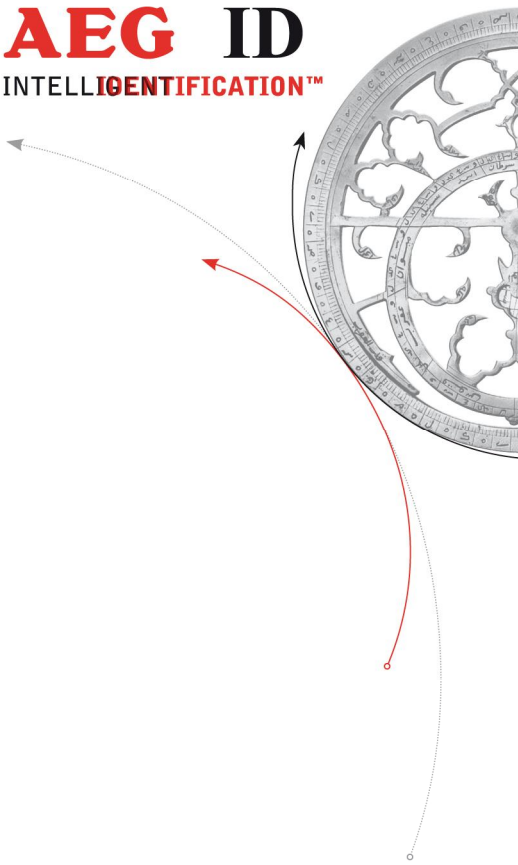
AEG ID
INTELLIGENTIFICATION™



Manual

Profibus-DP Communication

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Contents

1 Introduction 3
2 Data exchange via Profibus-DP 4
2.1 Data telegram 4
2.2 Transmission procedure 5
2.3 Receipt procedure 6
2.4 Sample data exchange 6
3 Available functional building blocks 8
3.1 Contact information 9
3.2 Other pertinent documentation 9

1 Introduction

This document describes the communication with the ID system via the integrated Profibus-DB interface.

The operation of the identification system is conducted via a data telegram using the cyclical profibus-DP service DATA_EXCHANGE. The number of readers on a bus is only limited by the number of possible Profibus-DP addresses and bus topology. The distance between two readers must be sufficiently large so that there is no interference between antennas.

In this document, we don't introduce the various reader-specific commands but the means by which the commands are transmitted from the host to the Profibus slave. This document is designed specifically for PLC programmers, who need to create appropriate functional building blocks.

For certain types of PLC, functional building blocks already exist. Please see chapter 3 for more on this.

2 Data exchange via Profibus-DP

Once the power supply is connected and the reader is connected to a Profibus-DP Master, the reader must be configured by the master according to the GSD supplied with the reader. Once the reader is started up, the default status of the reader's user interface is the DATA_EXCHANGE mode. In the DATA_EXCHANGE mode, cyclical data telegrams are exchanged between the Master and the reader. Reader-specific commands and responses are relayed in these data telegrams, which commands will be described in other documents.

2.1 Data telegram

When data are transmitted in the context of a Profibus data telegram, each command and each answer is preceded by a header. This header serves to control the flow of data for the reader, and is always three bytes long.

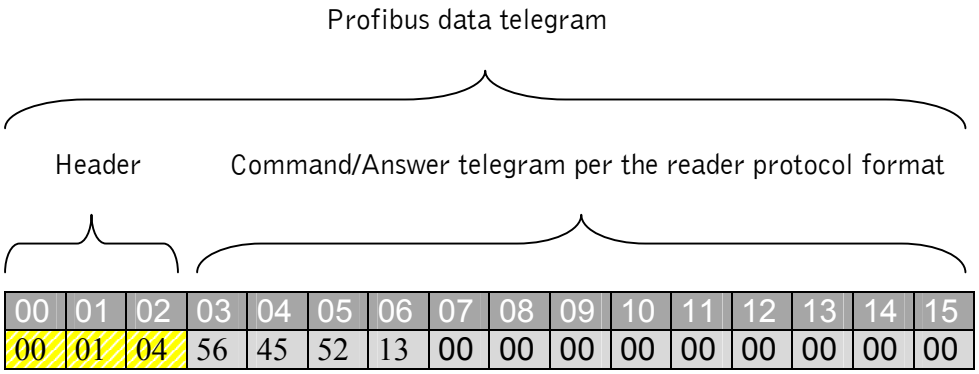

Figure 2-1 Character sequence of the profibus data telegram

The format of the header depends upon whether data are being sent by the Profibus Master (DATA_EXCH_REQUEST) or whether they are being received (DATA_EXCH_RESPONSE).

BYTE	TELEGRAM ELEMENT	RANGE OF VALUES
1	Receipt Request Number	0-255
2	Transmit Request Number	0-255
3	Length of data string N of the subsequent data	0-13
4-16	Telegram data (user data)	0-255

Tabe 2-1 Command Data Telegram(DATA_EXCH_REQUEST)

BYTE	TELEGRAM ELEMENT	RANGE OF VALUES
1	Status byte	0-255
2	Receipt confirmation number	0-255
3	Length of data string N of the subsequent data	0-13
4-16	Telegram data	0-255

Tabelle 2-2 Reply Data Telegram(DATA_EXCH_RESPONSE)

Since the presence of the header and the fixed telegram length of 16 bytes limit the total number of useable data to 13 bytes, commands and answers that are longer than 13 bytes must be broken up into several consecutive data telegrams.

Bit 3, the „data flag," of the data telegram's status byte indicates whether the reader has new data ready for transmission. The remaining bits in the status byte are at present reserved for other, future uses.

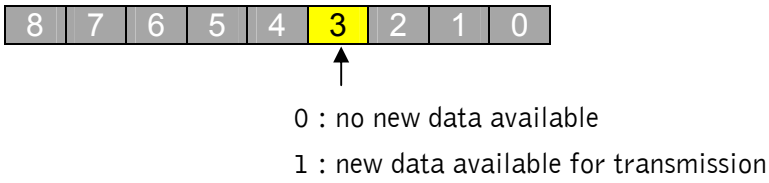

Figure 2-2 Data falg in the status byte of the answer telegram.

2.2 Transmission procedure

In order to transmit commands to the reader, the data flag of the status byte in the reply data telegram must be set to zero, and the following data must be included in the request data telegram.

- The transmission request number must be different from that of the preceding transmission. Logically, it should be increased by one.
- The length of the data must be equal to the number of the following data. If the data length is set to zero, no data will be received by the reader.
- The commands that are to be transmitted must be put into the data telegram.

Caution: Any change of the transmission request number will be interpreted as a transmission request. For this reason, the transmission request number may only be changed after the inclusion of the data and the data length.

2.3 Receipt procedure

The receipt of replies is controlled by the master. Only when the receipt request number is changed by the master and the data flag in the reply data telegram is set the reader will send a reply to the command or data. A reception procedure, described below, is then conducted.

- Bit 3 of the status byte of the Answer Telegram reports if there are new data in the reader that are ready for transmission and will remain set as long as there are data in the reader awaiting transmission. This makes fragmented replies possible, whose total length exceeds the data length.
- The Reception Request Number is modified by the Master, and the data are not transmitted in the subsequent Reply Data Telegram, but rather in the Answer Data Telegram of the immediately following DATA_EXCHANGE service.
- When a Reply Data Telegram contains valid data, this is signaled via the preceding telegram by means of a Reception Confirmation Number that is increased by one.

Caution: For certain commands, during the time it takes to process a command in the reader, several DATA_EXCHANGE may elapse between the augmentation of the Receipt Confirmation Number by the master and the actual modification of the Receipt Confirmation Number. For this reason, data may be read out in the Reply Data Telegram only after the Receipt Confirmation Number has been modified.

- As in the transmission procedure, the byte data length in the Reply Data Telegram indicates the number of subsequent user data bytes.
- The data (reply) to be transmitted are contained in the data field of the Reply Data Telegram.

2.4 Sample data exchange

We will use the command „read version" VER<CR> to demonstrate the communications interchange via the Profibus interface:

1.) Send command as a Request Data Telegram

a) Enter data length and data
b) Increase Transmission Request Number

Request Data Telegram															
00	01	04	56	45	52	0D									
R	S	L	'V'	'E'	'R'	CR									

R = Receipt Request Number
S = Transmission Request Number
L = Data length
Numeric representation in HEX

2.) Command is processed by reader.

3.) Check the answer data telegram to confirm if the data in the status byte indicates the presence of new data in the reader (compare with Chapter 2.1).

Reply Data Telegram															
08	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
S	E	L													

S = Status byte
E = Receipt confirmation number
L = Data length
Numeric representation in HEX

4.) When data are available, the Receipt Request Number must be increased and entered into the Request Data Telegram. (The Transmission Request Number has to retain its original value).

Request Data Telegram															
01	01														
R	S	L													

5.) Check the Reply Data Telegram to see if there has been a change in the Receipt Confirmation Number.

Reply Data Telegram															
08	01	0D	41	45	47	20	49	44	20	2D	20	50	46	42	20
S	E	L	'A'	'E'	'G'	' '	'I'	'D'	' '	'-'	' '	'P'	'F'	'B'	' '

- When the data flag in the status byte indicates the presence of no new data, ie.e. 0x00, the answer was transferred completely and a new command may be transmitted.
- In the event the data flag in the status byte indicates the presence of additional data in the reader, an additional request with an increased Reception Request Number must be sent.

Request Data Telegram															
02	01														
R	S	L													

- After an additional request, the Reply Telegram is checked to see if there is a change in the Reception Confirmation Number.

Reply Data Telegram															
08	02	06	56	31	2E	32	36	0D							
S	E	L	'V'	'1'	'.'	'2'	'6'	CR							

6.) Procedure 5.) is repeated until the data flag in the status byte indicates that no more data are in the reader.

Request Data Telegram															
03	01														
R	S	L													

Reply Data Telegram															
08	03	0D	41	45	47	20	49	44	20	2D	20	41	39	20	2F
S	E	L	'A'	'E'	'G'	' '	'I'	'D'	' '	'-'	' '	'A'	'9'	' '	'/'

Request Data Telegram															
04	01														
R	S	L													

Reply Data Telegram															
00	04	0A	50	46	42	20	56	31	2E	32	38	0D			
S	E	L	'P'	'F'	'B'	' '	'V'	'1'	'.'	'2'	'8'	CR			

3 Available functional building blocks

A selection of off-the-shelf functional building blocks and software drivers are available for commonly used PLC systems (i.e. S5, S7, Beckhoff TwinCat2.7).

Using these functional building blocks ARE reader systems can easily be integrated into existant PLC projects. For more information about the available functional building blocks, please get in touch with the points of contact listed below, or with one of our distribution partners.

3.1 Contact information

We are continually working to improve our products and documentation. Questions, feedback, reports of errors and other comments or amendments should be addressed to:

Tel.: ++49 (0)731-140088-0

Fax: ++49 (0)731-140088-9000

e-mail: sales@aegid.de

http:\ www.aegid.de

3.2 Other pertinent documentation

[1]: ARE I2 / PFB: Installation instructions manual
Describes the general procedure for activating and configuring the reader via a serial comms port.

[2]: ARE K1 / PFB: Installation instructions manual
Describes the general procedure for activating and configuring the reader