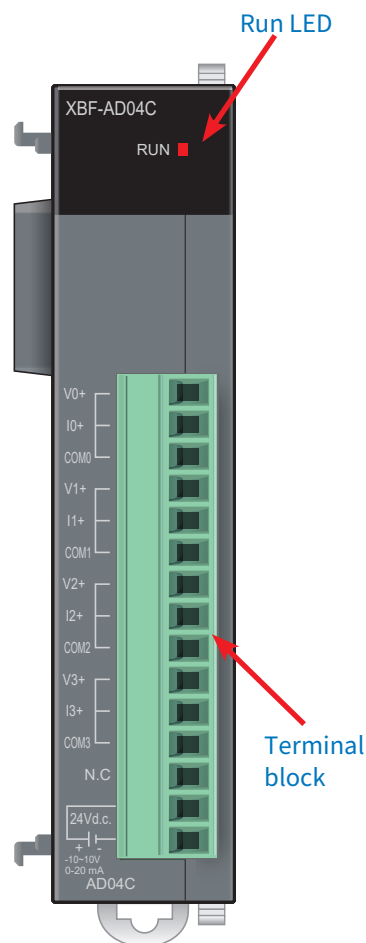# LS ELECTRIC

# XGB Analog Modules

## XBF-AD04C Analog Input Module

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

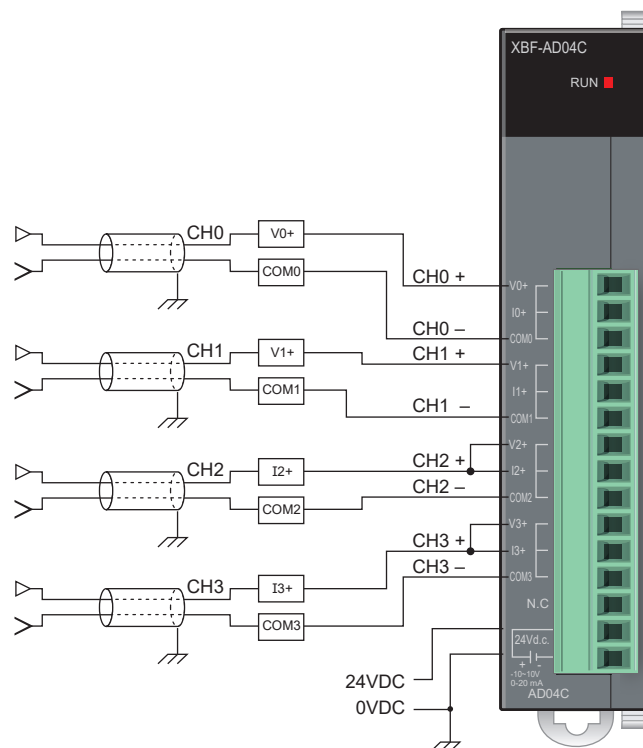| Part Number | Price | Classification | Description | # of Channels | Drawing |
|---|---|---|---|---|---|
| **XBF-AD04C** | $231.00 | Voltage/current Input | LS Electric XGB analog input module, 4-channel, current/voltage, 14-bit, input current signal range(s) of 0-20 mA, 4-20 mA, input voltage signal range(s) of 0-5 VDC, 1-5 VDC, 0-10 VDC, +/- 10 VDC, external 24 VDC required. | 4 | PDF |

Run LED

Terminal block

| General Specifications | | | XBF-AD04C | |
|---|---|---|---|---|
| | | | **Voltage** | **Current** |
| **Analog Input Range** | | | 1–5 VDC<br>0–5 VDC<br>0–10 VDC<br>±10 VDC<br>(Input resistance: 1MΩ min.) | 4–20 mA DC<br>0–20 mA DC<br>(Input resistance: 250Ω) |
| **Digital Output** | **Range** | Type | 16 bit binary data (Data: 14Bit) | |
| | | Unsigned Value | 0–16,000 | |
| | | Signed Value | ±8,000 | |
| | | Precise Value | 1,000–5,000 (1–5 V)<br>0–5,000 (0–5 V)<br>0–10,000 (0–10 V)<br>±10,000 (±10V) | 4,000–20,000 (4–20 mA)<br>0–20,000 (0–20 mA) |
| | | Percentile Value | 0–10,000 | |
| **Maximum Resolution** | | | 1/16,000 | |
| | | | 0.250 mV (1–5 V)<br>0.3125 mV (0–5 V)<br>0.625 mV (0–10 V)<br>1.250 mV (±10V) | 1.0 µA (4–20 mA)<br>1.25 µA (0–20 mA) |
| **Accuracy** | | | ±0.2% (when ambient temperature 25℃ ± 5℃)<br>±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<br>(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 | |

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# XGB Analog Modules

## 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

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# XGB Analog Modules

## 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 |

## 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 | $5 \leq f < 8.4$ Hz | 3.5 mm pulse width | IEC61131-3-2 |
| | | | $8.4 \leq f < 150$Hz | $9.8$ m/s$^2$ (1G) | |
| | Continuous Vibration | | $5 \leq f < 8.4$ Hz | 1.75 mm pulse width | |
| | | | $8.4 \leq f < 150$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<br>900VDC | LS Electric standard |
| | Electrostatic Discharge | | | Voltage: 4kV (contact discharge) | IEC61131-3-2<br>IEC61000-4-2 |
| | Radiated Electromagnetic Field Noise | | | 80–1,000 MHz, 10 V/m | IEC61131-3-2<br>IEC61000-4-3 |
| | Fast Transient / Burst Noise | Classification | | Voltage | IEC61131-3-2<br>IEC61000-4-4 |
| | | Power Supply | | 2kV | |
| | | Digital/Analog Input/Output Communication Interface | | 1kV | |
| Environment | | | | Free from corrosive gases and excessive dust | – |
| Attitude | | | | Less than 2,000m | |
| Pollution Degree | | | | Less than 2 (see note 2) | |
| Cooling Method | | | | Air-cooling | |

1 - Vibration of 10 times each direction (X, Y, and Z)
2 - Normally only nonconductive pollution occurs. Temporary conductivity caused by condensation is to be expected.

# XGB Series PLC Family

## Available I/O Modules

| Part Number | Price | Description | Digital Input | Digital Output | Analog Input | Analog Output | Motion | Smart Link Cable and Terminal Required |
|---|---|---|:---:|:---:|:---:|:---:|:---:|:---:|
| **Digital** | | | | | | | | |
| XBE-DC16A | $70.00 | LS Electric XGB discrete input module, 16-point, 24 VDC, sinking/sourcing, 1 common(s), 16 point(s) per common. Removable terminal blocks included. | ✓ | | | | | |
| XBE-DC16B | $78.00 | LS Electric XGB discrete input module, 16-point, 12-24 VDC, sinking/sourcing, 1 common(s), 16 point(s) per common. Removable terminal blocks included. | ✓ | | | | | |
| XBE-DC32A | $97.00 | LS Electric XGB discrete input module, 32-point, 24 VDC, sinking/sourcing, 1 common(s), 32 point(s) per common. Requires XTB-40H terminal block and C40HH-xxSB-XBI cable. | ✓ | | | | | ✓ |
| XBE-AC08A | $88.00 | LS Electric XGB discrete input module, 8-point, 120 VAC, 2 common(s), 4 point(s) per common. Removable terminal blocks included. | ✓ | | | | | |
| XBE-RY08B | $95.00 | LS Electric XGB relay output module, 8-point, 125 VDC/250 VAC, (8) Form A, 8 isolated common(s), 1 point(s) per common, 2A/point. Removable terminal blocks included. | | ✓ | | | | |
| XBE-RY16A | $110.00 | LS Electric XGB relay output module, 16-point, 125 VDC/250 VAC, (16) Form A, 2 isolated common(s), 8 point(s) per common, 2A/point, 5A/common. Removable terminal blocks included. | | ✓ | | | | |
| XBE-TN16A | $78.00 | LS Electric XGB discrete output module, 16-point, 12-24 VDC, sinking, 1 common(s), 16 point(s) per common, 0.5A/point, 2A/common. Removable terminal blocks included. | | ✓ | | | | |
| XBE-TN32A | $109.00 | LS Electric XGB discrete output module, 32-point, 12-24 VDC, sinking, 1 common(s), 32 point(s) per common, 0.2A/point, 2A/common. Requires XTB-40H terminal block and C40HH-xxSB-XBI cable. | | ✓ | | | | ✓ |
| XBE-TP16A | $88.00 | LS Electric XGB discrete output module, 16-point, 12-24 VDC, sourcing, 1 common(s), 16 point(s) per common, 0.5A/point, 2A/common. Removable terminal blocks included. | | ✓ | | | | |
| XBE-TP32A | $93.00 | LS Electric XGB discrete output module, 32-point, 12-24 VDC, sourcing, 1 common(s), 32 point(s) per common, 0.2A/point, 2A/common. Requires XTB-40H terminal block and C40HH-xxSB-XBI cable. | | ✓ | | | | ✓ |
| XBE-DN32A | $172.00 | LS Electric XGB discrete combo module, Input: 16-point, 24 VDC, sinking/sourcing, Output: 16-point, 12-24 VDC, sinking, 0.2A/point, 2A/common. Requires XTB-40H terminal block and C40HH-xxSB-XBI cable. | ✓ | ✓ | | | | ✓ |
| **Analog** | | | | | | | | |
| XBF-AD04A | $160.00 | 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 | $242.00 | 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 | $231.00 | 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 | $152.00 | 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 | $209.00 | 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 | $162.00 | 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 | $209.00 | 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 | $216.00 | 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. | | | ✓ | ✓ | | |
| **Motion** | | | | | | | | |
| XBF-PN04B | $350.00 | LS Electric XGB 4-axis positioning module, EtherCAT protocol, 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-Dx32Hx PLCs. | | | | | ✓ | |
| XBF-PN08B | $395.00 | LS Electric XGB 8-axis positioning module, EtherCAT protocol, 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-Dx32Hx PLCs. | | | | | ✓ | |
| XBF-HO02A | $176.00 | LS Electric XGB counter input module, 200 kHz maximum switching frequency, 2 high-speed input point(s), 5-24 VDC, sinking, 2-channel, single-ended encoder input(s), 2 high-speed output point(s), 5-24 VDC, sinking, external 24 VDC required. | | | | | ✓ | ✓ |
| XBF-HD02A | $253.00 | LS Electric XGB counter input module, 500 kHz maximum switching frequency, 2 high-speed input point(s), 5-24 VDC, sinking, 2-channel, differential encoder input(s), 2 high-speed output point(s), 5-24 VDC, sinking, external 24 VDC required. | | | | | ✓ | ✓ |
| **Communication** | | | | | | | | |
| XBL-EIPT | $199.00 | 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. | | | | | | |

**Note:** See "Smart Link I/O System" on page tLSE-83 for the XTB-40H terminal block and cables. See "XGB PLC Replacement Terminals" on page tLSE-82 for replacement removable terminal blocks.