Intelligent Drivesystems, Worldwide Services

GB

BU 0940

S7 standard modules

Supplementary manual options for NORD - Frequency Inverters

NORD DRIVESYSTEMS

NORD frequency inverters

Safety and operating instructions for drive power converters

(as per: Low Voltage Directive 2006/95/EEC)

1. General

During operation, drive power converters may, depending on their protection class, have live, bare, moving or rotating parts or hot surfaces.

Unauthorised removal of covers, improper use, incorrect installation or operation causes a risk of serious personal injury or material damage.

Further information can be found in this documentation.

All transportation, installation and initialisation and maintenance work must be carried out by qualified personnel (comply with IEC 364, CENELEC HD 384, DIN VDE 0100, IEC 664 and DIN VDE 0110, and national accident prevention regulations).

For the purposes of these basic safety instructions, qualified personnel are persons who are familiar with the assembly, installation, commissioning and operation of this product and who have the relevant qualifications for their work.

2. Proper use in Europe

Drive power converters are components intended for installation in electrical systems or machines.

When installed in machines, the drive power converter cannot be commissioned (i.e. commencement of the proper use) until it has been ensured that the machine meets the provisions of the EC Directive 2006/42/EEC (machine directive); EN 60204 must also be complied with.

Commissioning (i.e. implementation of the proper use) is only permitted when the EMC directive (2004/108/EEC) is complied with.

Drive power converters with the CE mark meet the requirements of the Low Voltage Directive 2006/95/EEC. The harmonized standards stated in the Declaration of Conformity are used for the drive power converters.

Technical data and information for connection conditions can be found on the rating plate and in the documentation, and must be complied with.

The drive power converters may only be used for the safety functions which are described and for which they have been explicitly approved.

3. Transport, storage

Information regarding transport, storage and correct handling must be complied with.

4. Installation

The installation and cooling of the equipment must be implemented according to the regulations in the corresponding documentation.

The drive power converter must be protected against impermissible loads. Especially during transport and handling, components must not be deformed and/or insulation distances must not be changed. Touching of electronic components and contacts must be avoided.

Drive power converters have electrostatically sensitive components, which can be easily damaged by incorrect handling. Electrical components must not be mechanically damaged or destroyed (this may cause a health hazard!).

5. Electrical connections

When working on live drive power converters, the applicable national accident prevention regulations must be complied with (e.g. VBG A3, formerly VBG 4).

The electrical installation must be implemented according to the applicable regulations (e.g. cable cross-section, fuses, ground lead connections). Further instructions can be found in the documentation.

Information about EMC-compliant installation – such as shielding, earthing, location of filters and installation of cables can be found in the drive power converter documentation. These instructions must be complied with even with CE marked drive power converters. Compliance with the limiting values specified in the EMC regulations is the responsibility of the manufacturer of the system or machine.

6. Operation

Where necessary, systems where drive power converters are installed must be equipped with additional monitoring and protective equipment according to the applicable safety requirements, e.g. legislation concerning technical equipment, accident prevention regulations, etc.

The parameterisation and configuration of the drive power converter must be selected so that no hazards can occur.

All covers must be kept closed during operation.

7. Maintenance and repairs

After the drive power converter is disconnected from the power supply, live equipment components and power connections should not be touched immediately, because of possible charged capacitors. Observe the relevant information signs located on the drive power converter.

Further information can be found in this documentation.

These safety instructions must be kept in a safe place!

Documentation

Designation:	BU 0940
Part No.:	607 94 02
Device series:	**PROFIBUS DP and PROFINET IO** standard modules for SK 2xxE and SK 5xxE

Version list

Name previous versions	Software Version	Remarks
BU 0940 GB, June 2012	V. 1.3	First version, standard modules, development status V1.3 dated 10.02.2012
BU 0940 GB, September 2012 Part No. 607 9402 / 3612	V. 1.3	Updating figures in chapter 2

Table 1: Version list

ATTENTION

This supplementary operating manual is only valid in conjunction with the operating manual supplied for the respective frequency inverter. This is an essential prerequisite for the availability of all the relevant information required for the safe commissioning of the frequency inverter.

Publisher

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Intended use of the frequency inverter

Compliance with the operating instructions is **necessary for fault-free** operation and the acceptance of any warranty claims. **These operating instructions must be read** before working with the device!

These operating instructions contain **important information about servicing.** They must therefore be kept close to the device.

The standard modules described here are intended for the integration of series SK 2xxE or SK 5xxE frequency inverters via the SIMATIC S7 Manager.

Commissioning (commencement of the intended use) is not permitted until it has been ensured that the machine complies with the EMC Directive 2004/108/EEC and that the conformity of the end product meets the Machinery Directive 2006/42/EEC (observe EN 60204).

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1. Introduction

1.1 General

The following modules are designed for the integration of NORD frequency inverters into the SIMATIC Manager. The description of the modules provides the programmer with a brief explanation of the use and parameterisation of the modules. For a more detailed description of the inverter parameters, please refer to the manual for the relevant frequency inverter.

The document is divided into a process module section and a parameter module section.

Process modules	Prozess_PPOx_16	For communication with up to four 16 bit words • STW + 1 or 3 SW • ZSW + 1 or 3 IW
	Prozess_PPOx_32	Specially for positioning applications with a 32 bit position value • STW + position value (32 bit) + 1 SW (16 bit) • ZSW +. position value (32 bit) + 1 IW (16 bit)
Parameter modules	PARA_PPO_...	For cyclic data communication
	PARA_ACYC_...	For acyclic data communication

Note

The modules described here are recommendations and can be individually modified by the customer.

For the structure of your own modules, please refer to the detailed information on NORD parameter structures in the supplementary PROFIBUS manuals (BU 0020 or BU 0200).

ATTENTION

NORD explicitly accepts no guarantee for the function of the modules or the devices which they control.

1.2 Use

Communication path: PROFIBUS

PROFINET IO

Controller: S7-300, S7-400

Module type	Process modules						Parameter modules					
Data exchange	cyclic						cyclic			acyclic		
Module	Prozess_PPO1_16	Prozess_PPO2_16	Prozess_PPO3_16	Prozess_PPO4_16	Prozess_PPO2_32	Prozess_PPO4_32	Para_PPO1+2R	Para_PPO1+2W16	Para_PPO1+2W32	Para_ACYC_READ	Para_ACYC_W16	Para_ACYC_W32
SK 2xxE	X	X	X	X	X	X	X	X	X	X	X	X
SK 5xxE	X	X	X	X	X	X	X	X	X	-	-	-

Table 2: Overview of use of standard modules

2. Step 7 hardware configurator

The following descriptions apply to all the process and parameter modules listed in this manual.

2.1 Step7 hardware configurator for PROFIBUS

The bus participants are configured first. Configuration is performed by the following steps:

1. Configuration of the master for the module
2. addition of the master to a network
3. the required module is selected from the hardware catalogue and assigned to the network.

Note

Care must be taken that the PPO type is correct when selecting the module from the GSD file.

2.1.1 SK 2xxE hardware configurator

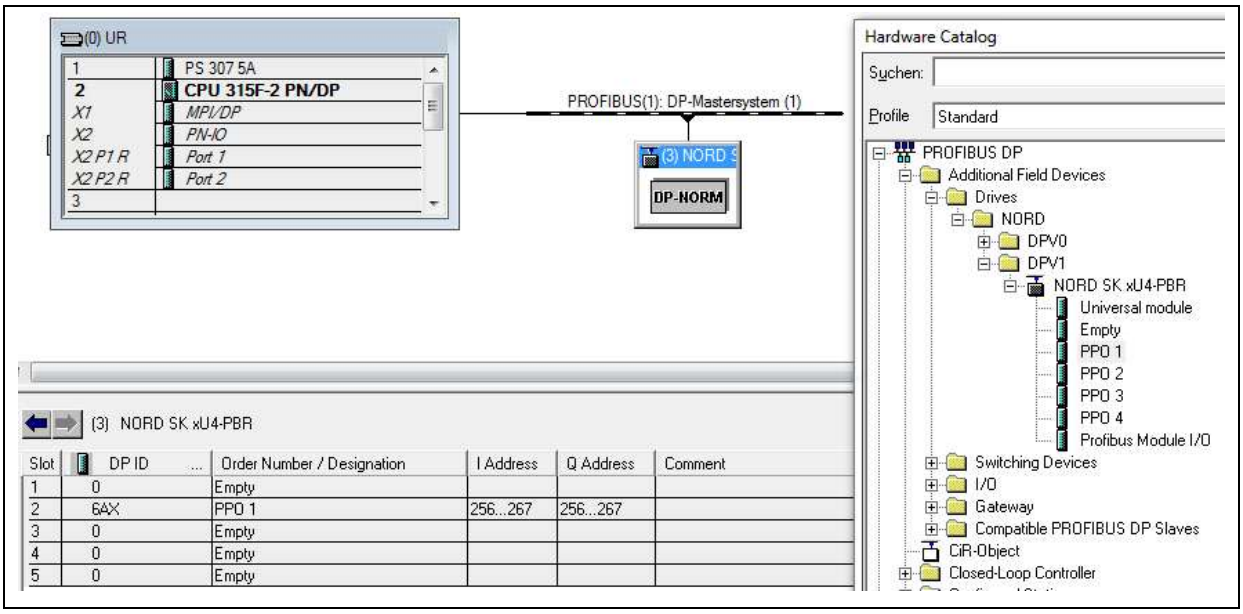

Fig. 1: Hardware configuration - Integration of NORD module [SK 2xxE] to PROFIBUS

After integration into the network (Figure above) a dialogue window opens in the hardware configurator (Figure below). Entries must be made in this window. The selected GSD file is displayed in the *General* tab in the "order number" field and therefore the correct selection can be checked. The quickest method of finding the GSD files is to use the search entry "NORD" at the top right of the hardware configurator catalogue.

A slave address and a diagnostic address must be assigned. For further documentation, the station can be assigned a more precise designation of the station name for the application.

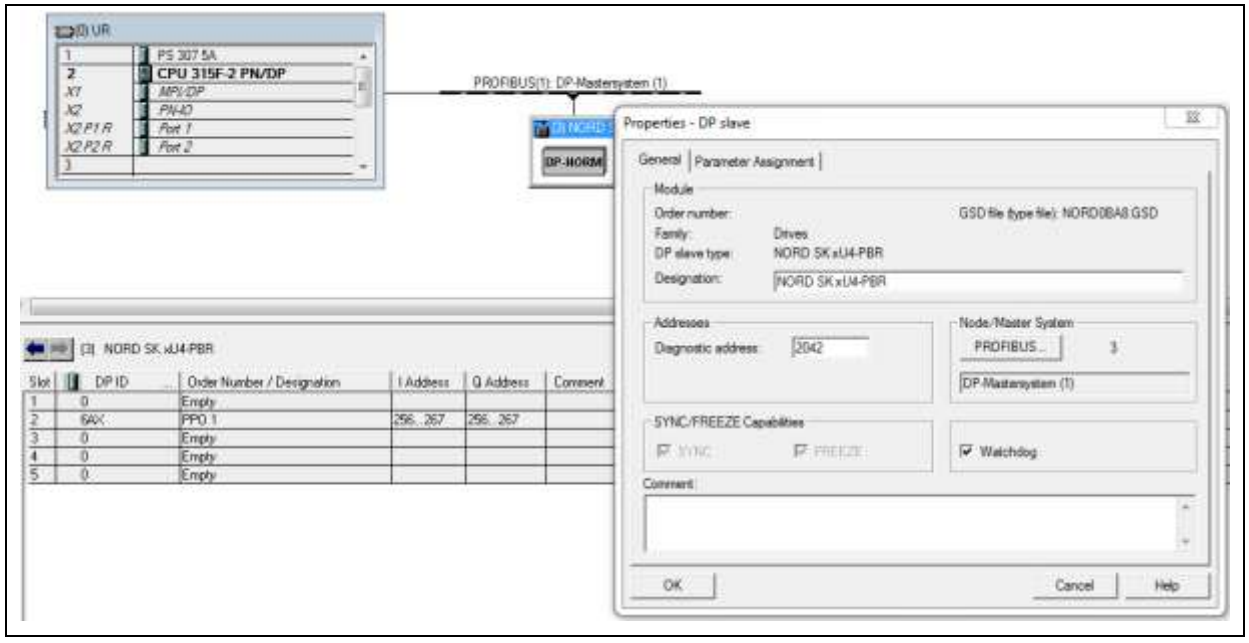

Fig. 2: Slave configuration, properties – General [SK 2xxE] - PROFIBUS

In addition, in the tab *Parameterise* of the properties window (Figure below), the "DP-Alarm-Mode" of the DP slave must be set to "DPV1", whereby this setting is only necessary if the frequency inverter is to be accessed in acyclic mode.

Note

If "DP-Alarm-Mode" is set on the slave, the operating mode of the DP-Master must be set to "DPV1" under DPMode.

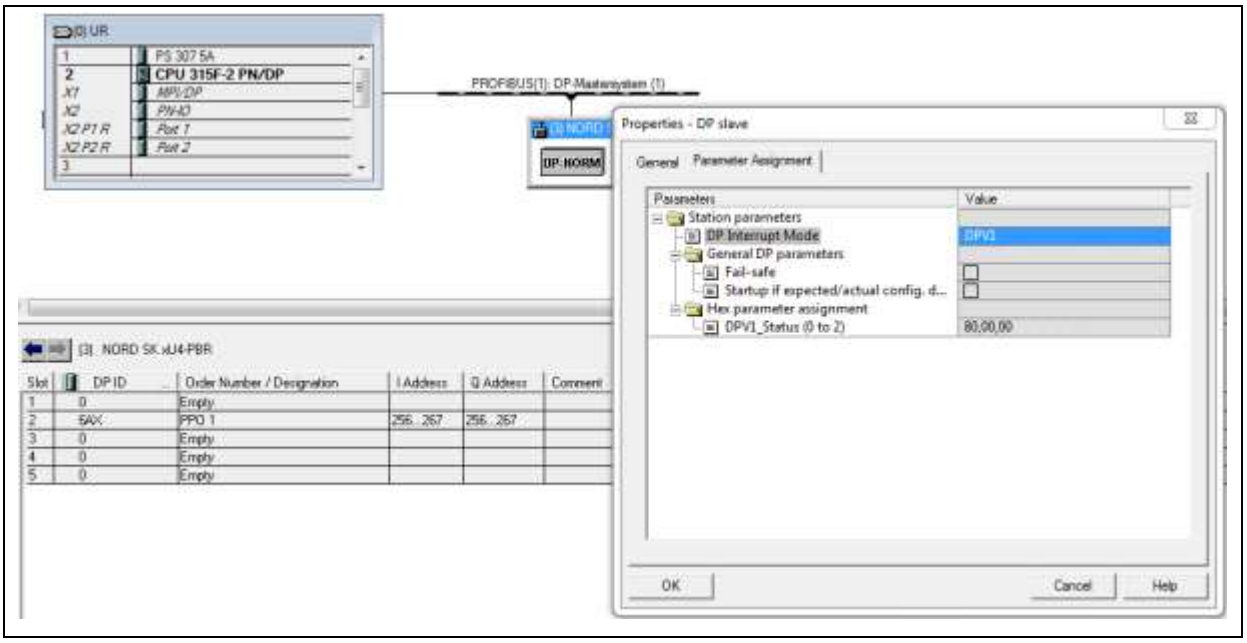

Fig. 3 Slave configuration, properties – Parameterisation [SK 2xxE] - PROFIBUS

The dialogue window for the assignment of the input and the output address is opened by a double-clicking on Slot 2 with the left mouse button (Figure below). Here, it is advisable to assign the same start addresses to the address ranges. It is important that the addresses which are assigned are in the peripheral image of the OB1.

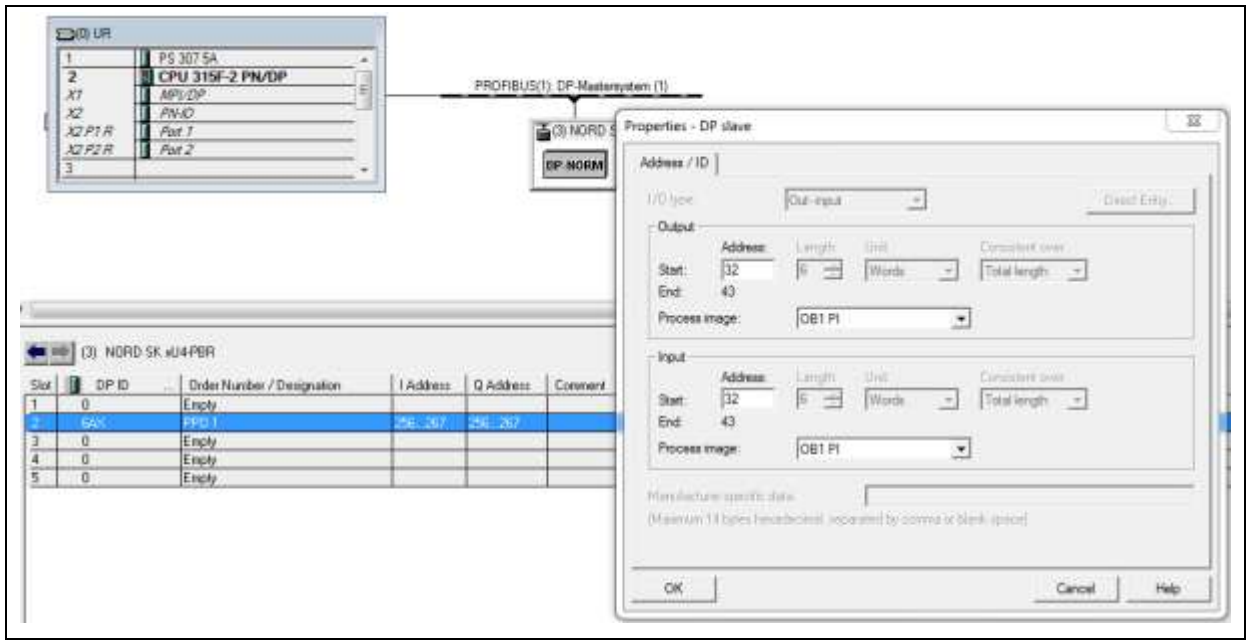

Fig. 4: Slave configuration, properties – Address ranges [SK 2xxE] – PROFIBUS

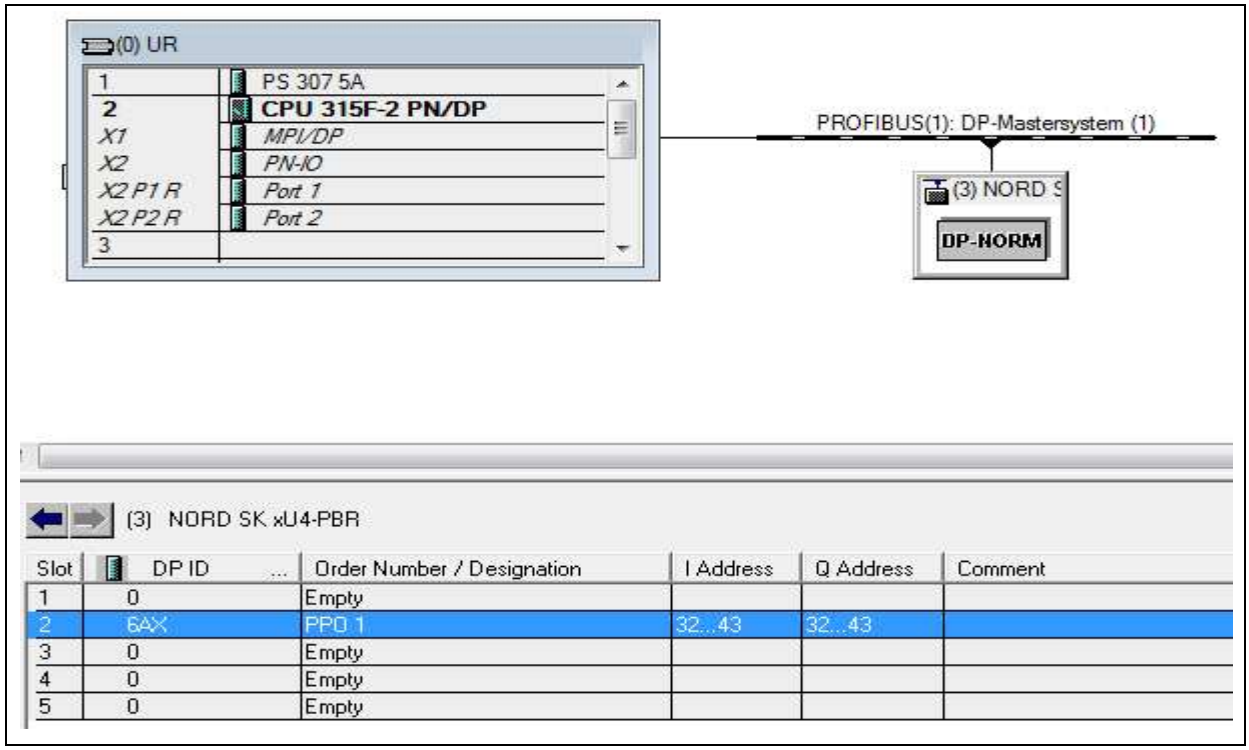

Fig. 5: Slave configuration, properties [SK 2xxE] – PROFIBUS

2.1.2 SK 5xxE hardware configurator

The procedure for the SK 5xxE is similar to that for the SK 2xxE

The GSD file "NORD_12.GSD" must be opened and the appropriate PPO type (e.g. PPO1 type) selected and added to the network.

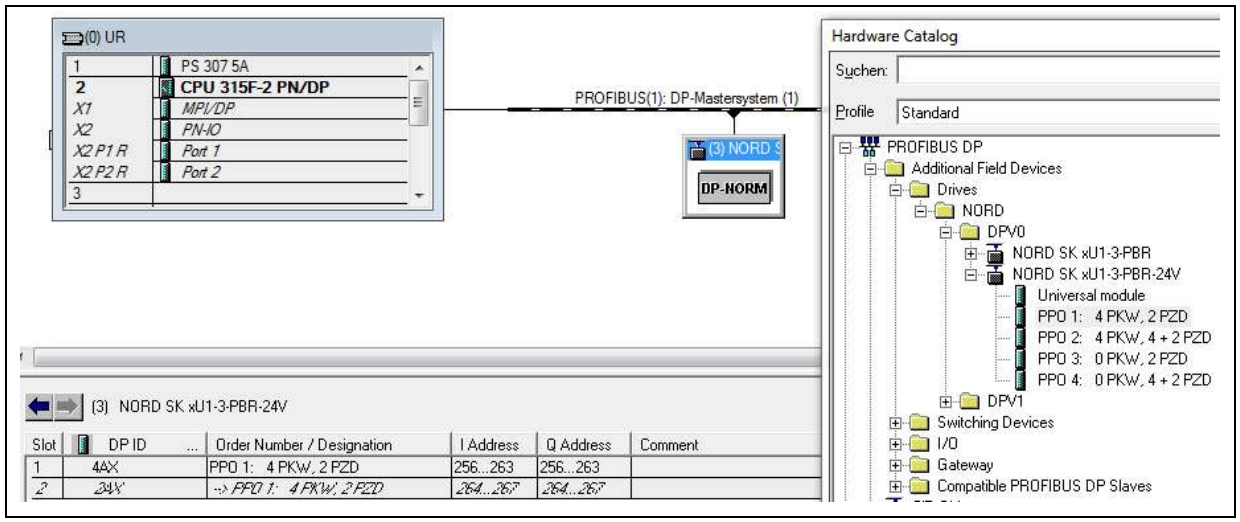

Fig. 6: Hardware configuration - Integration of NORD module [SK 5xxE] to PROFIBUS

After integration into the network (Figure above) a dialogue window opens in the hardware configurator (Figure below). Entries must be made in this window. The selected GSD file is displayed in the *General* tab in the "order number" field and therefore the correct selection can be checked.

A slave address and a diagnostic address must be assigned. For further documentation, the station can be assigned a more precise designation of the station name for the application.

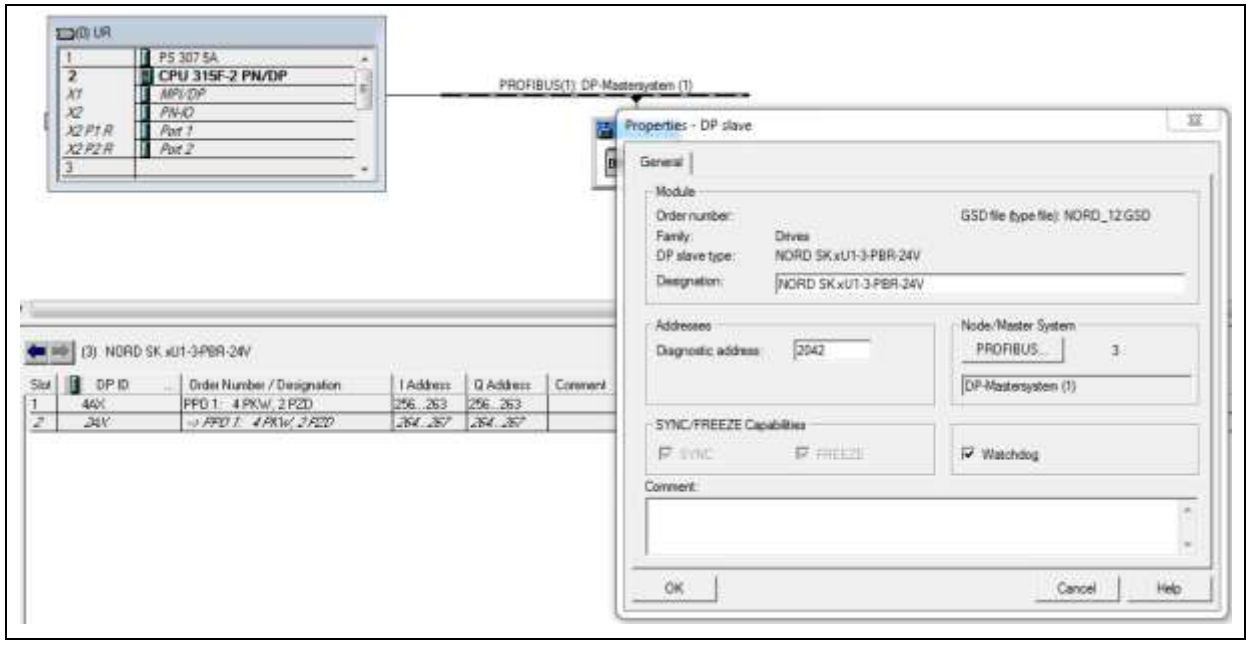

Fig. 7: Slave configuration, properties – General [SK 5xxE] - PROFIBUS

The dialogue window for the assignment of the input and the output address is opened by a double-clicking on Slot 1 with the left mouse button (Figure below). Here, it is advisable to assign the same start addresses to the address ranges. It is important that the addresses which are assigned are in the peripheral image of the OB1.

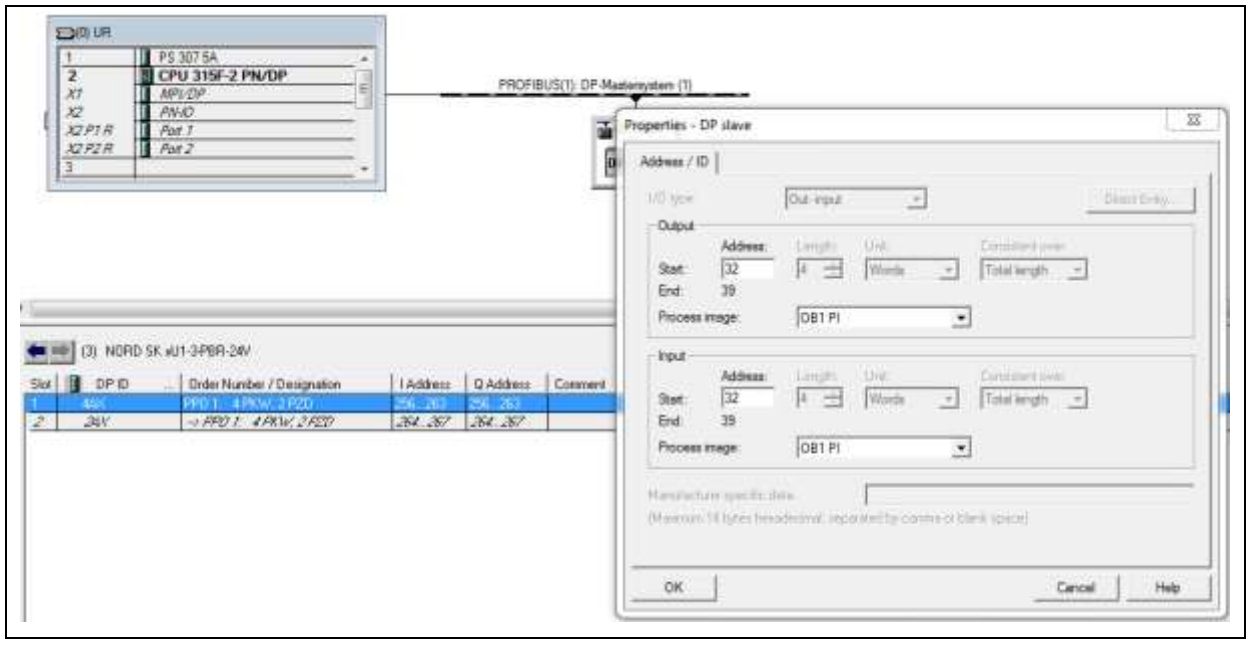

Fig. 8: Slave configuration, properties – Address ranges [SK 5xxE] - PROFIBUS

The dialogue window for the assignment of the input and the output addresses is opened by a double-clicking on Slot 2 with the left mouse button (Figure below). For this, the addresses must be selected after selection of the addresses for Slot 1. The addresses which are assigned must also be in the peripheral image of OB1 in order to enable direct access to the peripherals.

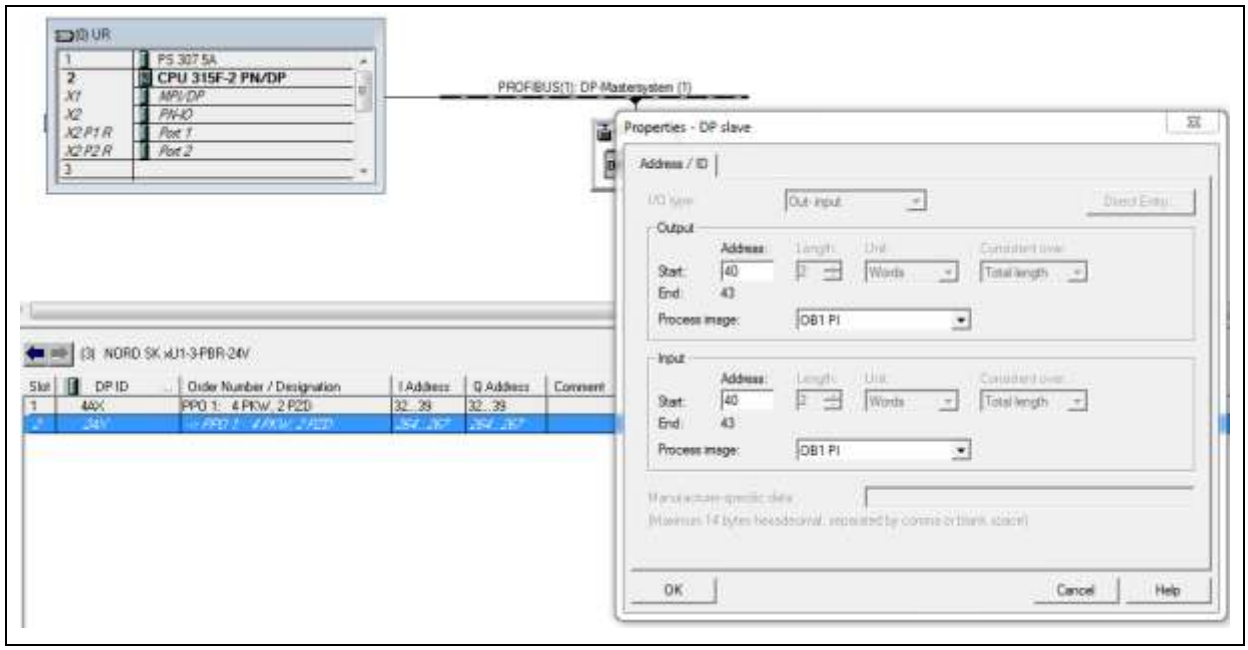

Fig. 9: Slave configuration, properties – Further address ranges [SK 5xxE] – PROFIBUS

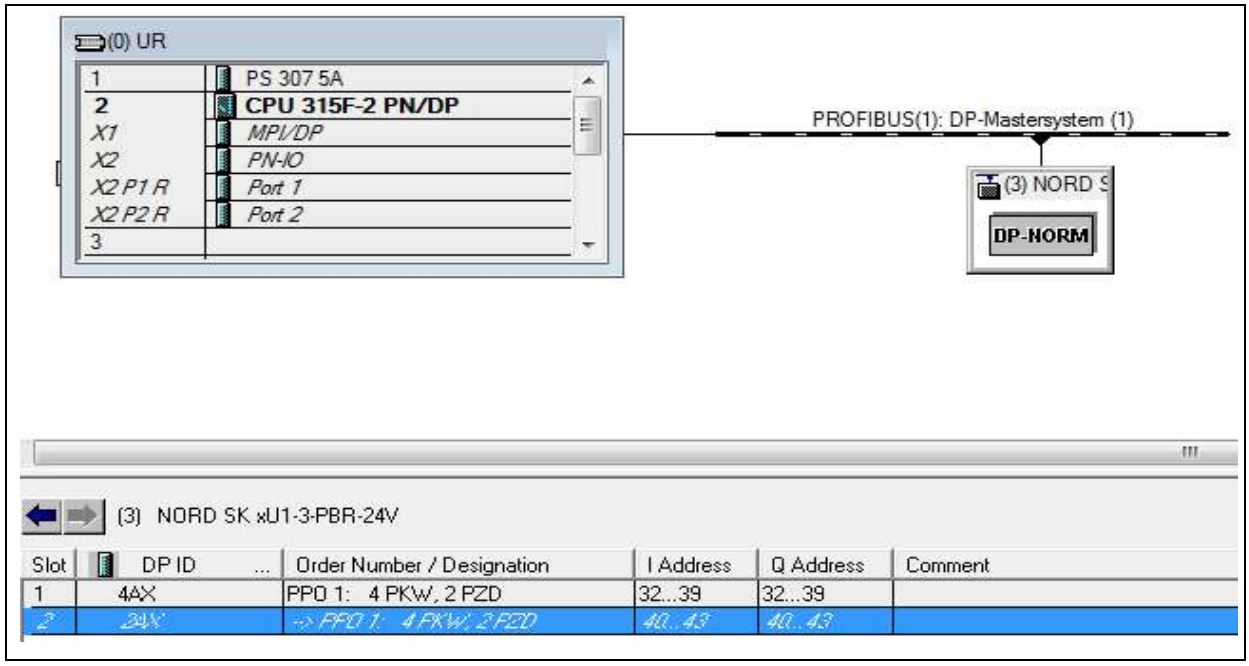

Fig. 10: Slave configuration, properties [SK 5xxE] – PROFIBUS

2.2 Step 7 hardware configurator for PROFINET IO

Configuration of the frequency inverter for a PROFINET IO network is carried out analogously to the PROFIBUS configuration It is only necessary to take care that the XML file which is associated with the frequency inverter is used.

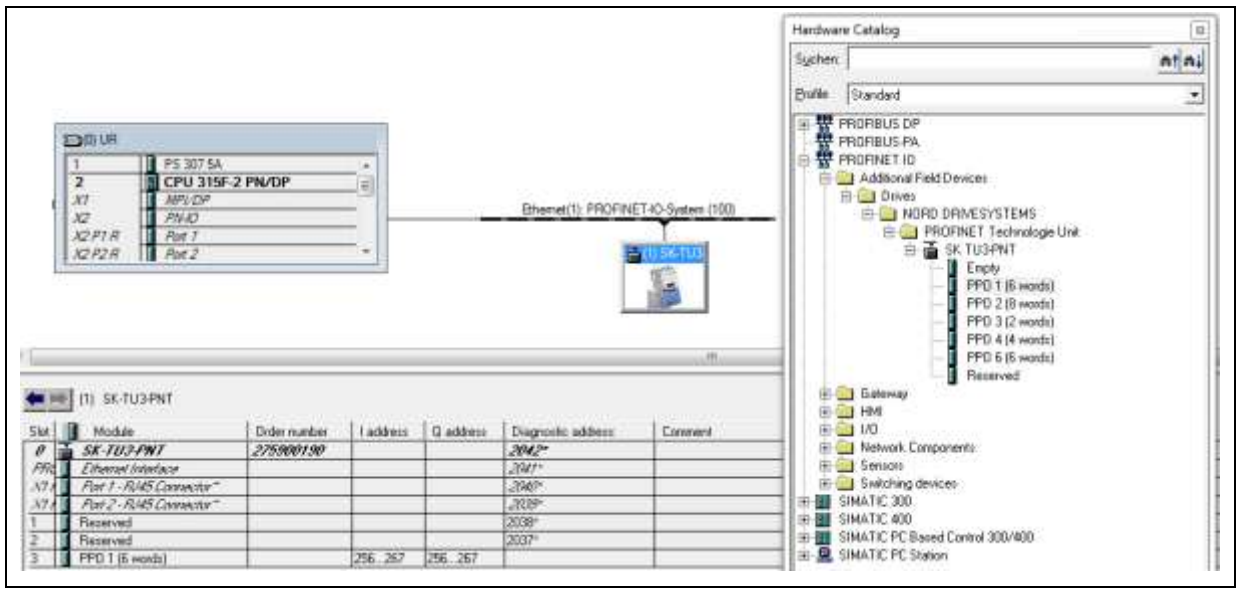

Fig. 11: Hardware configuration – Integration of NORD modules – PROFINET IO

The designation of the XML file can be obtained from Figure below.

For the configuration of the PROFINET IO device, a device number and an IP address are now assigned. For further documentation, a device name can be assigned here, which describes the device more closely for the application.

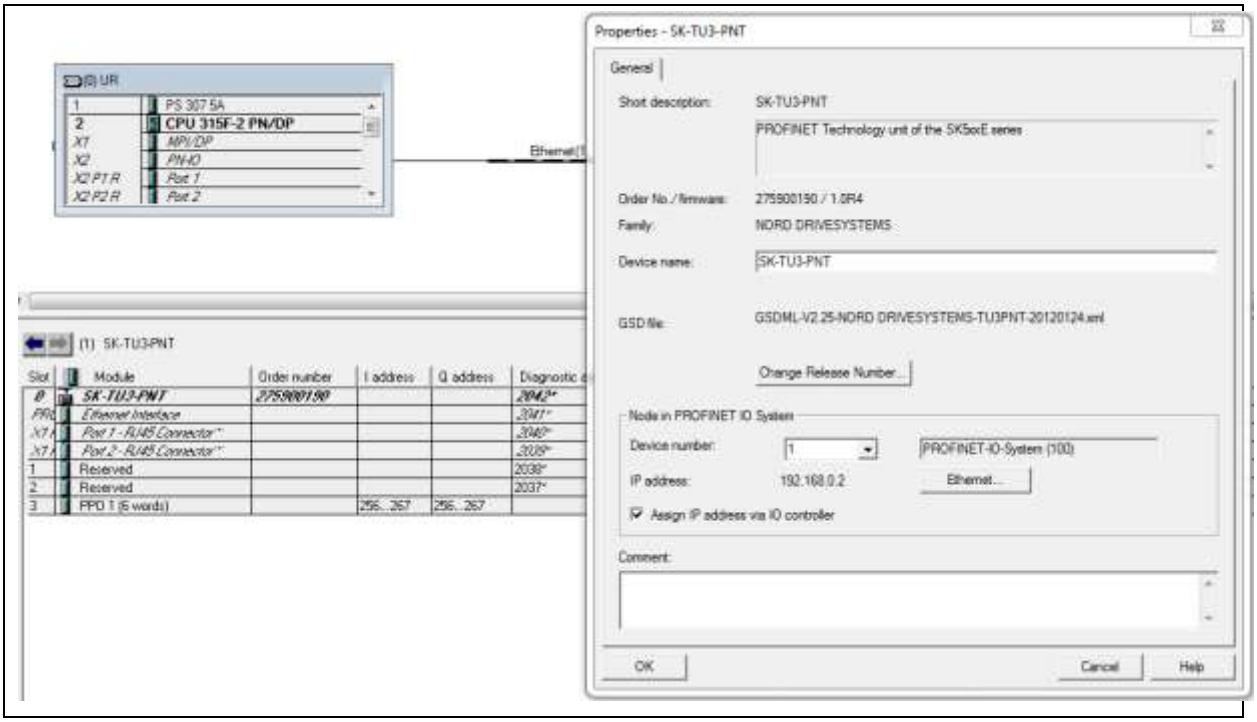

Fig. 12 Slave configuration, properties – General - PROFINET IO

The dialogue window for the assignment of the input and the output address is opened by a double-clicking on Slot 3 with the left mouse button (Figure below). Here, it is advisable to assign the same start addresses to the address ranges. It is important that the addresses which are assigned are in the peripheral image of the OB1.

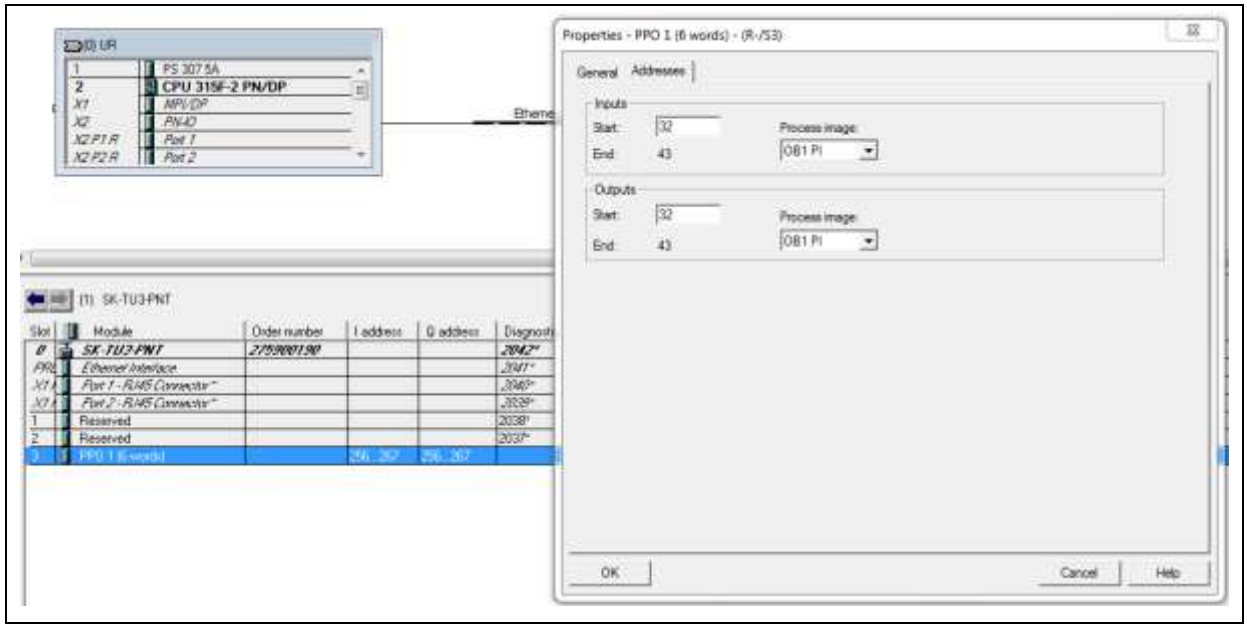

Fig. 13 Slave configuration, properties – Address ranges - PROFINET IO

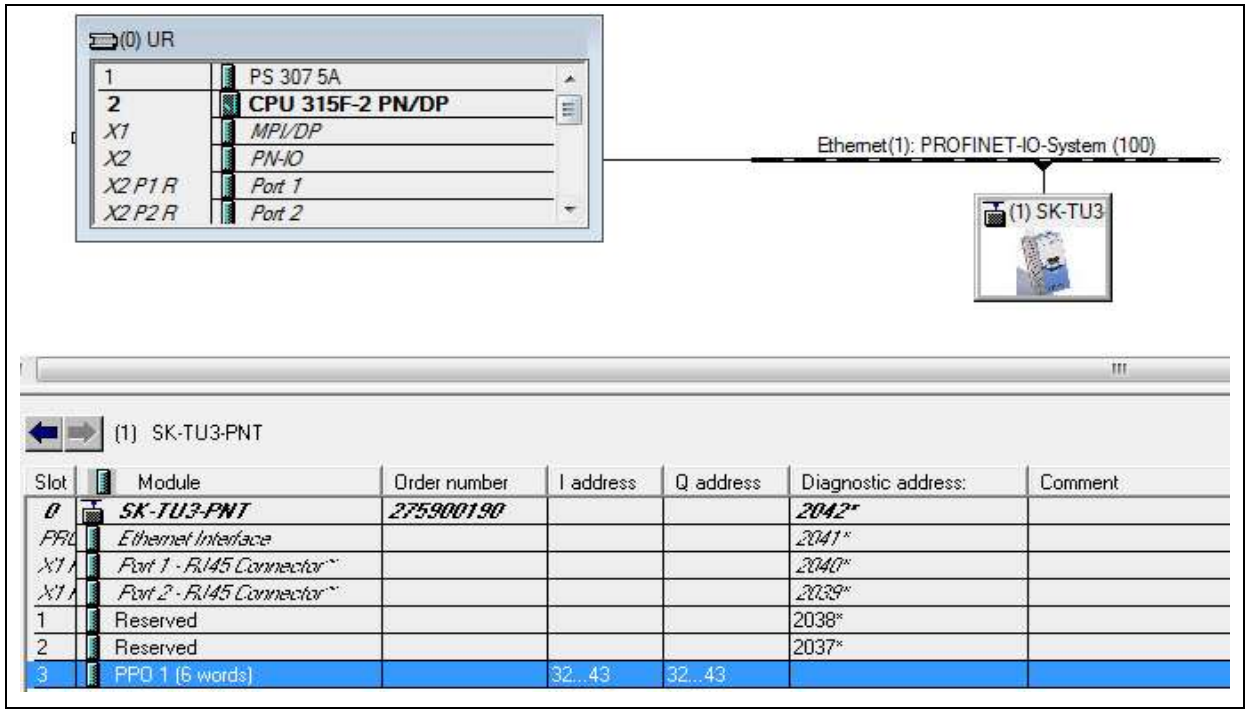

Fig. 14 Slave configuration, properties - PROFINET IO

3. Process modules

Process modules are only used to control a frequency inverter. No parameters are changed. Parameter changes are only performed by the use of other measures. If parameter values from the Step 7 program are to be changed, the appropriate parameter modules must be used. Call-up of the process modules is carried out in the cyclic program.

3.1 Purpose of the process modules

The function modules "Prozess_PPO…" are called up in the cyclic section of the program. In addition to the process modules, the associated instance modules "Inst_PPO" are also required.

Example:

Function module: *Prozess_PPO1_16*

Instance data module: *Inst_PPO1_16*

Purpose:

The function module "Prozess_PPO…" is used to control a frequency inverter with up to three setpoint inputs (Setpoint **SW** / Actual value **IW**). According to the type, up to three 16 bit setpoint inputs or one 32 bit and a 16 bit setpoint input (for positioning tasks with a 32 position setpoint) can be controlled on the inverter. In this case, the resulting actual values correspond to a 32 bit value as Actual Value 1 (AV_1) and a 16 bit value as Actual Value 2 (AV_2).

In addition to supplying the module with the corresponding number of 32 bit setpoints (in real format), the module also processes control tasks (Control word **STW** / Status word **ZSW**) such as *error acknowledgement* and *enable signals*. The description of the inputs and outputs is summarised in Section 3.3.

Function module	Instance module	Number of 32 bit input values	Number of 16 bit output values as setpoint for FI	Number of 32 bit output values as setpoint for FI
Prozess_PPO1_16	Inst_PPO1_16	1	1	0
Prozess_PPO2_16	Inst_PPO2_16	3	3	0
Prozess_PPO3_16	Inst_PPO3_16	1	1	0
Prozess_PPO4_16	Inst_PPO4_16	3	3	0
Prozess_PPO2_32	Inst_PPO2_32	2	1	1
Prozess_PPO4_32	Inst_PPO4_32	2	1	1

Table 3: Assignment of function modules

The process modules

Prozess_PPO1_16 and *Prozess_PPO3_16*
Prozess_PPO2_16 and *Prozess_PPO4_16*
Prozess_PPO2_32 and *Prozess_PPO4_32*

are more or less identical. The difference between them is only the provision of an extended data range of 4 words for the parameter identification data *PKW* for the PPO types 1 and 2.

This is illustrated in the following diagram, which shows an overview of the supported PPO types. For orientation, the addresses are also stated, whereby a start address of *32* was used in each case.

	PKW				PZD			
	PKE	IND	PWE	PWE	PZD1 STW ZSW	PZD2 SW1 IW1	PZD3 SW2 IW2	PZD4 SW3 IW3
	1st word	2nd word	3rd word	4th word	5th word	6th word	7th word	8th word
PPO 1	32, 33	34, 35	36, 37	38, 39	40, 41	42, 43		
PPO 2	32, 33	34, 35	36, 37	38, 39	40, 41	42, 43	44, 45	46, 47

	1st word	2nd word	3rd word	4th word
PPO3	32, 33	34, 35		
PPO4	32, 33	34, 35	36, 37	38, 39

Fig. 15 Overview of PPO types (incl. STEP 7 addressing)

3.2 Structure of process modules

The process modules are listed in chronological order below.

The relevant instance modules for the function blocks, "Inst_..." provide detailed information regarding the signal statuses between the PLC and the frequency inverter. Due to the complexity of the instance modules they are not shown here. They are self-explanatory.

The description of the inputs and outputs is summarised in Section 3.3.

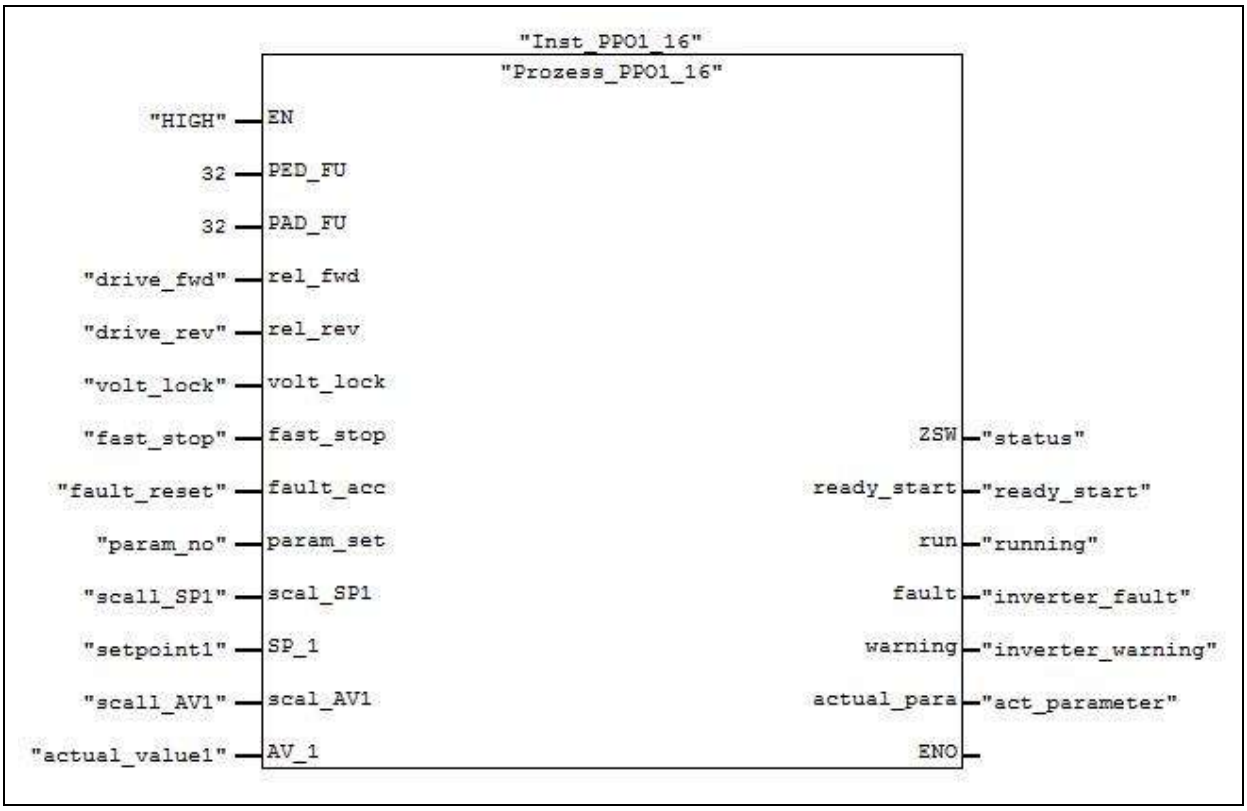

Fig. 16 Process module "Prozess_PPO1_16"

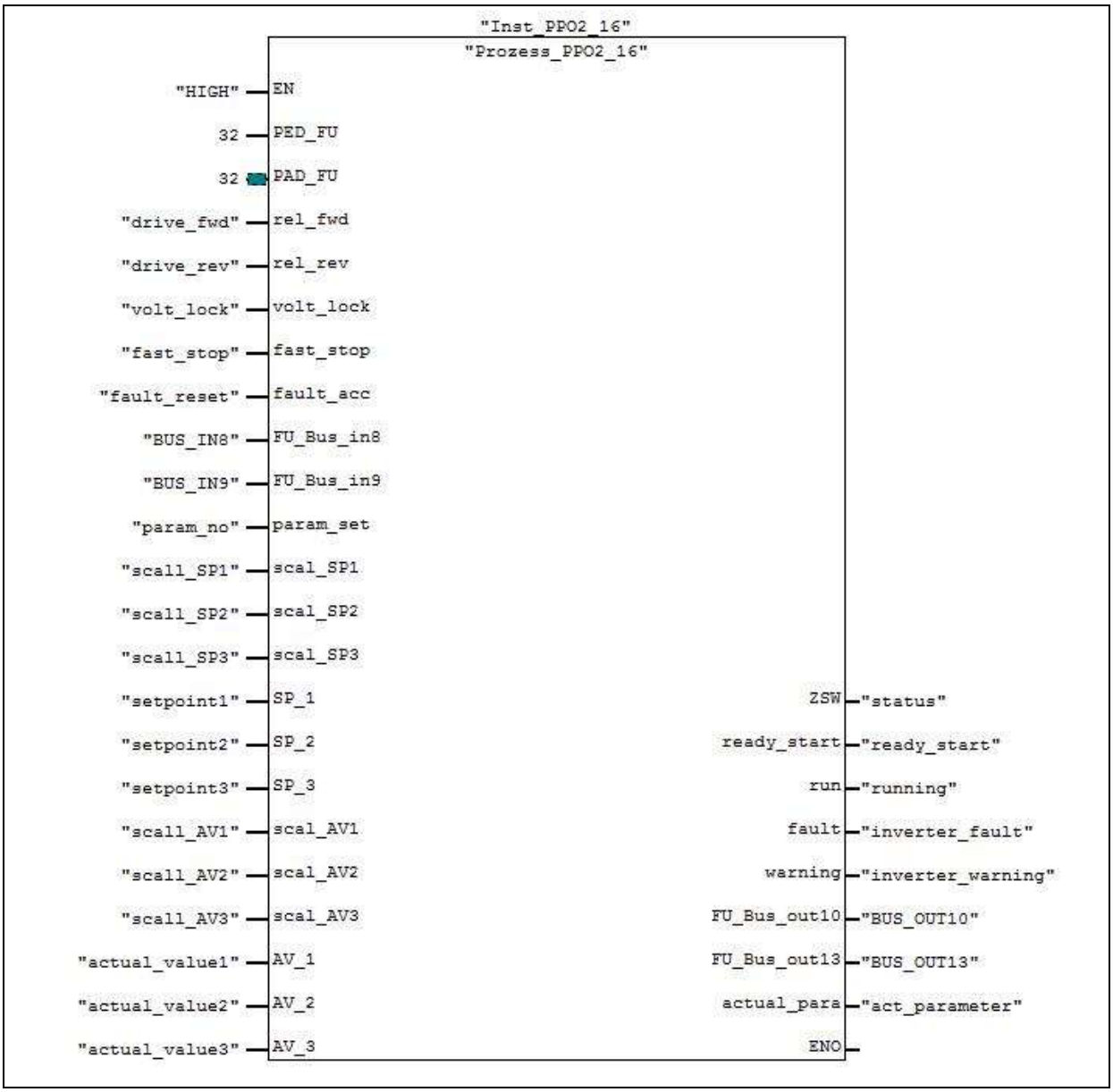

Fig. 17 Process module "Prozess_PPO2_16"

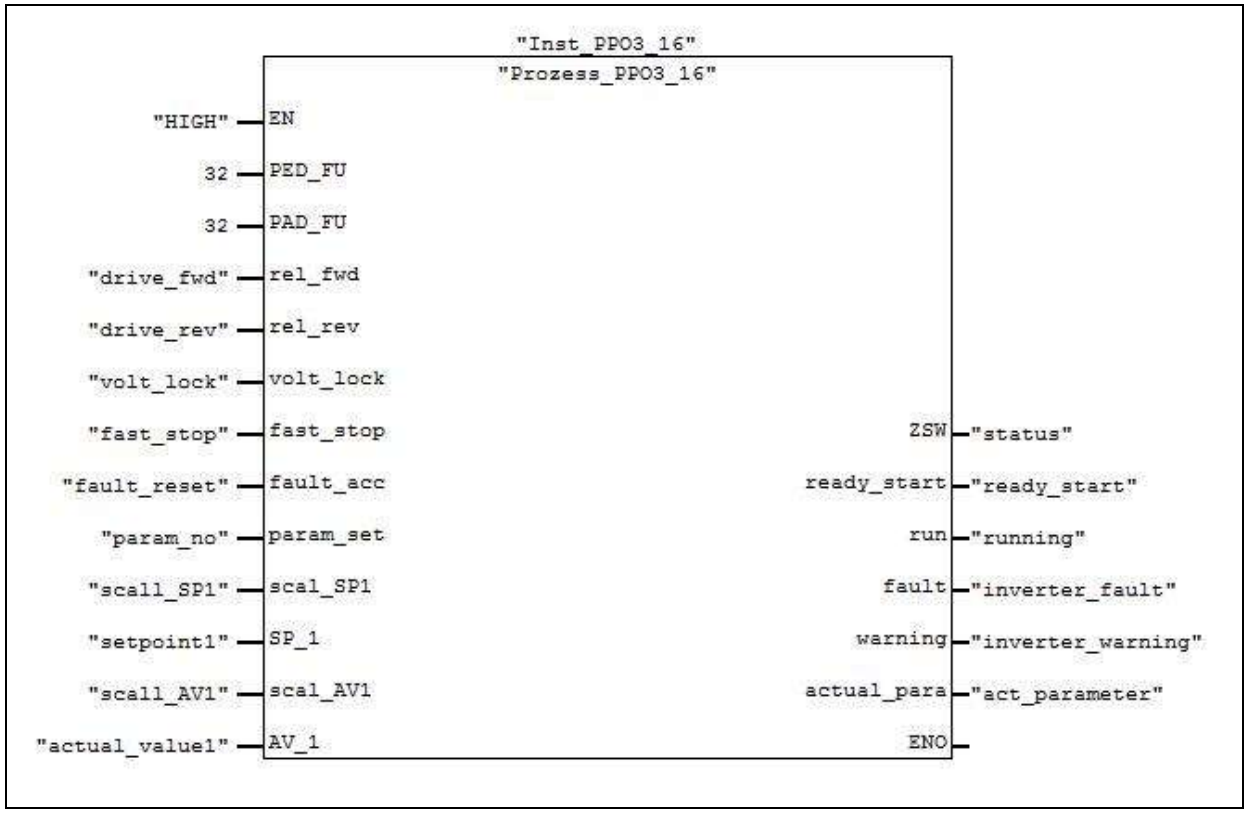

Fig. 18 Process module "Prozess_PPO3_16"

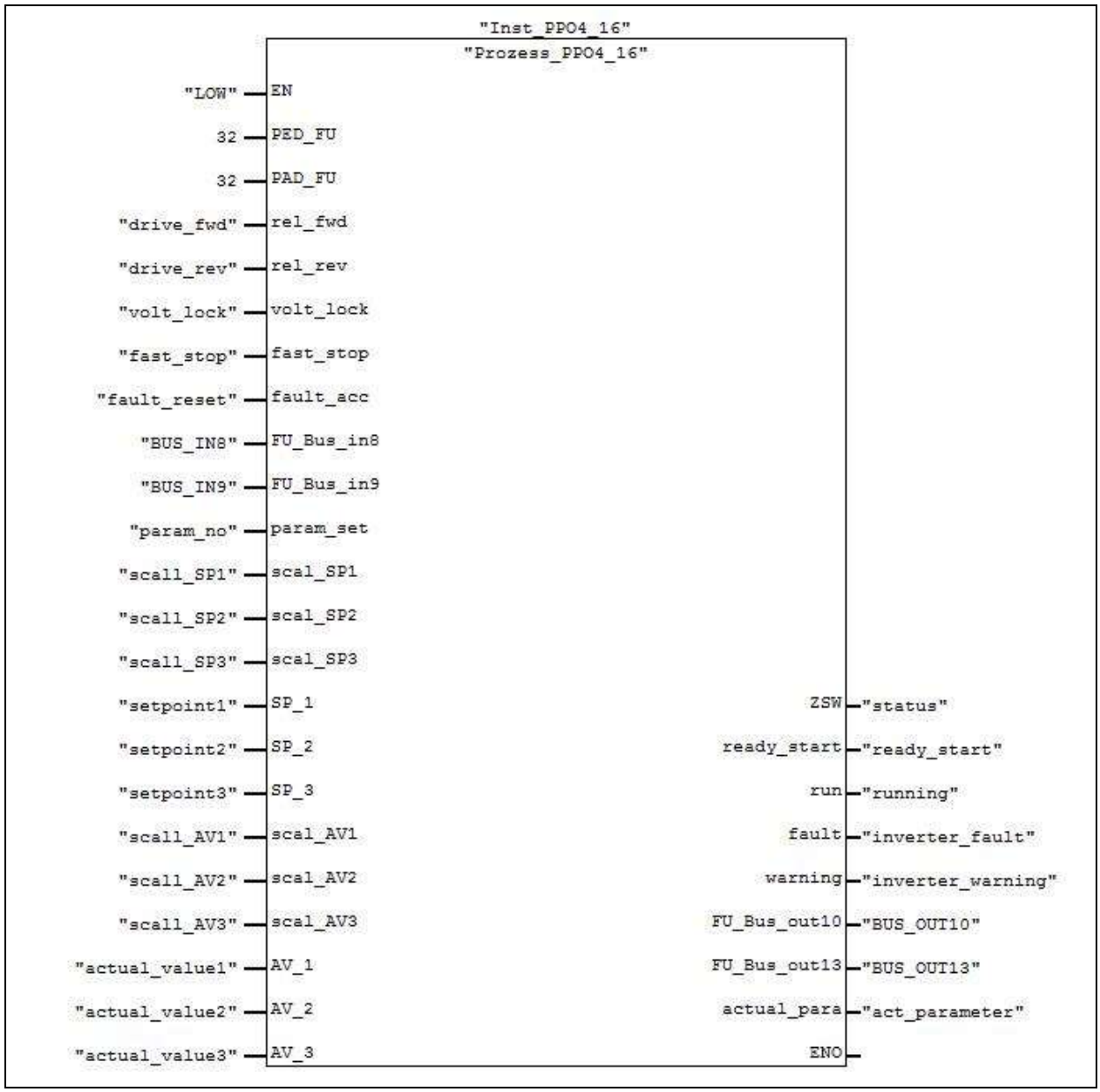

Fig. 19 Process module "Prozess_PPO4_16"

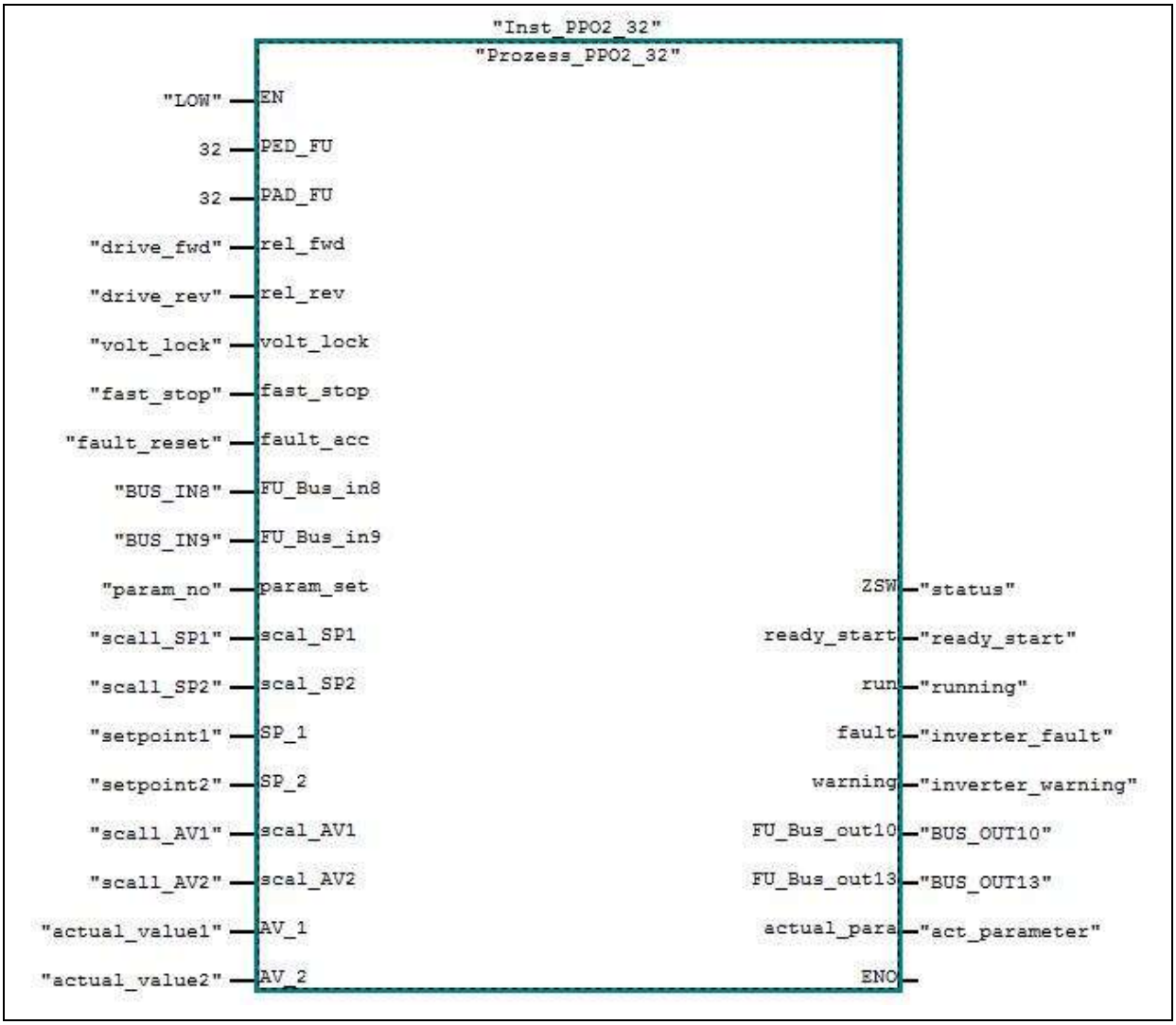

Fig. 20 Process module "Prozess_PPO2_32"

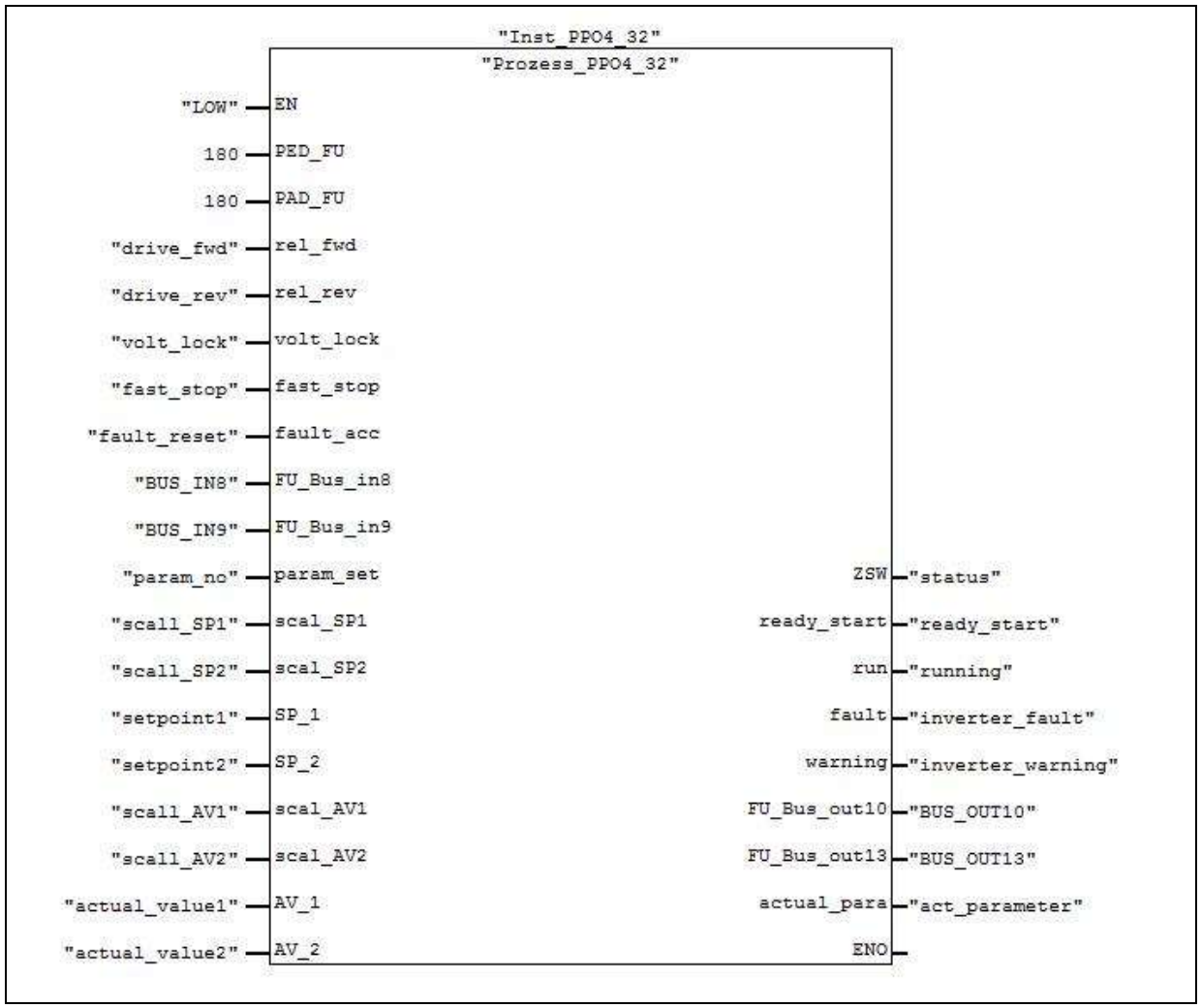

Fig. 21 Process module "Prozess_PPO4_32"

3.3 Process module parameters

3.3.1 Input parameters

Name	Type	Interface	Description	Module *Prozess_PPO…*					
				…1_16	*…2_16*	*…3_16*	*…4_16*	*…2_32*	*…4_32*
PED_FU	INT	IN	Start address of the inputs from the hardware configurator	X	X	X	X	X	X
PAD_FU	INT	IN	Start address of the outputs from the hardware configurator	X	X	X	X	X	X
rel_fwd	BOOL	IN	Enables the direction of rotation of the drive for a CW rotating field	X	X	X	X	X	X
rel_rev	BOOL	IN	Enables the direction of rotation of the drive for a CCW rotating field	X	X	X	X	X	X
volt_lock	BOOL	IN	0 = The inverter output voltage is switched off, the FI goes into switch-on block status. 1 = OFF 2 is cancelled; see manual for details	X	X	X	X	X	X
fast_stop	BOOL	IN	0 = Quick stop with programmed quick stop time; with disconnection from supply at f=0Hz; the FI switches to starting disabled condition. 1 = OFF 3 is cancelled; see manual for details	X	X	X	X	X	X
fault_acc	BOOL	IN	With the switch from 0 to 1, inactive errors are acknowledged. Note: When a digital input has been programmed for the "ack.fault" function, this bit must not permanently be set to 1 via the bus (otherwise, flank evaluation would be prevented).	X	X	X	X	X	X
FU_Bus_in8	BOOL	IN	Only for SK 2xxE and SK 5xxE. For further details of the function please refer to parameter P480 in the frequency inverter manual		X		X	X	X
FU_Bus_in9	BOOL	IN	Only for SK 2xxE and SK 5xxE. For further details of the function please refer to parameter P480 in the frequency inverter manual		X		X	X	X
param_set	INT	IN	The required parameter set number is entered here (1...4).	X	X	X	X	X	X
scal_SP1	REAL	IN	Scales the setpoint entered in parameter P546 or P546[-01]. This parameter is multiplied by the value from SP_1. **Example:** A value of 1.0 must be entered order to communicate a setpoint precisely according to the bits at input SP_1. A value of 163.84 must be entered at input SP_1 in order to communicate a setpoint to the FI as a percentage.	X	X	X	X	X	X

Name	Type	Interface	Description	Module *Prozess_PPO…*					
				…1_16	*…2_16*	*…3_16*	*…4_16*	*…2_32*	*…4_32*
scal_SP2	REAL	IN	Scales the setpoint entered in parameter P547 or P546[-02]. This parameter is multiplied by the value from SP_2. **Example:** Similar to *scal_SP1*		X		X	X	X
scal_SP3	REAL	IN	Scales the setpoint entered in parameter P548 or P546[-03]. This parameter is multiplied by the value from SP_3. **Example:** Similar to *scal_SP1*		X		X		
SP_1	REAL	IN	Here the setpoint is entered as a 32 bit real number. A **16 bit** value is output to the frequency inverter.	X	X	X	X		
SP_1	REAL	IN	Here the setpoint is entered as a 32 bit real number. A **32 bit** value is output to the frequency inverter.					X	X
SP_2	REAL	IN	Here the setpoint is entered as a 32 bit real number. A **16 bit** value is output to the frequency inverter.		X		X		
SP_2	REAL	IN	Here the setpoint is entered as a 32 bit real number. A **32 bit** value is output to the frequency inverter.					X	X
SP_3	REAL	IN	Here the setpoint is entered as a 32 bit real number. A **16 bit** value is output to the frequency inverter.		X		X		
scal_AV1	REAL	IN	Scaling of the actual bus value 1 entered in parameter P543 or P543[-01]. This value is multiplied by the contents of parameter P543 or P543[-01]. **Example:** A value of 1.0 must be entered order to communicate a setpoint precisely according to the bits at output AV_1. A value of 163.84 must be entered order to communicate a setpoint as a percentage at output AV_1.	X	X	X	X	X	X
scal_AV2	REAL	IN	Scaling of the actual bus value 2 entered in parameter P544 or P543[-02]. This value is multiplied by the contents of parameter P544 or P543[-02]. **Example:** Similar to *scal_AV1*		X		X	X	X

Name	Type	Interface	Description	Module *Prozess_PPO…*					
				…1_16	*…2_16*	*…3_16*	*…4_16*	*…2_32*	*…4_32*
scal_AV3	REAL	IN	Scaling of the actual bus value 3 entered in parameter P545 or P543[-03]. This value is multiplied by the contents of parameter P545 or P543[-03]. **Example:** Similar to *scal_AV1*		X		X		
AV_1	REAL	INOUT	Output of the calculated actual value 1 from the frequency inverter (*scal_AV1 * actual bus value 1* from the FI)	X	X	X	X	X	X
AV_2	REAL	INOUT	Output of the calculated actual value 2 from the frequency inverter (*scal_AV2 * actual bus value 2* from the FI)		X		X	X	X
AV_3	REAL	INOUT	Output of the calculated actual value 3 from the frequency inverter (*scal_AV3 * actual bus value 3* from the FI)		X		X		

Table 4: Process modules - Input parameters

3.3.2 Output parameters

Name	Type	Interface	Description	Module *Prozess_PPO…*					
				…1_16	*…2_16*	*…3_16*	*…4_16*	*…2_32*	*…4_32*
ZSW:	WORD	OUT	Status word from the frequency inverter.	X	X	X	X	X	X
ready_start:	BOOL	OUT	Initialisation is complete, the loading relay is in status ON, the output voltage is still disabled.	X	X	X	X	X	X
run:	BOOL	OUT	The frequency inverter outputs a 'runnning' message	X	X	X	X	X	X
fault	BOOL	OUT	Drive malfunctioning and out of order; the frequency inverter goes to switch-on block status if acknowledgement is successful. A new positive flank must be generated at the enabling output "rel_fwd" or "rel_rev".	X	X	X	X	X	X
warning	BOOL	OUT	The frequency inverter has generated a warning. The drive remains in operation. An acknowledgement is not required.	X	X	X	X	X	X
Bus_out10	BOOL	OUT	Only with SK 5xxE. For further details of the function please refer to parameter P481 in the frequency inverter manual		X		X	X	X
Bus_out13	BOOL	OUT	Only with SK 5xxE. For further details of the function please refer to parameter P481 in the frequency inverter manual		X		X	X	X
actual_para	INT	OUT	Actually used parameter set (1...4)	X	X	X	X	X	X

Table 5: Process modules - Output parameters

4. Parameter modules

The parameter modules are used to read out parameter values from the frequency inverters or to write values into them. All modules access the parameters in reading mode.

For acyclic reading and writing, access to the memory addresses (PKW channel) of the frequency inverter is not via the peripheral addresses but rather via the diagnostic address. This is explicitly specified in the dialogue during the hardware configuration. Access to the addresses is performed with standard Siemens function modules, which are available in the library of the Simatic Manager. Therefore access to the parameters no longer depends on the PPO type. With PROFIBUS, access to the parameters is only possible for Profibus slaves of type DPV1 and for PROFINET IO devices.

4.1 Purpose of the parameter modules

4.1.1 Purpose of parameter modules for cyclic data communication

The function modules "Para_PPO1+…" are called up in the cyclic section of the program. In addition to the parameter modules, the associated instance modules "Inst_PPO1+..." are also required.

Example:

Function module: *Para_PPO1+2R*

Instance data module: *Inst_PPO1+2R*

Purpose:

The function module "Para_PPO+..." is used to read a specific parameter via statement of the parameter number and index or to write this into the frequency inverter. In addition, parameters which provide a setting facility which depends on the parameter set can also be accessed. Please refer to the manual for the relevant frequency inverter for information regarding which parameters can be read or written with index and/or depending on the parameter set.

Parameter variants	Example	Parameter number	Index	Parameter set	Meaning
Standard parameter	P300	300	-	-	Servo mode
Parameter Index	P475 [-02]	475	02	-	ON/OFF switching delay, digital input 2
Parameter set-dependant parameter	P102 (P1 … P4)	102	-	1, 2, 3 or 4	Run-up time for parameter set 1 (or 2, 3 or 4)
Parameter set-dependant index parameter	P525 [-02] (P1 … P4)	525	02	1, 2, 3 or 4	Load monitoring auxiliary value 2 for parameter set 1 (or 2, 3 or 4)

Table 6: Example of parameter types

Function module	Instance module	Write parameter	Read parameter
Para_PPO1+2R	Inst_PPO1+2R	-	16Bit
Para_PPO1+2W16	Inst_PPO1+2W_16	16Bit	16Bit
Para_PPO1+2W32	Inst_PPO1+2W_32	32Bit	32Bit

Table 7: Assignment of function modules

The description of the inputs and outputs is summarised in Section 4.3.

4.1.2 Purpose of parameter modules for acyclic data communication

The function modules "Para_acyc+…" are called up in the cyclic section of the program, however they operation in the acyclic communication process. In this way, access to the data of a frequency inverter must not necessarily be concluded within a cycle of the PLC program, but rather can be continued in the following program cycle. In addition to the parameter modules, the associated instance modules "Inst_..." are also required.

Example:

Function module: *Para_acyc_read*

Instance data module: *Inst_FB204_R1632*

Access on the frequency inverter is via the diagnostic address. This address was specified during the hardware configuration and must be individually specified for each bus participant. In the modules described here, the diagnostic address is always 4092 (see also Section 2.1.1).

Purpose:

The function module "Para_acyc+..." is used to read a specific parameter via statement of the parameter number and index or to write this into the frequency inverter. In addition, parameters which provide a setting facility which depends on the parameter set can also be accessed. Please refer to the manual for the relevant frequency inverter for information regarding which parameters can be read or written with index and/or depending on the parameter set.

Only *Para_acyc_W16* and *Para_acyc_W32*:

When writing the parameter, a distinction can be made as to whether the data are to be written into the RAM or into the EEPROM of the frequency inverter.

If the data are written into the EEPROM, the information is retained, even if there is a power failure, whereas information which is written into the RAM is lost. However, the number or write cycles for an EEPROM is limited, so that this variant for writing date should be chosen with care.

WARNING

The maximum number or write cycles on the EEPROM of the frequency inverters is limited to 100,000 cycles. Continuous writing to the EEPROM therefore results in the destruction of the EEPROM.

Writing to the RAM of the frequency inverter should therefore be used for writing parameter data. The setting for this is made in parameter P560 of the frequency inverter.

Parameter variants	Example	Parameter number	Index	Parameter set	Meaning
Standard parameter	P300	300	-	-	Servo mode
Parameter Index	P475 [-02]	475	02	-	ON/OFF switching delay, digital input 2
Parameter set-dependant parameter	P102 (P1 … P4)	102	-	1, 2, 3 or 4	Run-up time for parameter set 1 (or 2, 3 or 4)
Parameter set-dependant index parameter	P525 [-02] (P1 … P4)	525	02	1, 2, 3 or 4	Load monitoring auxiliary value 2 for parameter set 1 (or 2, 3 or 4)

Table 8: Example of parameter types

Function module	Instance module	Write parameter	Read parameter
Para_acyc+read	Inst_FB204_R1632	-	16Bit, 32Bit
Para_acyc+W16	Inst_FB205+W16	16Bit	16Bit
Para_acyc+W32	Inst_FB206+W32	32Bit	32Bit

Table 9: Assignment of function modules

The description of the inputs and outputs is summarised in Section 4.3.

4.2 Structure of parameter modules

The parameter modules are listed in chronological order below.

The relevant instance modules for the function blocks, "Inst_..." provide detailed information regarding the signal statuses between the PLC and the frequency inverter. Due to the complexity of the instance modules they are not shown here. They are self-explanatory.

The description of the inputs and outputs is summarised in Section 4.3.

4.2.1 Parameter modules for cyclic data traffic

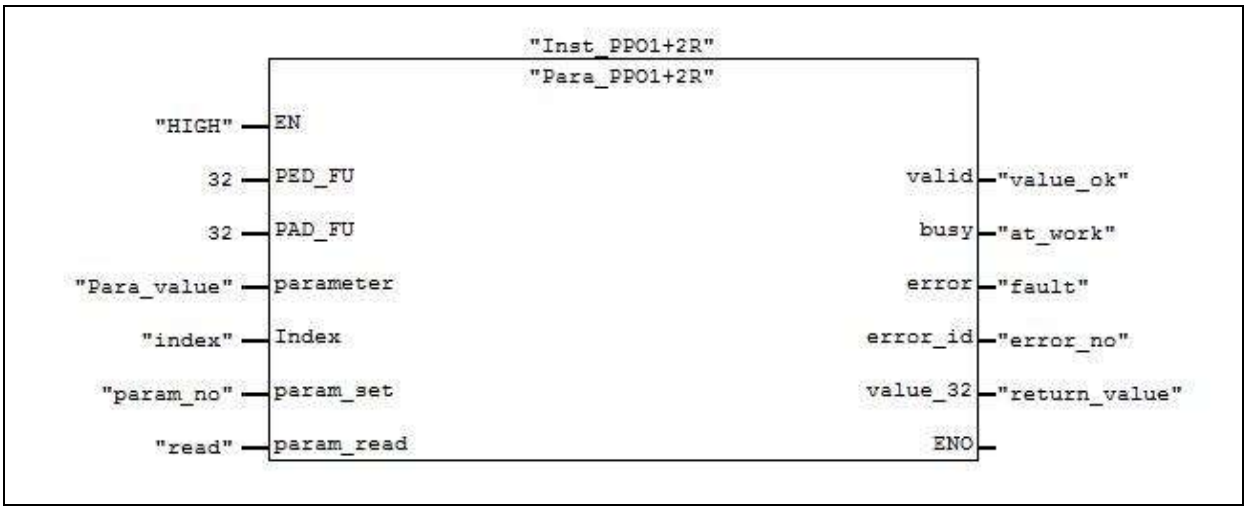

Fig. 22 Parameter module "Para_PPO1+2R"

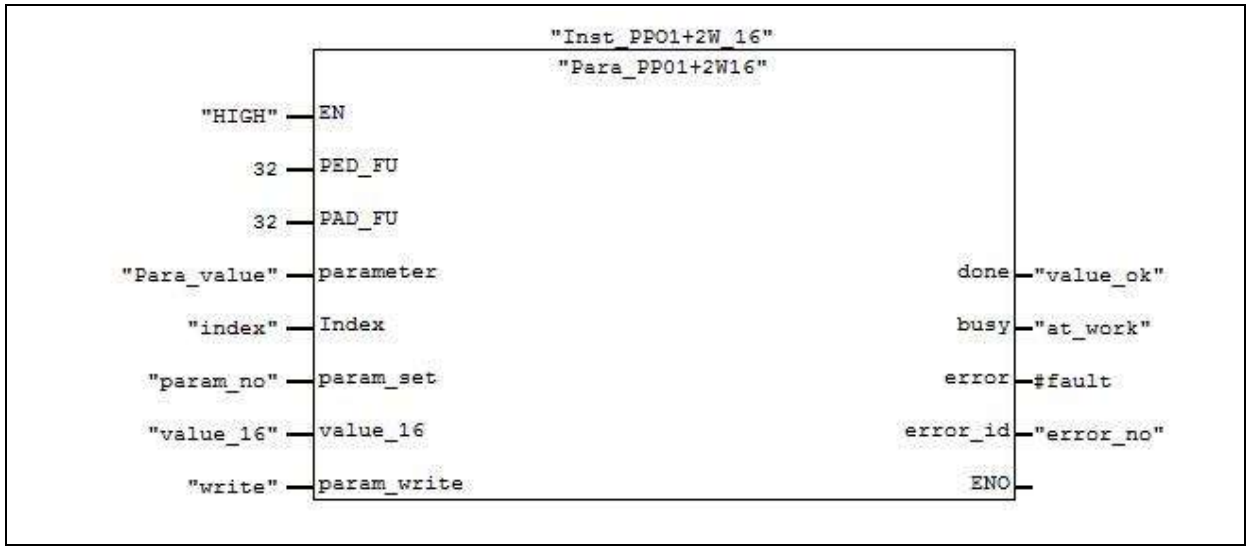

Fig. 23 Parameter module "Para_PPO1+2W16"

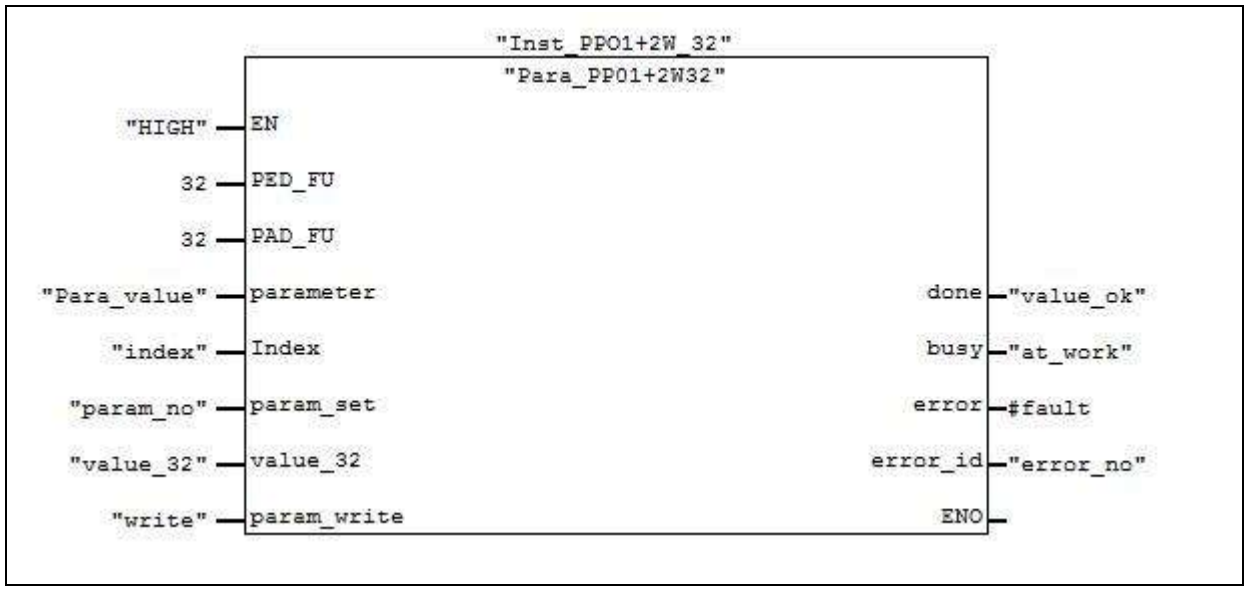

Fig. 24 Parameter module "Para_PPO1+2W32"

4.2.2 Parameter modules for acyclic data traffic

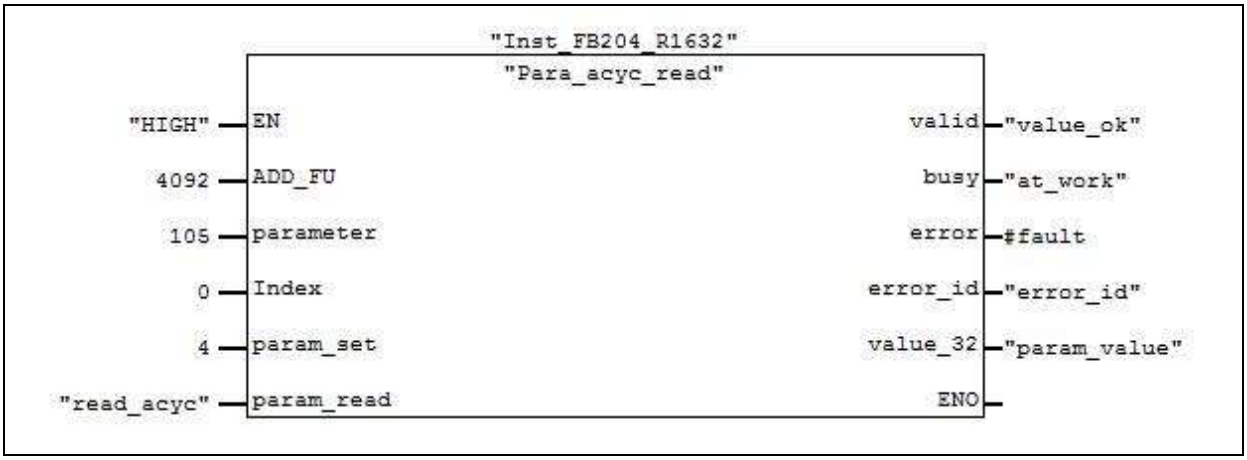

Fig. 25 Parameter module "Para_acyc_read"

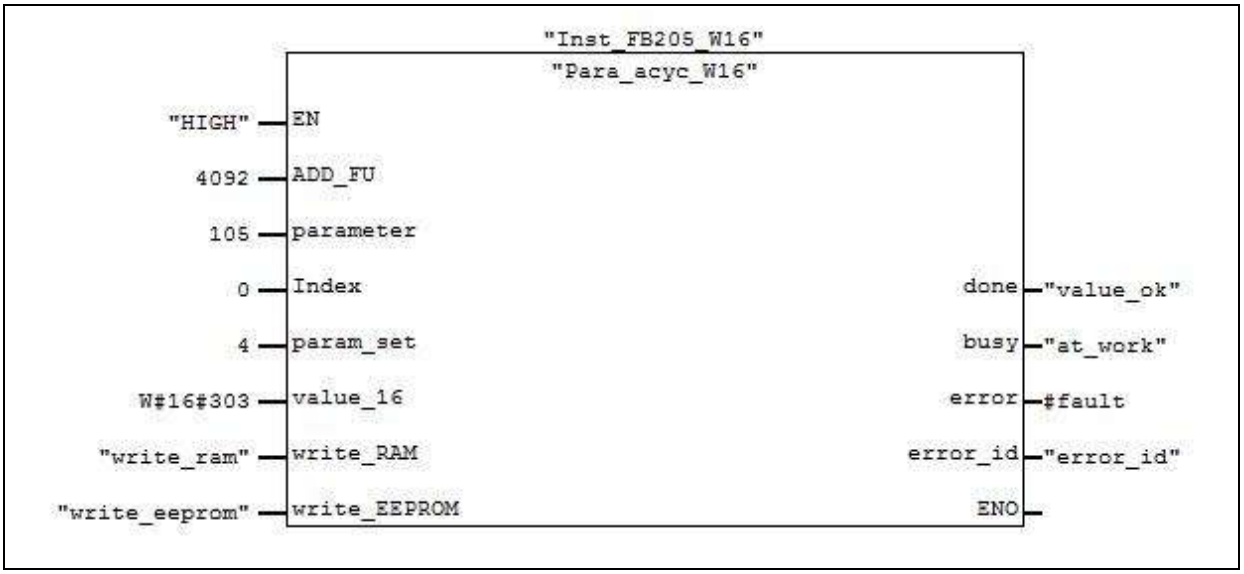

Fig. 26 Parameter module "Para_acyc_W16"

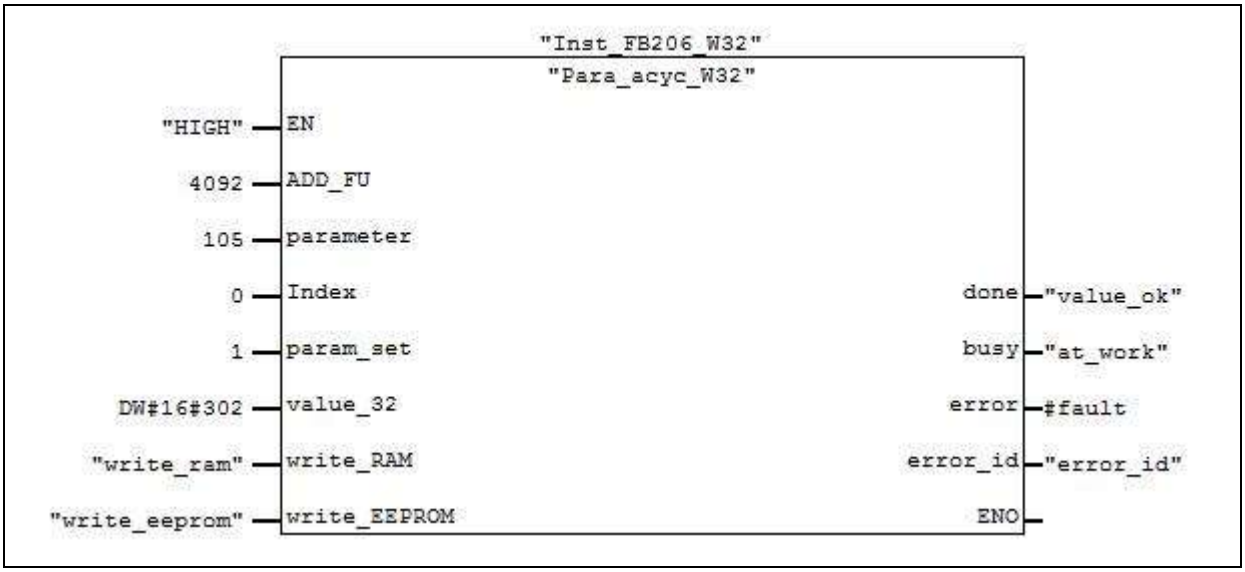

Fig. 27 Parameter module "Para_acyc_W32"

4.3 Parameter module parameters

4.3.1 Input parameters

Name	Type	Interface	Description	Module *Para_...*					
				...PPO1+...			*...ACYC_...*		
				...2R	*...2W16*	*...2W32*	*...Read*	*...W16*	*...W32*
PED_FU	INT	IN	Start address of the inputs from the hardware configurator	X	X	X			
PAD_FU	INT	IN	Start address of the outputs from the hardware configurator	X	X	X			
ADD_FU	INT	IN	Diagnostic address of the frequency inverter The address can be found in the hardware configurator.				X	X	X
parameter	INT	IN	Parameter number	X	X	X	X	X	X
index	INT	IN	Index number. For details of which parameters have an index, please refer to the manual for the frequency inverter. *If this is parameter is a parameter without an index, a zero must be entered here.*	X	X	X	X	X	X
param_set	INT	IN	Parameter set number (1...4). For details of which parameters have a parameter set number, please refer to the manual for the frequency inverter. *If this is parameter is a parameter to which none of the four parameter sets is assigned directly, a zero must be entered here.*	X	X	X	X	X	X

Name	Type	Interface	Description	Module Para_...					
				…PPO1+…			…ACYC_…		
				…2R	…2W16	…2W32	…Read	…W16	…W32
param_read	BOOL	IN	0 = Reading of parameter value is not requested. The parameter value at the output "value_32" does not need to be valid. 1 = Reading of parameter is requested. This signal may be used as a static signal. The output bits "valid" and " busy" are updated together with the read command.	X			X		
value_16	WORD	IN	The 16 bit numerical value for the parameter which is to be written is entered here. For details of which parameters have a 16 bit numerical value, please refer to the manual for the frequency inverter.		X			X	
value_32	WORD	IN	The 32 bit numerical value for the parameter which is to be written is entered here. For details of which parameters have a 32 bit numerical value, please refer to the manual for the frequency inverter.			X			X
param_write	BOOL	IN	0 = Writing of the parameter value is not requested. 1 = Writing of the parameter is requested. From this signal, the module forms a positive flank, which means that the signal must change from 0 -> 1 for for the parameter to be re-written.		X	X			
write_RAM	BOOL	IN	0 = Writing of the parameter value is not requested. 1 = Writing of the parameter is requested. From this signal, the module forms a positive flank, which means that the signal must change from 0 -> 1 for for the parameter to be re-written. The parameter is only written to the RAM.					X	X
write_EEPROM	BOOL	IN	0 = Writing of the parameter value is not requested. 1 = Writing of the parameter is requested. From this signal, the module forms a positive flank, which means that the signal must change from 0 -> 1 for for the parameter to be re-written. The parameter is written into the EEPROM and cannot be written an unlimited number of times.					X	X

Table 10: Parameter modules - Input parameters

4.3.2 Output parameters

Name	Type	Interface	Description	Module Para_...					
				…PPO1+…			…ACYC_…		
				…2R	…2W16	…2W32	…Read	…W16	…W32
valid	BOOL	OUT	1 = The frequency inverter supplies the requested parameter value. Updating is only performed with a read parameter request at the input "param_read".	X					
valid	BOOL	OUT	1 = The frequency inverter has taken over the requested data and written the result to the PLC.				X		
done	BOOL	OUT	1 = The frequency inverter has taken over the requested data and written the result to the PLC: positive acknowledgement					X	X
done	BOOL	OUT	1 = The frequency inverter has taken over the transmitted value and not output an error. "done" is only set if the write request "parameter_write" is still set to one.		X	X			
busy	BOOL	OUT	0 = Either there is no read request or the result of the request is available. 1 = The frequency inverter has not yet sent any valid data as a response to the last read request.	X	X	X	X	X	X
error	BOOL	OUT	1 = A module error is present. Error numbers are output to the "error_id" output.	X	X	X	X	X	X
error_id	WORD	OUT	The error code of the frequency inverter is output here. For details, please refer to the frequency inverter manual. A zero is entered here if a valid result is received from the frequency inverter.	X	X	X	X	X	X
value_32	DWORD	OUT	The result of the read request or parameter query is located here. The data is only valid if the bit "valid" has the value "1". A zero is entered here if an error message is received from the frequency inverter.	X			X		

Table 11: Parameter modules - Output parameters

Key word index

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