



# LX3V-4ADV-BD

## User manual



Website: <http://www.we-con.com.cn/en>

Technical Support: [support@we-con.com.cn](mailto:support@we-con.com.cn)

Skype: fcwkkj

Phone: 86-591-87868869

QQ: 1043098682

Technical forum: <http://wecon.freeforums.net/>



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# 1. Installation Instructions

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Before installation, it is necessary to ensure that the associated equipment of the PLC host and the terminal of the BD module are reliably powered off.

This module comes with two standard terminals; please plug the terminals into the module terminals after wiring. Confirm the installation of host, module and wiring are correct and then power on.

## Caution:

- 1) When using the voltage output, ensure the external load resistance is no less than  $2K\Omega$ . If the external load resistance is less than  $2K\Omega$ , the output voltage will be lower than the normal value;
- 2) The input must not exceed the absolute maximum ( $-15V/+15V$ ) or cause the module to be damaged;
- 3) The fastening torque is  $0.3-0.6N.m$ . Firmly screw down to prevent malfunctions;
- 4) The PLC main unit of the LX3V can only use one BD module. Don't try to use two or more BD modules (these BD modules will not work);
- 5) When mounting module to PLC, all the lights are blinking after power ON PLC, it means this PLC can't support it, please purchase new PLC.

## Warnings:

Cut off the electricity before installation/disassembly of the unit or connection of wires onto the unit, to prevent electric shock or product damage.

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# 2. Features of LX3V-4ADV-BD

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- 1) It could use LX3V-4ADV-BD to add 4 analog input points. It is internally installed in the top of PLC, thus it is not necessary to change the PLC's installation area.
- 2) The digital analog conversion of the LX3V-4ADV-BD module is the voltage inputs ( $-10V\sim 10V$ ), and the data of all the channels after conversion are stored inside a special digital memory, but the converted characteristics of the analog data cannot be adjusted. The allocation of the relevant channel addresses is in the following table.

Table 2- 1

Address	Instructions		Address	Instructions
M8112	CH1:flag of the input mode OFF: Voltage input mode	ON: Disabled	D8112	Digital value of CH1
M8113	CH2: flag of the input mode OFF: Voltage input mode		D8113	Digital value of CH2
M8114	CH3: Flag of the input mode OFF: Voltage input mode		D8114	Digital value of CH3
M8115	CH4: flag of the input mode OFF: Voltage input mode		D8115	Digital value of CH4

### 3. Dimension

Table 3- 1

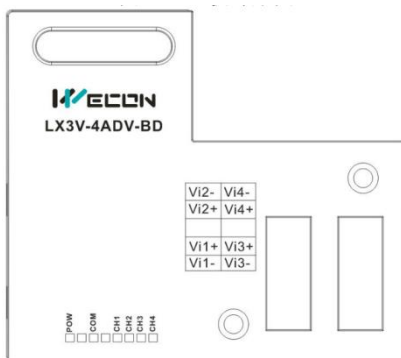


Figure 3- 1

IN-2ADV Part Input voltage ranges: -10V~10V			
VI1+	The anode of CH1 voltage input	VI3+	The anode of the CH3 voltage input
VI1-	The cathode of CH1 voltage input	VI3-	The cathode of the CH3 voltage input
▪	Disconnect	▪	Disconnect
VI2+	The anode of CH2 voltage input	VI4+	The anode of the CH4 voltage input
VI2-	The cathode of CH2 voltage input	VI4-	The cathode of the CH4 voltage input

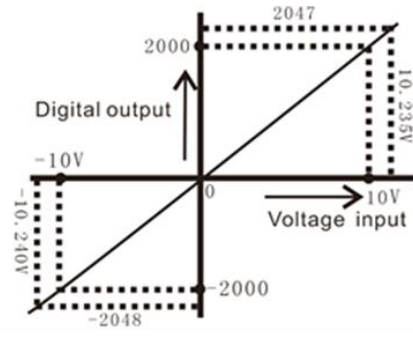
#### LED lights indicating:

- POW LED: Constantly ON when PLC power ON;
- COM LED: Lit when communicating PLC, OFF when timeout;
- CH1 LED: LED for CH1, constantly ON when analog signal in range, lit when analog signal out of range (-10V~10V). OFF when M8112 turns ON.
- CH2 LED: LED for CH2, constantly ON when analog signal in range, lit when analog signal out of range (-10V~10V). OFF when M8113 turns ON.
- CH3 LED: LED for CH3, constantly ON when analog signal in range, lit when analog signal out of range (-10V~10V). OFF when M8114 turns ON.
- CH4 LED: LED for CH4, constantly ON when analog signal in range, lit when analog signal out of range (-10V~10V). OFF when M8115 turns ON.

## 4. Specifications

- 1) **General specification:** The same as the PLC main unit. (Please refer to the attached instructions supplied with the main unit of the PLC.)
- 2) **Power specification:** Powered from inside of the programmable controller.
- 3) **Performance specifications**

Table 4- 1

Item	Specification
<b>Power supply</b>	5VDC $\pm$ 10%, 70mA (Powered by PLC host)
<b>Analog input (ADV)</b>	
<b>Analog input range</b>	DC-10V~10V (input resistance 160K $\Omega$ ). Note: If the input voltage exceeds $\pm$ 15V, the unit will be damaged.
<b>Rated range</b>	-10V~10V: -2000~2000
<b>The maximum display range</b>	-2048~2048
<b>Resolution</b>	5mV[10V default scope 1/2000]
<b>Precision</b>	$\pm$ 0.5% of full scale
<b>AD conversion time</b>	One PLC scanning cycle
<b>Input characteristics</b>	
<b>Insulation</b>	No insulation in each PLC channel
<b>Occupied points</b>	None

## 5. Wire Connection

### Warning:

Make sure cut off the electricity before installation/disassembly, to prevent electric shock or product damages.

**Caution:**

- 1) Please keep the signal cable from the high-voltage cable at least 100mm.
- 2) The shielding wire cable shall be grounded. But their grounding point can be the same with high-voltage lines.
- 3) Never connect cable with forbidden size.
- 4) Fix the cable, so that the stress does not act on the terminal board or the cable connection area.
- 5) The screwing torque of the terminal is from 0.5 to 0.6N.m. Fasten tight to prevent malfunction.
- 6) Keep the redundant terminals empty.

## 5.1 Applicable Cables

Use AWG25-16 to connect the output equipment

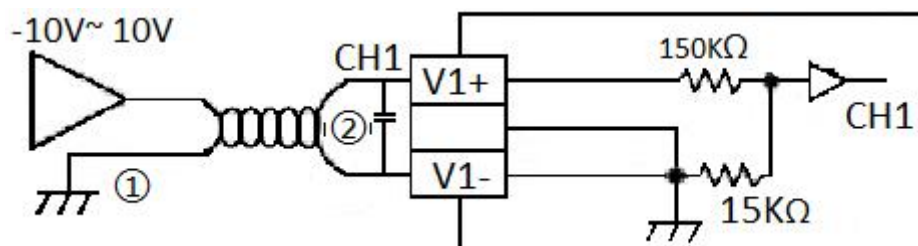
The maximal screwing torque is from 0.5 to 0.6N.m

The use of different types of cables might cause poor contact between the terminals. It is better to use pressed terminals.

Table 5- 1

Line type	Cross sectional area(mm <sup>2</sup> )	End-of-pipe treatment	
AWG26	0.1288	Stranded cable: stripped jacket, rub Conductor, then connect the cable.	
AWG16	1.309	Single-core cable: stripped jacket, Then connect the cable.	

## 5.2 Voltage Input Mode



- 1) It is necessary to use shielded cable to transfer analog input. The cable shall be far away from the power line or other electrical wires that might cause electrical disturbance.
- 2) If there is voltage ripple in the input or electrical disturbance outside, then a smoothing capacitor can be added. (0.1uF~0.47uF, 25V)

## 6. Program Examples

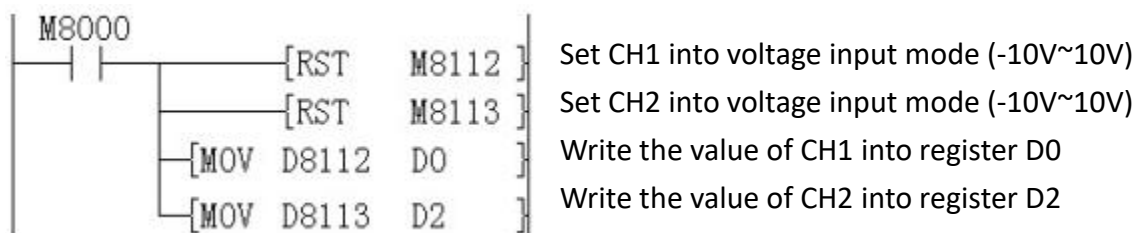
The input analog of all channels (-10V~10V) is stored inside the data memory (D8112, D8113) in the form of data. Values will be automatically stored when the “END” order is sent out. The value is calculated by the designated analog data conversion characteristics of the special auxiliary relays M8112 and M8113.

### 6.1 Basic Program Examples

**Caution:**

- 1) Start M8112 and M8113; designate the analog data conversion characteristics of CH1 and CH2.
- 2) After execution of analog data conversion, do not change the values of D8112 or D8113 through operator program, programming tools or graphic operating terminal.

The following program can set CH1 and CH2 into voltage input mode. After ADV conversion, values of all channels are stored into D0 and D2.



- ★ If the digital value is not stored in D0 or D2, D8112 and D8113, D8114 and D8115 can be used directly for both the set point and other instructions.  
For example timer \ counter.

### 6.2 Examples of Applications

Since the LX3V-4ADV-BD does not have offset and gain functions, if it needs for the values out of the standard specifications, additional programming orders will be needed to multiply or divide the converted value.

**Caution:**

- Since the use of additional programming orders, the converted precision and resolution of the analog value are different with the specifications.



PLC switch is turned to STOP, the bit will be cleared and the state will be switched accordingly.

(3) The PLC version numbers supporting extended functions are shown in the table below:

New BD-board support extended function		New PLC support extended function	
BD-board	Version and above	PLC	Version and above
2ADI2DAI	200	LX2V	24007
2ADV2DAV	200	LX2E	25015
4ADI	200	LX3VA1	22008
4ADV	200	LX3V	25016
2PT2DAI	200	LX3VP	25106
2PT2DAV	200	LX3VE	25205
2PT2ADV	200	LX3VM	25302
2TC2DAI	200		
2PTS	200		

## 7.1 Basic programming example

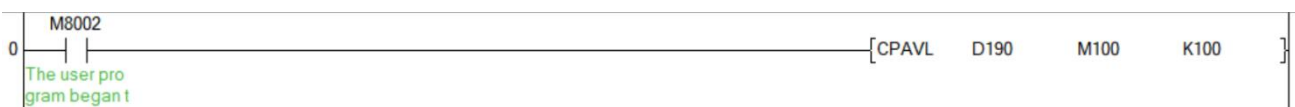
The BD module expansion function is a new function based on the original BD module. It can map the model, version number and other information of the BD module to the corresponding device through the CPAVL command. By checking the address of this device, you can get BD module model, version number and other information.

The specific compatibility is shown in the table below:

	New PLC	Old PLC
New BD-board	Using new functions and mappings	Using old functions and mappings
Old BD-board	Using old functions and mappings	Using old functions and mappings

## 7.2 Application Cases

The mapping ladder used is as follows:



Corresponding address description:

Device	4ADV	Device	4ADV
D190~D199	Reserve	D215~D226	Reserve
D200	Model	D227	Channel 1 gain value



D201	Version	D228	Channel 2 gain value
D202	Reserve	D229	Channel 3 gain value
D203	Channel 1 status code	D230	Channel 4 gain value
D204	Channel 2 status code	D231	Channel 1 offset value
D205	Channel 3 status code	D232	Channel 2 offset value
D206	Channel 4 status code	D233	Channel 3 offset value
D207	Reserve	D234	Channel 4 offset value
D208	Reserve	-----	-----
D209	Reserve	M100	Channel 1 Gain offset enable switch(0: off 1: on)
D210	Reserve	M101	Channel 2 Gain offset enable switch(0: off 1: on)
D211	Channel 1 digital value	M102	Channel 3 Gain offset enable switch(0: off 1: on)
D212	Channel 2 digital value	M103	Channel 4 Gain offset enable switch(0: off 1: on)
D213	Channel 3 digital value	-----	-----
D214	Channel 4 digital value	-----	-----

Corresponding channel status code:

Status code	Explanation
BIT0 = 1	Error status mark location: When there is an error, the location is one
BIT1 = 1	Reserve
BIT2 = 1	Sampling value out of range flag
BIT3 = 1	Reserve
BIT4 = 1	Gain offset setting error flag (ADI/DAI/ADV/DAV only)
BIT5 = 1	Reserve
BIT6 = 1	Uncalibrated error flag (BD module has not been calibrated)
BIT7 = 1	Gain offset setting effective flag bit

Gain and offset values (ADI/ADV/DAI/DAV only have this function)

The configuration is correct: the gain must be greater than the offset and the gain is not equal to 0.

Configuration error: The status code will prompt an error, and the configuration will not take effect

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(the calculation will be replaced with the default value, but the setting value will not be changed).

PS: Default value of ADV, DAV Gain: 5000 Offset: 0 Constant: 1000

Default value of ADI, DAI Gain: 20000 Offset: 4000 Constant: 2000

Calculation formula of gain: display value = (input value - offset value) \* constant / (gain value - offset value)