XNE-1SWIRE
Technology Module

E·T·N

Powering Business Worldwide
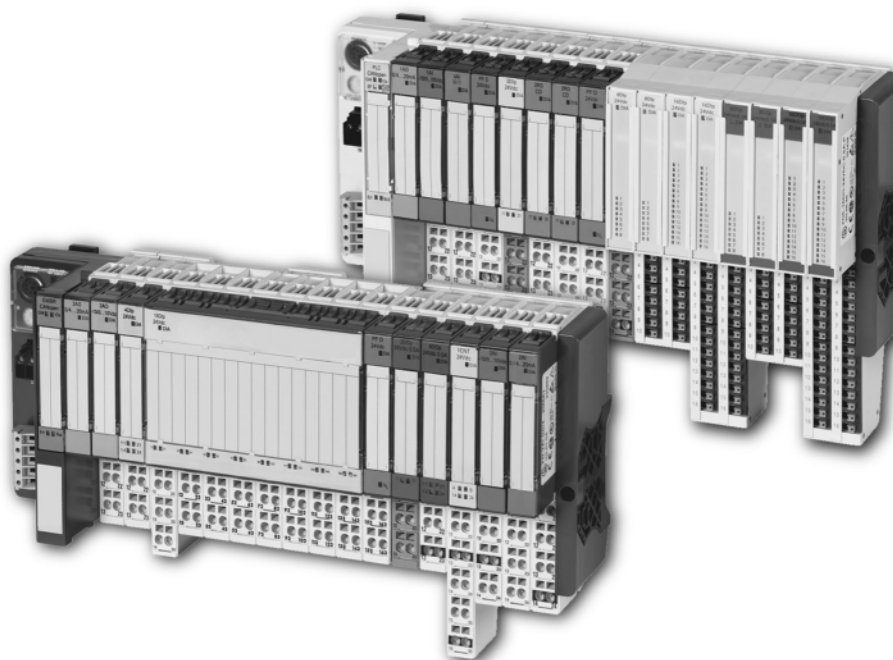
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Original manual

The German version of this document is the original manual.

Translations of the original manual

All non-German editions of this document are translations of the original manual.

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Subject to modifications.

Safety regulations

WARNING

> ⚠️ **Dangerous electrical voltage!**
>
> Serious injury and material damage may occur.
>
> Before commencing the installation:
> ▶ Disconnect the power supply of the device.
> ▶ Ensure that the device cannot be accidentally restarted.
> ▶ Verify isolation from the supply.
> ▶ Earth and short circuit.
> ▶ Cover or enclose neighbouring units that are live.
> ▶ Follow the engineering instructions of the device concerned.
> ▶ Only suitably qualified personnel in accordance with EN 50110-1/ -2 (DIN VDE 0105 Part 100) may work on this device.
> ▶ Before installation and before touching the device ensure that you are free of electrostatic charge.
> ▶ The functional earth (FE) must be connected to the protective earth (PE) or to the potential equalisation. The system installer is responsible for implementing this connection.
> ▶ Connecting cables and signal lines should be installed so that inductive or capacitive interference do not impair the automation functions.
> ▶ Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.
> ▶ Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
> ▶ Ensure a reliable electrical isolation of the low voltage for the 24 volt supply. Only use power supply units complying with IEC/HD 60364-4-41 (DIN VDE 0100 Part 410).
> ▶ Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
> ▶ Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause uncontrolled operation or restart.
> ▶ Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented.
> ▶ Wherever faults in the automation system may cause damage to persons or property, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks etc.).

▶ The electrical installation must be carried out in accordance with the relevant regulations (e.g. with regard to cable cross sections, fuses, PE).

▶ All work relating to transport, installation, commissioning and maintenance must only be carried out by qualified personnel. (IEC/HD 60364 (DIN VDE 0100) and national work safety regulations).

Table of contents

Table of contents

1   General

1.1   About this manual

Meaning of symbols   The following symbols are used in this User Manual according to the hazard level described:

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious permanent injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious permanent injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in slight injury or material damage.

☞ **Indicates important information not related to safety.**

The danger symbol used and the text indicate the actual danger and the related preventative measures.

1.2   **Purpose of this User Manual**

These operating instructions describe the technical features, the functions and the integration of the device as a local I/O component in XN-PLC-CANopen and as a decentralized component in XI/ON on a CANopen, Profibus and DeviceNet network. The User Manual is part of the devices supplied.

☞ **Read the chapter Safety regulations, page 3, before carrying out any work on the device. This contains important information for your personal safety. This chapter must be read and understood by all persons working with this device.**

WARNING

Incomplete copy of this User Manual

Working with individual pages of this User Manual may cause damage to property or personnel by failure to observe safety-related information.

▶ Always work with the complete original User Manual.

1.2.1   **Comments about the User Manual**

Please send any comments, recommendations or suggestions relating to this User Manual to: automation@eaton.com

1.3   Additional documentation

The following documents may be helpful in the use of the device in addition to this User Manual. These can be downloaded from our homepage:

www.eaton-automation.com under DOWNLOADS.

[1] MN05002004Z
     User Manual XI/ON
     Gateways for PROFIBUS-DP

[2] MN05002005Z
     User Manual XI/ON
     Gateways for CANopen

[3] MN05002006Z
     User Manual XI/ON
     Gateways for DeviceNet

[4] MN05002007Z
     User Manual XI/ON
     Gateway XNE-GWBR-2ETH-IP

[5] MN05002008Z
     User Manual XI/ON
     Gateway XNE-GWBR-2ETH-MB

[6] MN05002009Z
     User Manual XI/ON
     Gateway XN-GWBR-MODBUS-TCP

The following documents on the subject of SmartWire are available from www.moeller.net:

[7] AWB1210+1251-1591
     Connection system SmartWire Modules
     (Power module, I/O module, module for DILM)

[8] AWB2528-1589
     Connection system SmartWire-Easy223-SWIRE
     (easy Gateway, CAN-Open Gateway)

[9] AWB1251-1590
     Connection system SmartWire-SWIRE-GW-DP
     (PROFIBUS-DP Gateway)

2 Product description

Fig. 1 XNE-SWIRE module in a XI/ON CANopen station with 4 SWIRE slaves

2.1 Features

The XNE-1SWIRE makes it possible to operate an SWIRE bus with up to 16 SWIRE slaves. A 6-core cable is used here for power and data transfer. A XI/ON station can contain max. 3 XNE-1SWIRE modules.

The voltage U_{AUX} for supplying the relays and the U_{SW} for supplying the electronic equipment must be connected separately on the XNE-1SWIRE. Both power supplies must be fed from a power supply unit although it is possible to disconnect U_{AUX} separately. The SWIRE slaves and the accessories must be purchased from the appropriate manufacturer.

The Eaton XNE-1SWIRE can be run both locally on a XI/ON PLC (e.g. XN-PLC-CANopen) or remotely as a module in a remote XI/ON station.

The maximum number of XNE-1SWIRE modules per XI/ON station is restricted by:
• the number of process data, diagnostics, parameter and configuration bytes of the XNE-1SWIRE:
  • 8 bytes input data
  • 8 bytes output data
  • 24 bytes parameter data
  • 8 bytes diagnostics data
• and the fieldbus system used.

From version VN 01-04, XNE-1SWIRE can be run in conformance with the Moeller SmartWire standard. For this the «Moeller Conformance» function has been implemented. See Chapter 6 Moeller SWIRE conformance criteria, Page 51.

2.2 Function parameterization

2.2.1 Scan physical structure and store in the XNE-1SWIRE

In order for the SWIRE bus to start operation, the physical structure must match the SWIRE configuration stored in the XNE-1SWIRE. On power up, the physical structure of the SWIRE bus is scanned and compared with the SWIRE configuration stored in the XNE-1SWIRE (configuration check of number of slaves, type and assigned address). If the physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE (SW LED flashing):
- the physical structure of the SWIRE bus must be stored in the XNE-1SWIRE
- or the physical structure must be corrected.

The parameter setting determines how the physical structure of the SWIRE bus is stored:
- manually (see Section «Manual SWIRE configuration (default setting)», Page 12),
- or automatically (see Section «Automatic SWIRE configuration», Page 12).

☞ • **Only the manual SWIRE configuration is possible if the «Moeller Conformance» function is active.**
   • **The XNE-1SWIRE is factory set with a stored configuration of «Zero» slaves.**

Storing with manual and automatic SWIRE configuration:
- The slaves physically located on the SWIRE bus are scanned.
- Each slave is assigned with an address and stored in the corresponding slave.
- The configuration is stored in the XNE-1SWIRE.

Manual SWIRE configuration (default setting)

To store the physical structure of the SWIRE bus in the XNE-1SWIRE, the CFG button of the XNE-1SWIRE must be pressed manually (only functions if the SW LED is flashing).

Parameter setting:
- PROFIBUS-DP and CANopen (Byte 1):
  - Disable CFG = 0 (MXpro: «automatic configuration SWIRE» = deactivate)
- DeviceNet (Attribute 121 (79_{hex}) «PARAM_COMMON_OERATION_MODES»):
  - Bit 1 = 0

Automatic SWIRE configuration

If the physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE on power up, the physical structure is stored automatically in the XNE-1SWIRE.

Parameter setting:
- PROFIBUS-DP and CANopen (Byte 1):
  - Disable CFG = 1 (MXpro: «automatic configuration SWIRE» = activate) and
  - MC = 0 (MXpro: «Moeller compliant» = deactivate)
- DeviceNet (Attribute 121 (79_{hex}) «PARAM_COMMON_OERATION_MODES»):
  - Bit 1 = 1 and
  - Bit 4 = 0

2.2.2   **Activate and deactivate PLC configuration check**

During the PLC configuration check, the configuration stored in the XNE-1SWIRE is compared with the SET configuration stored in the PLC. The complete device ID must match. If the two configurations match completely, the entire SWIRE bus is ready for data exchange (RDY LED lit). If the two configurations do **not** match, the system responds according to other parameter settings (see Chapter 2.2.4 System behavior with negative configuration checks and slave failure, Page 14).

PLC configuration check active (default setting)

Parameter setting:
- PROFIBUS-DP and CANopen (Byte 1):
  - Configuration = 0 (MXpro: «configuration check PLC» = activate)
- DeviceNet (Attribute 121 (79$_{hex}$) «PARAM_COMMON_OERATION_MODES»):
  - Bit 2 = 0

PLC configuration check inactive

Parameter setting:
- PROFIBUS-DP and CANopen (Byte 1):
  - Configuration = 1 (MXpro: «configuration check PLC» = deactivate)
- DeviceNet (Attribute 121 (79$_{hex}$) «PARAM_COMMON_OERATION_MODES»):
  - Bit 2 = 1

2.2.3   **System behavior with positive configuration checks**

1 The physical structure of the SWIRE bus is scanned on power up and compared with the configuration stored in the XNE-1SWIRE (SW LED flashing).
- The SWIRE bus starts operation (SW LED lit) if the physical structure of the SWIRE bus matches the SWIRE configuration stored in the XNE-1SWIRE.

2 If the PLC configuration check is activated, the configuration stored in the XNE-1SWIRE is compared with the SET configuration stored in the PLC. The complete device ID must match.
- If the two configurations match completely, the entire SWIRE bus is ready for data exchange (RDY LED lit)

3 The system then starts data exchange.

4 The physical structure of the SWIRE bus is monitored continuously during operation so that any changes on the bus or slave failures can be detected.

2.2.4 **System behavior with negative configuration checks and slave failure**

CAUTION

⚡ **SWIRE bus energized**

Any manipulation of the physical structure (e.g. exchange of the SWIRE slaves) may damage the device.

▶ De-energize the SWIRE bus before carrying out any changes.

The system behavior when the result of a configuration check is negative, depends on the individual parameter settings:

☞ **The following functions are deactivated if the «Moeller Conformance» function is active:**
- **Automatic SWIRE configuration**
- **Bus-oriented configuration check**
- **Slave-oriented configuration check**

The following occurs if the physical structure of the SWIRE bus is found not to match the configuration stored in the XNE-1SWIRE on power up (SW LED flashing):
- If the **«Moeller Conformance»** function is **deactivated**, the physical structure is continuously compared with the configuration stored in the XNE-1SWIRE. The SWIRE bus starts operation as soon as the matching configurations are detected:
  - After the physical structure was stored in the XNE-1SWIRE:
    - Automatically (if the automatic SWIRE configuration is activated)
    - Or manually (if the automatic SWIRE configuration is deactivated), by pressing the CFG button (only functions if the SW LED is flashing).
  - After the physical structure is corrected.
- The operation is aborted if the **«Moeller Conformance»** function is **activated**. The SWIRE bus only starts operation:
  - After the physical structure was stored in the XNE-1SWIRE and a match was determined:
    - Manually, by pressing the CFG button (only functions if the SW LED is flashing).
      After the configuration is stored, the physical structure is compared once more with the configuration stored in the XNE-1SWIRE.
  - If the physical structure of the SWIRE bus matches the configuration stored in the XNE-1SWIRE the next time that U_{SW} is switched on.

The following occurs if the PLC configuration check (PLC configuration check must be activated) finds that the configuration stored in the XNE-1SWIRE does not completely match the SET configuration stored in the PLC:
- If the configuration check is set to **Bus-oriented** or the **«Moeller Conformance»** function is **activated**, the operation is aborted for the entire SWIRE bus (RDY LED flashing).
- If the configuration check is set to **Slave-oriented**:
  - The SWIRE slaves that match are ready for data exchange.
  - The operation is aborted for the SWIRE slaves that do not match.

The system behaves as follows if a modification to the bus or a slave failure is detected:
- If the **«Moeller Conformance»** function is **activated**, the system retains data exchange with the functional SWIRE slaves..
- If the **«Moeller Conformance»** function is **deactivated**, SWIRE communication on the entire SWIRE bus is aborted. The physical structure is then compared cyclically with the configuration stored in the XNE-1SWIRE.
  - The SWIRE bus starts operation as soon as matching configurations are detected:
    - After the physical structure was stored in the XNE-1SWIRE:
      - Automatically (if the automatic SWIRE configuration is activated)
      - Or manually (if the automatic SWIRE configuration is deactivated), by pressing the CFG button (only functions if the SW LED is flashing).
    - After the physical structure is corrected.
  - According to the parameter settings, the data exchange is then started or the operation is aborted:
    - The data exchange is resumed immediately if the PLC configuration check is deactivated.
    - If the PLC configuration check is activated and the configuration check is set to **Bus-oriented**, data exchange is only restarted if the configuration stored in the XNE-1SWIRE matches the SET configuration stored in the PLC. The operation for the entire SWIRE bus is aborted if they do not match completely.
    - If the PLC configuration check is activated and the configuration check is set to **Slave-oriented**, the configuration stored in the XNE-1SWIRE is compared with the SET configuration stored in the PLC:
      - The SWIRE slaves that match resume data exchange.
      - The operation is aborted for the SWIRE slaves that do not match.

Bus-oriented configuration check (default setting)

☞ **This function is automatically deactivated if the «Moeller Conformance» function is active.**

If the physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE on power up (SW LED flashing), the physical structure is compared continuously with the configuration stored in the XNE-1SWIRE. The SWIRE bus starts operation as soon as the matching configurations are detected:
- After the physical structure was stored in the XNE-1SWIRE:
  - Automatically (if the automatic SWIRE configuration is activated)
  - Or manually (if the automatic SWIRE configuration is deactivated), by pressing the CFG button (only functions if the SW LED is flashing).
- After the physical structure is corrected.

If the PLC configuration check is activated, data exchange is only started if the configuration stored in the XNE-1SWIRE fully matches the SET configuration stored in the PLC. If the two configurations do **not** match completely (RDY LED flashing), the operation is aborted for the entire SWIRE bus (RDY LED flashing).

SWIRE communication is aborted for the entire SWIRE bus, if a bus modification or slave failure is detected during operation. The physical structure is then compared cyclically with the configuration stored in the XNE-1SWIRE.
- The SWIRE bus starts operation as soon as the matching configurations are detected:
  - After the physical structure was stored in the XNE-1SWIRE:
    - Automatically (if the automatic SWIRE configuration is activated)
    - Or manually (if the automatic SWIRE configuration is deactivated), by pressing the CFG button (only functions if the SW LED is flashing).
  - After the physical structure is corrected.
- According to the parameter settings, the data exchange is then started or the operation is aborted:
  - The data exchange is resumed immediately if the PLC configuration check is deactivated.
  - If the PLC configuration check is activated, data exchange is only restarted if the configuration stored in the XNE-1SWIRE fully matches the SET configuration stored in the PLC. The operation for the entire SWIRE bus is aborted if they do **not** match completely.

Parameter setting:
- PROFIBUS-DP and CANopen (Byte 1):
  - MNA = 0 (MXpro: «configuration check» = bus oriented) and
  - MC = 0 (MXpro: «Moeller compliant» = deactivate)
- DeviceNet (Attribute 121 (79_{hex}) «PARAM_COMMON_OERATION_MODES»):
  - Bit 3 = 0 and
  - Bit 4 = 0

**Slave-oriented
configuration check**

☞ **This function is automatically deactivated if the «Moeller Conformance» function is active.**

If the physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE on power up (SW LED flashing), the physical structure is compared continuously with the configuration stored in the XNE-1SWIRE. The SWIRE bus starts operation as soon as the matching configurations are detected:
- After the physical structure was stored in the XNE-1SWIRE:
  - Automatically (if the automatic SWIRE configuration is activated)
  - Or manually (if the automatic SWIRE configuration is deactivated),
    by pressing the CFG button (only functions if the SW LED is flashing).
- After the physical structure is corrected.

If the PLC configuration check is activated, data exchange is started with all SWIRE slaves that match the SET configuration stored in the PLC. The SWIRE slaves that do not match the SET configuration stored in the PLC do not perform any data exchange.

SWIRE communication is aborted for the entire SWIRE bus, if a bus modification or slave failure is detected during operation. The physical structure is then compared cyclically with the configuration stored in the XNE-1SWIRE.
- The SWIRE bus starts operation as soon as the matching configurations are detected:
  - After the physical structure was stored in the XNE-1SWIRE:
    - Automatically (if the automatic SWIRE configuration is activated)
    - Or manually (if the automatic SWIRE configuration is deactivated),
      by pressing the CFG button (only functions if the SW LED is flashing).
  - After the physical structure is corrected.
- According to the parameter settings, the data exchange is then started or the operation is aborted:
  - The data exchange is resumed immediately if the PLC configuration check is deactivated.
  - If the PLC configuration check is activated, the configuration stored in the XNE-1SWIRE is compared with the SET configuration stored in the PLC.
    - The SWIRE slaves that match resume data exchange.
    - The operation is aborted for the SWIRE slaves that do not match.

Parameter setting:
- PROFIBUS-DP and CANopen (Byte 1):
  - MNA = 1 (MXpro: «configuration check» = slave oriented) and
  - MC = 0 (MXpro: «Moeller compliant» = deactivate)
- DeviceNet (Attribute 121 (79_{hex}) «PARAM_COMMON_OERATION_MODES»):
  - Bit 3 = 1 and
  - Bit 4 = 0

MC (Moeller Confor-mance)

If the «Moeller Conformance» function is activated, the XNE-1SWIRE behaves according to the Moeller SWIRE conformance criteria. Moeller SWIRE conformance criteria, see Chapter 6 Moeller SWIRE conformance criteria, Page 51.

If the physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE (SW LED flashing) when U_{SW} is switched on, the SWIRE bus only starts operation:
- After the physical structure was stored in the XNE-1SWIRE:
  - Manually, by pressing CFG button (only functions if the SW LED is flashing). After the configuration is stored, the physical structure is compared once more with the configuration stored in the XNE-1SWIRE.
- If the physical structure of the SWIRE bus matches the configuration stored in the XNE-1SWIRE the next time that U_{SW} is switched on.

If the PLC configuration check is activated, data exchange is only started if the configuration stored in the XNE-1SWIRE fully matches the SET configuration stored in the PLC. If the two configurations do **not** match completely (RDY LED flashing), the operation is aborted for the entire SWIRE bus (RDY LED flashing).

The system retains data exchange with the functional SWIRE slaves if a modification or slave failure is detected in the SWIRE bus during operation.

Parameter setting:
- PROFIBUS-DP and CANopen (Byte 1):
  - MC = 1 (MXpro: «Moeller compliant» = activate)
- DeviceNet (Attribute 121 (79_{hex}) «PARAM_COMMON_OERATION_MODES»):
  - Bit 4 = 1

2.2.5 Other parameters

The parameters U_{AUXERR}, $TYPE_{ERR}$, $TYPE_{INFO}$, PKZ_{ERR}, PKZ_{INFO}, SD_{ERR} and SD_{INFO} enable events to be indicated to the PLC as an error message or not.

2.3 Diagnostics

Faulty system states are indicated by means of a number of different diagnostics messages. The error messages U_{AUXERR}, $TYPE_{ERR}$, $TYPE{<}_{ERR}Sx$, PKZ_{ERR}, $PKZ_{ERR}Sx$, SD_{ERR} and $SD_{ERR}Sx$ can be deactivated via the parameter setting.

2.4 Technical features

Fig. 2 XNE-1SWIRE module linked to a GWBR-CANopen gateway

2.4.1 Block diagram
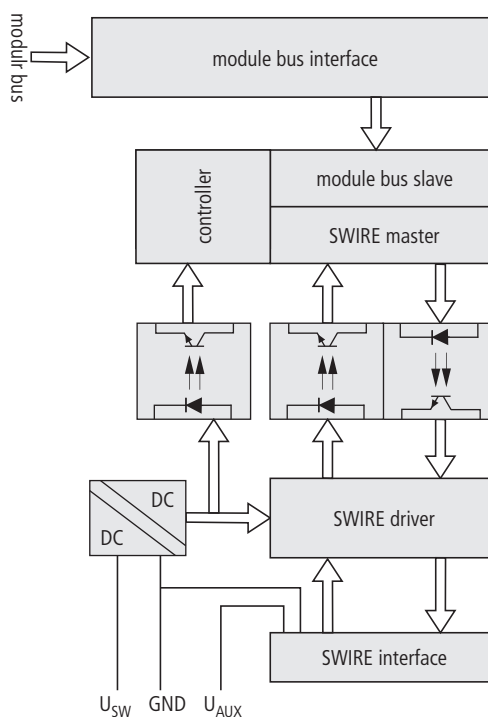
Fig. 3 Block diagram for XNE-1SWIRE

2.5   Technical data

Designation	XNE-1SWIRE
Power supply	
Nominal voltage from supply terminal U_L	24 V DC (18 to 30 V DC)
Nominal current consumption from supply terminal I_L (range)	0 mA
Nominal current consumption from module bus I_{MB} (module bus voltage)	max. 60 mA (4.75 to 5.25 V DC)
Supply voltage connection SWIRE U_{SW} (range)	24 V DC (18 to 30 V DC)
Supply current SWIRE (SWIRE bus at full load)	max. 600 mA
Power supply of contactors U_{AUX} (range)	24 V DC (18 to 30 V DC)
Power supply current of contactors	3 A
SWIRE connection	
Number of SWIRE buses	1
Number of XNE-1SWIRE modules per XI/ON station	max. 3
Number of SWIRE slaves per bus	max. 16
Number of diagnostics bits	4
Data per SWIRE slave	max. 4I / 4Q
Power supply of SWIRE slaves (short-circuit protected)	17 V DC
Power supply current of all SWIRE slaves (short-circuit protected)	max. 500 mA
Insulation	
Insulation voltage (module bus to U_{SW} / U_{AUX} to U_L)	500 V_{rms}
Insulation voltage (U_{SW} to U_{AUX})	None
Product standard	IEC/EN 61131-2
Protection type	IP 20
Climatic requirements	
Ambient temperature operating	0 to +55 °C
Ambient temperature storage	-25 to +85 °C
Relative air humidity	5 to 95 % non-condensing

Tab. 1 Technical data XNE-1SWIRE

2.6   Indication elements

LED	Signal	Meaning
DIA (module diagnostics)	OFF	o.k.
	Red	Module bus communication faulty.
	Red flashing	Module indicates a diagnostics message.
Rdy (configuration status)	OFF	SWIRE bus not active.
	Green	• The SWIRE bus is ready for data exchange. • If the PLC configuration check is activated: The configuration stored in the XNE-1SWIRE matches the SET configuration stored in the PLC. • SW LED and RDY LED are lit: The SWIRE bus is in data exchange mode.
	Green flashing	• The PLC configuration check is carried out. • The configuration stored in the XNE-1SWIRE does **not** match the SET configuration stored in the PLC.
SW (SWIRE bus status)	OFF	SWIRE bus not active.
	Green	• The physical structure of the SWIRE bus matches the configuration stored in the XNE-1SWIRE. • The SWIRE bus is in operation. • SW LED and RDY LED are lit: The SWIRE bus is in data exchange mode.

	Green flashing	• The physical structure of the SWIRE bus is compared with the configuration stored in the XNE-1SWIRE.
		• The physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE.
		• The SWIRE bus cannot be assigned a valid configuration. Possible causes:
		  - SWIRE bus with zero slaves.
		  - SWIRE slave faulty.

U_{SW} (indication of the SWIRE bus operating voltage)	OFF	• The voltage U_{SW} is faulty. • The module bus voltage is not present.
	Green	The voltage U_{SW} is within the permissible range and the module bus voltage is present.
U_{AUX} (indication of the relay supply of the bus)	OFF	The voltage U_{AUX} is faulty.
	Green	The voltage U_{AUX} is in the permissible range.

Tab. 2 LED indication elements

2.7 Approved SWIRE slaves

The following slaves on the SWIRE bus are currently approved for the XNE-1SWIRE:

ID	Device	Manufacturer
0x20	SWIRE-DIL	Moeller
0x21	SWIRE-4DI-2DO-R	Moeller
0x01	PH9285.91	Dold
0x02	PH9285.91/001	Dold
0x03	PH9285.91/002	Dold

Tab. 3 Approved slaves for the SWIRE bus

2.8 Wiring diagram and pin assignment

The following diagram is an example of the connected SWIRE power supply with a disconnection function (emergency-off) for the coil supply of the SWIRE relays.
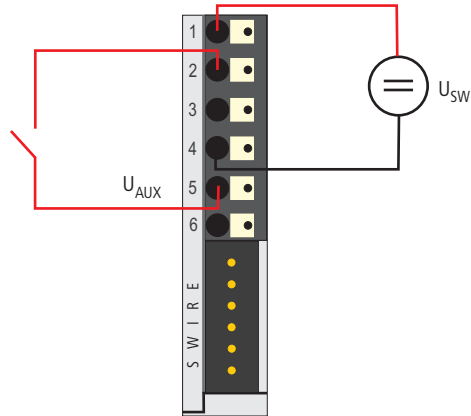
Fig. 4 Connection of the operating voltage for the XNE-1SWIRE with disconnectable coil power supply U_{AUX} of the SWIRE relays

The following diagram is a connection example for the SWIRE power supply. The coil supply voltage for the SWIRE relays is connected via PIN 2.
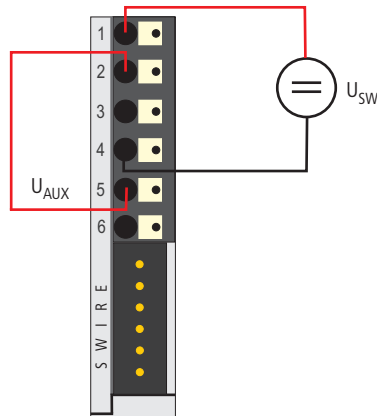
Fig. 5 Connection of the operating voltage for the XNE-1SWIRE. The coil supply voltage U_{AUX} for the SWIRE relays is connected via PIN 2.

PIN	Assignment	Connection
1	U_{SW} operating voltage supply of the SWIRE bus	PIN 1 and PIN 2 are bridged internally!
2	U_{SW} operating voltage supply of the SWIRE bus	
3	GND frame potential	PIN 3 and PIN 4 are bridged internally!
4	GND frame potential	
5	U_{AUX} relay power supply	PIN 4 and PIN 6 are bridged internally!
6	U_{AUX} relay power supply	

Tab. 4 Pin assignment of the connection terminals

3   Integration of the module in PROFIBUS-DP

The module can be integrated if the gateway firmware is at least Version 1.51.

3.1   Data mapping under PROFIBUS-DP

3.1.1   Process input

The field input data is transferred from the connected SWIRE bus to the XNE-1SWIRE. The process input data is the data that is transferred by the XNE-1SWIRE module via a gateway to the PLC. The transfer is carried out in 8-byte format. 4 bits are reserved for each SWIRE slave.

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 1	SWIRE Slave 2				SWIRE Slave 1			
Byte 2	SWIRE Slave 4				SWIRE Slave 3			
Byte 3	SWIRE Slave 6				SWIRE Slave 5			
Byte 4	SWIRE Slave 8				SWIRE Slave 7			
Byte 5	SWIRE Slave 10				SWIRE Slave 9			
Byte 6	SWIRE Slave 12				SWIRE Slave 11			
Byte 7	SWIRE Slave 14				SWIRE Slave 13			
Byte 8	SWIRE Slave 16				SWIRE Slave 15			

Tab. 5 Data structure

The data of SWIRE slave 1 is the data of the first physical slave on the SWIRE bus. The remaining slaves are assigned in consecutive order accordingly. The meaning of the data of an SWIRE slave depends on the product concerned.

Process input data of SWIRE-DIL slaves

The following information can be transferred for SWIRE-DIL slaves (manufacturer: Moeller):
- Contactor coil on/off
- Motor-protective circuit-breaker off (tripped) / on
- Status of the slave (online / diagnostics)

Meaning of the 4-bit process input data on an SWIRE-DIL device:

Bit 3 and 7	Bit 2 and 6	Bit 1 and 5	Bit 0 and 4
SCx	free	PKZSTx	SIx

Tab. 6 Process input data for SWIRE-DIL

The following table shows the meaning of the data bits:

Designation	Status	Comment		
SIx		Switch status, relay x		
		SIx supplies the switch status of the contactor coil of the SWIRE slave as a feedback signal. SIx makes it possible to check whether the set switch status was executed by a mechanical connection. This must take into account the time delay between the setting of an output, a mechanical execution and the subsequent feedback signal.		
	0	Off	Off	Contactor coil is switched off.
	1	On	On	Contactor coil is switched on.
PKZSTx		Switch status, PKZ x		
	0	Off	Off	The motor-protective circuit-breaker is off or has tripped.
	1	On	On	The motor-protective circuit-breaker is switched on.
SCx		Communication error, slave x		
		Setting the $SC_{DIAG}Sx$ parameter sets the SCx bit in the process input data. The information is provided as status information in the PLC for the user.		
	0	ON LINE	ON LINE	Status of slave x: Everything o.k.
	1	OFF LINE	OFF LINE	Status of slave x: One/several diagnostics messages present.

Tab. 7 Meaning of data bits

Process input data of approved SWIRE slaves (except SWIRE-DIL)

The field input data of all approved SWIRE slaves apart from SWIRE-DIL is passed to the process input data. If the parameters specify that the status of the slave (online / diagnostics) should be transferred, the most significant bit of the nibble of each slave is replaced by the status flag.

Meaning of the 4-bit process input data of approved SWIRE-DIL slaves apart from SWIRE-DIL devices:

Bit 3 and 7	Bit 2 and 6	Bit 1 and 5	Bit 0 and 4
SCx / DI 3	DI 2	DI 1	DI 0

Tab. 8 Process input data of approved SWIRE slaves (except SWIRE-DIL)

The automatic generation of a diagnostics flag via an input such as $PKZ_{ERR}Sx$ of the SWIRE-DIL is not implemented with these products. If a slave does not support the number of 4 input bits, the inputs are assigned to the process input data in ascending order, likewise starting from the least significant bit.

3.1.2   **Process output**

Field output data is output from an XNE-1SWIRE to a field device. The process output data is the data that is transferred by the PLC via a gateway and the XNE-1SWIRE to the SWIRE slaves. The transfer is carried out in 8-byte format. 4 bits are reserved for each SWIRE slave.

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 1	SWIRE Slave 2				SWIRE Slave 1			
Byte 2	SWIRE Slave 4				SWIRE Slave 3			
Byte 3	SWIRE Slave 6				SWIRE Slave 5			
Byte 4	SWIRE Slave 8				SWIRE Slave 7			
Byte 5	SWIRE Slave 10				SWIRE Slave 9			
Byte 6	SWIRE Slave 12				SWIRE Slave 11			
Byte 7	SWIRE Slave 14				SWIRE Slave 13			
Byte 8	SWIRE Slave 16				SWIRE Slave 15			

Tab. 9 Data structure

The data of SWIRE slave 1 is the data of the first physical slave on the SWIRE bus. The remaining slaves are assigned in consecutive order accordingly. The meaning of the data of an SWIRE slave depends on the product concerned.

Process output data of SWIRE-DIL slaves

The following information can be transferred for SWIRE-DIL slaves (manufacturer: Moeller):

• Switch status of contactor coil on/off

Meaning of the 4-bit process output data on an SWIRE-DIL device:

Bit 3 and 7	Bit 2 and 6	Bit 1 and 5	Bit 0 and 4
free	free	free	SOx

Tab. 10 Process output data for SWIRE-DIL

The following table shows the meaning of the data bits:

Designation	Status	Comment		
SOx		Relay x		
		SOx is transferred as the switch status of the contactor coil from the SWIRE bus master to the appropriate SWIRE slave.		
	0	Off	Off	Contactor not switched on.
	1	On	On	Contactor is switched on.

Tab. 11 Meaning of the data bit

Process output data of approved SWIRE slaves (except SWIRE-DIL)

The field output data of all approved SWIRE slaves apart from SWIRE-DIL is passed to the process output data.

Meaning of the 4-bit process output data of approved SWIRE-DIL slaves apart from SWIRE-DIL devices:

Bit 3 and 7	Bit 2 and 6	Bit 1 and 5	Bit 0 and 4
DO 3	DO 2	DO 1	DO 0

Tab. 12 Process output data of approved SWIRE slaves (except SWIRE-DIL)

If a slave does not support the number of 4 output bits, the outputs are assigned to the process output data in ascending order, likewise starting from the least significant bit.

3.1.3   **Diagnostics**

Diagnostics data contains the error messages for the higher-level system that relate to operation and the application.

The diagnostics indication mode for the PROFIBUS-DP gateway can be set in two ways with the "Gateway diagnostics" parameter. "Devices, ID, Channel diagnostics" selects a more detailed diagnostics indication. The diagnostics message then consists of:
- 2 bytes of gateway diagnostics (device-related diagnostics)
- 64 bits of ID-specific diagnostics
- n × 3 bytes channel-specific diagnostics (n: number of channels with active diagnostics)

The channel specific diagnostics indication enables the name of the error type to be displayed in plain text (e.g. Parameter error) through the use of an error number.

When "Device-related Diagnostics" is selected, an abbreviated diagnostics message is generated that simply shows the gateway diagnostics (device-related diagnostics). The diagnostics bytes of all station modules are attached that support diagnostics.

This should be interpreted as follows for the XNE-1SWIRE modules:

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 1	$GENERAL_{ERR}$	U_{SWERR}	free	COM_{ERR}	free	RDY_{ERR}	free	SW_{ERR}
Byte 2	free	U_{AUXERR}	$TYPE_{ERR}$	free	PKZ_{ERR}	free	SD_{ERR}	free
$TYPE_{ERR}$ field								
Byte 3	$TYPE_{ERR}S8$	$TYPE_{ERR}S7$	$TYPE_{ERR}S6$	$TYPE_{ERR}S5$	$TYPE_{ERR}S4$	$TYPE_{ERR}S3$	$TYPE_{ERR}S2$	$TYPE_{ERR}S1$
Byte 4	$TYPE_{ERR}S16$	$TYPE_{ERR}S15$	$TYPE_{ERR}S14$	$TYPE_{ERR}S13$	$TYPE_{ERR}S12$	$TYPE_{ERR}S11$	$TYPE_{ERR}S10$	$TYPE_{ERR}S9$
Slave diagnostics bit field								
Byte 5	$SD_{ERR}S8$	$SD_{ERR}S7$	$SD_{ERR}S6$	$SD_{ERR}S5$	$SD_{ERR}S4$	$SD_{ERR}S3$	$SD_{ERR}S2$	$SD_{ERR}S1$
Byte 6	$SD_{ERR}S16$	$SD_{ERR}S15$	$SD_{ERR}S14$	$SD_{ERR}S13$	$SD_{ERR}S12$	$SD_{ERR}S11$	$SD_{ERR}S10$	$SD_{ERR}S9$
PKZ field								
Byte 7	$PKZ_{ERR}S8$	$PKZ_{ERR}S7$	$PKZ_{ERR}S6$	$PKZ_{ERR}S5$	$PKZ_{ERR}S4$	$PKZ_{ERR}S3$	$PKZ_{ERR}S2$	$PKZ_{ERR}S1$
Byte 8	$PKZ_{ERR}S16$	$PKZ_{ERR}S15$	$PKZ_{ERR}S14$	$PKZ_{ERR}S13$	$PKZ_{ERR}S12$	$PKZ_{ERR}S11$	$PKZ_{ERR}S10$	$PKZ_{ERR}S9$

Tab. 13 Structure of the diagnostics bytes

3.1 Data mapping under PROFIBUS-DP

The following table shows the meaning of the diagnostics bits:

Byte	Designation	Status	Comment	
Byte 1	SW$_{ERR}$		SWIRE MASTER	
			If the physical structure of the SWIRE bus does not match the configuration stored in the XNE-1SWIRE, this bit indicates an error.	
		0	Data exchange	The physical structure of the SWIRE bus was accepted and the SWIRE bus is in operation.
		1	Offline	The physical structure was not accepted, the SWIRE bus does not start operation (SW LED flashing).
	RDY$_{ERR}$		PLC SLAVE	
			This bit indicates an error if the configuration stored in the XNE-1SWIRE does not match the SET configuration stored in the PLC.	
		0	OK	No error present. The SWIRE bus is ready for data exchange.
		1	Offline	The configuration stored in the XNE-1SWIRE was not accepted. The data exchange is prevented (RDY LED flashing).
	COM$_{ERR}$		Communication SWIRE	
			A communication error is present, such as a slave is no longer reached, its internal timeout has elapsed or communication is faulty. The master cannot carry out data exchange with at least one slave.	
		0	OK	No error present.
		1	faulty	An error is present
	U$_{SWERR}$		Voltage U$_{SW}$	
			Voltage fault in U$_{SW}$, voltage U (17 VDC) for supplying the SWIRE slaves	
		0	OK	No error present.
		1	Undervoltage	An error is present
	GENERAL$_{ERR}$		Error message	
			The creation of a function block shows that systems / function blocks for the general checking of a slave for any diagnostics messages present only check the first byte.	
		0	None	No diagnostics message present.
		1	Present	One/several diagnostics messages present.

Byte	Designation	Status	Comment	
Byte 2	SD$_{ERR}$		Communication SWIRE slave	
			If the parameter SD$_{ERR}$ is set for group diagnostics, this bit indicates an error as soon as only one slave on the bus sets its SD$_{ERR}$ error bit.	
		0	OK	No error is present or diagnostics function has been deactivated via the parameter setting.
		1	faulty	An error is present
	PKZ$_{ERR}$		Overcurrent protective circuit-breaker	
			If the parameter PKZ$_{ERR}$ is set for group diagnostics, this bit indicates an error as soon as only one PKZ of a slave has tripped.	
		0	OK	No PKZ has tripped or diagnostics function has been deactivated via the parameter setting.
		1	Tripping	At least one PKZ has tripped.
	TYPE$_{ERR}$		Configuration	
			If the TYPE$_{ERR}$ parameter is set with group diagnostics in the parameter setting, this bit indicates an error as soon as a PLC configuration check detects differing slave numbers, types or position of an SWIRE slave.	
		0	OK	The PLC configuration check was positive (the configuration stored in the XNE-1SWIRE matches the SET configuration stored in the PLC) or the diagnostics function is deactivated via the parameter setting.
		1	faulty	A mismatch was determined in the PLC configuration check.
	U$_{AUXERR}$		Voltage U$_{AUX}$	
			If the U$_{AUXERR}$ parameter is activated, U$_{AUXERR}$ will generate an error message as soon as the power supply goes below the level at which the function of the relays is not guaranteed.	
		0	OK	Contactor supply voltage is o.k. (> 20 VDC) or diagnostics function has been deactivated via this parameter.
		1	Undervoltage	Contactor supply voltage is not o.k. (< 18 VDC).

Byte	Designation	Status	Comment	
Byte 3,4	$TYPE_{ERR}Sx$		Device configuration, slave x	
			Info field for the individual indication of a configuration error as error message. If the $TYPE_{INFO}$ parameter is set with individual diagnostics, the error is indicated in this bit field as soon as a PLC configuration check detects differing slave numbers, types or position of an SWIRE slave.	
		0	OK	No error is present and the slave is in data exchange mode or diagnostics function has been deactivated via the parameter setting.
		1	Incorrect	No error is present and the slave is **not** in data exchange mode.
Byte 5,6	$SD_{ERR}Sx$		Communication, slave x	
			Info field for the individual indication of slave offline or slave diagnostics as error message. The fault is indicated in this bit field if the parameter setting SD_{INFO} is set with individual diagnostics.	
		0	OK	No error is present or diagnostics function has been deactivated via the parameter setting.
		1	Offline	The slave has set its diagnostics bit or the slave was in data exchange with the SWIRE master but is not any longer.
Byte 7,8	$PKZ_{ERR}Sx$		Only SWIRE-DIL: Overcurrent protective circuit-breaker slave x	
			Info field for the individual indication of the tripping a motor-protective circuit-breaker (PKZ) as error message. If the PKZ_{INFO} is set for single diagnostics, this bit field indicates the error as soon as the PKZ of the slave Sx has tripped.	
		0	OK	The PKZ of the slave has not tripped or diagnostics function has been deactivated via the parameter setting.
		1	Tripped	The PKZ of the slave has tripped.

Tab. 14 Meaning of diagnostics data bits

3.1.4 Parameter

Parameters are data that must be assigned to the module for correct operation of the application and in order to make it functional.

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 1	reserved	free	free	MC	MNA	Configuration	Disable Cfg	free
Byte 2	free	U_{AUXERR}	$TYPE_{ERR}$	$TYPE_{INFO}$	PKZ_{ERR}	PKZ_{INFO}	SD_{ERR}	SD_{INFO}
Byte 3	reserved							
Byte 4	reserved **(lifeguarding time up to version VN 01-03)**							
Byte 5	$SC_{DIAG}S8$	$SC_{DIAG}S7$	$SC_{DIAG}S6$	$SC_{DIAG}S5$	$SC_{DIAG}S4$	$SC_{DIAG}S3$	$SC_{DIAG}S2$	$SC_{DIAG}S1$
Byte 6	$SC_{DIAG}S16$	$SC_{DIAG}S15$	$SC_{DIAG}S14$	$SC_{DIAG}S13$	$SC_{DIAG}S12$	$SC_{DIAG}S11$	$SC_{DIAG}S10$	$SC_{DIAG}S9$
Byte 7	reserved							
Byte 8	reserved							
Byte 9 - 24	Type designation slave 1 - 16							

Tab. 15 Data structure of the parameters

3 Integration of the module in PROFIBUS-DP

3.1 Data mapping under PROFIBUS-DP

The following table shows the meaning of the parameter bits:

Byte	Designation	Status	Comment	
Byte 1	Disable Cfg		Automatic SWIRE configuration	
			If the physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE on power up (SW LED flashing), the physical structure of the SWIRE bus must be stored in the XNE-1SWIRE.	
		0*	Inactive	Manual SWIRE configuration: To store the physical structure of the SWIRE bus in the XNE-1SWIRE, the CFG button of the XNE-1SWIRE must be pressed manually (only functions if the SW LED is flashing).
		1	Active	Automatic SWIRE configuration: If the physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE on power up, the physical structure is stored automatically in the XNE-1SWIRE.
	Configuration		PLC configuration check	
			If the PLC configuration check is activated, the configuration stored in the XNE-1SWIRE is compared with the SET configuration stored in the PLC.	
		0*	Active	The configuration stored in XNE-1SWIRE is compared with the SET configuration stored in the PLC. Only SWIRE slaves in the SWIRE bus are accepted that have a device ID completely matching the SET configuration.
		1	Inactive	All slaves are mapped in 4Bit INPUT / 4Bit OUTPUT without checking the device ID.
	MNA	active / passive	Configuration check	
			Bus or slave-oriented configuration check (without function if MC = 1)	
		0*	Bus oriented	If the PLC configuration check is activated, data exchange is only started if the configuration stored in the XNE-1SWIRE fully matches the SET configuration stored in the PLC. Modifying the bus during operation causes the system to be aborted.
		1	Slave oriented	If the PLC configuration check is activated, data exchange is started with all SWIRE slaves that match the SET configuration stored in the PLC. The SWIRE slaves that do not match the SET configuration stored in the PLC do not perform any data exchange.
	MC		Moeller conformance **(from version VN 01-04)**	
			Behavior of the XNE-1SWIRE in accordance with SWIRE Conformance criteria.	
		0*	Inactive	Default behavior
		1	Active	The XNE-1SWIRE master responds according to the Moeller SWIRE Conformance criteria.

Byte	Designation	Status	Comment	
Byte 2	SD_{INFO}		Field -Slave error-	
			Activate slave diagnostics info field $SD_{ERR}Sx$. As soon as a slave on the bus sets its error bit, this is indicated as an individual error depending on the parameter setting.	
		0*	Active	Single diagnostics is activated.
		1	Inactive	Single diagnostics is not activated.
	SD_{ERR}		Group error -Slave error-	
			Activate slave diagnostics SD_{ERR}. As soon as only one slave on the bus sets its error bit, this is indicated as a group error depending on the parameter setting.	
		0*	Active	Group diagnostics is activated.
		1	Inactive	Group diagnostics is not activated.
	PKZ_{INFO}		Field -PKZ error-	
			Activate slave diagnostics info field $PKZ_{ERR}Sx$. As soon as an SWIRE-DIL slave on the bus clears its PKZ bit, this is indicated as an individual error depending on the parameter setting.	
		0*	Active	Single diagnostics is activated.
		1	Inactive	Single diagnostics is not activated.
	PKZ_{ERR}		Group error -PKZ error-	
			Activate slave diagnostics PKZ_{ERR}. As soon as only one SWIRE-DIL slave on the bus clears its PKZ bit, this is indicated as a group error depending on the parameter setting.	
		0*	Active	Group diagnostics is activated.
		1	Inactive	Group diagnostics is not activated.
	$TYPE_{INFO}$		Field -Configuration error-	
			Activate slave diagnostics info field $TYPE_{ERR}Sx$. As soon as a slave on the bus does not match the set configuration and therefore cannot be started, this is indicated as an individual error depending on the parameter setting.	
		0*	Active	Single diagnostics is activated.
		1	Inactive	Single diagnostics is not activated.

3.1 Data mapping under PROFIBUS-DP

Byte	Designa-tion	Status	Comment	
Byte 2	TYPE$_{ERR}$		Group error -Configuration error-	
			Activate slave diagnostics TYPE$_{ERR}$. As soon as only one slave on the bus is incorrectly configured, this is indicated as a group error depending on the parameter setting.	
		0*	Active	Group diagnostics is activated.
		1	Inactive	Group diagnostics is not activated.
	U$_{AUXERR}$		Error message -U$_{AUX}$-	
			Activate system diagnostics U$_{AUXERR}$. U$_{AUXERR}$ will generate an error message as soon as the power supply goes below a level at which the function of the relays is not guaranteed.	
		0*	Active	Error message U$_{AUXERR}$ activated.
		1	Inactive	Error message U$_{AUXERR}$ not activated.
Byte 3	reserved			
Byte 4	reserved (lifeguarding time up to version VN 01-03)		**Was up to version VN 01-03**: Lifeguarding time of the SWIRE slaves.	
		0x02-0xFF 0x64*	Setting of lifeguarding time, timeout time up to automatic reset of the slaves in the event of communication failure. (n × 10 ms) (Default 1s) 0xFF: Lifeguarding off	
Byte 5,6	SC$_{DIAG}$Sx		Input bit communication error, slave x	
			Slave diagnostics message from Byte 1 / Bit 7 is accepted in the feedback interface as Bit 4.	
		0*	Active	SC$_{DIAG}$Sx is accepted.
		1	Inactive	SC$_{DIAG}$Sx is not accepted.
Byte 7,8	reserved			
Byte 9-24	Device ID, slave x		TYPE setting for the SWIRE slave at position x on the SWIRE bus.	
		0x20	SWIRE-DIL (Moeller)	
		0x21	SWIRE-4DI-2DO-R (Moeller)	
		0x01	PH9285.91 (Dold)	
		0x02	PH9285.91/001 (Dold)	
		0x03	PH9285.91/002 (Dold)	
		0xFF	Basic setting (no slave)	

Tab. 16 Meaning of the parameter bits

4 Integration of the module in DeviceNet

4.1 SWIRE module class (VSC121)

This class contains all the parameters and information for the XNE-SWIRE module.

Attr.No. dec. (hex.)	Attribute name	Access	Type	Description
100 (64_{hex})	CLASS REVISION	G	UINT	Contains the revision number of this class (Maj. Rel. × 1000 + Min. Rel.).
101 (65_{hex})	MAX INSTANCE	G	USINT	Contains the number of the maximum instance of an object created on this level in the class hierarchy.
102 (66_{hex})	# OF INSTANCES	G	USINT	Contains the number of the object instances created on this class level.
103 (67_{hex})	MAX CLASS ATTR	G	USINT	Contains the number of the last implemented class attribute.

Tab. 17 Class instance

4.1 SWIRE module class (VSC121)

Attr.No. dec. (hex.)	Attribute name	Access	Type	Description
100 (64_{hex})	MAX OBJECT ATTRIBUTE	G	USINT	Contains the number of the last implemented object attribute.
101 (65_{hex})	MODULE PRESENT	G	BOOL	0: XI/ON module is not fitted, empty base module. 1: XI/ON module is fitted.
102 (66_{hex})	TERMINAL SLOT NUMBER	G	USINT	The slot number of the base module belonging to the module (base module on the right of the gateway = No. 1). Corresponds to the relevant instance number within the TERMINAL SLOT CLASS (description in AWB2700-1405).
103 (67_{hex})	MODULE ID	G	DWORD	Contains the module ID.
104 (68_{hex})	MODULE ORDER NUMBER	G	UDINT	Contains the order number of the module.
105 (69_{hex})	MODULE ORDER NAME	G	SHORT_STRING	Contains the module name, e.g. "XN-1RS485/422".
106 ($6A_{hex}$)	MODULE REVISION NUMBER	G	USINT	Contains the revision number of the module firmware.
107 ($6B_{hex}$)	MODULE TYPE ID	G	ENUM USINT	Provides information on the module type: 0 (00_{hex}) unknown module type 1 (01_{hex}) digital I/O module 17 (11_{hex}) analog module I/O voltage 18 (12_{hex}) analog module I/O current 19 (13_{hex}) analog module PT temperature 20 (14_{hex}) analog module thermo temperature 31 ($1F_{hex}$) analog module current/voltage 33 (21_{hex}) 16-bit counter module 34 (22_{hex}) 32-bit counter module 40 (28_{hex}) SSI module 49 (31_{hex}) motor starter module as DOL or reversing starter 50 (32_{hex}) electronic motor starter 65 (41_{hex}) RS232 module 66 (42_{hex}) RS485/422 module 67 (43_{hex}) TTY module
108 ($6C_{hex}$)	MODULE COMMAND INTERFACE	G/S	ARRAY	Command interface of the XI/ON module ARRAY OF: BYTE: Command byte sequence
109 ($6D_{hex}$)	MODULE RESPONSE INTERFACE	G	ARRAY	Signal interface of the XI/ON module ARRAY OF: BYTE: Signal byte sequence
110 ($6E_{hex}$)	MODULE REGISTERED INDEX	G	ENUM USINT	Contains the index number listed in all module lists.
111 ($6F_{hex}$)	NUMBER OF SUPPORTED INPUT CHANNELS	G	USINT	Shows the number of input channels supported by this module instance.

Attr.No. dec. (hex.)	Attribute name	Access	Type	Description
112 (70hex)	NUMBER OF SUPPORTED OUTPUT CHANNELS	G	USINT	Shows the number of output channels supported by this module instance.
113 (71hex)	INPUT1_DWORD	G	DWORD	Contains the first 4 bytes of the process input data (→ Chapter 3.1.1 Process input, Page 25).
114 (72hex)	INPUT2_DWORD	G	DWORD	Contains the last 4 bytes of the process input data (→ Chapter 3.1.1 Process input, Page 25).
115 (73hex)	OUTPUT1_DWORD	G	DWORD	Contains the first 4 bytes of the process output data (→ Chapter 3.1.2 Process output, Page 27).
116 (74hex)	OUTPUT2_DWORD	G	DWORD	Contains the last 4 bytes of the process output data (→ Chapter 3.1.2 Process output, Page 27).
117 (75hex)	DIAG_COMMON_ERROR	G	WORD	Each SWIRE slave is assigned a corresponding bit from DIAG_COMMON_ERROR. Slave 1 belongs to bit 0, slave 2 to bit 1 etc. 0: o.k. 1: One/several diagnostics messages present.
118 (76hex)	DIAG_CONFIG_ERROR	G	WORD	Each SWIRE slave is assigned a corresponding bit from DIAG_CONFIG_ERROR. Slave 1 belongs to bit 0, slave 2 to bit 1 etc. 0: The bus is in data exchange mode. 1: The configuration was not accepted, the bus does not switch to data exchange mode (LED SW flashes).
119 (77hex)	DIAG_COMMUNICATION_ ERROR	G	WORD	Each SWIRE slave is assigned a corresponding bit from DIAG_COMMUNICATION_ERROR. Slave 1 belongs to bit 0, slave 2 to bit 1 etc. 0: o.k. 1: A communication error is present, such as a slave is no longer reached, its internal timeout has elapsed or communication is faulty. The master cannot carry out data exchange with at least one slave.
120 (78hex)	DIAG_PKZ_ERROR	G	WORD	Each SWIRE slave is assigned a corresponding bit from DIAG_PKZ_ERROR. Slave 1 belongs to bit 0, slave 2 to bit 1 etc. 0: No PKZ has tripped or diagnostics function has been deactivated via the parameter setting. 1: At least one PKZ has tripped.

Attr.No. dec. (hex.)	Attribute name	Access	Type	Description
121 (79hex)	PARAM_COMMON_ OPERATION_MODES	G/S	BYTE	Bit 0 <reserved>
				Bit 1 - Automatic SWIRE configuration 0: Manual SWIRE configuration: To store the physical structure of the SWIRE bus in the XNE-1SWIRE, the CFG button of the XNE-1SWIRE must be pressed manually (only functions if the SW LED is flashing). 1: Automatic SWIRE configuration: If the physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE on power up, the physical structure is stored automatically in the XNE-1SWIRE.
				Bit 2 - PLC configuration check 0: PLC configuration check is active. The configuration stored in XNE-1SWIRE is compared with the SET configuration stored in the PLC. Only SWIRE slaves in the SWIRE bus are accepted that have a device ID completely matching the SET configuration. 1: PLC configuration check is not active. All slaves are mapped in 4Bit INPUT / 4Bit OUTPUT without checking the device ID.
				Bit 3 - Configuration check 0: Bus-oriented: If the PLC configuration check is activated, data exchange is only started if the configuration stored in the XNE-1SWIRE fully matches the SET configuration stored in the PLC. Modifying the bus during operation causes the system to be aborted. 1: Slave oriented: If the PLC configuration check is activated, data exchange is started with all SWIRE slaves that match the SET configuration stored in the PLC. The SWIRE slaves that do not match the SET configuration stored in the PLC do not perform any data exchange.
				Bit 4 - Moeller conformance **(from version VN 01-04)** 0: Default behavior 1: The XNE-1SWIRE master responds according to the Moeller SWIRE Conformance criteria.
				Bit 5 to bit 6 <reserved>

Attr.No. dec. (hex.)	Attribute name	Access	Type	Description
122 (7A$_{hex}$)	PARAM_ERROR_ REPORT_CONTROL	G/S	BYTE	Bit 0 - Field -Slave error- 0: Single diagnostics is activated. 1: Single diagnostics is not activated.
				Bit 1 - Group error -Slave error- 0: Group diagnostics is activated. 1: Group diagnostics is not activated.
				Bit 2 - Field -PKZ error- 0: Single diagnostics is activated. 1: Single diagnostics is not activated.
				Bit 3 - Group error -PKZ error- 0: Group diagnostics is activated. 1: Group diagnostics is not activated.
				Bit 4 - Field -Configuration error- 0: Single diagnostics is activated. 1: Single diagnostics is not activated.
				Bit 5 - Group error -Configuration error- 0: Group diagnostics is activated. 1: Group diagnostics is not activated.
				Bit 6 - Error message -U$_{AUX}$- 0: Error message U$_{AUXERR}$ activated. 1: Error message U$_{AUXERR}$ not activated.
				Bit 7 <reserved>
124 (7C$_{hex}$)	RESERVED / LIFEGUARDING_TIME **(Lifeguarding time only up to version VN 01-03)**	G/S	USINT	02$_{hex}$-FF$_{hex}$ Default: 64$_{hex}$ Disconnect: FF$_{hex}$ Setting of lifeguarding time, timeout time up to automatic reset of the slaves in the event of communication failure. (n $\times$ 10 ms) (Default 1s).
125 (7D$_{hex}$)	PROCESS_DATA_SLAVE_DIG/S AG		WORD	Input bit communication error, slave x 0: Slave diagnostics message from Byte 1 / Bit 7 is accepted in the feedback interface as Bit4. 1: Slave diagnostics message from Byte 1 / Bit 7 is accepted in the feedback interface as Bit 4.

Attr.No. dec. (hex.)	Attribute name	Access	Type	Description
128 (7E$_{hex}$) to 143 (8F$_{hex}$)	PARAM_SWIRE_TYPE_IDENT_ SLAVE_1 TO PARAM_SWIRE_TYPE_IDE NT_ SLAVE_1	G/S	BYTE	Bit 0 to bit 3 - Variant ID FF$_{hex}$ No slave 20$_{hex}$ SWIRE-DIL (Moeller) 21$_{hex}$ SWIRE-4DI-2DO-R (Moeller) 01$_{hex}$ PH9285.91 (Dold) 02$_{hex}$ PH9285.91/001 (Dold) 03$_{hex}$ PH9285.91/002 (Dold)

Tab. 18 Object Instance

5 Integration of the module in CANopen

5.1 Representation of process input data

The process input data of the XNE-1SWIRE modules is represented by objects 6000_{hex}, 6020_{hex}, 6021_{hex}, and 6022_{hex}, 6100_{hex} or 6120_{hex} for digital input channels of a XI/ON station. The user can choose between 4 different formats for representing the values:

- Only one bit represented by each SUB-index (objects 6020_{hex}, 6021_{hex} and 6022_{hex})
- 8 bits represented by each SUB-index (object 6000_{hex}).
- 16 bits represented by each SUB-index (object 6100_{hex}).
- 32 bits represented by each SUB-index (object 6120_{hex}).

PDO mapping of object 6000_{hex} is always executed by default and automatically for the first 8 sub-indexes. This corresponds to the 64 bits of the SWIRE feedback interface. If more than 64 process input data items are present, the PDO mapping must be carried out by the user. A total of 36 groups of 8 bits each can be displayed (288 bits).

If the representation of the data bits is **not** required with the object 6000_{hex} or if another arrangement of the mapped objects is required, PDO mapping must be carried out by the user.

The structure of the process input data of the XNE-1SWIRE module is described in Chapter 3.1.1 Process input, Page 25. This description is followed by a table with explanations on the meaning of the individual bits.

5.2 Representation of process output data

The process output data of the XNE-1SWIRE modules is represented by objects 6200_{hex}, 6220_{hex}, 6221_{hex}, and 6222_{hex}, 6300_{hex} or 6320_{hex} for digital output channels of a XI/ON station. The user can choose between 4 different formats for representing the values:

- Only one bit represented by each SUB-index (objects 6220_{hex}, 6221_{hex} and 6222_{hex})
- 8 bits represented by each SUB-index (object 6200_{hex}).
- 16 bits represented by each SUB-index (object 6300_{hex}).
- 32 bits represented by each SUB-index (object 6320_{hex}).

PDO mapping of object 6200_{hex} is always executed by default and automatically for the first 8 sub-indexes. This corresponds to the 64 bits of the SWIRE command interface. If more than 64 process output data items are present, the PDO mapping must be carried out by the user. A total of 36 groups of 8 bits each can be displayed (288 bits).

If the representation of the data bits is **not** required with the object 6200_{hex} or if a different arrangement of the mapped objects is required, PDO mapping must be carried out by the user.

The structure of the process output data of the XNE-1SWIRE module is described in Chapter 3.1.2 Process output, Page 27. This description is followed by a table with explanations on the meaning of the individual bits.

5.3 Representation of diagnostics data

The 8 bytes of diagnostics data for the XNE-1SWIRE module are represented by the manufacturer specific objects of the CANopen gateway.

The following manufacturer specific objects for representing the diagnostics data are used:
- 3040_{hex}, "XBI Diag Byte", ARRAY, Unsigned8
- 3042_{hex}, "XBI Diag Word", ARRAY, Unsigned16
- 3044_{hex}, "XBI Diag Dword", ARRAY, Unsigned32
- 3045_{hex}, "XBI Diag Dword2", ARRAY, Unsigned32
- 3046_{hex}, "XBI Diag Dword3", ARRAY, Unsigned32
- 3047_{hex}, "XBI Diag Dword4", ARRAY, Unsigned32

The objects have the following structure:
- The objects have a maximum of 74 sub-indexes. This number corresponds to the number of modules that are present on a XI/ON station. The sub-index corresponds to the module number of the XI/ON module.
- A sub-index can represent a maximum of 4 bytes. Larger diagnostics data volumes are distributed on the following objects. The sub-index also belongs to the module number.

The following table shows the assignment of the diagnostics data bytes of the XNE-1SWIRE module to the manufacturer specific objects:

☞ **Use the objects 3044_{hex} and 3045_{hex} to access all the diagnostics data! The diagnostics bytes of the XNE-1SWIRE module are represented completely with the objects 3044_{hex} and 3045_{hex} . The sub-index of the objects must correspond to the slot of the module in the XI/ON station.**

☞ **The structure of the diagnostics data of the XNE-1SWIRE module is described in Chapter 3.1.3 Diagnostics, Page 29. This description is followed by a table with explanations on the meaning of the individual bits.**

Byte No.	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	free								8 diagnostics bytes of the XNE-1SWIRE							
Object number in hex	3047				3046				3045 (→ Chapter 5.3.2, Page 45)				3044 (→ Chapter 5.3.1, Page 45)			
	(only the first two bytes are represented, word access)														3042	
	(only the first byte is represented, byte access)															3040

Tab. 19 Representation of the diagnostics bytes of the XNE-1SWIRE module

5.3.1 Object 3044$_{hex}$ - XBI Diag Dword

The object XBI Diag Dword reads the first Diag-Dword (Bytes 1...4) of a module on the XI/ON module bus. The sub-index 1 to 74 corresponds to the module number of the XI/ON module.

Property	Object 3044$_{hex}$
INDEX	3044$_{hex}$
Name	XBI Diag Dword
Object Code	ARRAY
Data type	Unsigned32
Access	ro
Default value XI/ON	No
PDO mapping	No

Tab. 20 Object 3044$_{hex}$ - Description

5.3.2 Object 3045$_{hex}$ - XBI Diag Dword2

The object XBI Diag Dword2 reads the second Diag-Dword (Bytes 5...8) of a module on the XI/ON module bus. The sub-index 1 to 74 corresponds to the module number of the XI/ON module.

Property	Object 3045$_{hex}$
INDEX	3045$_{hex}$
Name	XBI Diag Dword2
Object Code	ARRAY
Data type	Unsigned32
Access	ro
Default value XI/ON	No
PDO mapping	No

Tab. 21 Object 3045$_{hex}$ - Description

5.4 Representation of parameter data

The 24 bytes of parameter data for the XNE-1SWIRE module are represented by the manufacturer specific objects of the CANopen gateway.

The following manufacturer specific objects for representing the parameter data are used:

- 3060_{hex}, "XBI Param Byte", ARRAY, Unsigned8
- 3062_{hex}, "XBI Param Word", ARRAY, Unsigned16
- 3064_{hex}, "XBI Param Dword", ARRAY, Unsigned32
- 3065_{hex}, "XBI Param Dword2", ARRAY, Unsigned32
- 3066_{hex}, "XBI Param Dword3", ARRAY, Unsigned32
- 3067_{hex}, "XBI Param Dword4", ARRAY, Unsigned32
- 3068_{hex}, "XBI Param Dword5", ARRAY, Unsigned32
- 3069_{hex}, "XBI Param Dword6", ARRAY, Unsigned32
- $306A_{hex}$, "XBI Param Dword7", ARRAY, Unsigned32
- $306B_{hex}$, "XBI Param Dword8", ARRAY, Unsigned32

The objects have the following structure:

- The objects have a maximum of 74 sub-indexes. This number corresponds to the number of modules that are present on a XI/ON station. The sub-index corresponds to the module number of the XI/ON module.
- A sub-index can represent a maximum of 4 bytes. Larger parameter data volumes are distributed on the following objects. The sub-index also belongs to the module number.

The following table shows the assignment of the parameter data bytes of the XNE-1SWIRE module to the manufacturer specific objects:

☞ **Use the objects 3064_{hex} to 3069_{hex} to access all the parameter data! The parameter bytes of the XNE-1SWIRE module are represented completely with the objects 3064_{hex} and 3069_{hex}. The sub-index of the objects must correspond to the slot of the module in the XI/ON station.**

☞ **The structure of the parameter data of the XNE-1SWIRE module is described in Chapter 3.1.4 Parameter, Page 33. This description is followed by a table with explanations on the meaning of the individual bits.**

Byte No.	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	Parameter bytes 1 to 24																							
Object number in hex	3069 (▤ 50)				3068 (▤ 50)				3067 (▤ 49)				3066 (▤ 49)				3065 (▤ 48)				3064 (▤ 48)			
	(only the first two bytes are represented, word access)																						3062 (▤ 47)	
	(only the first byte is represented, byte access)																						3060 (▤ 47)	

Tab. 22 Representation of the parameter bytes of the XNE-1SWIRE module

5.4.1   **Object 3060$_{hex}$ - XBI Param Byte**

The object XBI Param Byte reads the first Param Byte (Byte 1...) of a module on the XI/ON module bus. The sub-index 1 to 74 corresponds to the module number of the XI/ON module.

Property	Object 3060$_{hex}$
INDEX	3060$_{hex}$
Name	XBI Param Byte
Object Code	ARRAY
Data type	Unsigned8
Access	rw
Default value XI/ON	No
PDO mapping	No

Tab. 23 Object 3060$_{hex}$ - Description

5.4.2   **Object 3062$_{hex}$ - XBI Param Word**

The object XBI Param Word reads the first Param Word (Byte 1...2) of a module on the XI/ON module bus. The sub-index 1 to 74 corresponds to the module number of the XI/ON module.

Property	Object 3062$_{hex}$
INDEX	3062$_{hex}$
Name	XBI Param Word
Object Code	ARRAY
Data type	Unsigned16
Access	rw
Default value XI/ON	No
PDO mapping	No

Tab. 24 Object 3062$_{hex}$ - Description

5.4.3   Object 3064_{hex} - XBI Param Dword

The object XBI Param Dword reads the first Param-Dword (Byte 1...4) of a module on the XI/ON module bus. The sub-index 1 to 74 corresponds to the module number of the XI/ON module.

Property	Object 3064$_{hex}$
INDEX	3064$_{hex}$
Name	XBI Param Dword
Object Code	ARRAY
Data type	Unsigned32
Access	rw
Default value XI/ON	No
PDO mapping	No

Tab. 25 Object 3064$_{hex}$ - Description

5.4.4   Object 3065_{hex} - XBI Param Dword2

The object XBI Param Dword2 reads the second Param-Dword (Byte 5...8) of a module on the XI/ON module bus. The sub-index 1 to 74 corresponds to the module number of the XI/ON module.

Property	Object 3065$_{hex}$
INDEX	3065$_{hex}$
Name	XBI Param Dword2
Object Code	ARRAY
Data type	Unsigned32
Access	rw
Default value XI/ON	No
PDO mapping	No

Tab. 26 Object 3065$_{hex}$ - Description

5.4.5   **Object 3066$_{hex}$ - XBI Param Dword3**

The object XBI Param Dword3 reads the third Param-Dword (Byte 9...12) of a module on the XI/ON module bus. The sub-index 1 to 74 corresponds to the module number of the XI/ON module.

Property	Object 3066$_{hex}$
INDEX	3066$_{hex}$
Name	XBI Param Dword3
Object Code	ARRAY
Data type	Unsigned32
Access	rw
Default value XI/ON	No
PDO mapping	No

Tab. 27 Object 3066$_{hex}$ - Description

5.4.6   **Object 3067$_{hex}$ - XBI Param Dword4**

The object XBI Param Dword4 reads the fourth Param-Dword (Byte 13...16) of a module on the XI/ON module bus. The sub-index 1 to 74 corresponds to the module number of the XI/ON module.

Property	Object 3067$_{hex}$
INDEX	3067$_{hex}$
Name	XBI Param Dword4
Object Code	ARRAY
Data type	Unsigned32
Access	rw
Default value XI/ON	No
PDO mapping	No

Tab. 28 Object 3067$_{hex}$ - Description

5.4.7 **Object 3068$_{hex}$ - XBI Param Dword5**

The object XBI Param Dword5 reads the fifth Param-Dword (Byte 17...20) of a module on the XI/ON module bus. The sub-index 1 to 74 corresponds to the module number of the XI/ON module.

Property	Object 3068$_{hex}$
INDEX	3068$_{hex}$
Name	XBI Param Dword
Object Code	ARRAY
Data type	Unsigned32
Access	rw
Default value XI/ON	No
PDO mapping	No

Tab. 29 Object 3068$_{hex}$ - Description

5.4.8 **Object 3069$_{hex}$ - XBI Param Dword6**

The object XBI Param Dword reads the sixth Param-Dword (Byte 21…...24) of a module on the XI/ON module bus. The sub-index 1 to 74 corresponds to the module number of the XI/ON module.

Property	Object 3069$_{hex}$
INDEX	3069$_{hex}$
Name	XBI Param Dword2
Object Code	ARRAY
Data type	Unsigned32
Access	rw
Default value XI/ON	No
PDO mapping	No

Tab. 30 Object 3069$_{hex}$ - Description

5.5 Additional emergencies

Error-Code (hex)	Name	Bit in error reg.	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Status change Preoperational	Meaning
7000h	Additional modules	7	Module no.	Diagbyte 0	Diagbyte 1	Diagbyte 2 | 4 | 6	Diagbyte 3 | 5 | 7	-	SWIRE

Tab. 31 Additional emergencies

Bytes 6 and 7 of the Emergency frame contain the result of the bit OR operation of the stated Diag bytes.

6   Moeller SWIRE conformance criteria

The SWIRE system was developed by Moeller. The XNE-1SWIRE supports the SWIRE slaves SWIRE-DIL and SWIRE-4DI-2DO-R from Moeller, and the PH9285.91, PH9285.91/001 and PH9285.91/002 from Dold. For this particular requirements must be fulfilled to ensure compatible operation. The «Moeller Conformance» function is supported from version VN 01-04.

☞ **The «Moeller Conformance» function is deactivated by default.**

6.1   Special system behavior with the «Moeller Conformance» function

The following applies if the «Moeller Conformance» function is activated.

- The following functions are automatically deactivated:
  - Automatic SWIRE configuration
  - Bus-oriented configuration check
  - Slave-oriented configuration check

- To store the physical structure of the SWIRE bus in the XNE-1SWIRE, the CFG button of the XNE-1SWIRE must be pressed manually (only functions if the SW LED is flashing).

- The physical structure of the SWIRE bus is scanned once and compared with the SWIRE configuration stored in the XNE-1SWIRE once when U_{SW} is switched on, or after a new configuration is stored (by pressing the CFG button while the SW LED is flashing).

- If the physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE (SW LED flashing) when U_{SW} is switched on, the SWIRE bus only starts operation:
  - After the physical structure was stored in the XNE-1SWIRE:
    - Manually, by pressing CFG button (only functions if the SW LED is flashing).
      After the configuration is stored, the physical structure is compared once more with the configuration stored in the XNE-1SWIRE.
  - If the physical structure of the SWIRE bus matches the configuration stored in the XNE-1SWIRE the next time that U_{SW} is switched on.

- If the «Moeller Conformance» function is activated, the physical structure of the SWIRE bus is continuously monitored during operation. However, data exchange continues with functioning slaves if slave failures occur. Not until the next power up is operation of the bus with faulty slaves discontinued.

6.2 System behavior with the configuration checks («Moeller Conformance»)

Parameter setting
- PROFIBUS-DP and CANopen (Byte 1):
  - MC = 1 (MXpro: «Moeller compliant» = activate)
- DeviceNet (Attribute 121 (79_{hex}) «PARAM_COMMON_OERATION_MODES»):
  - Bit 4 = 1

System behavior with the configuration checks

1 The physical structure of the SWIRE bus is scanned when U_{SW} is switched on (power up) and compared with the configuration stored in the XNE-1SWIRE.
  - The SWIRE bus starts operation (SW LED lit) if the physical structure of the SWIRE bus matches the SWIRE configuration stored in the XNE-1SWIRE.
  - The operation is aborted if the physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE (SW LED flashing). The SWIRE bus only starts operation:
    - After the physical structure was stored in the XNE-1SWIRE and a match was determined:
      - Manually, by pressing CFG button (only functions if the SW LED is flashing).
        After the configuration is stored, the physical structure is compared once more with the configuration stored in the XNE-1SWIRE.
    - If the physical structure of the SWIRE bus matches the configuration stored in the XNE-1SWIRE the next time that U_{SW} is switched on.

2 If the PLC configuration check is activated, the configuration stored in the XNE-1SWIRE is compared with the SET configuration stored in the PLC. The complete device ID must match.
  - If the two configurations match completely, the entire SWIRE bus is ready for data exchange (RDY LED lit)
  - If the two configurations do **not** match completely (RDY LED flashing), the operation is aborted for the entire SWIRE bus (RDY LED flashing).

3 The system then starts data exchange.

4 The physical structure of the SWIRE bus is monitored continuously during operation so that any changes on the bus or slave failures can be detected. The system retains data exchange with the functional slaves if a modification or slave failure is detected.

7 Configuration of the XNE-1SWIRE with MXpro

The following configuration example shows how to integrate the XNE-1SWIRE as a local module in the XN-PLC-CANopen station and as a remote module on an XN-GWBR-CANopen. The XN-PLC-CANopen is used here as the CAN master for the XN-GWBR-CANopen.

The system is configured as follows:
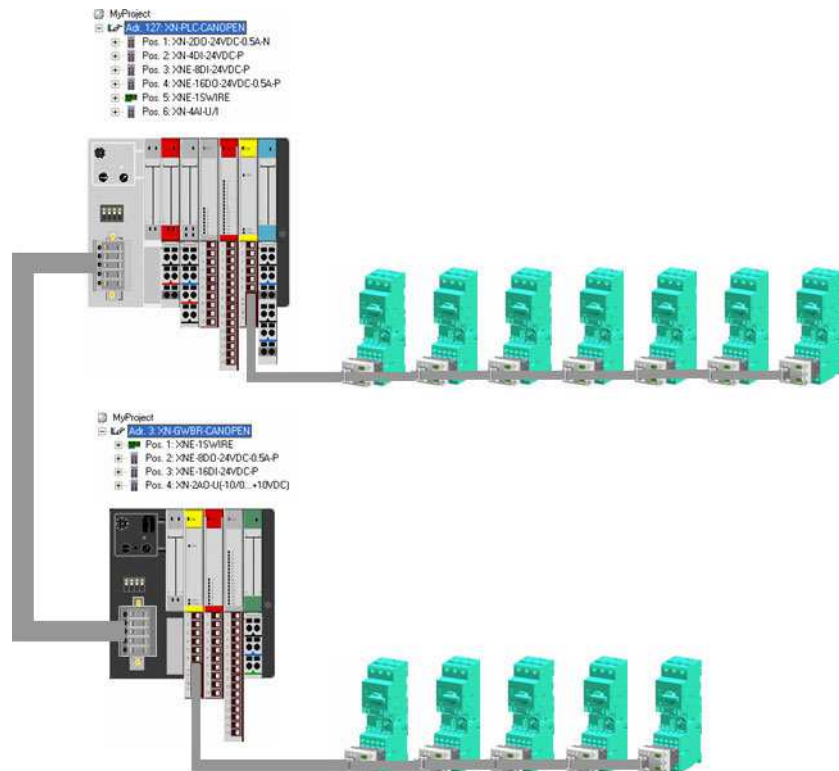
Fig. 6 Configuring the XNE-1SWIRE module (example)

7.1 Configuration of the XN-PLC-CANopen station

Once the XN-PLC-CANopen has been defined in the project as the target system, it must be configured in the PLC configuration. The local slaves on the XN-PLC-CANopen are selected under XN-PLC-CANopen[SLOT] **Inputs/Outputs**.
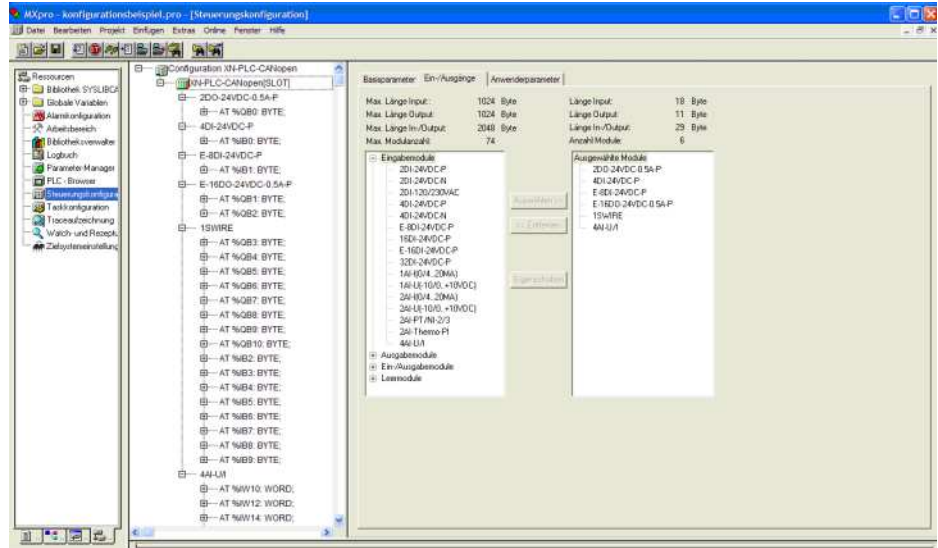
Fig. 7 Selection of local slaves on the XN-PLC-CANopen

The CanMaster functionality has to be activated in order to address the XN-GWBR-CANopen as a remote station via the XN-PLC-CANopen. This is carried out in Configuration XN-PLC-CANopen via Insert/Append Subelement/CanMaster. The XN-GWBR-CANopen must then be added to the element under CanMaster[VAR] via **Insert/Append Subelement** and the Node Id must be entered.

Fig. 8 Central settings

☞ **The XNE-SWIRE is supported by the XN-GWBR-CANopen from Version 2.0!**

The configuration of the remote modules located on the XN-GWBR-CANopen must now be carried out using I/Oassistant or by selecting the CAN module.
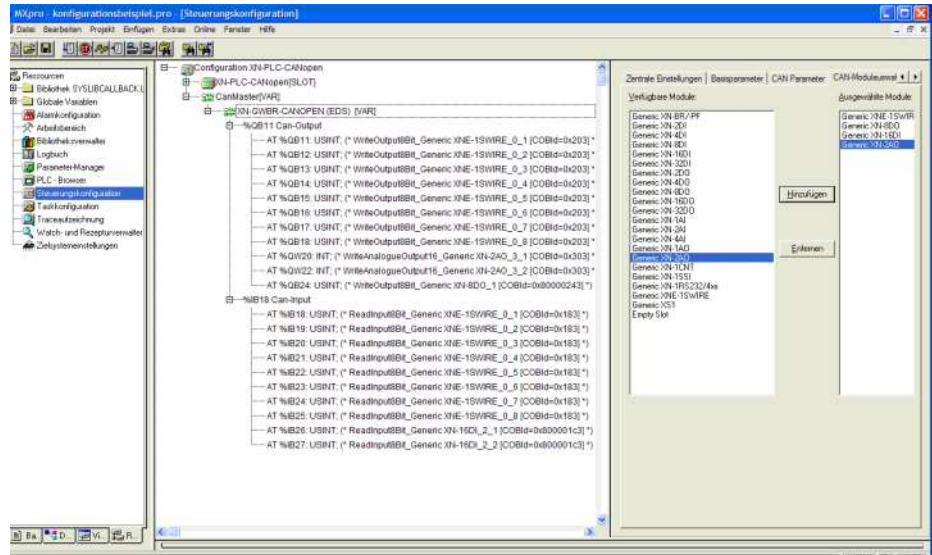
Fig. 9 CAN module selection

CANopen PDOs (process data objects) can contain up to 8 bytes of data. The data volume of the XNE-1SWIRE required the size of a complete send PDO and a complete receive PDO. If other digital modules are present in the station, the data of the XNE-1SWIRE can be assigned to different PDOs as digital data is arranged without any gaps in a PDO according to the physical arrangement in the station. It is therefore recommended that XNE-1SWIRE modules are positioned directly next to the gateway in order to ensure a clear allocation of the data in the PDO to the module.
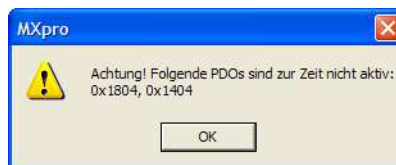
Fig. 10 Non-active PDOs

If the output data and the input data cannot be mapped directly in one PDO, as in this example, other COB-IDs must be activated. For this the COB-IDs must be extended under XN-GWBR-CANopen (EDS) [VAR] PDO Mapping Receive (PDOMappingSend) by changing the properties of $NodeId+0x80000240 (or $NodeId+0x800001c0) in $NodeId+0x00000240 (or $NodeId+0x000001c0).

☞ **For this read the manual "Gateways for CANopen" (MN05002005Z)**

7.1 Configuration of the XN-PLC-CANopen station
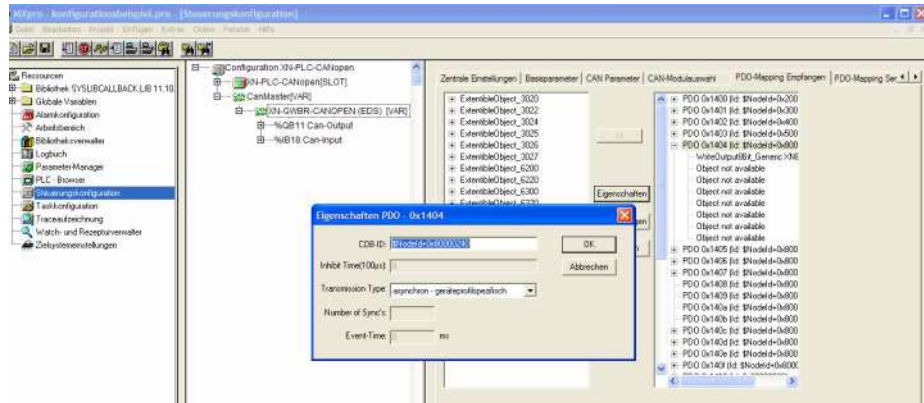
Fig. 11 Assigning the COB-ID to the PDO 0x1404
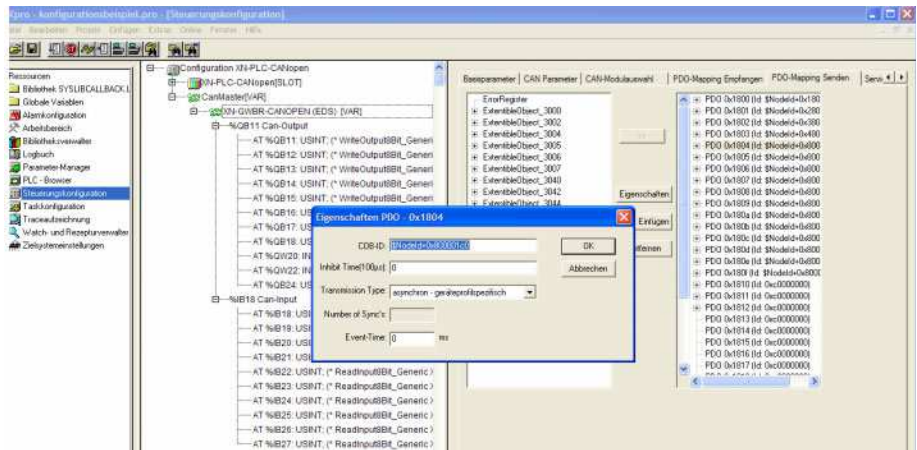
Fig. 12 Assigning the COB-ID to the PDO 0x1804

The CanUser-Master.lib and CANUser_Master.lib must be added to the Library and the variable declaration must be added via Project/Import CanUser.exp and CanUserMaster.exp in order to support the CAN master functionality of the XN-PLC-CANopen.
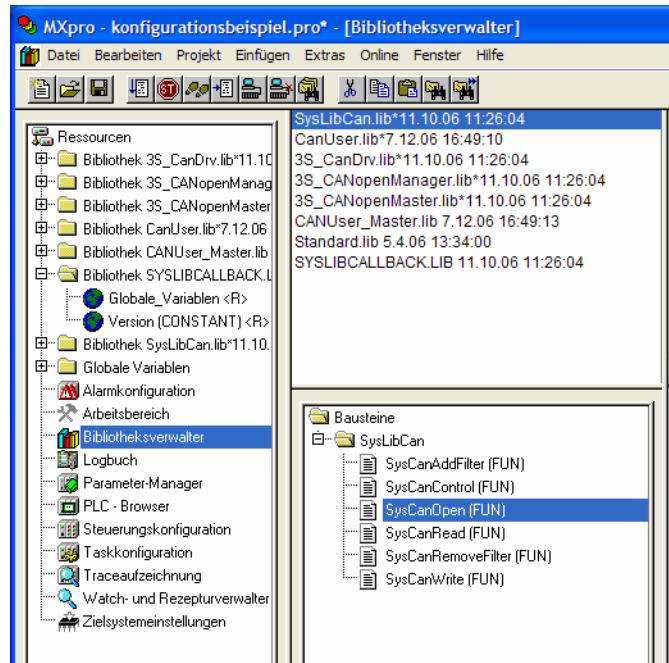

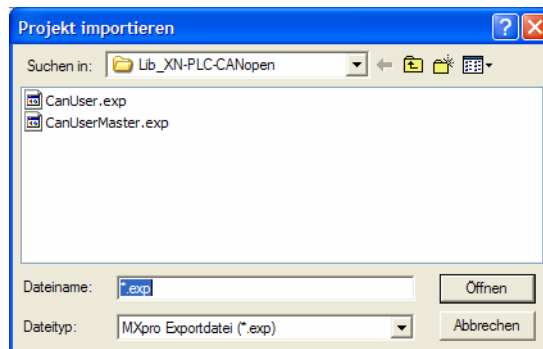Fig. 13 Adding the CanUser-Master.lib and CANUser_Master.lib in to the Library

Fig. 14 Incorporating the variable declaration

The number of data segments must then be increased (max. 12) via Project/Options/Build Options.
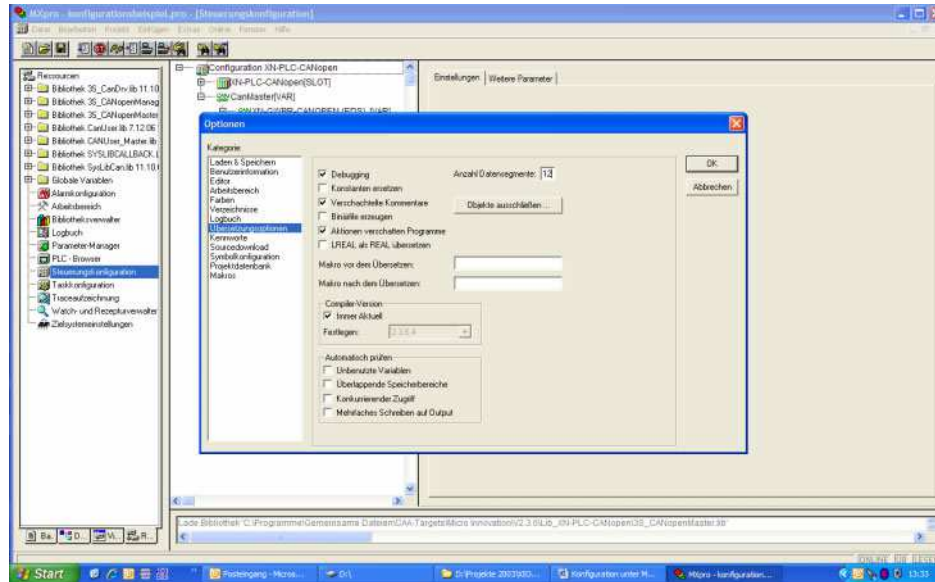
Fig. 15 Number of data segments

7.2   **Configuration of the XNE-1SWIRE as local module on the XN-PLC-CANopen**

After the XN-PLC-CANopen and XN-GWBR-CANopen have been configured, the modules located in the station must be parameterized for the required function.

In this example the XNE-1SWIRE is set for the following functions:
- The physical structure of the SWIRE bus should be stored automatically in the XNE-1SWIRE. This deactivates the function of the CFG button of the XNE-1SWIRE.
  - Activate automatic SWIRE configuration.
- The PLC should only exchange data with the SWIRE bus if all 8 of the SWIRE-DIL modules configured in the PLC (SET configuration) are present in the SWIRE configuration stored in the XNE-1SWIRE.
  - Activate PLC configuration check.
  - Set configuration check to Bus-oriented.
- PKZ trips should not generate any error messages as the information is evaluated in the input image.
  - Deactivate group error -PKZ error-.
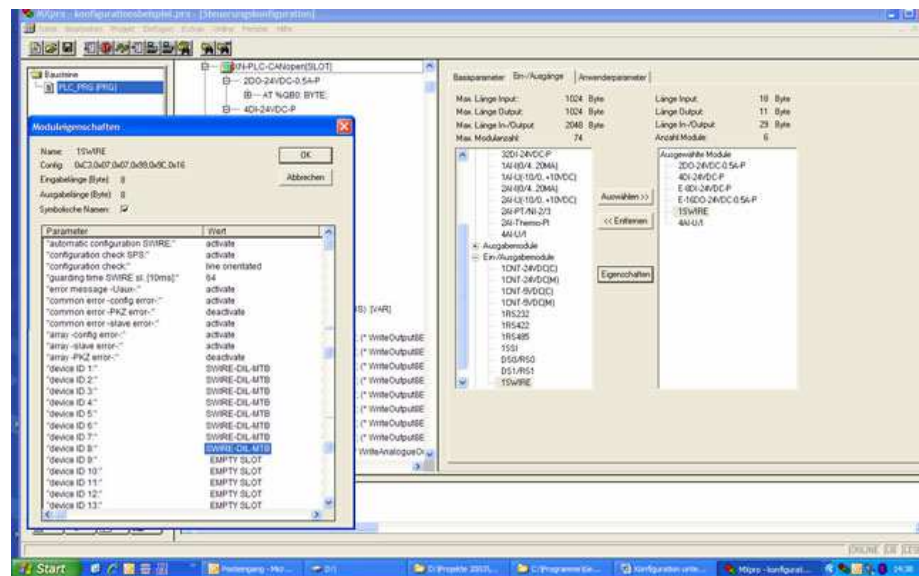 - Deactivate field -PKZ error-.

Fig. 16 Parameterization of module properties

The following takes place after the program is loaded and started on the XN-PLC-CANopen:
- The XNE-1SWIRE automatically starts the operation of the SWIRE bus fitted with 8 slaves (SW LED lit)
- The XNE-1SWIRE exchanges data with the PLC if the subsequent PLC configuration check finds that the configuration stored in the XNE-1SWIRE completely matches the SET configuration stored in the PLC (RDY LED lit).

The following occurs if the number of physical slaves on the SWIRE bus changes:
- Data exchange with the SWIRE bus is aborted.
- After a power up:
  - The XNE-1SWIRE automatically starts the operation of the SWIRE bus fitted with the modified number of slaves (SW LED lit).
  - The operation is aborted if the subsequent PLC configuration check finds that the configuration stored in the XNE-1SWIRE does **not** completely match the SET configuration stored in the PLC (RDY LED flashing).

7.3 Configuration of the XNE-1SWIRE as a remote module on the XN-GWBR-CANopen

The XNE-1SWIRE on the XN-GWBR-CANopen was fitted as the first I/O module directly behind the gateway. As the process data of the XNE-1SWIRE is included as digital I/O data, 2 or 4-channel digital modules in front of the XNE-1SWIRE would make allocations unclear.

In this example the XNE-1SWIRE is set for the following functions:
- The configuration stored in the XNE-1SWIRE should **not** be compared wit the SET configuration stored in the PLC. The data exchange should be automatic as soon as the SWIRE bus is in operation.
  - Deactivate PLC configuration check.
- During commissioning, the physical structure of the SWIRE bus should be stored by pressing the CFG button in the XNE-1SWIRE. On power up, the SWIRE bus should only start if the physical structure of the SWIRE bus matches the configuration stored in the XNE-1SWIRE.
  - Deactivate automatic SWIRE configuration.

☞ **If changes are carried out on the SWIRE bus, the CFG button of the XNE-1SWIRE must be pressed in order to store the current physical structure of the SWIRE bus in the XNE-1SWIRE.**

- PKZ trips should generate error messages which are to be evaluated by the PLC.
  - Activate group error -PKZ error-.
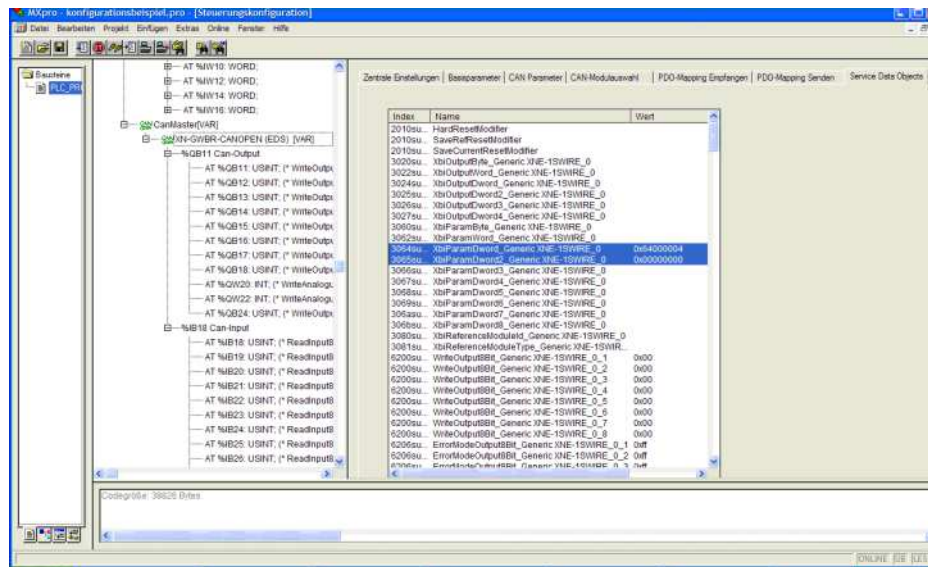 - Activate field -PKZ error-.

Fig. 17 Parameterization of module properties via service data objects

The following takes place after the program is loaded and started on the XN-PLC-CANopen:

- The XNE-1SWIRE on the XN-GWBR-CANopen is ready for data exchange (RDY LED lit).
- The physical structure of the SWIRE bus is scanned and compared with the configuration stored in the XNE-1SWIRE.
  - The SWIRE bus starts operation if the physical structure of the SWIRE bus matches the SWIRE configuration stored in the XNE-1SWIRE (SW LED lit).
  - The SWIRE bus does not start operation if the physical structure of the SWIRE bus does **not** match the configuration stored in the XNE-1SWIRE (SW LED flashing). If the CFG button of the XNE-1SWIRE is then pressed, the physical structure of the SWIRE bus is scanned, each slave is assigned an address and stored in the respective slave and the configuration is stored in the XNE-1SWIRE.
- RDY LED and SW LED flash shortly and are then permanently lit.
- DIA LED goes out since the SWIRE bus is in operation and therefore starts data exchange with the PLC.