terminal block connector
Weight		54g



XBE-TN16A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-TN16A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%QX0.z.0 – %QX0.z.15

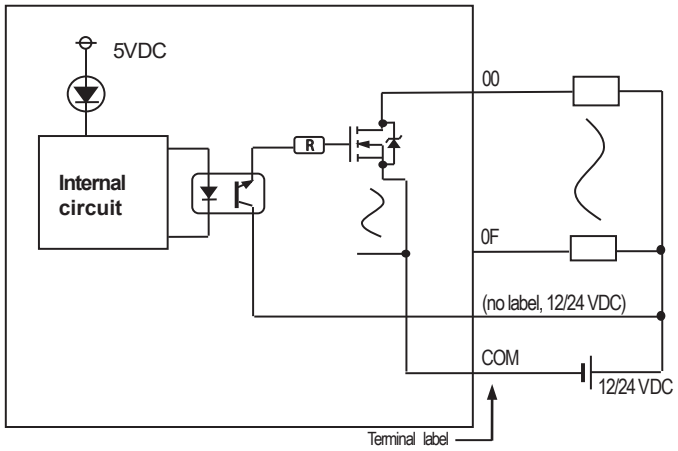
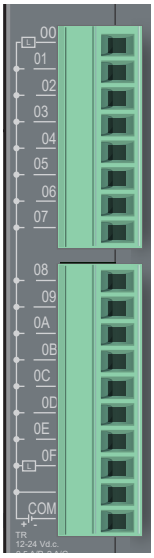
"z" denotes the module slot (2 to 8).

Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-TN16A Digital Output Module Wiring

XBE-TN16A Circuit Configuration

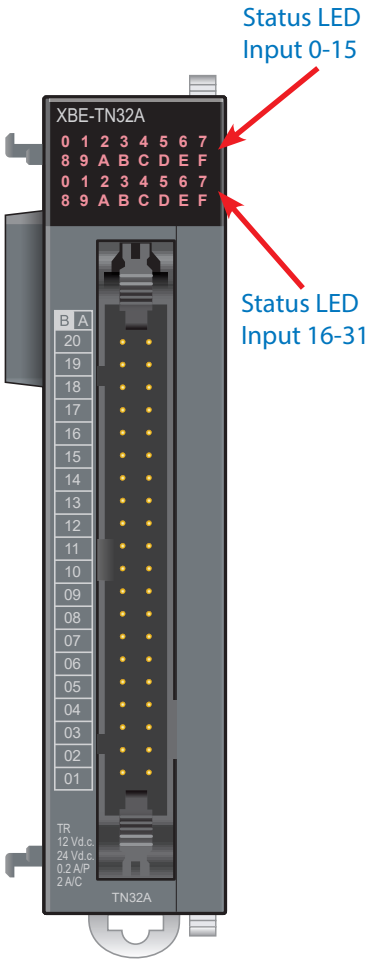
Circuit Configuration	Top TB Description	I/O Direct Variable	Terminal Block Image
	00	%QX0.z.0	
	01	%QX0.z.1	
	02	%QX0.z.2	
	03	%QX0.z.3	
	04	%QX0.z.4	
	05	%QX0.z.5	
	06	%QX0.z.6	
	07	%QX0.z.7	
	Bottom TB Description	**I/O Direct Variable**	
	08	%QX0.z.8	
	09	%QX0.z.9	
	0A	%QX0.z.10	
	0B	%QX0.z.11	
	0C	%QX0.z.12	
	0D	%QX0.z.13	
	0E	%QX0.z.14	
	0F	%QX0.z.15	
	(no label,12/24V)	–	
	COM	–	

Note: In the I/O Direct Variable name, z=slot number.

XBE-TN32A Digital Output Module

Part Number	Price	Classification	Description	Drawing
XBE-TN32A	$120.00	Digital Output	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.	PDF

General Specifications		XBE-TN32A
Input Point		32 point
Insulation Method		Photocoupler insulation
Rated Load Voltage		12/24 VDC
Load Voltage Range		10.2 – 26.4 VDC
Maximum Load Current		0.2 A / 1 point, 2A / 1COM
Off Leakage Current		0.1 mA or less
Maximum Inrush Current		0.7 A / 10ms or less
Maximum Voltage Drop (On)		0.4 VDC or less
Over Voltage Protection		Zener Diode
Response Time	Off → On	1ms or less
	On → Off	1ms or less (rated load, resistive load)
Common Method		32 point / COM
Proper Cable Size		0.3 mm^2
Current Consumption		120mA (when all point On)
External Power Supply	Voltage	12/24 VDC ± 10% (ripple voltage 4 Vp-p or less)
	Current	20mA or less (24VDC connection)
Operation Indicator		Output On, LED On
External Connection Method		40 pin connector
Weight		60g



XBE-TN32A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

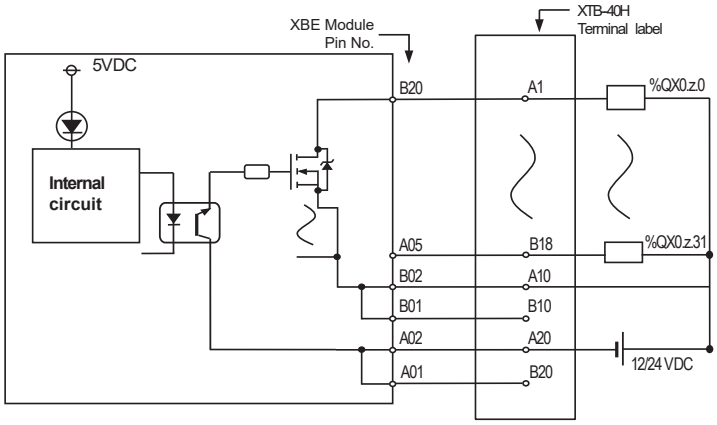
Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-TN32A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%QX0.z.0 – %QX0.z.31

"z" denotes the module slot (2 to 8).

Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-TN32A Digital Output Module Wiring

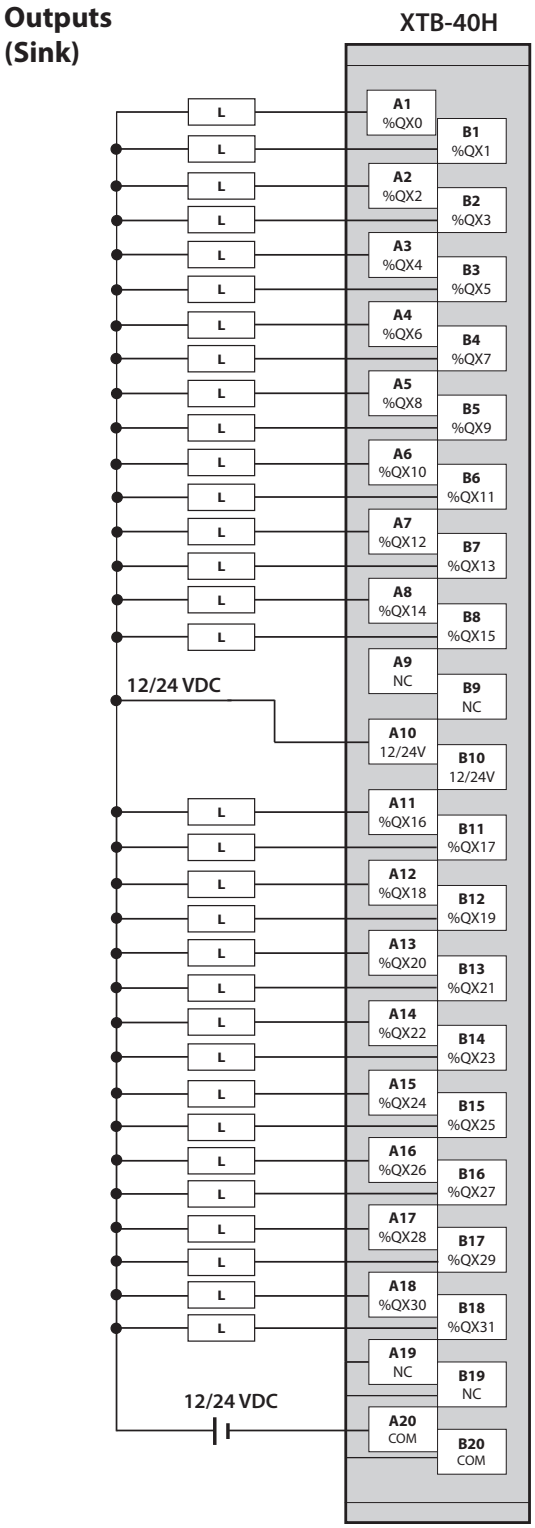
XBE-TN32A Circuit Configuration				
Circuit Configuration	*Module Pins*	*XTB-40H Terminal*	*Direct Variable*	*Description*
	B20	A1	%QX0.z.0	Output 0
	B19	B1	%QX0.z.1	Output 1
	B18	A2	%QX0.z.2	Output 2
	B17	B2	%QX0.z.3	Output 3
	B16	A3	%QX0.z.4	Output 4
	B15	B3	%QX0.z.5	Output 5
	B14	A4	%QX0.z.6	Output 6
	B13	B4	%QX0.z.7	Output 7
	B12	A5	%QX0.z.8	Output 8
	B11	B5	%QX0.z.9	Output 9
	B10	A6	%QX0.z.10	Output 10
	B09	B6	%QX0.z.11	Output 11
	B08	A7	%QX0.z.12	Output 12
	B07	B7	%QX0.z.13	Output 13
	B06	A8	%QX0.z.14	Output 14
	B05	B8	%QX0.z.15	Output 15
	B04	A9	–	NC
	B03	B9	–	NC
	B02	A10	–	+12/24 V
	B01	B10	–	+12/24 V
	A20	A11	%QX0.z.16	Output 16
	A19	B11	%QX0.z.17	Output 17
	A18	A12	%QX0.z.18	Output 18
	A17	B12	%QX0.z.19	Output 19
	A16	A13	%QX0.z.20	Output 20
	A15	B13	%QX0.z.21	Output 21
	A14	A14	%QX0.z.22	Output 22
	A13	B14	%QX0.z.23	Output 23
	A12	A15	%QX0.z.24	Output 24
	A11	B15	%QX0.z.25	Output 25
	A10	A16	%QX0.z.26	Output 26
	A09	B16	%QX0.z.27	Output 27
	A08	A17	%QX0.z.28	Output 28
	A07	B17	%QX0.z.29	Output 29
	A06	A18	%QX0.z.30	Output 30
	A05	B18	%QX0.z.31	Output 31
	A04	A19	–	NC
	A03	B19	–	NC
	A02	A20	–	COM
	A01	B20	–	COM

Note: In the I/O Direct Variable name, z=slot number.

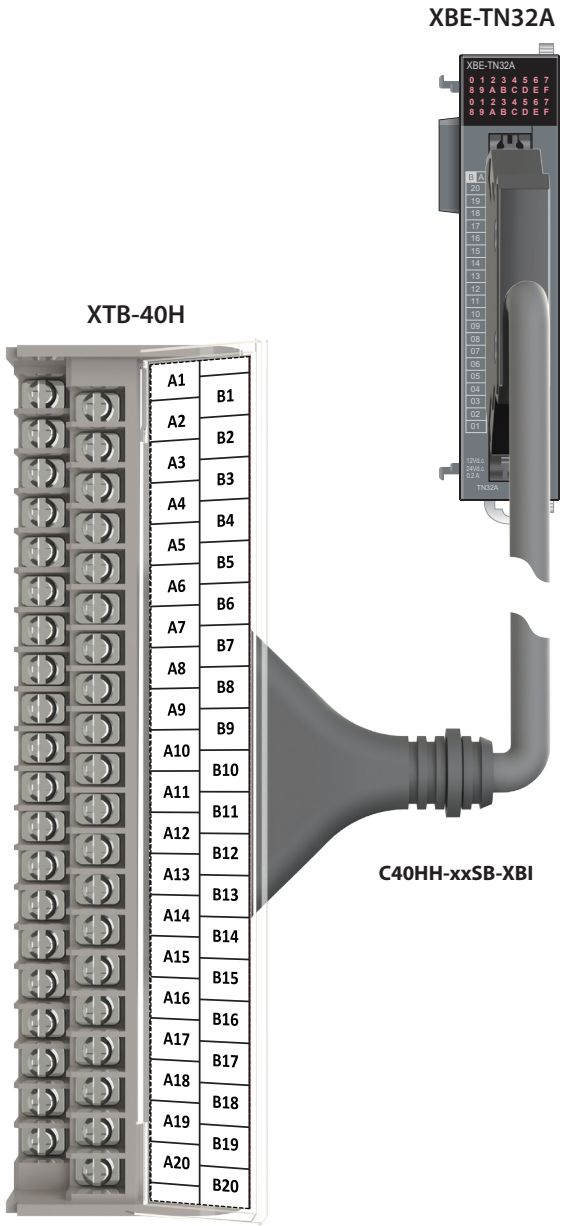
XBE-TN32A Digital Output Module Terminal Block Wiring

Download module specific XTB-40H Terminal Label Printouts here: Download Printouts

Terminal Wiring



PLC Connection



Note:

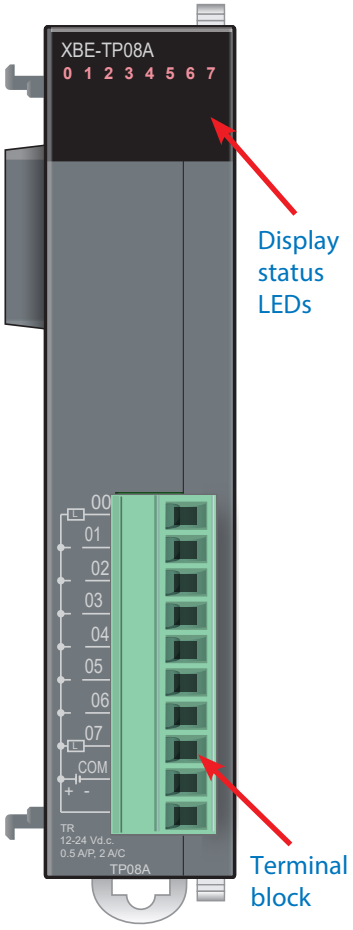
- Wiring: AWG22-16 (1.5mm^2/MAX)
- Screw: M3 X 8L
- Screw Torque: 1.2 N·m (12kgf·cm)

XBE-TP08A Digital Output Module

XBE-TP08A is an 8-point sourcing discrete output module that supports 12VDC – 24VDC.

Part Number	Price	Classification	Description	Drawing
XBE-TP08A	$69.00	Digital Output Module	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.	PDF

General Specifications		XBE-TP08A
Output Point		8 point
Insulation Method		Photocoupler insulation
Rated Load Voltage		12/24 VDC
Load Voltage Range		10.2–26.4 VDC
Maximum Load Current		0.5 A / 1 point
Off Leakage Current		0.1 mA or less
Maximum Inrush Current		4A / 10ms or less
Maximum Voltage Drop (On)		0.4 VDC or less
Over Voltage Protection		Zener Diode
Response Time	Off → On	1ms or less
	On → Off	1ms or less (rated load, resistive load)
Common Method		8 point / COM
Proper Cable Size		Stranded cable 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
Current Consumption		40mA (when all point On)
External Power Supply	Voltage	12/24 VDC ± 10% (ripple voltage 4 Vp-p or less)
	Current	10mA or less (24VDC connection)
Operation Indicator		Output ON, LED ON
External Connection Method		10 pin terminal block connector
Weight		30g



XBE-TP08A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-TP08A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%QX0.z.0 – %QX0.z.7

"z" denotes the module slot (2 to 8).

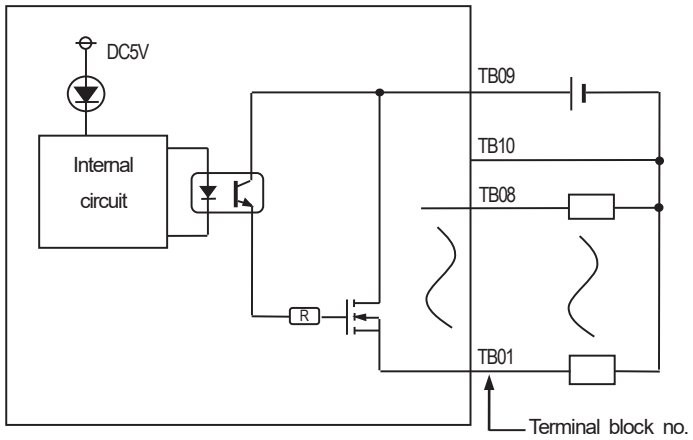
Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-TP08A Digital Output Module Wiring

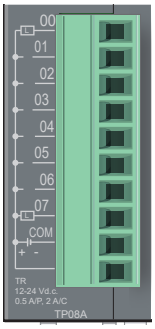
XBE-TP08A Circuit Configuration

Circuit Configuration



Terminal Description	*I/O Direct Variable*
00	%QX0.z.0
01	%QX0.z.1
02	%QX0.z.2
03	%QX0.z.3
04	%QX0.z.4
05	%QX0.z.5
06	%QX0.z.6
07	%QX0.z.7
COM (12/24 VDC)	n/a
(no label, 0VDC)	n/a

Terminal Block Image

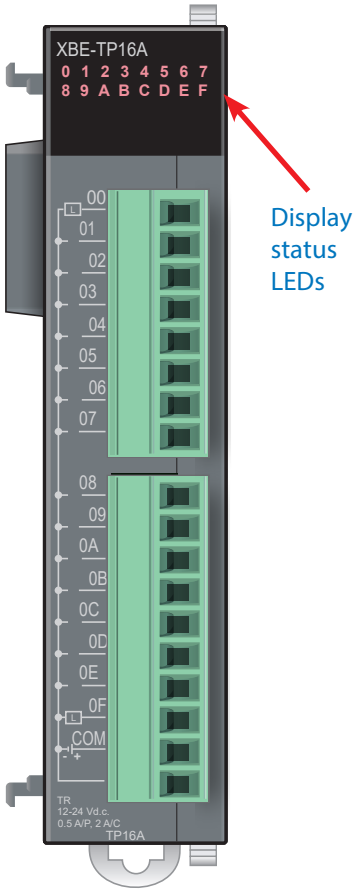


Note: In the I/O Direct Variable name, z=slot number.

XBE-TP16A Digital Output Module

Part Number	Price	Classification	Description	Drawing
XBE-TP16A	$97.00	Digital Output	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.	PDF

General Specifications		XBE-TP16A
Input Point		16 point
Insulation Method		Photocoupler insulation
Rated Load Voltage		12/24 VDC
Load Voltage Range		10.2 – 26.4 VDC
Maximum Load Current		0.5 A / 1 point, 2A / 1COM
Off Leakage Current		0.1 mA or less
Maximum Inrush Current		4A / 10ms or less
Maximum Voltage Drop (On)		0.4 VDC or less
Over Voltage Protection		Zener diode
Response Time	Off → On	1ms or less
	On → Off	1ms or less (rated load, resistive load)
Common Method		16 point / COM
Proper Cable Size		Standard cable 0.3–0.75 mm^2 (external diameter 2.8 mm or less)
Current Consumption		60mA (when all point On)
External Power Supply	Voltage	12/24 VDC ± 10% (ripple voltage 4 Vp-p or less)
	Current	10mA or less (24VDC connection)
Operation Indicator		LED On when output On
External Connection Method		8 pin terminal block connector + 10 pin terminal block connector
Weight		40g



XBE-TP16A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

FFor Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-TP16A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%QX0.z.0 – %QX0.z.15

"z" denotes the module slot (2 to 8).

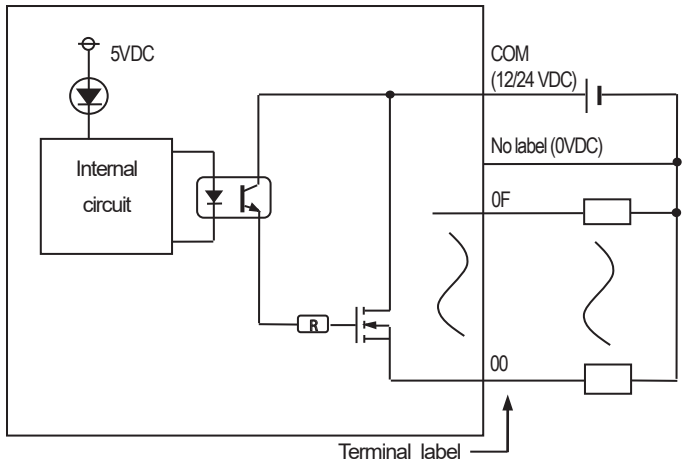
Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-TP16A Digital Output Module Wiring

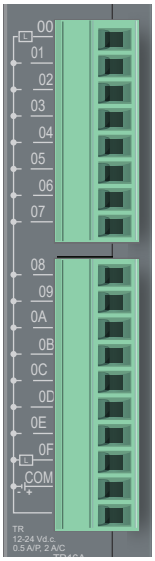
XBE-TP16A Circuit Configuration

Circuit Configuration



Top TB Description	*I/O Direct Variable*
00	%IX0.z.0
01	%IX0.z.1
02	%IX0.z.2
03	%IX0.z.3
04	%IX0.z.4
05	%IX0.z.5
06	%IX0.z.6
07	%IX0.z.7
Bottom TB Description	***I/O Direct Variable***
08	%IX0.z.8
09	%IX0.z.9
0A	%IX0.z.10
0B	%IX0.z.11
0C	%IX0.z.12
0D	%IX0.z.13
0E	%IX0.z.14
0F	%IX0.z.15
COM (12/24 VDC)	–
(no label, 0VDC)	–

Terminal Block Image

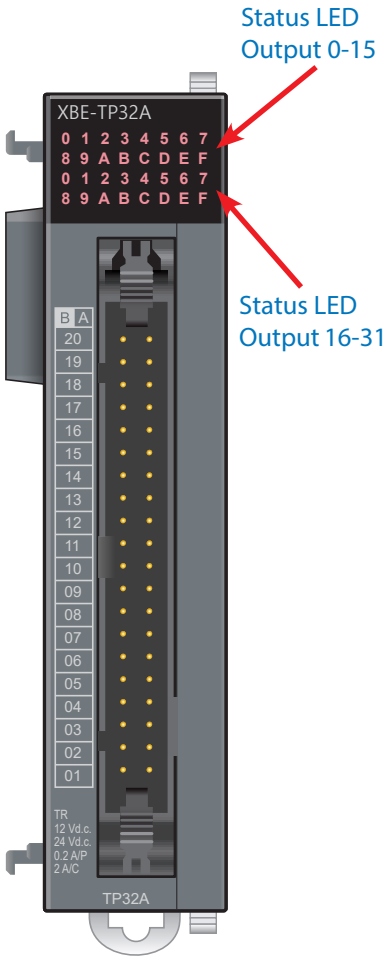


Note: In the I/O Direct Variable name, z=slot number.

XBE-TP32A Digital Output Module

Part Number	Price	Classification	Description	Drawing
XBE-TP32A	$103.00	Digital Output	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.	PDF

General Specifications		XBE-TP32A
Input Point		32 point
Insulation Method		Photocoupler insulation
Rated Load Voltage		12/24 VDC
Load Voltage Range		10.2 – 26.4 VDC
Maximum Load Current		0.2 A / 1 point, 2A / 1COM
Off Leakage Current		0.1 mA or less
Maximum Inrush Current		4A / 10ms or less
Maximum Voltage Drop (On)		0.4 VDC or less
Over Voltage Protection		Zener diode
Response Time	Off → On	1ms or less
	On → Off	1ms or less (rated load, resistive load)
Common Method		32 point / COM
Proper Cable Size		0.3 mm^2
Current Consumption		120mA (when all point On)
External Power Supply	Voltage	12/24 VDC ± 10% (ripple voltage 4 Vp-p or less)
	Current	20mA or less (24VDC connection)
Operation Indicator		LED On when output On
External Connection Method		40 pin connector
Weight		60g



XBE-TP32A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-TP32A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%QX0.z.0 – %QX0.z.31

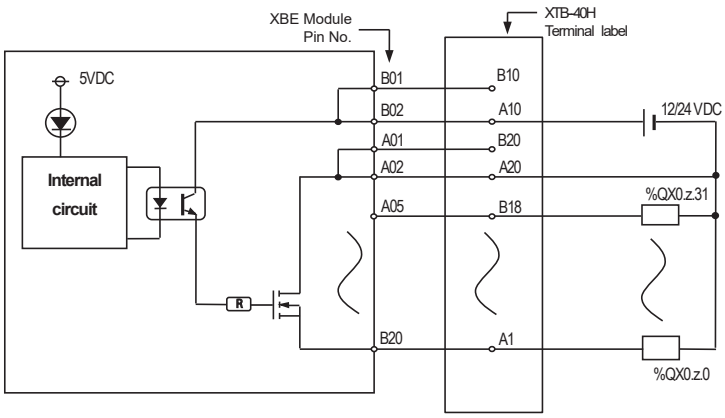
"z" denotes the module slot (2 to 8).

Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-TP32A Digital Output Module Wiring

XBE-TP32A Circuit Configuration

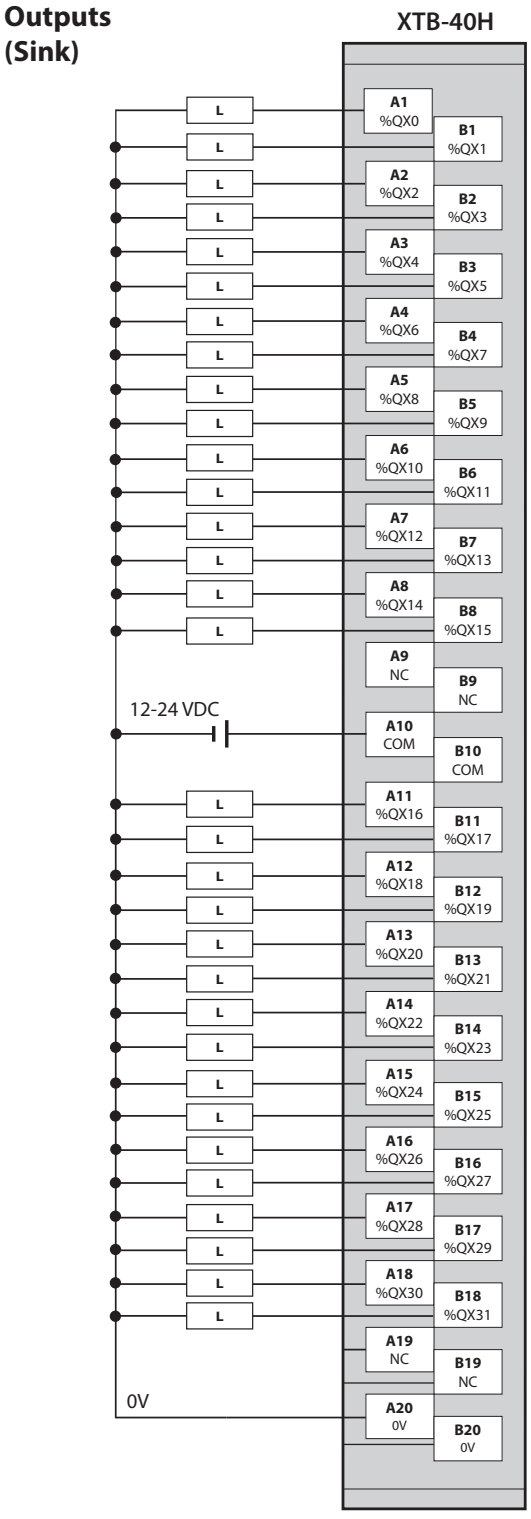
Circuit Configuration	Module Pins	XTB-40H Terminal	Direct Variable	Description
	B20	A1	%QX0.z.0	Output 0
	B19	B1	%QX0.z.1	Output 1
	B18	A2	%QX0.z.2	Output 2
	B17	B2	%QX0.z.3	Output 3
	B16	A3	%QX0.z.4	Output 4
	B15	B3	%QX0.z.5	Output 5
	B14	A4	%QX0.z.6	Output 6
	B13	B4	%QX0.z.7	Output 7
	B12	A5	%QX0.z.8	Output 8
	B11	B5	%QX0.z.9	Output 9
	B10	A6	%QX0.z.10	Output 10
	B09	B6	%QX0.z.11	Output 11
	B08	A7	%QX0.z.12	Output 12
	B07	B7	%QX0.z.13	Output 13
	B06	A8	%QX0.z.14	Output 14
	B05	B8	%QX0.z.15	Output 15
	B04	A9	–	NC
	B03	B9	–	NC
	B02	A10	–	External Power Common
	B01	B10	–	External Power Common
	A20	A11	%QX0.z.16	Output 16
	A19	B11	%QX0.z.17	Output 17
	A18	A12	%QX0.z.18	Output 18
	A17	B12	%QX0.z.19	Output 19
	A16	A13	%QX0.z.20	Output 20
	A15	B13	%QX0.z.21	Output 21
	A14	A14	%QX0.z.22	Output 22
	A13	B14	%QX0.z.23	Output 23
	A12	A15	%QX0.z.24	Output 24
	A11	B15	%QX0.z.25	Output 25
	A10	A16	%QX0.z.26	Output 26
	A09	B16	%QX0.z.27	Output 27
	A08	A17	%QX0.z.28	Output 28
	A07	B17	%QX0.z.29	Output 29
	A06	A18	%QX0.z.30	Output 30
	A05	B18	%QX0.z.31	Output 31
	A04	A19	–	NC
	A03	B19	–	NC
	A02	A20	–	0V GND
	A01	B20	–	0V GND

Note: In the I/O Direct Variable name, z=slot number.

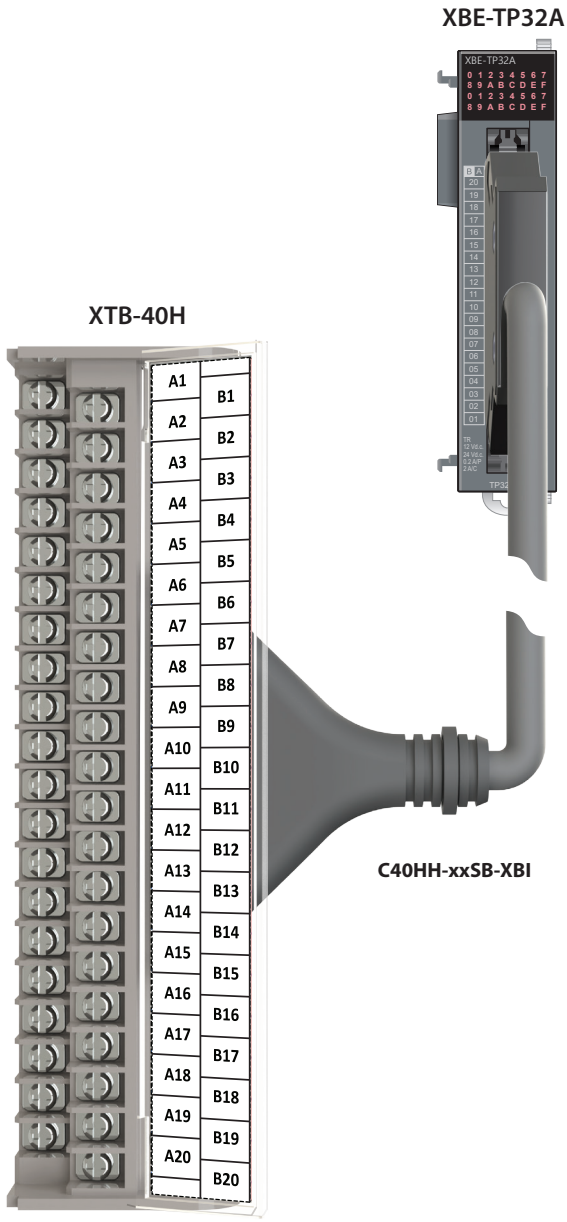
XBE-TP32A Digital Output Module Terminal Block Wiring

Download module specific XTB-40H Terminal Label Printouts here: Download Printouts

Terminal Wiring



PLC Connection

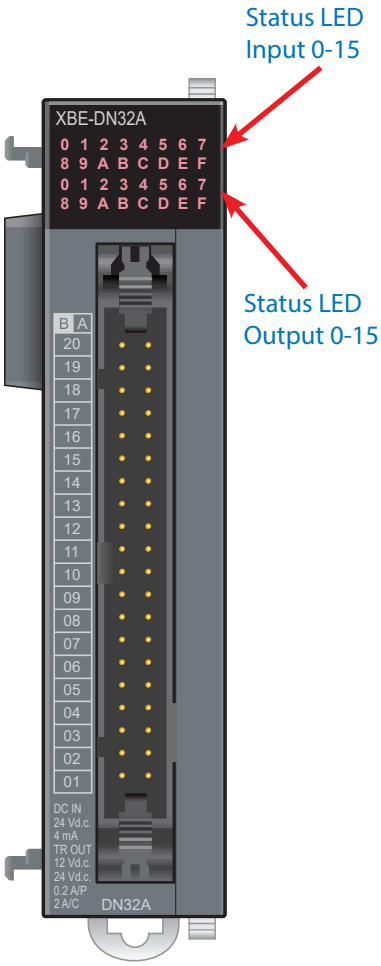


LS ELECTRIC

XGB Digital Modules

XBE-DN32A Digital Combo Module

Part Number	Price	Classification	Description	Drawing
XBE-DN32A	$190.00	Digital Input/Output	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.	PDF



General Specifications			XBE-DN32A
Input Specifications	Input Point		16 point
	Rated Input Voltage		24VDC
	Rated Input Current		~ 4mA
	Operation Voltage Range		20.4 – 28.8 VDC (ripple rate <5%)
	On Voltage/Current		19VDC or higher / 3mA or higher
	Off Voltage/Current		6VDC or less / 1mA or less
	Input Resistance		~ 5.6kΩ
	Response Time	Off → On	1/3/5/10/20/70/100 ms (set by CPU parameter) Default: 3ms
		On → Off	
	Common Method		16 point / COM
Output Specifications	Output Point		16 point
	Rated Voltage		12/24 VDC
	Operation Voltage Range		10.2–26.4 VDC
	Operation Load Current		0.2 A / 1 point, 2A / 1COM
	Off Leakage Current		0.1 mA or less
	Maximum Load Current		0.7A / 10ms or less
	Maximum Voltage Drop (On)		0.4 VDC or less
	Response Time	Off → On	1ms or less
		On → Off	1ms or less (rated load, resistive load)
	Common Method		16 point / COM
	External Power	Voltage	12/24 VDC ±10% (ripple voltage 4 Vp-p or less)
		Current	20mA or less (connecting 24VDC)
Over Voltage Protection			TVS Diode
Insulation Method			Photocoupler insulation
Insulation Pressure			560VACrms / 3 Cyle (altitude 2000m)
Insulation Resistance			10MΩ or more by Megohmmeter
Proper Cable Size			0.3 mm^2
Current Consumption			60mA (when all inputs and outputs are On)
Operation Indicator			Input On, LED On
External Connection Method			40 pin connector
Weight			60g

XBE-DN32A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-DN32A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%IX0.z.0 - %IX0.z.15 %QX0.z.0 - %QX0.z.15

"z" denotes the module slot (2 to 8).

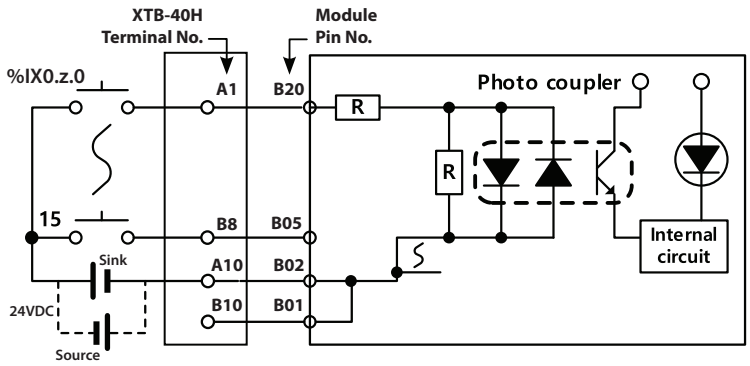
Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-DN32A Digital Combo Module Wiring

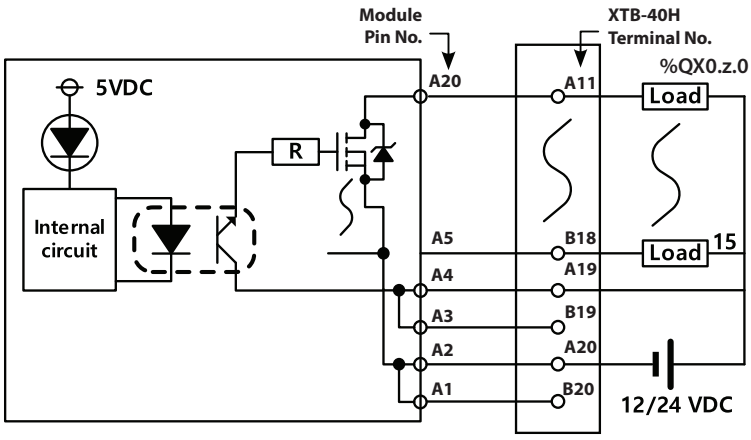
XBE-DN32A Input Circuit Configuration

Circuit Configuration



XTB-40H Terminal	XEM Pin#	I/O Direct Variable	Description	
A1	B20	%IX0.z.0	General Input 0	
B1	B19	%IX0.z.1	General Input 1	
A2	B18	%IX0.z.2	General Input 2	
B2	B17	%IX0.z.3	General Input 3	
A3	B16	%IX0.z.4	General Input 4	
B3	B15	%IX0.z.5	General Input 5	
A4	B14	%IX0.z.6	General Input 6	
B4	B13	%IX0.z.7	General Input 7	
A5	B12	%IX0.z.8	General Input 8	
B5	B11	%IX0.z.9	General Input 9	
A6	B10	%IX0.z.10	General Input 10	
B6	B09	%IX0.z.11	General Input 11	
A7	B08	%IX0.z.12	General Input 12	
B7	B07	%IX0.z.13	General Input 13	
A8	B06	%IX0.z.14	General Input 14	
B8	B05	%IX0.z.15	General Input 15	
A9	B04	–	Not used (NC)	
B9	B03	–	Not used (NC)	
A10	B02	–	Common	
B10	B01	–	Common	

XBE-DN32A Output Circuit Configuration



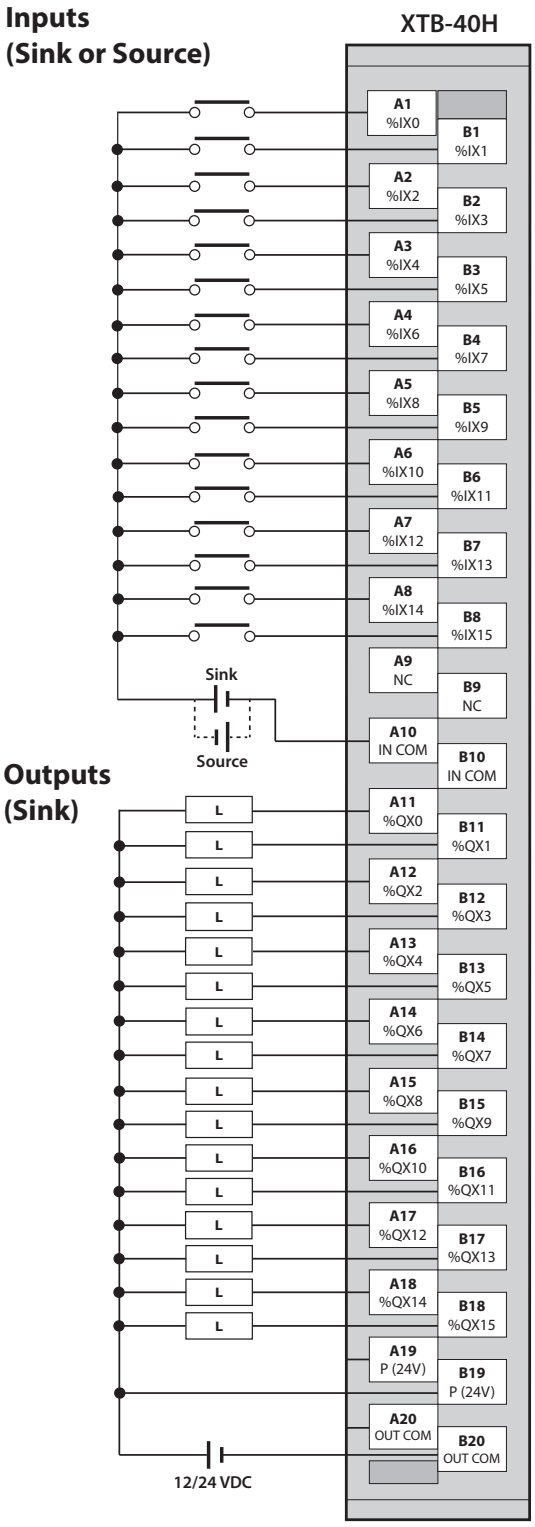
A11	A20	%QX0.z.0	General Output 0	
B11	A19	%QX0.z.1	General Output 1	
A12	A18	%QX0.z.2	General Output 2	
B12	A17	%QX0.z.3	General Output 3	
A13	A16	%QX0.z.4	General Output 4	
B13	A15	%QX0.z.5	General Output 5	
A14	A14	%QX0.z.6	General Output 6	
B14	A13	%QX0.z.7	General Output 7	
A15	A12	%QX0.z.8	General Output 8	
B15	A11	%QX0.z.9	General Output 9	
A16	A10	%QX0.z.10	General Output 10	
B16	A09	%QX0.z.11	General Output 11	
A17	A08	%QX0.z.12	General Output 12	
B17	A07	%QX0.z.13	General Output 13	
A18	A06	%QX0.z.14	General Output 14	
B18	A05	%QX0.z.15	General Output 15	
A19	A04	–	P (24V)	2.0A/common
B19	A03	–	P (24V)	
A20	A02	–	OUT_COM	
B20	A01	–	OUT_COM	

Note: Input Ambient Temp Derating: Derate 5% for each degree above 50°C. Max 55°C (25% derating at 55°C).

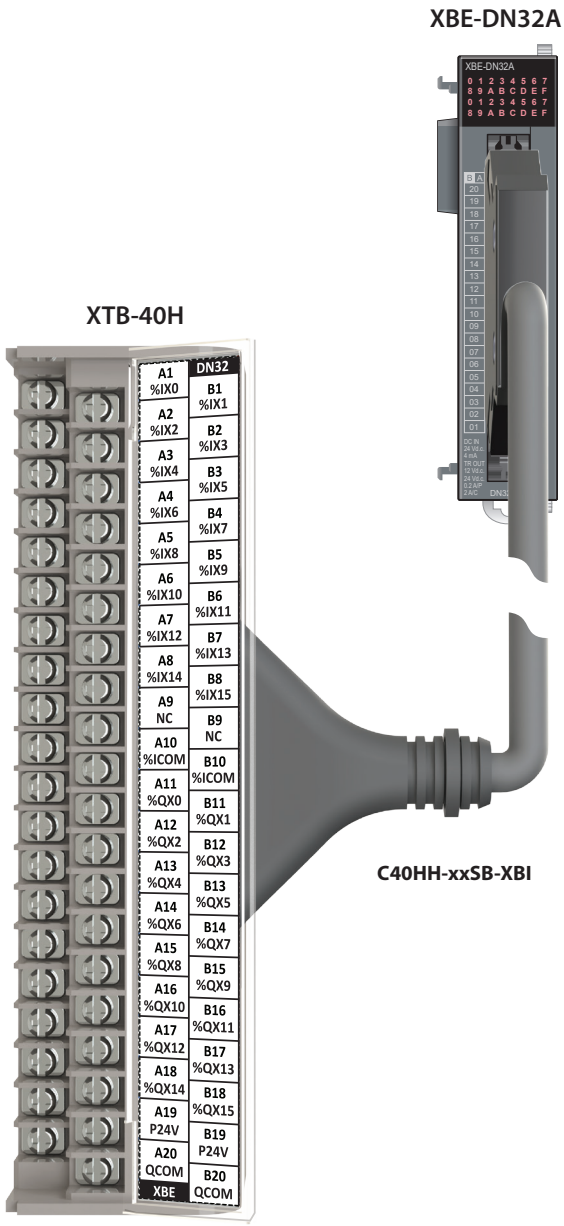
XBE-DN32A Digital Output Module Terminal Block Wiring

Download module specific XTB-40H Terminal Label Printouts here: Download Printouts

Terminal Wiring



PLC Connection



LS ELECTRIC

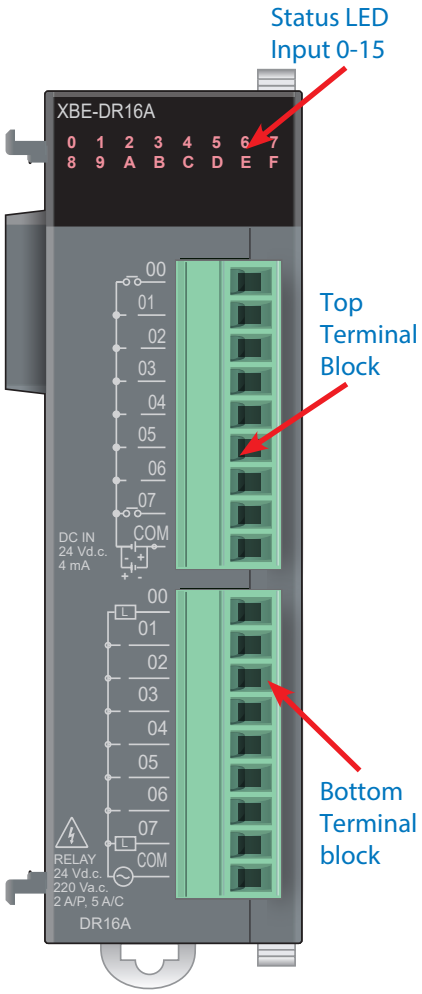
XGB Digital Modules

XBE-DR16A Digital Combo Module

XBE-DR16A is a combination module that has eight 24VDC sinking/sourcing inputs and 8 relay outputs.

Part Number	Price	Classification	Description	Drawing
XBE-DR16A	$112.00	Digital Combo Module	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.	PDF

General Specifications			XBE-DR16A
Input Specifications	Input Point		8 point
	Rated Input Voltage		24VDC
	Rated Input Current		~ 4mA
	Operation Voltage Range		20.4 – 28.8 VDC (ripple rate <5%)
	On Voltage/Current		19VDC or higher / 3mA or higher
	Off Voltage/Current		6VDC or less / 1mA or less
	Input Resistance		~ 5.6kΩ
	Response Time	Off → On	1/3/5/10/20/70/100 ms (set by CPU parameter) Default: 3ms
		On → Off	
	Common Method		8 point / COM
Output Specifications	Output Point		8 point
	Rated Voltage / Current		24VDC, 2A (resistive load) / 220VAC, 2A (COSΨ=1), 5A/COM
	Min. Load Voltage / Current		5VDC / 1mA
	Max. Load Voltage		250VAC, 125VDC
	Off Leakage Current		0.1 mA or less
	Max. On/Off frequency		3,600 times
	Surge Absorber		None
	Response Time	Off → On	10ms or less
		On → Off	12ms or less
	Common Method		8 point / COM
Insulation Method			Photocoupler insulation (input), Relay insulation (output)
Insulation Pressure			560VACrms / 3 Cyle (altitude 2000m)
Insulation Resistance			10MΩ or more by Megohmmeter
Proper Cable Size			Stranded cable 0.3–0.75 mm² (external diameter 2.8 mm or less)
Current Consumption			230mA (when all inputs and outputs are On)
Operation Indicator			Input On, LED On Output On, LED On
External Connection Method			9 pin connector x 2
Weight			81g



XBE-DR16A - Digital I/O Module Configuration

Direct Variables

The base rack slot number determines the Direct Variable name for the module. Each slot is automatically allocated 64 input points and 64 output points. See the chart below for the actual input Direct Variable assignments used.

For Direct Variable nomenclature explanation, see Direct Variable User Programming Memory.

Part Number	PLC Memory Allocation	Actual I/O Direct Variable
XBE-DR16A	Input: %IX0.z.0 – %IX0.z.63 Output: %QX0.z.0 – %QX0.z.63	%IX0.z.0 - %IX0.z.7 %QX0.z.0 - %QX0.z.7

"z" denotes the module slot (2 to 8).

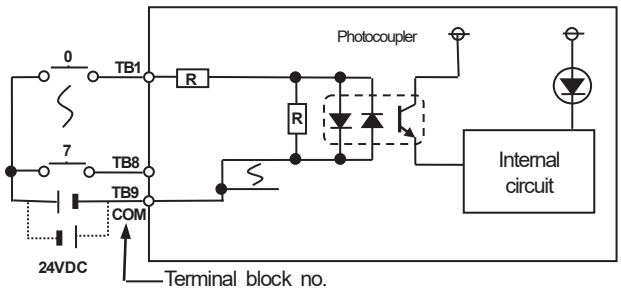
Follow the Quick start video to learn how to Register and Configure any Digital I/O Module.

Digital Module Setup

XBE-DR16A Digital Combo Module Wiring

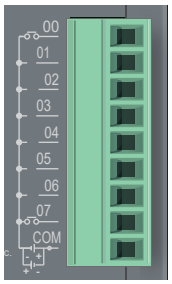
XBE-DR16A Input Circuit Configuration

Circuit Configuration

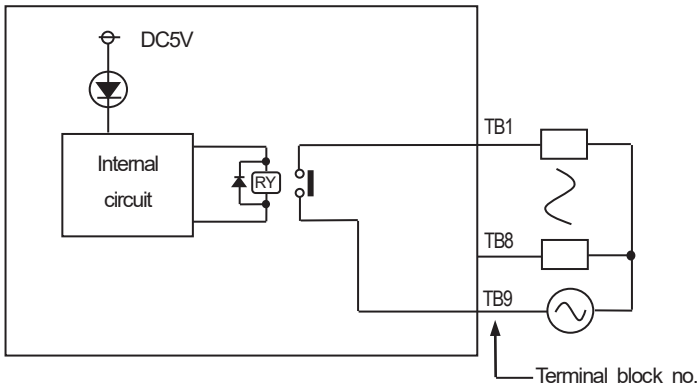


Terminal Description	*I/O Direct Variable*
00	%IX0.z.0
01	%IX0.z.1
02	%IX0.z.2
03	%IX0.z.3
04	%IX0.z.4
05	%IX0.z.5
06	%IX0.z.6
07	%IX0.z.7
COM	n/a

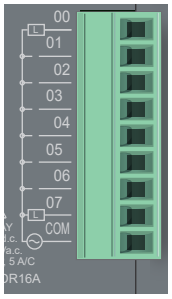
Terminal Block Image



XBE-DR16A Output Circuit Configuration



00	%QX0.z.0
01	%QX0.z.1
02	%QX0.z.2
03	%QX0.z.3
04	%QX0.z.4
05	%QX0.z.5
06	%QX0.z.6
07	%QX0.z.7
COM	n/a

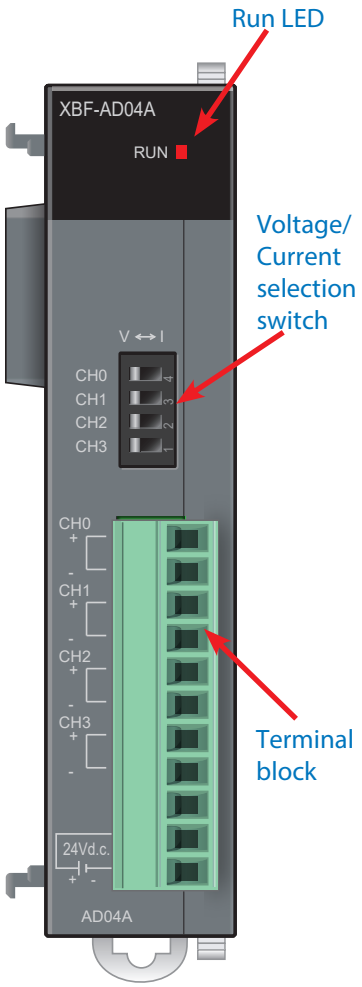


Note: Input Ambient Temp Derating: Derate 5% for each degree above 50°C. Max 55°C (25% derating at 55°C).

XBF-AD04A Analog Input Module

Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-AD04A	$176.00	Voltage/Current Input	LS Electric XGB analog input module, 4-channel, current/voltage, 12-bit, input current signal range(s) of 0-20 mA, 4-20 mA, input voltage signal range(s) of 0-10 VDC, external 24 VDC required.	4	PDF

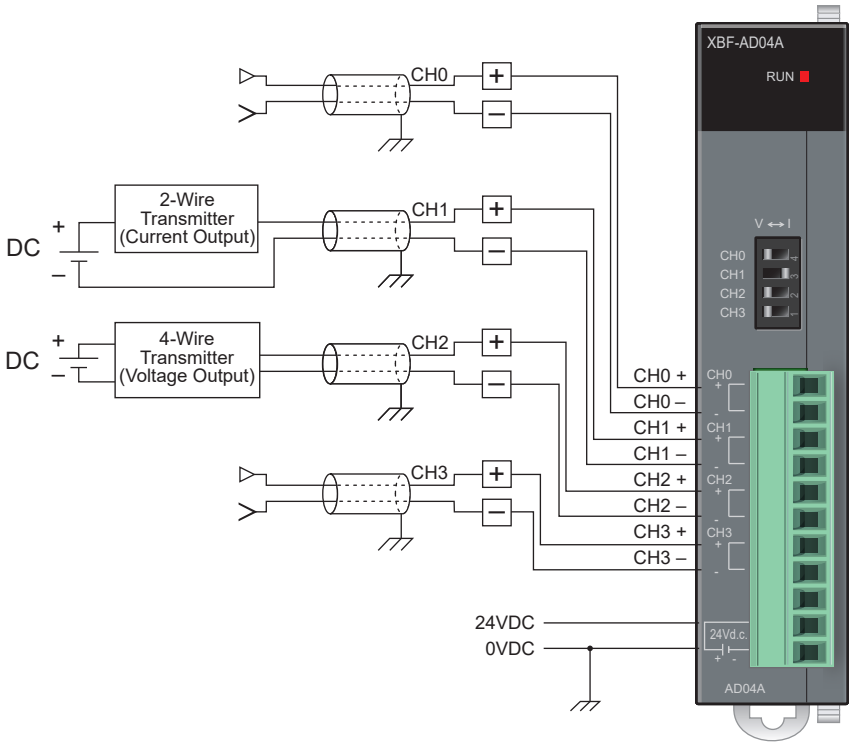
General Specifications			XBF-AD04A	
			Voltage	Current
Analog Input Range			0–10 VDC (Input resistance: 1MΩ min.)	DC 4–20mA DC 0–20mA (Input resistance: 250Ω)
Digital Output		Type	12-bit binary data	
		Direct Variable	%UW0.z.0 – %UW0.z.31 (z=slot number)	
	Range	Unsigned Value	0–4000	
		Signed Value	-2000 to 2000	
		Precise Value	0–1000	400–2000 / 0–2000
		Percentile Value	0–1000	
Maximum Resolution			2.5 mV (1/4000)	5μA (1/4000)
Accuracy			± 0.5% or less	
Maximum Conversion Speed			1.5 ms/channel	
Absolute Maximum Input			±15VDC	±25mA DC
Number of Input Channels			4 channels	
Insulation Method			Photocoupler insulation between input terminal and PLC power (no insluation between channels)	
Connection Terminal			11-point terminal block	
I/O Points Occupied			Fixed type: 512 points	
Current Consumption		Internal (5VDC)	120mA	
		External (24VDC)	62mA	
Weight			64g	
Additional Function			Filter processing, average processing (time, count)	
Power Supply			20.4–28.8 VDC	



XBF-AD04A Analog Input Module Wiring

When connecting cable to your XBF-AD04A:

- In case of voltage/current input, wiring is the same. Adjust the voltage/current setting switch according to the case.
- Keep the AC power line away from the analog input module's external input signal line to prevent surge or inductive noise.
- Use cable rated to meet your application's ambient temperature and current needs. AWG22 (0.3mm^2) or greater recommended.
- Keep cable clear of high heat and oil.
- Check polarity when wiring the terminal.
- Using high-voltage line or power line may cause abnormal operations or defects due to inductive hindrance.
- Make sure the desired channel is enabled.



Notes:

- Use 2-core twisted shield cable
- Use AWG22 (0.3mm^2) or greater cable
- Current input resistance is 250Ω
- Voltage input resistance is 1MΩ
- Terminal screwdriver: slotted 2.5 mm

XBF-AD04A Analog Input Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables
All XGB series analog 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.

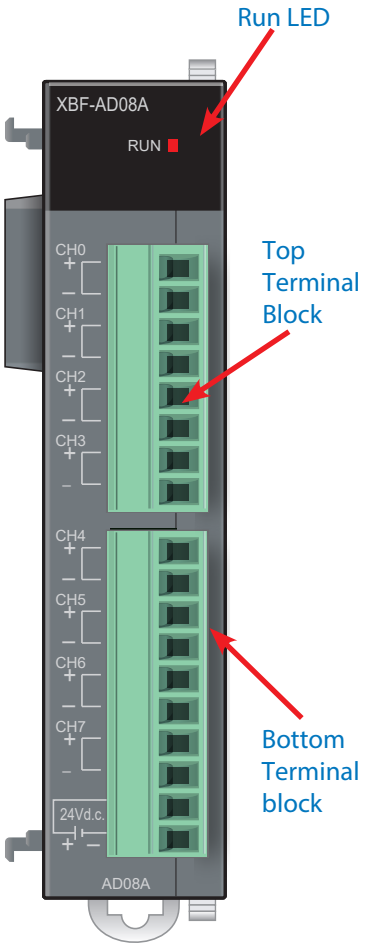
Symbolic variables and direct variables for AD04A are as follows (z refers to module slot number (2 to 8)).

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH0_ACT	%UX0.z.16	BOOL	Analog Input Module: CH0 Activation Status
Tag	GlobalVariable	_0z_CH0_DATA	%UW0.z.2	WORD	Analog Input Module: CH0 Output
Tag	GlobalVariable	_0z_CH1_ACT	%UX0.z.17	BOOL	Analog Input Module: CH1 Activation Status
Tag	GlobalVariable	_0z_CH1_DATA	%UW0.z.3	WORD	Analog Input Module: CH1 Output
Tag	GlobalVariable	_0z_CH2_ACT	%UX0.z.18	BOOL	Analog Input Module: CH2 Activation Status
Tag	GlobalVariable	_0z_CH2_DATA	%UW0.z.4	WORD	Analog Input Module: CH2 Output
Tag	GlobalVariable	_0z_CH3_ACT	%UX0.z.19	BOOL	Analog Input Module: CH3 Activation Status
Tag	GlobalVariable	_0z_CH3_DATA	%UW0.z.5	WORD	Analog Input Module: CH3 Output
Tag	GlobalVariable	_0z_CH_ACT_ARY	%UX0.z.16	ARRAY[0..3] OF BOOL	Analog Input Module: Bool Array of Active bit for Channel 0 to 3
Tag	GlobalVariable	_0z_CH_DATA_ARY	%UW0.z.2	ARRAY[0..3] OF WORD	Analog Input Module: Word Array of Data for Channel 0 to 3
Tag	GlobalVariable	_0z_ERR	%UX0.z.0	BOOL	Analog Input Module: Error Flag
Tag	GlobalVariable	_0z_ERR_CLR	%UX0.z.176	BOOL	Analog Input Module: Error Clear Request
Tag	GlobalVariable	_0z_RDY	%UX0.z.15	BOOL	Analog Input Module: Ready Flag

XBF-AD08A Analog Input Module

Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-AD08A	$267.00	Voltage/current Input	LS Electric XGB analog input module, 8-channel, current/voltage, 12-bit, input current signal range(s) of 0-20 mA, 4-20 mA, input voltage signal range(s) of 0-5 VDC, 1-5 VDC, 0-10 VDC, external 24 VDC required.	8	PDF

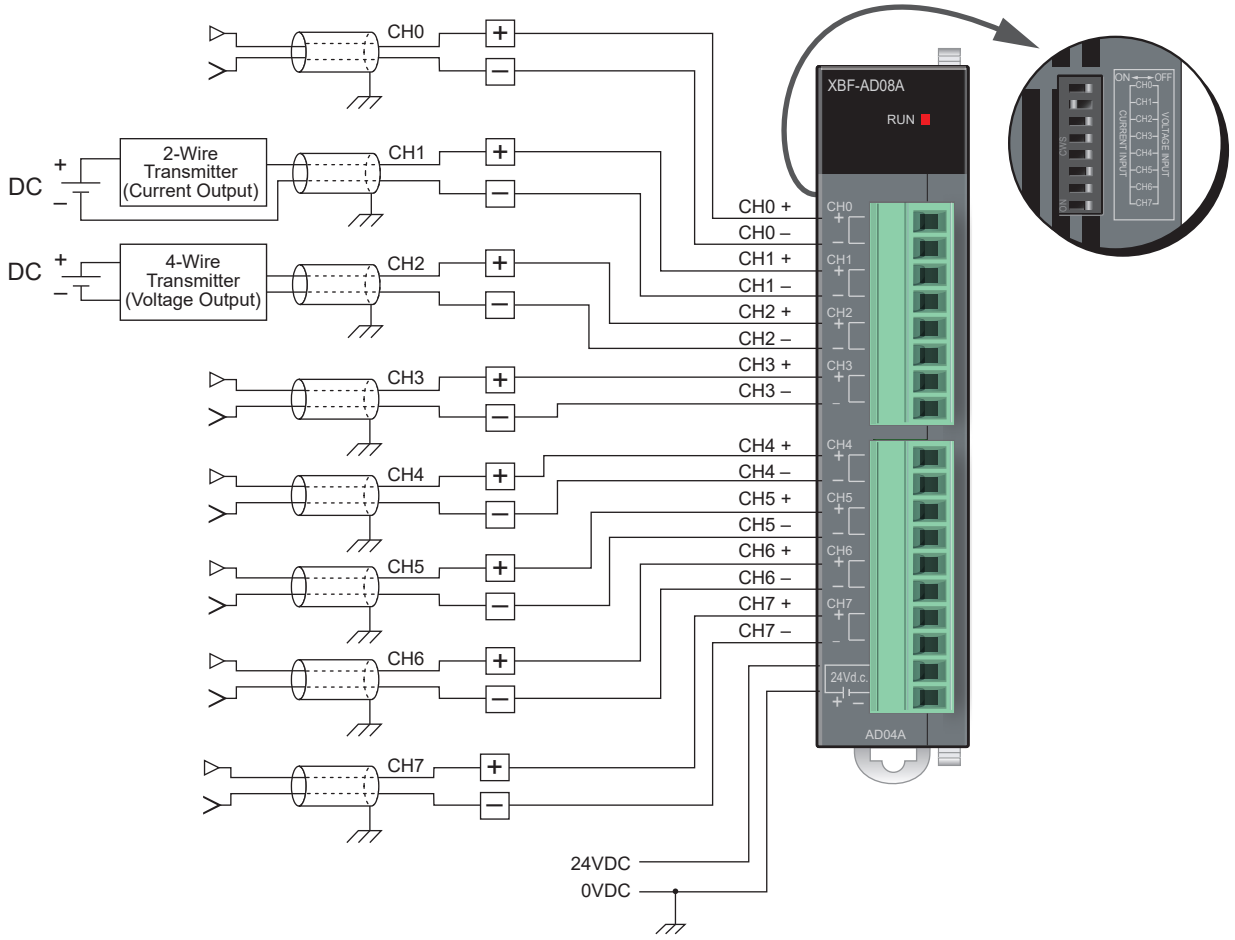
General Specifications			XBF-AD08A	
			Voltage	Current
Analog Input Range			1–5 VDC 0–5 VDC 0–10 VDC (input resistance 1MΩ min.)	4–20 mA DC 0–20mA DC (input resistance 250Ω)
Digital Output		Type	12 bit binary data	
	Range	Unsigned Value	0–4000	
		Signed Value	-2000–2000	
		Precise Value	100–500 (1–5 VDC) 0–500 (0–5 VDC) 0–1000 (0–10 VDC)	400–2000 (4–20 mA DC) 0–2000 (0–20 mA DC)
		Percentile Value	0–1000	
Maximum Resolution			1/4000	
			1.25 mV (1–5, 0–5 VDC) 2.5 mV (0–10 VDC)	5 µA (4–20 mA, 0–20 mA DC)
Accuracy			±0.5% or less	
Maximum Conversion Speed			1.5 ms/channel	
Absolute Maximum Input			±15VDC	±25mA DC
Additional Function		Filter Function	Digital filter (4–64,000 ms)	
		Average Function	Time average (4–16,000 ms)	
			Count average (2–64,000 times)	
			Moving average (2–100)	
		Alarm Function	Detecting disconnection (1–5 VDC, 4–20 mA DC)	
Insulation Method			Photocoupler insulation between I/O terminal and PLC power (no insulation between channels)	
Input Terminal			8-pin terminal block + 10-pin terminal block connector	
I/O Points Occupied			Fixed type: 512 points	
Current Consumption		Internal (5VDC)	105mA	
		External (24VDC)	85mA	
Weight			81g	
Power Supply			20.4–28.8 VDC	



XBF-AD08A Analog Input Module Wiring

When connecting cable to your XBF-AD08A:

- In case of voltage/current input, wiring is the same. Adjust the voltage/current setting switch according to the case.
- Keep the AC power line away from the analog input module's external input signal line to prevent surge or inductive noise.
- Use cable rated to meet your application's ambient temperature and current needs. AWG22 (0.3mm^2) or greater recommended.
- Keep cable clear of high heat and oil.
- Check polarity when wiring the terminal.
- Using high-voltage line or power line may cause abnormal operations or defects due to inductive hindrance.
- Make sure the desired channel is enabled.



Notes:

- Use 2-core twisted shield cable
- Use AWG22 (0.3mm^2) or greater cable
- Current input resistance is 250Ω
- Voltage input resistance is 1MΩ
- Terminal screwdriver: slotted 2.5 mm

XBF-AD08A Analog Input Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables

All XGB series analog 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-AD08A are as follows (z refers to module slot number (2 to 8)).

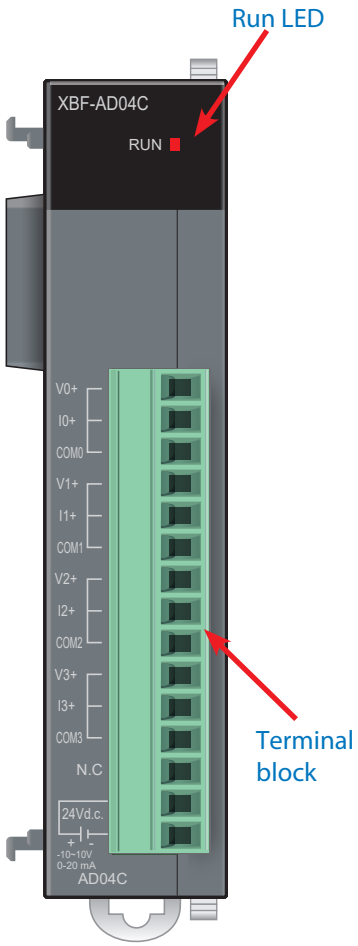
Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH0_ACT	%UX0.z.16	BOOL	Analog Input Module: CH0 Activation Status
Tag	GlobalVariable	_0z_CH0_DATA	%UW0.z.2	WORD	Analog Input Module: CH0 Output
Tag	GlobalVariable	_0z_CH0_ERR	%UX0.z.24	BOOL	Analog Input Module: CH0 Error
Tag	GlobalVariable	_0z_CH0_IDD	%UX0.z.160	BOOL	Analog Input Module: CH0 Disconnection Flag
Tag	GlobalVariable	_0z_CH1_ACT	%UX0.z.17	BOOL	Analog Input Module: CH1 Activation Status
Tag	GlobalVariable	_0z_CH1_DATA	%UW0.z.3	WORD	Analog Input Module: CH1 Output
Tag	GlobalVariable	_0z_CH1_ERR	%UX0.z.25	BOOL	Analog Input Module: CH1 Error
Tag	GlobalVariable	_0z_CH1_IDD	%UX0.z.161	BOOL	Analog Input Module: CH1 Disconnection Flag
Tag	GlobalVariable	_0z_CH2_ACT	%UX0.z.18	BOOL	Analog Input Module: CH2 Activation Status
Tag	GlobalVariable	_0z_CH2_DATA	%UW0.z.4	WORD	Analog Input Module: CH2 Output
Tag	GlobalVariable	_0z_CH2_ERR	%UX0.z.26	BOOL	Analog Input Module: CH2 Error
Tag	GlobalVariable	_0z_CH2_IDD	%UX0.z.162	BOOL	Analog Input Module: CH2 Disconnection Flag
Tag	GlobalVariable	_0z_CH3_ACT	%UX0.z.19	BOOL	Analog Input Module: CH3 Activation Status
Tag	GlobalVariable	_0z_CH3_DATA	%UW0.z.5	WORD	Analog Input Module: CH3 Output
Tag	GlobalVariable	_0z_CH3_ERR	%UX0.z.27	BOOL	Analog Input Module: CH3 Error
Tag	GlobalVariable	_0z_CH3_IDD	%UX0.z.163	BOOL	Analog Input Module: CH3 Disconnection Flag
Tag	GlobalVariable	_0z_CH4_ACT	%UX0.z.20	BOOL	Analog Input Module: CH4 Activation Status
Tag	GlobalVariable	_0z_CH4_DATA	%UW0.z.6	WORD	Analog Input Module: CH4 Output
Tag	GlobalVariable	_0z_CH4_ERR	%UX0.z.28	BOOL	Analog Input Module: CH4 Error
Tag	GlobalVariable	_0z_CH4_IDD	%UX0.z.164	BOOL	Analog Input Module: CH4 Disconnection Flag
Tag	GlobalVariable	_0z_CH5_ACT	%UX0.z.21	BOOL	Analog Input Module: CH5 Activation Status
Tag	GlobalVariable	_0z_CH5_DATA	%UW0.z.7	WORD	Analog Input Module: CH5 Output
Tag	GlobalVariable	_0z_CH5_ERR	%UX0.z.29	BOOL	Analog Input Module: CH5 Error
Tag	GlobalVariable	_0z_CH5_IDD	%UX0.z.165	BOOL	Analog Input Module: CH5 Disconnection Flag
Tag	GlobalVariable	_0z_CH6_ACT	%UX0.z.22	BOOL	Analog Input Module: CH6 Activation Status
Tag	GlobalVariable	_0z_CH6_DATA	%UW0.z.8	WORD	Analog Input Module: CH6 Output
Tag	GlobalVariable	_0z_CH6_ERR	%UX0.z.30	BOOL	Analog Input Module: CH6 Error
Tag	GlobalVariable	_0z_CH6_IDD	%UX0.z.166	BOOL	Analog Input Module: CH6 Disconnection Flag
Tag	GlobalVariable	_0z_CH7_ACT	%UX0.z.23	BOOL	Analog Input Module: CH7 Activation Status
Tag	GlobalVariable	_0z_CH7_DATA	%UW0.z.9	WORD	Analog Input Module: CH7 Output
Tag	GlobalVariable	_0z_CH7_ERR	%UX0.z.31	BOOL	Analog Input Module: CH7 Error
Tag	GlobalVariable	_0z_CH7_IDD	%UX0.z.167	BOOL	Analog Input Module: CH7 Disconnection Flag
Tag	GlobalVariable	_0z_CH_ACT_ARY	%UX0.z.16	ARRAY[0..7] OF BOOL	Analog Input Module: Each CH Active
Tag	GlobalVariable	_0z_CH_DATA_ARY	%UW0.z.2	ARRAY[0..7] OF WORD	Analog Input Module: Each CH Output
Tag	GlobalVariable	_0z_CH_ERR_ARY	%UX0.z.24	ARRAY[0..7] OF BOOL	Analog Input Module: Each CH Error
Tag	GlobalVariable	_0z_CH_IDD_ARY	%UX0.z.160	ARRAY[0..7] OF BOOL	Analog Input Module: Each CH Disconnection Flag
Tag	GlobalVariable	_0z_ERR	%UX0.z.0	BOOL	Analog Input Module: Error Flag
Tag	GlobalVariable	_0z_ERR_CLR	%UX0.z.176	BOOL	Analog Input Module: Error Clear Request
Tag	GlobalVariable	_0z_RDY	%UX0.z.15	BOOL	Analog Input Module: Ready Flag

XBF-AD04C Analog Input Module

AD04C is an enhanced analog input module which provides higher resolution and upper/lower alarm tag for each channel.

Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-AD04C	$255.00	Voltage/current Input	LS Electric XGB analog input module, 4-channel, current/voltage, 14-bit, input current signal range(s) of 0-20 mA, 4-20 mA, input voltage signal range(s) of 0-5 VDC, 1-5 VDC, 0-10 VDC, +/- 10 VDC, external 24 VDC required.	4	PDF

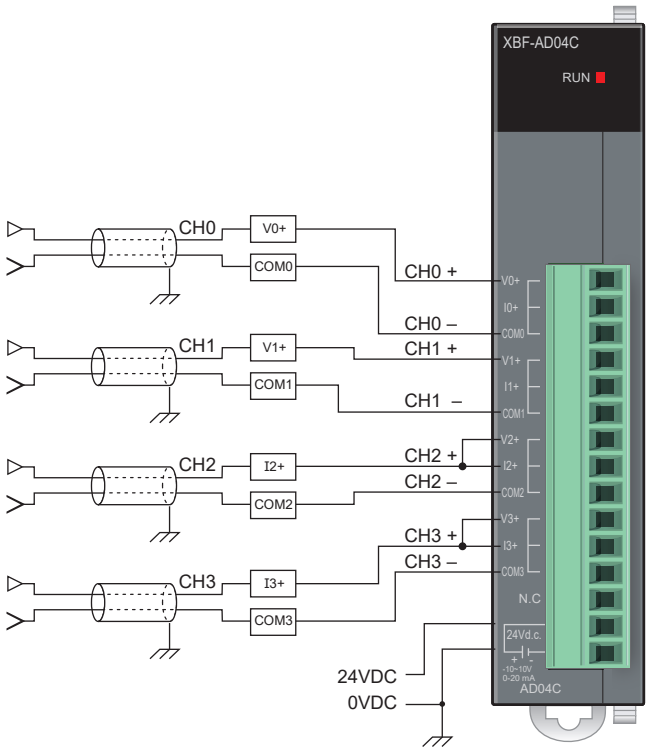
General Specifications			XBF-AD04C	
			Voltage	Current
Analog Input Range			1–5 VDC 0–5 VDC 0–10 VDC ±10 VDC (Input resistance: 1MΩ min.)	4–20 mA DC 0–20 mA DC (Input resistance: 250Ω)
Digital Output		Type	16 bit binary data (Data: 14Bit)	
	Range	Unsigned Value	0–16,000	
		Signed Value	±8,000	
		Precise Value	1,000–5,000 (1–5 V) 0–5,000 (0–5 V) 0–10,000 (0–10 V) ±10,000 (±10V)	4,000–20,000 (4–20 mA) 0–20,000 (0–20 mA)
		Percentile Value	0–10,000	
Maximum Resolution			1/16,000	
			0.250 mV (1–5 V) 0.3125 mV (0–5 V) 0.625 mV (0–10 V) 1.250 mV (±10V)	1.0 µA (4–20 mA) 1.25 µA (0–20 mA)
Accuracy			±0.2% (when ambient temperature 25°C ± 5°C) ±0.3% (when ambient temperature outside range above)	
Maximum Conversion Speed			1ms/channel	
Absolute Maximum Input			±15VDC	±30mA DC
Additional Function		Filter	Digital filter (4–64,000 ms)	
		Average	Time average (4–16,000 ms)	
		Detection Alarm	Disconnection (1–5VDC, 4–20 mA DC)	
		Hold Last Value	When input signal exceeds the effective range, holds the last effective value	
		Alarm Function	When input signal exceeds the effective range, relevant flag turns on.	
Insulation Method			Photocoupler insulation between input terminal and PLC power (no insulation between channels)	
Connection Terminal			15 point terminal block	
I/O Points Occupied			Fixed type assignment: 512	
Current Consumption		Internal (5VDC)	105mA	
		External (24VDC)	100mA	
Weight			72g	
Power Supply			20.4–28.8 VDC	



XBF-AD04C Analog Input Module Wiring

When connecting cable to your XBF-AD04C:

- Keep the AC power line away from the analog input module's external input signal line to prevent surge or inductive noise.
- Use cable rated to meet your application's ambient temperature and current needs. AWG22 (0.3mm^2) or greater recommended.
- Keep cable clear of high heat and oil.
- Check polarity when wiring the terminal.
- Using high-voltage line or power line may cause abnormal operations or defects due to inductive hindrance.
- Make sure the desired channel is enabled.



Notes:

- Use 2-core twisted shield cable
- Use AWG22 (0.3mm^2) or greater cable
- Current input resistance is 250Ω
- Voltage input resistance is 1MΩ
- Terminal screwdriver: slotted 2.5 mm

XBF-AD04C Analog Input Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables
All XGB series analog 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.

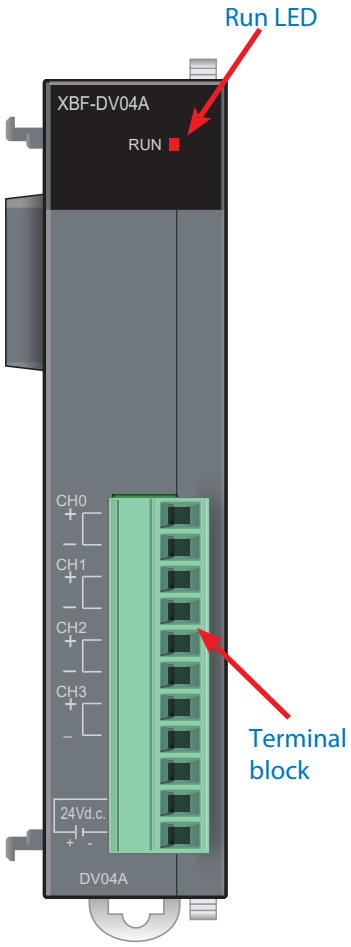
Symbolic variables and direct variables for XBF-AD04C are as follows (z refers to module slot number (2 to 8)).

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH0_ACT	%UX0.z.16	BOOL	Analog Input Module: CH0 Activation Status
Tag	GlobalVariable	_0z_CH0_DATA	%UW0.z.2	WORD	Analog Input Module: CH0 Output
Tag	GlobalVariable	_0z_CH0_ERR	%UX0.z.24	BOOL	Analog Input Module: CH0 Error
Tag	GlobalVariable	_0z_CH0_HOOR	%UX0.z.176	BOOL	Analog Input Module: CH0 Upper Alarm
Tag	GlobalVariable	_0z_CH0_IDD	%UX0.z.160	BOOL	Analog Input Module: CH0 Disconnection Flag
Tag	GlobalVariable	_0z_CH0_LOOR	%UX0.z.192	BOOL	Analog Input Module: CH0 Lower Alarm
Tag	GlobalVariable	_0z_CH1_ACT	%UX0.z.17	BOOL	Analog Input Module: CH1 Activation Status
Tag	GlobalVariable	_0z_CH1_DATA	%UW0.z.3	WORD	Analog Input Module: CH1 Output
Tag	GlobalVariable	_0z_CH1_ERR	%UX0.z.25	BOOL	Analog Input Module: CH1 Error
Tag	GlobalVariable	_0z_CH1_HOOR	%UX0.z.177	BOOL	Analog Input Module: CH1 Upper Alarm
Tag	GlobalVariable	_0z_CH1_IDD	%UX0.z.161	BOOL	Analog Input Module: CH1 Disconnection Flag
Tag	GlobalVariable	_0z_CH1_LOOR	%UX0.z.193	BOOL	Analog Input Module: CH1 Lower Alarm
Tag	GlobalVariable	_0z_CH2_ACT	%UX0.z.18	BOOL	Analog Input Module: CH2 Activation Status
Tag	GlobalVariable	_0z_CH2_DATA	%UW0.z.4	WORD	Analog Input Module: CH2 Output
Tag	GlobalVariable	_0z_CH2_ERR	%UX0.z.26	BOOL	Analog Input Module: CH2 Error
Tag	GlobalVariable	_0z_CH2_HOOR	%UX0.z.178	BOOL	Analog Input Module: CH2 Upper Alarm
Tag	GlobalVariable	_0z_CH2_IDD	%UX0.z.162	BOOL	Analog Input Module: CH2 Disconnection Flag
Tag	GlobalVariable	_0z_CH2_LOOR	%UX0.z.194	BOOL	Analog Input Module: CH2 Lower Alarm
Tag	GlobalVariable	_0z_CH3_ACT	%UX0.z.19	BOOL	Analog Input Module: CH3 Activation Status
Tag	GlobalVariable	_0z_CH3_DATA	%UW0.z.5	WORD	Analog Input Module: CH3 Output
Tag	GlobalVariable	_0z_CH3_ERR	%UX0.z.27	BOOL	Analog Input Module: CH3 Error
Tag	GlobalVariable	_0z_CH3_HOOR	%UX0.z.179	BOOL	Analog Input Module: CH3 Upper Alarm
Tag	GlobalVariable	_0z_CH3_IDD	%UX0.z.163	BOOL	Analog Input Module: CH3 Disconnection Flag
Tag	GlobalVariable	_0z_CH3_LOOR	%UX0.z.195	BOOL	Analog Input Module: CH3 Lower Alarm
Tag	GlobalVariable	_0z_CH_ACT_ARY	%UX0.z.16	ARRAY[0..3] OF BOOL	Analog Input Module: Each CH Active
Tag	GlobalVariable	_0z_CH_DATA_ARY	%UW0.z.2	ARRAY[0..3] OF WORD	Analog Input Module: Each CH Output
Tag	GlobalVariable	_0z_CH_ERR_ARY	%UX0.z.24	ARRAY[0..3] OF BOOL	Analog Input Module: Each CH Error
Tag	GlobalVariable	_0z_CH_HOOR_ARY	%UX0.z.176	ARRAY[0..3] OF BOOL	Analog Input Module: Each CH Upper Alarm
Tag	GlobalVariable	_0z_CH_IDD_ARY	%UX0.z.160	ARRAY[0..3] OF BOOL	Analog Input Module: Each CH Disconnection Flag
Tag	GlobalVariable	_0z_CH_LOOR_ARY	%UX0.z.192	ARRAY[0..3] OF BOOL	Analog Input Module: Each CH Lower Alarm
Tag	GlobalVariable	_0z_ERR	%UX0.z.0	BOOL	Analog Input Module: Error Flag
Tag	GlobalVariable	_0z_ERR_CLR	%UX0.z.208	BOOL	Analog Input Module: Error Clear Request
Tag	GlobalVariable	_0z_RDY	%UX0.z.15	BOOL	Analog Input Module: Ready Flag

XBF-DV04A Analog Output Module

Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-DV04A	$168.00	Voltage Output	LS Electric XGB analog output module, 4-channel, voltage, 12-bit, output voltage signal range(s) of 0-10 VDC, external 24 VDC required.	4	PDF

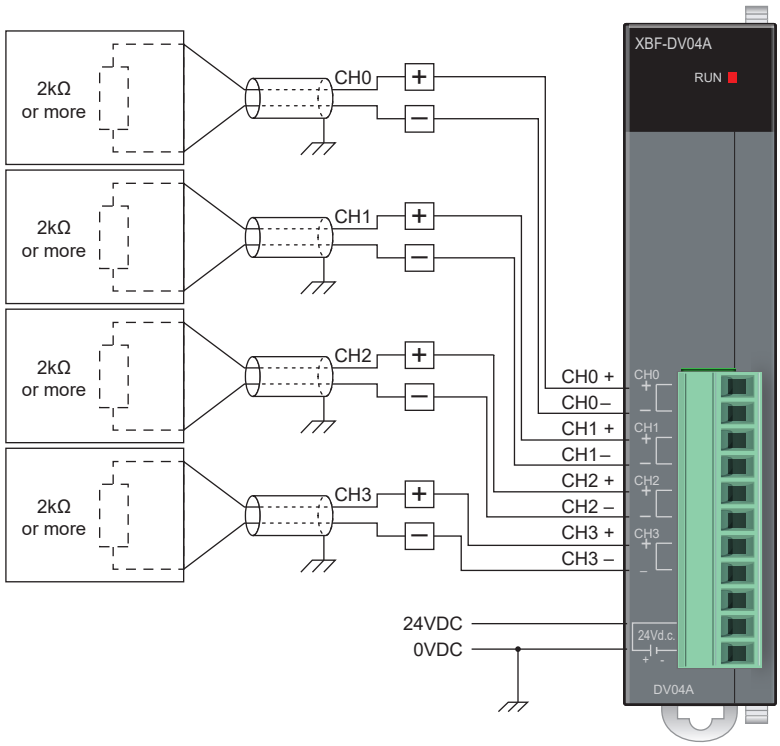
General Specifications			XBF-DV04A
			Voltage
Analog Ouput Range			0–10 VDC (Load resistance: 2kΩ or more)
Digital Input		Type	12-bit binary data
	Range	Signed Value	±2000
		Unsigned Value	0–4000
		Precise Value	0–1000
		Percentile Value	0–1000
Maximum Resolution			2.5 mV (1/4000)
Accuracy			±0.5% or less
Maximum Conversion Speed			1ms/channel
Absolute Maximum Output			±15VDC
Number of Output Channels			4 channels
Insulation Method			Photocoupler insulation between input terminal and PLC power (no insulation between channels)
Connection Terminal			11-point terminal block
I/O Points Occupied			Fixed type: 512 points
Current Consumption		Internal (5VDC)	110mA
		External (24VDC)	70mA
Weight			64g
Power Supply			20.4–28.8 VDC



XBF-DV04A Analog Output Module Wiring

When connecting cable to your XBF-DV04A:

- Keep the AC power line away from the analog output module's external output signal line to prevent surge or inductive noise.
- Use cable rated to meet your application's ambient temperature and current needs. AWG22 (0.3mm^2) or greater recommended.
- Keep cable clear of high heat and oil.
- Check polarity when wiring the terminal.
- Using high-voltage line or power line may cause abnormal operations or defects due to inductive hindrance.
- Make sure the desired channel is enabled.



Notes:

- Use 2-core twisted shield cable
- Use AWG22 (0.3mm^2) or greater cable
- Terminal screwdriver: slotted 2.5 mm
- Load resistance is 2kΩ or more

XBF-DV04A Analog Output Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables
All XGB series analog 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-DV04A are as follows (z refers to module slot number (2 to 8)).

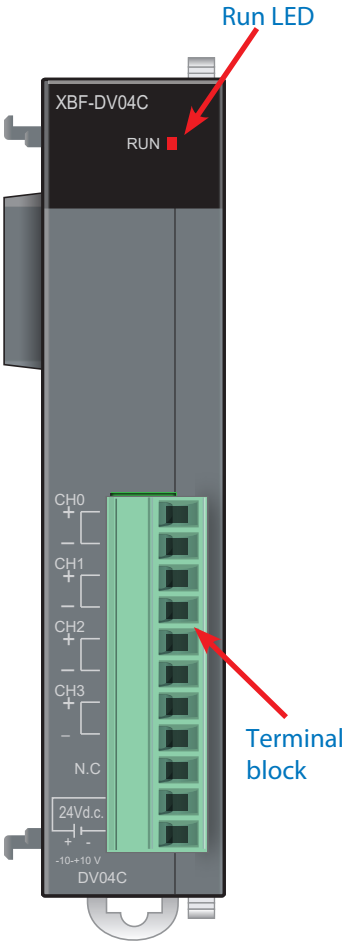
Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH0_ACT	%UX0.z.16	BOOL	Analog Output Module: CH0 Activation Status
Tag	GlobalVariable	_0z_CH0_DATA	%UW0.z.3	WORD	Analog Output Module: CH0 Input
Tag	GlobalVariable	_0z_CH0_ERR	%UX0.z.0	BOOL	Analog Output Module: CH0 Error
Tag	GlobalVariable	_0z_CH0_OUTEN	%UX0.z.32	BOOL	Analog Output Module: CH0 Output Enable
Tag	GlobalVariable	_0z_CH1_ACT	%UX0.z.17	BOOL	Analog Output Module: CH1 Activation Status
Tag	GlobalVariable	_0z_CH1_DATA	%UW0.z.4	WORD	Analog Output Module: CH1 Input
Tag	GlobalVariable	_0z_CH1_ERR	%UX0.z.1	BOOL	Analog Output Module: CH1 Error
Tag	GlobalVariable	_0z_CH1_OUTEN	%UX0.z.33	BOOL	Analog Output Module: CH1 Output Enable
Tag	GlobalVariable	_0z_CH2_ACT	%UX0.z.18	BOOL	Analog Output Module: CH2 Activation Status
Tag	GlobalVariable	_0z_CH2_DATA	%UW0.z.5	WORD	Analog Output Module: CH2 Input
Tag	GlobalVariable	_0z_CH2_ERR	%UX0.z.2	BOOL	Analog Output Module: CH2 Error
Tag	GlobalVariable	_0z_CH2_OUTEN	%UX0.z.34	BOOL	Analog Output Module: CH2 Output Enable
Tag	GlobalVariable	_0z_CH3_ACT	%UX0.z.19	BOOL	Analog Output Module: CH3 Activation Status
Tag	GlobalVariable	_0z_CH3_DATA	%UW0.z.6	WORD	Analog Output Module: CH3 Input
Tag	GlobalVariable	_0z_CH3_ERR	%UX0.z.3	BOOL	Analog Output Module: CH3 Error
Tag	GlobalVariable	_0z_CH3_OUTEN	%UX0.z.35	BOOL	Analog Output Module: CH3 Output Enable
Tag	GlobalVariable	_0z_CH_ACT_ARY	%UX0.z.16	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Active
Tag	GlobalVariable	_0z_CH_DATA_ARY	%UW0.z.3	ARRAY[0..3] OF WORD	Analog Output Module: Each CH Input
Tag	GlobalVariable	_0z_CH_ERR_ARY	%UX0.z.0	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Error
Tag	GlobalVariable	_0z_CH_OUTEN_ARY	%UX0.z.32	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Output Enable
Tag	GlobalVariable	_0z_OUTEN	%UW0.z.2	WORD	Analog Output Module: Output Enable
Tag	GlobalVariable	_0z_RDY	%UX0.z.15	BOOL	Analog Output Module: Ready Flag

XBF-DV04C Analog Output Module

DV04C is an enhanced analog output module which provides higher resolution and interpolation settings for each channel.

Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-DV04C	$230.00	Voltage Output	LS Electric XGB analog output module, 4-channel, voltage, 14-bit, output voltage signal range(s) of 0-5 VDC, 1-5 VDC, 0-10 VDC and +/- 10 VDC, external 24 VDC required.	4	PDF

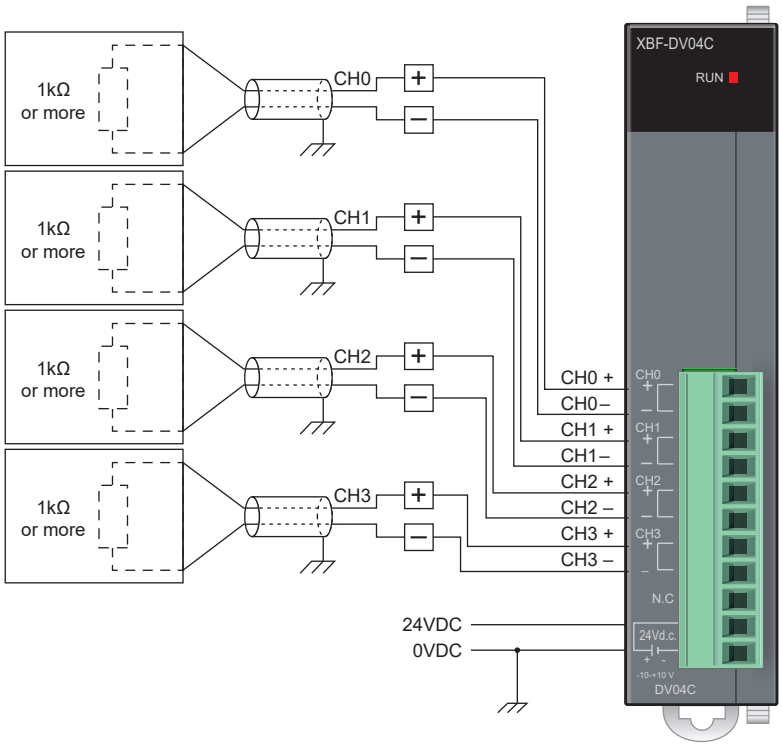
General Specifications			XBF-DV04C
			Voltage
Analog Output Range			1–5 VDC 0–5 VDC 0–10 VDC ±10 VDC (Input resistance: 1kΩ min.)
Digital Input		Type	16 bit binary data (Data: 14Bit)
	Range	Unsigned Value	0–16,000
		Signed Value	±8000
		Precise Value	1,000–5,000 (1–5 V) 0–5,000 (0–5 V) 0–10,000 (0–10 V) ±10,000 (±10V)
		Percentile Value	0–10,000
Maximum Resolution			1/16,000
			0.250 mV (1–5 V) 0.3125 mV (0–5 V) 0.625 mV (0–10 V) 1.250 mV (±10V)
Accuracy			±0.2% (when ambient temperature 25ºC ± 5ºC) ±0.3% (when ambient temperature outside range above)
Maximum Conversion Speed			1ms/channel
Additional Function			Setting of channel output status (select one among Previous, Min, or Max) Setting of interpolation method (Linear interpolation, S-type interpolation)
Insulation Method			Photocoupler insulation between output terminal and PLC power (no insulation between channels)
Connection Terminal			11 point terminal
I/O Points Occupied			Fixed point assignment: 512 points
Current Consumption		Internal (5VDC)	75mA
		External (24VDC)	170mA
Weight			68g
Power Supply			20.4–28.8 VDC



XBF-DV04C Analog Output Module Wiring

When connecting cable to your XBF-DV04C:

- Keep the AC power line away from the analog input module's external input signal line to prevent surge or inductive noise.
- Use cable rated to meet your application's ambient temperature and current needs. AWG22 (0.3mm^2) or greater recommended.
- Keep cable clear of high heat and oil.
- Check polarity when wiring the terminal.
- Using high-voltage line or power line may cause abnormal operations or defects due to inductive hindrance.
- Make sure the desired channel is enabled.



Notes:

- Use 2-core twisted shield cable
- Use AWG22 (0.3mm^2) or greater cable
- Load resistance is 1kΩ or more
- Terminal screwdriver: slotted 2.5 mm

XBF-DV04C Analog Output Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables

All XGB series analog 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.

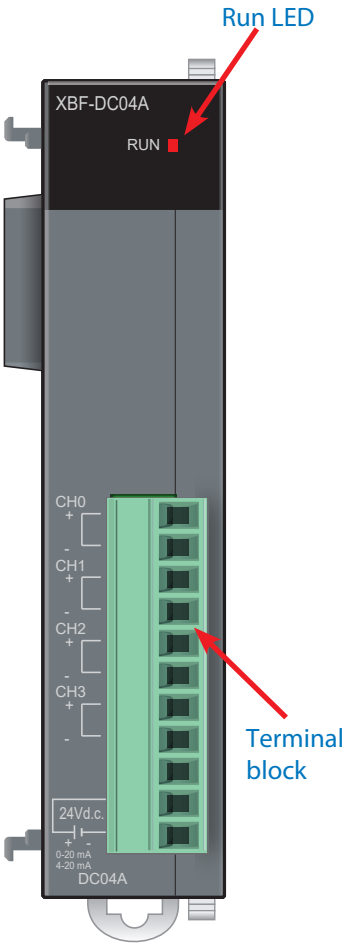
Symbolic variables and direct variables for XBF-DV04C are as follows (z refers to module slot number (2 to 8)).

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH0_ACT	%UX0.z.16	BOOL	Analog Output Module: CH0 Activation Status
Tag	GlobalVariable	_0z_CH0_DATA	%UW0.z.3	WORD	Analog Output Module: CH0 Input
Tag	GlobalVariable	_0z_CH0_ERR	%UX0.z.0	BOOL	Analog Output Module: CH0 Error
Tag	GlobalVariable	_0z_CH0_INTP	%UX0.z.24	BOOL	Analog Output Module : CH0 Interpolation Status
Tag	GlobalVariable	_0z_CH0_OUTEN	%UX0.z.32	BOOL	Analog Output Module: CH0 Output Enable
Tag	GlobalVariable	_0z_CH1_ACT	%UX0.z.17	BOOL	Analog Output Module: CH1 Activation Status
Tag	GlobalVariable	_0z_CH1_DATA	%UW0.z.4	WORD	Analog Output Module: CH1 Input
Tag	GlobalVariable	_0z_CH1_ERR	%UX0.z.1	BOOL	Analog Output Module: CH1 Error
Tag	GlobalVariable	_0z_CH1_INTP	%UX0.z.25	BOOL	Analog Output Module: CH1 Interpolation Status
Tag	GlobalVariable	_0z_CH1_OUTEN	%UX0.z.33	BOOL	Analog Output Module: CH1 Output Enable
Tag	GlobalVariable	_0z_CH2_ACT	%UX0.z.18	BOOL	Analog Output Module: CH2 Activation Status
Tag	GlobalVariable	_0z_CH2_DATA	%UW0.z.5	WORD	Analog Output Module: CH2 Input
Tag	GlobalVariable	_0z_CH2_ERR	%UX0.z.2	BOOL	Analog Output Module: CH2 Error
Tag	GlobalVariable	_0z_CH2_INTP	%UX0.z.26	BOOL	Analog Output Module: CH2 Interpolation Status
Tag	GlobalVariable	_0z_CH2_OUTEN	%UX0.z.34	BOOL	Analog Output Module: CH2 Output Enable
Tag	GlobalVariable	_0z_CH3_ACT	%UX0.z.19	BOOL	Analog Output Module: CH3 Activation Status
Tag	GlobalVariable	_0z_CH3_DATA	%UW0.z.6	WORD	Analog Output Module: CH3 Input
Tag	GlobalVariable	_0z_CH3_ERR	%UX0.z.3	BOOL	Analog Output Module: CH3 Error
Tag	GlobalVariable	_0z_CH3_INTP	%UX0.z.27	BOOL	Analog Output Module: CH3 Interpolation Status
Tag	GlobalVariable	_0z_CH3_OUTEN	%UX0.z.35	BOOL	Analog Output Module: CH3 Output Enable
Tag	GlobalVariable	_0z_CH_ACT_ARY	%UX0.z.16	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Active
Tag	GlobalVariable	_0z_CH_DATA_ARY	%UW0.z.3	ARRAY[0..3] OF WORD	Analog Output Module: Each CH Input
Tag	GlobalVariable	_0z_CH_ERR_ARY	%UX0.z.0	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Error
Tag	GlobalVariable	_0z_CH_INTP_ARY	%UX0.z.24	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Interpolation Status
Tag	GlobalVariable	_0z_CH_OUTEN_ARY	%UX0.z.32	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Output Enable
Tag	GlobalVariable	_0z_OUTEN	%UW0.z.2	WORD	Analog Output Module: Output Enable
Tag	GlobalVariable	_0z_RDY	%UX0.z.15	BOOL	Analog Output Module: Ready Flag

XBF-DC04A Analog Output Module

Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-DC04A	$179.00	Current Output	LS Electric XGB analog output module, 4-channel, current, 12-bit, output current signal range(s) of 0-20 mA and 4-20 mA, external 24 VDC required.	4	PDF

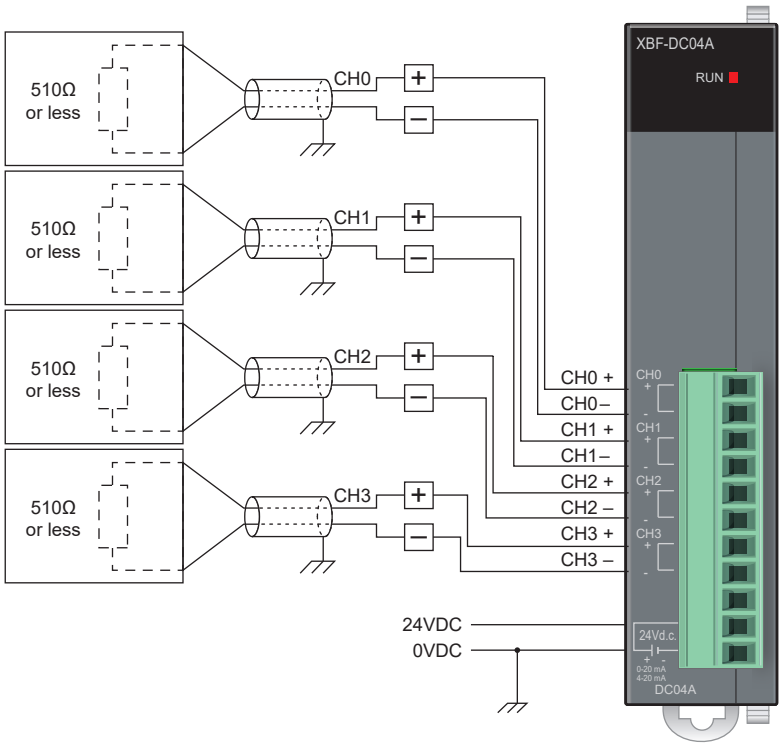
General Specifications			XBF-DC04A
			Current
Analog Output Range			4–20 mA DC 0–20 mA DC (Load resistance: 510Ω or less)
Digital Input		Type	12-bit binary data
	Range	Unsigned Value	0–4000
		Signed Value	±2000
		Precise Value	400–2000 / 0–2000
		Percentile Value	0–1000
Maximum Resolution			5µA (1/4000)
Accuracy			±0.5% or less
Maximum Conversion Speed			1ms/channel
Absolute Maximum Output			DC +25mA
Number of Output Channels			4 channels
Insulation Method			Photocoupler insulation between input terminal and PLC power (no insulation between channels)
Connection Terminal			11-point terminal block
I/O Points Occupied			Fixed type: 512 points
Current Consumption		Internal (5VDC)	110mA
		External (24VDC)	120mA
Weight			70g
Power Supply			20.4–28.8 VDC



XBF-DC04A Analog Output Module Wiring

When connecting cable to your XBF-DC04A:

- Keep the AC power line away from the analog input module's external input signal line to prevent surge or inductive noise.
- Use cable rated to meet your application's ambient temperature and current needs. AWG22 (0.3mm^2) or greater recommended.
- Keep cable clear of high heat and oil.
- Check polarity when wiring the terminal.
- Using high-voltage line or power line may cause abnormal operations or defects due to inductive hindrance.
- Make sure the desired channel is enabled.



Notes:

- Use 2-core twisted shield cable
- Use AWG22 (0.3mm^2) or greater cable
- Load resistance is 510Ω or less
- Terminal screwdriver: slotted 2.5 mm

XBF-DC04A Analog Output Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables

All XGB series analog 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-DC04A are as follows (z refers to module slot number (2 to 8)).

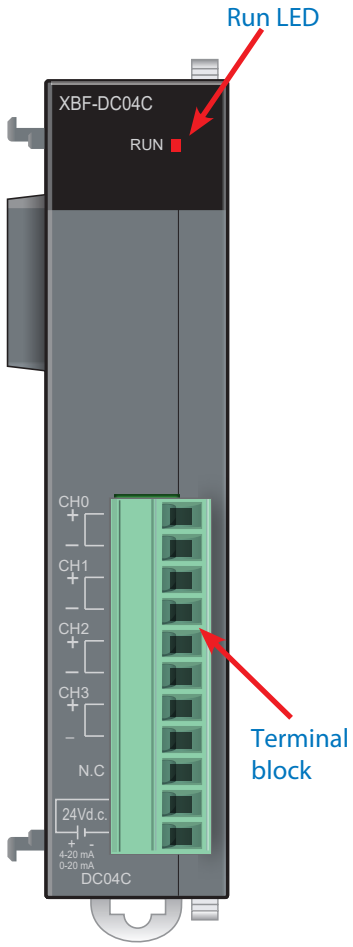
Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GobalVariable	_0z_CH0_ACT	%UX0.z.16	BOOL	Analog Output Module: CH0 Activation Status
Tag	GobalVariable	_0z_CH0_DATA	%UW0.z.3	WORD	Analog Output Module: CH0 Input
Tag	GobalVariable	_0z_CH0_ERR	%UX0.z.0	BOOL	Analog Output Module: CH0 Error
Tag	GobalVariable	_0z_CH0_OUTEN	%UX0.z.32	BOOL	Analog Output Module: CH0 Output Enable
Tag	GobalVariable	_0z_CH1_ACT	%UX0.z.17	BOOL	Analog Output Module: CH1 Activation Status
Tag	GobalVariable	_0z_CH1_DATA	%UW0.z.4	WORD	Analog Output Module: CH1 Input
Tag	GobalVariable	_0z_CH1_ERR	%UX0.z.1	BOOL	Analog Output Module: CH1 Error
Tag	GobalVariable	_0z_CH1_OUTEN	%UX0.z.33	BOOL	Analog Output Module: CH1 Output Enable
Tag	GobalVariable	_0z_CH2_ACT	%UX0.z.18	BOOL	Analog Output Module: CH2 Activation Status
Tag	GobalVariable	_0z_CH2_DATA	%UW0.z.5	WORD	Analog Output Module: CH2 Input
Tag	GobalVariable	_0z_CH2_ERR	%UX0.z.2	BOOL	Analog Output Module: CH2 Error
Tag	GobalVariable	_0z_CH2_OUTEN	%UX0.z.34	BOOL	Analog Output Module: CH2 Output Enable
Tag	GobalVariable	_0z_CH3_ACT	%UX0.z.19	BOOL	Analog Output Module: CH3 Activation Status
Tag	GobalVariable	_0z_CH3_DATA	%UW0.z.6	WORD	Analog Output Module: CH3 Input
Tag	GobalVariable	_0z_CH3_ERR	%UX0.z.3	BOOL	Analog Output Module: CH3 Error
Tag	GobalVariable	_0z_CH3_OUTEN	%UX0.z.35	BOOL	Analog Output Module: CH3 Output Enable
Tag	GobalVariable	_0z_CH_ACT_ARY	%UX0.z.16	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Active
Tag	GobalVariable	_0z_CH_DATA_ARY	%UW0.z.3	ARRAY[0..3] OF WORD	Analog Output Module: Each CH Input
Tag	GobalVariable	_0z_CH_ERR_ARY	%UX0.z.0	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Error
Tag	GobalVariable	_0z_CH_OUTEN_ARY	%UX0.z.32	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Output Enable
Tag	GobalVariable	_0z_OUTEN	%UW0.z.2	WORD	Analog Output Module: Output Enable
Tag	GobalVariable	_0z_RDY	%UX0.z.15	BOOL	Analog Output Module: Ready Flag

XBF-DC04C Analog Output Module

DC04C is an enhanced analog output module which provides higher resolution and interpolation settings for each channel.

Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-DC04C	$230.00	Current Output	LS Electric XGB analog output module, 4-channel, current, 14-bit, output current signal range(s) of 0-20 mA and 4-20 mA, external 24 VDC required.	4	PDF

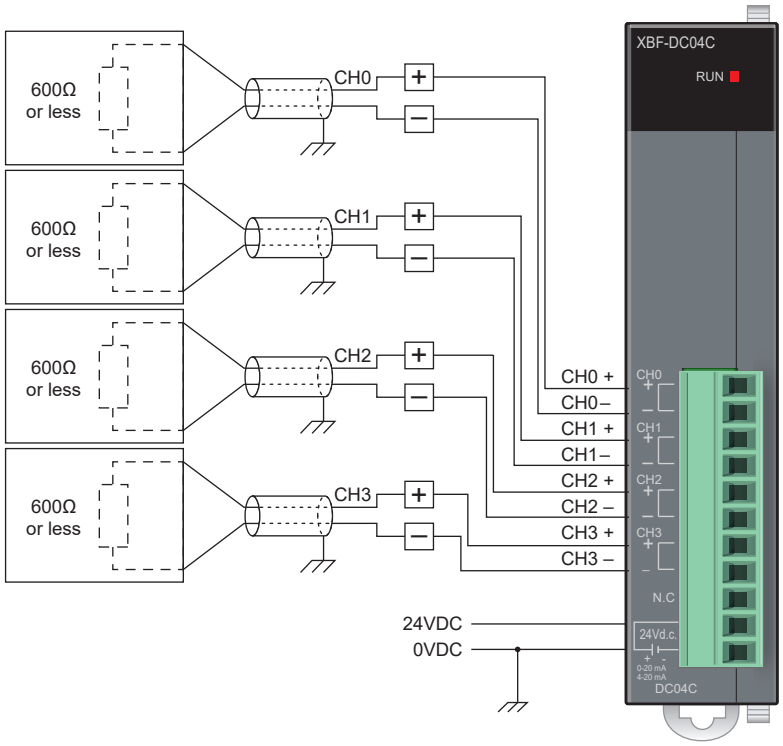
General Specifications			XBF-DC04C
			Current
Analog Output Range			4–20 mA DC 0–20 mA DC (Load resistance: 600Ω or less)
Digital Input		Type	16-bit binary data (Data: 14Bit)
	Range	Unsigned Value	0–16,000
		Signed Value	±8000
		Precise Value	4000–20,000 (4–20 mA) 0–20,000 (0–20 mA)
		Percentile Value	0–10,000
Maximum Resolution			1/16,000
			1.0 µA (4–20 mA) 1.25 µA (0–20 mA)
Accuracy			±0.2% (when ambient temperature 25°C ± 5°C) ±0.3% (when ambient temperature outside range above)
Maximum Conversion Speed			1ms/channel
Additional Function			Setting of channel output status (select one among Previous, Min, Max) Setting of interpolation method (linear interpolation, S-type interpolation)
Insulation Method			Photocoupler insulation between output terminal and PLC power (no insulation between channels)
Connection Terminal			11-point terminal
I/O Points Occupied			Fixed point assignment: 512 points
Current Consumption		Internal (5VDC)	75mA
		External (24VDC)	170mA
Weight			69g
Power Supply			20.4–28.8 VDC



XBF-DC04C Analog Output Module Wiring

When connecting cable to your XBF-DC04C:

- Keep the AC power line away from the analog input module's external input signal line to prevent surge or inductive noise.
- Use cable rated to meet your application's ambient temperature and current needs. AWG22 (0.3mm^2) or greater recommended.
- Keep cable clear of high heat and oil.
- Check polarity when wiring the terminal.
- Using high-voltage line or power line may cause abnormal operations or defects due to inductive hindrance.
- Make sure the desired channel is enabled.



Notes:

- Use 2-core twisted shield cable
- Use AWG22 (0.3mm^2) or greater cable
- Load resistance is 600Ω or less
- Terminal screwdriver: slotted 2.5 mm

XBF-DC04C Analog Output Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables

All XGB series analog 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-DC04C are as follows (z refers to module slot number (2 to 8)).

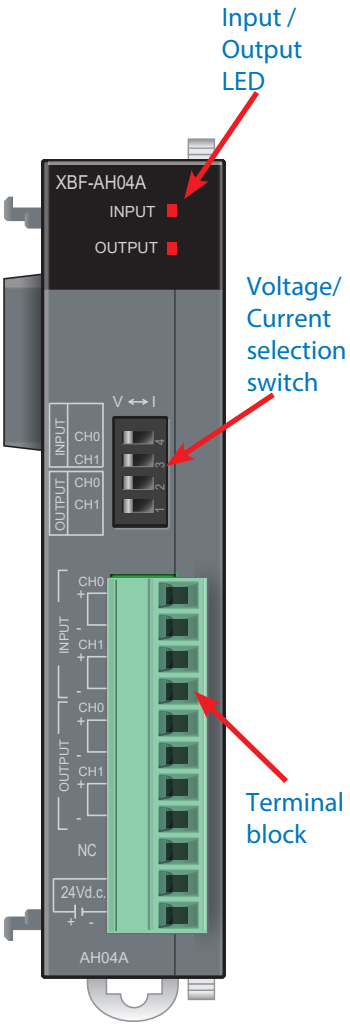
Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GobalVariable	_0z_CH0_ACT	%UX0.z.16	BOOL	Analog Output Module: CH0 Activation Status
Tag	GobalVariable	_0z_CH0_DATA	%UW0.z.3	WORD	Analog Output Module: CH0 Input
Tag	GobalVariable	_0z_CH0_ERR	%UX0.z.0	BOOL	Analog Output Module: CH0 Error
Tag	GobalVariable	_0z_CH0_INTP	%UX0.z.24	BOOL	Analog Output Module : CH0 Interpolation Status
Tag	GobalVariable	_0z_CH0_ODD	%UX0.z.28	BOOL	Analog Output Module: CH0 Output Disconnection
Tag	GobalVariable	_0z_CH0_OUTEN	%UX0.z.32	BOOL	Analog Output Module: CH0 Output Enable
Tag	GobalVariable	_0z_CH1_ACT	%UX0.z.17	BOOL	Analog Output Module: CH1 Activation Status
Tag	GobalVariable	_0z_CH1_DATA	%UW0.z.4	WORD	Analog Output Module: CH1 Input
Tag	GobalVariable	_0z_CH1_ERR	%UX0.z.1	BOOL	Analog Output Module: CH1 Error
Tag	GobalVariable	_0z_CH1_INTP	%UX0.z.25	BOOL	Analog Output Module: CH1 Interpolation Status
Tag	GobalVariable	_0z_CH1_ODD	%UX0.z.29	BOOL	Analog Output Module: CH1 Output Disconnection
Tag	GobalVariable	_0z_CH1_OUTEN	%UX0.z.33	BOOL	Analog Output Module: CH1 Output Enable
Tag	GobalVariable	_0z_CH2_ACT	%UX0.z.18	BOOL	Analog Output Module: CH2 Activation Status
Tag	GobalVariable	_0z_CH2_DATA	%UW0.z.5	WORD	Analog Output Module: CH2 Input
Tag	GobalVariable	_0z_CH2_ERR	%UX0.z.2	BOOL	Analog Output Module: CH2 Error
Tag	GobalVariable	_0z_CH2_INTP	%UX0.z.26	BOOL	Analog Output Module: CH2 Interpolation Status
Tag	GobalVariable	_0z_CH2_ODD	%UX0.z.30	BOOL	Analog Output Module: CH2 Output Disconnection
Tag	GobalVariable	_0z_CH2_OUTEN	%UX0.z.34	BOOL	Analog Output Module: CH2 Output Enable
Tag	GobalVariable	_0z_CH3_ACT	%UX0.z.19	BOOL	Analog Output Module: CH3 Activation Status
Tag	GobalVariable	_0z_CH3_DATA	%UW0.z.6	WORD	Analog Output Module: CH3 Input
Tag	GobalVariable	_0z_CH3_ERR	%UX0.z.3	BOOL	Analog Output Module: CH3 Error
Tag	GobalVariable	_0z_CH3_INTP	%UX0.z.27	BOOL	Analog Output Module: CH3 Interpolation Status
Tag	GobalVariable	_0z_CH3_ODD	%UX0.z.31	BOOL	Analog Output Module: CH3 Output Disconnection
Tag	GobalVariable	_0z_CH3_OUTEN	%UX0.z.35	BOOL	Analog Output Module: CH3 Output Enable
Tag	GobalVariable	_0z_CH_ACT_ARY	%UX0.z.16	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Active
Tag	GobalVariable	_0z_CH_DATA_ARY	%UW0.z.3	ARRAY[0..3] OF WORD	Analog Output Module: Each CH Input
Tag	GobalVariable	_0z_CH_ERR_ARY	%UX0.z.0	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Error
Tag	GobalVariable	_0z_CH_INTP_ARY	%UX0.z.24	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Interpolation Status
Tag	GobalVariable	_0z_CH_OUTEN_ARY	%UX0.z.32	ARRAY[0..3] OF BOOL	Analog Output Module: Each CH Output Enable
Tag	GobalVariable	_0z_OUTEN	%UW0.z.2	WORD	Analog Output Module: Output Enable
Tag	GobalVariable	_0z_RDY	%UX0.z.15	BOOL	Analog Output Module: Ready Flag

XBF-AH04A Analog Combo Module

Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-AH04A	$238.00	Voltage/Current Input/Output	LS Electric XGB analog combo module, Input: 2-channel, current/voltage, 0-20 mA and 4-20 mA, 0-5 VDC, 1-5 VDC and 0-10 VDC, Output: 2-channel, current/voltage, 0-20 mA and 4-20 mA, 0-5 VDC, 1-5 VDC and 0-10 VDC.	4	PDF

General Specifications				XBF-AH04A	
				Voltage	Current
Input Performance Specifications	Analog Input Range*			1–5 VDC, 0–5 VDC, 0–10 VDC (Input resistance: 1MΩ or above)	4–20 mA DC, 0–20 mA DC (Input resistance 250Ω)
	Digital Output		Type	12-bit binary data	
		Range	Unsigned Value	0–4000	
			Signed Value	±2000	
			Precise Value	100–500 (1–5 VDC), 0–500 (0–5 VDC), 0–1000 (0–10 VDC)	400–2000 (4–20 mA DC) 0–2000 (0–20 mA DC)
			Percentile Value	0–1000	
	Additional Function		Filter Function	Digital filter (4–64,000 ms)	
			Averaging Function	Time averaging (4–16,000 ms)	
				Count averaging (2–64,000 times)	
				Moving averaging (2–100 samples)	
			Alarm Function	Disconnection detection (1–5 VDC, 4–20 mA DC)	
Output Performance Specifications	Analog Output Range*			1–5 VDC, 0–5 VDC, 0–10 VDC (Load resistance: 2kΩ or above)	4–20 mA DC, 0–20 mA DC (Load resistance 510Ω or less)
	Digital Input		Type	12-bit binary data	
		Range	Unsigned Value	0–4000	
			Signed Value	±2000	
			Precise Value	100–500 (1–5 VDC), 0–500 (0–5 VDC), 0–1000 (0–10 VDC)	400–2000 (4–20 mA DC) 0–2000 (0–20 mA DC)
			Percentile Value	0–1000	
	Additional Function			Function setting channel output status (can select one from Previous, Minimum, Median, Maximum)	
Common Specifications	Maximum Resolution			1/4000	
				1.25 mV (1–5, 0–5 VDC) 2.5 mV (0–10 VDC)	5μA (4–20, 0–20 mA DC)
	Accuracy			±0.5%	
	Maximum Conversion Speed			1ms/channel	
	Absolute Maximum Input			±15VDC	±25mA DC
	Insulation Method			Photocoupler insulation between I/O terminal and PLC power (not insulated between channels)	
	I/O Terminal Block			11 points terminal block	
	I/O Points Occupied			Fixed type: 512 points	
	Current Consumption		Internal (5VDC)	120mA	
			External (24VDC)	130mA	
	Weight			73g	
	Power Supply			20.4–28.8 VDC	

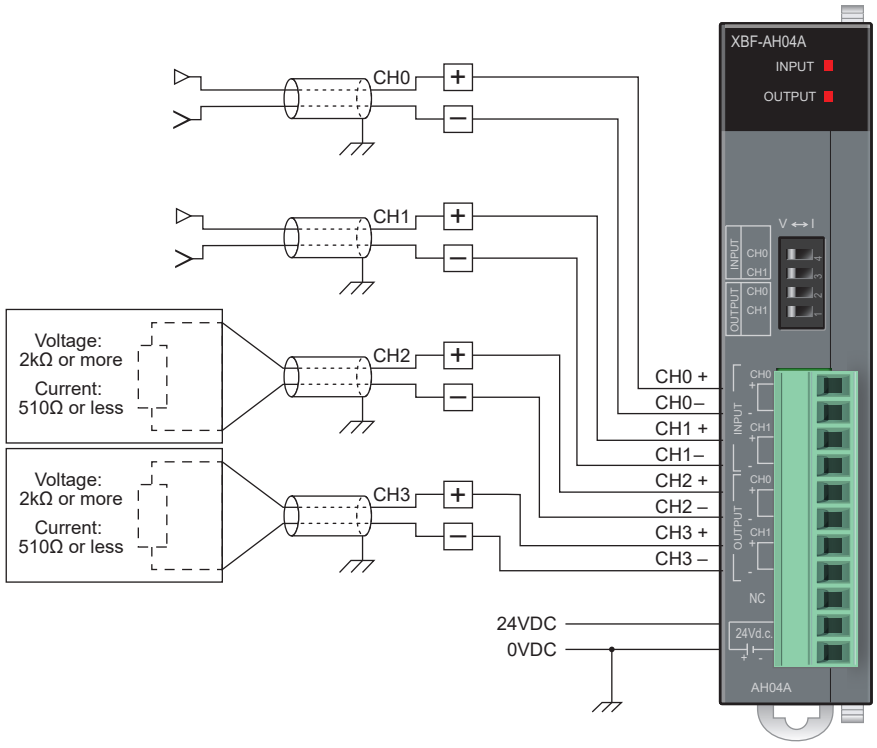
*** Input and Output Voltage/Current selection switch for each channel must match user program settings..**



XBF-AH04A Analog Combo Module Wiring

When connecting cable to your XBF-AH04A:

- In case of voltage/current input/output, wiring is the same. Adjust the voltage/current setting switch according to the case.
- Keep the AC power line away from the analog input module's external input signal line to prevent surge or inductive noise.
- Use cable rated to meet your application's ambient temperature and current needs. AWG22 (0.3mm^2) or greater recommended.
- Keep cable clear of high heat and oil.
- Check polarity when wiring the terminal.
- Using high-voltage line or power line may cause abnormal operations or defects due to inductive hindrance.
- Make sure the desired channel is enabled.



Notes:

- Use 2-core twisted shield cable
- Use AWG22 (0.3mm^2) cable
- Current input resistance is 250Ω
- Current output load resistance is 510Ω or less
- Voltage input resistance is 1MΩ
- Voltage output load resistance is 2kΩ or above
- Terminal screwdriver: slotted 2.5 mm

XBF-AH04A Analog Combo Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables
All XGB series analog 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-AH04A are as follows (z refers to module slot number (2 to 8)).

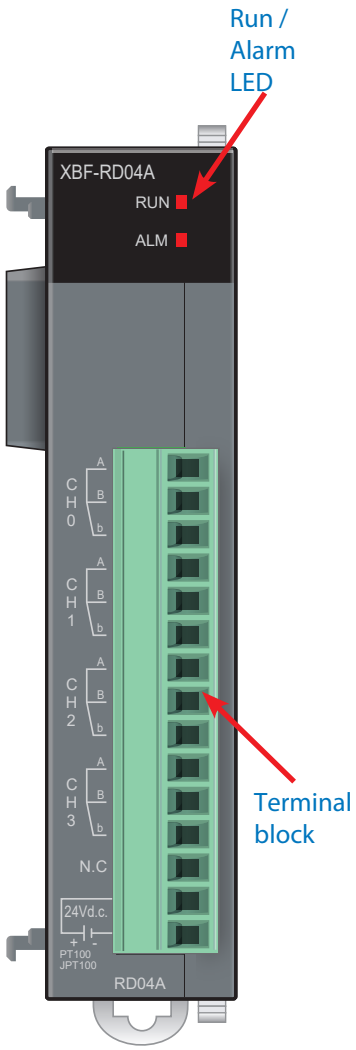
Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_AD01_DATA_ARY	%UW0.z.4	ARRAY[0..1] OF WORD	Analog IO Module: Input each CH Data
Tag	GlobalVariable	_0z_AD0_ACT	%UX0.z.16	BOOL	Analog IO Module: AD0 Activation Status
Tag	GlobalVariable	_0z_AD0_DATA	%UW0.z.4	WORD	Analog IO Module: AD0 Digital Output Data
Tag	GlobalVariable	_0z_AD0_ERR	%UX0.z.24	BOOL	Analog IO Module: AD0 Error Code
Tag	GlobalVariable	_0z_AD0_IDD	%UX0.z.20	BOOL	Analog IO Module: AD0 Disconnection Flag
Tag	GlobalVariable	_0z_AD1_ACT	%UX0.z.17	BOOL	Analog IO Module: AD1 Activation Status
Tag	GlobalVariable	_0z_AD1_DATA	%UW0.z.5	WORD	Analog IO Module: AD1 Digital Output Data
Tag	GlobalVariable	_0z_AD1_ERR	%UX0.z.25	BOOL	Analog IO Module: AD1 Error Code
Tag	GlobalVariable	_0z_AD1_IDD	%UX0.z.21	BOOL	Analog IO Module: AD1 Disconnection Flag
Tag	GlobalVariable	_0z_CH_ACT_ARY	%UX0.z.16	ARRAY[0..3] OF BOOL	Analog IO Module: Input/Output each CH Active
Tag	GlobalVariable	_0z_CH_ERR_ARY	%UX0.z.24	ARRAY[0..1] OF BOOL	Analog IO Module: Input/Output each CH Error
Tag	GlobalVariable	_0z_DA01_DATA_ARY	%UW0.z.7	ARRAY[0..1] OF WORD	Analog IO Module: Output each CH DATA
Tag	GlobalVariable	_0z_DA0_ACT	%UX0.z.18	BOOL	Analog IO Module: DA0 Activation Status
Tag	GlobalVariable	_0z_DA0_DATA	%UW0.z.7	WORD	Analog IO Module: DA0 Digital Input Data
Tag	GlobalVariable	_0z_DA0_ERR	%UX0.z.26	BOOL	Analog IO Module: DA0 Error Code
Tag	GlobalVariable	_0z_DA0_OUTEN	%UX0.z.96	BOOL	Analog IO Module: DA0 Output Enable
Tag	GlobalVariable	_0z_DA1_ACT	%UX0.z.19	BOOL	Analog IO Module: Output CH1 Activation Status
Tag	GlobalVariable	_0z_DA1_DATA	%UW0.z.8	WORD	Analog IO Module: DA1 Digital Input Data
Tag	GlobalVariable	_0z_DA1_ERR	%UX0.z.27	BOOL	Analog IO Module: DA1 Error Code
Tag	GlobalVariable	_0z_DA1_OUTEN	%UX0.z.97	BOOL	Analog IO Module: DA1 Output Enable
Tag	GlobalVariable	_0z_DA_OUTEN_ARY	%UX0.z.96	ARRAY[0..1] OF BOOL	Analog IO Module: Output each CH Status Setting
Tag	GlobalVariable	_0z_ERR	%UX0.z.0	BOOL	Analog IO Module: Error Flag
Tag	GlobalVariable	_0z_RDY	%UX0.z.15	BOOL	Analog IO Module: Ready Flag

XBF-RD04A Temperature Input Module

XBF-RD04A temperature sensing module provides the XGB PLC with the capability to monitor 4 independent RTD style temperature sensors.

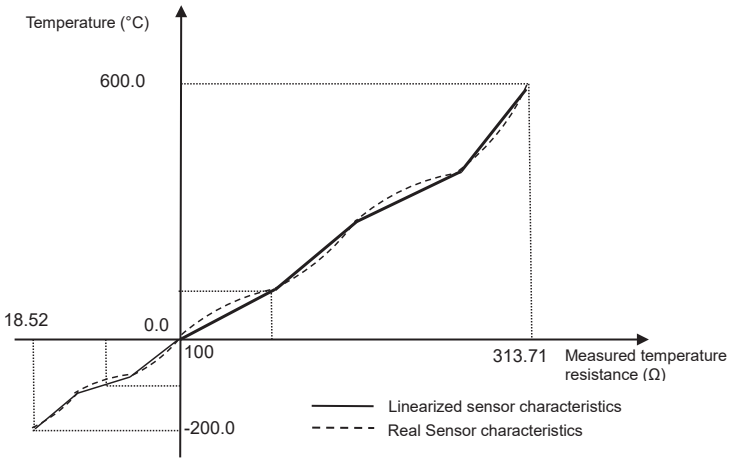
Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-RD04A	$219.00	Temperature Input Module	LS Electric XGB temperature input module, RTD, 4-channel, 14-bit resolution, input RTD type(s): Pt100 and JPt100. Removable terminal block included.	4	PDF

Input Specifications		XBF-RD04A
Input Channels		4
Input Sensor Type	PT100	JIS C1604-1997
	JPT100	JISC1604-1981, KS C1603-1991
Temperature Input Range	PT100	-200 to 600 ℃
	JPT100	-200 to 600 ℃
Scaling Value	PT100	-2000 to 6000
	JPT100	-2000 to 6000
Accuracy	Normal temp (25℃)	Within ± 0.3%
	Full temp (0–55℃)	Within ± 0.5%
Conversion speed		40ms/channel
Insulation	Channel to Channel	Non-insulation
	Terminal to PLC Power	Insulation (photocoupler)
Terminal Block		15-point terminal block
I/O Points Occupied		Fixed type: 64 points
Wiring Method		3-wire
Max. number per CPU		7
Function	Filtering	Digital filter (160–64000 ms)
	Alarm	Disconnection detection
Current Consumption	Inner 5VDC	100mA
	External 24VDC	100mA
Weight		63g

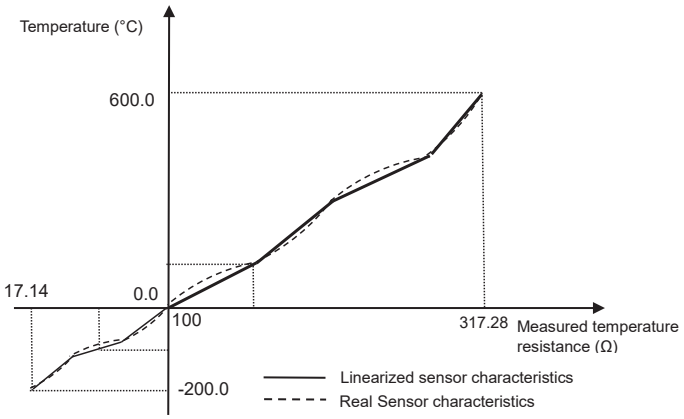


Temperature Conversion

PT100 Sensor



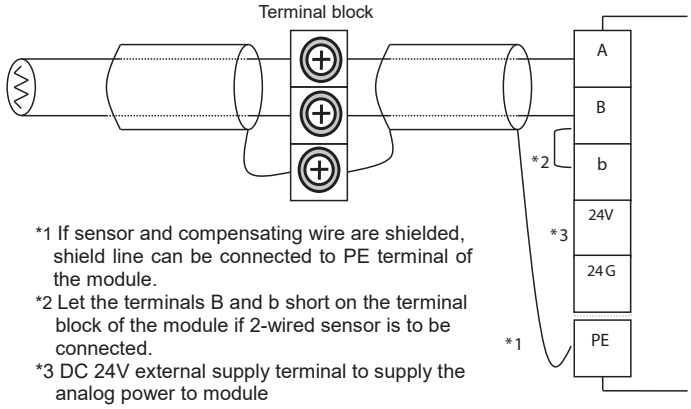
JPT100 Sensor



XBF-RD04A Analog Combo Module, *continued*

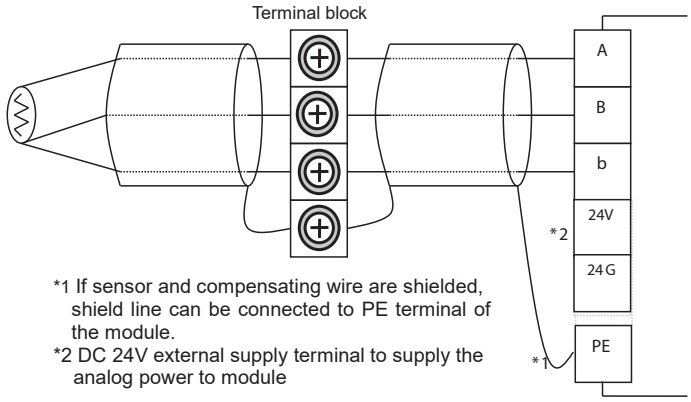
Wiring

Two-wired Sensor



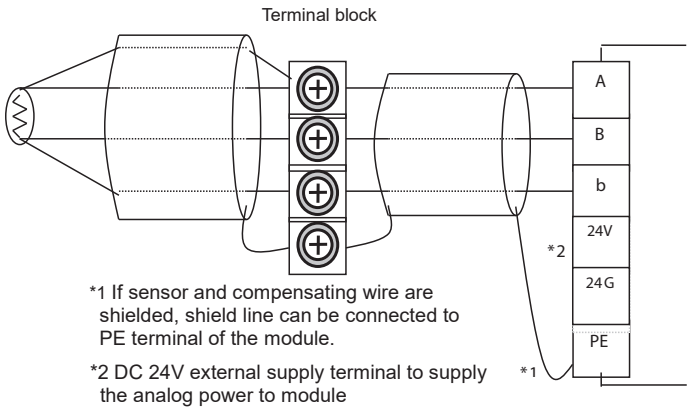
*1 If sensor and compensating wire are shielded, shield line can be connected to PE terminal of the module.
*2 Let the terminals B and b short on the terminal block of the module if 2-wired sensor is to be connected.
*3 DC 24V external supply terminal to supply the analog power to module

Three-wired Sensor



*1 If sensor and compensating wire are shielded, shield line can be connected to PE terminal of the module.
*2 DC 24V external supply terminal to supply the analog power to module

Four-wired Sensor



*1 If sensor and compensating wire are shielded, shield line can be connected to PE terminal of the module.
*2 DC 24V external supply terminal to supply the analog power to module

XBF-RD04A Analog Combo Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables

All XGB series analog 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-RD04A are as follows (z refers to module slot number (2 to 8)).

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH0_ACT	%UX0.z.16	BOOL	Temp. Measuring Module : CH0 Activation Status
Tag	GlobalVariable	_0z_CH0_BOUT	%UX0.z.20	BOOL	Temp. Measuring Module : CH0 Disconnection Flag
Tag	GlobalVariable	_0z_CH0_SCAL	%UW0.z.8	WORD	Temp. Measuring Module : CH0 Scaling Data
Tag	GlobalVariable	_0z_CH0_TEMP	%UW0.z.4	WORD	Temp. Measuring Module : CH0 Temp. Data
Tag	GlobalVariable	_0z_CH1_ACT	%UX0.z.17	BOOL	Temp. Measuring Module : CH1 Activation Status
Tag	GlobalVariable	_0z_CH1_BOUT	%UX0.z.21	BOOL	Temp. Measuring Module : CH1 Disconnection Flag
Tag	GlobalVariable	_0z_CH1_SCAL	%UW0.z.9	WORD	Temp. Measuring Module : CH1 Scaling Data
Tag	GlobalVariable	_0z_CH1_TEMP	%UW0.z.5	WORD	Temp. Measuring Module : CH1 Temp. Data
Tag	GlobalVariable	_0z_CH2_ACT	%UX0.z.18	BOOL	Temp. Measuring Module : CH2 Activation Status
Tag	GlobalVariable	_0z_CH2_BOUT	%UX0.z.22	BOOL	Temp. Measuring Module : CH2 Disconnection Flag
Tag	GlobalVariable	_0z_CH2_SCAL	%UW0.z.10	WORD	Temp. Measuring Module : CH2 Scaling Data
Tag	GlobalVariable	_0z_CH2_TEMP	%UW0.z.6	WORD	Temp. Measuring Module : CH2 Temp. Data
Tag	GlobalVariable	_0z_CH3_ACT	%UX0.z.19	BOOL	Temp. Measuring Module : CH3 Activation Status
Tag	GlobalVariable	_0z_CH3_BOUT	%UX0.z.23	BOOL	Temp. Measuring Module : CH3 Disconnection Flag
Tag	GlobalVariable	_0z_CH3_SCAL	%UW0.z.11	WORD	Temp. Measuring Module : CH3 Scaling Data
Tag	GlobalVariable	_0z_CH3_TEMP	%UW0.z.7	WORD	Temp. Measuring Module : CH3 Temp. Data
Tag	GlobalVariable	_0z_CH_ACT_ARY	%UX0.z.16	ARRAY[0..3] OF BOOL	Temp. Measuring Module : Each CH Activation Status
Tag	GlobalVariable	_0z_CH_SCAL_ARY	%UW0.z.8	ARRAY[0..3] OF WORD	Temp. Measuring Module : Each CH Scaling Data
Tag	GlobalVariable	_0z_CH_TEMP_ARY	%UW0.z.4	ARRAY[0..3] OF WORD	Temp. Measuring Module : Each CH Temp. Data
Tag	GlobalVariable	_0z_ERR	%UX0.z.0	BOOL	Temp. Measuring Module : Module Error
Tag	GlobalVariable	_0z_RDY	%UX0.z.15	BOOL	Temp. Measuring Module : Ready Flag

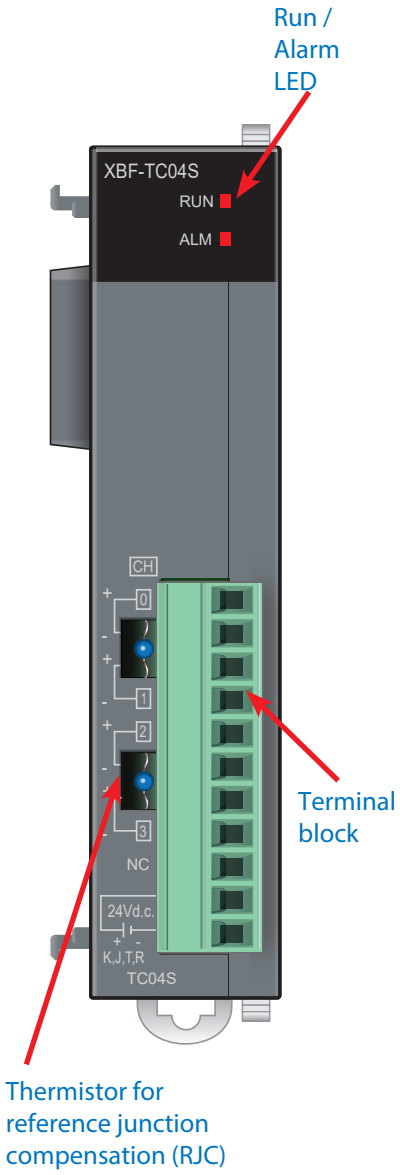
XBF-TC04S Analog Thermocouple Input Module

XBF-TC04S temperature sensing module provides the XGB PLC with the capability to monitor 4 independent thermocouple style temperature sensors.

Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-TC04S	$219.00	Thermocouple Input Module	LS Electric XGB temperature input module, thermocouple, 4-channel, 16-bit resolution, input thermocouple type(s): J, K, R, T. Removable terminal block included.	4	PDF

Input Specifications			XBF-TC04S
Input Channels			4
Type of Input Sensor			Thermocouple K / J / T / R type JIS C1602-1995
Range of Input Temperature		K	-200.0 to 1300.0 ℃
		J	-200.0 to 1200.0 ℃
		T	-200.0 to 400.0 ℃
		R	0.0 to 1700.0 ℃
Digital Output		Temperature Display	Displaying down to one decimal place K, J, T type: 0.1 ℃ R type: 0.5 ℃
		Scaling Display	Unsigned scaling (0–65535)
			Signed scaling (-32768 to 32767)
Accuracy		Ambient Temperature (25℃)	Within ± 0.2%
		Temperature Coefficient (range of operating temp)	± 100 ppm/°C
Conversion Time			50ms/channel
Reference Junction Compensation			Auto compensation by RJC sensing (Thermistor) at ± 1.0°C
Warming-up Time			15 minutes or more*
Insulation	Insulation Method	Terminal - inner circuit	Photocoupler insulation
		Terminal - operating power	DC/DC converter insulation
		Between channels	PhotoMos relay insulation
	Dielectric Withstand Voltage		400VAC, 50/60Hz, 1 minute, leaking current 10mA or less
	Insulation Resistance		500VDC, 10MΩ or less
Terminal Block			11-point terminal
I/O Occupied Points			64 points
Max. Number per CPU			7
Additional Function		Filter Process	Digital filter (200–64,000 ms)
		Average Process	Time average (400–64,000 ms)
			Count average (2–64,000 times)
			Moving average (2–100)
		Alarm	Disconnection detection
		Max/Min Display	Display Max/Min
		Scaling Function	Signed scaling / unsigned scaling
Consumption Current		Internal 5VDC	100mA
		External 24VDC	100mA
Weight			63g

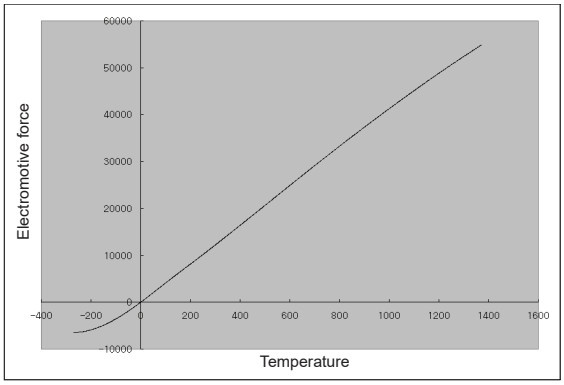
*For stability of measured temperature, 15 minutes warm-up is required after power on.



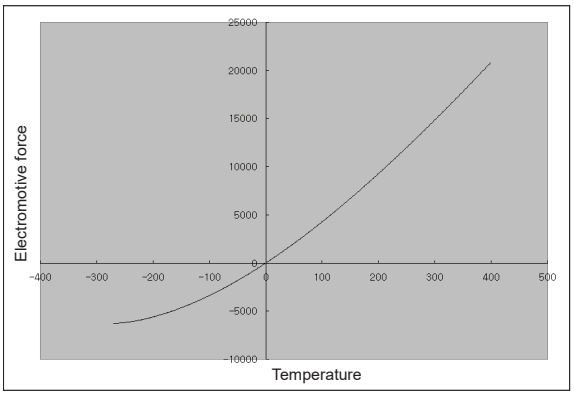
XBF-TC04S Analog Thermocouple Input Module, *continued*

Thermocouple Temperature Conversion

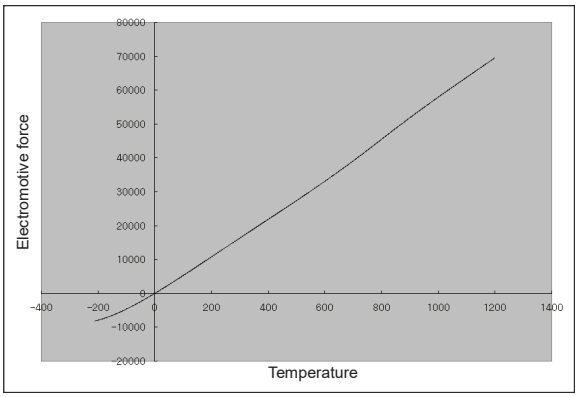
K Type



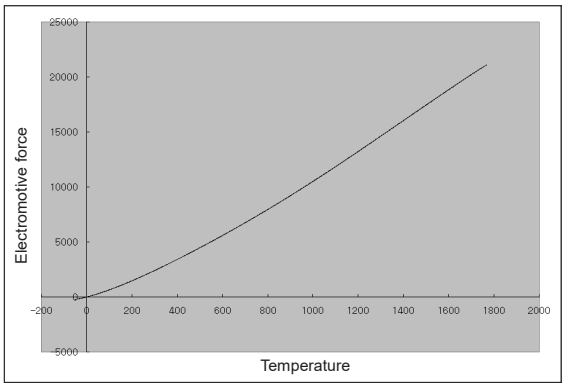
T Type



J Type



R Type



Accuracy/Resolution

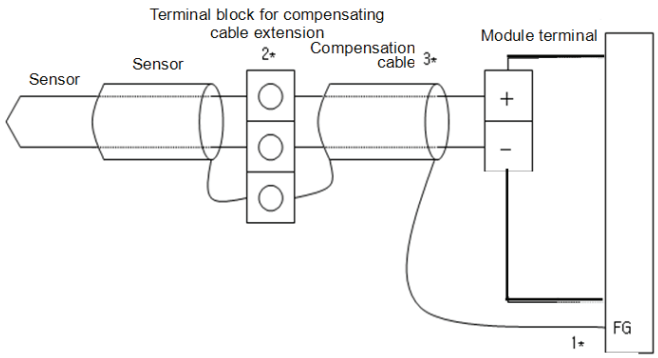
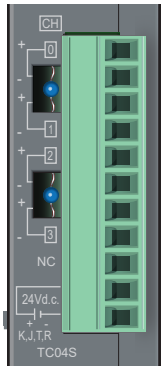
Thermocouple Type	*Measurement Temperature Range*	*Indication Temperature Range*	*Accuracy[1]*		*Resolution*
			Normal temperature (25°C)	*Operating Temperature[2] (0°C to 55°C)*	
K	-200.0 °C to 1300.0 °C	-270.0 to -200.0 °C	n/a[3]		
		-200.0 to 0.0 °C	±3.0 °C	±7.5 °C	0.2 °C
		0.0 to 1300.0 °C	±3.0 °C	±7.5 °C	0.1 °C
		1300.0 to 1372.0 °C	n/a[3]		
J	-200.0 °C to 1200.0 °C	-210.0 to -200.0 °C	n/a[3]		
		-200.0 to -100.0 °C	±2.8 °C	±7.0 °C	0.2 °C
		-100.0 to 1200.0 °C	±2.8 °C	±7.0 °C	0.1 °C
T	-200.0 °C to 400.0 °C	-270.0 to -200.0 °C	n/a[3]		
		-200.0 to 400.0 °C	±1.2 °C	±3.0 °C	0.1 °C
R	00.0 °C to 1700.0 °C	-50.0 to 0.0 °C	n/a[3]		
		0.0 to 1700.0 °C	±3.5 °C	±8.5 °C	0.5 °C
		1700.0 to 1768.0 °C	n/a[3]		

1 - Total accuracy (normal temperature): accuracy (normal temp) + cold junction compensation accuracy = ±(full scale x 0.2% + 1.0 °C)
Cold junction compensation accuracy = ± 1.0 °C
2 - Temperature coefficient is ±100 ppm/°C
3 - Measuring the temperature is possible, but accuracy and resolution are not guaranteed

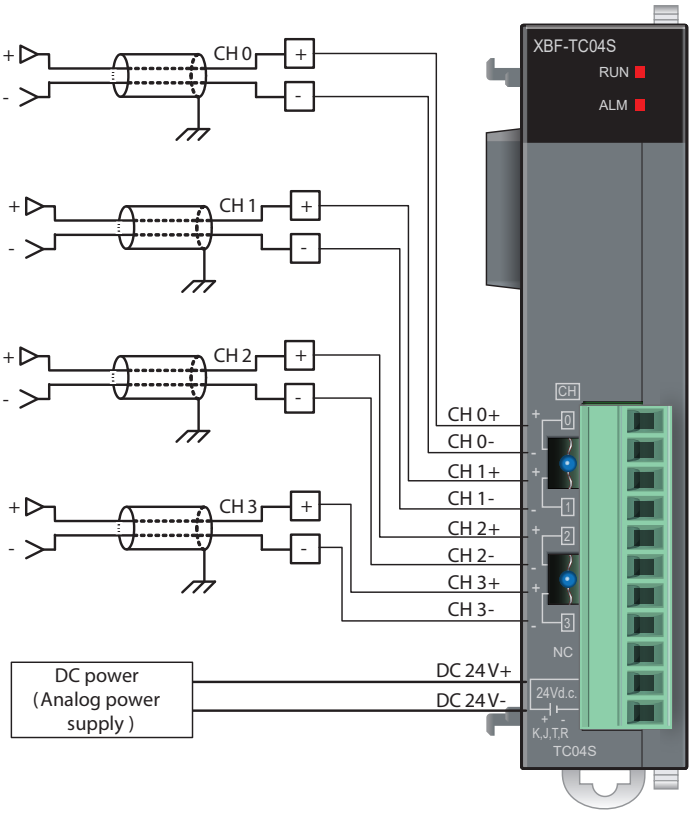
XBF-TC04S Analog Thermocouple Input Module, *continued*

Wiring

XBF-TC04S Circuit Configuration

Circuit Configuration	Terminal	Description	Terminal Block Image
	CH0+	CH0 TC input	
	CH0-		
	CH1+	CH1 TC input	
	CH1-		
	CH2+	CH2 TC input	
	CH2-		
	CH3+	CH3 TC input	
	CH3-		
	NC	Not used	
	24VDC+	24VDC power supply	
	24VDC-		

XBF-TC04S Terminal Wiring



XBF-TC04S Analog Thermocouple Input Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables
All XGB series analog 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-TC04S are as follows (z refers to module slot number (2 to 8)).

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH0_ACT	%UX0.z.16	BOOL	Temp. Measuring Module : CH0 Activation Status
Tag	GlobalVariable	_0z_CH0_ADJERR	%UX0.z.0	BOOL	Temp. Measuring Module : CH0 Offset/Gain Error Flag
Tag	GlobalVariable	_0z_CH0_BOUT	%UX0.z.20	BOOL	Temp. Measuring Module : CH0 Disconnection Flag
Tag	GlobalVariable	_0z_CH0_FINDEN	%UX0.z.464	BOOL	Temp. Measuring Module : CH0 Max./Min. Search Enable
Tag	GlobalVariable	_0z_CH0_MAX	%UW0.z.13	WORD	Temp. Measuring Module : CH0 Temp. Max. Data
Tag	GlobalVariable	_0z_CH0_MIN	%UW0.z.12	WORD	Temp. Measuring Module : CH0 Temp. Min. Data
Tag	GlobalVariable	_0z_CH0_RJCDS	%UX0.z.472	BOOL	Temp. Measuring Module : CH0 Cold Junction Compensation Enable
Tag	GlobalVariable	_0z_CH0_SCAL	%UW0.z.8	WORD	Temp. Measuring Module : CH0 Scaling Data
Tag	GlobalVariable	_0z_CH0_SETERR	%UX0.z.24	BOOL	Temp. Measuring Module : CH0 Error Code
Tag	GlobalVariable	_0z_CH0_TEMP	%UW0.z.4	WORD	Temp. Measuring Module : CH0 Temp. Data
Tag	GlobalVariable	_0z_CH1_ACT	%UX0.z.17	BOOL	Temp. Measuring Module : CH1 Activation Status
Tag	GlobalVariable	_0z_CH1_ADJERR	%UX0.z.1	BOOL	Temp. Measuring Module : CH1 Offset/Gain Error Flag
Tag	GlobalVariable	_0z_CH1_BOUT	%UX0.z.21	BOOL	Temp. Measuring Module : CH1 Disconnection Flag
Tag	GlobalVariable	_0z_CH1_FINDEN	%UX0.z.465	BOOL	Temp. Measuring Module : CH1 Max./Min. Search Enable
Tag	GlobalVariable	_0z_CH1_MAX	%UW0.z.15	WORD	Temp. Measuring Module : CH1 Temp. Max. Data
Tag	GlobalVariable	_0z_CH1_MIN	%UW0.z.14	WORD	Temp. Measuring Module : CH1 Temp. Min. Data
Tag	GlobalVariable	_0z_CH1_RJCDS	%UX0.z.473	BOOL	Temp. Measuring Module : CH1 Cold Junction Compensation Enable
Tag	GlobalVariable	_0z_CH1_SCAL	%UW0.z.9	WORD	Temp. Measuring Module : CH1 Scaling Data
Tag	GlobalVariable	_0z_CH1_SETERR	%UX0.z.25	BOOL	Temp. Measuring Module : CH1 Error Code
Tag	GlobalVariable	_0z_CH1_TEMP	%UW0.z.5	WORD	Temp. Measuring Module : CH1 Temp. Data
Tag	GlobalVariable	_0z_CH2_ACT	%UX0.z.18	BOOL	Temp. Measuring Module : CH2 Activation Status
Tag	GlobalVariable	_0z_CH2_ADJERR	%UX0.z.2	BOOL	Temp. Measuring Module : CH2 Offset/Gain Error Flag
Tag	GlobalVariable	_0z_CH2_BOUT	%UX0.z.22	BOOL	Temp. Measuring Module : CH2 Disconnection Flag
Tag	GlobalVariable	_0z_CH2_FINDEN	%UX0.z.466	BOOL	Temp. Measuring Module : CH2 Max./Min. Search Enable
Tag	GlobalVariable	_0z_CH2_MAX	%UW0.z.17	WORD	Temp. Measuring Module : CH2 Temp. Max. Data
Tag	GlobalVariable	_0z_CH2_MIN	%UW0.z.16	WORD	Temp. Measuring Module : CH2 Temp. Min. Data
Tag	GlobalVariable	_0z_CH2_RJCDS	%UX0.z.474	BOOL	Temp. Measuring Module : CH2 Cold Junction Compensation Enable
Tag	GlobalVariable	_0z_CH2_SCAL	%UW0.z.10	WORD	Temp. Measuring Module : CH2 Scaling Data
Tag	GlobalVariable	_0z_CH2_SETERR	%UX0.z.26	BOOL	Temp. Measuring Module : CH2 Error Code
Tag	GlobalVariable	_0z_CH2_TEMP	%UW0.z.6	WORD	Temp. Measuring Module : CH2 Temp. Data
Tag	GlobalVariable	_0z_CH3_ACT	%UX0.z.19	BOOL	Temp. Measuring Module : CH3 Activation Status
Tag	GlobalVariable	_0z_CH3_ADJERR	%UX0.z.3	BOOL	Temp. Measuring Module : CH3 Offset/Gain Error Flag
Tag	GlobalVariable	_0z_CH3_BOUT	%UX0.z.23	BOOL	Temp. Measuring Module : CH3 Disconnection Flag
Tag	GlobalVariable	_0z_CH3_FINDEN	%UX0.z.467	BOOL	Temp. Measuring Module : CH3 Max./Min. Search Enable
Tag	GlobalVariable	_0z_CH3_MAX	%UW0.z.19	WORD	Temp. Measuring Module : CH3 Temp. Max. Data
Tag	GlobalVariable	_0z_CH3_MIN	%UW0.z.18	WORD	Temp. Measuring Module : CH3 Temp. Min. Data
Tag	GlobalVariable	_0z_CH3_RJCDS	%UX0.z.475	BOOL	Temp. Measuring Module : CH3 Cold Junction Compensation Enable

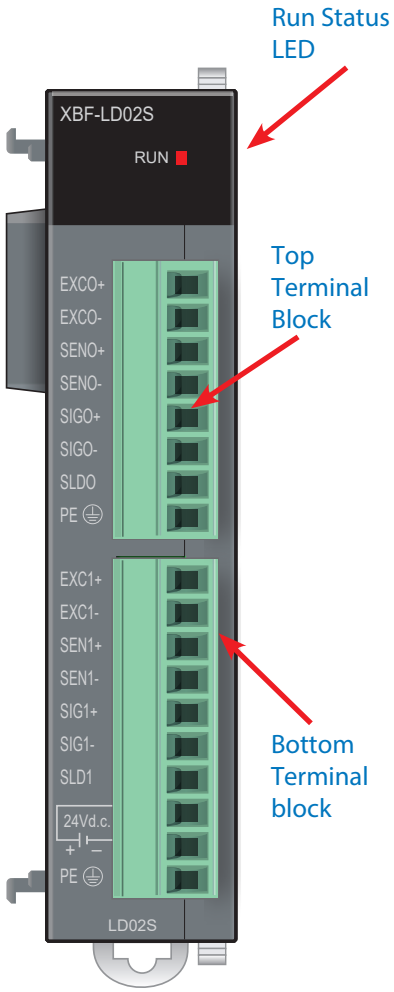
XBF-TC04S Analog Thermocouple Input Module Configuration, *continued*

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH3_SCAL	%UW0.z.11	WORD	Temp. Measuring Module : CH3 Scaling Data
Tag	GlobalVariable	_0z_CH3_SETERR	%UX0.z.27	BOOL	Temp. Measuring Module : CH3 Error Code
Tag	GlobalVariable	_0z_CH3_TEMP	%UW0.z.7	WORD	Temp. Measuring Module : CH3 Temp. Data
Tag	GlobalVariable	_0z_CH_ACT_ARY	%UX0.z.16	ARRAY[0..3] OF BOOL	Temp. Measuring Module : Each CH Activation Status
Tag	GlobalVariable	_0z_CH_ADJERR_ARY	%UX0.z.0	ARRAY[0..3] OF BOOL	Temp. Measuring Module : Each CH Offset/Gain Error Flag
Tag	GlobalVariable	_0z_CH_FINDEN_ARY	%UX0.z.464	ARRAY[0..3] OF BOOL	Temp. Measuring Module : Each CH Max./Min. Search Enable
Tag	GlobalVariable	_0z_CH_RJCDS_ARY	%UX0.z.472	ARRAY[0..3] OF BOOL	Temp. Measuring Module : Each CH Cold Junction Compensation Enable
Tag	GlobalVariable	_0z_CH_SCAL_ARY	%UW0.z.8	ARRAY[0..3] OF WORD	Temp. Measuring Module : Each CH Scaling Data
Tag	GlobalVariable	_0z_CH_SETERR_ARY	%UX0.z.24	ARRAY[0..3] OF BOOL	Temp. Measuring Module : Each CH Error Code
Tag	GlobalVariable	_0z_CH_TEMP_ARY	%UW0.z.4	ARRAY[0..3] OF WORD	Temp. Measuring Module : Each CH Temp. Data
Tag	GlobalVariable	_0z_EEPROMERR	%UX0.z.13	BOOL	Temp. Measuring Module : Offset/Gain Backup Error Flag
Tag	GlobalVariable	_0z_EXT_PWR_ERR	%UX0.z.12	BOOL	Temp. Measuring Module : External Power Error
Tag	GlobalVariable	_0z_RDY	%UX0.z.15	BOOL	Temp. Measuring Module : Ready Flag
Tag	GlobalVariable	_0z_WDT_ERR	%UX0.z.14	BOOL	Temp. Measuring Module : H/W Error Flag

XBF-LD02S Load Cell Input Module

XBF-LD02S load cell input module gives the XGB PLC the capability to work with any weighing application that uses load cells. This is the only AutomationDirect offered PLC with load cell capability.

Part Number	Price	Classification	Description	Drawing
XBF-LD02S	$299.00	Load Cell Input Module	LS Electric XGB load cell input module, 2-channel, voltage, 15-bit resolution, input voltage signal range(s) of 0-6 mV/VDC. For use with 5 VDC four- or six-wire load cells. Removable terminal blocks included.	PDF



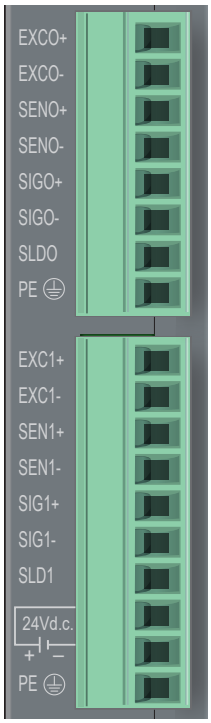
General Specifications		XBF-LD02S
Input Channel		2
Load Cell Input Voltage		5VDC±5% (8 per 350Ω load cell channel)
Load Cell Type		Four-wire or six-wire
Resolution		1/40000
Analog Input Range		0.0–30.0 mV[1] (Load cell 6mV/V)
Load Cell Output Sensitivity		0.125µV (when the rated output of the load cell is 0.0–1.0 mV/V)
Input Accuracy		±0.01% or less (nonlinear accuracy, 25°C) Zero Drift: ±0.25 µV/°C Gain Drift: ±15ppm/ °C
Sampling Cycle (per channel)		2.5 ms, 5ms (default), 10ms, 20ms
Insulation	Classification	Input terminal and internal circuits
	Insulation Method	Photocoupler
	Insulation Voltage Resistance	550VAC, 50/60Hz, 1 minute Leakage 10mA or less
	Insulation Resistance	500VDC, 10MΩ or more
Warm-up Time		30 minutes or more[2]
Input ConnectorHi		8-pin connector (CH0), 10-pin connector (CH1)
I/O Occupation Points		Fixed type: 64 points
Maximum Number per CPU		7
Power Supply		Internal: 5VDC External: 20.4–28.8 VDC
Power Consumption	Internal 5VDC	110mA
	External 24VDC	280mA
Weight		68g

1 - Analog input range: For the tensile strength and type load cell, the input range is ±30mV
2 - Warm-up time: Calibration or measurement must begin 30 minutes after the power supply is applied.

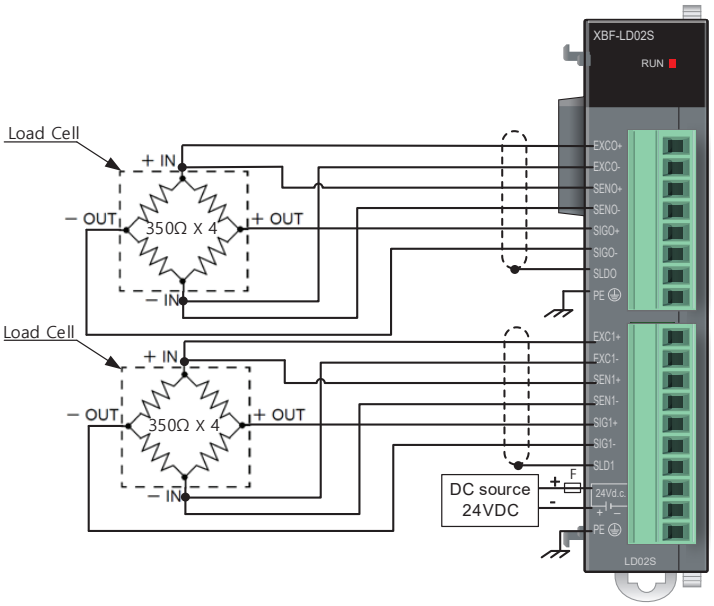
XBF-LD02S Load Cell Input Module Functions

Item	Function		Details
Load Cell Input Function	Calibration Function	2-point Calibration Function	Before measuring the actual weight, it calibrates the measurement range of the weight system.
		1-point Calibration Function	After 2-point calibration, calibrates only the zero point depending on changes in the surrounding environment such as temperature.
		Equivalent Circuit calibration Function	Perform calibration when using environment that is difficult to calibrate using actual load or tension / compression type load cell.
	Input Processing	Moving Average Function	The average processing method that reflects the diving the difference (between the present value and the previous moving average value) by 2^n.
		Moving/Count Average Function	It accumulates the moving averages of a designated channel in accordance with the set counts, and displays the average value of the sum as digital data.
		Moving/Time Average Function	It accumulates the moving averages of a designated channel for the set amount of time, and displays the average value of the sum as digital data.
		Stable Status Determination Function	It determines whether the status of the total weight value is safe.
	Zero Processing	Zero Tracking Function	It adjusts zero output values in accordance with changes of the surrounding environment, such as temperature change.
		Zero Setting, Reset Function	It temporarily adjusts zero output values when 0 is not output even after 2-point calibration due to changes of the surrounding environment such as gathering of foreign matters around the pallet caused by using the load cell for a long time. When using a container (Tare), you can also use this function to remove the weight of the container.
	Alarm Function	HL Alarm Function	Processes alarm by defining the HH, H, L, LL of inputs.
		Flag Display Function	It displays (L) L Status Flag.
			It displays (L) L Status Flag.
	Output Maintenance Function	Maximum Minimum Value Maintenance Function	It displays the maximum / minimum values of the total weight measured while running the input channel.
		Output Value Maintenance Function	It temporarily maintains the output value of the total weight. It is executed only when the output status request flag is turned on.
	Auxiliary Functions	Free Fall Calibration Function	It automatically calibrates free fall values.
	Backup	Zero-point Backup Setting	Function to measure the weight on the weighing pan when PLC power is turned on or display it as zero automatically.

XBF-LD02S Load Cell Input Module Wiring

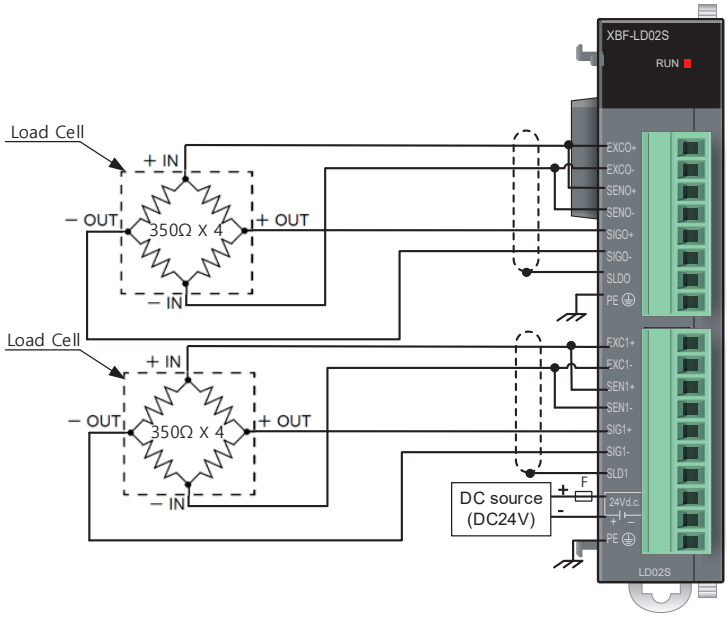
Terminal Image	Terminal Name	Function	Description
	***EXC0+***	Load cell applied voltage(+)	Voltage supplied to the load cell in the module(5VDC)(CH0)
	EXC0-	Load cell applied voltage(-)	
	SEN0+	Load cell sensing input(+)	Signal for measuring the voltage drop in EXC0+ side of the load cell cable
	SEN0-	Load cell sensing input(-)	Signal for measuring the voltage drop in EXC0- side of the load cell cable
	SIG0+	Load cell signal input(+)	Load cell output voltage(CH0)
	SIG0-	Load cell signal input(-)	
	SLD0	Shield	Connect shield wires of the load cell cable(CH0)
	PE	Grounding	External grounding (CH0)
	EXC1+	Load cell applied voltage(+)	Voltage supplied to the load cell in the module(5VDC)(CH1)
	EXC1-	Load cell applied voltage(-)	
	SEN1+	Load cell sensing input(+)	Signal for measuring the voltage drop in EXC1+ side of the load cell cable
	SEN1-	Load cell sensing input(-)	Signal for measuring the voltage drop in EXC1- side of the load cell cable
	SIG1+	Load cell signal input(+)	Load cell output voltage(CH1)
	SIG1-	Load cell signal input(-)	
	SLD1	Shield	Connect shield wires of the load cell cable(CH1)
	24VDC	24VDC power +	External 24VDC power supply (24V)
	GND	24VDC power ground	External 24VDC power supply ground (0VDC)
	PE	Grounding	External grounding (CH1)

6 Lines Type Load Cell

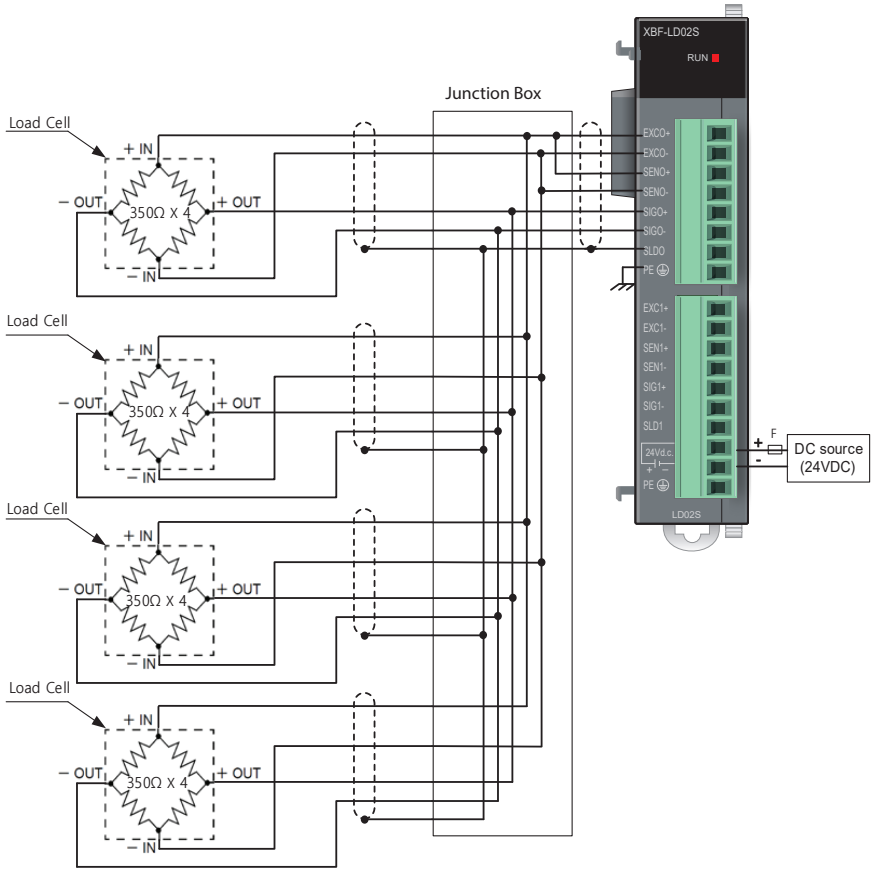


XBF-LD02S Load Cell Input Module Wiring, *continued*

4 Lines Type Load Cell



Load Cell Parallel Connection



XBF-LD02S Load Cell Input Module Configuration

Follow the Quick start video to learn how to Register and Configure any Analog Module:

Analog Module Setup

Direct Variables

All XGB series analog 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-LD02S are as follows (z refers to module slot number (2 to 8)).

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH0_CAL1REQ	%UX0.z.464	BOOL	Loadcell Input Module: CH0 1-Point Calibration Request
Tag	GlobalVariable	_0z_CH0_CAL2REQ	%UX0.z.466	BOOL	Loadcell Input Module: CH0 2-Point Calibration Request
Tag	GlobalVariable	_0z_CH0_CALEND	%UX0.z.52	BOOL	Loadcell Input Module: CH0 Save Complete Flag
Tag	GlobalVariable	_0z_CH0_CALMOD	%UX0.z.24	BOOL	Loadcell Input Module: CH0 Calibration Status
Tag	GlobalVariable	_0z_CH0_CALSTORE	%UX0.z.484	BOOL	Loadcell Input Module: CH0 Save Request
Tag	GlobalVariable	_0z_CH0_COMPLETE	%UX0.z.36	BOOL	Loadcell Input Module: CH0 Weighing Complete Status
Tag	GlobalVariable	_0z_CH0_CUR_FFVAL	%UW0.z.26	WORD	Loadcell Input Module: CH0 Free Fall Data
Tag	GlobalVariable	_0z_CH0_EQUCALEND	%UX0.z.54	BOOL	Loadcell Input Module: CH0 Equivalent Calibration Status
Tag	GlobalVariable	_0z_CH0_EQUCALREQ	%UX0. z.468	BOOL	Loadcell Input Module: CH0 Equivalent Calibration Request
Tag	GlobalVariable	_0z_CH0_ERR	%UX0.z.30	BOOL	Loadcell Input Module: CH0 Error
Tag	GlobalVariable	_0z_CH0_GRSMINUS	%UX0.z.76	BOOL	Loadcell Input Module: CH0 Gross Weight Negative Status
Tag	GlobalVariable	_0z_CH0_GWDATA	%UD0.z.3	DINT	Loadcell Input Module: CH0 Gross Weight Data
Tag	GlobalVariable	_0z_CH0_GWMAX	%UD0.z.9	DWORD	Loadcell Input Module: CH0 Gross Weight Max. Data
Tag	GlobalVariable	_0z_CH0_GWMIN	%UD0.z.10	DWORD	Loadcell Input Module: CH0 Gross Weight Min. Data
Tag	GlobalVariable	_0z_CH0_HHOORSTAT	%UX0.z.88	BOOL	Loadcell Input Module: CH0 High High Status
Tag	GlobalVariable	_0z_CH0_HOLDREQ	%UX0.z.502	BOOL	Loadcell Input Module: CH0 Output Hold Request
Tag	GlobalVariable	_0z_CH0_HOOR	%UX0.z.80	BOOL	Loadcell Input Module: CH0 Upper Alarm
Tag	GlobalVariable	_0z_CH0_HOORSTAT	%UX0.z.89	BOOL	Loadcell Input Module: CH0 High Status
Tag	GlobalVariable	_0z_CH0_LLOORSTAT	%UX0.z.91	BOOL	Loadcell Input Module: CH0 Low Low Status
Tag	GlobalVariable	_0z_CH0_LOOR	%UX0.z.82	BOOL	Loadcell Input Module: CH0 Lower Alarm
Tag	GlobalVariable	_0z_CH0_LOORSTAT	%UX0.z.90	BOOL	Loadcell Input Module: CH0 Low Status
Tag	GlobalVariable	_0z_CH0_MAXMINREQ	%UX0.z.504	BOOL	Loadcell Input Module: CH0 Min./Max. Hold Request
Tag	GlobalVariable	_0z_CH0_MINMAXHLD	%UX0.z.72	BOOL	Loadcell Input Module: CH0 Min./Max. Hold Status
Tag	GlobalVariable	_0z_CH0_NEARZERO	%UX0.z.74	BOOL	Loadcell Input Module: CH0 Near Zero Status
Tag	GlobalVariable	_0z_CH0_NETDATA	%UD0.z.7	DINT	Loadcell Input Module: CH0 Net Weight Data
Tag	GlobalVariable	_0z_CH0_NETMINUS	%UX0.z.78	BOOL	Loadcell Input Module: CH0 Net weight Negative Status
Tag	GlobalVariable	_0z_CH0_OVER	%UX0.z.42	BOOL	Loadcell Input Module: CH0 Over Status
Tag	GlobalVariable	_0z_CH0_RUN	%UX0.z.16	BOOL	Loadcell Input Module: CH0 Run Status
Tag	GlobalVariable	_0z_CH0_SCALEND	%UX0.z.50	BOOL	Loadcell Input Module: CH0 Span Calibration Status
Tag	GlobalVariable	_0z_CH0_SCALREQ	%UX0.z.482	BOOL	Loadcell Input Module: CH0 Span Calibration Request
Tag	GlobalVariable	_0z_CH0_SEQREQ	%UX0.z.506	BOOL	Loadcell Input Module: CH0 Sequential Control Request
Tag	GlobalVariable	_0z_CH0_SP1	%UX0.z.38	BOOL	Loadcell Input Module: CH0 Step1 Status
Tag	GlobalVariable	_0z_CH0_SP2	%UX0.z.39	BOOL	Loadcell Input Module: CH0 Step2 Status
Tag	GlobalVariable	_0z_CH0_SP3	%UX0.z.40	BOOL	Loadcell Input Module: CH0 Step3 Status
Tag	GlobalVariable	_0z_CH0_STBL	%UX0.z.32	BOOL	Loadcell Input Module: CH0 Stable Status
Tag	GlobalVariable	_0z_CH0_TAREDATA	%UD0.z.5	DWORD	Loadcell Input Module: CH0 Tare Weight Data
Tag	GlobalVariable	_0z_CH0_TAREREQ	%UX0.z.500	BOOL	Loadcell Input Module: CH0 Tare Setting
Tag	GlobalVariable	_0z_CH0_TARERSTREQ	%UX0.z.508	BOOL	Loadcell Input Module: CH0 Tare Release Request
Tag	GlobalVariable	_0z_CH0_TSET	%UX0.z.68	BOOL	Loadcell Input Module: CH0 Tare Setting Status

XBF-LD02S Load Cell Input Module Configuration, *continued*

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH0_UNDER	%UX0.z.41	BOOL	Loadcell Input Module: CH0 Lack Status
Tag	GlobalVariable	_0z_CH0_WEIGHTHLD	%UX0.z.70	BOOL	Loadcell Input Module: CH0 Output Hold Status
Tag	GlobalVariable	_0z_CH0_ZCALEND	%UX0.z.48	BOOL	Loadcell Input Module: CH0 Zero Calibration Status
Tag	GlobalVariable	_0z_CH0_ZCALREQ	%UX0.z.480	BOOL	Loadcell Input Module: CH0 Zero Calibration Request
Tag	GlobalVariable	_0z_CH0_ZERO	%UX0.z.34	BOOL	Loadcell Input Module: CH0 Zero Status
Tag	GlobalVariable	_0z_CH0_ZRST	%UX0.z.66	BOOL	Loadcell Input Module: CH0 Zero Reset Status
Tag	GlobalVariable	_0z_CH0_ZRSTREQ	%UX0.z.498	BOOL	Loadcell Input Module: CH0 Zero Reset request
Tag	GlobalVariable	_0z_CH0_ZSET	%UX0.z.64	BOOL	Loadcell Input Module: CH0 Zero Setting Status
Tag	GlobalVariable	_0z_CH0_ZSETREQ	%UX0.z.496	BOOL	Loadcell Input Module: CH0 Zero Setting Request
Tag	GlobalVariable	_0z_CH1_CAL1REQ	%UX0.z.465	BOOL	Loadcell Input Module: CH1 1-Point Calibration Request
Tag	GlobalVariable	_0z_CH1_CAL2REQ	%UX0.z.467	BOOL	Loadcell Input Module: CH1 2-Point Calibration Request
Tag	GlobalVariable	_0z_CH1_CALEND	%UX0.z.53	BOOL	Loadcell Input Module: CH1 Save Complete Flag
Tag	GlobalVariable	_0z_CH1_CALMOD	%UX0.z.25	BOOL	Loadcell Input Module: CH1 Calibration Status
Tag	GlobalVariable	_0z_CH1_CALSTORE	%UX0.z.485	BOOL	Loadcell Input Module: CH1 Save Request
Tag	GlobalVariable	_0z_CH1_COMPLETE	%UX0.z.37	BOOL	Loadcell Input Module: CH1 Weighing Complete Status
Tag	GlobalVariable	_0z_CH1_CUR_FFVAL	%UW0.z.27	WORD	Loadcell Input Module: CH1 Free Fall Data
Tag	GlobalVariable	_0z_CH1_EQUCALEND	%UX0.z.55	BOOL	Loadcell Input Module: CH1 Equivalent Calibration Status
Tag	GlobalVariable	_0z_CH1_EQUCALREQ	%UX0.z.469	BOOL	Loadcell Input Module: CH1 Equivalent Calibration Request
Tag	GlobalVariable	_0z_CH1_ERR	%UX0.z.31	BOOL	Loadcell Input Module: CH1 Error
Tag	GlobalVariable	_0z_CH1_GRSMINUS	%UX0.z.77	BOOL	Loadcell Input Module: CH1 Gross Weight Negative Status
Tag	GlobalVariable	_0z_CH1_GWDATA	%UD0.z.4	DINT	Loadcell Input Module: CH1 Gross Weight Data
Tag	GlobalVariable	_0z_CH1_GWMAX	%UD0.z.11	DWORD	Loadcell Input Module: CH1 Gross Weight Max. Data
Tag	GlobalVariable	_0z_CH1_GWMIN	%UD0.z.12	DWORD	Loadcell Input Module: CH1 Gross Weight Min. Data
Tag	GlobalVariable	_0z_CH1_HHOORSTAT	%UX0.z.92	BOOL	Loadcell Input Module: CH1 High High Status
Tag	GlobalVariable	_0z_CH1_HOLDREQ	%UX0.z.503	BOOL	Loadcell Input Module: CH1 Output Hold Request
Tag	GlobalVariable	_0z_CH1_HOOR	%UX0.z.81	BOOL	Loadcell Input Module: CH1 Upper Alarm
Tag	GlobalVariable	_0z_CH1_HOORSTAT	%UX0.z.93	BOOL	Loadcell Input Module: CH1 High Status
Tag	GlobalVariable	_0z_CH1_LLOORSTAT	%UX0.z.95	BOOL	Loadcell Input Module: CH1 Low Low Status
Tag	GlobalVariable	_0z_CH1_LOOR	%UX0.z.83	BOOL	Loadcell Input Module: CH1 Lower Alarm
Tag	GlobalVariable	_0z_CH1_LOORSTAT	%UX0.z.94	BOOL	Loadcell Input Module: CH1 Low Status
Tag	GlobalVariable	_0z_CH1_MAXMINREQ	%UX0.z.505	BOOL	Loadcell Input Module: CH1 Min./Max. Hold Request
Tag	GlobalVariable	_0z_CH1_MINMAXHLD	%UX0.z.73	BOOL	Loadcell Input Module: CH1 Min./Max. Hold Status
Tag	GlobalVariable	_0z_CH1_NEARZERO	%UX0.z.75	BOOL	Loadcell Input Module: CH1 Near Zero Status
Tag	GlobalVariable	_0z_CH1_NETDATA	%UD0.z.8	DINT	Loadcell Input Module: CH1 Net Weight Data
Tag	GlobalVariable	_0z_CH1_NETMINUS	%UX0.z.79	BOOL	Loadcell Input Module: CH1 Net weight Negative Status
Tag	GlobalVariable	_0z_CH1_OVER	%UX0.z.47	BOOL	Loadcell Input Module: CH1 Over Status
Tag	GlobalVariable	_0z_CH1_RUN	%UX0.z.17	BOOL	Loadcell Input Module: CH1 Run Status
Tag	GlobalVariable	_0z_CH1_SCALEND	%UX0.z.51	BOOL	Loadcell Input Module: CH1 Span Calibration Status
Tag	GlobalVariable	_0z_CH1_SCALREQ	%UX0.z.483	BOOL	Loadcell Input Module: CH1 Span Calibration Request
Tag	GlobalVariable	_0z_CH1_SEQREQ	%UX0.z.507	BOOL	Loadcell Input Module: CH1 Sequential Control Request
Tag	GlobalVariable	_0z_CH1_SP1	%UX0.z.43	BOOL	Loadcell Input Module: CH1 Step1 Status
Tag	GlobalVariable	_0z_CH1_SP2	%UX0.z.44	BOOL	Loadcell Input Module: CH1 Step2 Status
Tag	GlobalVariable	_0z_CH1_SP3	%UX0.z.45	BOOL	Loadcell Input Module: CH1 Step3 Status
Tag	GlobalVariable	_0z_CH1_STBL	%UX0.z.33	BOOL	Loadcell Input Module: CH1 Stable Status
Tag	GlobalVariable	_0z_CH1_TAREDATA	%UD0.z.6	DWORD	Loadcell Input Module: CH1 Tare Weight Data
Tag	GlobalVariable	_0z_CH1_TAREREQ	%UX0.z.501	BOOL	Loadcell Input Module: CH1 Tare Setting
Tag	GlobalVariable	_0z_CH1_TARERSTREQ	%UX0.z.509	BOOL	Loadcell Input Module: CH1 Tare Release Request
Tag	GlobalVariable	_0z_CH1_TSET	%UX0.z.69	BOOL	Loadcell Input Module: CH1 Tare Setting Status
Tag	GlobalVariable	_0z_CH1_UNDER	%UX0.z.46	BOOL	Loadcell Input Module: CH1 Lack Status

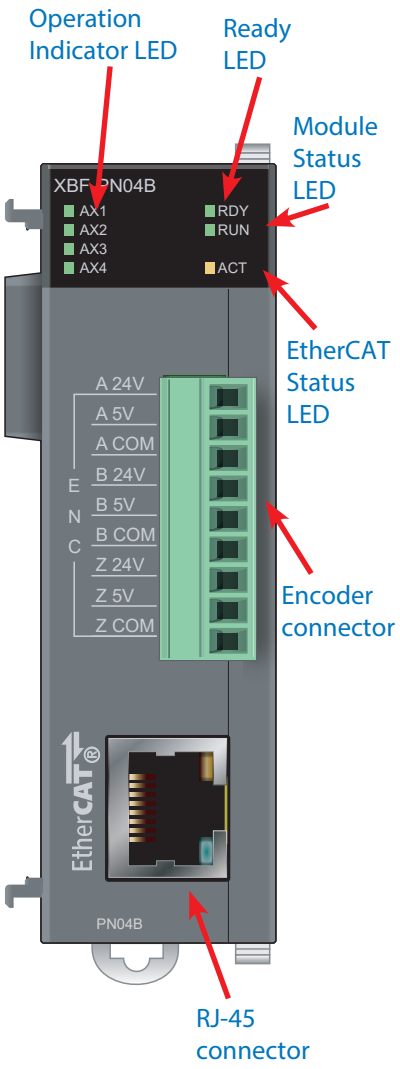
XBF-LD02S Load Cell Input Module Configuration, *continued*

Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GlobalVariable	_0z_CH1_WEIGHTHLD	%UX0.z.71	BOOL	Loadcell Input Module: CH1 Output Hold Status
Tag	GlobalVariable	_0z_CH1_ZCALEND	%UX0.z.49	BOOL	Loadcell Input Module: CH1 Zero Calibration Status
Tag	GlobalVariable	_0z_CH1_ZCALREQ	%UX0.z.481	BOOL	Loadcell Input Module: CH1 Zero Calibration Request
Tag	GlobalVariable	_0z_CH1_ZERO	%UX0.z.35	BOOL	Loadcell Input Module: CH1 Zero Status
Tag	GlobalVariable	_0z_CH1_ZRST	%UX0.z.67	BOOL	Loadcell Input Module: CH1 Zero Reset Status
Tag	GlobalVariable	_0z_CH1_ZRSTREQ	%UX0.z.499	BOOL	Loadcell Input Module: CH1 Zero Reset request
Tag	GlobalVariable	_0z_CH1_ZSET	%UX0.z.65	BOOL	Loadcell Input Module: CH1 Zero Setting Status
Tag	GlobalVariable	_0z_CH1_ZSETREQ	%UX0.z.497	BOOL	Loadcell Input Module: CH1 Zero Setting Request
Tag	GlobalVariable	_0z_CH_CUR_FFVAL_ARY	%UW0.z.26	ARRAY[0..1] OF WORD	Loadcell Input Module: Each CH Free Fall Data
Tag	GlobalVariable	_0z_CH_GWDATA_ARY	%UD0.z.3	ARRAY[0..1] OF DINT	Loadcell Input Module: Each CH Gross Weight Data
Tag	GlobalVariable	_0z_CH_NETDATA_ARY	%UD0.z.7	ARRAY[0..1] OF DINT	Loadcell Input Module: Each CH Net Weight Data
Tag	GlobalVariable	_0z_CH_TAREDATA_ARY	%UD0.z.5	ARRAY[0..1] OF DWORD	Loadcell Input Module: Each CH Tare Weight Data
Tag	GlobalVariable	_0z_ECODE	%UW0.z.28	WORD	Loadcell Input Module: Error Code
Tag	GlobalVariable	_0z_ERR	%UX0.z.0	BOOL	Loadcell Input Module: Error Flag
Tag	GlobalVariable	_0z_RDY	%UX0.z.15	BOOL	Loadcell Input Module: Ready Flag

XBF-PN04B / XBF-PN08B
EtherCAT® Multi-Axis Positioning Module

EtherCAT®

Part Number	Price	Classification	Description	# of Axes	Drawing
XBF-PN04B	$199.00	Positioning	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.	4	PDF
XBF-PN08B	$229.00		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.	8	PDF



General Specifications		XBF-PN04B	XBF-PN08B
Number of Control Axis		4	8
Interpolation Function		2–4 (8) axes linear interpolation, 2 axes circular interpolation, 3 axes helical interpolation	
Control Method		Position control, Torque Control, Speed control, Speed/Position control, Position/Speed control, Position/Torque control, Feed control	
Control Unit		Pulse, mm, inch, degree	
Positioning Data		Can have up to 400 steps for each axis (1–400) available to set with XG-PM or program	
XG-PM	Connection	RS-232C port, EtherNet port, or USB. Connect through XEM CPU.	
	Setting Data	Common, Basic, Extended, Servo parameter, Operation data, Cam data, Command information	
	Monitor	Operation information, Trend, External input signal, Error information	
Backup		Saves parameters and operation data in MRAM and flash ROM	
Positioning	Positioning Method	Absolute or Incremental	
	Position Address Range	See table below	
	Speed Range	See table below	
	Acc./Dec. Process	Trapezoid-shaped, S-curve	
Manual Operation		Jog operation, Manual Pulse Generator (MPG) operation, Inching operation	
Homing Method		Refer to the method supported by the servo drive	
Speed Change Function		Speed change (percent/absolute value)	
Torque Command Unit		Rated torque % designation	
Absolute Position System		Available (when using absolute encoder type servo motor)	

Position Address Range

Unit	Absolute	Incremental	Speed/Position, Position/Speed Switching Control
μm	-214748364.8–214748364.7	-214748364.8–214748364.7	-214748364.8–214748364.7
Inch	-21474.83648–21474.83647	-21474.83648–21474.83647	-21474.83648–21474.83647
Degree	-21474.83648–21474.83647	-21474.83648–21474.83647	-21474.83648–21474.83647
Pulse	-2147483648–2147483647	-2147483648–2147483647	-2147483648–2147483647

Speed Range

Unit	Range
mm	0.01–20000000.00 (mm/min)
Inch	0.001–2000000.00 (Inch/min)
Degree	0.001–2000000.00 (degree/min)
Pulse	1–20,000,000 (pulse/sec)
RPM	0.1–100000.0 (RPM)

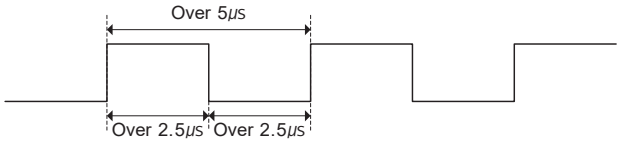
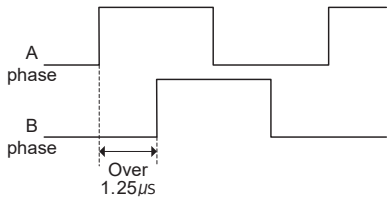
NOTE: EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

XBF-PN0xB Multi-axis Positioning Module, continued

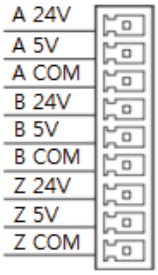
General Specifications		XBF-PN04B	XBF-PN08B
External Encoder Input	Channel	1 channel	
	Maximum Input	200kpps	
	Input Form	Line drive input (RS-422A IEC specification), open collector output type encoder	
	Input Type	CW/CCW, Pulse/Dir, Phase A/B	
	Connection Connector	9-point connector	
External Command Signal	Input Point	3-point (Input signal A,B,Z)	
	Input Specification	Same as input specification of external encoder (5V, 24V)	
	Connector	9-point connector (input terminal of external encoder shared)	
Communication Period		1/2/3/4 ms	
Maximum Transmission Distance		100m	
Communication Cable		Over CAT.5 STP (shielded twisted-pair) cable	
Error Indication		Indicated by LED	
Communication Status Indication		Indicated by LED	
Consumable Current		510mA	
Supported EtherCAT Devices		Only EtherCAT servo and stepper drives that use CANopen over EtherCAT (CoE)	
Max Modules per XEM CPU		Max of two (2) modules installed immediately adjacent to XEM CPU (slot 2 and 3)	
Weight		115g	

Encoder Input Specifications

NOTE: Encoder inputs can also be used for external command signals.

Specification	Open Collector		Line Driver
Input Voltage	5VDC (4.5 V – 5.5 V)	24VDC (19.2 V – 26.4 V)	In accordance with RS-422A Line Driver Level (5V level)
Input Current	8mA–11mA	8mA–11mA	
Min. On Guarantee Voltage	4.1 V	17.0 V	
Max. Off Guarantee Voltage	1.7 V	4.5 V	
Input Pulse	1) Pulse width  2) Phase difference  When A phase input pulse is ahead of B phase input pulse : Position value increases When B phase input pulse is ahead of A phase input pulse : Position value decreases		

XBF-PN0xB Connector Pin Assignments

XBF-PN0xB Pin Arrangement				
Pin Arrangement	*Pin No.*	*Description*	*Signal Name*	*Signal Direction*
	1	A 24V	Encoder A 24V input	Input
	2	A 5V	Encoder A 5V input	
	3	A COM	Encoder A input COM	
	4	B 24V	Encoder B 24V input	
	5	B 5V	Encoder B 5V input	
	6	B COM	Encoder B input COM	
	7	Z 24V	Encoder Z 24V input	
	8	Z 5V	Encoder Z 5V input	
	9	Z COM	Encoder Z input COM	

NOTE: 5VDC encoders use the 5V terminals and 24VDC encoders use the 24V terminals. Compatible with 12V systems (see the User Manual for dropping resistor specifications).

XBF-PN0xB Variable Assignments

Direct Variables

XGB series EtherCAT modules are assigned 1 word of status information in the "U" memory area based on the slot number assignment. (%UX0.z.0 - %UX0.z.15 , z=slot number). 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 motion module can be automatically created in XG5000 software by using the top MENU bar: Edit > Register Module Variable Comments.

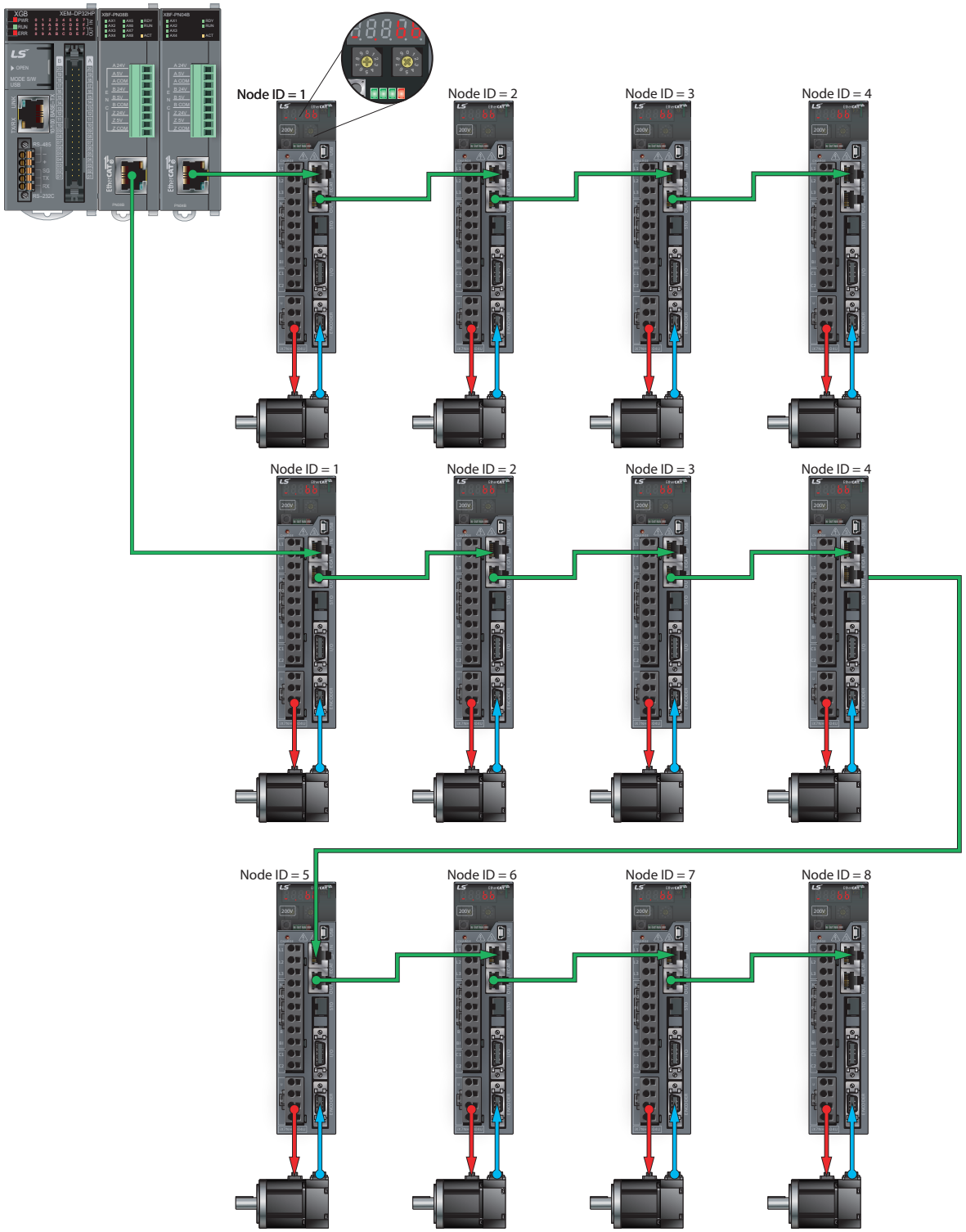
Symbolic variables and direct variables for XBF-PN04B/08B are as follows (z refers to module slot number (2 or 3)).

Type	*Scope*	*Variable (Symbolic)*	*Address (Direct Variable Alias)*	*Data Type*	*Comment*
Tag	GobalVariable	_000z_A1_RDY	%UX0.z.0	BOOL	Positioning Module: 1-Axis Ready
Tag	GobalVariable	_000z_A2_RDY	%UX0.z.1	BOOL	Positioning Module: 2-Axis Ready
Tag	GobalVariable	_000z_A3_RDY	%UX0.z.2	BOOL	Positioning Module: 3-Axis Ready
Tag	GobalVariable	_000z_A4_RDY	%UX0.z.3	BOOL	Positioning Module: 4-Axis Ready
Tag	GobalVariable	_000z_A5_RDY	%UX0.z.4	BOOL	Positioning Module: 5-Axis Ready
Tag	GobalVariable	_000z_A6_RDY	%UX0.z.5	BOOL	Positioning Module: 6-Axis Ready
Tag	GobalVariable	_000z_A7_RDY	%UX0.z.6	BOOL	Positioning Module: 7-Axis Ready
Tag	GobalVariable	_000z_A8_RDY	%UX0.z.7	BOOL	Positioning Module: 8-Axis Ready
Tag	GobalVariable	_000z_AX_RDY_AR	%UX0.z.0	ARRAY[0..7]	Positioning Module: Each Axis Ready
Tag	GobalVariable	_000z_LINKUP_INF	%UX0.z.14	BOOL	Positioning Module: Link up/down informatoin
Tag	GobalVariable	_000z_RDY	%UX0.z.15	BOOL	Positioning Module: Ready Flag

XBF-PN0xB EtherCAT Drive/Motor Setup Example

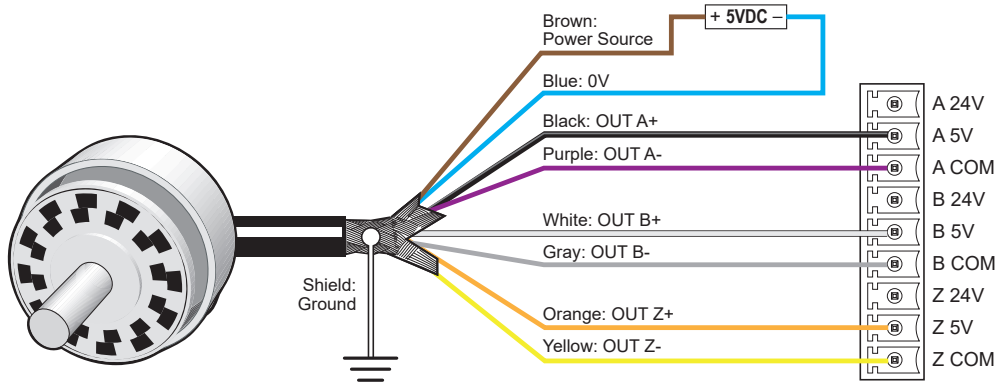
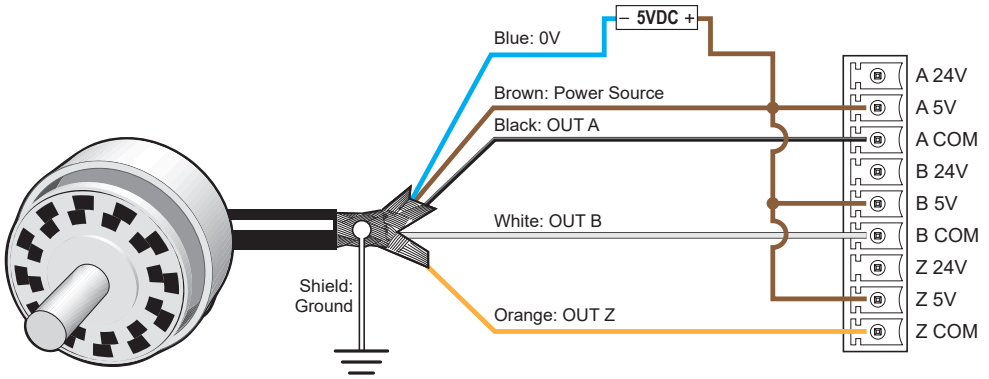
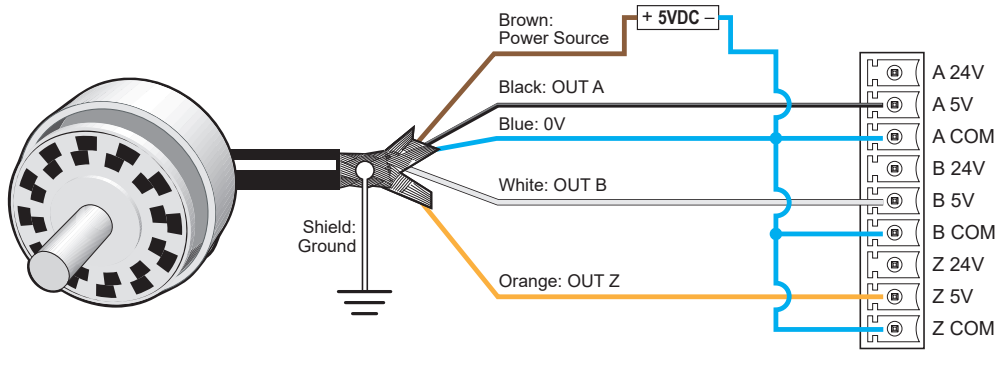
LS Electric iX7NH EtherCAT drives can be found HERE.

NOTE: Each XBF-PN0xB module is a separate EtherCAT® network.



XBF-PN0xB Encoder Wiring Examples

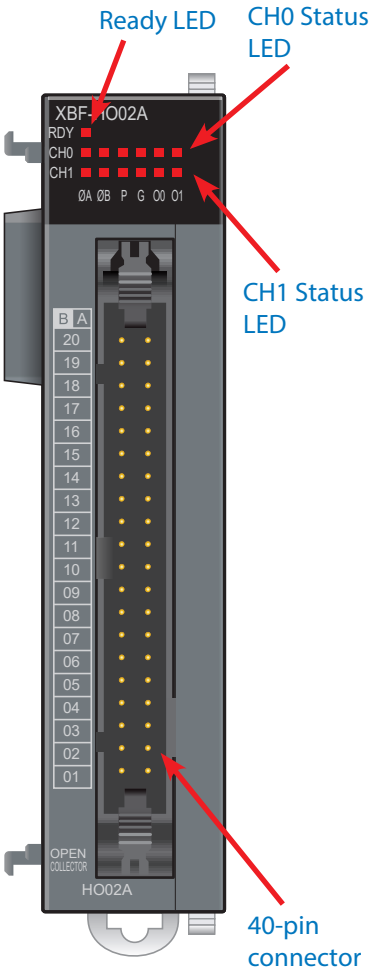
XBF-PN0xB Encoder Wiring

Encoder Type	Wiring Configuration
Line Driver	
Open Collector	
Totem Pole	

For 12V encoders, use a 1k Ohm dropping resistor between each encoder signal (Out A, Out B, Out Z) and the corresponding 5V terminal above.
For 24V encoder signals, wire each encoder signal (Out A, Out B, Out Z) to the A 24V, B 24V, and Z 24V inputs. No dropping resistor required.

XBF-HO02A Counter Input Module

Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-HO02A	$194.00	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

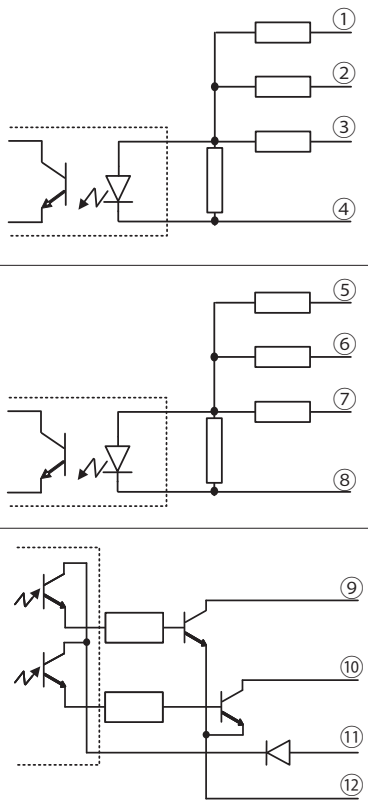


General Specifications		XBF-HO02A
Count Input Signal	Signal	A-phase, B-phase
	Input Type	Voltage input (Open Collector)
	Signal Level	5/12/24 VDC
Maximum Coefficient Speed		200kHz
Number of Channels		2
Coefficient Range		Signed 32-bit (-2,147,483,648 to +2,147,483,647)
Count Mode		Linear Count (when 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 frquency (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 CH0	Pin Number CH1	Signal Name
Input	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
Output	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 poiwer input GND



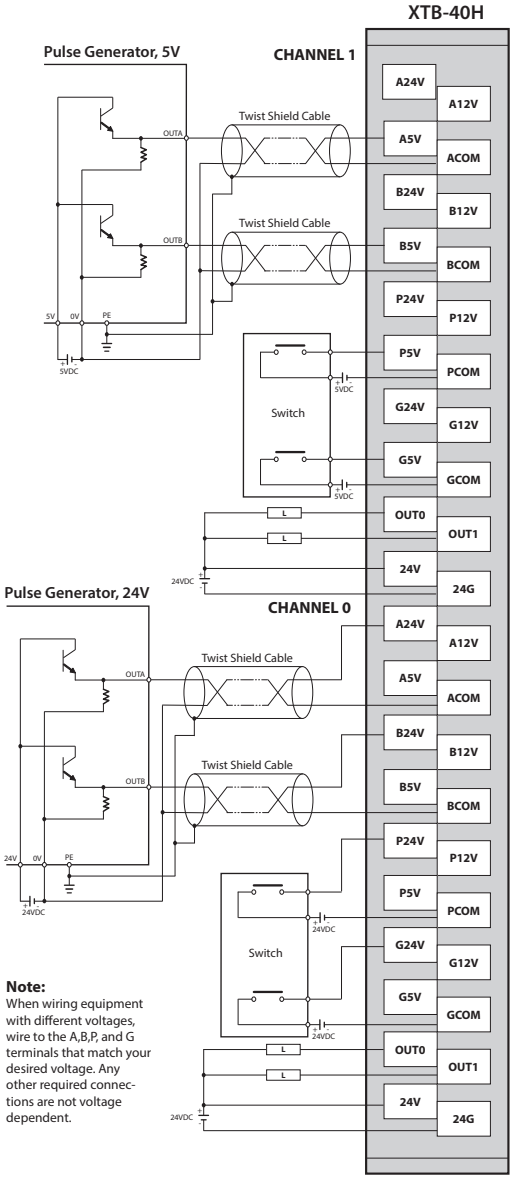
Note: External power (24V: A02, B02 / 24G: A01, B01) is the power source for output comparison output to terminal (A03, B03, A04, B04). Connect when using comparison output.

XBF-HO02A Counter Input Module Terminal Wiring

When connecting cable to your XBF-HO02A:

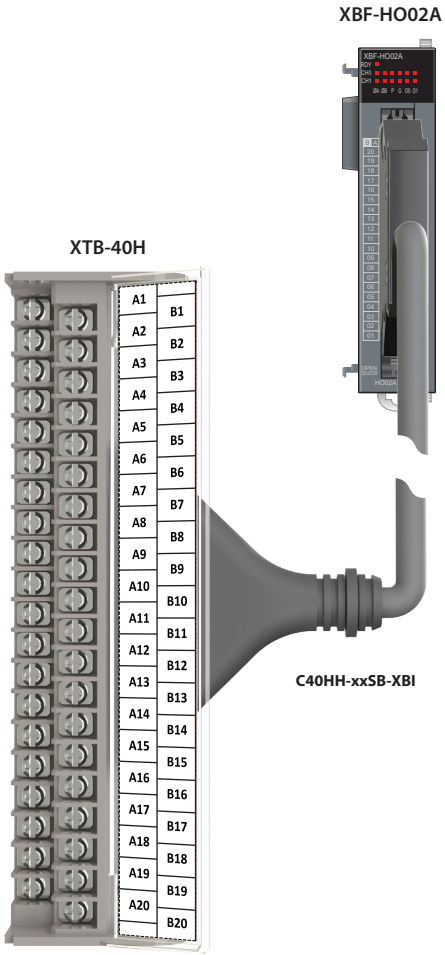
- Take precautions to shield high-speed input wiring from external noise sources.
- Use grounded twisted pair shielded cable (Class3)
- Keep input wiring clear of power or I/O wiring to prevent noise.
- For single-phase applications, connection only to the A-phase input points.
- Ensure wiring length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

Terminal Wiring



Note:
When wiring equipment with different voltages, wire to the A,B,P, and G terminals that match your desired voltage. Any other required connections are not voltage dependent.

Module Connection



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_EXTAUX_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

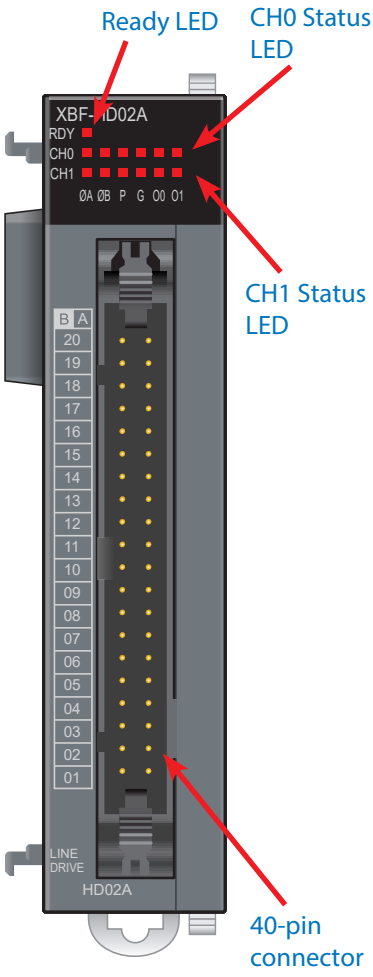
XBF-HO02A Counter Input Module Configuration, *continued*

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

XBF-HD02A Counter Input Module

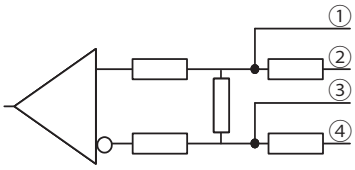
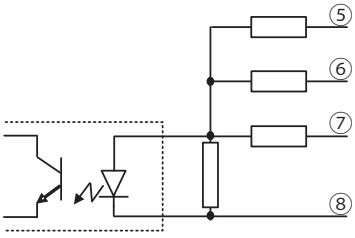
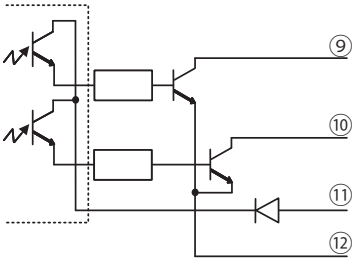
Part Number	Price	Classification	Description	# of Channels	Drawing
XBF-HD02A	$279.00	Counter Input	LS Electric XGB counter input module, 500 kHz maximum switching frequency, 2 high-speed input point(s), 5-24 VDC, sinking, 2-channel, differential encoder input(s), 2 high-speed output point(s), 5-24 VDC, sinking, external 24 VDC required.	2	PDF

General Specifications		XBF-HD02A
Count Input Signal	Signal	A-phase, B-phase
	Input Type	Differential input (Line Drive)
	Signal Level	RS-422A Line Drive/HTL LEVEL Line Drive
Maximum Coefficient Speed		500kpps (HTL input: 250kpps)
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 only in enable status)
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 frquency (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		260mA
Weight		90g



XBF-HD02A Counter Input Module Wiring

XBF-HD02A Circuit Configuration

Circuit Configuration		Internal Circuit Number	XTB-40H Terminal	Pin Number CH1	Pin Number CH0	Signal Name	Driver Type
Input		1	AI+	B20	A20	A I phase differentiation input +	RS-422A line driver
		2	AI-	B19	A19	A I phase differentiation input -	RS-422A line driver
		3	AII+	B18	A18	A II phase differentiation input +	HTL level line driver
		4	AII-	B17	A17	A II phase differentiation input -	HTL level line driver
		1	BI+	B16	A16	B I phase differentiation input +	RS-422A line driver
		2	BI-	B15	A15	B I phase differentiation input -	RS-422A line driver
		3	BII+	B14	A14	B II phase differentiation input +	HTL level line driver
		4	BII-	B13	A13	B II phase differentiation input -	HTL level line driver
		5	P24V	B12	A12	Preset input 24V	User terminal per appropriate external power source voltage (5, 12, or 24 VDC)
		6	P12V	B11	A11	Preset input 12V	
		7	P5V	B10	A10	Preset input 5V	
		8	PCOM	B09	A09	Preset input COM	n/a
		5	G24V	B08	A08	Auxiliary function input 24V	User terminal per appropriate external power source voltage (5, 12, or 24 VDC)
		6	G12V	B07	A07	Auxiliary function input 12V	
		7	G5V	B06	A06	Auxiliary function input 5V	
		8	GCOM	B05	A05	Auxiliary function input COM	
Output		9	OUT0	B04	A04	Comp. output 0	n/a
		10	OUT1	B03	A03	Comp. output 1	
		11	24V	B02	A02	External power input 24V	
		12	24G	B01	A01	External poiwer input GND	

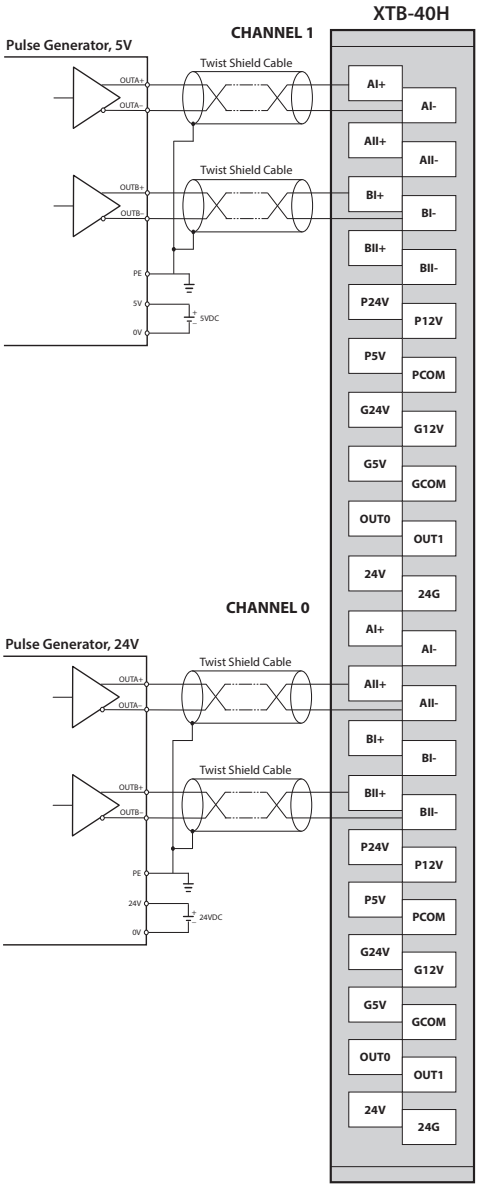
Note: AI+, AI-, BI+, BI- are 5V line driver input terminal. AII+, AII-, BII+, BII- are 24V line driver input terminal.

XBF-HD02A Counter Input Module Wiring

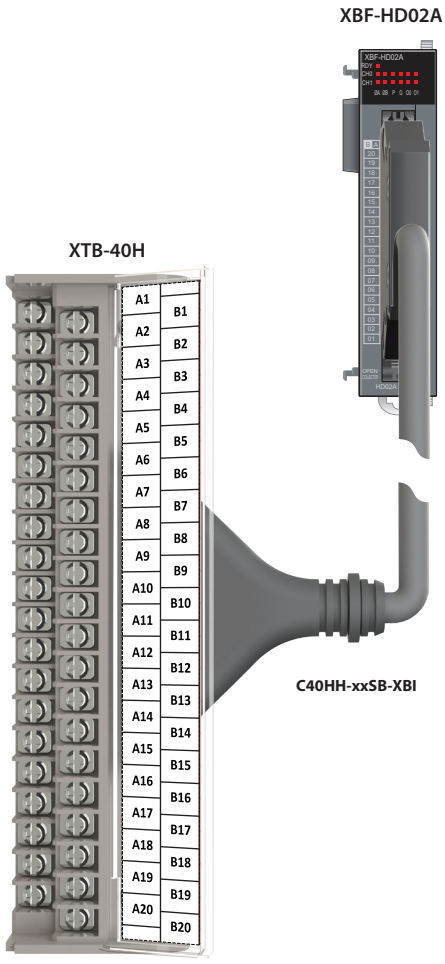
When connecting cable to your XBF-HD02A:

- 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



XBF-HD02A Counter Input Module Configuration

Learn how to Register and Configure this counter input module by viewing the LS PLC Interactive Guide:

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-HD02A 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_EXTAUX_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

XBF-HD02A Counter Input Module Configuration, *continued*

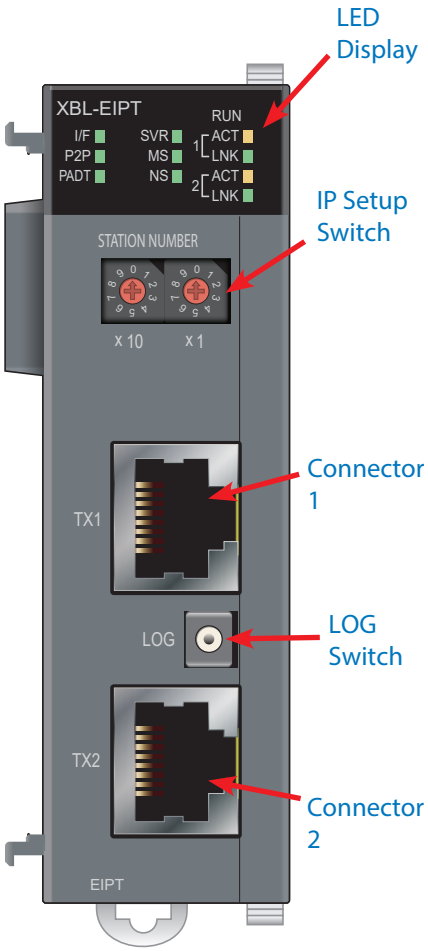
Type	Scope	Variable (Symbolic)	Address (Direct Variable Alias)	Data Type	Comment
Tag	GobalVariable	_000z_CH1_CNT	%UD0.z.6	DINT	HSC Module: CH1 Count Data
Tag	GobalVariable	_000z_CH1_LTH	%UD0.z.7	DINT	HSC Module: CH1 Latch Count Data
Tag	GobalVariable	_000z_CH1_RNG	%UD0.z.8	DINT	HSC Module: CH1 Sampling 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_DN	%UX0.z.16	BOOL	HSC Module: CH1 Count Direction Status
Tag	GobalVariable	_000z_CH1_EXTPRE	%UX0.z.17	BOOL	HSC Module: CH1 Preset Ext. Input Flag
Tag	GobalVariable	_000z_CH1_CRY	%UX0.z.19	BOOL	HSC Module: CH1 Carry Flag
Tag	GobalVariable	_000z_CH1_BRW	%UX0.z.20	BOOL	HSC Module: CH1 Borrow Flag
Tag	GobalVariable	_000z_CH1_AUXING	%UX0.z.21	BOOL	HSC Module: CH1 Auxiliary Function Status
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_ERR	%UX0.z.30	BOOL	HSC Module: CH1 Error Flag
Tag	GobalVariable	_000z_CH1_CNTEN	%UX0.z.384	BOOL	HSC Module: CH1 Enable Counter
Tag	GobalVariable	_000z_CH1_PREEN	%UX0.z.385	BOOL	HSC Module: CH1 Enable Preset
Tag	GobalVariable	_000z_CH1_DWNCNT	%UX0.z.386	BOOL	HSC Module: CH1 Count Direction Select
Tag	GobalVariable	_000z_CH1_AUXEN	%UX0.z.387	BOOL	HSC Module: CH1 Auxiliary Function Request
Tag	GobalVariable	_000z_CH1_CMPEN	%UX0.z.388	BOOL	HSC Module: CH1 Enable Compare Function
Tag	GobalVariable	_000z_CH1_OUTEN	%UX0.z.389	BOOL	HSC Module: CH1 Enable Compare Output Signal
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_CRYBRW_RST	%UX0.z.394	BOOL	HSC Module: CH1 Carry/Borrow Reset Request
Tag	GobalVariable	_000z_CH1_EXTPST_EN	%UX0.z.395	BOOL	HSC Module: CH1 Preset Ext. Input Enable
Tag	GobalVariable	_000z_CH1_EXTAUX_EN	%UX0.z.396	BOOL	HSC Module: CH1 Enable Aux-Func Ext. Input
Tag	GobalVariable	_000z_CH1_EXTPST_RST	%UX0.z.397	BOOL	HSC Module: CH1 Preset Ext. Input Reset Request
Tag	GobalVariable	_000z_RDY	%UX0.z.15	BOOL	HSC Module: Ready Flag

XGB Communication Modules

XBL-EIPT Communication Module

This module is used for EtherNet/IP communications. Built in switch functionality and tag based communication configuration make setup easy. The module supports:

- Symbolic Addressing (ANSI Extended Symbol Segment)
- Class 1 Connected Implicit(IO)Messaging(Cyclic I/O Service Only)
- Class 3 Connected Explicit Messaging(Server Only)
- UCMM Explicit Messaging,

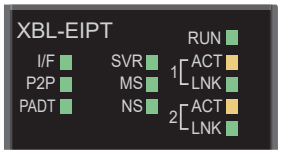


Part Number	Price	Classification	Description	Drawing
XBL-EIPT	$99.00	Ethernet Communications	LS Electric XGB communication module, EtherNet/IP, 2 ports, (2) Ethernet 10/100Base-T (RJ45) port(s). For use with LS Electric XGB series PLCs.	PDF

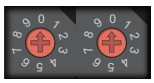
General Specifications		XBL-EIPT
Transmission Standard	Speed	100Mbps
	Method	Base band
	Maximum Extension Distance between Nodes	100m
	Communication Zone Excess Method	CSMA/CD
	Frame Error-Checking Method	CRC 32 = $X^{32}+X^{26}+X^{23}+...+X^{2}+X+1$
Topology		Line, Star
Diagnosis Function		Module information, service state, media information, auto scan, ping test
Service	Periodic Client	Implicit I/O Client
	Aperiodic Client	UCMM Client
	Periodic Server	Implicit I/O Server
Number of Connections (Client/ Server)	TCP	16/32
	CIP (I/O Communication)	32/64
Maximum Number of Services		2
Maximum Units per CPU		2
Maximum Setting Data Size Per Block	Periodic Client	500 byte
	Aperiodic Client	512 byte
Media		UTP/STP Category 5
Current Consumption		290mA
Weight		102g
Requirements		XG5000 version 4.76_2024-02-22 or later XEM Dx32Hx series PLC with firmware v2.4 or later

XBL-EIPT Communication Module Interface

Device LED Functionality

Faceplate View	LED	Status	Meaning
	***RUN***	ON	Power ON and process normally operating.
		OFF	Power OFF and process abnormally operating.
	I/F	Blink	I/F operating normally with CPU.
		Flicker/OFF	I/F operating abnormally with CPU.
	P2P	ON	P2P service is enabled
		OFF	P2P service is disabled
	PADT	ON	XG5000 connected via remote control.
		OFF	XG5000 remote connection is disabled
	SVR	ON	Exterior client connected.
		OFF	No exterial client connected.
	MS	Green Light ON	Normal operation.
		Green Light flickers	Device configuration in progress.
		Red Light flickers	Incorrect setup or restorable errors.
		Red Light ON	Unrestorable errors.
		Red/Green Light flickers	Self-diagnosis in progress.
	NS	Green Light flickers	No connection to device.
		Green Light ON	Connection with at least 1 device.
		Red Light flickers	Device timeout occured.
		Red Light ON	Identical IP addresses detected.
		Red/Green Light flickers	Self-diagnosis in progress.
	nACT	Flicker	In case of frame - transmitted and received (n=1,2)
	nLNK	ON	Network link established (n=1,2)
		OFF	No network link (n=1,2)

Device Switch Functionality

Faceplate View	Name	Setting	Function
LOG 	***Log Switch***	Push for > 1s	Press the Log Switch for at least 1 second to store the communication module log to the Flash Area Log. Data in the Flash Area Log is mantained during power cycling. Otherwise, the communication module log is stored to the Memory Area Log and will be erased when the power cycles.
STATION NUMBER  x 10 x 1	***Station Number (IP setup)***	1–90, 94–99	If an IP address is not assigned by the XG5000 software, an IP address will be assigned based as “192.168.250.switch value”.
		91–93	Internal configuration only. Do not Use.
		99	For Ring configuration. See User Manual for more information.

Device Software Configuration

Visit the quick start tutorial for EtherNET/IP card setup and implicit/explicit connection configuration:

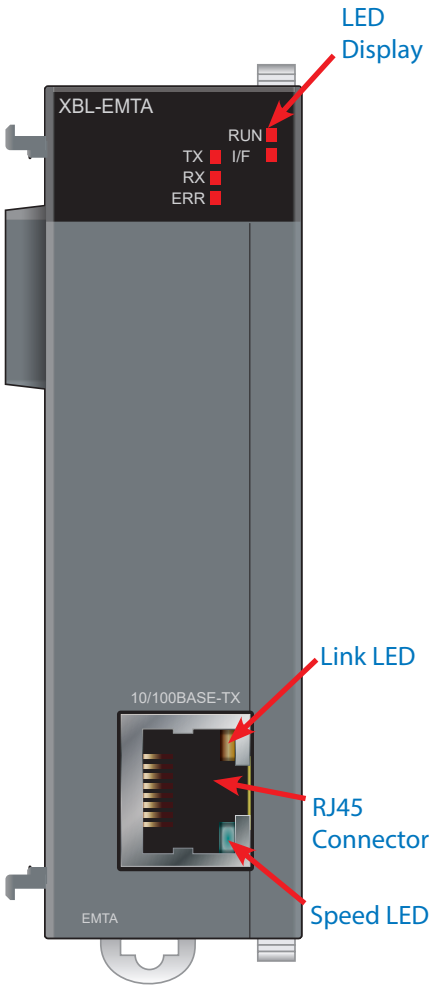
https://cdn.automationdirect.com/static/helpfiles/ls_plc/Content/C_ProcedureTopics/LP200.htm

XGB Communication Modules

XBL-EMTA Communication Module

XBL-EMTA is an Ethernet expansion module that supports Modbus TCP Client/Server and XGT protocol.

Part Number	Price	Classification	Description	Drawing
XBL-EMTA	$219.00	Communication Module	LS Electric XGB communication module, Modbus TCP and LS XGT protocol, 1 port, (1) Ethernet 10/100Base-T (RJ45) port(s). For use with LS Electric XGB series PLCs.	PDF

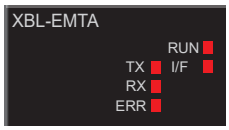
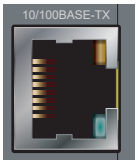


General Specifications		XBL-EMTA
Transmission Standard	Speed	Auto/10M/100Mbps
	Type	Base band
	Flow Control	HALF/FULL
	Modulation Type	NRZI
	Transformer CT	1:1
	Maximum Distance between Nodes	100m
	Minimum Distance between Nodes	1m or more[1]
	Max. Number of Nodes	Hub connection
	Max Protocol Size	Data 512 bytes
	Communication Zone Access Method	CSMA/CD
	Frame Error-Checking Method	CRC32
Diagnosis Function		HS link station no., IP/Subnet mask IP/Gateway IP/DNS Server IP, Main service/HS Link/P2P enable, Setting media, Hardware/software version
Number of Connections (Client/ Server)	XGT server or Modbus	4 channels
	Remote 1	1 channel
	Remote 2	1 channel
Maximum Units per CPU		2
Maximum Setting Data Size Per Block	Dedicated	4 channels, 512 bytes
	HS Link	64 blocks, 200 words per block
	P2P	3 channels, 32 blocks, 512 bytes
	Remote	Max 1 channel server, 1 channel client
Current Consumption		5VDC: 300mA
Weight		71g

1 - When using a cable of less than 1m, the SNR (Signal to Noise Ratio) decreases due to the influence of refleced waves, which may cause Link Down or packet loss.

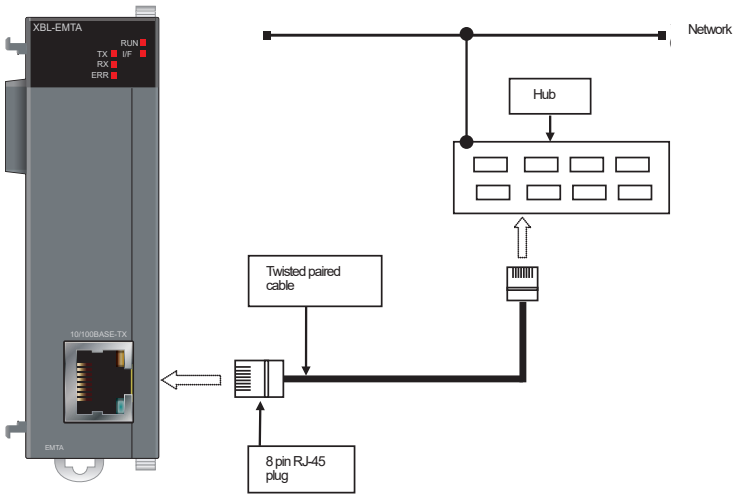
XBL-EMTA Communication Module Interface

Device LED Functionality

Faceplate View	LED	Status	Meaning
 	***RUN***	On	Normal operating
		Off	Stop operating
	I/F	Flicker	Interface with CPU
		Off	Stop interface with CPU
	TX	Flicker	Transmitting data
		Off	Not transmitting data
	RX	Flicker	Receiving data
		Off	No receiving data
	ERR	On	Hardware error
		Flicker	Software error
	LINK LED (Yellow)	Flicker	Receiving packets
		Off	Not receiving packets
	Speed LED (Green)	On	100Mbps operating speed
		Off	10Mbps operating speed

Wiring and Installation

Network Connection



RJ45 Cable Wiring

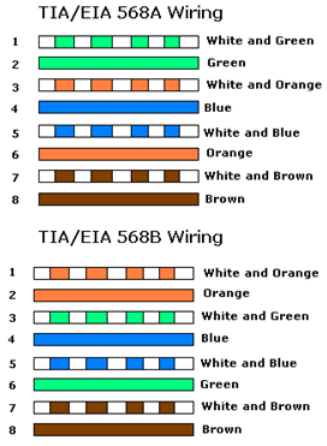


Figure A

Shows the Pin Out of Straight through Cables

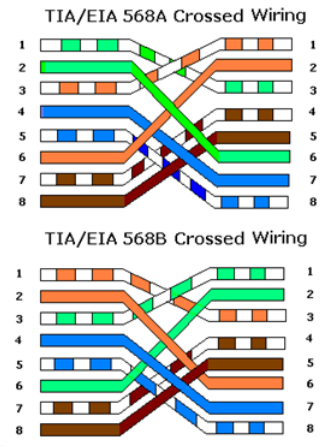


Figure B

Shows the Pin Out of Crossover Cables

XBL-C21A Communication Module

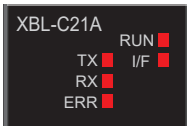
XBL-C21A is an RS-232 expansion module that supports Modbus RTU Client/Server and XGT protocol.

Part Number	Price	Classification	Description	Drawing
XBL-C21A	$149.00	Communication Module	LS Electric XGB communication module, Modbus RTU, Modbus ASCII and LS XGT protocol, 1 port, (1) RS-232 (DB9 female) port(s). For use with LS Electric XGB series PLCs.	PDF

General Specifications		XBL-C21A
Serial Communication Method		RS-232C 1 channel
Modem Connection Function		External modem connection available
Operation Mode	P2P	Act as communication client: XGT dedicated protocol client Modbus ASCII/RTU client User defined communication
	Server	XGT dedicated protocol server Modbus ASCII/RTU server
Data Type	Data Bit	7 or 8
	Stop Bit	1 or 2
	Parity	Even/Odd/None
Synchronization Type		Asynchronous type
Transmission Speed (bps)		1200/2400/4800/9600/19200/38400/57600/115200 bps available
Station Number Setting	Range	0–255
	Max Available	32 stations
Transmission Distance		Max of 15m (Extension available if using modem)
Max Number of CPU		2
Diagnosis Function		Check available by XG5000 diagnosis service
Consumption Current		120mA
Weight		56g



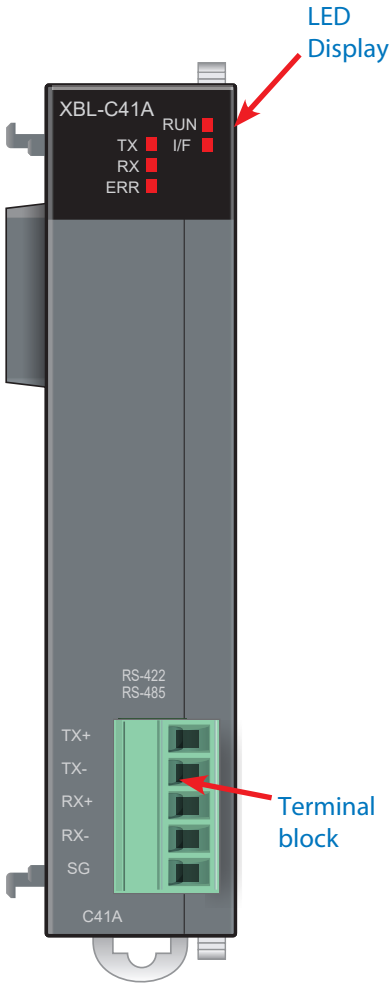
Device LED Functionality

Faceplate View	LED	Status	Meaning
	RUN	On	Normal operating
		Off	Not operating
	I/F	Flicker	Interface with CPU
		Off	Not interfacing with CPU
	TX	Flicker	Transmitting frame
		Off	Not transmitting frame
	RX	Flicker	Receiving frame
		Off	Not receiving frame
	ERR	On	Frame error
		Off	Normal frame

XBL-C41A Communication Module

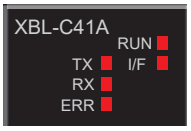
XBL-C41A is an RS-485 expansion module that supports Modbus RTU Client/Server and XGT protocol.

Part Number	Price	Classification	Description	Drawing
XBL-C41A	$149.00	Communication Module	LS Electric XGB communication module, Modbus RTU, Modbus ASCII and LS XGT protocol, 1 port, (1) RS-422/ RS-485 (5-pin terminal) port(s). For use with LS Electric XGB series PLCs. (1) 5-pin serial communication terminal block included.	PDF



General Specifications		XBL-C41A
Serial Communication Method		RS-422 (485) 1 channel
Modem Connection Function		n/a
Operation Mode	P2P	Act as communication client: XGT dedicated protocol client Modbus ASCII/RTU client User defined communication LS Bus client
	Server	XGT dedicated protocol server Modbus ASCII/RTU server
Data Type	Data Bit	7 or 8
	Stop Bit	1 or 2
	Parity	Even/Odd/None
Synchronization Type		Asynchronous type
Transmission Speed (bps)		1200/2400/4800/9600/19200/38400/57600/115200 bps available
Station Number Setting	Range	0–255
	Max Available	32 stations
Transmission Distance		Max of 500m
Max Number of CPU		2
Diagnosis Function		Check available by XG5000 diagnosis service
Consumption Current		120mA
Weight		56g

Device LED Functionality

Faceplate View	LED	Status	Meaning
	RUN	On	Normal operating
		Off	Not operating
	I/F	Flicker	Interface with CPU
		Off	Not interfacing with CPU
	TX	Flicker	Transmitting frame
		Off	Not transmitting frame
	RX	Flicker	Receiving frame
		Off	Not receiving frame
	ERR	On	Frame error
		Off	Normal frame

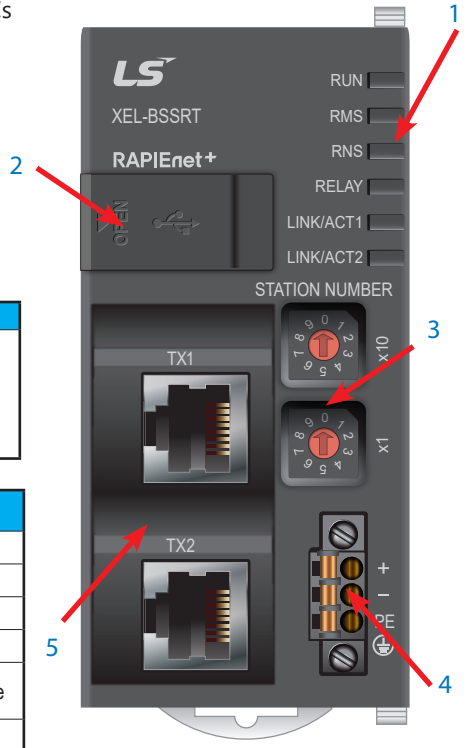
XEL-BSSRT Bus Coupler

XEL-BSSRT is a cost-effective bus coupler that brings XGB Remote I/O to many brands of PLCs that support EtherNet/IP and Modbus TCP.

Features

- Provides EtherNet/IP and Modbus/TCP protocol communications
- Easy setup and configuration using XG5000 software
- Supports Line, Tree, Star, DLR (Ring node), and Ring topologies
- Automatic identification of cable type and communication speed
- Easy addressing with addressing tool available at: https://www.automationdirect.com/support/software-downloads?itemcode=XGB+Field+I-O

Part Number	Price	Classification	Description	Drawing
XEL-BSSRT	$257.00	Bus Coupler	LS Electric XGB bus coupler, 24 VDC, (2) Ethernet (RJ45) and (1) USB B port(s), EtherNet/IP and Modbus TCP, 100/1000 Mbps. For use with LS Electric XGB series I/O modules.	PDF



Location	Function
1	LED Display
2	Mini-USB Connector
3	Station Number switch
4	24VDC input power
5	Ethernet connectors

General Specifications		XEL-BSSRT
Transmission Specifications	Transmission Speed	PORT1/PORT2 (Electric): 100/1000Mbps
	Transmission Method	Base band
	Max Distance between Nodes	100m@CAT5E or higher
	Min Distance between Nodes	1m or more[1]
	Send Media	Electric: Category 5E or higher STP (Shielded Twisted-pair) cable
	Maximum Protocol Size	1,500 bytes
	Communication Network Access Method	CSMA/CD
	Frame Error Check Method	CRC32
Maximum Load		Ethernet: 10,000pps
Topology		Line, Tree, Star etc. (with switch) DLR (Ring node)[2]
Diagnosis Function		Station number / IP collision detection function, self-diagnosis service, diagnosis using XG5000
Station Number	IP Setting Method	Rotary switch, XG5000, BOTP/DHCP
	IP Setting Range	Station number; Rotary switch (1–99). IP:192.168.1.xx, where xx=100+rotary switch 1–99. When the switch is set to 0, the station number is set by XG5000 or DHCP.
External Connecting terminal	USB mini B	PADT connection
	RJ45, SFP	PADT connection, data communication
	3-pin Push-in/Screw Connector	24VDC Power input
Status Indication LED		RUN, RMS, RNS, RELAY, LINK/ACT1, LINK/ACT2
Parameter Setting		XG5000(USB, Ethernet)
Device File		EDS file(Only EtherNet/IP)
Max Number of Modules to be Installed		8ea[3]
Protocol		EtherNet/IP, Modbus-TCP, BOOTP, DHCP
I/O Refresh Size	Max Inputs	512 bytes
	Max Output	512 bytes

Continued on next page

1 - When using a cable of less than 1m, the SNR (Signal to Noise Ratio) decreases due to the influence of reflected waves, which may cause Link Down or packet loss.
2 - DLR (Ring node) only works with XEL-BSSRT V1.80 or higher.
3 - Supports a maximum output current of 3A.

XEL-BSSRT Bus Coupler, *continued*

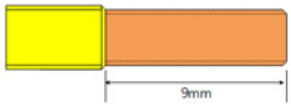
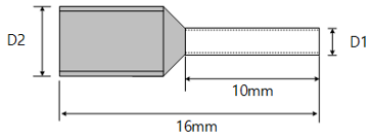
General Specifications			XEL-BSSRT
Protocol Specifications	EtherNet/IP	Data processing unit	Byte (8-bit)
		Max read data size	Non-periodic tag: 1,400 byte Non-periodic object: 1,024 byte Cycle[4]: 1,024 byte
		Max write data size	Non-periodic tag: 1,400 byte Non-periodic object: 1,024 byte Cycle[4]: 1,024 byte
		Available communication type	Connection-type (Cycle) messages: Class1 Non-connection type (Non-periodic) message: Tag, Object
		Maximum number of connections	Connection-type (Cycle): 10 Non-connection type (Non-periodic) message (Tag, Object): 10
	Modbus/TCP	Data processing unit	Word (16-bit), bit
		Max read data size	125 Word (2,000 bits)
		Max write data size	123 Word (1,968 bits)
		Maximum number of connections	64
Weight			136g

4 - The I/O refresh size can only be accessed by an Originator that supports Large forward open (0x5B) if it is greater than or equal to 512 bytes including the header. The input header size consists of a 2-byte PDU sequence number, the output header size includes a 2-byte PDU sequence number and 4 bytes of Run-Idle information. Run-Idle information 4 bytes are determined according to the setting value of EDS.

Power Specifications		XEL-BSSRT
Input	Rated input voltage	24VDC
	Input voltage range	20.4–28.8 VDC (-15%, + 20%)
	Input current	1.3 A or less (typically 1A)
	Inrush current	50A peak or less
	Efficiency	80% or more
	Permitted momentary power failure	Less than 10ms
Output	Rated output voltage	5VDC (±2%)
	Output point	3.0 A
Power Supply Status Indication		When output voltage is normal, LED On

XEL-BSSRT Bus Coupler, *continued*

Wiring

Wiring Specifications	*XEL-BSSRT*
Using Solid Wire	Wire specification: 24–16 AWG (0.2–1.5 mm^2) Strip: 9mm 
Using Stranded Wire	Sleeve type crimp terminal  D1 and D2 according to the wire standard are as follows. • 20 AWG: D1 (1mm), D2 (2.6 mm) • 18 AWG: D1 (1.2 mm), D2 (2.8 mm)

RJ45 Cable Wiring

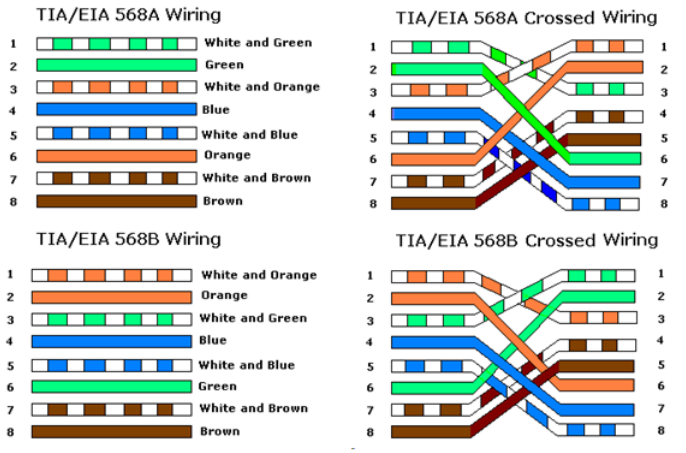


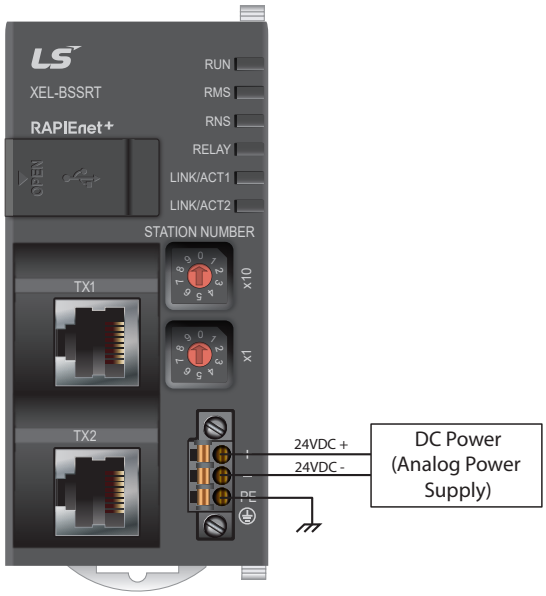
Figure A

Shows the Pin Out of Straight through Cables

Figure B

Shows the Pin Out of Crossover Cables

Power Wiring



XEL-BSSRT Bus Coupler, *continued*

LED Functionality

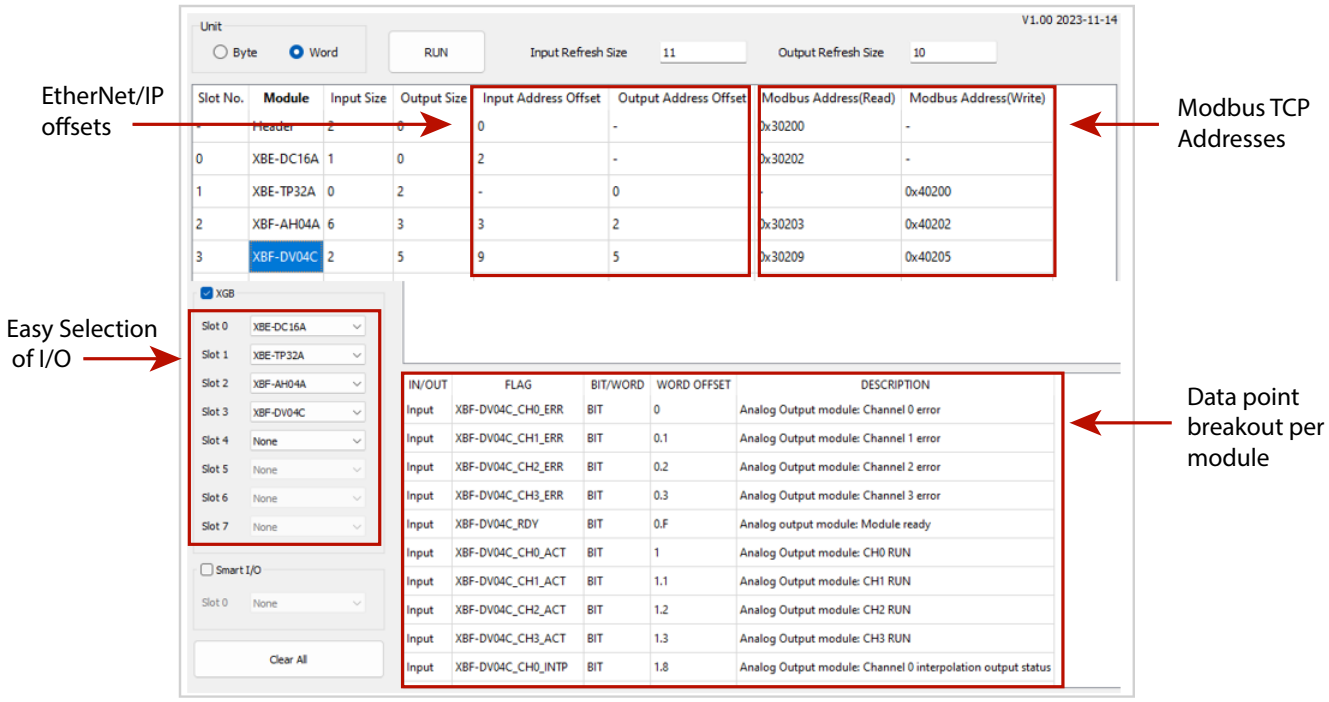
Faceplate View	LED	Status	Meaning
	***RUN***	Green ON	Ethernet (Master) run status.
		Red ON	Ethernet (Master) stop status.
		Green flicker	This is Initial service wait state or time out.
		OFF	Power Off state.
	RMS	Green ON	Normal operation.
		Green flicker	The expansion device setting is not completed.
		Red ON	An unrecoverable error has occurred.
		Red flicker	There is a recoverable error (misconfiguration, parameter error, initialization error, mismatching port-to-port speed or duplex).
	RNS	Green ON	When data is received normally.
		Green flicker	This is the initial state of the network.
		Red ON	A duplicate IP address / station number is detected.
		Red flicker	Timeout, station number conflict, overload status (receiving more than 60000 packets per second) from other nodes on the network.
	RELAY	ON	When the Relay option of the basic parameter is checked and the media speed of Port 1 and Port 2 is the same, the data frame can be relayed.
		OFF	The relay option is not selected.
	LINK/ACT1	Green ON	1G Link=Yes, Activity=No
		Green flicker	1G Link=Yes, Activity=Yes
		Yellow ON	10/100M Link=Yes, Activity=No
		Yellow flicker	10/100M Link=Yes, Activity=Yes
		OFF	Link=No, Activity=NA
	LINK/ACT2	Green ON	1G Link=Yes, Activity=No
		Green flicker	1G Link=Yes, Activity=Yes
		Yellow ON	10/100M Link=Yes, Activity=No
		Yellow flicker	10/100M Link=Yes, Activity=Yes
		OFF	Link=No, Activity=NA

Device Switch Functionality

Faceplate View	Name	Setting	Function
	***Station Number***	1–99	Sets the station number
		0	The station number setting value is set by XG5000 or DHCP
		IP: 192.168.1.xx	IP set by the switch, where xx=100+switch setting 1-99.

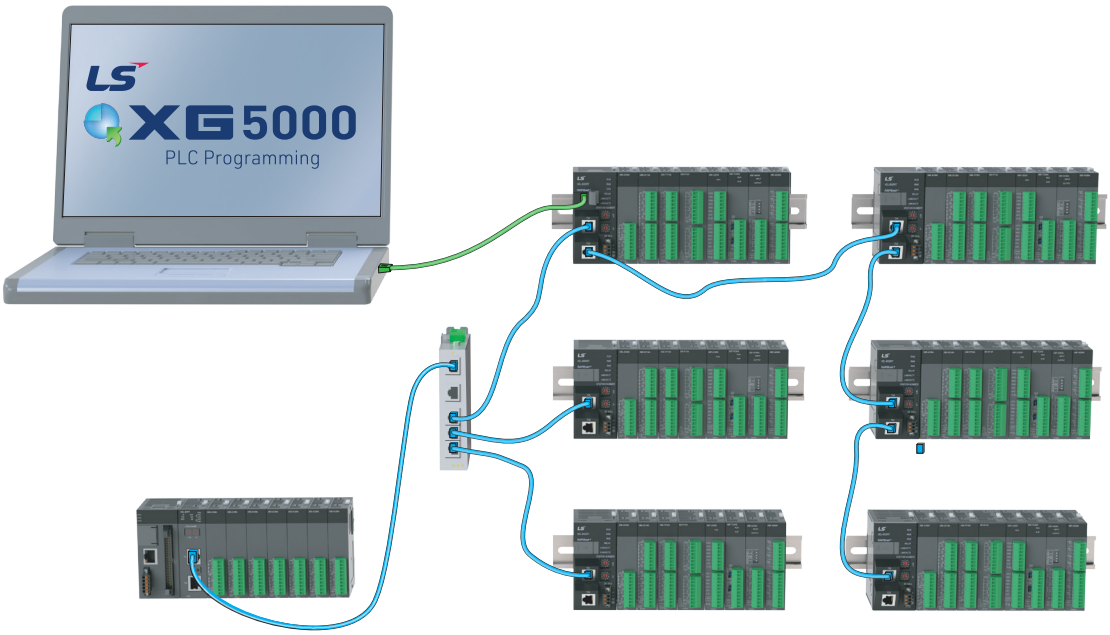
XEL-BSSRT Bus Coupler, *continued*

Addressing Tool

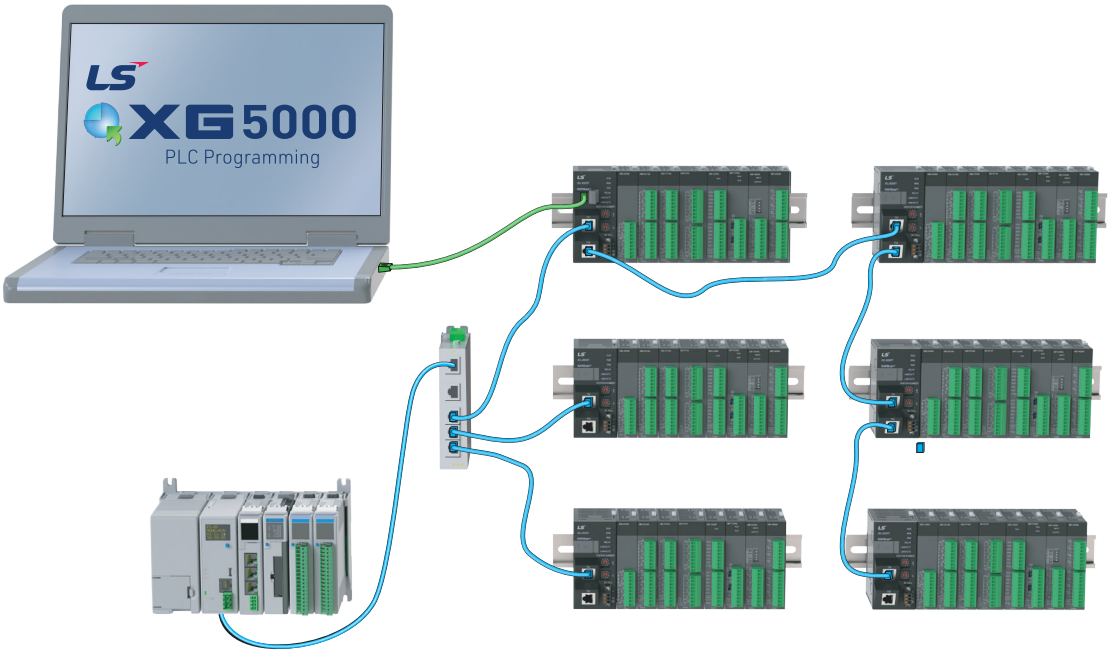


XEL-BSSRT Bus Coupler, *continued*

Example Network Diagram with XEM-DN32 Series



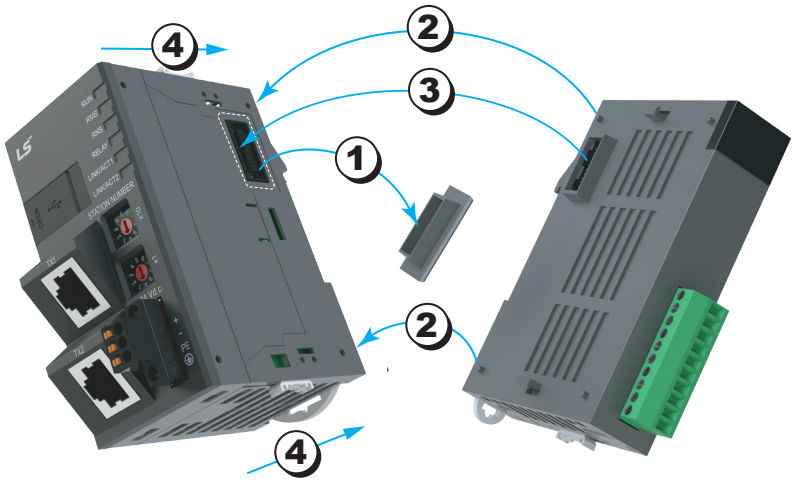
Example Network Diagram with P2000



Bus Coupler Installation

Module Installation

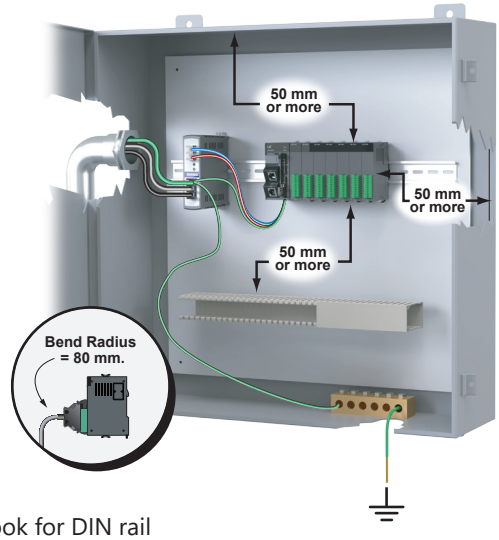
Attach each I/O module to the XEL-BSSCT or XEL-BSSRT bus coupler per the diagram to the right. Up to eight modules can be attached by hooking in to each expansion module in the same manner. Any 32-point I/O and counter input module will require a Smart Link cable and terminal block. Use the online Product Selector to help configure the PLC at automationdirect.com/ls/config.



1.Remove expansion port cover.
2. Align tabs with corresponding holes.
3. Seat the expansion port connector.
4. Secure modules with top and bottom sliding lock.

Mounting the Bus Coupler

When mounting the completed XEL-BSSCT or XEL-BSSRT module to your structure, keep the distances shown in the diagram below to maintain proper ventilation and allow easy detachment and attachment.



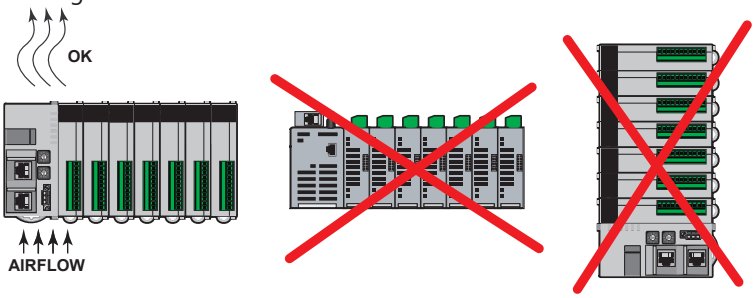
Additional Clearance Distances:

- Wire duct on the side requires 5mm or more
- Panel wall on the side requires 20mm or more
- Another device on the side requires 50mm or more

DIN Rail Mounting

The XEL-BSSCT and XEL-BSSRT have a hook for DIN rail mounting (35mm). To mount to DIN rail:

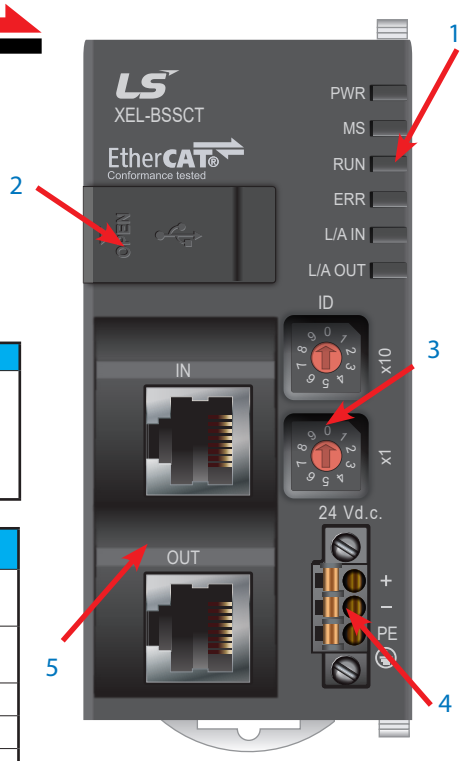
- Pull the hook as shown below at the bottom of module and install it at the DIN rail.
- Push the hook to fix the module to the rail after installing.



XEL-BSSCT Bus Coupler

XEL-BSSCT is a cost-effective EtherCAT bus coupler that brings XGB Remote I/O expansion to the XMC motion controllers and other EtherCAT masters.

EtherCAT®



Features

- Provides EtherCAT protocol communication
- Easy setup and configuration using XG5000 software
- Supports the network topology that the EtherCAT master is compliant with
- Automatic identification of cable type and communication speed

Part Number	Price	Classification	Description	Drawing
XEL-BSSCT	$219.00	Bus Coupler	LS Electric XGB bus coupler, 24 VDC, (2) Ethernet (RJ45) and (1) USB B port(s), EtherCAT Slave, 100 Mbps. For use with LS Electric XGB series I/O modules.	PDF

General Specifications				XEL-BSSCT
Adapter Specifications	Max Number of Modules to be Installed			8*
	Operation Mode			RUN, STOP (manual testing through XG5000 is only available in STOP mode)
	Refresh Time			DC Sync0 time x refresh time (0–100)
	Standard Input Filter			1, 3, 5, 10, 20, 70, 100 ms
	Self-diagnosis Function			Indication of a current error and warning
	EEPROM	Self-recovery Function		Enable/disable automatic recovery
		EEPROM Size		4kB
	Memory	System Flag Area	F Area	2kB
		Extension Module Mapping Area	I Area	2kB
			Q Area	2kB
			U Area	1kB
	External Connection Terminal	Programming Port		USB 1 channel
		Communication Port		RJ45 2 ports (response to shield)
		Power Port		3-pin push-in/screw fixing type connector
EtherCAT Communication Specifications	Communication Protocol			EtherCAT
	Data Transfer Speed			100Mbps
	Phsyical Layer			100BASE-TX (IEEE 802.3)
	Topology			Conforms to the EtherCAT master
	Transmission Media			STP (Shielded Twisted-pair) cable with Category 5 or higher
	Transmission Distance			100m or less between slaves
	Size of PDO Data Transmission and Reception			Input: up to 1,024 byte Output: up to 1,024 byte
	Mailbox Data Size			Input: up to 256 byte Ouput: up to 256 byte
	Mailbox Support Command			SDO requests, SDO information
	Refresh Method			Free-run, Refresh Sync mode (for LS devices only)
	Slave Address Setting Method			Rotary switch, master, PADT
	Slave Address Setting Range			Explicit ID (1–99)
				Alias Address (1–65535)
				Applies the EEPROM value set by the master when setting PADT 0

*** Supports a maximum output current of 3A.**

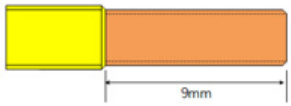
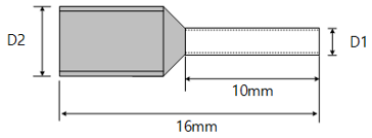
Location	Function
1	LED Display
2	Mini-B USB Connector
3	Slave address switch
4	24VDC input power
5	Ethernet connectors

XEL-BSSCT Bus Coupler, *continued*

Power Specifications		XEL-BSSCT
Input	Rated input voltage	24VDC
	Input voltage range	20.4–28.8 VDC (-15%, + 20%)
	Input current	1.3 A or less (typically 1A)
	Inrush current	50A peak or less
	Efficiency	80% or more
	Permitted momentary power failure	Less than 10ms
Output	Rated output voltage	5VDC (±2%)
	Output point	3.0 A
Power Supply Status Indication		When output voltage is normal, LED On
Cable specification		22–20 AWG (0.3–0.5mm^2)

XEL-BSSCT Bus Coupler, *continued*

DC Power Wiring

Wiring Specifications	*XEL-BSSCT*
Using Solid Wire	Wire specification: 24–16 AWG (0.2–1.5 mm^2) Strip: 9mm 
Using Stranded Wire	Sleeve type crimp terminal  D1 and D2 according to the wire standard are as follows. • 20 AWG: D1 (1mm), D2 (2.6 mm) • 18 AWG: D1 (1.2 mm), D2 (2.8 mm)

RJ45 Cable Wiring

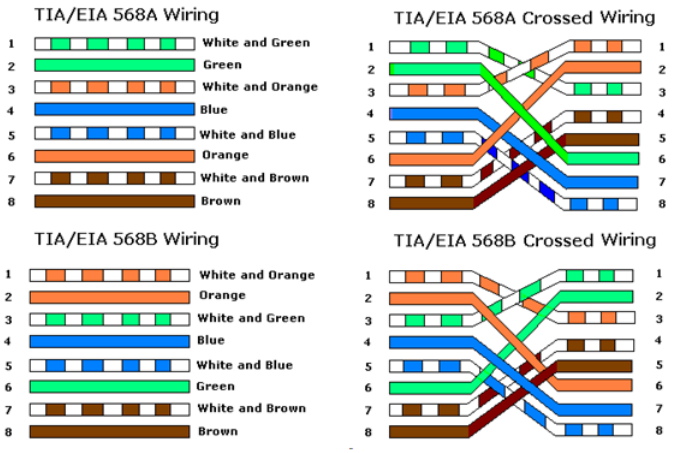


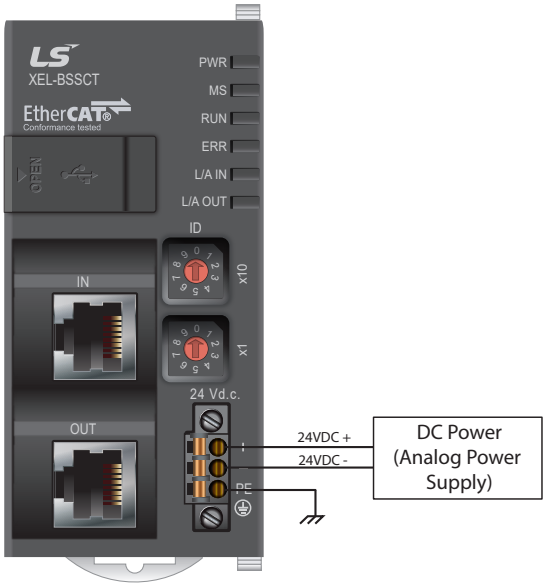
Figure A

Shows the Pin Out of Straight through Cables

Figure B

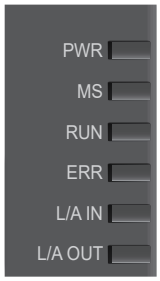
Shows the Pin Out of Crossover Cables

Power Wiring



XEL-BSSCT Bus Coupler, *continued*

LED Functionality

Faceplate View	LED	Status	Meaning
	***PWR***	Red OFF	Power Off
		Red ON	Power On
	MS	Green ON	RUN mode
		Green OFF	STOP mode or operation unavailable error
		Red ON	Unrecoverable error has occured
		Red 1s flicker	Recoverable or insignificant error has occured
		Red 500ms flicker	Minor error has occured
		Red 100ms flicker	Critical error has occured
	RUN	Green ON	OP status
		Green blinking	PRE-OP status
		Green single flash	SAFE-OP status
		Green flicker	Initialization or BOOTSTRAP status
		Green OFF	INIT status
	ERR	Red OFF	No error
		Red blinking	General setting error or invalid H/W setting
		Red single flash	EtherCAT state cannot be changed to OP due to error
		Red double flash	Sync manager watchdog timeout
		Red flicker	Booting error
		Red ON	ESC failure / hardware failure
	L/A IN	Green OFF	No connection, no communication
		Green ON	Connected to master, no communication
		Green flicker	Connected to master, communicating
	L/A OUT	Green OFF	No connection, no communication
		Green ON	Connected to master, no communication
		Green flicker	Connected to master, communicating

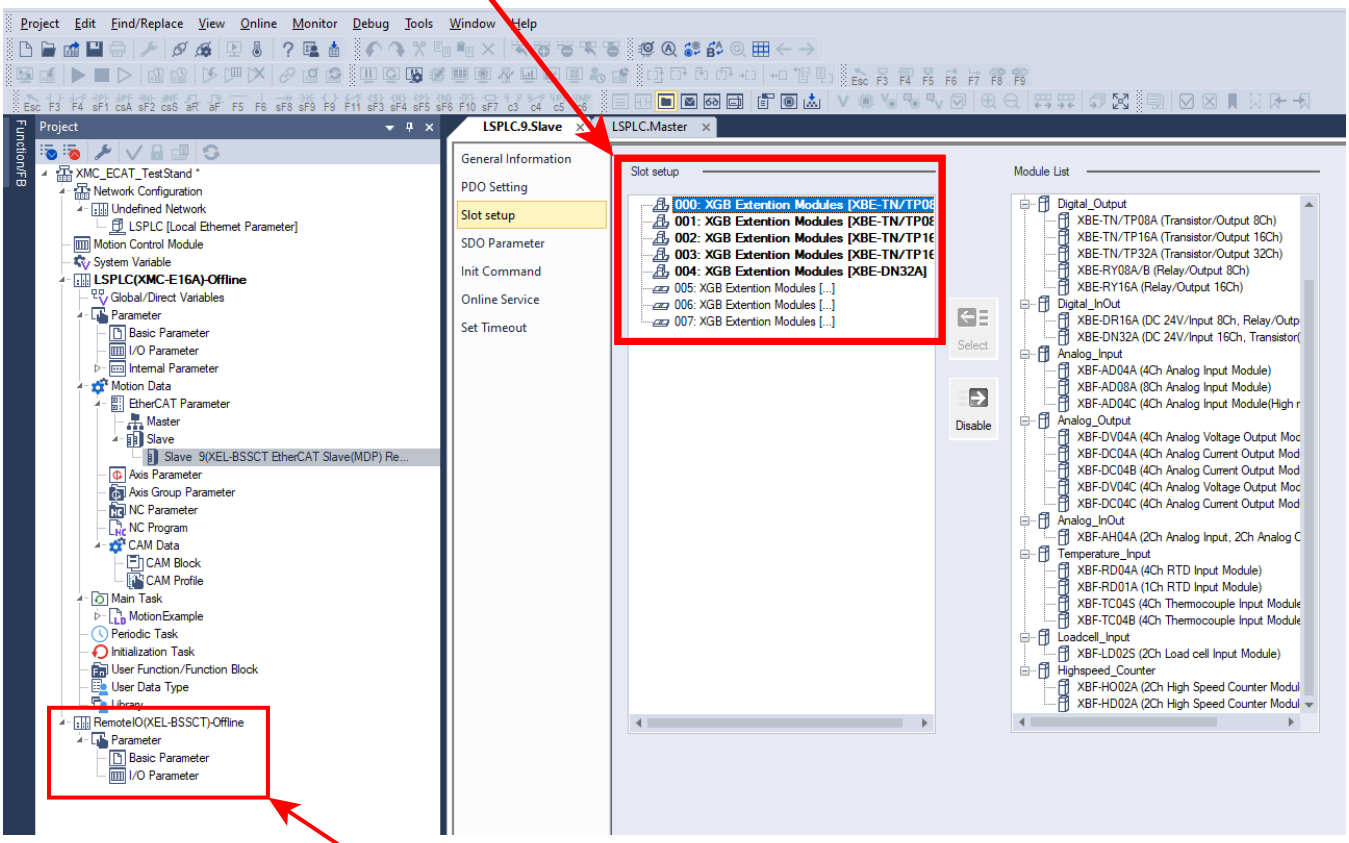
Device Switch Functionality

Faceplate View	Name	Setting	Function
	***ID***	01–99	Sets the EtherCAT slave address.
		00	EtherCAT master assigns the slave address.

XEL-BSSCT Bus Coupler, *continued*

Example XEL-BSSCT XG5000 Project

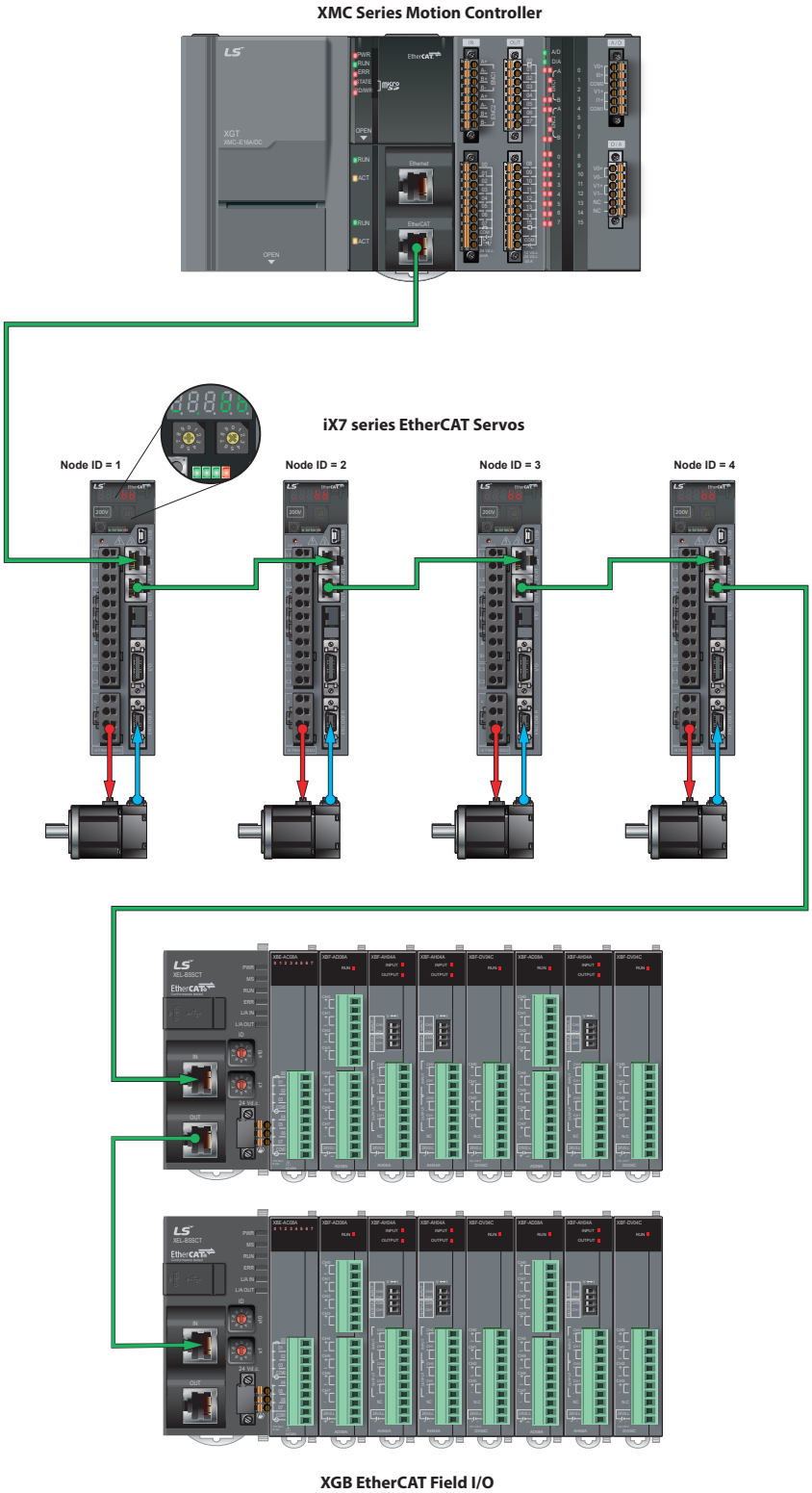
XEL-BSSCT I/O configuration configured for XMC to access module data



XEL-BSSCT setup can be stored in the same XG5000 project as XMC

XEL-BSSCT Bus Coupler, *continued*

Example Network Diagram for an LS Electric EtherCAT Motion System



XG5000 and XG-PM Software for LS Electric Controllers

XG5000 is a powerful software suite for programming and configuring the XMC programable motion controller and the XGB PLC.

XG5000

Offers four languages from the IEC61131-3 PLC programming standard.

- Ladder Diagram (LD): includes many versatile function blocks, including advanced motion control specific blocks, for convenience when programming complex systems.
- Structured Text (ST): a text based language which is a powerful tool for advanced motion programming and data handling.
- Sequential Function Chart (SFC) and Instruction List (IL) are also supported by the XGB PLC.

LS XG5000 PLC Programming

The software uses Symbolic (also called Automatic) variables created by the user. These can be created as global or local task variables, and can be aliased to direct variables. Variables can be imported/exported for quick editing in spreadsheet format.

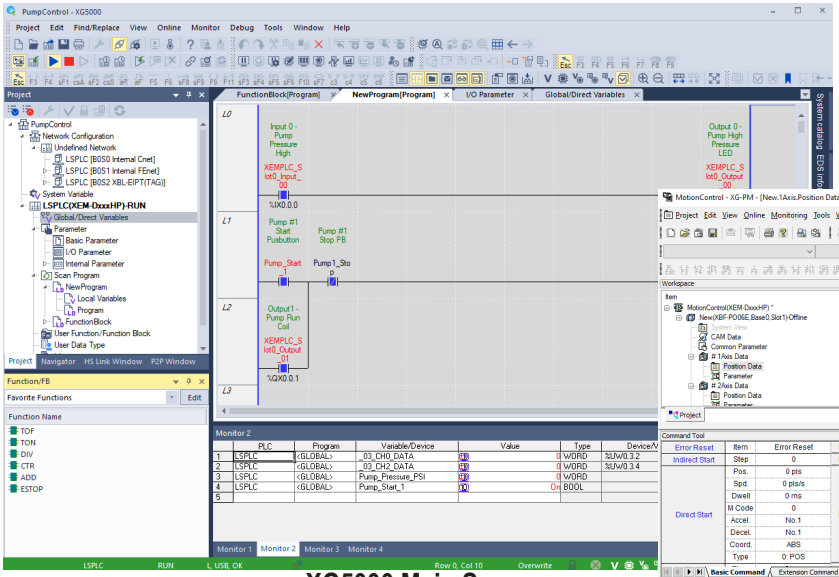
Other features include User data types/function blocks, XY Trend for motion visualization, online system information, simulator, EDS file library for EtherNet/IP communications, ESI file library for EtherCAT device configuration, and much more.

Motion Control Functions	
XGB PLC	Uses LS Electric's custom XPM motion function blocks.
XMC Motion Controller	Uses PLCopen compliant motion function blocks and some custom LS Electric function blocks.

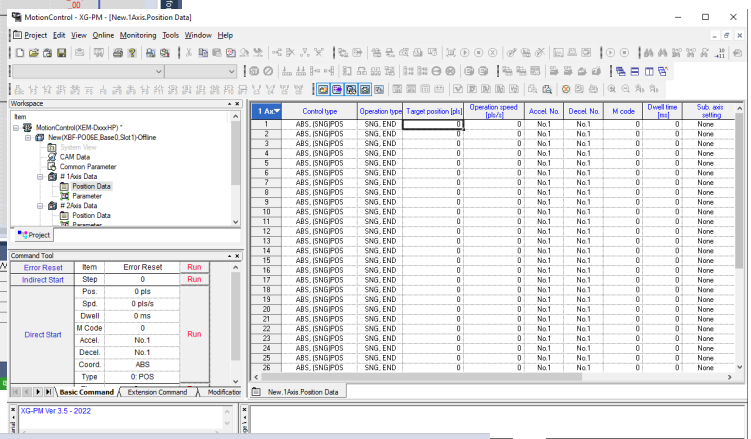
XG-PM (for XGB PLC only)

XG-PM Position control software is used to configure the axis parameters of the XGB PLC. The Command Tool allows for quick testing, and online edits make maintenance changes quick and easy. Access XG-PM from the XG5000 Main menu-> Tools ->Position Control.

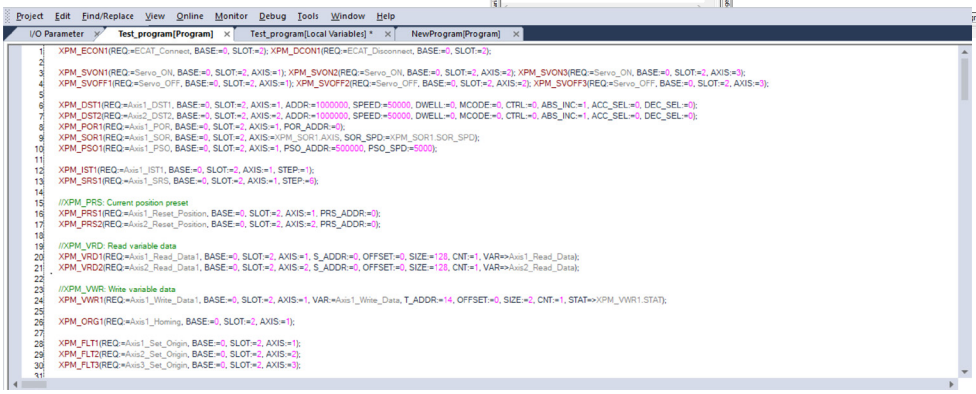
LS XG-PM Position Control



XG5000 Main Screen



XG-PM for XGB PLC Motion Configuration



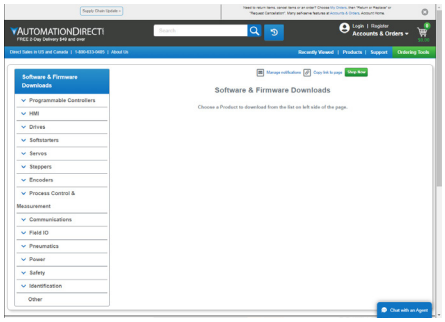
Structured Text Editor

XG5000 Software Setup

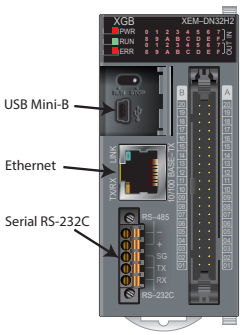
If using an XGB PLC, view the XG5000 overview topic in the LS PLC Interactive Guide here: Starting an XG5000 Project

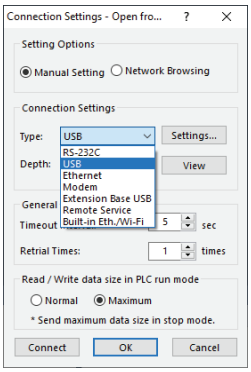
If using an XMC Motion Controller, view the XG5000 overview topic in the XMC Interactive Guide here: Starting an XG5000 Project

1 Download and install XG5000 software: Download Software



2 Connect your processor to a laptop using USB or Ethernet (XGB or XMC), or Serial cable (XGB only). Default IP address in the processor is 192.168.250.120.

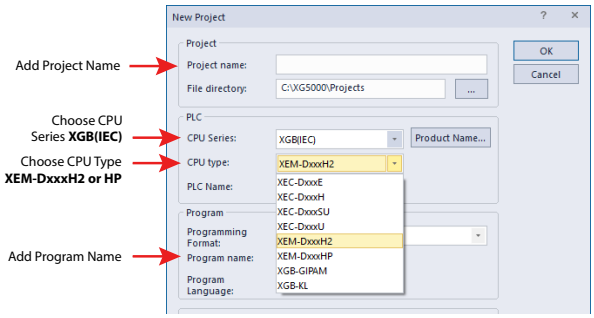




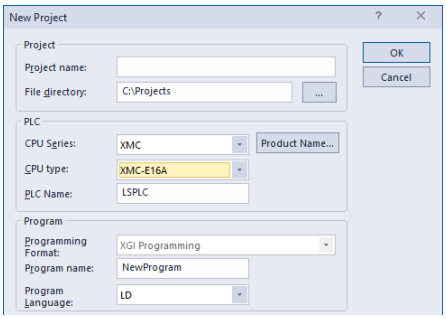
Example shown for XGB PLC setup.

3 Open XG5000. From the top menu select **Project → New Project**.

Enter a project name, choose your CPU, add a program name, then click OK to save.



Example XGB Setup

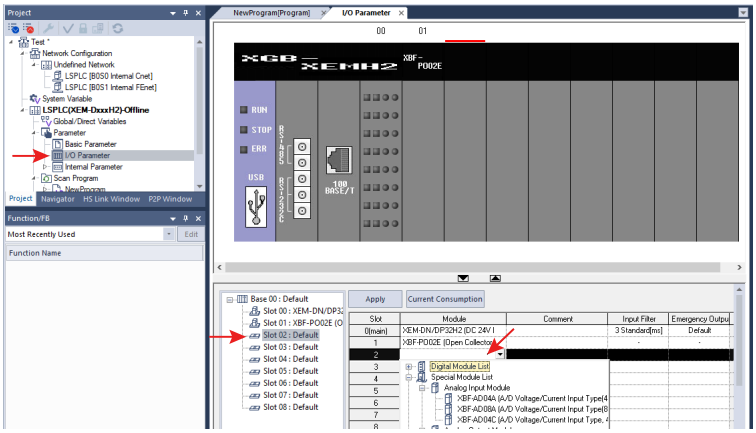


Example XMC Setup

4 ***(XGB Only)*** Choose **Parameter → I/O Parameter** from the project menu bar.

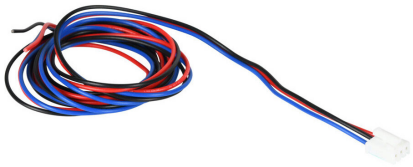
Select a slot from the bottom menu, then use the drop down under **Module** to add modules.

See the video under Adding Modules for going online and uploading I/O configuration from your rack.



XGB PLC Replacement Terminals

Part Number	Price	Function	Description	Compatible With
XGB-CON-3PBC	$7.00	LS Bus coupler power connector, 3 pole	LS Electric XGB terminal block, 3-pin screw type, replacement. For use with LS Electric XGB series bus coupler.	XEL-BSSCT XEL-BSSRT
XGB-CON-3PX	$4.00	LS XEM Processor Power 3 pole , Tab Lock, Assembly Connector & Wire	LS Electric XGB terminal block, 3-pin with cable pigtail, replacement. For use with LS Electric XEM-DxxxHx PLCs.	XEM-DN32H2, XEM-DN32HP, XEM-DP32H2, XEM-DP32HP
XGB-CON-5PX	$4.00	LS XEM Processor Serial Communication 5 Pole, Screw Lock	LS Electric XGB terminal block, 5-pin spring clamp, replacement. For use with LS Electric XEM-DxxxHx PLCs.	XEM-DN32H2, XEM-DN32HP, XEM-DP32H2, XEM-DP32HP
XGB-CON-8P	$5.00	LS XGB PLC IO Connector 8 Pole	LS Electric XGB terminal block, 8-pin screw type, replacement. For use with LS Electric XGB series I/O modules.	XBE-DC16A, XBE-DC16B, XBE-TN16A, XBE-TP16A, XBF-AD08A
XGB-CON-9P	$6.00	LS XGB PLC IO Connector 9 Pole	LS Electric XGB terminal block, 9-pin screw type, replacement. For use with LS Electric XGB series I/O modules.	XBE-RY08B, XBE-RY16A
XGB-CON-10P	$6.00	LS XGB PLC IO Connector 10 Pole	LS Electric XGB terminal block, 10-pin screw type, replacement. For use with LS Electric XGB series I/O modules.	XBE-DC16A, XBE-DC16B, XBE-TN16A, XBE-TP16A, XBF-AD08A, XBE-AC08A
XGB-CON-11P	$6.00	LS XGB PLC IO Connector 11 Pole	LS Electric XGB terminal block, 11-pin screw type, replacement. For use with LS Electric XGB series I/O modules.	XBF-AD04A , XBF-AH04A, XBF-DV04A, XBF-DV04C, XBF-DC04A, XBF-DC04C
XGB-CON-15P	$7.00	LS XGB PLC IO Connector 15 Pole	LS Electric XGB terminal block, 15-pin screw type, replacement. For use with LS Electric XGB series I/O modules.	XBF-AD04C



XGB-CON-3PX



XGB-CON-9P



XGB-CON-15P



XGB-CON-3PBC

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.

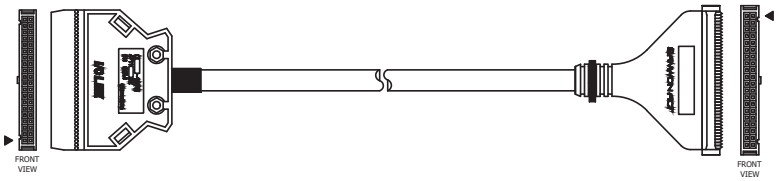
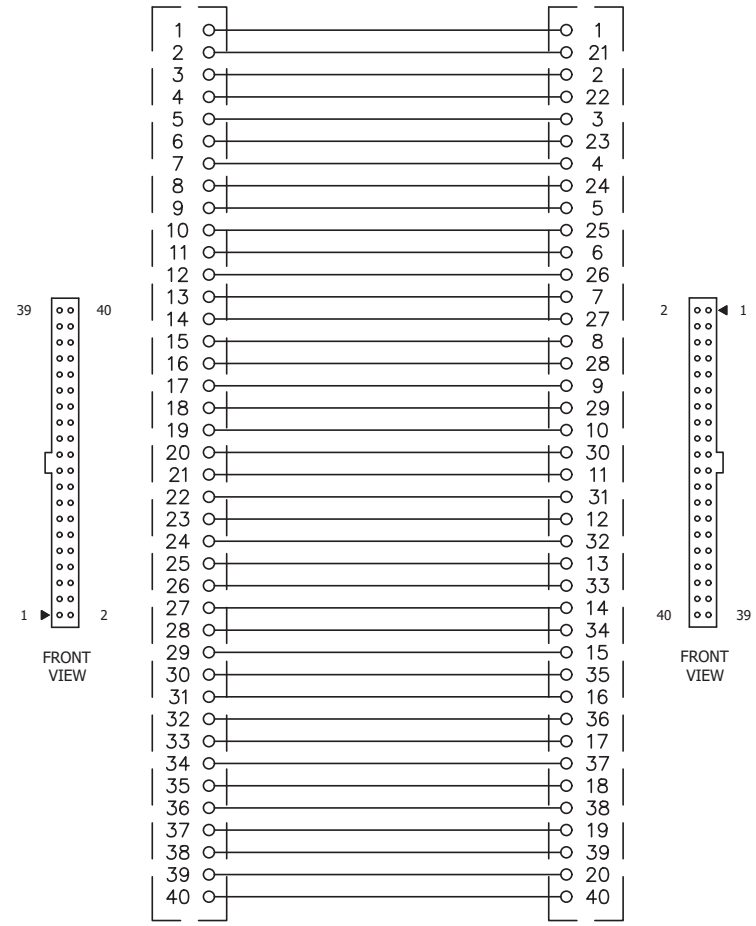
Download module specific XTB-40H Terminal Label Printouts here: Terminal Printouts



Part Number	Price	Description	Length	Compatible With
XTB-40H	$22.00	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
XTB-40H-LABEL	$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	
C40HH-05SB-XBI	$25.00	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	
C40HH-10SB-XBI	$28.00	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	
C40HH-15SB-XBI	$32.00	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	
C40HH-20SB-XBI	$40.00	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	
C40HH-30SB-XBI	$47.00	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^2/MAX)
Insulation Resistance		100MΩ (500VDC)
Dielectric Strength		500VAC 1 minute
Screw		M3 x 8L
Screw Torque		1.2N•m (12kgf•cm)
Ambient Temperature		-10ºC to +50ºC (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		A1
B19		B1
B18		A2
B17		B2
B16		A3
B15		B3
B14	HIROSE HIF3BA-40D-2.54R HIROSE HIF3BA-40D-2.54R	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

LS ELECTRIC

XMC Motion Controller

LS XMC EtherCAT®

MOTION CONTROLLER

Motion Controller (with embedded I/O)

- ***XMC-E08A***
- ***XMC-E08A-DC***
- ***XMC-E16A***
- ***XMC-E16A-DC***



The XMC programmable motion controller pairs advanced automation with a cost-effective and user-friendly engineering solution. The XMC series delivers high performance EtherCAT-based motion control functions along with a variety of embedded functions and high-tech capabilities specialized for various motion tasks.

The XMC series delivers an optimized solution to a system that has a need for motion control. With 8 digital inputs / 16 digital outputs, analog inputs (2ch) / analog outputs (2ch), encoder inputs (2ch) and an EtherCAT port, many applications can be deployed rapidly and easily. A built-in SD card slot is available for saving programs, downloading programs, and logging data. The XMC series is capable of high-speed program processing of 6.25 ns for a basic command. EtherCAT cycle times of 0.5/1/2/4 ms can be achieved depending on system setup.

XMC-E16A supports up to 16 EtherCAT servos and 32 EtherCAT slaves total. XMC-E08A supports up to 8 EtherCAT servos and 16 EtherCAT slaves total. EtherCAT devices such as I/O, AC drives, stepper drives, encoders, and robots may be connected to an XMC. The XMC series gives you advanced functionality by supporting CAM profiles, G-code, and robot control (Delta3, Delta 3R, Linear Delta, and others).

The XMC series offers an advanced level of programming, featuring the IEC61131-3 standard capable of Ladder and Structured Text. Motion programming is compliant to the PLCopen standard. All development and commissioning are done within the free-to-download XG5000 programming software. XG5000's various bult-in motion control and CNC control functions can be applied to a wide range of machines including packaging machines, dedicated CNC, XYZ cartesian coordinate systems and Delta robots.

Features

- EtherCAT port supports up to 16 motion axis and 32 slave devices (depending on XMC model)
- Ethernet port supports ModbusTCP and socket programming.
- 8 digital inputs
- 16 digital outputs
- 2-channel analog inputs
- 2-channel analog outputs
- 2-channel encoder inputs
- For additional IO, use XEL-BSSCT with XGB IO
- Built-in SD card slot
- XG5000 software with IEC 61131 programming languages (Ladder, Structured Text), User Defined tags/ function blocks, 64 bit data types, and motion axis graphing
- Motion function blocks compliant to the PLCopen standard.
- G-code and robot control supported
- PID control available with XG5000 function block
- DIN-rail mountable

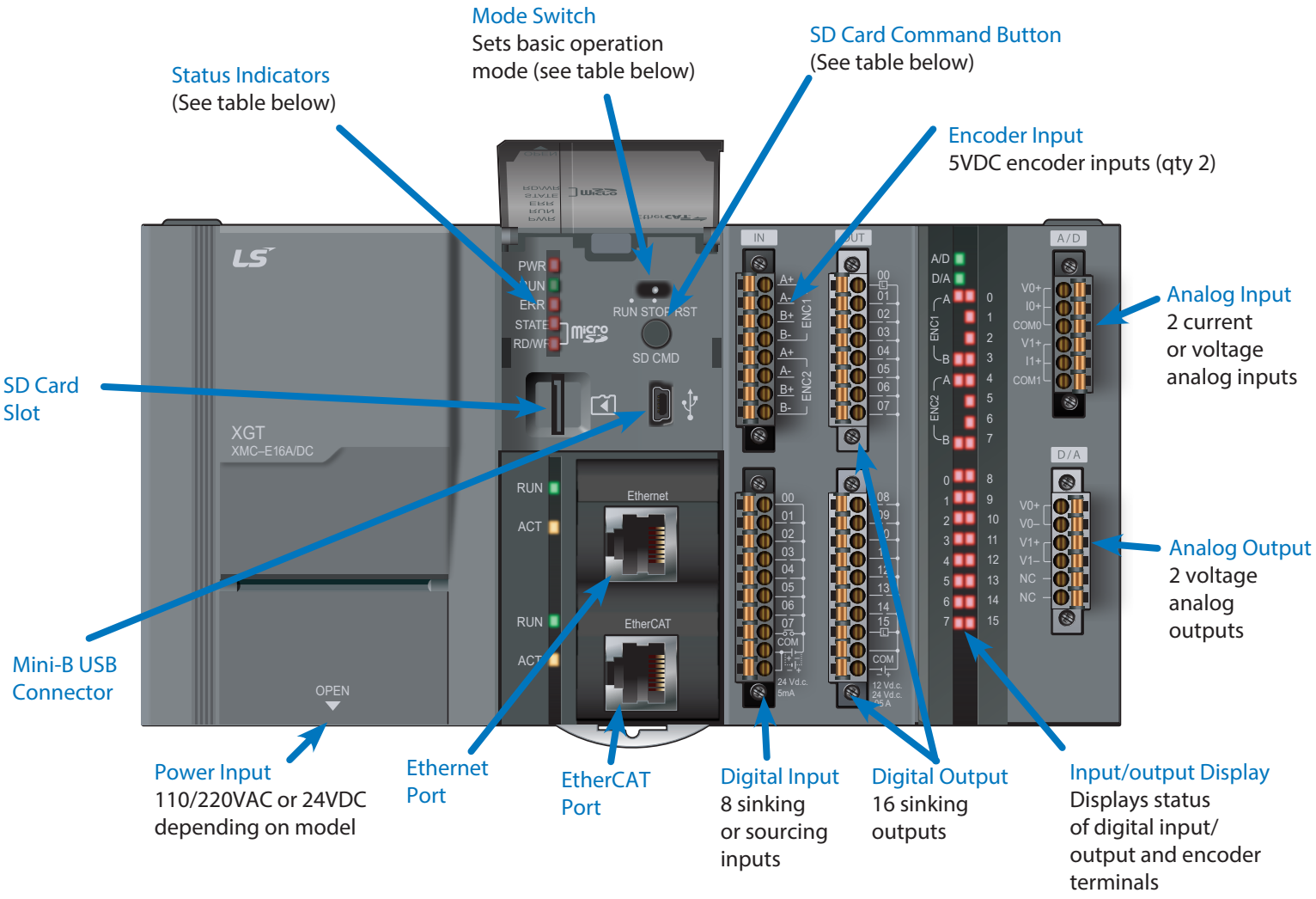
Motion Controller Feature Breakdown

Part Number	Price	Built-in I/O*			USB	Ethernet	Max EtherCAT Slaves	Memory Backup	Online Editing	Drawing
		EtherCAT Motion Axis	Inputs	Outputs						
XMC-E08A	$857.00	8	8	16	Yes	Yes	16	Memory: Non-Volitale RAM RTC: 6 month backup (MS920T battery)	Yes	PDF
XMC-E08A-DC	$857.00	8								PDF
XMC-E16A	$959.00	16					32			PDF
XMC-E16A-DC	$959.00	16								PDF

*** To add additional I/O, use XEL-BSSCT bus coupler and XGB series I/O modules.**

XMC Motion Controller

XMC Configuration



Status Indicators	
Indicator	***Function***
PWR	Red LED is illuminated when power is ON.
RUN	Green LED is illuminated when XMC is in RUN mode.
ERR	Red LED is illuminated to indicate program error(s).
STATE	Red LED is illuminated when SD card is installed or flickering for an SD card error.
RD/WR	Red LED is flickering during SD card read/write.

Mode Switch	
Position	***Function***
RUN	Executes user program.
STOP	Normal program load position. Allows for Remote Run from XG5000.
RST	Reset program operation.

SD Card Command Button	
Action	***Function***
Press less than 3 seconds	SD Card additional functions such as program back-up, program recovery, and program comparison.
Press more than 3 seconds	Enable or Disable SD card.
Pressing while Powering Up	Performs SD Card boot operations.

LS ELECTRIC

XMC Motion Controller

Performance Specifications

Specification				Part Number			
				XMC-E08A	XMC-E16A	XMC-E08A-DC	XMC-E16A-DC
Power Specifications	Input	Input Voltage Range		100–240 VAC (50/60Hz)		19.2–28.8 VDC	
		Input Current		0.7 A or less (110VAC) 0.4 A or less (120VAC)		1.6 A or less	
		Inrush Current		120A peak or less (240VAC, Phase 90 degree)		100A peak or less (28.8 VDC)	
		Leakage Current		3mA or less			
		Efficiency		65% or more			
		Acceptable External Power Drop		10ms or less			
	Output	Output Voltage Ripple Range	+5V	4.90–5.20 V		5.90–5.15 V	
			+24V	21.1–26.9 V		–	
		Output Current	+5V	4A			
			+24V	0.4A		–	
		Ripple	+5V	100mVpp or less			
			+24V	400mVpp or less		–	
		Noise	+5V	200mVpp or less			
			+24V	400mVpp or less		–	
		Overcurrent Protection	+5V	4.4 A or higher			
			+24V	0.44A or higher		–	
Operation Method				Main task/Periodic task: Fixed cyclic operation, initialization task: executed when entering RUN mode.			
Control Cycle Time				Main task time: 0.5 ms, 1ms, 2ms, 4ms. Periodic task time: multiple setting of main task.			
I/O Control method				Synchronized with main task			
Programming Languages				LD (Ladder Diagram), ST (Structured Text), G-Code			
Special Features/Instructions				User Defined Data Type, User Defined Functions/Function Blocks			
Calculation Processing Speed	Basic			6.25 ns or more (general point/coil)			
	MOVE			5ns or more (Word type)			
	Arithmetic			30ns or more (Word type)			
Program Memory	Quantity			Maximum 256			
	Capacity			10MB (motion program), 10MB (NC program)			
Data Memory	Symbolic Variable (A)			4,096 kB (retain setting available up to 2,048 kB)			
	Input Variable (I)			16kB			
	Output Variable (Q)			16kB			
	Direct Variable (M)			2,048 kB (configurable up to 1,024 kB)			
	Flag Variable		F	128kB			
			K	18kB			
			U	1kB			
Timer				Time range: 0.001–4,294,967.295 seconds (1,193 hours)			
Counter				Counting range: 64-bit range			
Available Program Types				Initialization program, main task program, periodic task program, NC program			
Operation Mode				RUN, STOP			
Restart Mode				Cold, Warm			
Diagnostic Functions				Cyclic error monitoring, program watchdog time, memory monitoring, power monitoring, etc.			
Data Retention in Case of Power Failure				Retained memory and variables are backed up when power failure is detected.			

Built-in Functions

Specification		Part Number			
		XMC-E08A	XMC-E16A	XMC-E08A-DC	XMC-E16A-DC
EtherCAT Control	Real/Virtual Axes	8	16	8	16
	Dedicated Virtual Axis	1	2	1	2
	Slave (including real axes)	16	32	16	32
Supported EtherCAT Devices		CoE: CANopen over EtherCAT, FoE: File Access over EtherCAT			
Communication Period		0.5 ms, 1ms, 2ms, 4ms (same as the Main Task period)			
Servo Drive Support		Only EtherCAT servo drives that use CANopen over EtherCAT (CoE)			
Control Unit		Pulse, mm, inch, degree			
Control Method		Position, Velocity, Torque (servo drive support), Synchronous, Interpolation Control			
Position Address Range		± LREAL, 0			
Speed Range		± LREAL, 0			
Torque Unit		Rated torque % designation			
Acceleration/Deceleration Processing		Trapezoid type, S-type (setting by specifying Jerk at a function block)			
Range of Acceleration/Deceleration		+ LREAL[1], 0			
Manual Operation		JOG Operation			
Cam Operation		8 profiles, 8,192 points	16 profiles, 16,384 points	8 profiles, 8,192 points	16 profiles, 16,384 points
Absolute Position System		Available (when using an absolute encoder type servo drive)			
Digital I/O	Digital Input	8 points			
	Digital Output	16 points (transistor)			
	Encoder Input	2 channels Max input: 500Kpps Input method: Line drive, Voltage input Input Type: CW/CCW, Pulse/Direction, Phase A/B			
Analog Input/ Output	Analog Input	2 channels Voltage input range: -10 to 10VDC / 0 to 10VDC / 1 to 5VDC / 0 to 5VDC Current input range: 4–20mA / 0–20mA Max. resolution: 14 bit (1/16,000)			
	Analog Output	2 channels Voltage output range: -10 to 10VDC / 0 to 10VDC / 1 to 5VDC / 0 to 5VDC Max. resolution: 14 bit (1/16,000)			
Coordinate System (Robot)		Cartesian, Detla			
SD Memory	Memory Type	Mirco SDHC			
	File System	FAT32			
	Maximum Capacity	32GB (memory over 8GB can only use 8GB of overall area)			
	Functions	Program back-up/restoration, booting operation, data logging			
Ethernet	Communication Speed	Auto / 10Mbps / 100Mbps			
	Communication Port	1 port			
	Commmunication Distance	Max. 100m betwen slaves			
	Service	Loader service (XG5000) LS Electric protocol supported (XGT, MODBUS TCP) FTP server: read and write files from the SD card SNTP client			
USB		USB 2.0, 1 channel			
Error Indication		Indicated by LED			
Weight		790g [1.74 lbs]			

1 - LREAL range: 2.22507385585072e-308 to 1.79759313486232e+308. Long real number (+LREAL) positive range: 0 < x ≤ 1.79769313486232e+308

EtherCAT Communication Specifications

Item	Specifications
Communication Protocol	EtherCAT
Support Specification	CoE (CANopen over EtherCAT)
Physical Layer	100BASE-TX
Communication Speed	100Mbps
Topology	Daisy chain
Communication Cable	Cat 5 STP (Shielded Twisted-pair) cable
Max Number of Slaves	E16A / E16A-DC = 32 (max 16 motion axes) E08A / E08A-DC = 16 (max 8 motion axes)
Communication Period	0.5 ms / 1ms / 2ms / 4ms
Synchronous Jitter	Less than 1μs
Synchronous Communication	PDO (Process Data Object) mapping through CoE
Communication Setting	Set the communication configuration using XG5000
Maximum Transmission Distance	100m
Communication Status Indicator	LED

Environmental Specifications, all XMC Series Modules

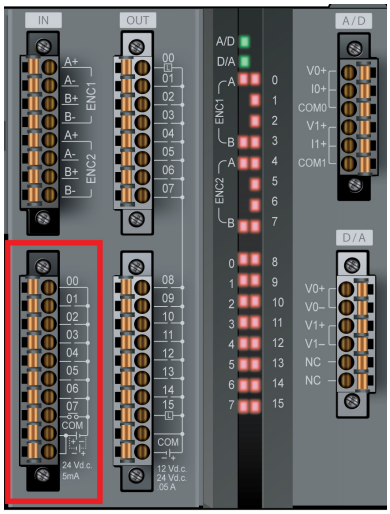
Item				Specification	Reference
Ambient Operating Temperature				0–55°C (32–131°F)	–
Storage Temperature				-25–70°C (-13–158°F)	
Ambient Operating Humidity				5–95% relative humidity (non-condensing)	
Storage Humidity				5–95% relative humidity (non-condensing)	
Vibration[1]	Occasional Vibration	Frequency	5 ≤ f < 8.4 Hz	3.5 mm pulse width	IEC61131-3-2
			8.4 ≤ f < 150Hz	9.8 m/s^2 (1G)	
	Continuous Vibration		5 ≤ f < 8.4 Hz	1.75 mm pulse width	
			8.4 ≤ f < 150Hz	4.9 m/s^2 (0.5G)	
Shocks			Peak Acceleration	147 m/s^2 (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				Up to 2,000m	
Pollution Degree				Less than or equal to 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.

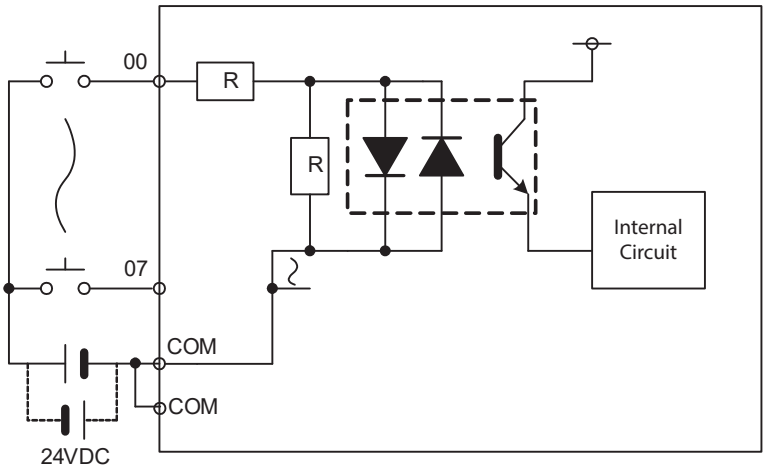
Digital Input Specifications

8-point 24VDC Input (Sink/Source Type) Specifications					
Model		**XMC-E08A**	**XMC-E16A**	**XMC-E08A-DC**	**XMC-E16A-DC**
Input Point		8 points			
Insulation Method		Photocoupler Insulation			
Rated Input Volage		24VDC			
Rated Input Current		About 5mA			
Operation Voltage Range		20.4–28.8 VDC (within ripple rate 5%)			
On Voltage		19VDC or higher			
On Current		3mA or higher			
Off Voltage		6VDC or less			
Off Current		1mA or less			
Input Resistance		About 4.7 kΩ			
Response Time	**Off → On**	0.5/1/3/5/10/20/70/100 ms (set by I/O parameter) Default: 3ms			
	On → Off				
Insulation Pressure		AC560Vrms / 3 cycle (altitude 2000m)			
Insulation Resistance		10MΩ or more by MegOhmMeter			
Common Method		8 point / COM			



Note: Red box highlights pins of the CPU inputs.

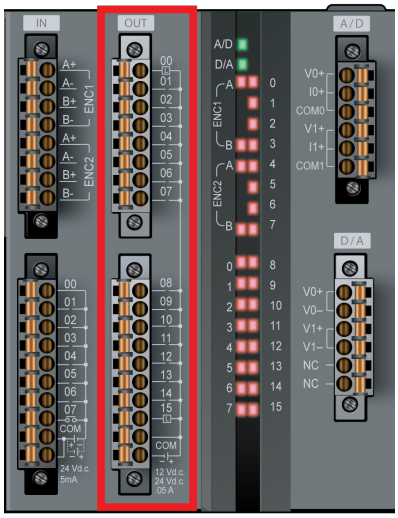
8-point 24VDC Input (Sink/Source Type) Circuit Configuration



XMC Pin#	*I/O Direct Variable*	*Description*
00	%IX0.0.0	General Input
01	%IX0.0.1	
02	%IX0.0.2	
03	%IX0.0.3	
04	%IX0.0.4	
05	%IX0.0.5	
06	%IX0.0.6	
07	%IX0.0.7	
COM	–	Common
COM	–	

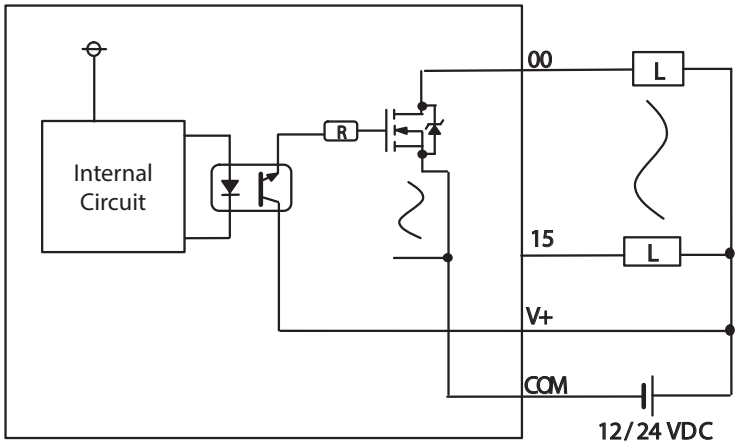
Digital Output Specifications

16-point Transistor Output (Sink Type) Specifications					
Model		XMC-E08A	XMC-E16A	XMC-E08A-DC	XMC-E16A-DC
Output Point		16 points			
Insulation Method		Photocoupler Insulation			
Rated Load Volage		12VDC / 24VDC			
Operation Load Voltage Range		10.2–26.4 VDC			
Max. Load Current		0.5 A / 1 point, 2A / 1COM			
Off Leakage Current		0.1 mA or less			
Max. Inrush Current		4A / 10ms or less			
Max. Voltage Drop when On		0.4 VDC or less			
Over Voltage Protection		Zener diode			
Response Time	**Off → On**	1ms or less			
	On → Off	1ms or less (rated load, resistive load)			
Common Method		16 point / COM			
External Power	**Voltage**	12VDC / 24VDC ± 10% (ripple voltage 4 Vp-p or less)			
	Current	10mA or less (when connecting 24VDC)			



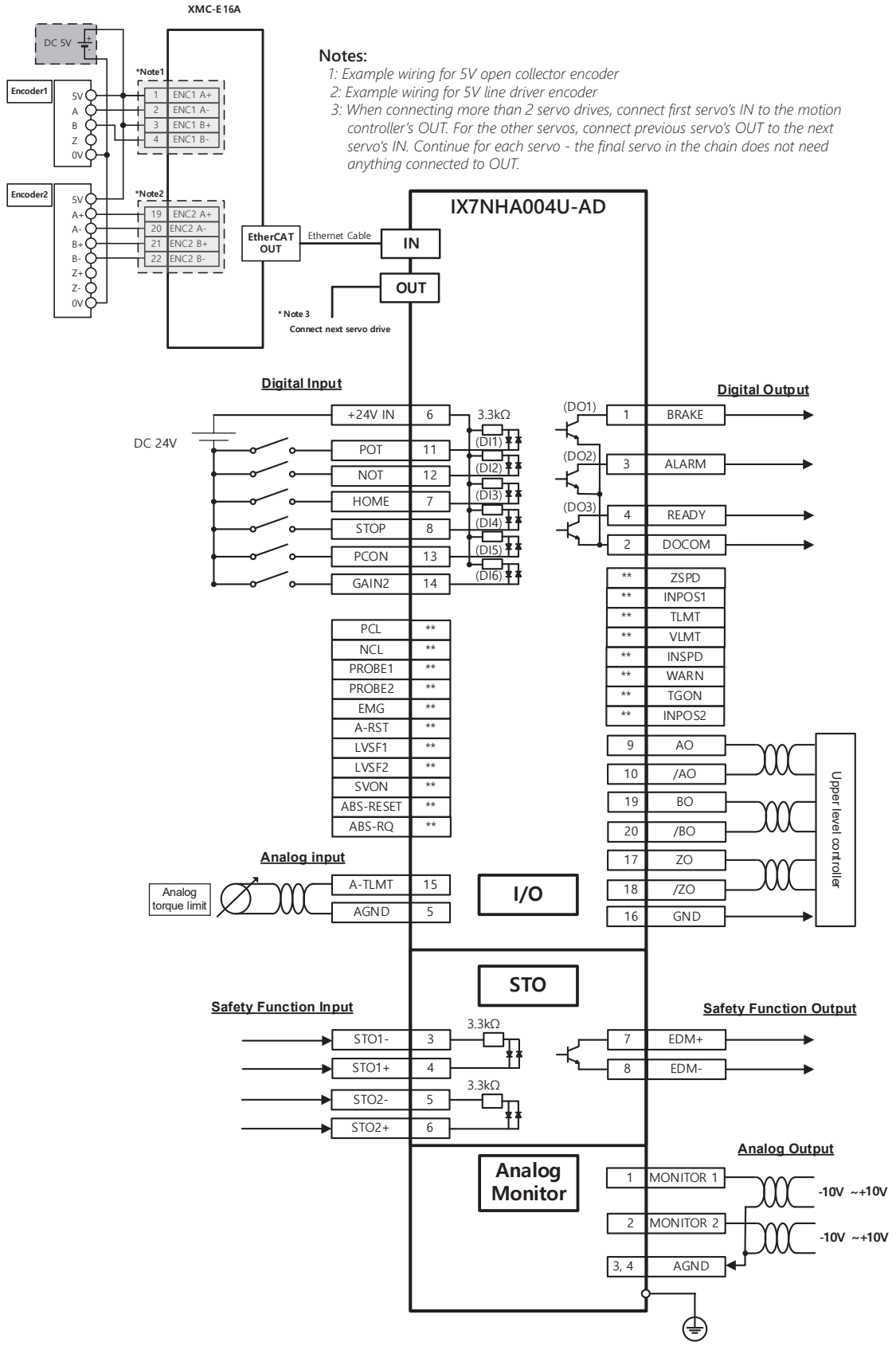
Note: Red box highlights pins of the CPU outputs.

16-point Transistor Output (Sink Type) Circuit Configuration

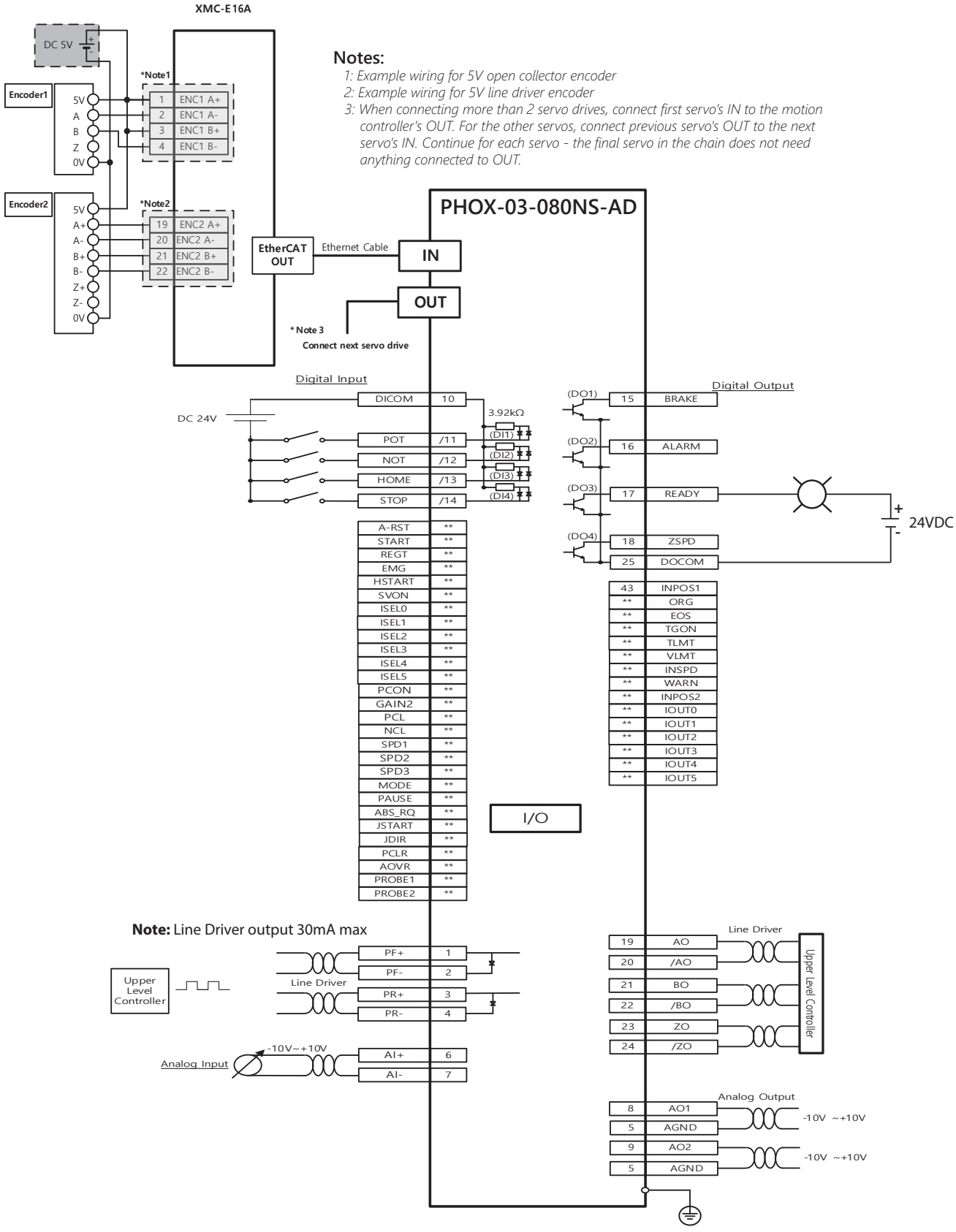


XMC Pin#	I/O Direct Variable	Description
00	%QX0.0.0	General Output 0.5 A / pt
01	%QX0.0.1	
02	%QX0.0.2	
03	%QX0.0.3	
04	%QX0.0.4	
05	%QX0.0.5	
06	%QX0.0.6	
07	%QX0.0.7	
08	%QX0.0.8	
09	%QX0.0.9	
10	%QX0.0.10	
11	%QX0.0.11	
12	%QX0.0.12	
13	%QX0.0.13	
14	%QX0.0.14	
15	%QX0.0.15	
V+	–	+24VDC from supply
COM	–	0VDC from supply

Example Wiring with iX7NH Servo



Example Wiring with PHOX Servo



Notes:

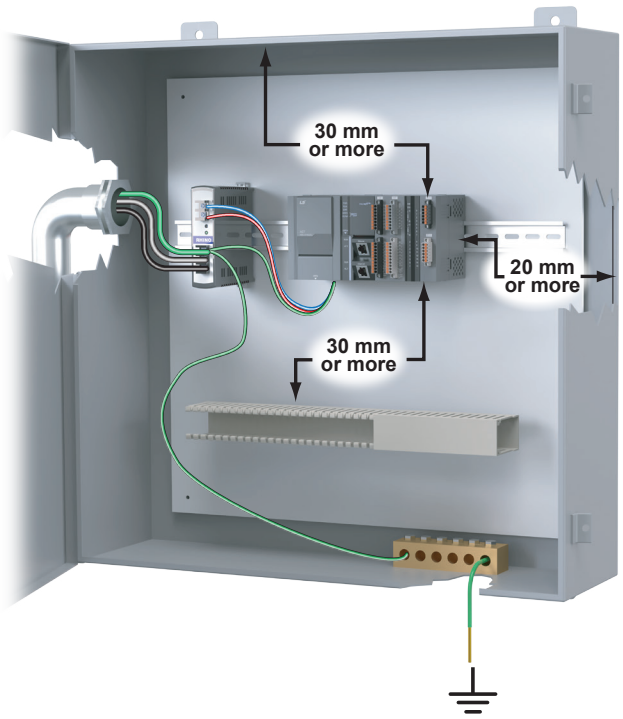
1: Example wiring for 5V open collector encoder

2: Example wiring for 5V line driver encoder

3: When connecting more than 2 servo drives, connect first servo's IN to the motion controller's OUT. For the other servos, connect previous servo's OUT to the next servo's IN. Continue for each servo - the final servo in the chain does not need anything connected to OUT.

Mounting the Motion Controller

When mounting the completed XMC controller to your structure, keep the distances shown in the diagram below to maintain proper ventilation and allow easy detachment and attachment.



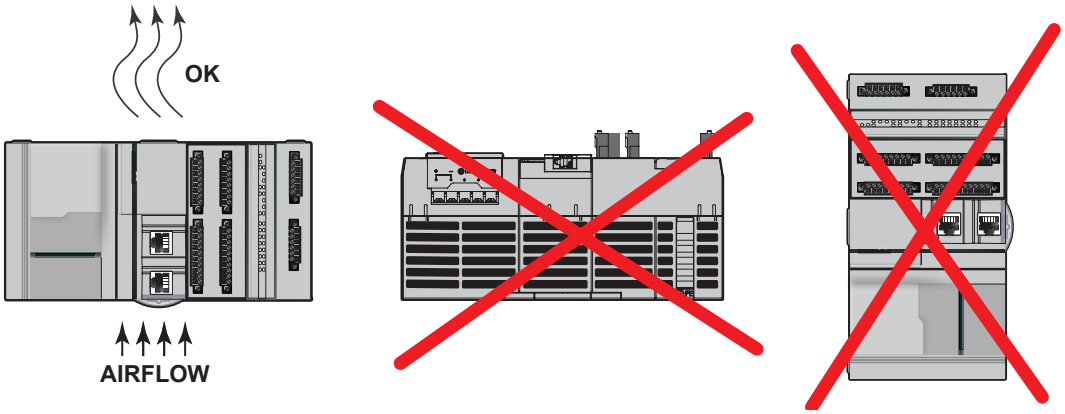
Additional Clearance Distances:

- Wire duct on the side requires 5mm or more
- Panel wall on the side requires 20mm or more
- Another device on the side requires 50mm or more
- Another device in front requires 100mm or more

DIN Rail Mounting

The motion controller has a hook for DIN rail mounting (35mm). To mount to DIN rail:

- Pull the hook as shown below at the bottom of module and install it at the DIN rail.
- Push the hook to fix the module to the rail after installing.



Motion Function Blocks

MC function blocks are compliant to the PLCopen standard.

Single-axis Command	
Single-axis Command	***Function***
MC_Power	Servo On/Off
MC_Home	Perform the homing procedure
MC_Stop	Stop motion and cancel ongoing commands
MC_Halt	Stop motion
MC_MoveAbsolute	Absolute positioning operation
MC_MoveRelative	Relative positioning operation
MC_MoveAdditive	Additive positioning operation
MC_MoveVelocity	Velocity operation
MC_SyncMoveVelocity	Cyclic Synchronous Velocity control
MC_MoveContinuousAbsolute	Absolute position operation ending with velocity operation
MC_MoveContinuousRelative	Relative position operation ending with velocity operation
MC_TorqueControl	Torque control
MC_ReadParameter	Read Parameter
MC_WriteParameter	Write Parameter
MC_Reset	Reset axis error
MC_TouchProbe	Touch probe and Position Registration
MC_AbortTrigger	Abort trigger events
MC_MoveSuperImposed	SuperImposed operation
MC_HaltSuperImposed	SuperImposed operation halt
MC_SetPosition	Setting the current position
MC_SetOverride	Velocity/Acceleration override

Axis Group Command	
Axis Group Command	***Function***
MC_AddAxisToGroup	Adds one axis to a group
MC_RemoveAxisFromGroup	Removes one axis from a group
MC_UngroupAllAxes	Removes all axes from the group
MC_GroupEnable	Changes the state for a group from GroupDisabled to GroupEnable
MC_GroupDisable	Changes the state for a group to GroupDisabled
MC_GroupPower	Servo ON/OFF for all axes in a group
MC_GroupHome	The AxesGroup to perform their homing procedure
MC_GroupSetPosition	Sets the Position of all axes in a group without moving
MC_GroupStop	Stop a Group immediately
MC_GroupHalt	Stop a Group
MC_GroupReset	Reset a group error
MC_MoveLinearAbsolute	Absolute positioning linear interpolation operation
MC_MoveLinearRelative	Relative positioning linear interpolation operation
MC_MoveCircularAbsolute	Absolute positioning circular interpolation operation
MC_MoveCircularRelative	Relative positioning circular interpolation operation
MC_SetKinTransform	Sets a kinematic transformation between the ACS and MCS
MC_SetCartesianTransform	Sets a Cartesian transformation between the MCS and PCS.
MC_MoveCircularAbsolute2D	Circular interpolation operation for absolute position of coordinate system
MC_MoveCircularRelative2D	Circular interpolation operation for relative position of coordinate system
MC_TrackConveyorBelt	Synchronization setting with a conveyor belt
MC_TrackRotaryTable	Synchronization setting with a rotary table

Multi-axis Command	
Multi-axis Command	***Function***
MC_CamIn	Activate master-slave coupling with CAM profile
MC_CamOut	Deactivate master-slave CAM coupling
MC_GearIn	Activate master-slave linear coupling (gearing)
MC_GearInEx	Activate master-slave gearing with larger value ratios
MC_GearOut	Deactivate master-slave linear coupling (gearing)
MC_GearInPos	Activates master-slave coupling with a specific positional relationship
MC_HomeAll	Perform homing operation for all axes
MC_Phasing	Provides a constant phase shift between master and slave axis
MC_PowerAll	Servo ON/OFF for all axes
MC_Reset2All	Reset all axes errors
MC_SetPositionAll	Set all axes current position
MC_StopAll	Stop motion for all axes

LS Custom Function Blocks	
LS Command	***Function***
LS_Connect	Connect EtherCAT network
LS_Disconnect	Disconnect EtherCAT network
LS_ReadSDO	Read slave SDO data
LS_WriteSDO	Write slave SDO data
LS_SaveSDO	Save slave SDO data
LS_EncoderPreset	Setting encoder current position
LS_Jog	JOG operation
LS_ReadCamData	Read CAM data
LS_WriteCamData	Write CAM data
LS_ReadEsc	Read ESC
LS_WriteEsc	Write ESC
LS_CamSkip	Skip CAM
LS_VarCamIn	Variable CAM operation
LS_VarGearIn	Variable gear operation
LS_VarGearInPos	Variable positioning gear operation
LS_ReadCAMtableSlavePos	Read the slave location of the CAM table
LS_InverterWriteVel	Write inverter speed
LS_InverterReadVel	Read inverter speed
LS_InverterControl	Write inverter control word
LS_InverterStatus1	Read inverter status 1
LS_InverterStatus2	Read inverter status 2
LS_SyncMoveVelocity	Speed control operation (csv mode)
LS_SetWorkSpaceTransform	Work space setting
LS_MoveLinearTimeAbsolute	Time- linear interpolation operation for absolute position of coordinate system
LS_MoveLinearTimeRelative	Time- linear interpolation operation for relative position of coordinate system
LS_RobotJOG	JOG operation of the coordinate system
LS_SetMovePath	Set path operation data
LS_ResetMovePath	Delete path operation data
LS_GetMovePath	Read path operation data
LS_RunMovePath	Perform path operation
LS_RotaryKnifeCamGen	Rotary knife cam profile generation
LS_CrossSealCamGen	Cross sealer cam profile generation

CNC Control Codes and Commands

G-code	
G-code	***Function***
G00	Rapid positioning control
G01	Linear interpolation feed control
G02	Clockwise circular / helical interpolation
G03	Counter clockwise circular / helical interpolation
G04	DWELL function
G09	Exact Stop
G17	Select the circular interpolation plane (XY plane)
G18	Select the circular interpolation plane (ZX plane)
G19	Select the circular interpolation plane (YZ plane)
G20	Inch input
G21	Metric input
G22	Stroke check function ON
G23	Stroke check function OFF
G27	Homing check
G28	Automatic homing
G29	Return at the auto-origin
G30	Automatic 2nd and 3rd homing
G31	Skip function
G40	Cancel compensation of tool diameter
G41	Compensate the tool diameter to the left
G42	Compensate the tool diameter to the right
G43	Compensate the tool length in the direction of +
G49	Cancel compensation of the tool length
G52	Set the local coordinate system
G53	Select the machine coordinate system
G54	Select the workpiece coordinate system 1
G55	Select the workpiece coordinate system 2
G56	Select the workpiece coordinate system 3
G57	Selecting the workpiece coordinate system 4
G58	Selecting the workpiece coordinate system 5
G59	Selecting the workpiece coordinate system 6
G60	Single direction positioning
G90	Absolute command
G91	Incremental command
G92	Set the workpiece coordinate system
G94	Feed mode command per minute
G95	Feed mode command per revolution
G107	Cylindrical interpolation mode setting
G112	Interpolation mode of the polar coordinate ON
G113	Interpolation mode of the polar coordinates OFF

Note: Please see section 9.3.2 of the XMC User Manual for a complete list of all available G-codes.

M-code	
M-code	***Function***
M00	Program stop
M01	Optional stop
M02	Program END
M03	Forward rotation of the main axis
M04	Reverse rotation of the main axis
M05	Main axis stop
M06	Tool change
M08	Coolant ON
M09	Coolant OFF
M30	End of the program
M98	Auxiliary program call
M99	End of the auxiliary program

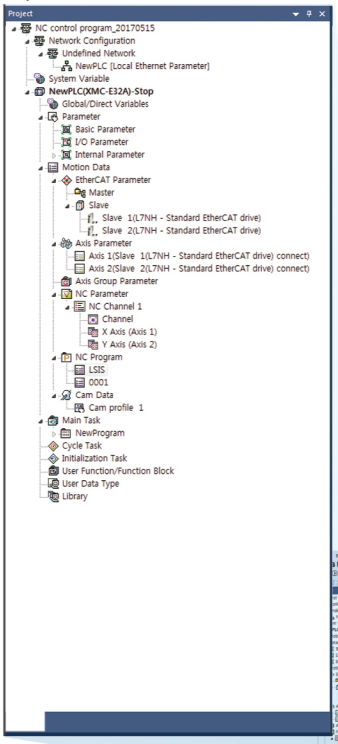
NC Command Function Blocks	
NC Command	***Function***
NC_LoadProgram	Specify NC program
NC_CycleStart	Start automatic operation
NC_BlockControl	Specify Block operation
NC_FeedHold	Feed Hold
NC_Emergency	Emergency stop
NC_Reset	reset
NC_RapidTraverseOverride	Rapid traverse override
NC_CuttingFeedOverride	Cutting feed override
NC_SpindleOverride	Spindle override
NC_Home	Homing
NC_McodeComplete	M Code operation completed
NC_ScodeComplete	S Code operation completed
NC_TcodeComplete	T Code operation completed
NC_ReadParameter	Read NC parameters
NC_WriteParameter	Write NC parameters

Note: See section 6.8 of the XMC User Manual for a complete list of all available NC Command Function Blocks.

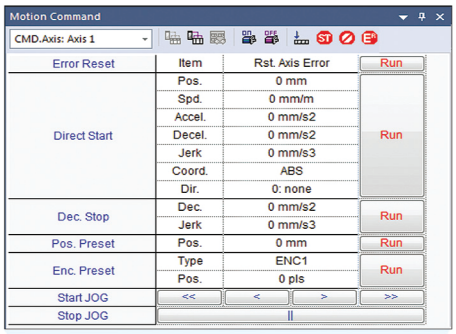
XG5000 PLC Programming and Motion Control

XG5000 is the only tool needed to deploy the XMC. It handles programming, motion control commands, manual commands, and status monitoring.

Project Tree

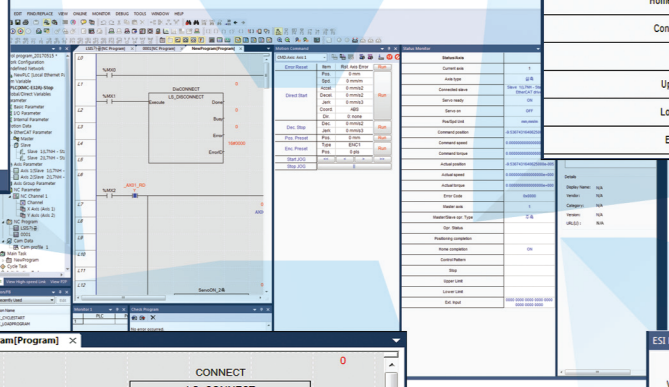


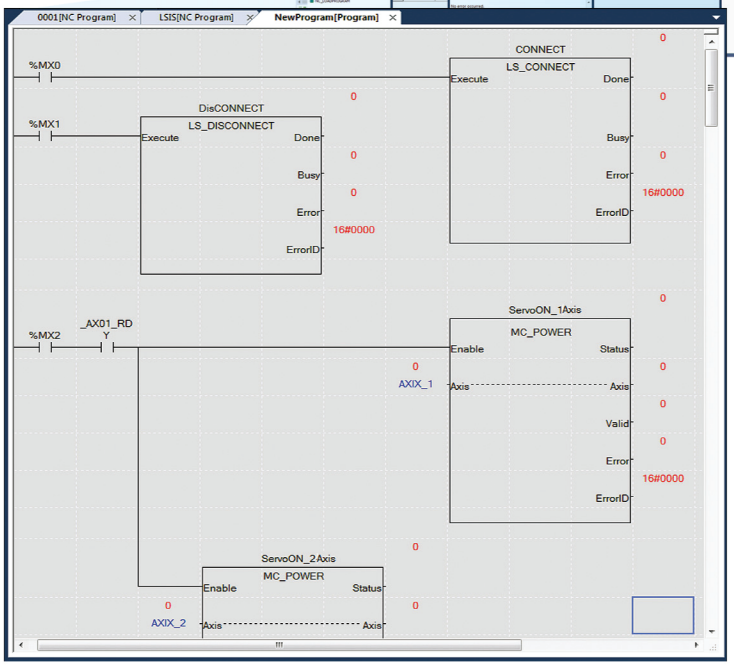
Motion Command



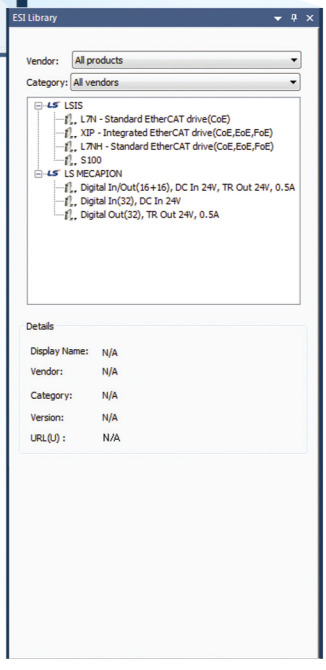
Status Monitor







Program Editor

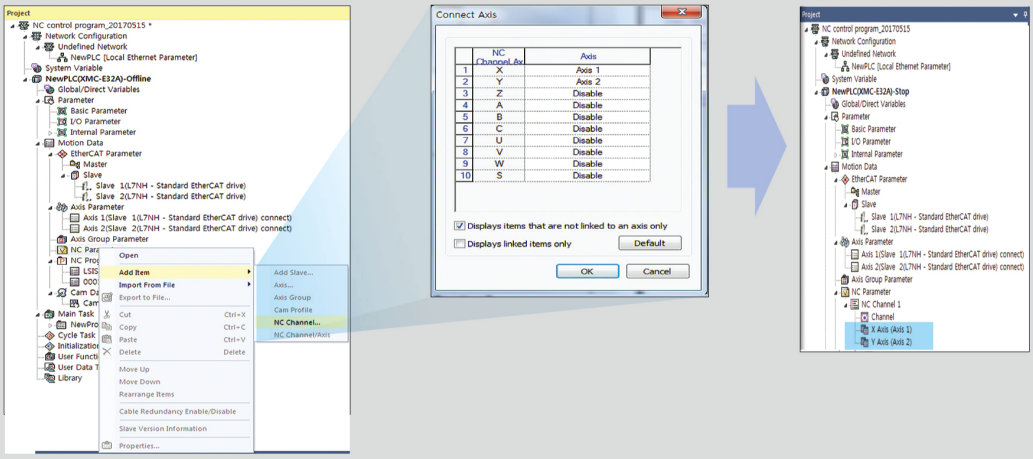


ESI Library

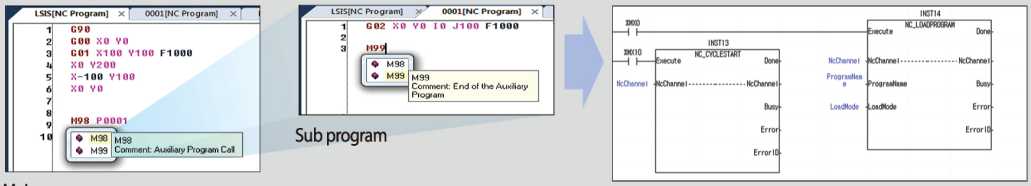
G-code Commands for Controlling CNC Equipment

Easily control CNC equipment such as packing and cutting machines with G-code commands.

Choose NC channel & axis



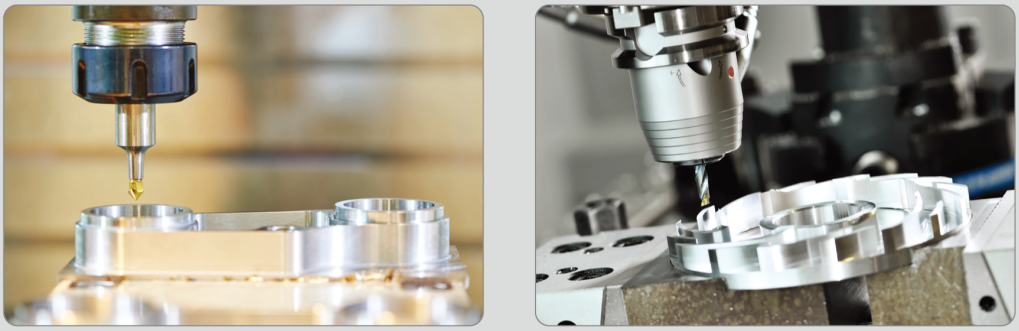
NC programming by G-code & M-code



Main program

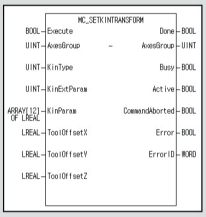
Sub program

NC program control by NC Function Block (NC_ LOADPROGRAM, NC_CYCLESTART)

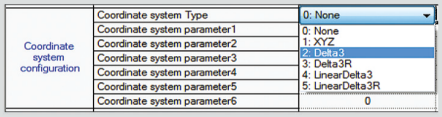


Innovative Control Function for Robot Control

Control various types of robots using group motion in coordinate systems such as Cartesian, Delta3, Delta3R, and Linear Delta.

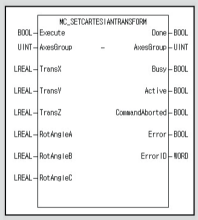


or

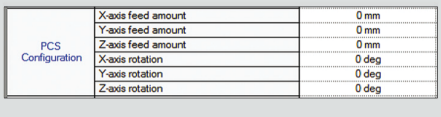


Coordinate system and tool setting via MC_SETKINTRANSFORM (Set in axis group parameter)

XYZ/Delta3/Delta3R/Linear Delta

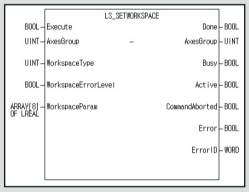


or

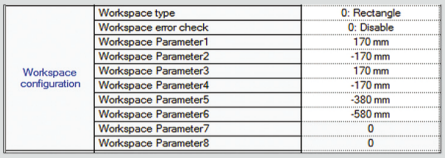


PCS setting via MC_SETCARTESIANTRANSFORM (Set in axis group parameter)

Indicate the position of the machine by moving or rotating based on the product coordinate system



or

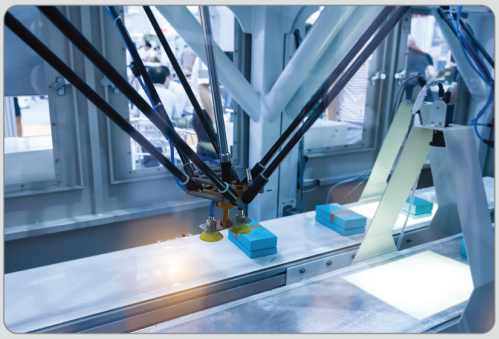


Work space setting via MC_SETWORKSPACE (Set in axis group parameter)

Safe workspace setting to prevent safety accidents

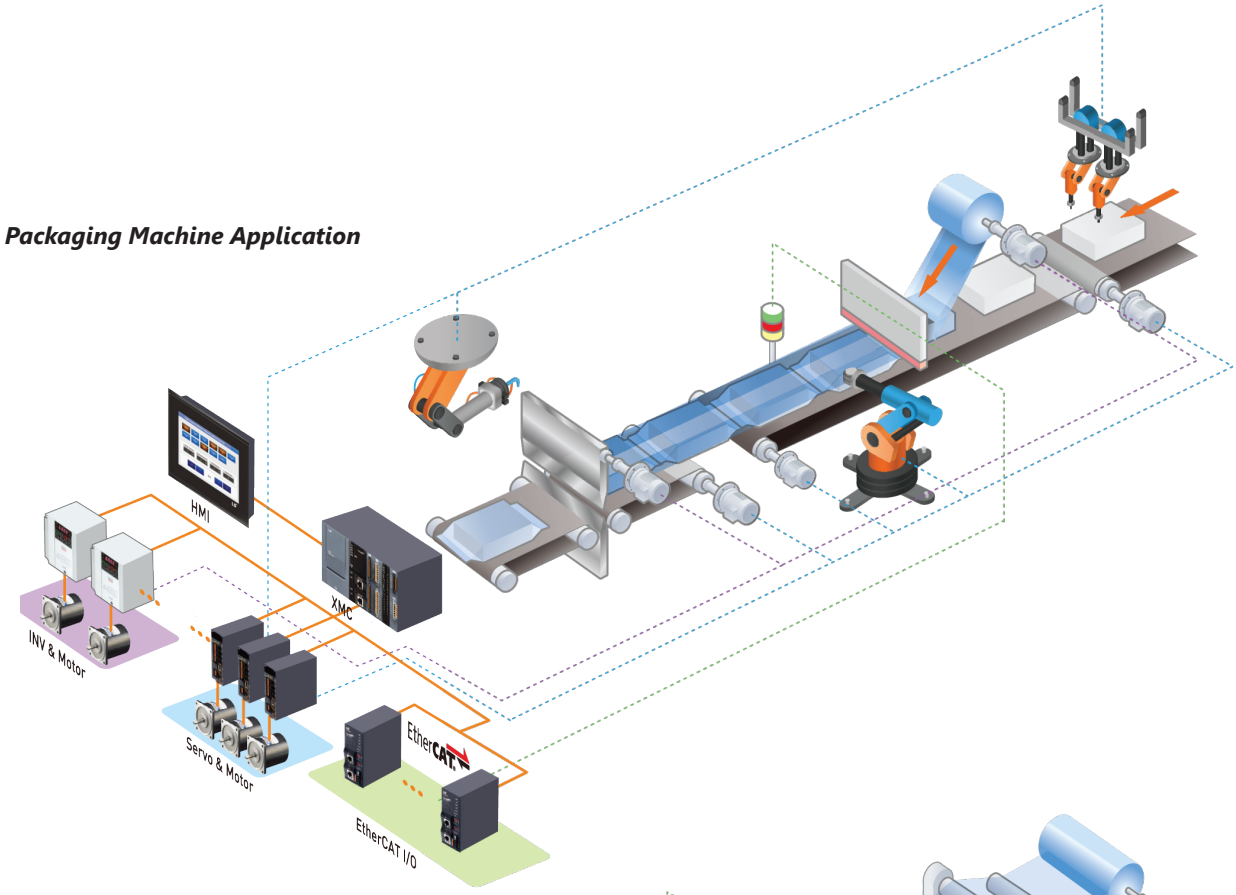
Starting operation by coordinate system dedicated command such as MC_MOVECIRCULARABSOLUTE2D, LS_MOVELINEARTIMEABSOLUTE, etc.



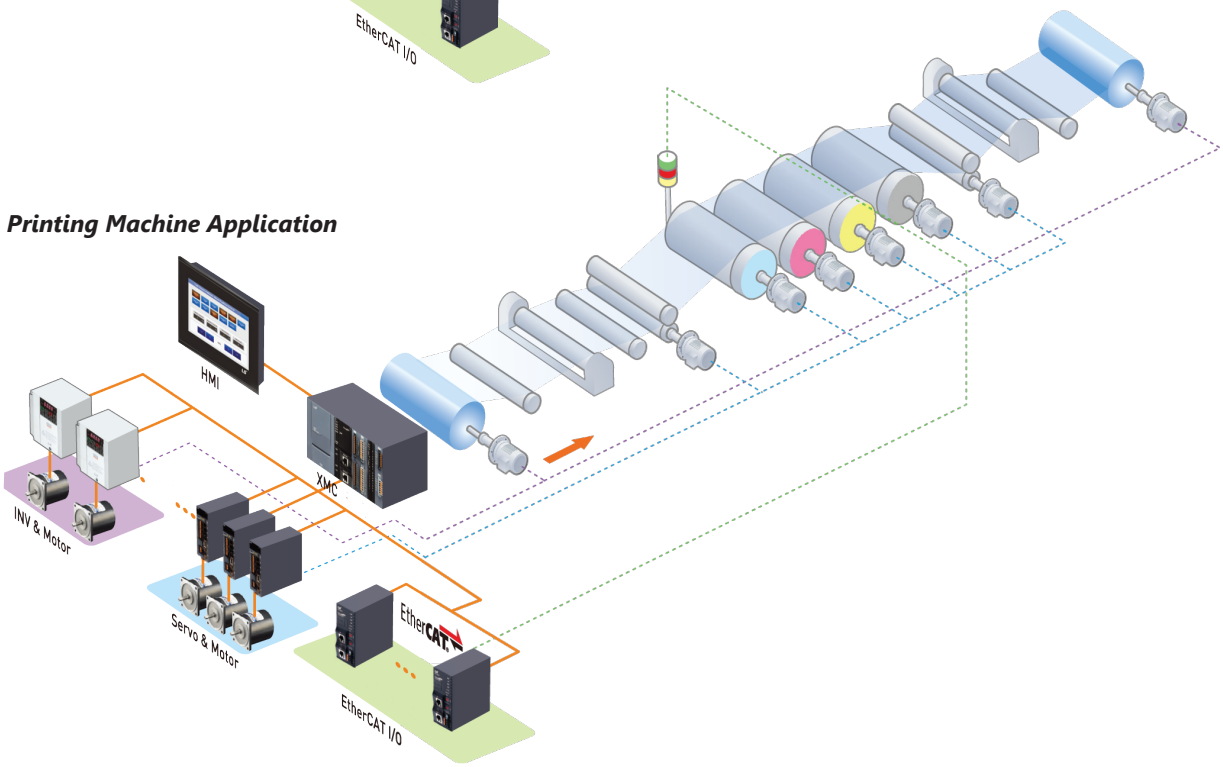


Example Motion Applications

Packaging Machine Application



Printing Machine Application



XMC Motion Controller Replacement Terminals

Part Number	Price	Function	Description	Compatible With
XMC-CON-6P	$9.00	LS XMC Motion Controller I/O Connector, 6 Pole	LS Electric XMC terminal block, 6-pin spring clamp, replacement. For use with LS Electric XMC series programmable motion controllers.	XMC-E08A XMC-E08A-DC XMC-E16A XMC-E16A-DC
XMC-CON-8P	$10.00	LS XMC Motion Controller I/O Connector, 8 Pole	LS Electric XMC terminal block, 8-pin spring clamp, replacement. For use with LS Electric XMC series programmable motion controllers.	
XMC-CON-10P	$14.00	LS XMC Motion Controller I/O Connector, 10 Pole	LS Electric XMC terminal block, 10-pin spring clamp, replacement. For use with LS Electric XMC series programmable motion controllers.	



XMC-CON-6P



XMC-CON-8P



XMC-CON-10P