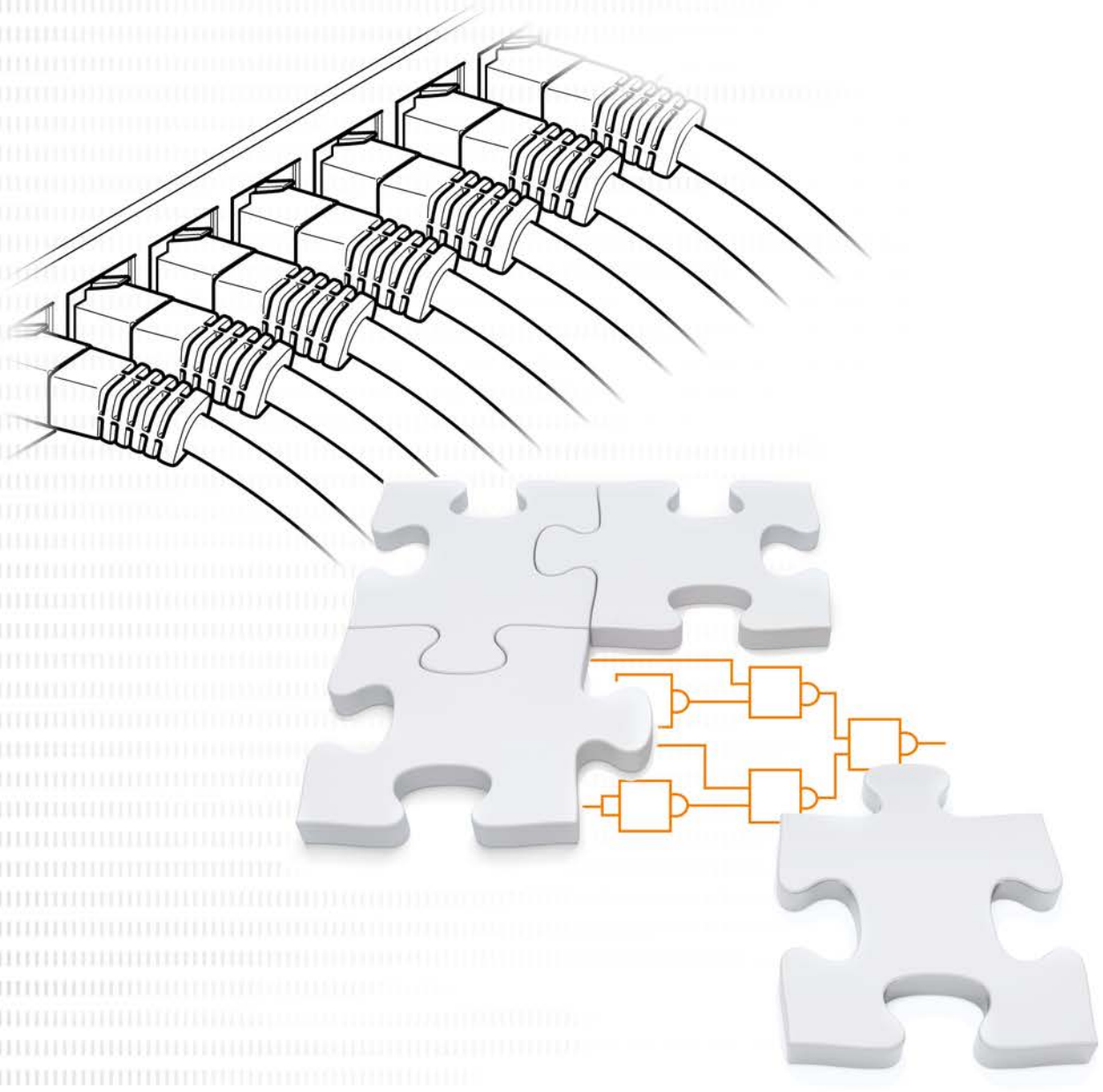

BU 0950 – en

TIA standard modules

Supplemental manual for frequency inverters

NORD DRIVESYSTEMS

Table of Contents

1 Introduction

1.1 General

1.1.1 Documentation

Designation:	**BU 0950**
Material number	**6079502**
Series:	**TIA Standard Modules**

1.1.2 Document history

Edition Order number	Automation environment version	Remarks
BU 0950, April 2018 **6079502** / 1718	TIA Portal V13 SP1	First edition
BU 0950, December 2021 **6079502** / 5021	TIA Portal V13 SP1	Comprehensive revision of the manual, including • Revision of section structure • Adjustment of module parameters • Configuration description for the TIA portal

1.1.3 Copyright notice

1.1.4 Publisher

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1.2 Registered Trademarks

PROFIBUS® and PROFINET® are registered trademarks of PROFIBUS and PROFINET International (PI).

1.3 About this manual

This manual briefly explains the use and parameterisation of the modules which are intended for the integration of electronic drive technology products from NORD GmbH & Co. KG into the TIA portal. It is intended for qualified electricians who integrate and commission these products in a corresponding control system (📖 Section 2.2 "Selection and qualification of personnel"). The information in this manual assumes that the qualified electricians who are entrusted with this work are familiar with the technology of the relevant field bus system and programmable logic controllers (PLC).

1.4 Other applicable documents

This manual is only valid in combination with the operating instructions for the frequency inverter which is used and if necessary, the relevant special documentation for specific special functions or bus systems.

This documentation can be found under www.nord.com.

2 Safety

2.1 Intended use

The TIA standard modules from Getriebebau NORD GmbH & Co. KG are modules for integrating NORD drive electronics into the TIA portal. They have been developed and configured for use with the NORDAC *BASE* (SK 180E and SK 190E), NORDAC *FLEX* (SK 200E … SK 235E), NORDAC *LINK* (SK 250E-FDS … SK 260E-FDS), NORDAC *ON* (SK 300P) and NORDAC *PRO* (SK 500E … SK 545E and SK 550P) frequency inverters from Getriebebau NORD GmbH & Co. KG.

Any other use of the modules is deemed to be incorrect use.

2.2 Selection and qualification of personnel

The standard modules, bus interface and frequency inverters may only be installed and started up by qualified electricians. These must possess the necessary knowledge with regard to the frequency inverter, the technology of the field bus system, as well as configuration software and the controller (bus master) which are used.

In addition, the qualified electricians must also be familiar with the installation, commissioning and operation of the bus interfaces and the frequency inverters as well as all of the accident prevention regulations, guidelines and laws which apply at the place of use.

2.2.1 Qualified personnel

Qualified personnel includes persons who due to their specialist training and experience have sufficient knowledge in a specialised area and are familiar with the relevant occupational safety and accident prevention regulations as well as the generally recognised technical rules.

These persons must be authorised to carry out the necessary work by the operator of the system.

2.2.2 Qualified electrician

An electrician is a person who, because of their technical training and experience, has sufficient knowledge with regard to

- Switching on, switching off, isolating, earthing and marking power circuits and devices,
- Proper maintenance and use of protective devices in accordance with defined safety standards.
- Emergency treatment of injured persons.

2.3 Safety information

Only use TIA standard modules from the NORD DRIVESYSTEMS Group for their intended purpose, 🕮 Section 2.1 "Intended use".

To ensure safe operation observe all of the instructions in this manual, and in particular the warning information in the other applicable documents for the electronic drive technology which is used.

Work on and with electronic drive technology devices, e.g. bus interfaces and frequency inverters, must only be carried out by qualified personnel, 🕮 Section 2.2 "Selection and qualification of personnel".

2.4 Exclusion of liability

This technical documentation is for users who wish to use TIA standard modules from Getriebebau NORD GmbH & Co. KG. It is solely for information purposes and is only intended for qualified and adequately trained specialist personnel (📖 Section 2.2 "Selection and qualification of personnel"). The information is intended as a guide and was compiled and produced in good faith. No claim is made with regard to the completeness of this documentation, in particular for the listing of directives and standards. The technical and schematic diagrams do not constitute binding solutions or application suggestions for the particular application. The illustrated application examples only relate to modules from Getriebebau NORD GmbH & Co. KG. It is the sole responsibility of the user to check and comply with all laws, directives and standards which are relevant for the particular application, design, manufacture and operation of the products. Users act independently at their own responsibility. Getriebebau NORD GmbH & Co. KG accepts no liability or warranties for solutions which are planned by the user.

3 Integration into TIA portal

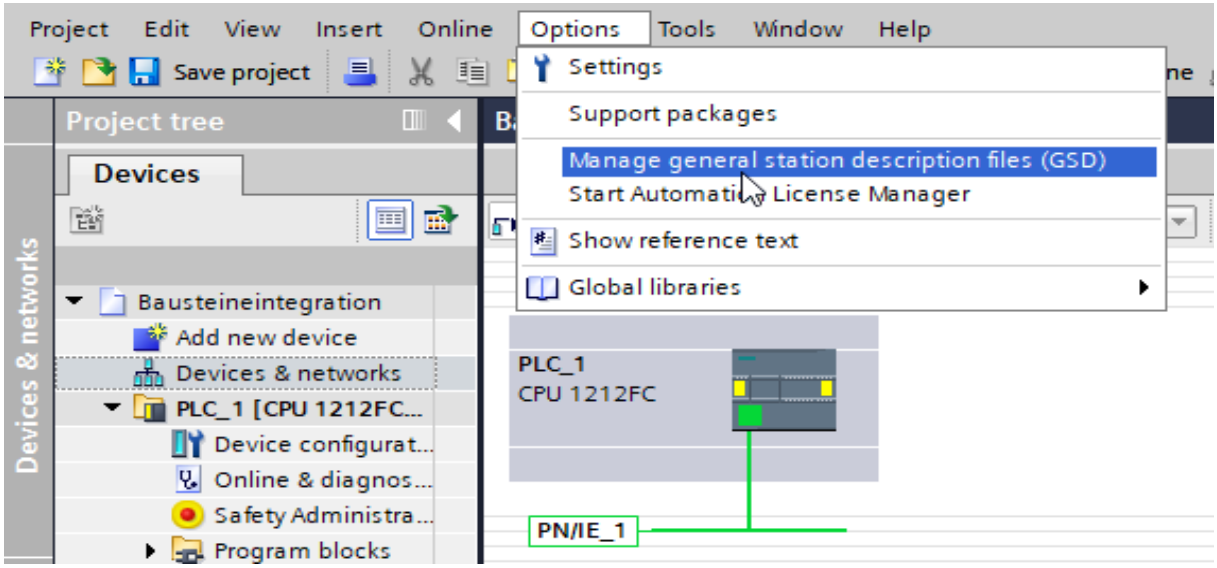
3.1 Installation of device description file

The functionality and the device characteristics of the bus interface are described in a device description file (GSDML file). This file contains all the relevant data, which are of importance for the exchange of data with the bus interface.

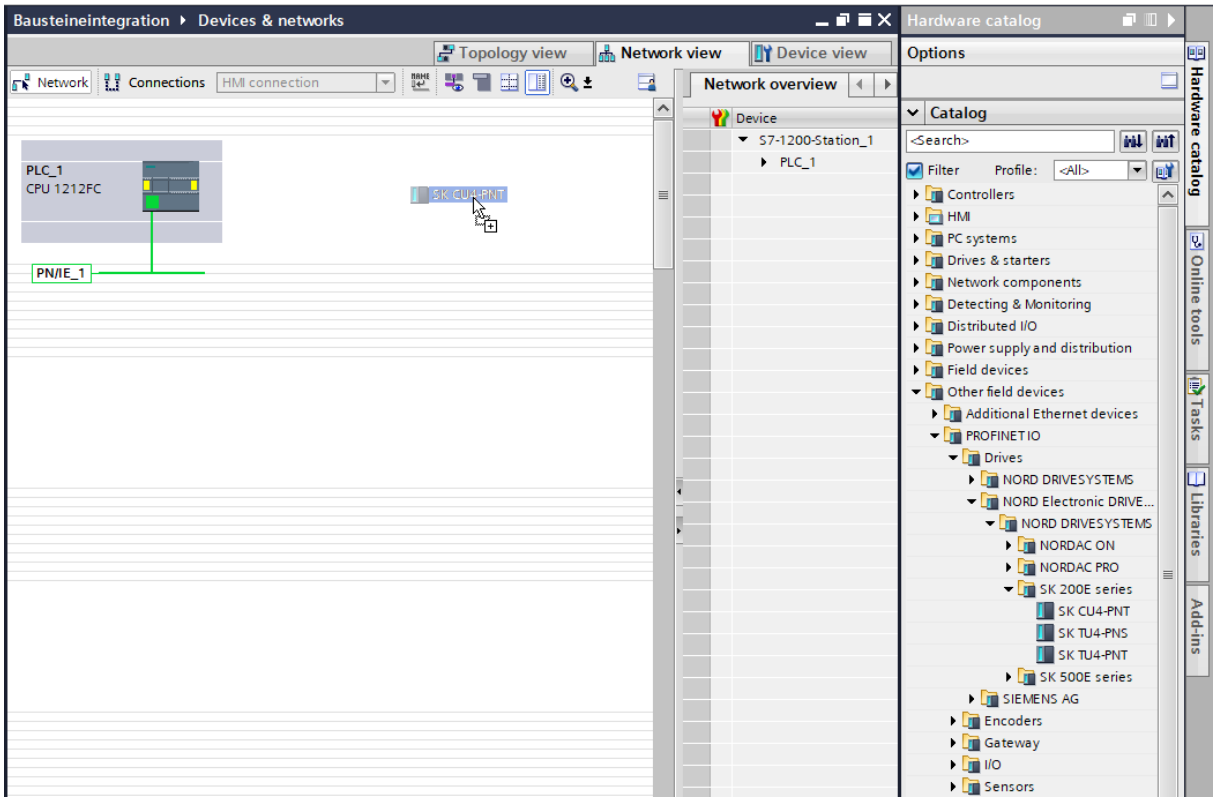
The current device description file can be obtained from our website www.nord.com directly from the link Fieldbus Files by selecting the “PROFINET” or “PROFIBUS” option.

3.1.1 PROFINET procedure

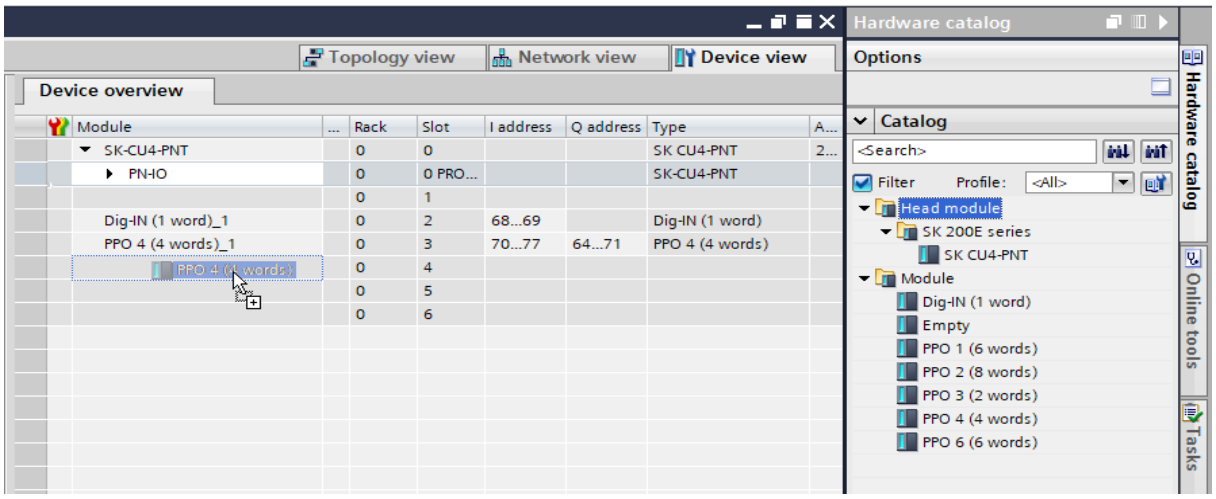
1. Install the GSDML file via the administration manager.



2. In the TIA network view, drag (insert) the required bus interface from the hardware catalogue into the project.



3. In the TIA device view, configure the slots for the specific application. For this, drag (insert) the modules from the hardware catalogue into the free slots of the bus interface. Existing modules can be deleted from the slots beforehand.



The following are configurable*:

Slot 1	Access of PROFIsafe F-Data in the form of F-Input data and F-Output data
Slot 2	Access of the module's (not the frequency inverter's) individual I/Os
Slots 3–10	Access to the frequency inverters' cyclic process data

*Availability of slots depends on the module

For the slots 3–10, the PPO type can be selected according to the following table.

	PKW				PZD					
	PKE	IND	PWE	PWE	PZD1	PZD2	PZD3	PZD4	PZD5	PZD6
					CTW	SW1	SW2	SW3	SW4	SW5
					STW	IW1	IW2	IW3	IW4	IW5
	1st word	2nd word	3rd word	4th word	5th word	6th word	7th word	8th word		
PPO 1	x	x	x	x	x	x				
PPO 2	x	x	x	x	x	x	x	x		
					1st word	2nd word	3rd word	4th word	5th word	6th word
PPO 3					x	x				
PPO 4					x	x	x	x		
PPO 6					x	x	x	x	x	x

*A more detailed description of the data communication to PROFINET can be found in the BU2400

Up to eight* frequency inverters, which can be interconnected via the system bus, can be integrated into PROFINET IO via the bus interface's gateway function. The system bus is CANopen based.

The assignment of the frequency inverters to the slots takes place via the frequency inverters' CAN bus address P515[1].

If the gateway function is not used, the value in P515[1] must be left in the factory setting.

Device	FI1	FU2	FU3	FU4	FU5*	FU6*	FU7*	FU8*
Slot	3	4	5	6	7	8	9	10
CAN ID	32	34	36	38	40	42	44	46

The number of the maximum possible participants can be found in the following table.

	Decentralised frequency inverters			Centralised frequency inverters		
	SK 1x0E	SK 2xxE	SK 3xxP	SK 500–535E	SK 54xE	SK 5xxP
Frequency inverter	4	4	1	8	8	8
Input/output extensions	8	8	0	—	16	16
CANopen encoder	4	4	0	8	8	8
Bus interface	1	1	1	1	1	1
NORDCON software tool (PC)	1	1	1	1	1	1

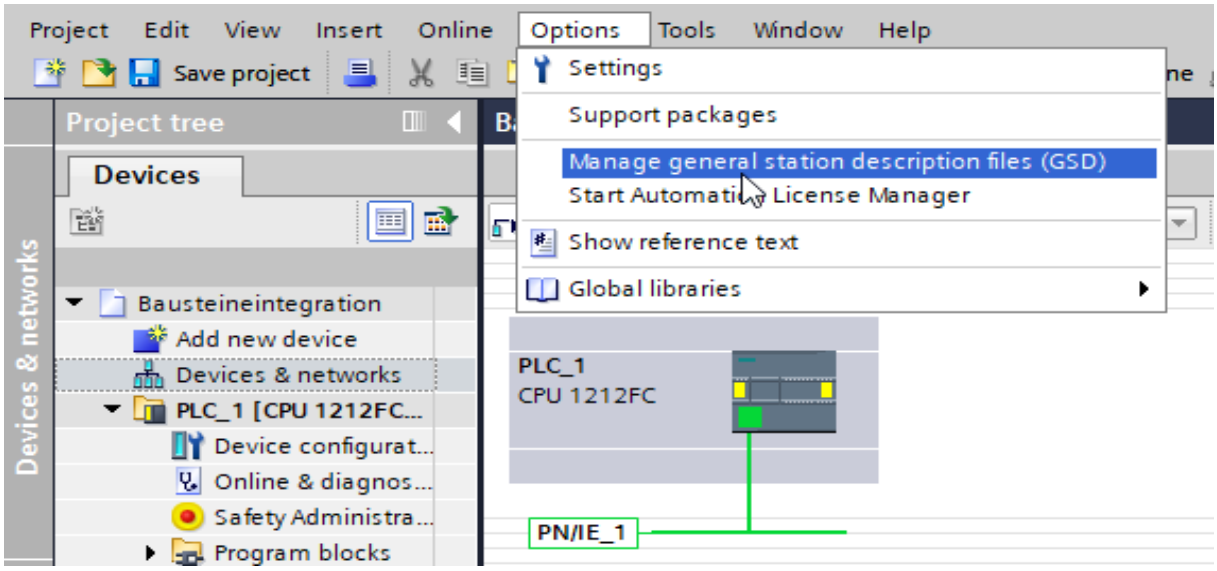
To reduce the utilisation of the PROFINET IO bus, it is sufficient to only configure the slots required in the application.

Information

By default, operation for FI 1 is pre-configured in the GSDML file.

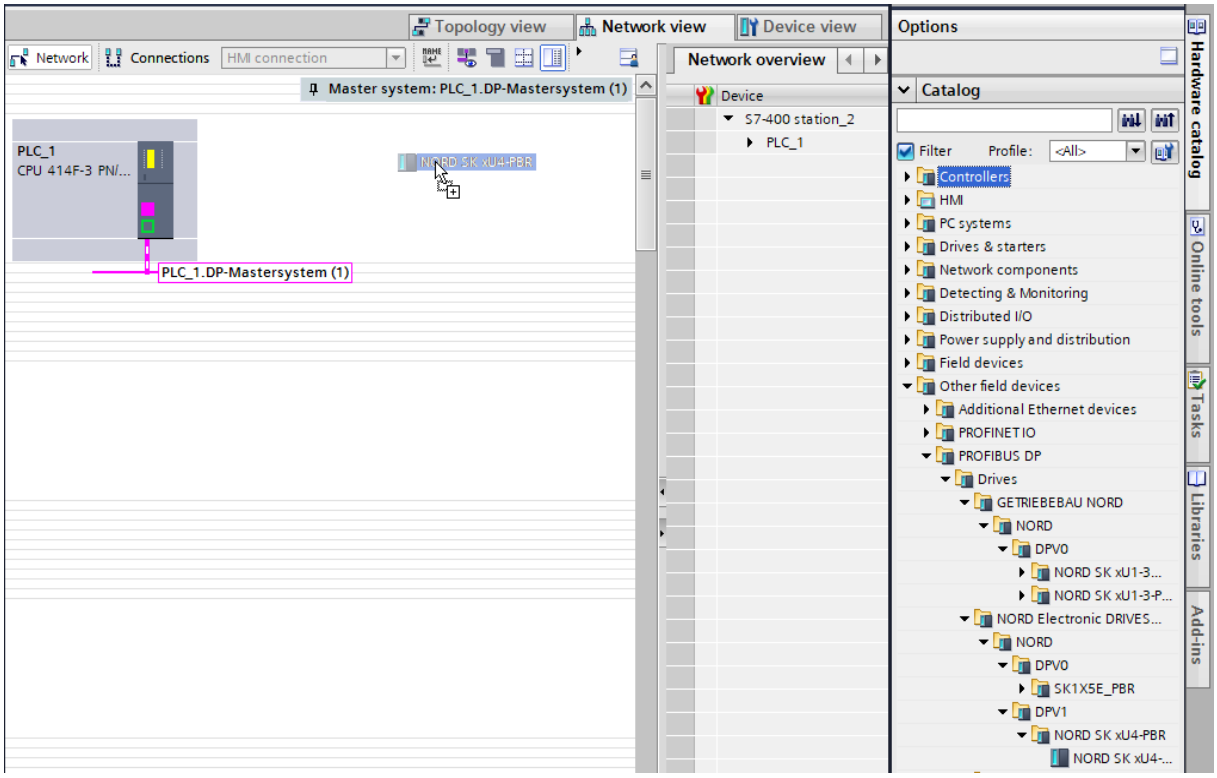
3.1.2 PROFIBUS procedure

1. Install the GSDML file via the administration manager.

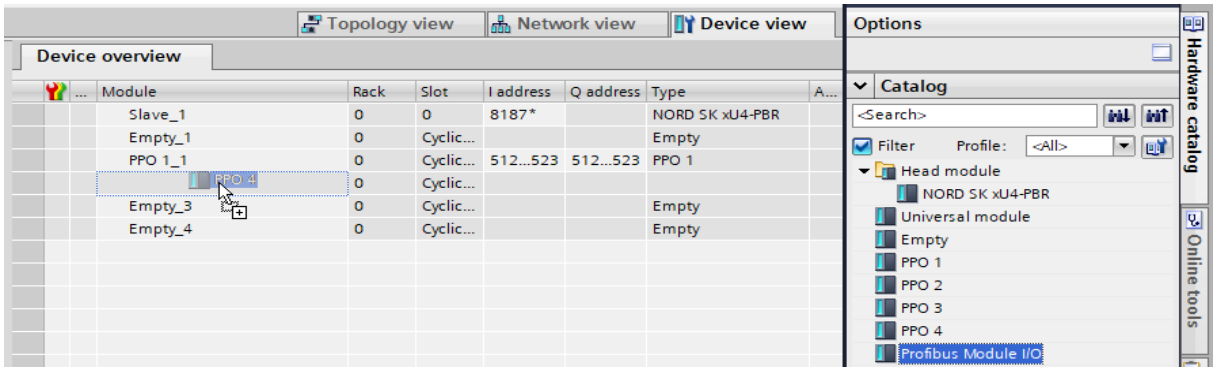


File	Bus interface	Frequency inverter
NORD_1_5.gsd	SK TU3-PBR	SK 5xxE series
NORD_12.gsd	SK TU3-PBR-24V	
NORD0BA8.gsd	SK CU4-PBR	SK 180E, SK 2xxE and SK 2xxE-FDS series
	SK TU4-PBR	

2. In the TIA network view, drag (insert) the required bus interface from the hardware catalogue into the project.



3. In the TIA device view, configure the slots for the specific application. For this, drag (insert) the modules from the hardware catalogue into the free slots of the bus interface. Existing modules can be deleted from the slots beforehand.



The following are configurable*:

Slot 1 (cyclic bus module)	Access of the module's (not the frequency inverter's) individual I/Os
Slots 2–5 (cyclic FI 1–FI 4)	Access to the frequency inverters' cyclic process data

For the slots 2–5, the PPO type can be selected according to the following table.

	PKW				PZD					
	PKE	IND	PWE	PWE	PZD1	PZD2	PZD3	PZD4	PZD5	PZD6
					CTW	SW1	SW2	SW3	SW4	SW5
					STW	IW1	IW2	IW3	IW4	IW5
	1st word	2nd word	3rd word	4th word	5th word	6th word	7th word	8th word		
PPO 1	x	x	x	x	x	x				
PPO 2	x	x	x	x	x	x	x	x		
					1st word	2nd word	3rd word	4th word	5th word	6th word
PPO 3					x	x				
PPO 4					x	x	x	x		

*A more detailed description of the data communication to PROFIBUS can be found in the BU2700

Up to four* frequency inverters, which can be interconnected via the system bus, can be integrated into PROFIBUS DP via the bus interface's gateway function. The system bus is CANopen based.

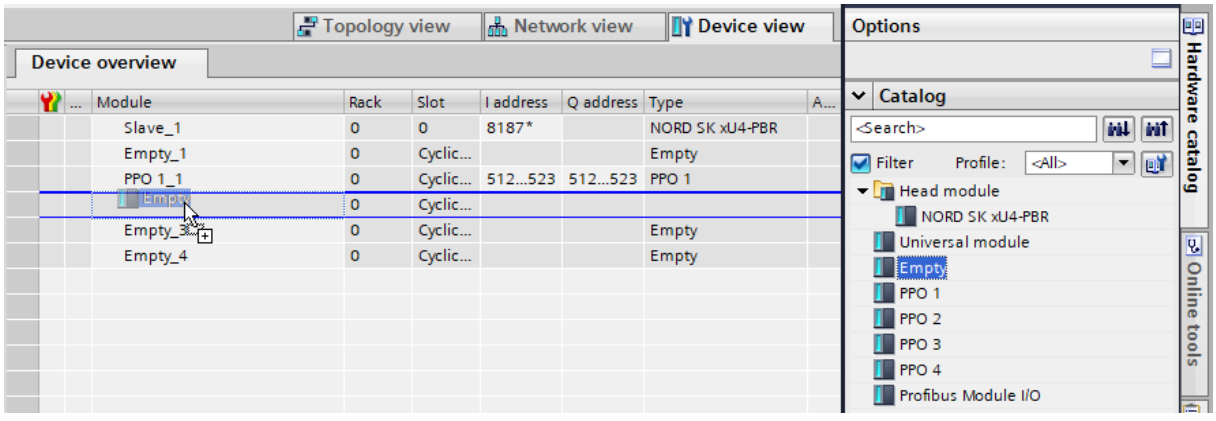
The assignment of the frequency inverters to the slots takes place via the frequency inverters' CAN bus address P515[1].

If the gateway function is not used, the value in P515[1] must be left in the factory setting.

Device	FI1	FI2	FI3	FI4
Slot	2	3	4	5
CAN ID	32	34	36	38

Information

Unused slots must be equipped with the Empty module.



Information

By default, operation for FI 1 is pre-configured in the GSDML file.

3.2 Installation of standard modules

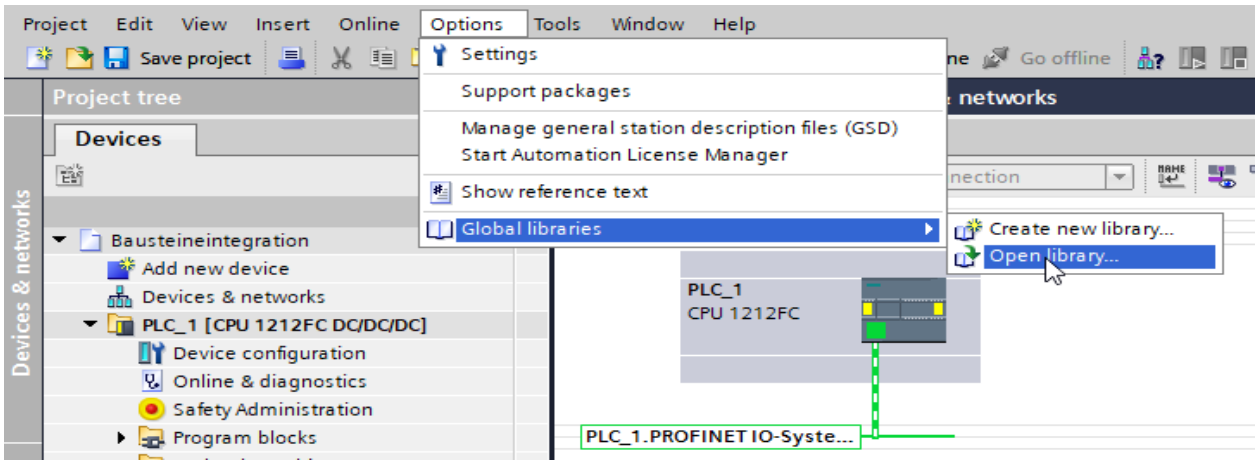
The current standard modules can be obtained from our website www.nord.com directly from the link NORD TIA Standard Modules.

The download provides for the TIA portal standard modules for the NORDAC *BASE* (SK 180E and SK 190E), NORDAC *FLEX* (SK 200E … SK 235E), NORDAC *LINK* (SK 250E-FDS … SK 260E-FDS), NORDAC *ON* (SK 300P) and NORDAC *PRO* (SK 500E … SK 545E and SK 550P) frequency inverters from Getriebebau NORD GmbH & Co. KG.

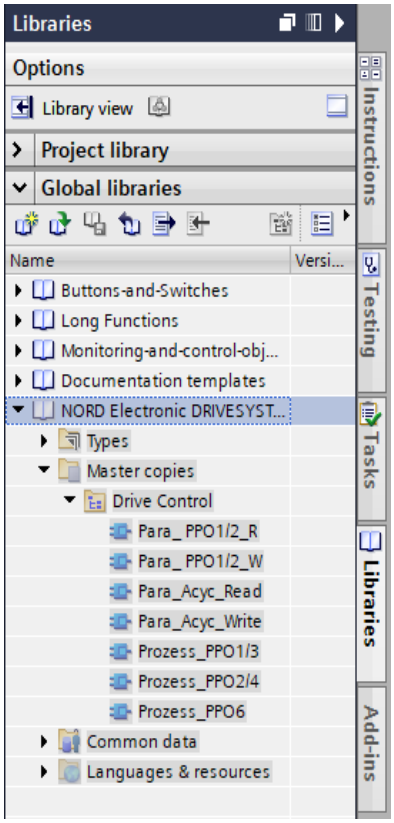
A distinction is made between process modules, which are used for cyclic communication for the control and evaluation of the device, and parameter modules, which allow for the reading and changing of individual parameters.

Procedure

1. Download the library from the homepage and unzip it.
2. Open the global libraries manager, and select and install the unzipped file.



3. Drag the required function module from the library into the program block.



4 Process modules

Process modules are used to control and evaluate a frequency inverter. No parameters are read or changed. Parameters are exclusively accessed via the intended parameter modules.

Call-up of the process modules must be carried out in the cyclic program.

The following modules are available for cyclic communication:

- Process_PPO1/3
- Process_PPO2/4
- Process_PPO6

They are used depending on the PPO type configured in the TIA portal.

Structure of PPO types:

	PKW				**PZD**					
	PKE	IND	PWE	PWE	PZD1	PZD2	PZD3	PZD4	PZD5	PZD6
					CTW	SW1	SW2	SW3	SW4	SW5
					STW	IW1	IW2	IW3	IW4	IW5
	1st word	2nd word	3rd word	4th word	5th word	6th word	7th word	8th word		
PPO 1	x	x	x	x	x	x				
PPO 2	x	x	x	x	x	x	x	x		
					1st word	2nd word	3rd word	4th word	5th word	6th word
PPO 3					x	x				
PPO 4					x	x	x	x		
PPO 6					x	x	x	x	x	x

4.1 Process_PPO1/3

4.1.1 Task

This function module must be called in the cyclic program, and is intended for the PPO types PPO1 and PPO3.

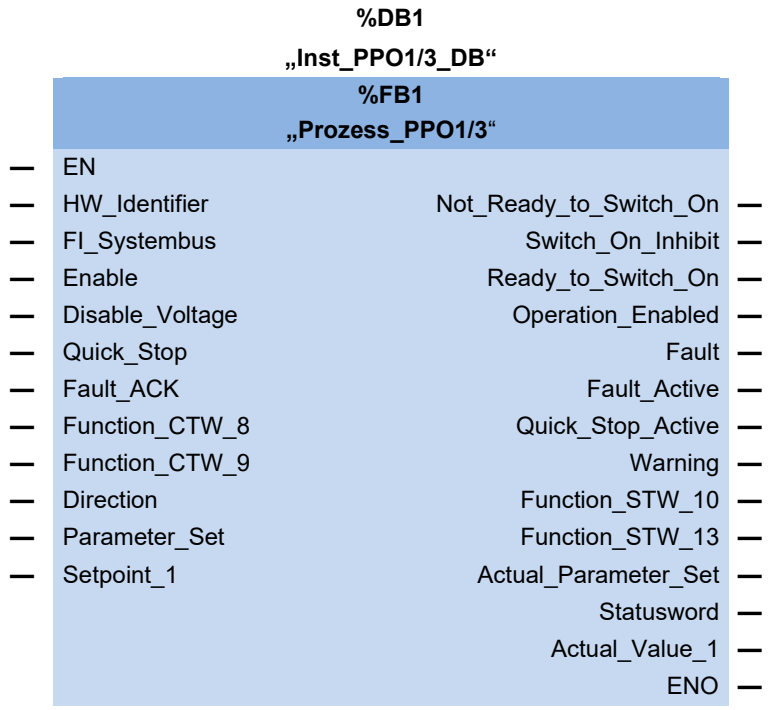
	PKW				PZD					
	PKE	IND	PWE	PWE	PZD1	PZD2	PZD3	PZD4	PZD5	PZD6
					CTW	SW1	SW2	SW3	SW4	SW5
					STW	IW1	IW2	IW3	IW4	IW5
	1st word	2nd word	3rd word	4th word	5th word	6th word	7th word	8th word		
PPO 1	x	x	x	x	x	x				
					1st word	2nd word	3rd word	4th word	5th word	6th word
PPO 3					x	x				

In comparison with the other process data modules, due to the PPO type, a maximum of

- one 16 bit set or actual value

can be transferred with this process data module.

4.1.2 Module parameters



4.1.2.1 Inputs of module parameters PPO 1 and PPO3

Parameter name	Type	Description
HW_Identifier	HW_IO	The module's hardware identifier. You may indicate it with a symbol or with the value of the hardware identifier. Recommendation: For S7-1200/1500 controls, identification is realised via system constants, which are generated automatically for the centralised and decentralised peripherals upon creation of the device configuration. This offers the advantage that they can address via device names instead of hardware identifiers. The symbolic system constant for NORD modules is composed of the device name and the addition "~Head". Example: "SK-TU4-PNT~Head". This is listed in the system constants in the device view.
FI_Systembus	INT	Selection of the frequency inverter to be used in the system bus integration. 1= FI 1 at slot 3 8= FU 8 at slot 10[1)]
Enable	BOOL	Enable drive unit
Disable_Voltage	BOOL	0= "Voltage disable" is cancelled 1= The output voltage is switched off, the FI goes into "Switch-on inhibit" status
Quick_Stop	BOOL	0= "Quick stop" is cancelled 1= Emergency stop with programmed emergency stop time; at f = 0 Hz voltage enable; the FI goes into "switch-on inhibit" status
Fault_ACK	BOOL	Faults which are no longer active are acknowledged with a change from 0 to 1. **Information** If a digital input has been programmed for the "Fault acknowledgem." function, this bit must not be permanently set to 1 via the bus (otherwise, flank evaluation would be prevented).
Function_CTW_8	BOOL	Bit 8 in the control word
Function_CTW_9	BOOL	Bit 9 in the control word
Direction	BOOL	Direction of rotation 0= Clockwise, to the right 1= Anticlockwise, to the left
Parameter_Set	INT	Selection of the required parameter set (1...4).
Setpoint_1	INT	Setpoint 1 (16 bit integer)

1) See device number assignment, slot and CAN-ID in 🕮 Section 3.1.1 "PROFINET procedure".

4.1.2.2 Outputs of module parameters PPO1 and PPO3

Parameter name	Type	Description
Not_Ready_to_Switch_On	BOOL	1= The drive is in the “Not ready to switch-on” state
Switch_On_Inhibit	BOOL	1= The drive is in the “Switch-on inhibit” state
Ready_to_Switch_On	BOOL	1= The drive is in the “Ready to switch-on” state
Operation_Enabled	BOOL	1= The drive is in the “Operation enabled” state
Fault	BOOL	1= The drive is in the “Fault” state and is therefore not in operation. After acknowledgement, the frequency inverter goes into status "Switch-on inhibit". A new positive flank must be generated at the enabling output (“Enable"). Unless the automatic start is activated, it switches to the “Operation enabled” state
Fault_Active	BOOL	1= The drive is in the “Fault active” state. The cause of error is still active and the error cannot be acknowledged.
Quick_Stop_Active	BOOL	1= The drive is in the “Switch-on inhibit” state because the “Quick stop” is active.
Warning	BOOL	1= The frequency inverter has generated a warning. The drive remains in the “Operation enabled” state, acknowledgement is not necessary.
Function_STW_10	BOOL	Corresponds to bit 10 in the status word
Function_STW_13	BOOL	Corresponds to bit 13 in the status word
Actual_Parameter_Set	INT	Currently used parameter set (1…4)
Statusword	WORD	Status word from the frequency inverter
Actual_Value_1	INT	Actual value 1 (16 bit integer)

4.2 Process_PPO2/4

4.2.1 Task

This function module must be called in the cyclic program, and is intended for the PPO types PPO2 and PPO4.

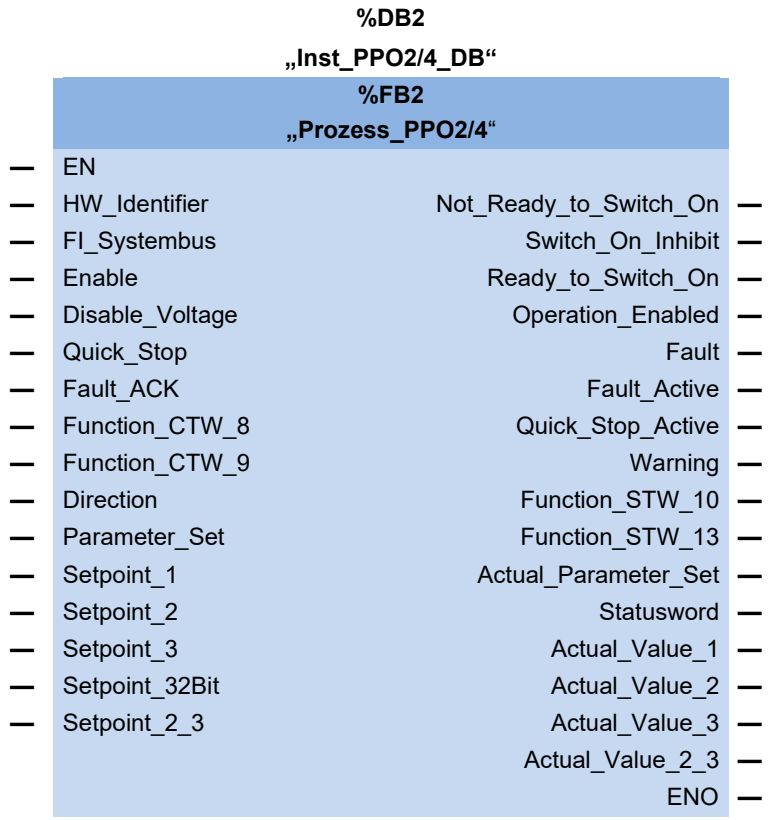
	PKW				PZD					
	PKE	IND	PWE	PWE	PZD1	PZD2	PZD3	PZD4	PZD5	PZD6
					CTW	SW1	SW2	SW3	SW4	SW5
					STW	IW1	IW2	IW3	IW4	IW5
	1st word	2nd word	3rd word	4th word	5th word	6th word	7th word	8th word		
PPO 2	x	x	x	x	x	x	x	x		
					1st word	2nd word	3rd word	4th word	5th word	6th word
PPO 4					x	x	x	x		

In comparison with the other process data modules, due to the PPO type, a maximum of

- up to three 16 bit set or actual values or
- one 16 bit set or actual value and one 32 bit set or actual value

can be transferred with this process data module.

4.2.2 Module parameters



4.2.2.1 Inputs of module parameters PPO2 and PPO4

Parameter name	Type	Description
HW_Identifier	HW_IO	The module's hardware identifier. You may indicate it with a symbol or with the value of the hardware identifier. Recommendation: For S7-1200/1500 controls, identification is realised via system constants, which are generated automatically for the centralised and decentralised peripherals upon creation of the device configuration. This offers the advantage that they can address via device names instead of hardware identifiers. The symbolic system constant for NORD modules is composed of the device name and the addition "~Head". Example: "SK-TU4-PNT~Head". This is listed in the system constants in the device view.
FI_Systembus	INT	Selection of the frequency inverter to be used in the system bus integration. 1= FU 8 at slot 3 8= FU 8 at slot 10[1)]
Enable	BOOL	Enable drive unit
Disable_Voltage	BOOL	0= "Voltage disable" is cancelled 1= The output voltage is switched off, the FI goes into "Switch-on inhibit" status
Quick_Stop	BOOL	0= "Quick stop" is cancelled 1= Emergency stop with programmed emergency stop time; at f = 0 Hz voltage enable; the FI goes into "switch-on inhibit" status
Fault_ACK	BOOL	Faults which are no longer active are acknowledged with a change from 0 to 1. **Information** If a digital input has been programmed for the "Fault acknowledgem." function, this bit must not be permanently set to 1 via the bus (otherwise, flank evaluation would be prevented).
Function_CTW_8	BOOL	Bit 8 in the control word
Function_CTW_9	BOOL	Bit 9 in the control word
Direction	BOOL	Direction of rotation 0= Clockwise, to the right 1= Anticlockwise, to the left
Parameter_Set	INT	Selection of the required parameter set (1...4).
Setpoint_1	INT	Setpoint 1 (16 bit integer)
Setpoint_2	INT	Setpoint 2 (16 bit integer)
Setpoint_3	INT	Setpoint 3 (16 bit integer)
Setpoint_32Bit	BOOL	0= Values from Setpoint_2 and Setpoint_3 are sent 1= Value Setpoint_2_3 is sent instead of Setpoint_2 and Setpoint_3 as 32 bit value.
Setpoint_2_3	DINT	Setpoint 2_3 (32 bit integer) combined setpoint. Inputs Setpoint_2 and Setpoint_3 are ignored if Setpoint_32Bit is set.

1) See device number assignment, slot and CAN-ID in 🕮 Section 3.1.1 "PROFINET procedure".

4.2.2.2 Outputs of module parameters PPO2 and PPO4

Parameter name	Type	Description
Not_Ready_to_Switch_On	BOOL	1= The drive is in the “Not ready to switch-on” state
Switch_On_Inhibit	BOOL	1= The drive is in the “Switch-on inhibit” state
Ready_to_Switch_On	BOOL	1= The drive is in the “Ready to switch-on” state
Operation_Enabled	BOOL	1= The drive is in the “Operation enabled” state
Fault	BOOL	1= The drive is in the “Fault” state and is therefore not in operation. After acknowledgement, the frequency inverter goes into status "Switch-on inhibit". A new positive flank must be generated at the enabling output (“Enable"). Unless the automatic start is activated, it switches to the “Operation enabled” state
Fault_Active	BOOL	1= The drive is in the “Fault active” state. The cause of error is still active and the error cannot be acknowledged.
Quick_Stop_Active	BOOL	1= The drive is in the “Switch-on inhibit” state because the “Quick stop” is active.
Warning	BOOL	1= The frequency inverter has generated a warning. The drive remains in the “Operation enabled” state, acknowledgement is not necessary.
Function_STW_10	BOOL	Corresponds to bit 10 in the status word
Function_STW_13	BOOL	Corresponds to bit 13 in the status word
Actual_Parameter_Set	INT	Currently used parameter set (1…4)
Statusword	WORD	Status word from the frequency inverter
Actual_Value_1	INT	Actual value 1 (16 bit integer)
Actual_Value_2	INT	Actual value 2 (16 bit integer)
Actual_Value_3	INT	Actual value 3 (16 bit integer)
Actual_Value_2_3	INT	Actual value 2_3 (32 bit integer)

4.3 Process_PPO6

4.3.1 Task

This function module must be called in the cyclic program, and is intended for the PPO type PPO6.

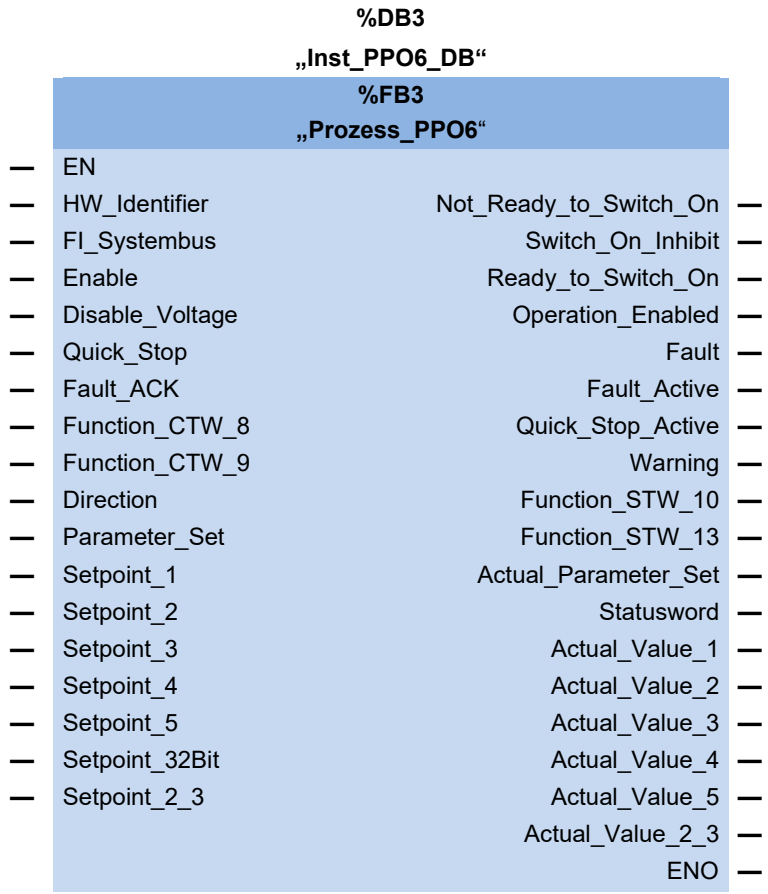
	PKW				PZD					
	PKE	IND	PWE	PWE	PZD1	PZD2	PZD3	PZD4	PZD5	PZD6
					CTW	SW1	SW2	SW3	SW4	SW5
					STW	IW1	IW2	IW3	IW4	IW5
					1st word	2nd word	3rd word	4th word	5th word	6th word
PPO 6					x	x	x	x	x	x

In comparison with the other process data modules, due to the PPO type, a maximum of

- up to five 16 bit set or actual values or
- three 16 bit set or actual value and one 32 bit set or actual value

can be transferred with this process data module.

4.3.2 Module parameters



4.3.2.1 Inputs of module parameter PPO6

Parameter name	Type	Description
HW_Identifier	HW_IO	The module's hardware identifier. You may indicate it with a symbol or with the value of the hardware identifier. Recommendation: For S7-1200/1500 controls, identification is realised via system constants, which are generated automatically for the centralised and decentralised peripherals upon creation of the device configuration. This offers the advantage that they can address via device names instead of hardware identifiers. The symbolic system constant for NORD modules is composed of the device name and the addition "~Head". Example: "SK-TU4-PNT~Head". This is listed in the system constants in the device view.
FI_Systembus	INT	Selection of the frequency inverter to be used in the system bus integration. 1= FU 8 at slot 3 8= FU 8 at slot 10[1)]
Enable	BOOL	Enable drive unit
Disable_Voltage	BOOL	0= "Voltage disable" is cancelled 1= The output voltage is switched off, the FI goes into "Switch-on inhibit" status
Quick_Stop	BOOL	0= "Quick stop" is cancelled 1= Emergency stop with programmed emergency stop time; at f = 0 Hz voltage enable; the FI goes into "switch-on inhibit" status
Fault_ACK	BOOL	Faults which are no longer active are acknowledged with a change from 0 to 1. **Information** If a digital input has been programmed for the "Fault acknowledgem." function, this bit must not be permanently set to 1 via the bus (otherwise, flank evaluation would be prevented).
Function_CTW_8	BOOL	Bit 8 in the control word
Function_CTW_9	BOOL	Bit 9 in the control word
Direction	BOOL	Direction of rotation 0= Clockwise, to the right 1= Anticlockwise, to the left
Parameter_Set	INT	Selection of the required parameter set (1...4).
Setpoint_1	INT	Setpoint 1 (16 bit integer)
Setpoint_2	INT	Setpoint 2 (16 bit integer)
Setpoint_3	INT	Setpoint 3 (16 bit integer)
Setpoint_4	INT	Setpoint 4 (16 bit integer)[2)]
Setpoint_5	INT	Setpoint 5 (16 bit integer)[2)]
Setpoint_32Bit	BOOL	0= Values from Setpoint_2 and Setpoint_3 are sent 1= Value Setpoint_2_3 is sent instead of Setpoint_2 and Setpoint_3 as 32 bit value.
Setpoint_2_3	DINT	Setpoint 2_3 (32 bit integer) combined setpoint. Inputs Setpoint_2 and Setpoint_3 are ignored if Setpoint_32Bit is set.

1) See device number assignment, slot and CAN-ID in 🕮 Section 3.1.1 "PROFINET procedure".

2) Only for SK TU3-PNT or SK 550P

4.3.2.2 Outputs of module parameter PPO6

Parameter name	Type	Description
Not_Ready_to_Switch_On	BOOL	1= The drive is in the “Not ready to switch-on” state
Switch_On_Inhibit	BOOL	1= The drive is in the “Switch-on inhibit” state
Ready_to_Switch_On	BOOL	1= The drive is in the “Ready to switch-on” state
Operation_Enabled	BOOL	1= The drive is in the “Operation enabled” state
Fault	BOOL	1= The drive is in the “Fault” state and is therefore not in operation. After acknowledgement, the frequency inverter goes into status "Switch-on inhibit". A new positive flank must be generated at the enabling output (“Enable"). Unless the automatic start is activated, it switches to the “Operation enabled” state
Fault_Active	BOOL	1= The drive is in the “Fault active” state. The cause of error is still active and the error cannot be acknowledged.
Quick_Stop_Active	BOOL	1= The drive is in the “Switch-on inhibit” state because the “Quick stop” is active.
Warning	BOOL	1= The frequency inverter has generated a warning. The drive remains in the “Operation enabled” state, acknowledgement is not necessary.
Function_STW_10	BOOL	Corresponds to bit 10 in the status word
Function_STW_13	BOOL	Corresponds to bit 13 in the status word
Actual_Parameter_Set	INT	Currently used parameter set (1…4)
Statusword	WORD	Status word from the frequency inverter
Actual_Value_1	INT	Actual value 1 (16 bit integer)
Actual_Value_2	INT	Actual value 2 (16 bit integer)
Actual_Value_3	INT	Actual value 3 (16 bit integer)
Actual_Value_4	INT	Actual value 4 (16 bit integer) [1)]
Actual_Value_5	INT	Actual value 5 (16 bit integer) [1)]
Actual_Value_2_3	INT	Actual value 2_3 (32 bit integer)

1) Only for SK 5xxE and SK 550P

5 Parameter modules

The parameter modules are used to read out parameter values from the frequency inverters and the bus interface or to write values into them. They must be called in the cyclic program.

The access can be done cyclically with the modules “Para_PPO1/2_R” and “Para_PPO1/2_W” or acyclically with the modules “Para_Acyc_Read” and “Para_Acyc_Write”.

Only the types PPO1 and PPO2 contain information about the parameter values in their data structure to enable cyclic access.

The cyclic and acyclic reading and writing access is carried out via the hardware ID. This is explicitly assigned automatically by TIA during the hardware configuration.

Access type of the communication	Modules used	Description
Cyclic	“Para_PPO1/2_R“	Reading
	“Para_PPO1/2_W“	Writing
Acyclic	“Para_Acyc_Read“	Reading[1)]
	“Para_Acyc_Write“	Writing[1)]

1) Not possible with SK TU3-PBR.

Structure of PPO types:

	PKW				PZD					
	PKE	IND	PWE	PWE	PZD1	PZD2	PZD3	PZD4	PZD5	PZD6
					CTW	SW1	SW2	SW3	SW4	SW5
					STW	IW1	IW2	IW3	IW4	IW5
	1st word	2nd word	3rd word	4th word	5th word	6th word	7th word	8th word		
PPO 1	x	x	x	x	x	x				
PPO 2	x	x	x	x	x	x	x	x		
					1st word	2nd word	3rd word	4th word	5th word	6th word
PPO 3					x	x				
PPO 4					x	x	x	x		
PPO 6					x	x	x	x	x	x

Characteristics of cyclic/ acyclic accesses:

cyclic parameter accesses:

There is a higher bus load compared to acyclic parameter access, since the Profinet telegram length of the cyclic communication is longer due to the selected PPO types. Even when there are no parameter accesses, PKW data are filled with zeros and transmitted.

Another characteristic of the cyclic parameter accesses is that no bus interface parameters can be read out/ written. This is only possible with acyclic parameter accesses.

acyclic parameter accesses:

The data for parameter access is transferred only if a parameter access occurs.

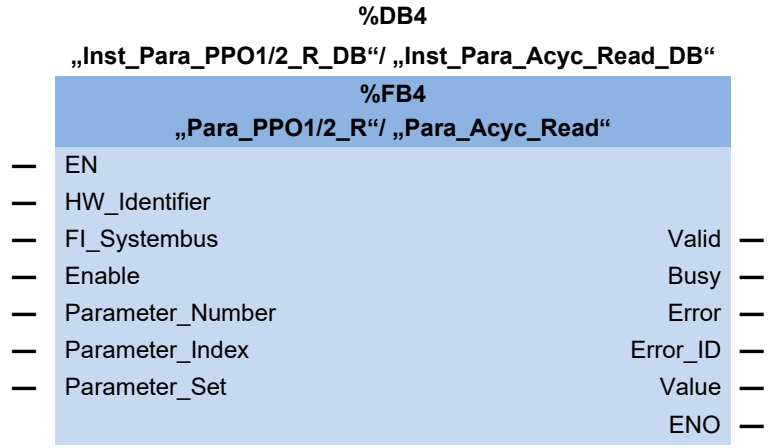
The priority of acyclic communication is lower than that of cyclic communication.

Information

General recommendation: use acyclic parameter accesses if a parametrisation is to be carried out once, e.g. during commissioning or during a device replacement. Cyclic parameter access is particularly suited if e.g. information parameters are to be read out continuously.

5.1 “Para_PPO1/2_R” and “Para_Acyc_Read”

5.1.1 Module parameters



5.1.1.1 Inputs of module parameters “Para_PPO1/2_R” and “Para_Acyc_Read”

Parameter name	Type	Description
HW_Identifier	HW_IO	The module’s hardware identifier. You may indicate it with a symbol or with the value of the hardware identifier. Recommendation: For S7-1200/1500 controls, identification is realised via system constants, which are generated automatically for the centralised and decentralised peripherals upon creation of the device configuration. This offers the advantage that they can address via device names instead of hardware identifiers. The symbolic system constant for NORD modules is composed of the device name and the addition “~Head”. Example: "SK-TU4-PNT~Head". This is listed in the system constants in the device view.
FI_Systembus	INT	Selection of the frequency inverter to be used in the system bus integration. 0= Bus interface[1)] 1= FU 8 at slot 3 8= FU 8 at slot 10[2)]
Enable	BOOL	0= Parameter reading is not requested. 1= Parameter reading is requested.
Parameter_Number	INT	Parameter number to be read.
Parameter_Index	INT	Selection of the required index. For details of which parameters have an index, please refer to the manual for the frequency inverter. If this parameter does not have one, a zero must be entered.
Parameter_Set	INT	Selection of the required parameter set (1...4). For details of which parameters depend on the parameter set, please refer to the manual for the frequency inverter. If this parameter does not depend on the parameter set, a zero must be entered.

1) Only possible for Para_Acyc_Read

2) See device number assignment, slot and CAN-ID in 🕮 Section 3.1.1 "PROFINET procedure".

The parameter request can be used in 4 different ways:

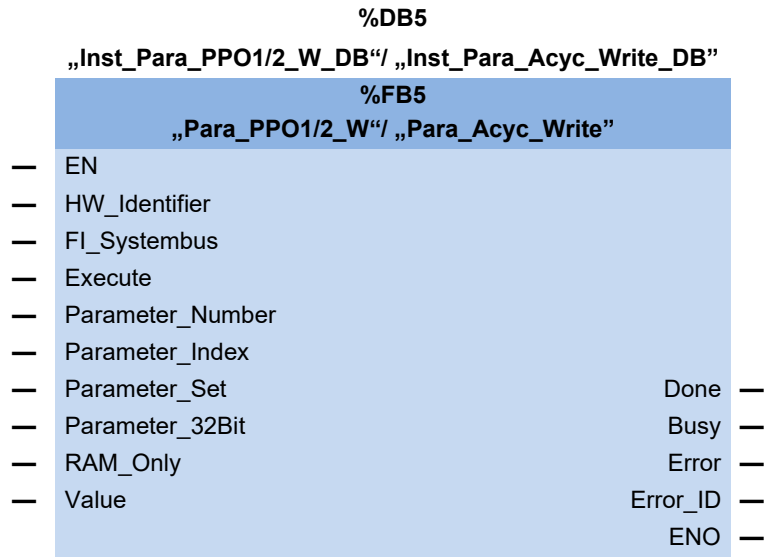
1. Enable is maximally activated until the outputs Valid or Error switch to 1 and the module inputs are not changed during the parameter request.
   – The parameter is read out once and the outputs (Valid, ErrorID, Value) are set exclusively for a single cycle.
2. Enable is set to 0 again before the outputs Valid or Error switch to 1 and the module inputs are changed during the parameter request.
   – The original parameter request is processed to the end. After the parameter request is completed, Busy is set to 0 again, the result of the parameter request is not output to the outputs (Valid, Error, ErrorID, Value).
3. Enable is permanently set and the module inputs are not changed during the parameter request.
   – The parameter is permanently read out cyclically. Valid, Error, ErrorID and Value remain present at the output between the parameter requests.
4. Enable is permanently set and the module inputs are changed during the parameter request.
   – The parameters are permanently read out cyclically. During the switch of the parameter request, Valid and Error are set immediately to 0. Only when the new parameter request has been completed are the outputs Valid, Error, ErrorID and Value set again.

5.1.1.2 Outputs of module parameters “Para_PPO1/2_R” and “Para_Acyc_Read”

Parameter name	Type	Description
Valid	BOOL	1= The read, valid parameter value is present at the output parameter Value.
Busy	BOOL	1= The frequency inverter has not yet sent any valid data as a response to the last write request. 0= Either there is no write request or the result of the request is available.
Error	BOOL	1= The reading process failed. The detailed error code is output out at the output Error_ID. In this case, the Valid Signal is 0.
Error_ID	WORD	Output of the error code of the reading request. The error codes are explained in the manual BU0050 Section 1.5.4 "Error codes when the request cannot be executed”. If a valid result is received from the frequency inverter, "Error_ID" outputs the value "0".
Value	DINT	Result of the parameter request. The data is only valid if the bit "Valid" has the value "1".

5.2 “Para_PPO1/2_W” and “Para_Acyc_Write”

5.2.1 Module parameters



5.2.1.1 Inputs of module parameters “PPO1/2_W” and “Para_Acyc_Write”

Parameter name	Type	Description
HW_Identifier	HW_IO	The module’s hardware identifier. You may indicate it with a symbol or with the value of the hardware identifier. Recommendation: For S7-1200/1500 controls, identification is realised via system constants, which are generated automatically for the centralised and decentralised peripherals upon creation of the device configuration. This offers the advantage that they can address via device names instead of hardware identifiers. The symbolic system constant for NORD modules is composed of the device name and the addition “~Head”. Example: "SK-TU4-PNT~Head". This is listed in the system constants in the device view.
FI_Systembus	INT	Selection of the frequency inverter to be used in the system bus integration. 0= Bus interface[1)] 1= FU 8 at slot 3 8= FU 8 at slot 10[2)]
Execute	BOOL	0= Writing of the parameter value is not requested. 1= During the change of flank from 0 to 1, the parameter request is executed once. Execute can be left at 1 to keep the output variables Busy and Done visible. Regardless of this, the parameter request is also executed if Execute is set immediately to 0, then the current state of the parameter request is only visible for one cycle.
Parameter_Number	INT	Parameter number to be read.
Parameter_Index	INT	Selection of the required index. For details of which parameters have an index, please refer to the manual for the frequency inverter. If this parameter does not have one, a zero must be entered.
Parameter_Set	INT	Selection of the required parameter set (1...4). For details of which parameters depend on the parameter set, please refer to the manual for the frequency inverter. If this parameter does not depend on the parameter set, a zero must be entered.
Parameter_32Bit	BOOL	0= 16-bit value is written 1= 32-bit value is written [3)]
RAM_Only	BOOL	0= The parameter is written to the EEPROM. The number of writing cycles is limited (see the manual for the frequency inverter). 1= The parameter is written to the RAM.
Value	DINT	Value to be written into the parameter

1) Only possible for Para_Acyc_Write

2) See device number assignment, slot and CAN-ID in & Section 3.1.1 "PROFINET procedure".

3) The parameters which are written as 32 bit or 16 bit can be obtained from the frequency inverter manual.

5.2.1.2 Outputs of module parameters “Para_PPO1/2_W” and “Para_Acyc_Write”

Parameter name	Type	Description
Done	BOOL	1= The parameter was written successfully. The Done signal remains present until Execute switches to 0 again.
Busy	BOOL	0= No writing process is active 1= The writing process is active
Error	BOOL	1= The reading process failed. The detailed error code is output out at the output Error_ID. In this case, the Valid Signal is 0.
Error_ID	WORD	Output of the error code of the reading request. The error codes are explained in the manual BU0050 Section 1.5.4 "Error codes when the request cannot be executed”. If a valid result is received from the frequency inverter, "Error_ID" outputs the value "0".

Key word index

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