

# Manual

## Absolute Encoder with RS485 – SLIN interface

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At any time we should be pleased receiving your comments and proposals for further improvement of the present document.

## 1. Introduction

### 1.1. Scope of delivery

Please check the delivery upon completeness prior to commissioning. Depending on encoder configuration and part number delivery is including:

- Encoder
- Manual available as download in the Internet

### 1.2. Product assignment

**Shaft encoder**

Product	Product family
GXM7W SLIN	Shaft encoder, Multiturn

## 2. Safety and operating instructions

### Supplementary information

- This manual is intended as a supplement to already existing documentation (e.g. catalogue, data sheet and assembly instruction).
- The manual must be read without fail before initial commissioning of the equipment.

### Intended purpose of the equipment

- The encoder is a precision measurement device. It is used to determine angular positions and revolutions, and to prepare and supply measured values in the form of electrical output signals for the follow-on device systems. The encoder may only be used for this purpose.

### Commissioning

- The encoder may only be installed and assembled by suitably qualified experts.
- Observe the operating instructions of the machine manufacturer.

### Safety remarks

- Prior to commissioning the equipment, check all electrical connections.
- If installation, electrical connection or any other work performed at the encoder or at the equipment is not correctly executed, this can result in a malfunction or failure of the encoder.
- Steps must be taken to exclude any risk of personal injury, damage to the plant or to the operating equipment as a result of encoder failure or malfunction by providing suitable safety precautions.
- Encoders must not be operated outside the specified limited values (see detailed product documentation).

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*Failure to comply with the safety remarks can result in malfunctions, personal injury or damage to property.*

### Transport and storage

- Only ever transport or store encoders in their original packaging.
- Never drop encoders or expose them to major vibrations.

### Assembly

- Avoid impacts or shocks on the housing and shaft / hollow shaft.
- Avoid any twist or torsion on the housing.
- Do not open the encoder or make any mechanical changes to it.

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*The shaft, ball bearings, glass pane or electronic components can be damaged. In this case, safe and reliable operation cannot be guaranteed.*

### Electrical commissioning

- Do not make any electrical changes at the encoder.
- Do not carry out any wiring work when the encoder is live.
- Never plug or unplug the electrical connection when the encoder is live.
- Ensure that the entire plant is installed in line with EMC requirements. The installation environment and wiring affect the electromagnetic compatibility of the encoder. Install the encoder and supply cables separately or at a long distance from cables with high interference emissions (frequency converters, contactors etc.)
- Where working with consumers which have high interference emissions, make available a separate power supply for the encoder.
- Completely shield the encoder housing and connecting cable.
- Connect the encoder to the protective earth (PE) conductor using shielded cable. The braided shield must be connected to the cable gland or plug. Ideally, aim at bilateral connection to protective earth (PE), the housing via the mechanical assembly, the cable shield via the downstream connected devices. In case of earth loop problems, earth on one side only as a minimum requirement.

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*Failure to observe these instructions can result in malfunctions, material damage or personal injury.*

### 3. SLIN protocol

#### 3.1. Technical data

- bus interface according to RS485
- linear bus topology
- max. 8 bus users, selectable encoder address
- standard transmission rates: 9.6 kBaud, 19.2 kBaud and 115.2 kBaud
- bus access according to master / slave communication
- variable length of telegram
- data transmission asynchronous and half-duplex
- UART character format defined in line with IEC FT1.2 standard.
- data backup by parity and checksum

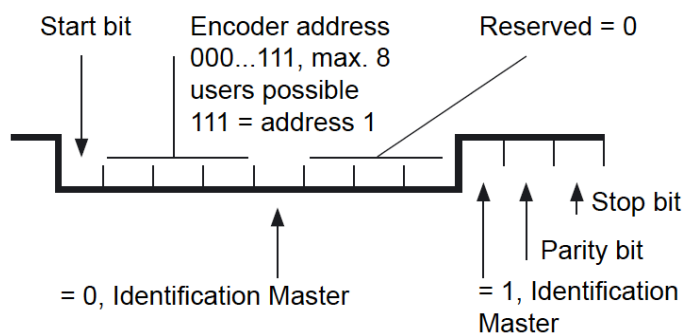
The physical bus is available to each user at a certain time only, since information might collide and become illegible when being transmitted by several users at the same time. Consequently, the chronological order in bus using time has to be regulated by bus access control. The SLIN protocol coordinates bus access according to the master/slave principle. Every bus activity of passive users (encoders) is launched by master (PLC, PC) using a control word.

#### 3.2. Data transmission

##### 1. Master request

The control word comprises:

- 1 start bit
- 3 bits for the encoder address
- 1 control bit (low) master identifier
- 3 reserved bits (low)
- 1 control bit (high) control word identifier
- 1 parity bit, even parity
- 1 stop bit



The slave shall only transmit a response telegram when authorised by the above illustrated master request. The encoder responds within 1 ms.

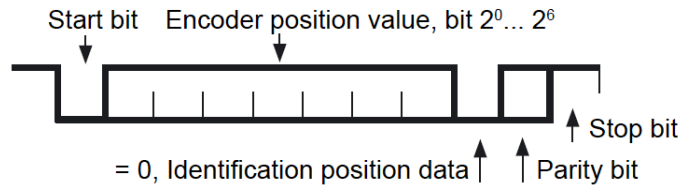
## 2. Encoder response, data byte 1

The response comprises 11 UART character bits together with the first 7 data bits:

- 1 start bit
- 7 data bits
- 1 control bit (low), identification encoder position data
- 1 stop bit

The above data words are being transmitted subsequently until no more relevant data are available.

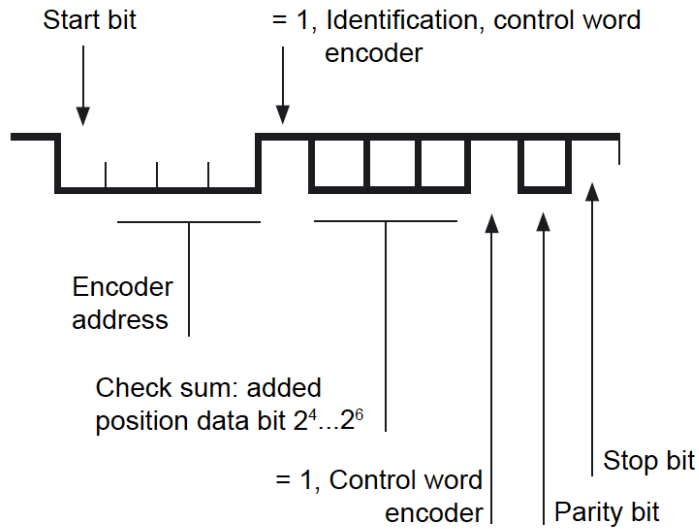
Corresponding to the encoder position the encoder reply comprises max. 4 data bytes.



## 3. Encoder control byte (footer word)

Following is the encoder footer word together with the encoder address:

- 1 start bit
- 3 bits encoder address
- 1 bit control bit (high) encoder identification
- 3 bits checksum
- 1 control bit (high) control word identification
- 1 parity bit with even parity
- 1 stop bit



### 3.3. Check sum

Position data are added up to equal the check sum. Completed by address and control bit, the value configures the encoder control word (footer word).

M\_CHECK\_SUM:

```
CLR    C ;
MOV    A,RESPONSE_SLIN_BYTE1 ; 1. byte position data
ADD    A,RESPONSE_SLIN_BYTE2 ; 2. byte position data (if relevant)
ADD    A,RESPONSE_SLIN_BYTE3 ; 3. byte position data (if relevant)
ADD    A,RESPONSE_SLIN_BYTE4 ; 4. byte position data (if relevant)
; configure control word
ANL    A,#70h ;
ORL    A,TLNADR ; OR user address
SETB   ACC.3 ; set bit 2**3 signature control word
SETB   ACC.7 ; set bit 2**7 signature control word
MOV    CONTROL_WORD,A ; control word completed
```