

How to Use CANopen Manager to Configure Analog I/O Parameters of a BLCCO Analog Node



HOW TO

ABOUT THIS GUIDE

This “How to” will show the user how to use CANopen manager to configure analog I/O parameters of a BLCCO analog node. This guide specifically uses a BLCCO-6M12L-4AI4AO-VI-2AO-I to perform this function.

REQUIRED PARTS

Hardware

- BLCCO-6M12L-4AI4AO-VI-2AO-I
- Power Cables

Software

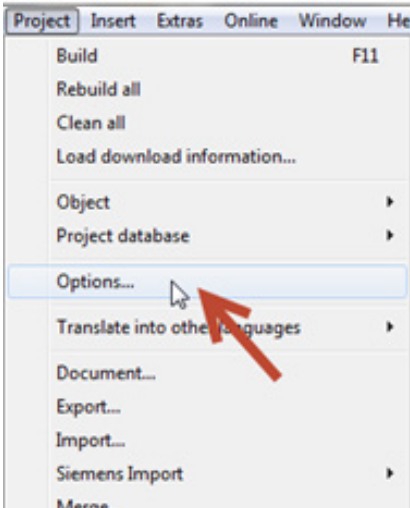
- Windows XP or Windows 7
- CoDeSys

INTRODUCTION

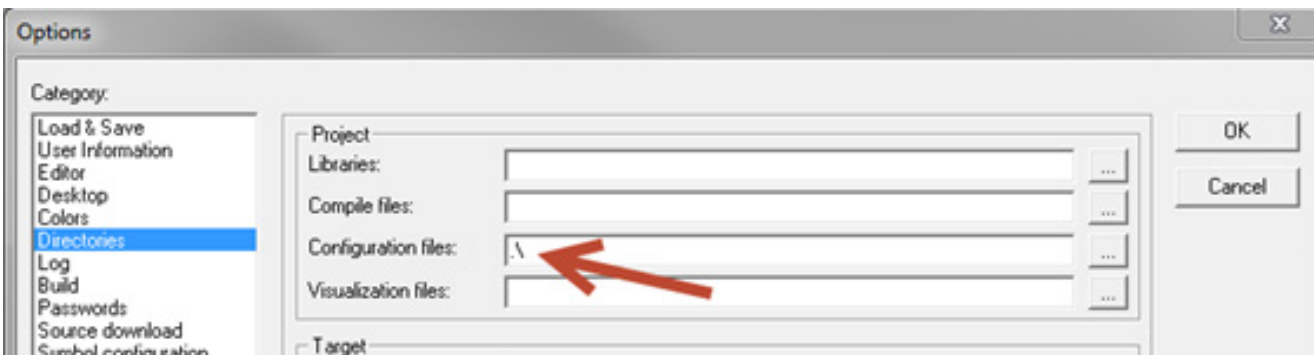
This document assumes a CoDeSys project is open with CANopen manager and required CANopen libraries loaded. This document serves as a brief overview of how to configure the analog channel parameters for the TURCK BLCompact module:BLCCO-6M12L-4AI4AO-VI-2AO-I

CONFIGURE EDS FILES

Under the 'Project' menu, select 'Options.'



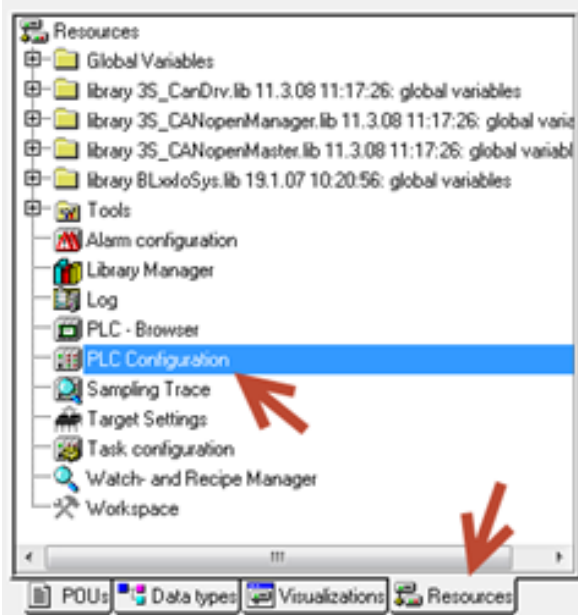
Select 'Directories' in the Category list. Be sure that in the configuration field '\.' is entered. Entering this causes CoDeSys to look in the local folder where the program is saved for any configuration files (.eds, .cfg, etc.), then load those files on program startup. This step would have likely been performed when setting up the CANopen Manager.



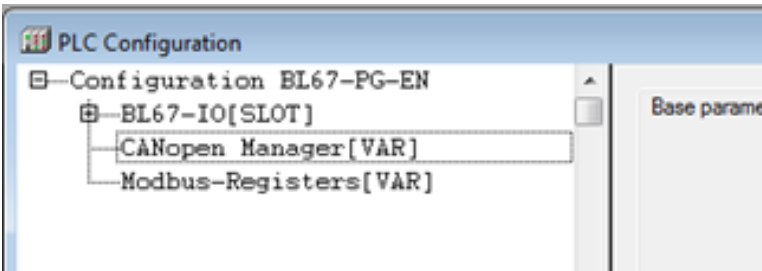
Add any .eds files to be used (in this case 'BLCCO-6M12L-4AI4AO-VI-2AO-I V1.22.eds') into the project folder. If any eds files are added in this manner, save & close then reopen the project.

CONFIGURE PLC

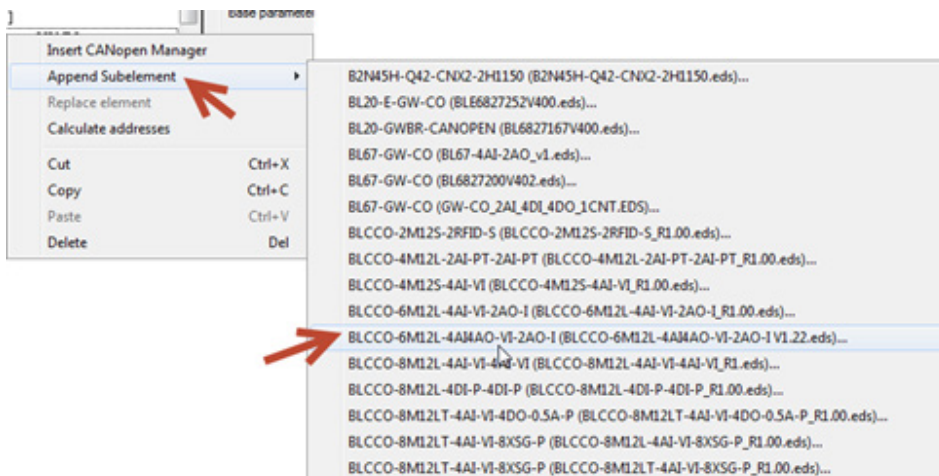
Open the 'PLC Configuration.'



As this document is covering only node configuration, not CANOpen manager adding/configuration, under the 'Configuration BL67-PG-xx' tree there should be 'BL67-IO[SLOT]' and 'CANOpen Manager[VAR]'. If not, refer to guides for implementation of the CANOpen manager.



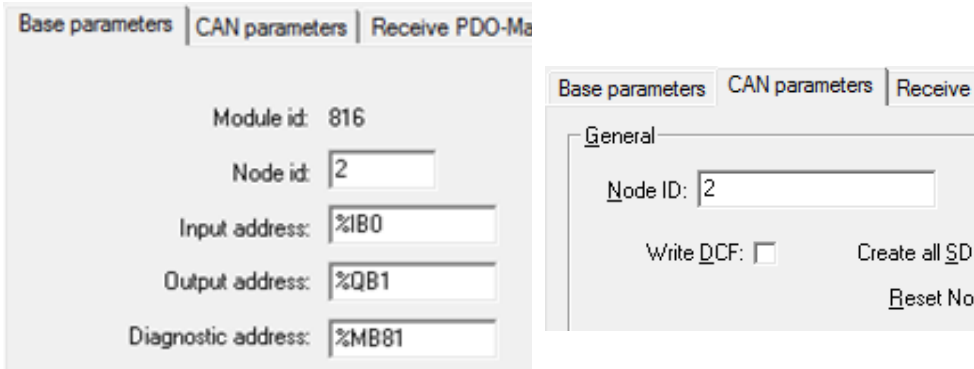
Right-click on 'CANOpen Manager[VAR]' and under 'Append Subelement' select the BLCCO-6M12L-4AI4AO-VI-2AO-I.



CONFIGURE CANOPEN PARAMETERS

Setting Node ID

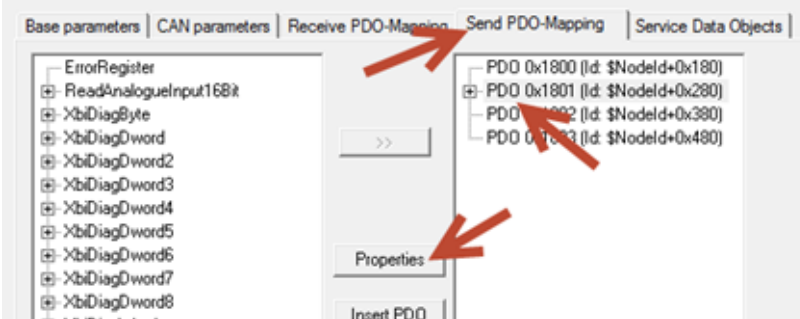
After the .eds is brought into the configuration tree, select the BLCCO-6M12L-4AI4AO-VI-2AO-I. Under the 'Base Parameters' tab, set the 'Node id' to the node address of the BLCCO. Also set that node ID under the 'CAN parameters' in the Node ID field.



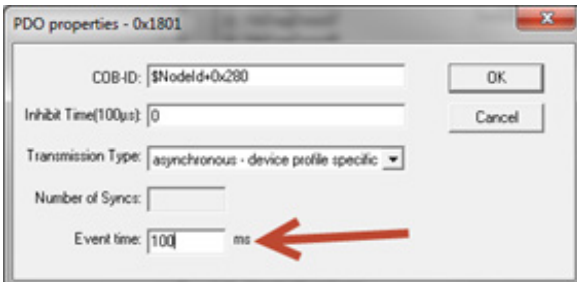
In this case, as we are configuring a node with analog inputs, it is important to configure the PDO communication parameters for Send PDOs that contain analog data (The default values CoDeSys uses would parameterize change-of-state transmission type. As this would overload the bus with analog data, the BLCCO would not transmit data on these PDOs.)

CHANGING PDO COMMUNICATION PARAMETERS FOR ANALOG I/O:

Go to the 'Send PDO-Mapping' tab. Select 'PDO 0x1801 (Id: \$NodeId+0x280)' then click 'Properties'.



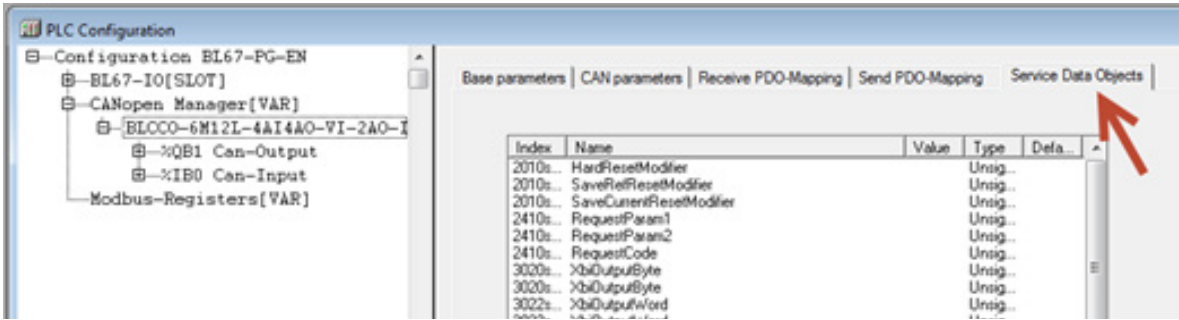
In the Properties window, in the 'Event time' field, enter a time value. This time value will be the delay between PDO transmissions for the particular Send-PDO chosen (therefore choose a logical value given data prioritization and bus characteristics). Then click 'OK' to close the window.



CONFIGURE ANALOG PARAMETERS

SDO Object List for CANopen Node in CoDeSys

In the PLC Configuration window, click on the Service Data Objects tab.



All of the SDO objects in this list relate to objects (data or parameters) available within the BLCCO. These objects are all described within the document 'BLxx CANopen Object Register' available on the TURCK website. If a value is entered in this list, it is sent to the CANopen node each time that node starts up (or the master comes online) after the node goes into the pre-operational state and before the master sends the node to the operational state.

The relevant object for parameterizing the analog input channels is 0x5420; the object for the analog output channels is 0x5440. The sub indices correspond to the channel number (each analog channel is individually parameterized by an instance of either 0x5420 or 0x5440).

In each instance (0x5420 or 0x5440) a parameter set can be written by determining the binary value to be stored (see the following tables), then converting that binary value to a decimal value.

Breakdown of Analog Input Parameter Object (0x5420)

analog input modules, current/ voltage

Table 91: Parameter, analog input modules, current/voltage A Default- setting	Byte	Bit	Parameters	Value/ meaning
	n	0	Range	0 = 0...10 V/0...20 mA A 1 = -10...10 V/4...20 mA
		1	Value representation	0 = Integer (15 bit + sign) A 1 = reserved
		2	Diagnostic	0 = release A 1 = block
		3	Channel x	0 = activate A 1 = deactivate
		4	Operation mode	0 = voltage A 1 = current
		5 to 7	reserved	

Breakdown of Analog Output Parameter Object (0x5440)

First four analog output channels (related to 4AI4AO):

analog output modules, voltage

Byte	Bit	Parameters	Value/ meaning
n	0 - 3	voltage	0000 = -10...10 V DC Std A
			0001 = 0...10 V DC Std
			0010 = -10...10 V DC PA (NE 43)
			0011 = 0...10 V DC PA (NE 43)
			0100 = -10...10 V DC Ext. range
			0101 = 0...10 V DC Ext. range
		deactivate	1111
4		Value representation	0 = Integer (15 bit + sign) A 1 = 12 bit (left-justified)
5		Diagnostics	0 = release A 1 = block
6+7		Behavior on module bus error Ax	00 = output substitute value 01 = hold current value
n + 1		Substitute value A x / LOW Byte	
n + 2		Substitute value A x / HIGH Byte	

Last two analog output channels (related to 2AO-V):

Analog output modules, voltage

Byte	Bit	Parameters	Value/ meaning
n	0	Current mode	0 = 0...10 V A 1 = -10...10 V
	1	Value representation	0 = Integer (15 bit + sign) A 1 = reserved
	3	Channel x	0 = activate A 1 = deactivate
n + 1 and n + 2		substitute value A1	The substitute value will be transmitted if the respective parameters of the gateway have been set to "output substitute value".

Example of Setting Analog Input Parameters

As an example for parameterizing the analog inputs, consider:

- Analog input channel 3
- Set to 4..20mA
- Diagnostics disabled.

analog input modules, current/ voltage

Table 91: Parameter, analog input modules, current/voltage
ADefault-setting

Byte	Bit	Parameters	Value/ meaning
n	0	Range	0 = 0...10 V/0...20 mA A 1 = -10...10 V/4...20 mA
	1	Value representation	0 = Integer (15 bit + sign) A 1 = reserved
	2	Diagnostic	0 = release A 1 = block
	3	Channel x	0 = activate A 1 = deactivate
	4	Operation mode	0 = voltage A 1 = current
5 to 7		reserved	

Therefore to set these parameters, the binary value 00010101 (or decimal 21) should be written to 0x5420 subindex 3...

Index	Name	Value	Type
3063sub2	XbiParamDword6		Unsig...
306asub1	XbiParamDword7		Unsig...
306asub2	XbiParamDword7		Unsig...
306bsub1	XbiParamDword8		Unsig...
306bsub2	XbiParamDword8		Unsig...
3080sub1	XbiReferenceModuleId		Unsig...
3080sub2	XbiReferenceModuleId		Unsig...
3081sub1	XbiReferenceModuleType		Unsig...
3081sub2	XbiReferenceModuleType		Unsig...
30f0sub1	XbiRegBankAddr		Unsig...
30f0sub2	XbiRegBankAddr		Unsig...
30f1sub1	XbiRegBankContent		Unsig...
30f1sub2	XbiRegBankContent		Unsig...
5420sub1	ManuSpecAnalogueInputRange		Unsig...
5420sub2	ManuSpecAnalogueInputRange		Unsig...
5420sub3	ManuSpecAnalogueInputRange	21	Unsig...
5420sub4	ManuSpecAnalogueInputRange		Unsig...
5440sub1	ManuSpecAnalogueOutputRange		Unsig...
5440sub2	ManuSpecAnalogueOutputRange		Unsig...
5440sub3	ManuSpecAnalogueOutputRange		Unsig...
5440sub4	ManuSpecAnalogueOutputRange		Unsig...
5440sub5	ManuSpecAnalogueOutputRange		Unsig...
5440sub6	ManuSpecAnalogueOutputRange		Unsig...
6411sub1	WriteAnalogueOutput16	0	Intege...
6411sub2	WriteAnalogueOutput16	0	Intege...
6411sub3	WriteAnalogueOutput16	0	Intege...

After all required values are entered, the PLC Configuration window can be closed. And the parameters will take effect next time the program is downloaded to the controller.