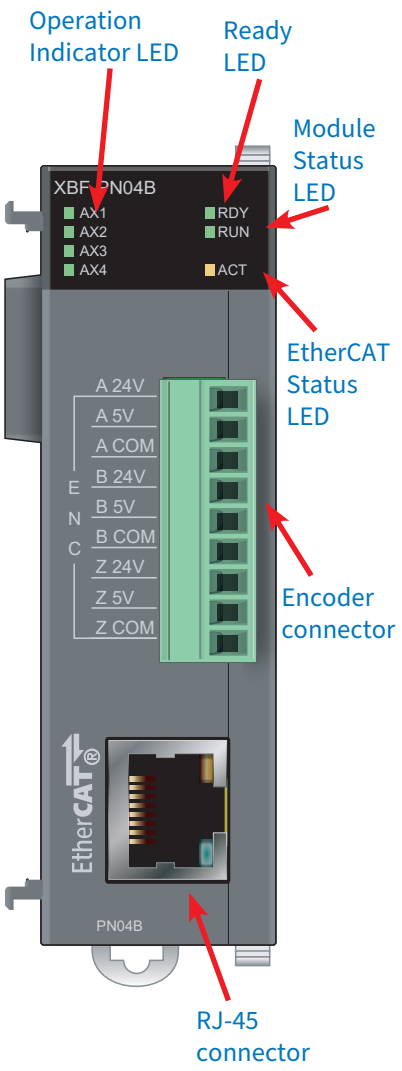
XBF-PN04B / XBF-PN08B
EtherCAT® Multi-Axis Positioning Module

EtherCAT®

Part Number	Price	Classification	Description	# of Axes	Drawing
XBF-PN04B	$350.00	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	$395.00		LS Electric XGB 8-axis positioning module, EtherCAT Master, 1 high-speed input point(s), sinking/line driver (differential), 1-channel, differential and single-ended encoder input(s), (1) Ethernet 100Base-TX (RJ45) port(s). For use with LS Electric XEM-DxxxHx PLCs.	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)

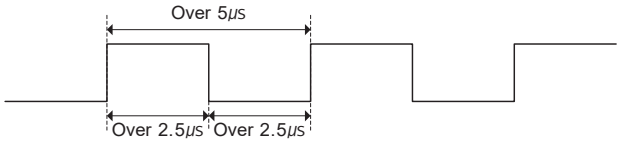
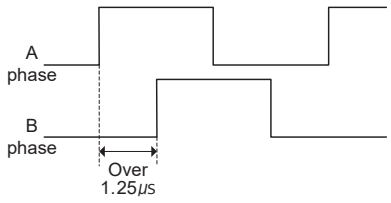
NOTE: EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

XBF-PN0xB Multi-axis Positioning Module, continued

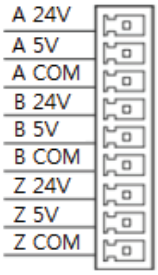
General Specifications		XBF-PN04B	XBF-PN08B
External Encoder Input	Channel	1 channel	
	Maximum Input	200kpps	
	Input Form	Line drive input (RS-422A IEC specification), open collector output type encoder	
	Input Type	CW/CCW, Pulse/Dir, Phase A/B	
	Connection Connector	9-point connector	
External Command 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.

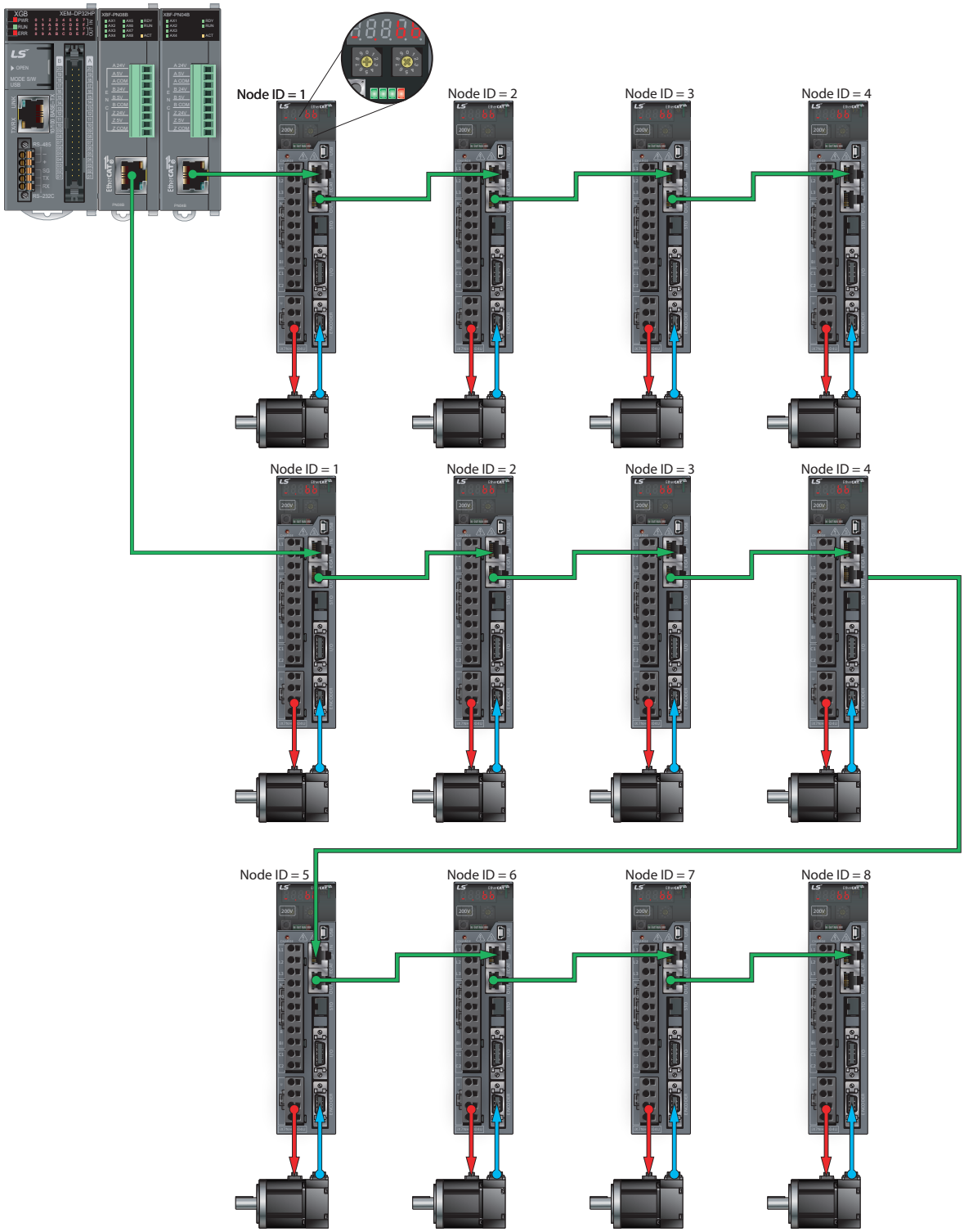
Symbolic variables and direct variables for XBF-PN04B/08B are as follows (z refers to module slot number (2 or 3)).

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

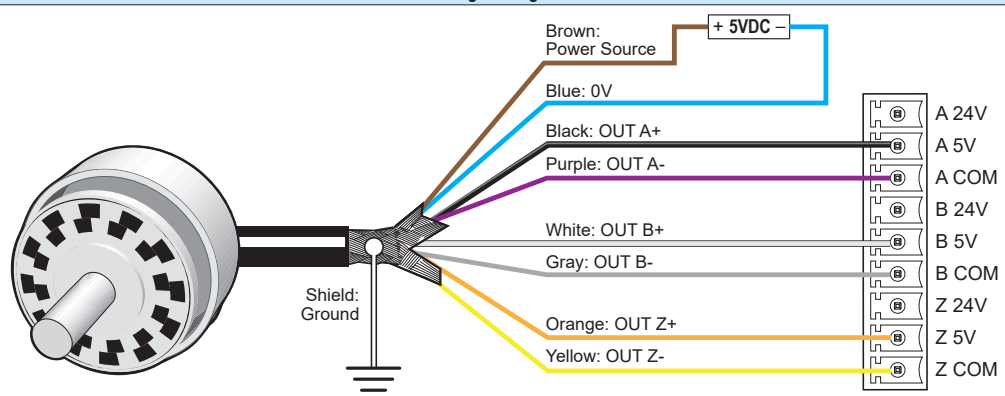
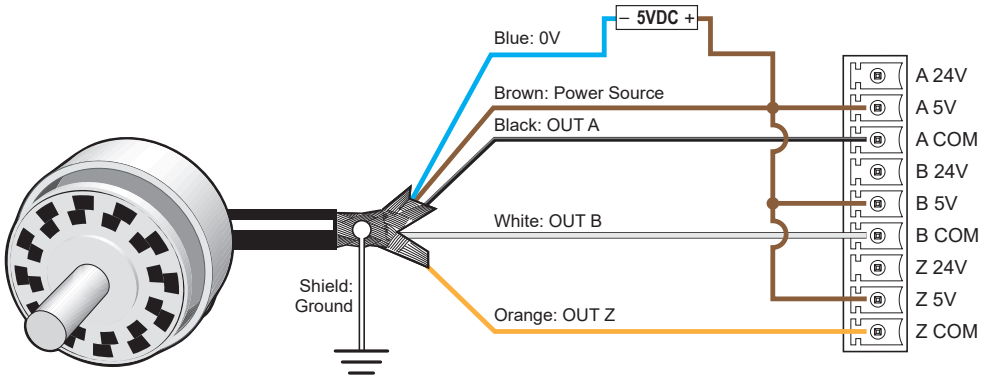
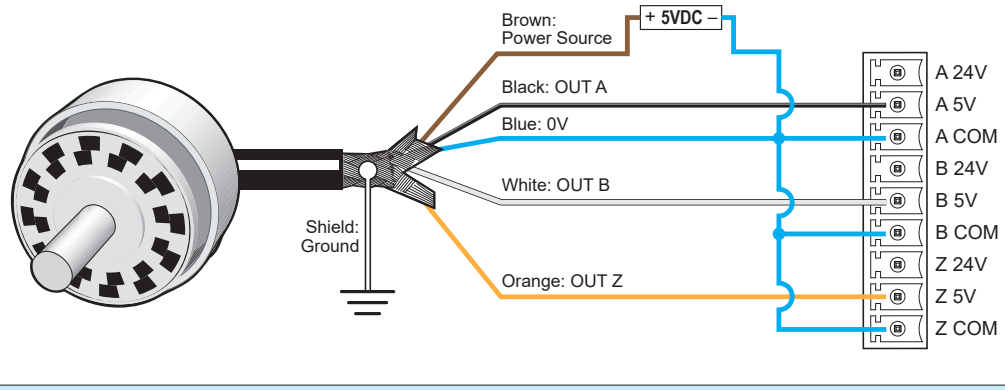
LS Electric iX7NH EtherCAT drives can be found HERE.

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.