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How To Configure Block IO stations using Catalog Files Configure Turck block IO with Allen Bradley PLC

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### Overview

The configuration of the TURCK block IO stations with Allen Bradley PLC's may be done in two ways:

- The device EDS files or
- The Generic Ethernet Module profiles.

The EDS files are available for download from the TURCK web site. They are installed using Rockwell Software EDS installation tool.

The Generic Ethernet Module profile enables configuration of any device using simple method as it shown on Figure 1, for example. The configuration page contains information about assembly instance and data size of the input data, output data and configuration data. BLCEN-6M12LT-2RFID-S-8XSG-P configuration page for example, looks as follows:

Module Properties Report: BLCEN (ETHERNET-M	ODULE 1.1)			×							
General Connection Module Info											
Type: ETHERNET-MODULE Generic Etherne	ETHERNET-MODULE Generic Ethernet Module										
Vendor: Allen-Bradley	Allen-Bradley										
Parent: BLCEN											
Name: BLCEN_6M12LT_2RFID_S_8XSG_	Name: BLCEN 6M12LT 2RFID S 8XSG Connection Parameters										
Description:		Assembly Instance:	Size:								
	Input:	103	16	🗘 (16-bit)							
<b></b>	Output:	104	13	≑ (16-bit)							
Comm Format: Data - INT 👻	Configuration:	106	58	(8-bit)							
Address / Host Name	Configuration.			• (0 Dit)							
○ IP Address:	Status Input:										
Host Name: a220	Status Output:										
Status: Offline OK	Cancel	Apply		Help							

Figure 1: Generic Ethernet Module configuration page

The Generic Ethernet module profiles of the all TURCK block IO devices, i.e. device configurations, are entered into the RSLogix5000 project which is called "TURCK\_BLOCK\_IO\_STATIONS" Catalog file (the Catalog file). The catalog file may be expanded with the future device additions.

Devices from the Catalog file are copied into user's main project as described in this document. This procedure is identical for any device. There are two configuration examples: one for discrete an IO station and another analog IO station.

### Catalog file content

The Catalog file contains configurations of the following stations:

### **TBEN-Lx**

- TBEN-L4-16DIP, TBEN-L4-16DOP, TBEN-L4-16DXP, TBEN-L4-8DIP-8DOP
- TBEN-L4-16DIN, TBEN-L4-16DON, TBEN-L4-16DXN, TBEN-L4-8DIN-8DON
- TBEN-L5-16DIP, TBEN-L5-16DOP, TBEN-L5-16DXP, TBEN-L5-8DIP-8DOP
- TBEN-LG-16DIP, TBEN-LG-16DOP, TBEN-LG-16DXP, TBEN-LG-8DIP-8DOP

### TBEN-Sx

- TBEN-S1-8DIP, TBEN-S1-8DIP-D, TBEN-S1-8DOP, TBEN-S1-8DXP, TBEN-S1-4DIP-4DOP
- TBEN-S2-4AI, TBEN-S2-4AO, TBEN-S2-2COM-4DXP

### FEN20

- FEN20-4DIP-4DXP, FEN20-16DXP

### BLCEN

- All BLCEN multiprotocol devices

### FGEN and FXEN

- FGEN-IM16-4001, FGEN-OM16-4001, FGEN-IOM88-4001, FGEN-16DXP-4001
- FGEN-IM16-5001, FGEN-OM16-5001, FGEN-IOM88-5001, FGEN-16DXP-5001
- FXEN-IM16-0001-IP/CS30007, FXEN-OM16-0001-IP/CS30007, FXEN-XSG16-0001-IP/CS30007
- FXEN-IOM88-0001-IP/CS30007



### **Discrete IO Station Configuration**

1. Download the Catalog file: Enter TBEN-L in search field of the TURCK home page:



2. Click on any TBEN-Lx link

TURCK.COM Sales: +49 20	8 4952-380   Technical: +49 208 4952-390
<ul> <li>Menu</li> </ul>	Search Q
Search results (3	6)
36 results found for 'TBEN-L'	
Filter your search	result:
Products (25)	ws (4) 🔲 General (7)
	10 per page ▼ Page 1 of 4 1 2 3 4 ► ►
CONTENT	
Product TBEN-L4-16 Device Type Compact temperature (min.) -40 anzeigen> Data	DOP (HTML, 48.4K) t StationI/O Modules Protection class IP65IP67IP69K Approvals cULus Ambient ) °C Ambient temperature (max.) 70 °C Product series TBEN-L alle EDBs US
Products → Fieldbu Last update: 02 July 2	ıs Technology → I/O Modules 2016, 8:02 pm

3. Download "Configuration file" which contains EDS files and Catalog files

TBEI	N-L4-1	.6DOP ×					
$\leftarrow \rightarrow$	G	n D pdb2.turck.de	/en/DE/produ	cts/00000008000	3637d0004003a	Q 🖧 🖸	G ≡
Apps	🧀 I	mported From IE 🛛 🔫 Turck	USA - Home 🛛 🔓	Google 🎿 MSNBC	🖬 News	» 📋 Othe	r bookmarks
		Data Sheet (CN)			359 KB	Download	^
		catalogue.products.details.	datasheet.tur		296 KB	Download	
		Full range catalog		Factory Automation Products	43634 KB	Download	
		Product flyer		New Generation of Block I/O modules fo Ethernet	or 330 KB	Download	
		Product Overview		Multiprotocol I/O systems for Ethernet	493 KB	Download	
		User manual		TBEN-L/ TBDP-L – Compact I/O module for Ethernet and PROFIBUS-DP	's 5805 KB	Download	
	Θ	Configuration file		EDS files୩ Catalog files	259 KB	Download	
	Ð	Configuration file		GSDML files	17 KB	Download	

4. Unzip configuration file into any folder of your choice and open TURCK-CATALOG folder





5. "TURCK-CATALOG" folder contains "TURCK\_BLOCK\_STATIONS\_xxx.L5K" files.

Documents library L5K_v1.0.4.0		Arrange by: Fc
Name	Size	Date modified
TURCK_BLOCK_STATIONS_V19_FULL.L5K	3,923 KB	6/24/2016 2:52 PM
TURCK_BLOCK_STATIONS_V19_LITE.L5K	3,910 KB	6/24/2016 2:52 PM
TURCK_BLOCK_STATIONS_V24_FULL.L5K	3,921 KB	6/24/2016 2:52 PM
TURCK_BLOCK_STATIONS_V24_LITE.L5K	2,359 KB	6/24/2016 2:52 PM
TURCK_BLOCK_STATIONS_V24_LITE_BLCEN.L5K	1,565 KB	6/24/2016 2:52 PM

These files are RSLogix5000 / Studio 5000 project files utilizing text data format (file type "L5K") and have to be converted into "ACD" data format.

Different files are created for users that may have different revisions of RSLogix5000 or Studio5000 programming software. For example RSLogix5000 Lite or Mini versions run CompactLogix PLCs only. If you have RSLogix5000 / Studio5000 full edition, you may use any catalog file.

Following matrix shows how to use catalog file, based on a revision of RSLogix/Studio 5000:

	RSLogix5000 Enterprise Edition (revision 19 and 20)									
	Professional, Full, Standard Editions	Lite, Mini and Service Edition								
BLOC	TURCK_BLOCK_STATIONS_V19_FULL	TURCK_BLOCK_STATIONS_V19_LITE.L5K								
K IO	.L5K									
BL20	BL20_Catalog_file_V19_2014_8_10.L5K	BL20_Catalog_file_V20_2014_08_27_LITE.L5K								
BL67	BL67_Catalog_file_V19_2014_12_08.L5	BL67_Catalog_file_V20_2014_12_08_LITE.L5K								
	K									
	Studio5000 / Logix Des	signer (revisions 24 and above)								
	Professional, Full, Standard Editions	Lite, Mini and Service Edition								
BLOC	TURCK_BLOCK_STATIONS_V24_FULL	TURCK_BLOCK_STATIONS_V24_LITE.L5K								
K IO	.L5K	TURCK_BLOCK_STATIONS_V24_LITE_BLCEN								
		.L5K								
BL20	BL20_Catalog_file_v24_2015_07_01.L5K	BL20_Catalog_file_v24_2015_07_01_LITE.L5K								

Example:

- If you have RSLogix5000 rev 20 Full edition, use TURCK BLOCK STATIONS V19 FULL 15K" file

	RSLog	ix 5000		
	File E	About RSLog	gix 5000 💌	
	1		BSL paix 5000 Standard Edition	₩.,
	No Con	1. A. A.	Copyright (c) 2015 Bockwell Automation Technologies, Inc. All	2.16
	No Force	Π		-4
	Redunda		Version history : V20.04.00 (CPR 9 SR 5)	X
T				

6. Import "L5K" file into RSLogix and save it as "ACD" file - Start RSLogix5000 click "File" select "Open"

8	RSLogix 5000	-	-									
File	e Edit View	Search	Logic	Communications	Tools	Window	Help					
冒	<u>N</u> ew			Ct	rl+N		- <u>A</u>	風へ	ĪT=	D' S	/ Đ	Q
2	<u>O</u> pen			Cti	rl+O		-		L			
	<u>C</u> lose					AFI		GSV	SSV	++ +/		-(U)(L)
la	<u>S</u> ave			Ct	rl+S	Favorit	es 🖌 Safe	ety 🖌 A	larms	K Bit /	Timer	Counter 🔾
	Save <u>A</u> s											
	Ne <u>w</u> Compor	nent			+							

Go to folder where L5K files are saved

- Highlight file to import
- Click "Open"

🔞 Open/Import	Project			
Look in:	▶ L5K_v1.0.6.0	G 🤌 📂 🖽 -		
A	Name	Date modified	Туре	Size
	TURCK_BLOCK_STATIONS_V19_FULL.ACD	7/19/2016 2:39 PM	RSLogix 5000 Proj	1,270 KB
Recent Places	TURCK_BLOCK_STATIONS_V19_FULL.L5K	7/19/2016 2:06 PM	RSLogix 5000 Imp	4,008 KB
	TURCK_BLOCK_STATIONS_V19_LITE.L5K	7/19/2016 2:06 PM	RSLogix 5000 Imp	3,995 KB
	TURCK_BLOCK_STATIONS_V24_FULL.L5K	7/19/2016 2:06 PM	RSLogix 5000 Imp	4,007 KB
Desktop	TURCK_BLOCK_STATIONS_V24_LITE.L5K	7/19/2016 2:06 PM	RSLogix 5000 Imp	2,359 KB
	TURCK_BLOCK_STATIONS_V24_LITE_BLCEN	7/19/2016 2:06 PM	RSLogix 5000 Imp	1,650 KB

- Select directory to save file (may use the same directory where L5K files are located)
- Click "Import"

Network	•			•
	File name:	TURCK_BLOCK_STATIONS_V24_FULL.A	CD 👻	Import
	Files of type:	Logix Designer Project Files (*.ACD)	•	Cancel
				Help
_				Help

- Follow dialog to save it as "ACD" file.



The catalog file "TURCK\_BLOCK\_STATIONS\_V24\_FULL.ACD" is the RSLogix project which contains multiple 1756-EN2T bridges.



Click on "+" to expand the content of the bridge:





Examples of TBEN-Sx and BLCEN's configurations:



- 7. Copy TBEN-L4-16DXP configuration into your project:
  - Open both your online project and the "TURCK\_BLOCK\_STATIONS\_V24\_FULL.ACD" catalog file in separate windows
  - Expand the "1756-EN2T TBEN\_L" bridge in the catalog file
  - Drag the "TBEN-L4-16DXP" from the catalog file and drop it into your project, into Ethernet
  - Close the catalog file





### 8. Assign IP address to the station

- Right-click on TBEN-L4-16DXP and open device properties
- Assign device name; it can be changed to fit your project needs
- Assign IP addressClick "Apply" and "OK"

	Controller Organizer 👻	ųΧ	Ir,	Module Pror	erties Report: FIP (FTH	ERNET-MODI	ILE 1 001)			
Sta	6814007 TBEN_L1_OM16		l r	modulerrop	entes nepora en (erri		/22 1:001/			
	6814008 TBEN_L1_XSG16			General* Con	nection Module Info					
ag	6814006 TBEN_L1_IOM88			Tuno:		Conorio Ethomo	Madula			
<u> </u>	6814065 TBEN LG IM16			Type.		acheric Etherne	Module			
	6814067 TBEN LG OM16			Vendor.	Alleri-bradley					
	6814068 TBEN LG XSG16			Parent:	EIF		Connection Para	meters		
	6814066 TBEN LG IOM88			Name:	TBEN_L4_16DXP			Assembly		
	ETHERNET-MODULE TBENSLIM8			Description:				Instance:	Size:	
	ETHERNET-MODULE TBENS1 OM8						Input:	103	5 🏩 (1	l 6-bit)
	ETHERNET-MODULE TBENSI IM8 D					-		104		
	ETHERNET-MODULE TBENSL XSG8						Output:	104	2 🛒 (1	6-bit)
	ETHERNET-MODULE TBENS1 IOM44			Comm Format:	Data - INT	-	Configuration	106	42 🛋 0	(hit)
	ETHERNET-MODULE TBENS2 4AI			Address / H	ost Name		configuration.		v	
	ETHERNET-MODULE TBENS2_4AO	Ξ		IP Addre	s: <u>192</u> . 168 . 1	. 4	Status Input:			
	ETHERNET-MODULE TBEN_L4_16DX	p 👘			·					
	🖃 🖞 [2] 1756-DNB DN			Host Nar	ne: a130		Status Uutput:			
		-			-					
	•	F		L						
ļ				Status: Offline		ОК	Cancel	Apply	/ Hel	р
	T= Controller Organizer		۱Ľ							
Proje	ect saved to Recovery file.									

### -The controller creates the configuration tag, input tag and output tag.

Sco	ope:	CLX	72v27	•	Show:	All Tags				-	<b>7.</b> En	ter Name Filter	
	Name III 🛆							Value 🗧	Style	Data Type		Description	
	— - TE	BEN_L4_	16DXP:C					{}		AB:ETHERN	IET		
	+	TBEN_L	4_16DXP:(	C.Data				{}	Hex	SINT[400]			
- 6	TB	BEN_L4_	16DXP:I					{}		AB:ETHERN	IET		
	Ē	TBEN_L	4_16DXP:I	I.Data				{}	De	INT[5]			
		+ TBEN	L4_16DX	(P:I.Dat	ta[0]			0	De	INT		Station Status Word	
		+ TBEN	L4_16DX	(P:I.Dat	ta[1]			0	De	INT		Input value	
		+ TBEN	L4_16DX	(P:I.Dat	ta[2]			0	De	INT		Scheduled diagnostic header data	
		+ TBEN	L4_16DX	(P:I.Dat	ta[3]			0	De	INT		Diagnostic data - expand for more info	
		+ TBEN	L4_16DX	(P:I.Dat	ta[4]			0	De	INT		Diagnostic data - expand for more info	
E	-TBEN_L4_16DXP:O							{}		AB:ETHERN	IET		
	- TBEN_L4_16DXP:O.Data							{}	De	INT[2]			
	+-TBEN_L4_16DXP:O.Data[0]					0	De	INT		Station Control Word			
	+ TBEN_L4_16DXP:O.Data[1]					0	De	INT		Output value			

 9. Use Configuration tag to setup IO properties
 – Expand the configuration tag to set IO configuration parameters (parameterization) to desired values.

Scope: Scope: Show: All Tags				▼ T. Enter Name Filter	
Name == △	Value 🗧 🗧	Style	Data Type	Description	*
+-TBEN_L4_16DXP:C.Data[5]	16#00	Hex	SINT	Reserved	
	16#00	Hex	SINT	Reserved	
	16#00	Hex	SINT	Reserved	
	16#00	Hex	SINT	Reserved	
	16#00	Hex	SINT	Quick Connect, Eth Custom Setup	ſ
TBEN_L4_16DXP:C.Data[10]	16#00	Hex	SINT	Reserved	
TBEN_L4_16DXP:C.Data[11]	16#00	Hex	SINT	Reserved	
-TBEN_L4_16DXP:C.Data[12]	16#00	Hex	SINT	Invert digital input	
-TBEN_L4_16DXP:C.Data[12].0	0	De	BOOL	Digital In/Out 1 - Invert digital input: 0=no, 1=yes	
-TBEN_L4_16DXP:C.Data[12].1	0	De	BOOL	Digital In/Out 2 - Invert digital input: 0=no, 1=yes	
-TBEN_L4_16DXP:C.Data[12].2	0	De	BOOL	Digital In/Out 3 - Invert digital input: 0=no, 1=yes	
	0	De	BOOL	Digital In/Out 4 - Invert digital input: 0=no, 1=yes	
TBEN_L4_16DXP:C.Data[12].4	0	De	BOOL	Digital In/Out 5 - Invert digital input: 0=no, 1=yes	
-TBEN_L4_16DXP:C.Data[12].5	0	De	BOOL	Digital In/Out 6 - Invert digital input: 0=no, 1=yes	
TBEN_L4_16DXP:C.Data[12].6	0	De	BOOL	Digital In/Out 7 - Invert digital input: 0=no, 1=yes	
TBEN_L4_16DXP:C.Data[12].7	0	De	BOOL	Digital In/Out 8 - Invert digital input: 0=no, 1=yes	
	16#00	Hex	SINT	Invert digital input	
TBEN_L4_16DXP:C.Data[14]	16#00	Hex	SINT	Manual reset after overcurr.	
	0	De	BOOL	Digital In/Out 1 - Manual reset after overcurr.: 0=no, 1=yes	
	0	De	BOOL	Digital In/Out 2 - Manual reset after overcurr.: 0=no, 1=yes	
TBEN_L4_16DXP:C.Data[14].2	0	De	BOOL	Digital In/Out 3 - Manual reset after overcurr.: 0=no, 1=yes	
-TBEN_L4_16DXP:C.Data[14].3	0	De	BOOL	Digital In/Out 4 - Manual reset after overcurr.: 0=no, 1=yes	
TBEN_L4_16DXP:C.Data[14].4	0	De	BOOL	Digital In/Out 5 - Manual reset after overcurr.: 0=no, 1=yes	
TBEN_L4_16DXP:C.Data[14].5	0	De	BOOL	Digital In/Out 6 - Manual reset after overcurr.: 0=no, 1=yes	
TBEN_L4_16DXP:C.Data[14].6	0	De	BOOL	Digital In/Out 7 - Manual reset after overcurr.: 0=no, 1=yes	
TBEN_L4_16DXP:C.Data[14].7	0	De	BOOL	Digital In/Out 8 - Manual reset after overcurr.: 0=no, 1=yes	
+ TBEN_L4_16DXP:C.Data[15]	16#00	Hex	SINT	Manual reset after overcurr.	÷
Monitor Tags / Edit Tags /			•	III.	

10. The configuration tag is used to set analog IO or communication IO channels for example.

11. Controller downloads configuration data to the device whenever the connection between the PLC and the device is established.



### Analog IO Station Configuration

- 1. TBEN-S2-4AI is a universal analog input station which is configured as follows:
  - Open both your online project and the "TURCK\_BLOCK\_STATIONS\_V24\_FULL.ACD" catalog file in separate windows.
  - Expand the "1756-EN2T TBEN\_S" bridge in the catalog file
  - Drag the "TBEN-S2-4AI" device from the catalog file and drop it into your project, into Ethernet



2. Highlight the "ETHERNET-MODULE TBEN\_S2\_4AI" in the Controller organizer of the project and open "Module Properties" page. Assign IP address; name can be changed as well. Click Apply and OK.



The controller creates configuration tag, input tag and output tag. It also saves content of the configuration tag. The configuration is downloaded from the controller to the device every time when device is connected to the controller.

	Controller Organizer 🗸 🗸	×		Controller Tags - CLX72v27(controller)			
Sta	a🔄 Controller CLX72v27		Ē				
A Pa	Controller Tags			Scope: CLX72v27 - Show: All	Tags	-	T. Enter Name
ge	🗀 Controller Fault Handler			Name IB A	Value 🗧	Style Data Typ	Description
	🔤 Power-Up Handler	Ξ	IF	THEN S2 4ALC	{}	AB:ETH	
	j 🗀 Tasks			THEN S2 4AI:	{}	AB:ETH.	
	g 🧰 Motion Groups		I h	THEN S2 4ALO	L	AB·FTH	
	and Add-On Instructions	-	IF.	THEN S2 4AOC	L	AB:ETH	
	g 🗀 Data Types		Iŀ	TREN \$2 4401	1 1	AB·ETH	
	···· 🗀 Trends		Iŀ	TREN \$2.440.0	11		
			Iŀ		[····]		
	a		Iŀ		{}	AD.ETH.	
	📄 🛲 1756 Backplane, 1756-A7		Iŀ	+-TBEN_32_4IOL:1	{}	ABIETH	
	[1] [0] 1756-L72 CLX72v27		⊪	+-1BEN_S2_4IOL:0	{}	AB:ETH	
	🖕 🖷 🚺 [1] 1756-EN2TR EIP		II-		{}	AB:ETH	
	ian 品 Ethernet				{}	AB:ETH	
	🖞 ETHERNET-MODULE TBEN_S2_4AI			+-TBENS1_IM8:O	{}	AB:ETH	
	🖞 ETHERNET-MODULE TBEN_S2_4AO		IL.		{}	AB:ETH	
	🖞 ETHERNET-MODULE TBEN_S2_4IOL	÷	IE		{}	AB:ETH	
					{}	AB:ETH	
	📴 Controller Organizer 🗽 Logical Organizer	_	Ŀ	Monitor Tags / Edit Tags /		< III	-

TBEN-S2-4AI is universal analog input device. It supports multiple analog signal inputs such as: thermocouple input, voltage or current inputs, resistance or RTD inputs. 4 analog input channels may be set to different mode of operation which has dedicated set of configuration parameters. These are contained in the configuration tag.



# Configuration Tag

Following example shows configuration parameters of a single analog channel when configuration tag is expanded. Other channels (analog inputs) have identical set of parameters.

	Scope: 🔁 CLX72v27 🔹 Sho	ow: All Tags			<ul> <li>▼.</li> </ul>
tart	Name	EB 🛆 Value 🔍	Style	Data Typ	Description
Pag	-TBENS2_4AI:C.Data	{	Hex	SINT[4	
ē	+-TBENS2_4AI:C.Data[0]	16#0	Hex	SINT	Reserved
		16#0	) Hex	SINT	Reserved
	TBENS2_4AI:C.Data[2]	16#0	) Hex	SINT	Reserved
	TBENS2_4AI:C.Data[3]	16#0	) Hex	SINT	Reserved
	TBENS2_4AI:C.Data[4]	16#0	) Hex	SINT	Reserved
	TBENS2_4AI:C.Data[5]	16#0	) Hex	SINT	Reserved
	TBENS2_4AI:C.Data[6]	16#0	) Hex	SINT	Reserved
	TBENS2_4AI:C.Data[7]	16#0	) Hex	SINT	Reserved
	TBENS2_4AI:C.Data[8]	16#0	) Hex	SINT	Reserved
	TBENS2_4AI:C.Data[9]	16#0	) Hex	SINT	Quick Connect, Eth Custom Setup
	TBENS2_4AI:C.Data[10]	16#0	) Hex	SINT	Analog In 1 - Operation mode
	TBENS2_4AI:C.Data[11]	16#0	Hex	SINT	Analog In 1 - Thermocouple type
	TBENS2_4AI:C.Data[12]	16#0	Hex	SINT	Analog In 1 - Thermocouple cold junc. config.
	TBENS2_4AI:C.Data[13]	16#0	Hex	SINT	Analog In 1 - Voltage range
	TBENS2_4AI:C.Data[14]	16#0	Hex	SINT	Analog In 1 - Voltage wiring type
	TBENS2_4AI:C.Data[15]	16#0	Hex	SINT	Analog In 1 - Current range
	TBENS2_4AI:C.Data[16]	16#0	) Hex	SINT	Analog In 1 - Current wiring type
	TBENS2_4AI:C.Data[17]	16#0	Hex	SINT	Analog In 1 - Resistance range
	TBENS2_4AI:C.Data[18]	16#0	Hex	SINT	Analog In 1 - Resistance wiring type
	TBENS2_4AI:C.Data[19]	16#0	Hex	SINT	Analog In 1 - RTD type
	TBENS2_4AI:C.Data[20]	16#0	) Hex	SINT	Analog In 1 - RTD wiring type
	TBENS2_4AI:C.Data[21]	16#0	Hex	SINT	Analog In 1 - Data representation
	TBENS2_4AI:C.Data[22]	16#0	Hex	SINT	Analog In 1 - Temperature unit
	+-TBENS2_4AI:C.Data[23]	16#0	) Hex	SINT	Analog In 1 - Input averaging filter
	+ TBENS2_4AI:C.Data[24]	16#0	Hex	SINT	Analog In 1 - Deactivate channel
	+ TBENS2_4AI:C.Data[25]	16#0	Hex	SINT	Analog In 1 - Deactivate diagnostics
	+ TBENS2_4AI:C.Data[26]	16#0	Hex	SINT	Analog In 1 - Mains suppression
	+ TBENS2_4AI:C.Data[27]	16#0	) Hex	SINT	Reserved

The first and most important action is to define mode of operation of a channel that is being configured. Each channel supports any of these operation modes:

Deremeter nome		Paramet	ter value
Falameter hame	Analog Input	decimal	binary
Operation Mode	Thermocouple (*)	0	0000
	Voltage	1	0001
	Current	2	0010
	Resistance	3	0011
	RTD	4	0100

### Note: (\*) default setting

Here is example how to select current input. You can either enter decimal value 2 into operation mode tag:

_					
[]]	TBEN_S2_4AI:C.Data[10]	16#02	Hex	SINT	Analog In 1 - Operation mode

### Or

Expand that tag and enter it as binary value 0010. Binary representation looks as follows:

b0 = 0 b1 = 1 b2 = 0b3 = 0

l		0	Decimal	BOOL	Analog In 1 - Operation mode (ENUM bit0): 0000=thermocoupl
l		1	Decimal	BOOL	Analog In 1 - Operation mode (ENUM bit 1): 0010=current
l		0	Decimal	BOOL	Analog In 1 - Operation mode (ENUM bit2): 0011=resistance
l		0	Decimal	BOOL	Analog In 1 - Operation mode (ENUM bit3): 0100=RTD



# Configure thermocouple input

TBEN-S2-4AI analog input supports different types of thermocouples. There are additional parameters which determine other features of the thermocouple input. In the following example, the analog input 1 is configured to as highlighted:

	Analog Input Thermocouples	Paramet	er value
Parameter	Туре	decimal	Binary
name			
Thermocouple	Type K, -270…1370 °C, -454…2498 °F (*)	0	0000
type	Туре В, 100…1820 °С, 212…3308 °F	1	0001
	Type E, -2701000 °C, -4541832 °F	2	0010
	Type J, -2101200 °C, -3462192 °F	<mark>3</mark>	<mark>0011</mark>
	Type N, -270…1300 °C, -454…2372 °F	4	0100
	Type R, -501768 °C, -583214 °F	5	0101
	Type S, -501768 °C, -583214 °F	6	0110
	Type T, -270400 °C, -454752 °F	7	0111
	Type C, 02315 °C, 324199 °F	8	1000
	Type G, 02315 °C, 324199 °F	9	1001
Thermocouple	PT1000(*)	<mark>0</mark>	0000
cold	PT100	1	0001
	cold junction from channel 1	2	0010
	none	3	0011
Temperature	Celsius(*)	0	0
unit	Fahrenheit	<mark>1</mark>	1
Input averaging	standard(*)	0	0000
filter	smooth	<u>1</u>	0001
	fast	2	0010
	off	3	0011

### Select operation mode - thermocouple

- TBEN_S2_4AI:C.Data[10]	16#00	Hex	SINT	Analog In 1 - Operation mode
	0	Decimal	BOOL	Analog In 1 - Operation mode (ENUM bit0): 0000=themocouple, 0001=voltage
	0	Decimal	BOOL	Analog In 1 - Operation mode (ENUM bit 1): 0010=current
	0	Decimal	BOOL	Analog In 1 - Operation mode (ENUM bit2): 0011=resistance
-TBEN_S2_4AI:C.Data[10].3	0	Decimal	BOOL	Analog In 1 - Operation mode (ENUM bit3): 0100=RTD

### Select thermocouple type

-TBEN_S2_4AI:C.Data[11]	16#03	Hex	SINT	Analog In 1 - Thermocouple type
-TBEN_S2_4AI:C.Data[11].0	1	Decimal	BOOL	Analog In 1 - Thermocouple type (ENUM bit0): 0000=type K, -2701370 C, -4542498 F, 0001=type B, +100
TBEN_S2_4AI:C.Data[11].1	1	Decimal	BOOL	Analog In 1 - Thermocouple type (ENUM bit 1): 0011=type J, -2101200 C, -3462192 F, 0100=type N, -270
TBEN_S2_4AI:C.Data[11].2	0	Decimal	BOOL	Analog In 1 - Thermocouple type (ENUM bit2): 0110=type S, -501768 C, -583214 F, 0111=type T, -27040
TBEN_S2_4AI:C.Data[11].3	0	Decimal	BOOL	Analog In 1 - Thermocouple type (ENUM bit3): 1000=type C, 02315 C, 324199 F, 1001=type G, 02315 C,
TBEN_S2_4AI:C.Data[11].4	0	Decimal	BOOL	Reserved
TBEN_S2_4AI:C.Data[11].5	0	Decimal	BOOL	Reserved
-TBEN_S2_4AI:C.Data[11].6	0	Decimal	BOOL	Reserved
TBEN_S2_4AI:C.Data[11].7	0	Decimal	BOOL	Reserved

### Select thermocouple cold junction configuration

	16#	00	Hex	SINT	Analog In 1 - Thermocouple cold junc. config.
-TBEN_S2_4AI:C.Data[12].0		0	Decimal	BOOL	Analog In 1 - Thermocouple cold junc. config. (ENUM bit0): 0000=PT1000
-TBEN_S2_4AI:C.Data[12].1		0	Decimal	BOOL	Analog In 1 - Thermocouple cold junc. config. (ENUM bit1): 0001=PT100
-TBEN_S2_4AI:C.Data[12].2		0	Decimal	BOOL	Analog In 1 - Thermocouple cold junc. config. (ENUM bit2): 0010=cold junction from channel 1
-TBEN_S2_4AI:C.Data[12].3		0	Decimal	BOOL	Analog In 1 - Thermocouple cold junc. config. (ENUM bit3): 0011=none

### Select temperature unit

TBEN_S2_4AI:C.Data[22]	16#01	Hex	SINT	Analog In 1 - Temperature unit
-TBEN_S2_4AI:C.Data[22].0	1	Decimal	BOOL	Analog In 1 - Temperature unit (ENUM bit0): 0=Celsius, 1=Fahrenheit
-TBEN_S2_4AI:C.Data[22].1	0	Decimal	BOOL	Reserved
-TBEN_S2_4AI:C.Data[22].2	0	Decimal	BOOL	Reserved
-TBEN S2 4AI:C.Data[22].3	0	Decimal	BOOL	Reserved

### Select input average filtering

-TBEN_S2_4AI:C.Data[23]	16#02	2 Hex	SINT	Analog In 1 - Input averaging filter
-TBEN_S2_4AI:C.Data[23].0	(	Decimal	BOOL	Analog In 1 - Input averaging filter (ENUM bit0): 0000=standard
-TBEN_S2_4AI:C.Data[23].1	1	Decimal	BOOL	Analog In 1 - Input averaging filter (ENUM bit 1): 0001=smooth
-TBEN_S2_4AI:C.Data[23].2	(	Decimal	BOOL	Analog In 1 - Input averaging filter (ENUM bit2): 0010=fast
-TBEN_S2_4AI:C.Data[23].3	(	Decimal	BOOL	Analog In 1 - Input averaging filter (ENUM bit3): 0011=off
-TBEN_S2_4AI:C.Data[23].4	(	) Decimal	BOOL	Reserved
-TBEN_S2_4AI:C.Data[23].5	(	) Decimal	BOOL	Reserved
-TBEN_S2_4AI:C.Data[23].6	(	) Decimal	BOOL	Reserved
TBEN_S2_4AI:C.Data[23].7	(	) Decimal	BOOL	Reserved



## Configure voltage input

There are multiple voltage input options available for selection. Following example shows how to set analog input 2 as follows:

Analog	g Input Voltage	Parameter value		
Parameter name	Туре	decimal	binary	
Voltage range	<u>-10 10</u> V (*)	0	0000	
	0 10 V	1	0001	
	2 10 V	2	0010	
	0 5 V	3	0011	
	15V	4	0100	
	-11V	5	0101	
	-500 500 mV	6	0110	
	$-100 \dots 100 \text{ mV}$	/ 0	1000	
Valtage wiring type	differential(*)	0	1000	
voltage winng type				
	single ended	1	01	
	differential without ground	2	10	
Data representation	standard	O	<mark>00</mark>	
	NE43	1	01	
	extended range	2	10	
Input averaging	standard(*)	O	00	
filter	smooth	1	01	
	fast	2	10	
	off	3	11	

### Select operation mode – voltage

-					
L	TBEN_S2_4AI:C.Data[28]	16#01	Hex	SINT	Analog In 2 - Operation mode
Ľ		1	Decimal	BOOL	Analog In 2 - Operation mode (ENUM bit0): 0000=thermocouple, 0001=voltage
Ľ		0	Decimal	BOOL	Analog In 2 - Operation mode (ENUM bit 1): 0010=current
Ľ		0	Decimal	BOOL	Analog In 2 - Operation mode (ENUM bit2): 0011=resistance
Ĺ		0	Decimal	BOOL	Analog In 2 - Operation mode (ENUM bit3): 0100=RTD

### Select voltage range "0...10V"

-					
	- TBEN_S2_4AI:C.Data[31]	16#01	Hex	SINT	Analog In 2 - Voltage range
	-TBEN_S2_4AI:C.Data[31].0	1	Decimal	BOOL	Analog In 2 - Voltage range (ENUM bit0): 0000=-1010 V, 0001=010 V, 0010=210 V
	-TBEN_S2_4AI:C.Data[31].1	0	Decimal	BOOL	Analog In 2 - Voltage range (ENUM bit 1): 0011=05 V, 0100=15 V
	-TBEN_S2_4AI:C.Data[31].2	0	Decimal	BOOL	Analog In 2 - Voltage range (ENUM bit2): 0101=-11 V, 0110=-500500 mV
	-TBEN_S2_4AI:C.Data[31].3	0	Decimal	BOOL	Analog In 2 - Voltage range (ENUM bit3): 0111=-100100 mV, 1000=-5050 mV
	-TBEN_S2_4AI:C.Data[31].4	0	Decimal	BOOL	Reserved
	-TBEN_S2_4AI:C.Data[31].5	0	Decimal	BOOL	Reserved
	-TBEN_S2_4AI:C.Data[31].6	0	Decimal	BOOL	Reserved
	TBEN_S2_4AI:C.Data[31].7	0	Decimal	BOOL	Reserved

Other "Analog in 2" parameters: voltage wiring type, data representation and input average filtering are set to default value.

# Configure current input

There are multiple current input options available for selection. Following example shows how to set analog input 3 using following parameter setup:

Analog Inpu	Paran	neter Value	
Parameter name	Туре	decimal	binary
Current range	4 20 mA (*)	<mark>0</mark>	<mark>00</mark>
	0 20 mA	1	01
	-2020 mA	2	10
Current wiring type	differential (*)	<mark>0</mark>	<mark>00</mark>
	single ended	1	01
	differential without ground	2	10
Data representation	standard (*)	0	00
	NE43	1	01
	extended range	2	<mark>10</mark>
Input averaging filter	standard(*)	<mark>0</mark>	0000
	smooth	1	0001
	fast	2	0010
	off	3	0011

#### Select operation mode - current

-TBEN_S2_4AI:C.Data[46]	16#02	Hex	SINT	Analog In 3 - Operation mode
-TBEN_S2_4AI:C.Data[46].0	0	Decimal	BOOL	Analog In 3 - Operation mode (ENUM bit0): 0000=thermocouple, 0001=voltage
-TBEN_S2_4AI:C.Data[46].1	1	Decimal	BOOL	Analog In 3 - Operation mode (ENUM bit 1): 0010=current
-TBEN_S2_4AI:C.Data[46].2	0	Decimal	BOOL	Analog In 3 - Operation mode (ENUM bit2): 0011=resistance
-TBEN_S2_4AI:C.Data[46].3	0	Decimal	BOOL	Analog In 3 - Operation mode (ENUM bit3): 0100=RTD

### Select signal type - default

[	-TBEN_S2_4AI:C.Data[51]	16#00	Hex	SINT	Analog In 3 - Current range
l	-TBEN_S2_4AI:C.Data[51].0	0	Decimal	BOOL	Analog In 3 - Current range (ENUM bit0) <mark>: 00=420 mA,</mark> 01=020 mA
ĺ	-TBEN_S2_4AI:C.Data[51].1	0	Decimal	BOOL	Analog In 3 - Current range (ENUM bit 1): 10=-2020 mA

### Select current wiring type – default

	-TBEN_S2_4AI:C.Data[52]	16#00	Hex	SINT	Analog In 3 - Current wiring type
I	-TBEN_S2_4AI:C.Data[52].0	0	Decimal	BOOL	Analog In 3 - Current wiring type (ENUM bit0): 00=differential, 01=single ended
I	-TBEN_S2_4AI:C.Data[52].1	0	Decimal	BOOL	Analog In 3 - Current wiring type (ENUM bit 1): 10=differential without ground

#### Select data representation - extended range

L	-TBEN_S2_4AI:C.Data[57]	16#02	Hex	SINT	Analog In 3 - Data representation
L		0	Decimal	BOOL	Analog In 3 - Data representation (ENUM bit0): 00=standard, 01=NE43
Ľ	-TBEN_S2_4AI:C.Data[57].1	1	Decimal	BOOL	Analog In 3 - Data representation (ENUM bit 1): 10=extended range

### Select input averaging filter - default

2	201	oot input avoraging mor	adiadit			
l		+ TBEN_S2_4AI:C.Data[59]	16#00	Hex	SINT	Analog In 3 - Input averaging filter
	_					



## Configure resistance input

There are multiple RTD input options supported by the station. Following example shows how to set analog input 4 using following parameter setup:

Analog Input F	Param	Parameter Value		
Parameter name	Туре	decimal	binary	
Resistance range	0 100 Ohm (*)	0	00	
	0 400 Ohm	1	01	
	0 2000 Ohm	2	10	
	0 4000 Ohm	3	11	
Resistance wiring type	2-wire (*)	0	00	
	<mark>3-wire</mark>	1	<mark>01</mark>	
	4-wire	2	10	
Input averaging filter	standard(*)	0	0000	
	smooth	1	0001	
	fast	2	0010	
	off	3	0011	

#### Select operation mode – resistance

-TBEN_S2_4AI:C.Data[64]	16#03	Hex	SINT	Analog In 4 - Operation mode
-TBEN_S2_4AI:C.Data[64].0	1	Decimal	BOOL	Analog In 4 - Operation mode (ENUM bit0): 0000=themocouple, 0001=voltage
	1	Decimal	BOOL	Analog In 4 - Operation mode (ENUM bit 1): 0010=current
-TBEN_S2_4AI:C.Data[64].2	0	Decimal	BOOL	Analog In 4 - Operation mode (ENUM bit2): 0011=resistance
-TBEN_S2_4AI:C.Data[64].3	0	Decimal	BOOL	Analog In 4 - Operation mode (ENUM bit3): 0100=RTD

#### Select resistance range

_	0				
	-TBEN_S2_4AI:C.Data[71]	16#02	Hex	SINT	Analog In 4 - Resistance range
	-TBEN_S2_4AI:C.Data[71].0	0	Decimal	BOOL	Analog In 4 - Resistance range (ENUM bit0): 00=0100 Ohm, 01=0400 Ohm
Ĺ	-TBEN_S2_4AI:C.Data[71].1	1	Decimal	BOOL	Analog In 4 - Resistance range (ENUM bit1): 10=02000 Ohm, 11=04000 Ohm

### Select wiring type

-TBEN_S2_4AI:C.Data[72]	16#(	01	Hex	SINT	Analog In 4 - Resistance wiring type
-TBEN_S2_4AI:C.Data[72].0		1	Decimal	BOOL	Analog In 4 - Resistance wiring type (ENUM bit0): 00=2-wire, 01=3-wire
-TBEN_S2_4AI:C.Data[72].1		0	Decimal	BOOL	Analog In 4 - Resistance wiring type (ENUM bit 1): 10=4-wire

### Select input average filter - default

-TBEN_S2_4AI:C.Data[77]	16	16#00		SINT	Analog In 4 - Input averaging filter
-TBEN_S2_4AI:C.Data[77].0		0	Decimal	BOOL	Analog In 4 - Input averaging filter (ENUM bit0): 0000=standard
-TBEN_S2_4AI:C.Data[77].1		0	Decimal	BOOL	Analog In 4 - Input averaging filter (ENUM bit 1): 0001=smooth
-TBEN_S2_4AI:C.Data[77].2		0	Decimal	BOOL	Analog In 4 - Input averaging filter (ENUM bit2): 0010=fast
-TBEN_S2_4AI:C.Data[77].3		0	Decimal	BOOL	Analog In 4 - Input averaging filter (ENUM bit3): 0011=off

# Configure RTD input

There are multiple RTD input options supported by the station. Following example shows how to set analog input 4 using following parameter setup:

	Analog Input RTD	Parame	eter value
Parameter name	Туре	decimal	binary
RTD Type	PT100, -200 850 °C, -3281562 °F (*)	0	0000
	PT100, -200 150 °C, -328302 °F	1	0001
	NI100, -60 250 °C, -76482 °F	2	0010
	NI100, -60 150 °C, -76302 °F	3	0011
	PT200, -200 850 °C, -3281562 °F	4	0100
	PT200, -200 150 °C, -328302 °F	5	0101
	PT500, -200 850 °C, -3281562 °F	6	0110
	PT500, -200 150 °C, -328302 °F	7	0111
	PT1000, -200 850 °C, -3281562 °F	8	<mark>1000</mark>
	PT1000, -200 150 °C, -328302 °F	9	1001
	NI1000, -60 250 °C, -76482 °F	10	1010
	NI1000, -60 150 °C, -76302 °F	11	1011
RTD wiring type	2-wire(*)	0	00
	<mark>3-wire</mark>	1	<mark>01</mark>
	4-wire	2	10
Temperature unit	Celsius(*)	0	0
	Fahrenheit	1	1

#### Select Operation mode - RTD

[	-TBEN_S2_4AI:C.Data[64]	16#04	Hex	SINT	Analog In 4 - Operation mode
l	-TBEN_S2_4AI:C.Data[64].0	0	Decimal	BOOL	Analog In 4 - Operation mode (ENUM bit0): 0000=thermocouple, 0001=voltage
l	-TBEN_S2_4AI:C.Data[64].1	0	Decimal	BOOL	Analog In 4 - Operation mode (ENUM bit 1): 0010=current
l	-TBEN_S2_4AI:C.Data[64].2	1	Decimal	BOOL	Analog In 4 - Operation mode (ENUM bit2): 0011=resistance
l	-TBEN_S2_4AI:C.Data[64].3	0	Decimal	BOOL	Analog In 4 - Operation mode (ENUM bit3): 0100=RTD

### Select RTD type - PT1000

TBEN_S2_4AI:C.Data[73]	16#08	Hex	SINT	Analog In 4 - RTD type
-TBEN_S2_4AI:C.Data[73].0	0	Decimal	BOOL	Analog In 4 - RTD type (ENUM bit0): 00000000=PT100, -200850 C, -3281562 F, 00000001=PT100, -200
-TBEN_S2_4AI:C.Data[73].1	0	Decimal	BOOL	Analog In 4 - RTD type (ENUM bit 1): 00000010=NI100, -60250 C, -76482 F, 00000011=NI100, -60150 C,
-TBEN_S2_4AI:C.Data[73].2	0	Decimal	BOOL	Analog In 4 - RTD type (ENUM bit2): 00000100=PT200, -200850 C, -3281562 F, 00000101=PT200, -200
-TBEN_S2_4AI:C.Data[73].3	1	Decimal	BOOL	Analog In 4 - RTD type (ENUM bit3): 00000110=PT500, -200850 C, -3281562 F, 00000111=PT500, -200
-TBEN_S2_4AI:C.Data[73].4	0	Decimal	BOOL	Analog In 4 - RTD type (ENUM bit4): 00001000=PT1000, -200850 C, -3281562 F
-TBEN_S2_4AI:C.Data[73].5	0	Decimal	BOOL	Analog In 4 - RTD type (ENUM bit5): 00001001=PT1000, -200150 C, -328302 F
-TBEN_S2_4AI:C.Data[73].6	0	Decimal	BOOL	Analog In 4 - RTD type (ENUM bit6): 00001010=NI1000, -60250 C, -76482 F
TBEN_S2_4AI:C.Data[73].7	0	Decimal	BOOL	Analog In 4 - RTD type (ENUM bit7): 00001011=NI1000, -60150 C, -76302 F

### Select RTD wiring type - 3 wire

Ľ	-TBEN_S2_4AI:C.Data[72]	16#	01	Hex	SINT	Analog In 4 - Resistance wiring type
Ľ			1	Decimal	BOOL	Analog In 4 - Resistance wiring type (ENUM bit0): 00=2-wire, 01=3-wire
Ľ	-TBEN_S2_4AI:C.Data[72].1		0	Decimal	BOOL	Analog In 4 - Resistance wiring type (ENUM bit 1): 10=4-wire

### Select RTD temperature unit - Fahrenheit

- TBEN_S2_4AI:C.Data[74]	16#	01	Hex	SINT	Analog In 4 - RTD wiring type
-TBEN_S2_4AI:C.Data[74].0		1	Decimal	BOOL	Analog In 4 - RTD wiring type (ENUM bit0): 00=2-wire, 01=3-wire
-TBEN_S2_4AI:C.Data[74].1		0	Decimal	BOOL	Analog In 4 - RTD wiring type (ENUM bit 1): 10=4-wire