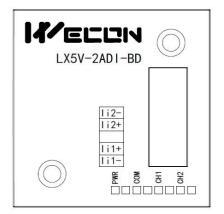


LX5V-2ADI-BD BD Module Manual

1 Installation

- Before installation, it must be ensured that the PLC host and the related device of the BD module terminal wiring are powered off reliably. The shell is inserted into the BD module slot of PLC host, and then locked with two standard screws for fixation.
- Two standard terminal heads are equipped with this BD module. After connecting the wiring, insert them into its terminal. After confirming that the host, BD module, wiring, etc. are installed correctly, it can be powered on for use.
- Note:
 - The ADV input cannot exceed the absolute maximum (-15V/+15V), otherwise the BD module will be damaged.
 - Please install the BD module firmly and fix it on PLC. Poor contact may lead to failure.
 - Tightening torque for fixing BD module or PLC top cover is 0.3N.m to0.6N.m. Please tighten it firmly to avoid malfunction.
- Warning: Cut off the power before installing, removing or wiring the BD module to avoid electric shock or product damage.

2 Appearance and terminal



Input current range: 4mA to 20mA						
li2-	Channel 2 current input negative					
II2 +	Channel 2 current input positive					
	NC					
li1+	Channel 1 current input positive					
li2-	Channel 1 current input negative					

Table1 Terminal distribution

Table2 LED lamp function description

Indicator Iamp	Description
PWR	ON when power-on (when the program is running, it will be ON).
СОМ	It flashes when communicating with PLC normally, and it is OFF when timeout.
CH1	Channel 1 lamp: Always on in range; Flashing outside the range of (4mA to 20mA); Off when the channel is closed.
CH2	Channel 2 lamp: Always on in range; Flashing outside the range of (4mA to 20mA); Off when the channel is closed.



3 Specification

(1) General specification: Same as PLC main unit. (Please refer to the accompanying manual of the PLC main unit.)

- (2) Power supply specification: The power supply is provided internally by PLC.
- (3) Performance specifications:

Ducient	Specification					
Project	Current input					
Analog input range	DC 4mA to 20mA (input resistor 250 Ω) , absolute maximum input: -2mA, +60mA					
Digital output	12-bit binary					
Resolution	8uA (4mA to 20mA/2000)					
Comprehensive precision	±0.5% of full scale (4mA to 20mA: ±0.16 mA)					
A/D conversion	One scan cycle (A/D conversion after ladder diagram END instruction is executed, and BD					
time	channel map value is updated)					
Input features	2000 Digital Output 0 4mA 20mA Analog Input					
Insulation	There is no insulation between the channels of the module					
Points occupied	0 point (2ADI is not affected by the standard maximum control points of the main PLC because it is operated through the data register)					



4 Wiring



Cut off the power before installing, removing or wiring the BD module to avoid electric shock or product damage.

Note:

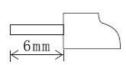
- Do not place signal cables near high voltage power cables or in the same trunk line. Otherwise, it may be disturbed or surged. Keep a safe distance between signal cable and power cable, at least 100mm.
- Ground the shielding of shielded wire or shielded cable. But the ground point and high voltage line cannot be the same.
- Do not connect cables of impermissible size to avoid poor contact or product damage.
- Fix the cable so that no force directly acts on the terminal line or cable connection area.
- The tightening torque of terminal is 0.5Nm to 0.6N.m. Please tighten it to prevent malfunction.
- Do not use empty terminals.

4.1 Applicable cables

- (1) AWG25-16 is used for connection with output device.
- (2) Maximum terminal tightening torque is 0.5N.m to 0.6N.m.
- (3) Using different types of cables may cause poor contact with terminals. Please use pressfit terminals for good contact.

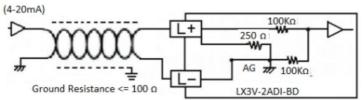
Line number and cross-sectional area

Line number	Cross-sectional area (mm ²)	End processing
AWG26	0.1288	Stranded cable: Strip off the sheath, rub the core wire,
	•••	and then connect the cable.
AWG16	1.309	Single-core cable: Strip off the sheath and connect the cable.



4.2 Input mode

Current input mode





5 Description of PLC device

- (1) When connected to LX3 series PLC, please refer to LX3 series BD module manual.
- (2) When connected to LX5 series PLC, if the firmware version of PLC is lower than 2.051 (excluding 2.051), or BD module is not configured by host computer, it can be controlled by the following system devices: Table3Device allocation

PLC model	BD model	Device	Expansion port 1 description	Device	Expansion port 2 description			
		SM2010	CH1 current input channel open flag OFF: Open ON: Close	SM2030	CH1 current input channel open flag OFF: Open ON: Close			
LX5V	LX5V 2ADI	SM2011	CH2 current input channel open flag OFF: Open ON: Close	SM2031	CH2 current input channel open flag OFF: Open ON: Close			
			CH1 digital value (4mA to 20mA: 0 to 2000)	SD2030	CH1 digital value (4mA to 20mA: 0 to 2000)			
		SD2011	CH2 digital value (4mA to 20mA: 0 to 2000)	SD2031	CH2 digital value (4mA to 20mA: 0 to 2000)			

⁽³⁾ You can select device through I/O mapping to use the configuration function of new BD module. For details, please refer to "<u>6.1 Parameter configuration</u>".

6 Instructions

6.1 Parameter configuration

- (1) Open the host computer software and create a new project, double-click "Project Manager" \rightarrow "Extended Function" \rightarrow "BD module Configuration" Note to enter "BD settings" interface;
- (2) Configure the currently connected PLC (take the LX5V-2416 model as an example) and BD module model on the BD module configuration interface: Select "LX5V-2ADI" in the device bar on the right side of the BD module configuration interface and double-click to add it to the corresponding slot position of PLC (slot number 1 or 2, the software will select slot 1 by default, and right-click to move down to slot 2);
- (3) After adding the BD module to the slot, double-click or right-click to select configuration parameters to enter LX5V-2ADI-BD configuration parameters interface, as shown in the following figure. Configure related parameters on this interface.



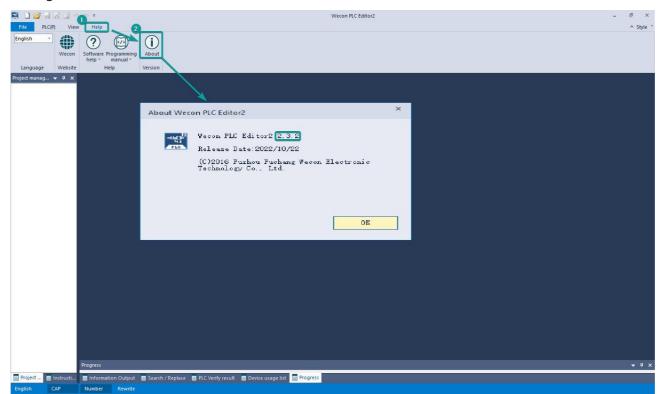
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* .						Wecon PLC	Editor2 - Extended Funct	ion BD Board Configuration	n		- 0
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anagement	- + ×	Scanning MAIN	Extended Function BD Board	Configuration ×	Module monitoring	-1					
rogram	1	lot num Configure devic							ice occupation	Actual installatio Device version n	 Device
Scanning MAIN	-	LX5V-2416	LX5V-2416 2-channel analog-to-digital con		3			×0~: R0:E	x27;Y0~Y17		 PLC host LX5V-3624
Event		LXSV-2ADI	2-channel analogito-digital con	version module AU, si	pponing current input			BU(F	U);		- LX5V-2424
Subroutine				_	-				~		- LX5V-2416
Interrupt				c	onfiguration LXSV-2TC					×	- LX5V-1814 - LX5V-1616
evice Comment arameter					-	-					- LX5V-1412
evice memory					Module configuratio	TCConfiguration	/O mapping Device Infi)			LX5V-1212
stended Functio					Response time (0	lms) 10	1~32767				#- BD board
Electronic CAN											- LX5V-2PT - LX5V-2TC
PLCLINK	0						Da .				- LX5V-2DAV
BD Board Cor	nfiguration										- LX5V-2DAI
											- LX5V-2AD12
											- LX5V-2PTS
											- LX5V-2PT2ADV
											— LX5V-2PT2DAV
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											- LX5V-2ADV2DAV
											- LX5V-2ADI2DAI
											- LX5V-4ADI - LX5V-4ADV
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Note: This function is only supported in the following versions of host computer, slave computer and BD module:



(1) Supported host computer versions: Wecon PLC Editor2 2.1.204 and above, as shown in the following figure:



(2) Supported slave computer versions: 2.051 and above, as shown in the following figure:

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Project	Clipboard	Ladder Symbol	Edit	Program	Program Mode		Online		Tool	
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	USB por	No device detected.		•	Communication test	-		lu t		
						Parameter	ersion informatio	Value		
	O Ethernet conn	ection			OK	PLC model		LX5V-2416MT		1
					UA		ersion number	V2.061		
	NIC selection	Realtek PCIe GbE Family Con	roller	- 6			version number	V1.000		
				- 4		Product Un Production			02278730DE9C8C3BDC24D	
					Device Info		configuration in	2020.09.09	20122108	
	IP address	4 4 4	Devices se	arch			configuration in installation type	LX5V-2DAV		
						BD1 versie		1013		
	Serial connect	tion			0. (č. 1997) 1997)		installation type	LX5V-2ADV		
	Contrar contrac	TOR			Close	BD2 versi		1013		
						🖌 Hardware	parameter inform	ation		
						Hardware (configuration table	100		
	COM por	t COM1-通信端口		T		Hardware v	ersion number	1000		
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(3) Supported BD module version number: 1013 and above, as shown in the following figure:

Slot num	Configure device	Device description	Device occupation	Actual installatio	Device version n
	LX5V-2416	LX5V-2416	X0~X27;Y0~Y17	LX5V-2416MT	V2.061
	LX5V-2ADI	2-channel analog-to-digital conversion module AD, supporting current input	R0;R1;	LX5V-2ADI	1013
2					



The parameter configuration interface is as follows:

1. Module setting: Set response time (The response time is the interval time between PLC acquisition of BD module data. Range: 0.1ms to 3276.7ms).

figuration LX5V-2ADI			
Module configuration ADI	Configuration I/	O mapping Device Info	
Response time (0.1ms)	10	1~32767	

2、 ADI configuration:

CI 11	ADIConfiguration I/O mapping	y Devic	e Info	
Channel-1 Channel Enable channel			Channel-2	
Conversion mode	4mA~20mA(0~2000)	*	Conversion mode	4mA~20mA(0~2000) *
Filtering intensity	4	7	Filtering intensity	4 *
Enable calibration		12	Enable calibration	
Gain	1.000000 -10000.0~10000.0		Gain	1.000000 -10000.0~10000.0
offset	0.000000 -10000.0~10000.0		offset	0.000000 -10000.0~10000.0

- ① Check enable channel to set whether to enable the current BD module channel.
- ② The conversion mode is set to ADI conversion mode by default, and the measurement range is 4mA~20mA (0~2000).
- ③ Setting the filtering intensity can reduce the jitter of BD channel value. The default configuration of filter intensity is 4. Level 0 is the lowest and level 9 is the highest. The filter intensity can be adjusted according to actual use.
- (a) Check enable calibration, you could calculate the gain offset according to the following formula to convert the corresponding channel value:

Channel value = digital value × gain value + offset value

- (5) When the channel value deviates, you could also set the gain offset to calibrate the channel. For example:
 - When the channel input analog is 20mA, the digital quantity of BD module acquisition channel value is 1970, and the actual digital value should be 2000.
 - When the channel input analog is 4mA, the digital quantity of BD module acquisition channel value is

7



30, and the actual digital value should be 0.

$$\begin{cases} 2000 = 1970 * a + b \\ 0 = 30 * a + b \end{cases}$$

Suppose the gain is a, and the offset is b, then $[0 = 30 \cdot a -$

$$\begin{cases} a = 1.030928 \\ b = -30.92784 \end{cases}$$

Solve and get $\begin{bmatrix} b = -30.92784 \end{bmatrix}$ The calibration can be completed by setting the corresponding gain

offset to the current channel.



3、 Set I/O mapping. The channels are mapped to R device according to the current number of BD module channels by default. As shown in the following figure, BD module CH1 to CH2 is mapped to device R0 to R1.

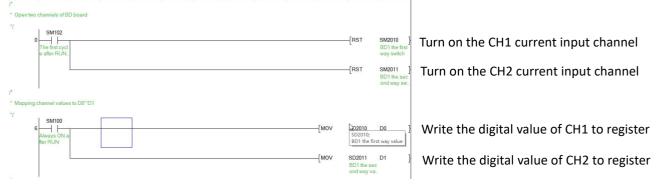
Module configuration ADIConfiguration I/C	O mapping Device Info	
Channel mapping element	Channel	
4		
- R0	CH1	
– R1	CH2	

4. After the above configuration is completed, check the program, download the configuration to PLC, and STOP \rightarrow RUN configuration takes effect.

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The second	write USB(4)HUB(5) LXSV 0/2			11

6.2 Ladder Diagram

1. Programming example that does not use the host computer software "BD module configuration" function. For device allocation, please refer to "<u>5 PLC device description</u>".





2.Programming example using "BD module configuration" function of host computer software:

* Copy chan	inel values to R0 [~] R1 via I/O mapping				
	SM100 Always DN a Mer RUN	[MOV	R0	D0	Map CH1 into R0 device
		[MOV	R1	D1	Map CH2 into R1 device
	[₽			[cup	
38				-[END	1

6.3 BD monitoring interface and buffer memory

Open the module monitoring interface, select BD module, select LX5V-2ADI from the list of BD modules on the right to monitor it online, and check the current BD module communication status and error information in time.

C model change Paste of Unc art 3V Cut (P Red Copy Project Clipboard management 9 X	10 15 15 15 15 15 15 15 15 15 15	3월 월 문 Edit 3월 155 말 mbol E	statement statement dit Program	all O Moni Moni Progra	odd	g ∰ Automatic backup 👔 USB flash disk download ∰ PLC encryption tool 🔂 Generate download file Project encrypt tool 📜 Calculation of total program step Tool	s	
Program Scanning		pansio BD board	Operating mode Operating mode			Current module info.: LX5V-2ADI(1)	Refresh	Custor
Event	Address	Value		Sisplay format			Module info.	Solution Info.
Subroutine	- 0x2000	1	Byte [unsigned]	Decimal	Channel 1 channel enable. 0: Channel off; 1: Channel on		LX5V-2ADI	
interrupt	- 0x2001	1	Byte [unsigned]	Decimal	Channel 1 channel mode selection. 1: Current mode (4mA ~20mA)			
Device Comment	0x2002	4	Byte [unsigned]	Decimal	Channel 1 filter intensity			
Parameter	- 0x2080	-360	Word [Signed]	Decimal	Channel 1 channel value			
Device memory Extended Function	- 0x2082	2	Word [Unsigne	Decimal	Channel 1 status information. 0: Channel off; 1: Channel on; 2: Channel value is out of range			
Extended Function Electronic CAM table	- 0x2084	1	Word [Unsigne	Decimal	Channel 1 error code. 0: No error; 1: Channel value is out of range			
PLCLINK	-0x2100	1	Byte [unsigned]	Decimal	Channel 2 channel enable. 0: Channel off; 1: Channel on			
BD Board Configuration	- 0x2101	1	Byte [unsigned]	Decimal	Channel 2 channel mode selection, 1: Current mode (4mA ~20mA)			
	-0x2102	4	Byte [unsigned]	Decimal	Channel 2 filter intensity			
	- 0x2180	-362	Word [Signed]	Decimal	Channel 2 channel value			
	0x2182	2	Word [Unsigne	Decimal	Channel 2 status information. 0: Channel off; 1: Channel on; 2: Channel value is out of range			
	- 0x2184	1	Word [Unsigne	Decimal	Channel 2 error code. 0: No error; 1: Channel value is out of range			
	0x0200	60	Word [Unsigne	Decimal	Current maximum package length			
	- 0x0202	0	Word [Unsigne	Decimal	Number of retransmissions			
	- 0x0204	0	Word [Unsigne	Decimal	Number of retransmissions of subpackages			
	0x0206	0	Word [Unsigne	Decimal	Received times of sync frame			
	- 0x0208	0	Word [Unsigne	Decimal	Sent times of sync frame			
	- 0x020A	120	Word [Unsigne	Decimal	Sent times of control			
	-0x020C	121	Word [Unsigne	Decimal	Received times of control			
	- 0x020E	6770	Word [Unsigne	Decimal	Sent times of subscribe			
	0x0210	0	Word [Unsigne	Decimal	Received times of subscribe			
	0x0212	0	Word [Unsigne	Decimal	Latest error code. 0: Clear error code			
	0x0214	72283726	Double word [Decimal	Number of bytes sent			
	0x0218	6358531	Double word [Decimal	Number of valid bytes sent			
	- 0x021C	65932946	Double word [Decimal	Number of bytes received			
	- 0x0220	7771	Double word [Decimal	Number of valid bytes received			
	-0x0224	665	Double word [Decimal	Communication time, unit: s			
	0x0214 0x0218 0x021C 0x0220	72283726 6358531 65932946 7771	Double word [Double word [Double word [Double word [Decimal Decimal Decimal Decimal	Number of bytes sent Number of välid bytes sent Number of bytes received Number of välid bytes received		[⋧	
	Enter BFM						Help	Save

(1) 2ADI buffer memory (BFM): Used for 2ADI-BD module status monitoring.

				, , , , , , , , , , , , , , , , , , ,		
BFM address	Power off hold	Read- write Functi on	Memory name	Default	Range	Description
0x2000	×	R/W	Channel 1 channel enable	1	0 to 1	0: Channel closed; 1: Channel open
0x2001	×	R/W	Channel 1 channel mode selection	1	1	1: Current mode (4mA to 20mA)
0x2002	×	R/W	Channel 1 filter intensity	4	0 to 9	0: Minimum filter strength; 9: Maximum filter strength
0x2080	×	R	Channel 1 channel value	0	0 to 2000	
0x2082	×	R	Channel 1 status information	0	0 to 2	0: Channel closed; 1: Channel opened 2: Channel value exceeds the range
0x2084	×	R	Channel 1 error code	0	0 to 1	0: No error; 1: Channel value exceeds the range
0x2100	×	R/W	Channel 2 channel enable	1	0 to 1	0: Channel closed; 1: Channel open
0x2101	×	R/W	Channel 2 channel mode selection	1	1	1: Current mode (4mA to 20mA)
0x2102	×	R/W	Channel 2 filter intensity	4	0 to 9	0: Minimum filter strength; 9: Maximum filter strength

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BFM address	Power off hold	Read- write Functi on	Memory name	Default	Range	Description
0x2180	×	R	Channel 2 channel value	0	0 to 2000	
0x2182	×	R	Channel 2 status information	0	0 to 2	0: Channel closed; 1: Channel opened 2: Channel value exceeds the range
0x2184	×	R	Channel 2 error code	0	0 to 1	0: No error; 1: Channel value exceeds the range

(2) Universal buffer memory (BFM): used to diagnose the communication status of the currently connected BD module.

BFM address	Power -off hold	Read- write Functi on	Memory name	Default	Range	Description
0x200	×	R	Current maximum package length	0	0 to 0xFFFF	The maximum length of the currently sent package
0x202	×	R	Number of retransmissions	0	0 to 0xFFFF	Number of retransmissions
0x204	×	R	Number of retransmissions of subpackages	0	0 to 0xFFFF	Number of retransmissions of subpackages
0x206	×	R	Received times of sync frames	0	0 to 0xFFFF	Received times of sync frames
0x208	×	R	Sent times of sync frames	0	0 to 0xFFFF	Sent times of sync frames
0x20A	×	R	Control the number of transmissions	0	0 to 0xFFFF	Control the number of transmissions
0x20C	×	R	Control the number of receptions	0	0 to 0xFFFF	Control the number of receptions
0x20E	×	R	Number of subscriptions sent	0	0 to 0xFFFF	Number of subscriptions sent
0x210	×	R	Number of subscriptions received	0	0 to 0xFFFF	Number of subscriptions received
0x212	v	R/W	Latest error code	0	Only 0 can be written.	Protocol internal error code, write 0 to clear
0x214	×	R	Number of bytes sent	0	0 to 0xFFFFFFFF	Number of bytes sent
0x218	×	R	Number of valid bytes sent	0	0 to 0xFFFFFFFF	Number of valid bytes sent
0x21C	×	R	Number of bytes received	0	0 to 0xFFFFFFFF	Number of bytes received
0x220	×	R	Number of valid bytes received	0	0 to 0xFFFFFFFF	Number of valid bytes received
0x224	×	R	Communication time (unit s)	0	0 to 0xFFFFFFFF	Normal communication time since the BD module is powered on