Knick

Interface Specification

Protos II 4400

Protos II PN4400-095 Module

PROFINET

Document Revision 2.0

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Contents

Firmwareversions

This document is valid from the following combination of firmware versions:

Module	Version
Protos II FRONT 4400	1.4.0
Protos II PN4400-095	1.1.0

Related Documents

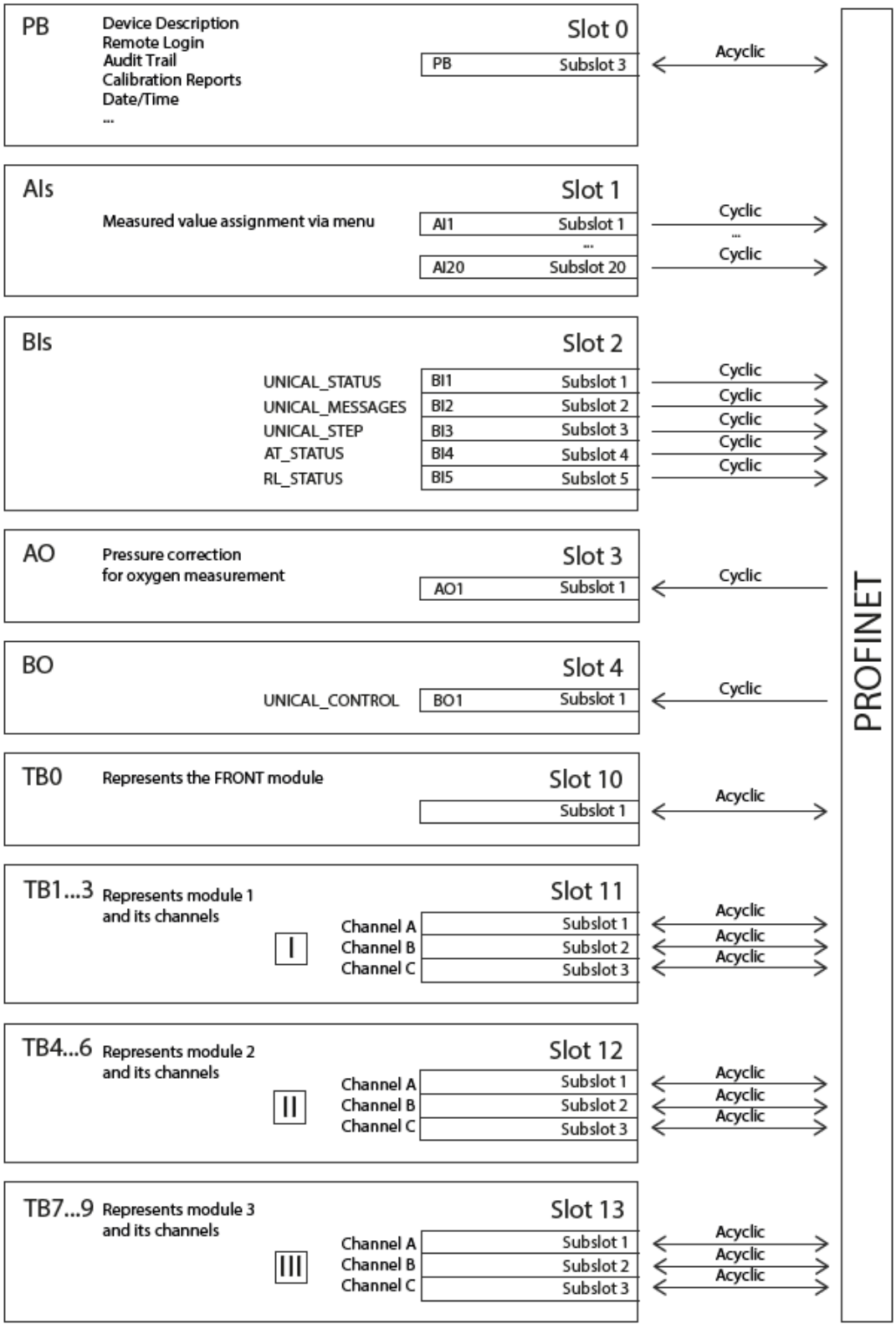
Document Name	Code	Version
Protos Common Interface Specification	[CIS]	1.0
Protos Common Interface Specification Audit Trail	[CIS AT]	1.0

1 General

1.1 Block Model

To enable structured access, the PROFINET interface of the Protos II PN4400-095 module was divided into blocks on the basis of the PA profile. These are divided into the following block types: Physical Block (PB), Transducer Block (TB), and Function Block (AI, BI, AO, BO).

The following figure shows the blocks contained in the PN4400-095 and their PROFINET addresses.



1.2 Bit Fields and Bit Definitions

Bit positions inside values are written as hexadecimal values (e.g., 0x02). This means the bit or bits that indicate a 1 in the binary representation of this number (e.g., 0x02 = b00000010).

The following applies to all the bit fields listed in the coding sections of the parameter tables: Bits that are not explicitly listed are reserved. They must be ignored for read access and set to zero for write access.

Values in decimal notation represent a numerical value and do not symbolize a bit position in bit fields.

1.3 Parameter Names

The names of parameters are written in capital letters and begin with the code of a function group, if any (e.g., DSC_AVAILABLE).

If a parameter contains subparameters (Elements), they are written in CamelCase notation (e.g., FirmwareVersion). If a parameter does not contain subparameters, the name of the parameter is repeated as the element.

If symbolic names for values or bit definitions are used, they are written in capital letters but do not begin with a characteristic code.

2 Cyclic Communication

With the PN4400-095 module, Protos offers the following process data, which is included in the cyclic process data communication with the help of the GSDML file.

Number	Type	Transmission From		Bytes	Direction
20	AI (Analog Input)	AI1…AI20:	Measured Values	5	From Protos
5	BI (Binary Input)	BI1:	UNICAL_STATUS	3	From Protos
		BI2:	UNICAL_MESSAGES		
		BI3:	UNICAL_STEP		
		BI4:	AT_STATUS		
		BI5:	RL_STATUS		
1	AO (Analog Output)	AO1:	Process Pressure	5	To Protos
1	BO (Binary Output)	BO1:	UNICAL_CONTROL	3	To Protos

Protos itself selects which measured values an AI transmits.

The AO enables the current process pressure to be transmitted to Protos if this pressure is to be used as a compensation variable during oxygen measurement.

For the coding of UNICAL_CONTROL, UNICAL_STATUS, UNICAL_MESSAGES, and UNICAL_STEP, see the document [CIS].

For the coding of AT_STATUS and RL_STATUS, see the document [CIS AT].

2.1 Structure of the Process Data

All process data of AI, AO, BI, and BO contain not only the actual process value (Value) but also a status byte that provides information about the quality of the measuring channel. In detail, this results in the following structure of the individual process data elements.

When sending process data to Protos via BO and AO, be sure to set the status byte to the value 128 (0x80).

	Parameter Description	
	AI/AO Process Value **5 bytes** For transmitting measured values.	
	Element	*Type*
	Value	Float
	Measured value as a floating-point number in IEEE-754 code.	
	Status	UInt8
	Quality of the transmitted value – also called “measured value status”, as AI and AO are used to transmit measured values	
	BI/BO Process Value **3 bytes** For transmitting bit fields consisting of 16 bits.	
	Element	*Type*
	Value	OctetString2
	Bit field	
	Status	UInt8
	Quality of the transmitted value	

The status byte contains information about the state of the measuring channel where the measured value originated and is interpreted as follows:

Status	Value Range	Meaning
GOOD	0x80, 0x83	Good
UNCERTAIN	0x79 … 0x7A	Out of specification
	0x68 … 0x6B	Maintenance request
FUNCTION_CHECK	0x3C	Function check
BAD	0x24 … 0x27, 0x00	Failure

3 Acyclic Parameters

3.1 Physical Block (Device Description)

These parameters are the interface to the Device Description function. This function can be used to read out the identification data, OrderID, serial number, hardware version, and firmware version for all components of a Protos, including the connected sensors.

For the description, see the document [CIS].

Slot	Subslot	Index	Access	Parameter Description	
0	3	96	r	**DSC_AVAILABLE**	**4 bytes**
0	3	97	r	**DSC_FRONT**	**86 bytes**
0	3	98	r	**DSC_BASE**	**86 bytes**
0	3	99	r	**DSC_MOD1**	**86 bytes**
0	3	100	r	**DSC_MOD1_CHANNEL_A**	**86 bytes**
0	3	101	r	**DSC_MOD1_CHANNEL_B**	**86 bytes**
0	3	102	r	**DSC_MOD1_CHANNEL_C**	**86 bytes**
0	3	103	r	**DSC_MOD2**	**86 bytes**
0	3	104	r	**DSC_MOD2_CHANNEL_A**	**86 bytes**
0	3	105	r	**DSC_MOD2_CHANNEL_B**	**86 bytes**
0	3	106	r	**DSC_MOD2_CHANNEL_C**	**86 bytes**
0	3	107	r	**DSC_MOD3**	**86 bytes**
0	3	108	r	**DSC_MOD3_CHANNEL_A**	**86 bytes**
0	3	109	r	**DSC_MOD3_CHANNEL_B**	**86 bytes**
0	3	110	r	**DSC_MOD3_CHANNEL_C**	**86 bytes**

3.2 Physical Block (Time Synchronization)

This parameter is the interface to the Time Synchronization function. The function can be used to read or set the system time of Protos.

For the description, see the document [CIS].

Slot	Subslot	Index	Access	Parameter Description	
0	3	95	rw	**TS_DEVICE_DATE_TIME**	**8 bytes**

3.3 Device Settings

Slot	Subslot	Index	Access	Parameter Description
0	4	0	rw	**LOCAL_OP_ENABLE** **1 byte** Use this parameter to set a key lock on Protos that completely prevents local operation. An interruption in the PROFINET connection ends the key lock and enables local operation again. *Element* *Type* LOP_Enable UInt8 0 – Key lock set 1 – Key lock canceled

3.4 Physical Block (Audit Trail)

This parameter is the interface to the Audit Trail function, which is part of TAN option FW4400-081.

For the description, see the document [CIS AT].

Slot	Subslot	Index	Access	Parameter Description	
0	3	66	r	**AT_READ_RECORD**	**200 bytes**
0	3	67	w	**AT_RECORD_ACK**	**4 bytes**
0	3	68	r	**AT_STATUS**	**1 byte**
0	3	71	r	**AT_LAST_ACK**	**4 bytes**
0	3	72	w	**AT_SYNC**	**4 bytes**

3.5 Physical Block (Remote Login)

These parameters are the interface to the Remote Login function, which is part of TAN option FW4400-081.

For the description, see the document [CIS AT].

Slot	Subslot	Index	Access	Parameter Description	
0	3	76	w	**RL_LOGIN_REQUEST**	**186 bytes**
0	3	77	w	**RL_LOGIN_CANCEL**	**1 byte**
0	3	79	r	**RL_COMMAND_STATUS**	**1 byte**
0	3	81	r	**RL_STATUS**	**1 byte**

3.6 Physical Block (Calibration Report)

These parameters are the interface to the Calibration Report function, which is part of TAN option FW4400-081.

For the description, see the document [CIS AT].

Slot	Subslot	Index	Access	Parameter Description	
0	3	86	r	**CR_INFO**	**42 bytes**
0	3	87	r	**CR_READ_LINE**	**128 bytes**
0	3	88	w	**CR_LINE_ACK**	**1 byte**
0	3	89	w	**CR_REPORT_ACK**	**4 bytes**
0	3	90	w	**CR_RESTART**	**1 byte**

4 Compatibility with Previous Versions

Some of the familiar functions of the PN4400-095 module have been replaced by improved functions that have been standardized, particularly across all fieldbus modules. The previous versions are still available via PROFINET, but are not recommended for new projects. Therefore, they are only listed here and not described in detail.

4.1 Device Description and Sensor Description

These functions were replaced by the generalized DSC_* parameters, which supply much more detailed information about the structure of Protos and the connected sensors.

Slot	Subslot	Index	Access	Parameter Description	
0	3	0	r	**DEVICE_CONFIG**	**4 bytes**
11-13	1-3	60	r	**SNS_DESC_nX**	**64 bytes**

4.2 Product Calibration

The parameters for implementing product calibration will become part of the Common Interface Specification and, in this context, will be standardized across all Protos fieldbus interfaces.

Slot	Subslot	Index	Access	Parameter Description	
11-13	1-3	62	rw	**CAL_PRD_MODE_nX**	**1 byte**
11-13	1-3	63	rw	**CAL_PRD_SAMPLE_nX**	**1 byte**
11-13	1-3	64	r	**CAL_PRD_STORED_VAL_nX**	**4 bytes**
11-13	1-3	65	rw	**CAL_PRD_TRUE_VAL_nX**	**4 bytes**
11-13	1-3	66	r	**CAL_PRD_STEP_nX**	**1 byte**
11-13	1-3	67	r	**CAL_CAL_RESULT_nX**	**1 byte**

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