

Vacuum-Automation

Function Block-Documentation

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1 Function block “FB_PARA_RW_ETH“

1.1 Brief description

This function block is used to access parameter data of the respective products via various systems.

Systems:

- Siemens S7 – Profinet
- Siemens TIA – Profinet
- Beckhoff TC2 – EtherCat
- Beckhoff TC3 – EtherCat
- Allen Bradley – Ethernet IP

The functions Read parameter and Write parameter are available.

Please refer to the respective parameter lists for the documents of the corresponding products.

2 Siemens - Profinet

2.1 Image of function block

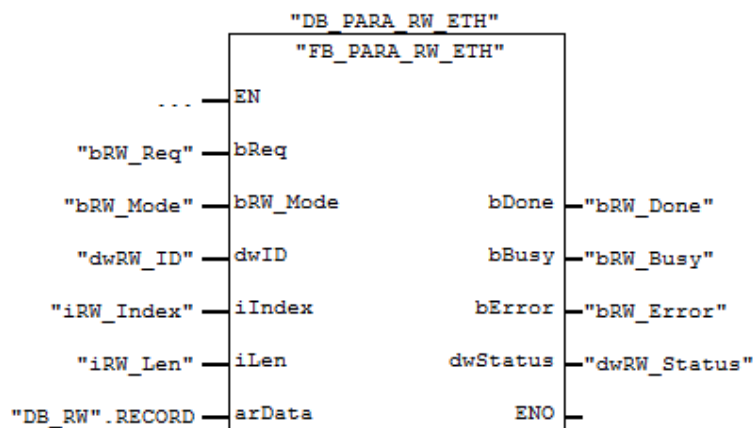


figure 1: example of function block – Siemens Step7

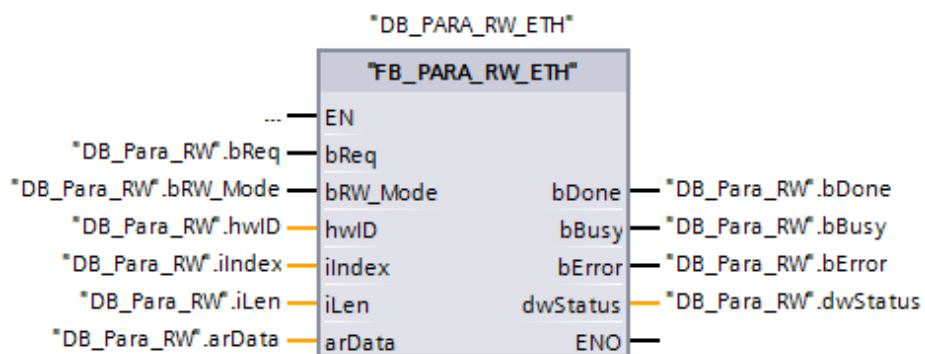


figure 2: example of function block – Siemens TIA

2.2 Parameter - Input

S7

Name	Datentyp	Beschreibung
EN	BOOL	Activates the function block
bReq	BOOL	Execute the read or write process
bRW_Mode	BOOL	Select the mode: 0 = Read, 1 = Write
dwID	DWORD	Specification of the diagnostic address
iIndex	INT	Index of the object to be used
iLen	INT	Number of data to be used in bytes
arData	ARRAY [0..231] OF BYTE	Address (pointer) to the data buffer: Read -> read data available Write -> enter data to be written

TIA

Name	Datentyp	Beschreibung
EN	BOOL	Activates the function block
bReq	BOOL	Execute the read or write process
bRW_Mode	BOOL	Select the mode: 0 = Read, 1 = Write
hwID	HW_IO	Specification of the hardware ID of the Hardware module
iIndex	INT	Index of the object to be used
iLen	INT	Number of data to be used in bytes
arData	ARRAY [0..231] OF BYTE	Address (pointer) to the data buffer: Read -> read data available Write -> enter data to be written

2.3 Parameter - Output

S7, TIA

Name	Datentyp	Beschreibung
ENO	BOOL	Feedback about status of Enable
bDone	BOOL	Record was read or transferred
bBusy	BOOL	Is active during the processing of the process until a feedback occurs
bError	BOOL	Will be activated if an error has occurred
dwStatus	DWORD	Returns the block status or error information

2.4 Additional information

S7

At the input parameter dwID, enter the diagnostic address of the port to be processed.

Steckplatz	Baugruppe	Bestellnummer ...	E-Adresse	A-Adresse	Diagnoseadresse
0	SCTMi-PNT				2040*
X1	Interface				2039*
P1	Port 1				2038* ←
P2	Port 2				2037*

figure 3: examplel S7 – function block – diagnostics address

In this example, the information is read from port 1 of the SCTMi Ethernet. This information can be taken from the hardware configuration. So at the input parameter dwID, enter the diagnostic address of port 1 (2038) in hexadecimal (DW # 16 # 7F6).

TIA

At the hwID input parameter, enter the hardware identifier of the hardware module (PROFINET IO) to be processed. The number is assigned automatically and is stored in the properties of the module or the interface in the hardware configuration.

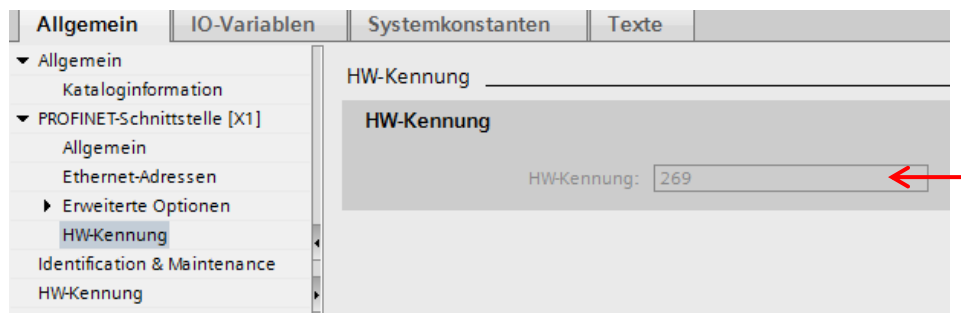


figure 4: example TIA – function block – Hardware ID

3 Beckhoff – EtherCat

3.1 Image of function block

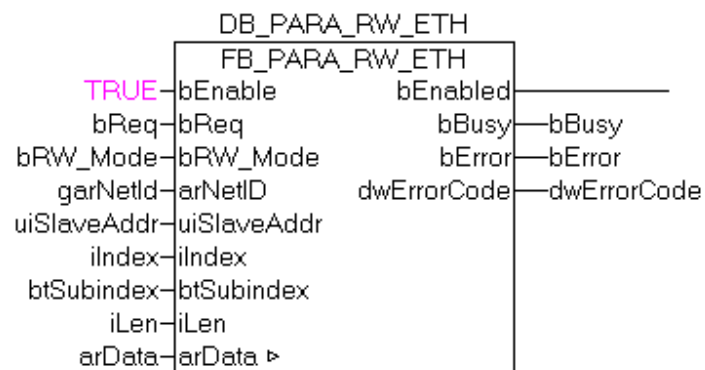


figure 5: example of function block – Beckhoff TC2

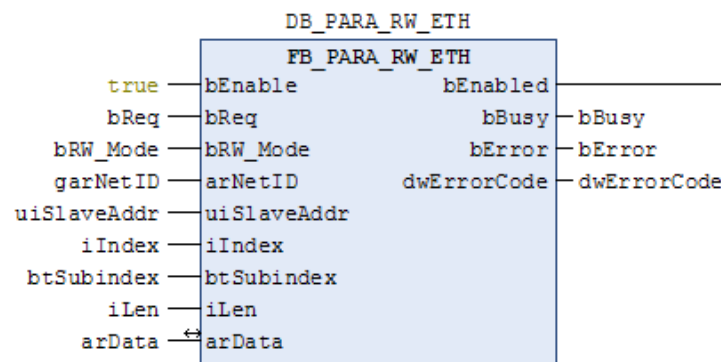


figure 6: example of function block – Beckhoff TC3

3.2 Parameter - Input

TC2, TC3

Name	Datentyp	Beschreibung
bEnable	BOOL	Activates the function block
bReq	BOOL	Execute the read or write process
bRW_Mode	BOOL	Select the mode: 0 = Read, 1 = Write
arNetId	ARRAY [0..5] OF BYTE	Specification of the AMS network ID of the EtherCAT master device
uiSlaveAddr	UINT	Address of the desired EtherCAT slave
iIndex	INT	Index of the object to be used
btSubindex	BYTE	Subindex of the object to be used
iLen	INT	Number of data to be used in bytes
arData	ARRAY [0..231] OF BYTE	Address (pointer) to the data buffer: Read -> read data available Write -> enter data to be written

3.3 Parameter - Output

TC2, TC3

Name	Datentyp	Beschreibung
bEnabled	BOOL	Feedback about status of Enable
bBusy	BOOL	Is active during the processing of the process until a feedback occurs
bError	BOOL	Will be activated if an error has occurred
dwErrorCode	DWORD	Returns the ADS error code of the last executed command in case of an error

3.4 Additional information

In order to perform the required functions, library blocks were used. For the block described here to work, the PLC library "TcEtherCAT.Lib" must be integrated into the project.

So that data can be read from the object directory of an EtherCAT slave, the slave must have a mailbox and support the "CANopen over EtherCAT" (CoE) protocol.

4 Allen Bradley – Ethernet IP

4.1 Image of function block

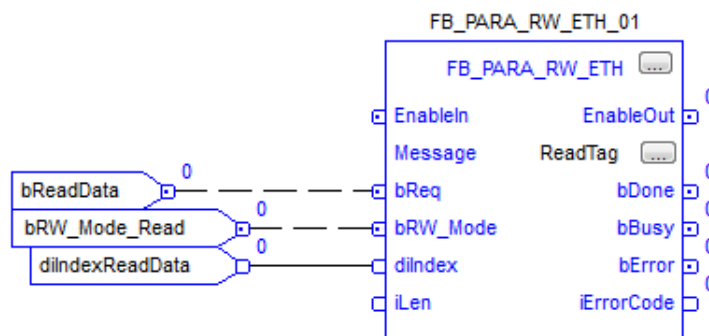


figure 7: example of function block – Allen Bradley

4.2 Parameter - Input

AB

Name	Datentyp	Beschreibung
EnableIn	BOOL	Activates the function block
Message	MESSAGE	Configuration of the message function
bReq	BOOL	Execute the read or write process
bRW_Mode	BOOL	Select the mode: 0 = Read, 1 = Write
diIndex	DINT	Index of the object to be used
iLen	INT	Number of data to be used in bytes (only necessary when writing)

4.3 Parameter - Output

AB

Name	Datentyp	Beschreibung
EnableOut	BOOL	Feedback about status of Enable
bDone	BOOL	Record was read or transferred
bBusy	BOOL	Is active during the processing of the process until a feedback occurs
bError	BOOL	Will be activated if an error has occurred
iErrorCode	INT	Returns the error information

FB_PARA_RW_ETH

4.4 Additional information

In order to be able to use the function block correctly, 2 variables must be declared in each case.

<input type="checkbox"/> + ReadData	{ ... }	{ ... }	Decimal	SINT[200]
<input type="checkbox"/> + ReadTag	{ ... }	{ ... }		MESSAGE

figure 8: example AB - variable declaration – Read

After successful insertion of the function block "FB_PARA_RW_ETH", the corresponding tag must be parameterized and the message configuration opened.

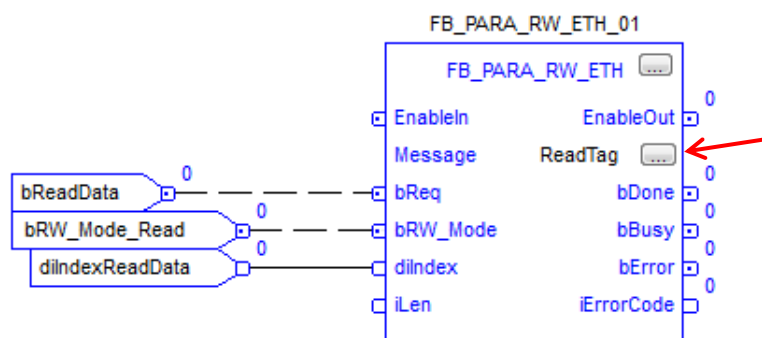


figure 9: example AB – function block – Read

In the message configuration the corresponding "Message Type" and "Service Type" must be selected. Furthermore, the correct "Class" and the "Attribute" must be entered. Next, the "Destination Element" is declared when reading or the "Source Element" when writing.

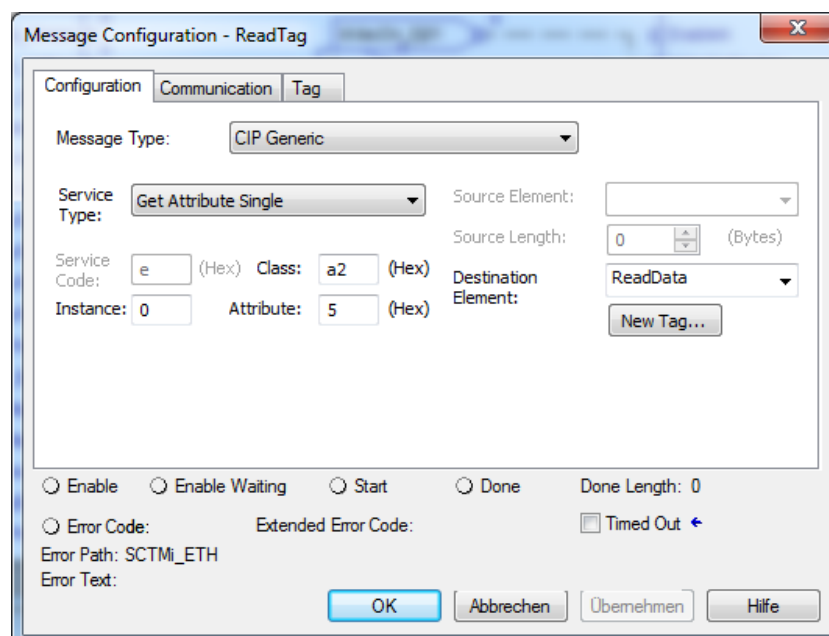


figure 10: example AB - message konfiguration – Read

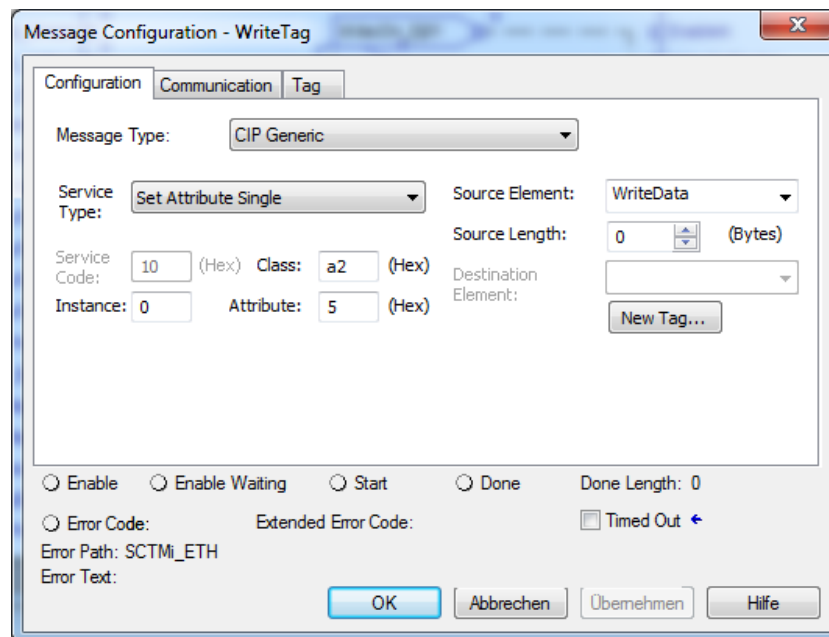


figure 11: example AB - message konfiguration – Write

To set the communication to the desired device, you have to change to the "Communication" tab. There, under "Path", after selecting "Browse", the corresponding device can be selected.

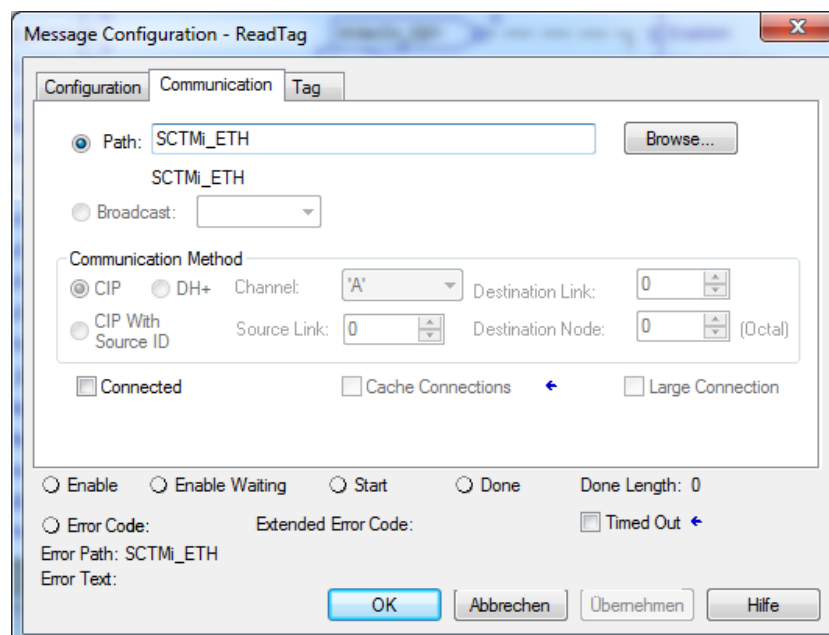


figure 12: example AB - message konfiguration – Path

The data is then made available via the variables "ReadData" or "WriteData" in the example.

5 Appendix

5.1 List of abbreviations

abbreviation	description
TC2	Beckhoff TwinCAT 2
TC3	Beckhoff TwinCAT 3
S7	Siemens Step 7
TIA	Siemens Step 7 TIA
AB	Allen Bradley
FB	Function module
EPC	Energy- and Processcontrol
CM	Condition Monitoring
EM	Energy Monitoring
PM	Predictive Maintenance

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5.3 Note

The byte order of the product is represented as big endian.

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