

Type 70.9061

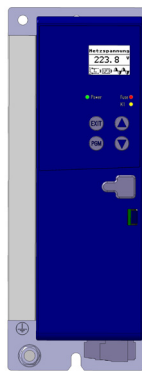
Thyristor power units



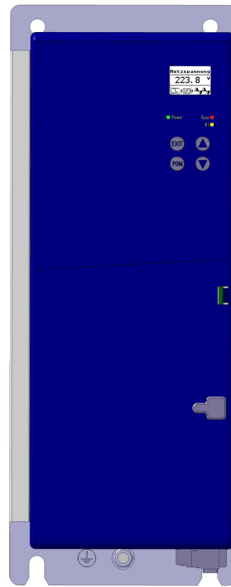
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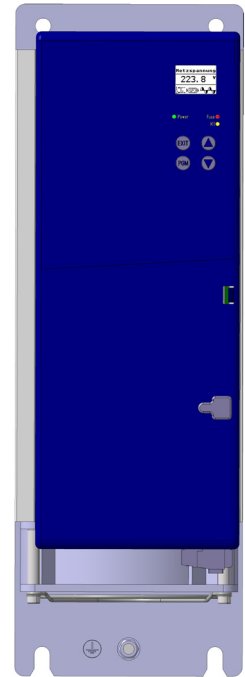
709061/8-01-032
709061/8-01-050



709061/8-01-100



709061/8-01-150
709061/8-01-200



709061/8-01-250

B 70.9061.2.3

Interface description

PROFIBUS DP

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1.1 Preface

The documentation for this device is addressed to equipment manufacturers (OEMs) and users with appropriate technical expertise and knowledge of PCs.



Please read this interface description prior to starting operation with the PROFIBUS-DP. Keep the interface description in a place accessible to all users at all times. Your comments are appreciated and may assist us in improving this interface description.

Telephone: +49 661 6003-727

Fax: +49 661 6003-508

Warranty



All necessary settings are described in this operating manual. Should problems be encountered during commissioning/start-up, please refrain from carrying out any manipulations that are not described in the operating manual.

This could endanger your rights under the device warranty. In such a case, please contact your local representative or the main factory.

Service

For technical questions

phone support in Germany:

Telephone: +49 661 6003-300 or -653 or -899

Fax: +49 661 6003-881729

Email: service@jumo.net

Austria:

Telephone: +43 1 610610

Fax: +43 1 6106140

Email: info@jumo.at

Switzerland:

Telephone: +41 44 928 24 44

Fax: +41 44 928 24 48

Email: info@jumo.ch

Electrostatic charge



When accessing the inner parts of the device and returning device modules, assembly groups or components, please observe the regulations as per EN 61340-5-1 and EN 61340-5-2 "Protection of electrostatic sensitive devices against electrostatic phenomena". Only use the appropriate **ESD** packaging for transport.

Please note that we cannot accept any liability for damage caused by ESD (electrostatic discharge).

ESD=Electro Static Discharge

1 Introduction

1.2 Typographical conventions

1.2.1 Warning signs

Caution



This symbol is used when there may be **danger to personnel** if the instructions are ignored or not followed correctly!

Attention



This sign is used where there may be **damage to equipment or data** if the instructions are ignored or not followed correctly!

ESD



This symbol is used when precautions are to be taken for handling **electrostatically sensitive components**.

1.2.2 Note signs

Note



This symbol is used when your attention is drawn to **special information**.

Reference



This symbol refers to **further information** contained in other manuals, chapters or sections.

Footnote

abc¹

Footnotes are comments that **refer** to specific text sections. Footnotes consist of two parts:
A marker in the text and the footnote text itself.
The markers in the text are arranged as continuous superscript numbers.

1.2.3 Performing an action

Instruction to act *

This symbol identifies the description of a **required action**. The individual operating steps are indicated by asterisks, for example:

- * start SPS-Software
- * click Hardware-catalog

Always read this text



This text contains important information and must always be read before work is continued.

chain of command

File → save as

Small arrows between the words indicate a **sequence of commands** to be subsequently performed.

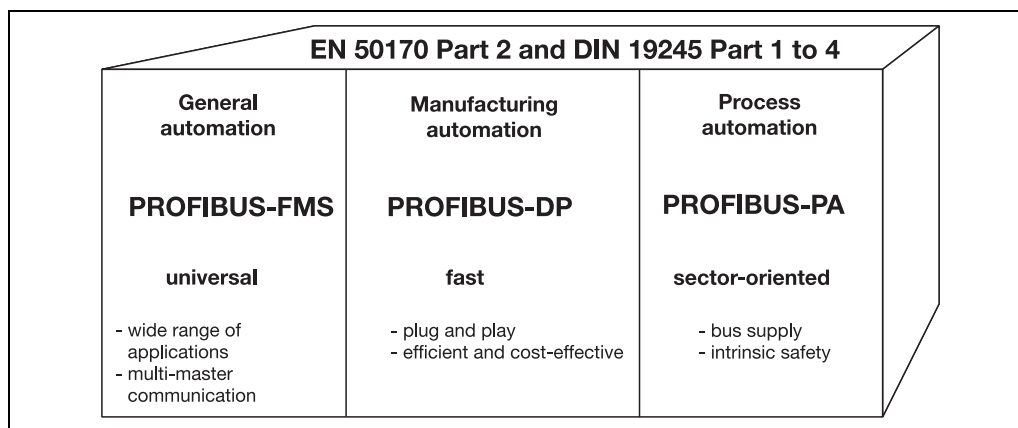
1 Introduction

2 PROFIBUS-DP description

PROFIBUS-DP is a manufacturer-independent, open fieldbus standard for a wide range of applications in manufacturing, process and building automation. Manufacturer independence and openness are ensured by the international standards IEC 61158 and IEC 61784.

With PROFIBUS-DP, devices from different manufacturers can communicate without any special interface adaptation. PROFIBUS-DP can be employed for both high-speed time-critical data transmission and extensive, complex communications tasks.

2.1 Profibus types



The PROFIBUS family

PROFIBUS

This PROFIBUS variant optimized for high speed and low connection costs, has been specially tailored for communication between automation control systems (PLC's) and distributed field devices (typical access time < 10ms). PROFIBUS-DP can be used to replace conventional, parallel signal transmission with 24 V or 0/4-20 mA.

DPV0: Cyclical data transfer:
--> is supported by all JUMO devices.

DPV1: Cyclical and acyclical data transfer:
--> is not supported by JUMO devices.

DPV2: Slave-to-slave communication, among others, takes place in addition to cyclic and acyclic data transfer:
--> is not supported by JUMO devices.

PROFIBUS-PA

PROFIBUS-PA has been specially designed for process engineering and permits the linking of sensors and actuators to a common bus cable, even in explosion endangered zones. PROFIBUS-PA allows data communication with and energy supply to two-wire technology devices as per MBP (Manchester Bus Powering), specified in the international IEC 61158-2 standard.

PROFIBUS-FMS

This is the universal solution for communication tasks at the cell level (typical access time approx. 100ms). The powerful FMS services open up a wide range of applications and provide a high degree of flexibility. FMS is also suitable for extensive communication tasks.

2 PROFIBUS-DP description

2.2 RS-485 transmission technology

Transmission takes place as per the RS-485 standard. It covers all areas in which high transmission speed and simple, cost-efficient installation technology is required. A shielded, twisted copper cable with one conductor pair is used.

The bus structure permits addition and removal of stations or step-by-step commissioning of the system without affecting other stations. Later expansions have no influence on the stations already in operation.

Transmission speeds can be selected within a range of 9.6 kbit/s and up to 12 Mbit/s. During system commissioning, one uniform speed is selected for all devices connected to the bus.

Basic characteristics

Network topology	Linear bus, active bus termination on both ends, stub cables are only permissible for baud rates <1.5 Mbit/s.
Medium	Shielded, twisted-pair cable
Number of stations	32 stations in each segment without repeater (line amplifier). With repeaters, extension to 126 stations is possible.
Connector	Preferably 9-pin sub-D connector

Structure

All devices must be connected in a line structure (one after the other). Up to 32 stations (master or slaves) can be linked up with one segment. Repeater are required for more than 32 stations, for example, to increase the number of devices.

Cable length

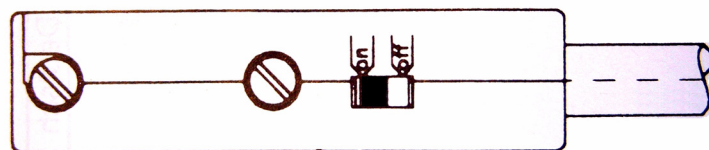
The maximum cable length depends on the transmission speed. The cable length specified can be extended by the use of repeaters. It is recommended to limit the number of repeaters connected in series to a total of 3.

Baud rate (kBit/s)	9.6	19.2	93.75	187.5	500	1500	12000
Range/segment	1200 m	1200 m	1200 m	1000 m	400 m	200 m	100 m

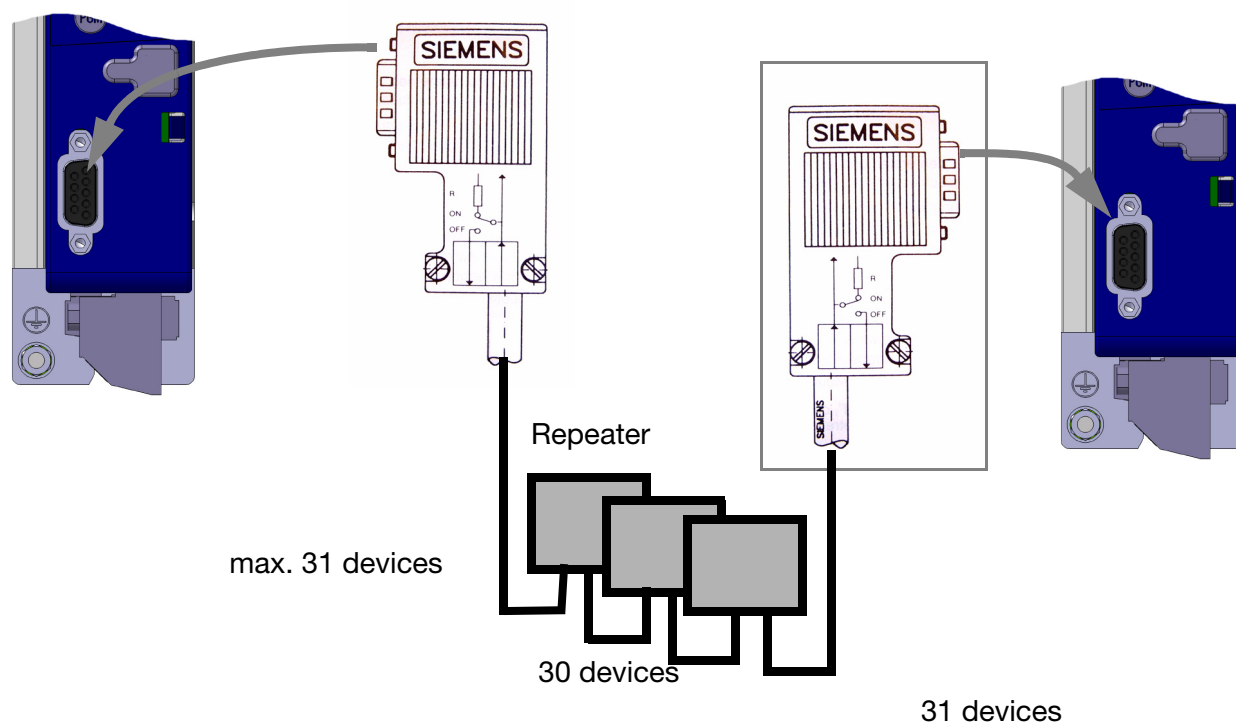
Range based on the transmission speed

bus termination

At both ends of each segment the bus is terminated by termination resistors. To ensure malfunction-free operation, make sure that voltage is applied to both bus terminations at all times. The termination resistors are located in the Profibus connectors and can be activated by moving the slide switch to "on".



2 PROFIBUS-DP description



Cable data

The cable length specifications refer to the cable type A described as follows:

Characteristic impedance:	135 ... 165 Ω
Capacity per unit length:	< 30 pf/m
Loop resistance:	110 Ω /km
Core diameter:	0.64 mm
Core cross-section:	> 0.34 mm ²

It is preferable to use a 9-pin sub-D connector for PROFIBUS networks incorporating RS-485 transmission technology. The PIN assignment at the connector and the wiring are shown at the end of this chapter.

PROFIBUS-DP cables and connectors are offered by several manufacturers. Please refer to the PROFIBUS product catalog (www.profibus.com) for types and addresses of suppliers.

When connecting the devices, make sure that the data lines are not reversed. We strongly recommend to use a shielded data line. The braided shield and the screen foil underneath (if any) should be connected to the protective earth on both sides, with good conductivity. Furthermore, the data lines should be routed separately from all high-voltage cables, as far as this is possible.

As a suitable cable, we recommend, for instance, the following type from Siemens:

Simatic Net Profibus 6XV1

Order No.: 830-0AH10

*** (UL) CMX 75 °C (Shielded) AWG 22 ***

2 PROFIBUS-DP description

Data rate

For installation, the use of sub cables must be avoided for data rates ≥ 1.5 MBit/s.



For important information on installation, please refer to the Installation Guidelines PROFIBUS-DP, Order No. 2.111 from PNO.

Address:

Profibus Nutzerorganisation e.V.

Haid- u. Neu-Straße 7

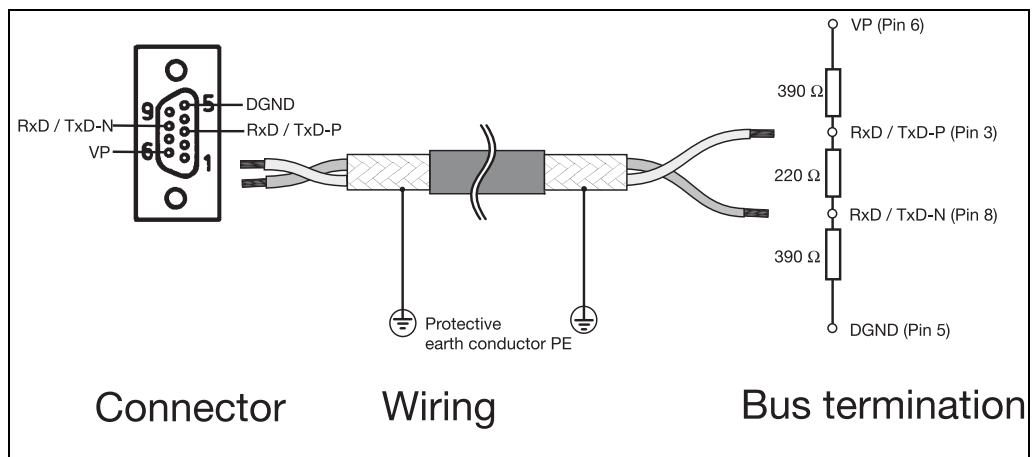
D-76131 Karlsruhe

Internet: www.profibus.com

Recommendation:

Please follow the installation recommendations given by PNO, particularly when using frequency converters simultaneously.

Wiring and bus termination



2.3 PROFIBUS

PROFIBUS-DP is designed for high-speed data exchange at the field level. The central control devices, PLC/PC for instance, communicate through a fast serial connection with distributed field devices, such as I/O, paperless recorders and controllers. Data exchange with these distributed devices is mainly cyclic. Communication functions required for this purpose are defined by the basic PROFIBUS-DP functions in accordance with IEC 61158 and IEC 61784.

Basic functions

The central control system (master) reads the input information cyclically from the slaves and writes the output information cyclically to the slaves. The bus cycle time must be shorter than the program cycle time of the central PLC. In addition to cyclic user data transmission, PROFIBUS-DP also provides powerful functions for diagnostics and commissioning.

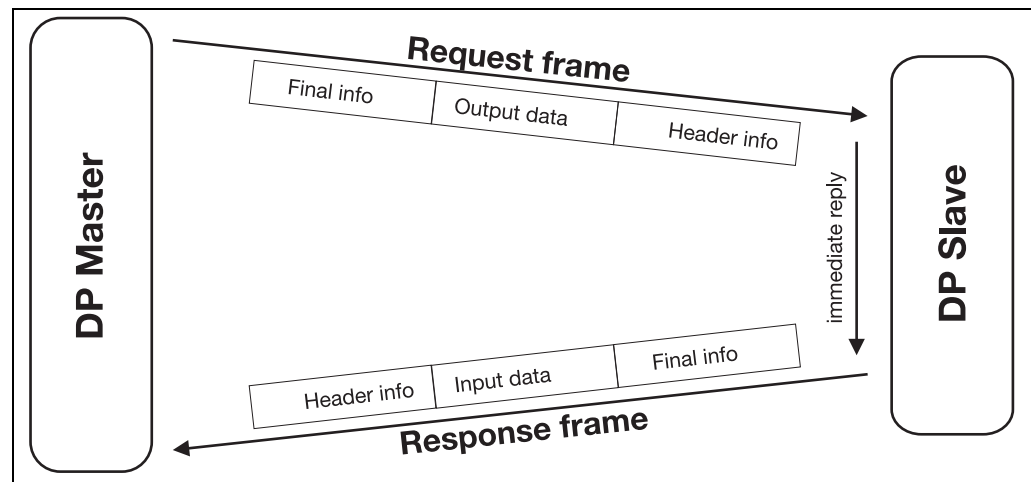
Transmission technology: <ul style="list-style-type: none">• RS485 twisted 2-wire line• Baud rates from 9.6 kbit/s to 12 Mbit/s
Bus access: <ul style="list-style-type: none">• Master and slave devices, max. 126 participants on one bus
Communication: <ul style="list-style-type: none">• Point-to-Point (user data transmission)• Cyclical master-slave user data transmission
Operating states: <ul style="list-style-type: none">• Operate: Cyclical transmission of input and output data• Clear: Inputs are read, outputs remain in a secure state• Stop: Only master-master data transfer is possible
Synchronization: <ul style="list-style-type: none">• Sync mode: is not supported by JUMO devices• Freeze mode: is not supported by JUMO devices
Functions: <ul style="list-style-type: none">• Cyclical user data transfer between DP master and DP slave(s)• Dynamic activation or deactivation of individual DP slaves• Check of the configuration of the DP slaves• Default addresses for the DP slaves via the bus (is not supported by the TYA200)• Configuration of the DP master (master) via the bus• Max. 246 byte input/output data per DP slave possible
Protective functions: <ul style="list-style-type: none">• Response monitoring for the DP slaves• Access protection for inputs/outputs of the DP slaves• Monitoring of the user data transmissions with adjustable monitoring timer for the DP master
Device types: <ul style="list-style-type: none">• DP master class 2, e.g. programming/project-planning devices• DP master class 1, e.g. central automation devices such as PLC, PC...• DP slave e.g. devices with binary or analog inputs/outputs, controllers, recorders...

2 PROFIBUS-DP description

Cyclical data transmission

The data transmission between the DP master and the DP slaves is automatically carried out by the DP master in a defined, recurring order. During bus system configuration, the user defines the assignment of a DP slave to the DP master. The user also defines the DP slaves that are to be included in, or excluded from, the cyclic user data transmission.

Data transmission between the DP master and the DP slaves is divided into three phases: parameterization, configuration and data transfer. Prior to a DP slave entering the data transfer phase, the DP master checks in the parameterization and configuration phase, whether or not the intended configuration matches the actual device configuration. In the course of this check, the device type, format and length information as well as the number of inputs and outputs must coincide. These checks provide the user with reliable protection against parameterization errors. In addition to the user data transfer, which is automatically performed by the DP master, new parameterization data can be sent to the DP slaves at the request of the user.



User data transmission in PROFIBUS-DP

3 Configuring a PROFIBUS-DP system

3.1 The GSD file

Device data (GSD) allow open project design.

PROFIBUS-DP devices have different performance features. They differ with respect to the available functionality (e.g. number of I/O signals, diagnostic messages) or the possible bus parameters, such as baud rate and time monitoring. These parameters vary individually for each device type and manufacturer. To accomplish a simple plug & play configuration for PROFIBUS-DP, the characteristic device features are defined in an electronic data sheet **device database file** (ddf = GSD file). The standardized GSD files expand open communication up to the operator level. Simple and user friendly integration of devices from different manufacturers is possible by means of the project design tool, which is based on the GSD files. The GSD files provide clear and comprehensive description of the features of a device type in a precisely defined format. GSD files are produced for the specific application. The defined file format permits the project design system to simply read in the device data of any PROFIBUS-DP device and to automatically use this information for the bus system configuration. As early as in the project design phase, the project design system can automatically perform checks for input errors and the consistency of data entered in relation to the entire system.

The GSD files are subdivided into three sections.

- **General specifications**
This section contains, among others, information on manufacturer and device names, hardware and software release versions, and on the supported baud rates.
- **Specifications related to the DP master**
This section is used to enter all parameters related to DP master devices only, such as the maximum number of DP slaves that can be connected, or upload and download options. This section is not available for slave devices.
- **Specifications related to the DP slaves**
This section contains all slave-related information, such as the number and type of the I/O channels, specifications of diagnosis texts and information about the consistency of I/O data.

The GSD file not only includes lists, such as the baud rate supported by the device, but also the possibility of describing the modules available in a modular device.

3 Configuring a PROFIBUS-DP system

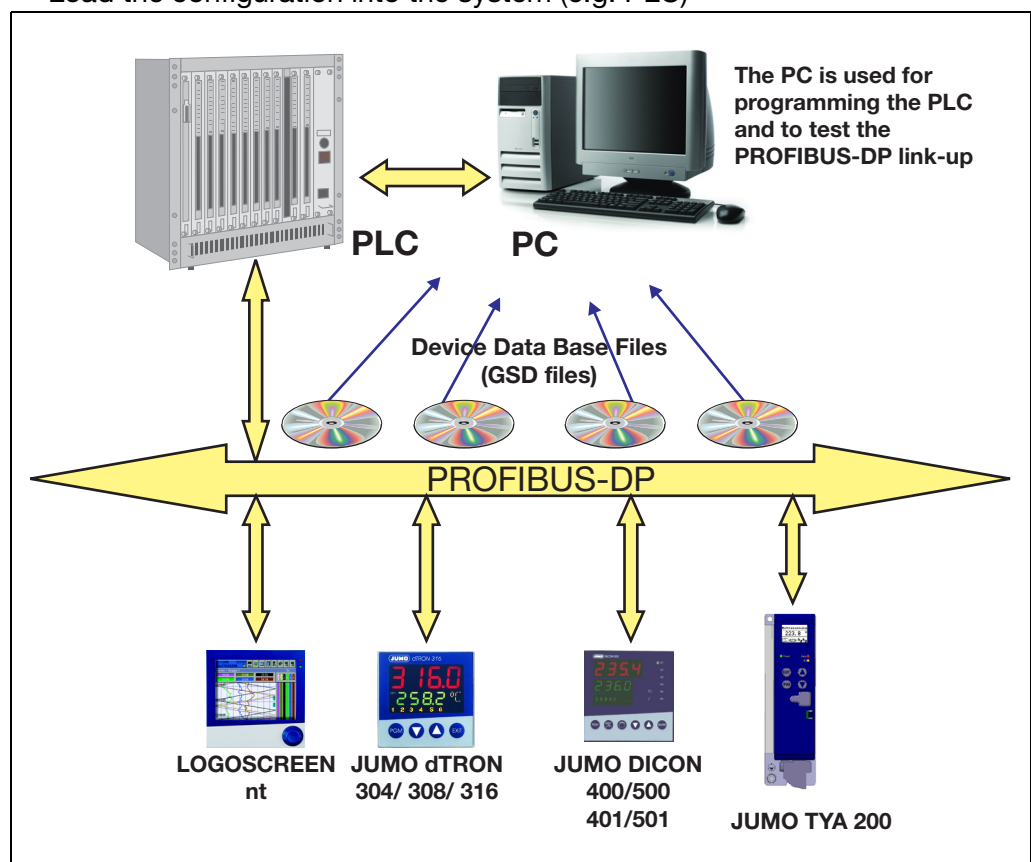
3.2 Configuration

Plug & Play

To simplify configuration of the PROFIBUS-DP system, the DP master (PLC) is configured with the aid of the PROFIBUS-DP configurator and the GSD files, or with the hardware configurator in the PLC.

Sequence of a configuration:

- Accomplishing a GSD file by means of the GSD generator
- Loading the GSD files of the PROFIBUS-DP slaves into the PROFIBUS-DP network configuration software
- Carry out configuration
- Load the configuration into the system (e.g. PLC)



The GSD file

The individual device features of a DP slave are specified clearly and comprehensively in a precisely defined format in the GSD file by the manufacturer.

The PROFIBUS-DP configurator / hardware configurator (PLC)

This software can read in the GSD files of PROFIBUS-DP devices of any manufacturer and integrate them for bus system configuration.

During the project design phase, the PROFIBUS-DP configurator automatically checks the entered files for system consistency errors.

The result of the configuration is read into the DP master (PLC).

3 Configuring a PROFIBUS-DP system

3.3 The GSD generator

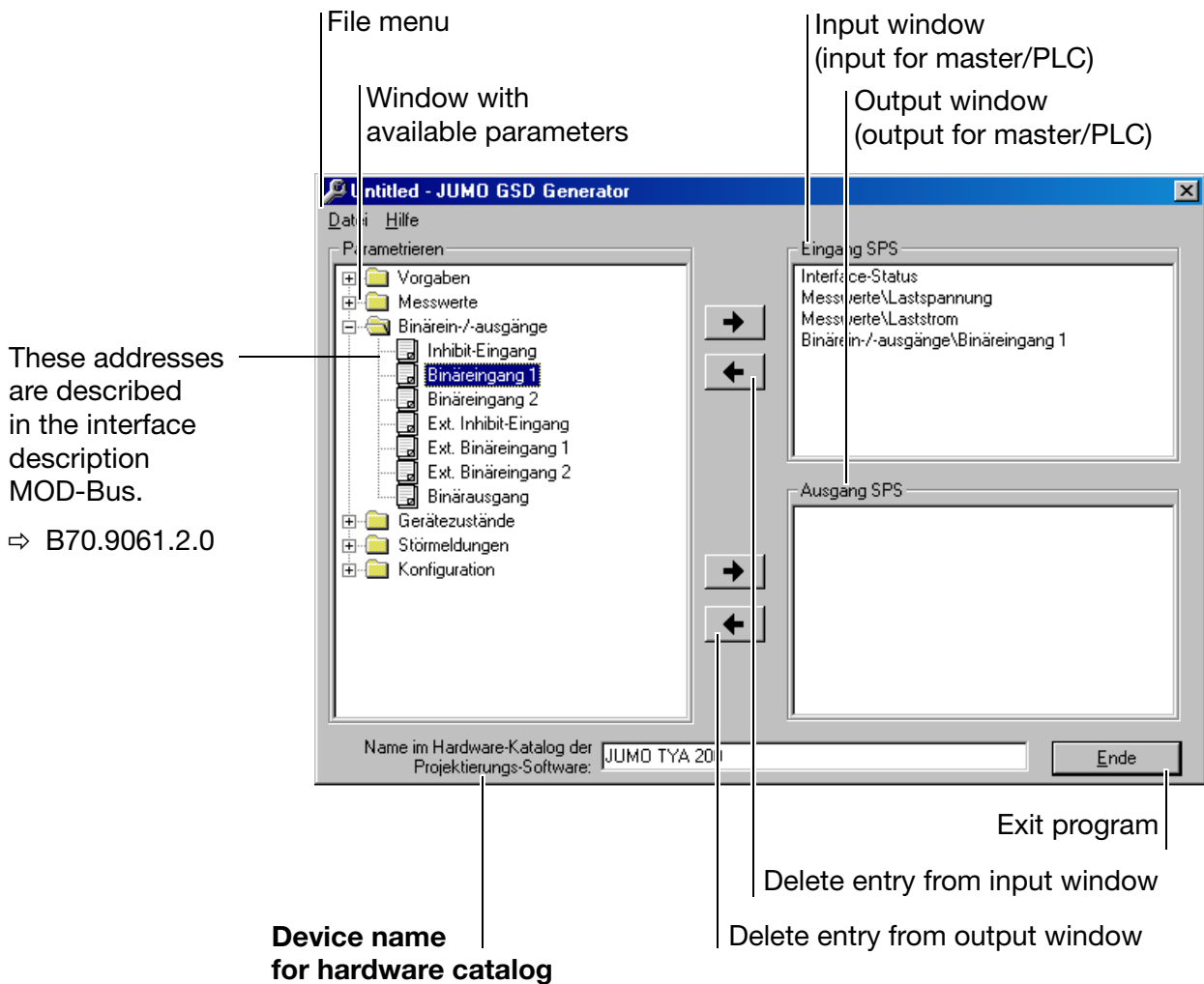
3.3.1 General information

The user can use the GSD generator to generate GSD files for JUMO devices with PROFIBUS-DP interface.

The devices with PROFIBUS-DP interface available from JUMO are able to transmit or receive a large amount of variables (parameters). Due to the fact, however, that in the most applications only a part of these variables are to be transmitted via PROFIBUS-DP, the GSD generator is used to select these variables.

Once the device is selected, all variables available appear in the "Parameterization" window. Only when these have been copied either to the "Input" or "Output" window, will they later be contained in the GSD file for further processing or pre-processing by the DP master (PLC).

3.3.2 Operation



If different GSD files are required for devices of the same type, this standard name has to be altered in such a way as to enable unambiguous assignment of the Profibus master in the hardware configuration.

3 Configuring a PROFIBUS-DP system

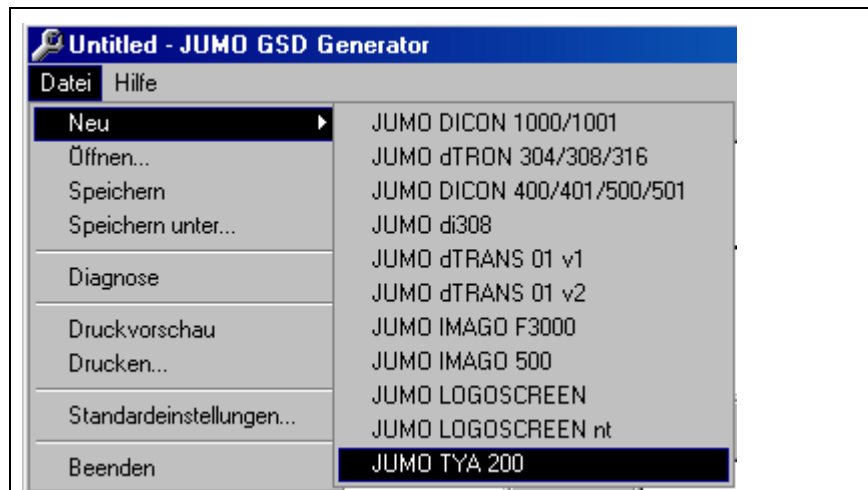


If SIMATIC S7 from SIEMENS is used for project design, the names in the GSD file must not be longer than 8 characters.

GSD files with long file names cannot be entered into the PLC hardware catalog!

File menu

The file menu can be called up using the Alt-D key combination or by the left mouse button. It provides the following options:



New	After calling up the function for the creation of a new GSD file, the available devices are selected. After selecting the required device, all available parameters are shown in the parameter window.
Open	This function opens an existing GSD file.
Save/ Save as	This function is used to save the generated or edited GSD file.
Diagnosis	This function can be used to test the GSD file in connection with a PROFIBUS-DP master simulator from B+W and the Profibus slave.
Print preview	shows a preview of a report ¹ that can be printed.
Print	Prints a report ¹ .
Standard settings	The language to be used at the next restart of the program can be selected here.
End	Exits the program.



1. The report contains additional information for the PLC programmer (such as data type of the selected parameters).

⇒ Section 3.3.3 “Example report”

3 Configuring a PROFIBUS-DP system

3.3.3 Example report

```
I/O Report
Gerät:      JUMO TYA 200
Länge der Eingänge (Byte):      11
Länge der Ausgänge (Byte):      4

Eingänge
Byte      Beschreibung      Type
-----
[ 0]      Interface-Status      BYTE
[ 1]      Messwerte\Lastspannung      REAL
[ 5]      Messwerte\Laststrom      REAL
[ 9]      Binärein-/-ausgänge\Binäreingang 1      INTEGER

Ausgänge
Byte      Beschreibung      Type
-----
[ 0]      Vorgaben\Eingangs-Sollwert      REAL
```

3 Configuring a PROFIBUS-DP system

3.3.4 Configuration of a GSD file

```
=====
; GSD-File Gateway PROFIBUS-DP
; JUMO TYA 200
=====
;
;
#Profibus_DP
GSD_Revision = 2 ;extended GSD-file is supported
; ;according to PNO directive of 14.12.95
Vendor_Name = "JUMO GmbH & Co. KG" ;name of the manufacturer
Model_Name = "JUMO TYA 200" ;name of the DP-instrument
Revision = "Ausgabestand 2.0" ;actual edition of the DP-instrument
Ident_Number = 0x0D28 ;exact type designation of the DP-instrument
Protocol_Ident = 0 ;protocol characteristic PROFIBUS-DP
Station_Type = 0 ;DP-Slave
FMS_supp = 0 ;DP-instrument only
Hardware_Release = "1.00" ;actual edition of the hardware
Software_Release = "2.00" ;actual edition of the software
; ;the following baudrates are supported
9.6_supp = 1 ; 9.6 kBaud
19.2_supp = 1 ; 19.2 kBaud
; ; 31.25 kBaud (PA)
45.45_supp = 1 ; 45.45 kBaud
93.75_supp = 1 ; 93.75 kBaud
187.5_supp = 1 ; 187.5 kBaud
500_supp = 1 ; 500 kBaud
1.5M_supp = 1 ; 1.5 MBaud
3M_supp = 1 ; 3 MBaud
6M_supp = 1 ; 6 MBaud
12M_supp = 1 ; 12 MBaud
;
MaxTsdr_9.6 = 60
MaxTsdr_19.2 = 60
; ; 31.25 kBaud (PA)
MaxTsdr_45.45 = 60
MaxTsdr_93.75 = 60
MaxTsdr_187.5 = 60
MaxTsdr_500 = 100
MaxTsdr_1.5M = 150
MaxTsdr_3M = 250
MaxTsdr_6M = 350
MaxTsdr_12M = 800
;
Redundancy = 0 ;no redundant transmission
Repeater_Ctrl_Sig = 1 ;Plug signal CNTR-P RS485
24V_Pins = 0 ;Plug signals M24V and P24 V not connected
Implementation_Type = "SPC3" ;Application of ASIC SPC3
;
;
; ;*** Slave specific values ***
Freeze_Mode_supp = 0 ;Freeze-mode is not supported
Sync_Mode_supp = 0 ;Sync-mode is not supported
Auto_Baud_supp = 1 ;Automatic recognition of baudrate
Set_Slave_Add_supp = 0 ;Set_Slave_Add is not supported
Min_Slave_Intervall = 6 ;Slave-Interval = 0.6 ms
Modular_Station = 1 ;Modular station
Max_Module = 5
Max_Diag_Data_Len = 6 ;
Slave_Family = 0 ;Allgemein
;
;
; ;**** P..... ****
```

3 Configuring a PROFIBUS-DP system

```
;/
;                                     ;*** Parameterization ***
;
;This lines are for locating PBC file, and initial data length.
;Do not disturb!!!
;atPBC_File = C:\PROGRAMME\JUMO\GSDGEN\14401XX\D\ju_tya200.PBC
;atINIT_LEN = 2
;
User_Prm_Data_Len = 20
User_Prm_Data = 0x00, 0x03, 0x03, 0x01, 0x13, 0x00, 0x3A, 0x04, 0x13, 0x00, \
0x3C, 0x04, 0x11, 0x00, 0x72, 0x02, 0x23, 0x00, 0x44, 0x04
Max_Input_Len = 11
Max_Output_Len = 4
Max_Data_Len = 15
;===== Input Master =====
Module = "Interface Mode" 0x10
Preset = 1
Endmodule
Module = "Messwerte/Lastspannung" 0x13
Preset = 1
Endmodule
Module = "Messwerte/Laststrom" 0x13
Preset = 1
Endmodule
Module = "närein-/-ausgänge/Einäreingang 1" 0x11
Preset = 1
Endmodule
;===== Output Master =====
Module = "Vorgaben/Eingangs-Sollwert" 0x23
Preset = 1
Endmodule
```

The configuration of the GSD file is designed for the in-stallation on the SIMATIC S7 (SIEMENS).

Should installation problems with other controls be encountered, delete all Preset=1 entries.

In this case, in the PLC process image, it is also necessary to set up the variables selected in the GSD generator in the correct order.

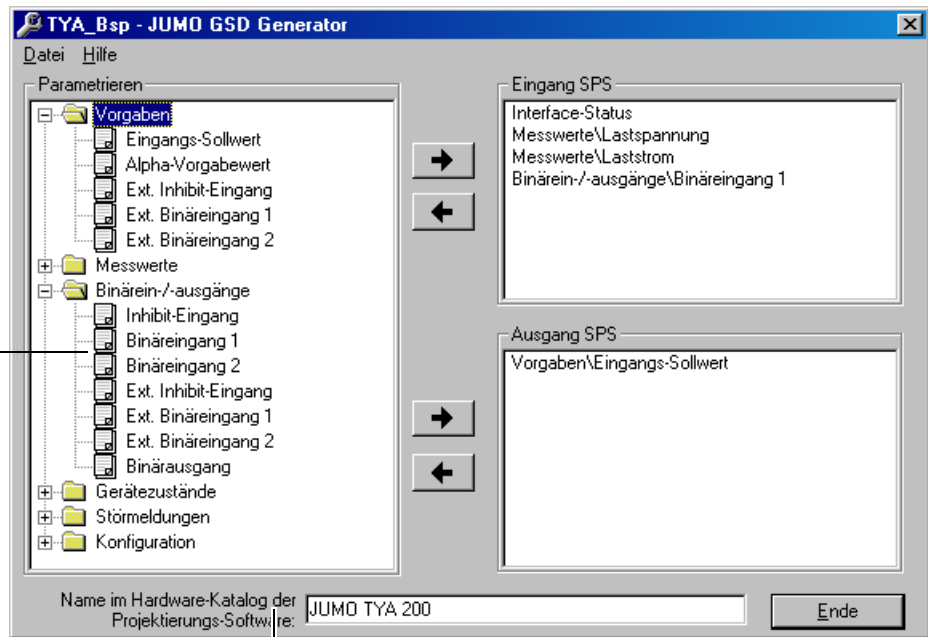
3 Configuring a PROFIBUS-DP system

Select parameter

When an existing file has been opened or a new file created, all available parameters are shown in the parameter window.

These addresses are described in the interface description MOD-Bus.

⇒ B70.9061.2.0




Device name for hardware catalog

If different GSD files are required for devices of the same type, this standard name has to be altered in such a way as to enable unambiguous assignment of the Profibus master in the hardware configuration.

A click with the left mouse button on the "+" (Regler) or "-" (Sollwerte) symbol will extend or reduce the parameter list.

"Click" on the parameters with the left mouse button, keep the button pressed (Drag & Drop) while copying the parameter to the input or output window.

Delete parameter

Parameters are deleted from the input or output window by pressing the left-pointing arrow key  .



The "Interface status" parameter automatically appears in the input window and cannot be deleted. This parameter is used for diagnosis of the internal data transmission in the device and should be evaluated by the PLC program to ensure data validity.

0 : internal communication in the device is OK

not equal to 0: faulty internal communication in the device

Configuration data (user level)

The configuration folder contains the parameters from the device user level. These parameters must not be cyclically written to permanently by the PLC because they are written to the EEPROM, which is only designed for a limited number of 1,000,000 writing cycles.

3 Configuring a PROFIBUS-DP system

3.4 Connection example

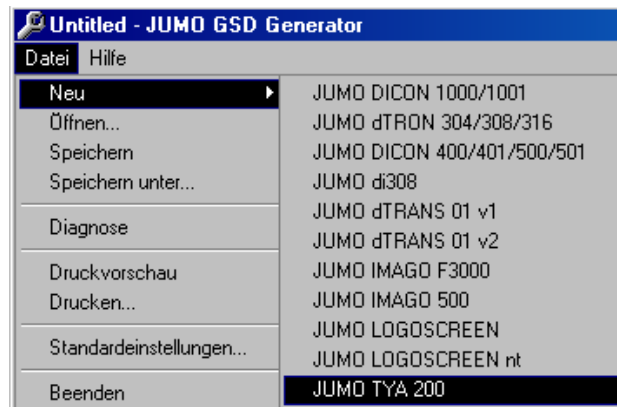
The example below shows the path for the connection of a TYA 200 to a SIMATIC S7.

3.4.1 TYA 200

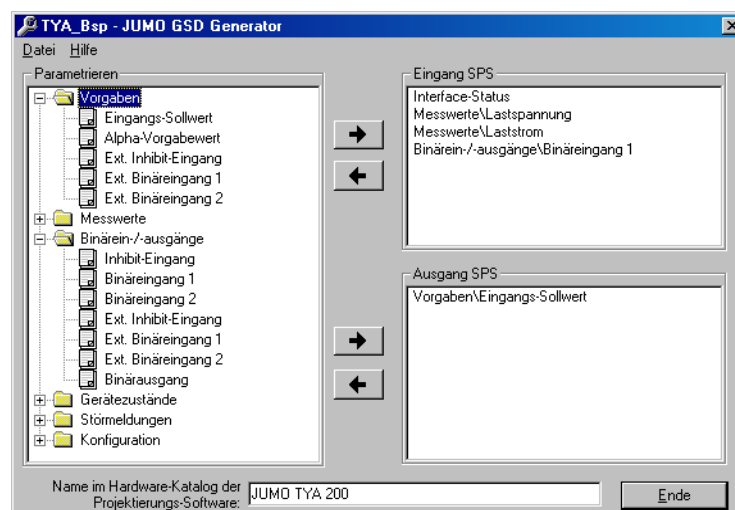
- * Connect the device to the PLC.
- * Set the device address.
The device address can be set using the device keyboard or the setup program.

3.4.2 JUMO GSD generator

- * Start the GSD generator (Example: *Start* → *Programs* → *JUMO devices* → *PROFIBUS* → *JUMO GSD generator*).
- * Select the device.

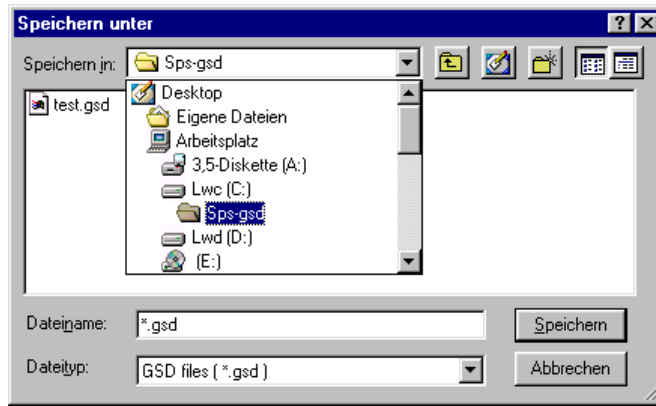


- * Select the variable to be transmitted to the DP master in the left window.
- * Click on the directional arrow and the variable appears in the RH window or displace the variable to the RH window using Drag&Drop.



3 Configuring a PROFIBUS-DP system

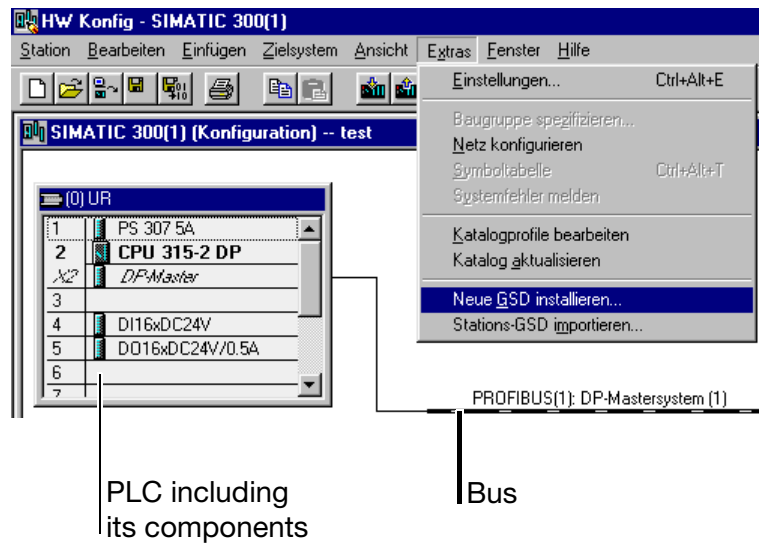
- * Save the GSD file in any folder.



If SIMATIC S7 from SIEMENS is used for project design, the names in the GSD file must not be longer than 8 characters.

3.4.3 PLC configuration

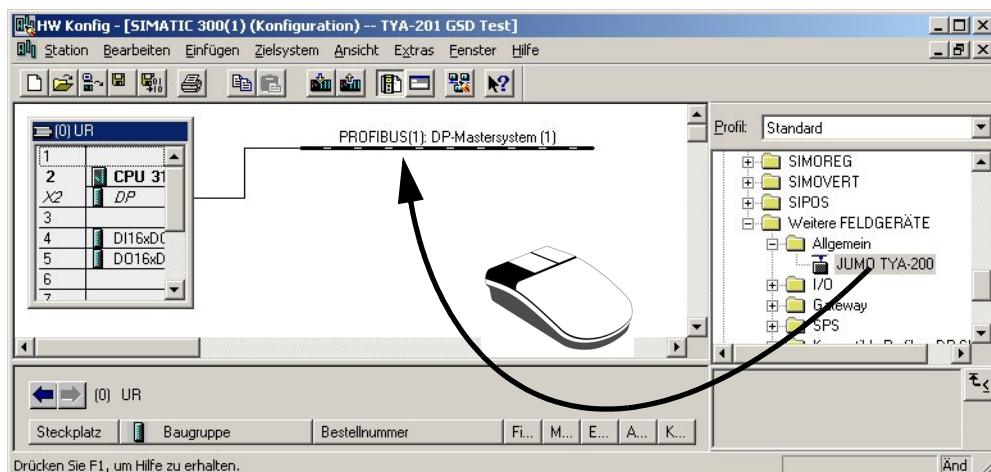
- * Start the PLC software
- * Call up the hardware configuration and execute the menu command "Install new GSD".




The new GSD file will be read in, processed, and the TYA 200 inserted into the hardware catalog.

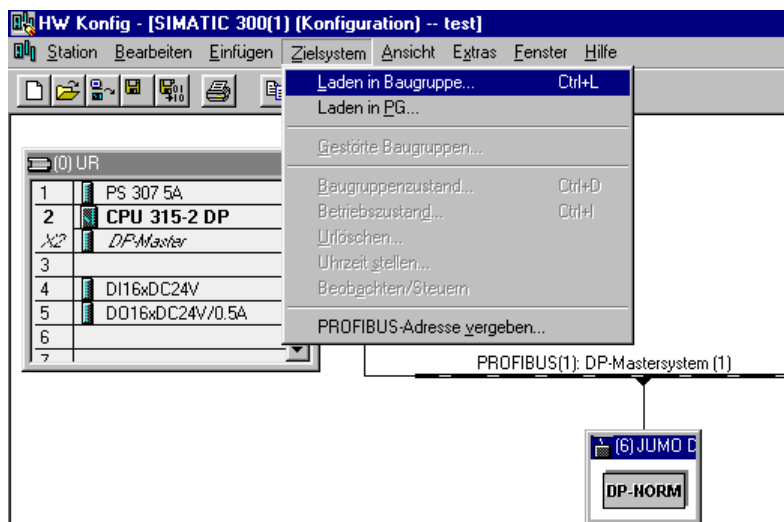
3 Configuring a PROFIBUS-DP system


- * Open the hardware catalog and place the new device in the work surface.



-  Via the GSD file of the slaves, the master receives information on which baud rates are supported.

- * Finally load the configuration into the PLC
(Target system → Load to module).



-  If a device with PROFIBUS-DP interface is operated on a master system (PLC), suitable error analysis routines should be provided in the master system.

In conjunction with a SIMATIC S7, we recommend to install the OB86 in the PLC, so that failure of a PROFIBUS-DP device can be detected, analyzed and registered for the specific plant.

3 Configuring a PROFIBUS-DP system



The "Interface status" parameter automatically appears in the input window and cannot be deleted. It serves for the diagnosis of the internal data transmission in the device and should be evaluated by the PLC program to ensure, e.g. that a communication problem within the device can be detected by the PLC master.

0 : internal communication in the device is OK

not equal to 0 : faulty communication in the device

4 Data format of the JUMO devices

When using JUMO devices on a PROFIBUS-DP system, observe the data format used by the devices.

Two different data formats can be selected on the TYA 200 by means of the configuration. The first is the Intel format (Little Endian) and the second is the Motorola format (Big Endian).



The Motorola format (default value) is used for communication with Siemens PLCs.

4.1 Integer values

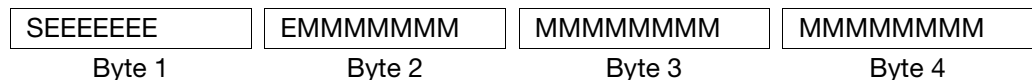
Integer values are transmitted in the following format:

	Motorola format: (Big Endian)	Intel format: (Little Endian)
first the	- High byte,	- Low byte,
followed by the	- Low byte.	- High byte.

4.2 Float values / real values

The float values/real values of the device are saved in the IEEE-754 standard format (32 bit).

Single-float format (32bit) as per standard IEEE 754



S - prefix bit (bit31)

E - exponent in the 2-complement (bit23...bit30)

M - 23bit standardised mantissa (bit0...bit22)

Example:

Calculation of the real number from prefix, exponent and mantissa.

Byte1 = 40h, Byte2 = F0, Byte 3 = 0, Byte 4 = 0

40F00000h = 0100 0000 1111 0000 0000 0000 0000 0000b

S = 0

E = 100 0000 1

M = 111 0000 0000 0000 0000 0000

$$\text{Value} = -1^S \cdot 2^{\text{Exponent}-127} \cdot (1 + M_{b22} \cdot 2^{-1} + M_{b21} \cdot 2^{-2} + M_{b20} \cdot 2^{-3} + M_{b19} \cdot 2^{-4} + \dots)$$
$$\text{Value} = -1^0 \cdot 2^{129-127} \cdot (1 + 1 \cdot 2^{-1} + 1 \cdot 2^{-2} + 1 \cdot 2^{-3} + 0 \cdot 2^{-4})$$
$$\text{Value} = 1 \cdot 2^2 \cdot (1 + 0.5 + 0.25 + 0.125 + 0)$$
$$\text{Value} = 1 \cdot 4 \cdot 1.875$$
$$\text{Value} = 7.5$$

4 Data format of the JUMO devices

The transmission order of the individual bytes depends on the data format set in the configuration.

Motorola format (Big Endian)

SEEEEEEE	EMMMMMMM	MMMMMMMM	MMMMMMMM
Byte 1	Byte 2	Byte 3	Byte 4

Intel format (Little Endian)

MMMMMMMM	MMMMMMMM	EMMMMMMM	SEEEEEEE
Byte 4	Byte 3	Byte 2	Byte 1

Prior to/after transmission from/to the device, the bytes of the float value need to be changed over accordingly.

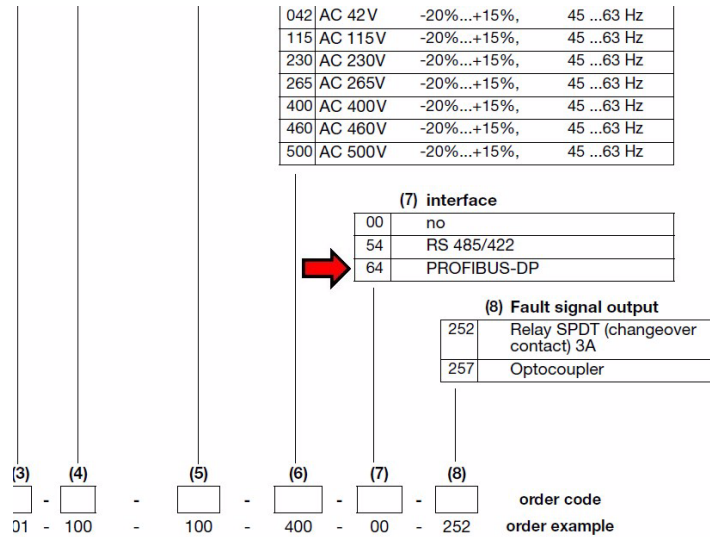
Please determine the way float values are saved in your application. If necessary, change over the bytes accordingly.

5 Technical data of the devices

5.1 Connection type 70.9061 and 70.9062

PROFIBUS DP option

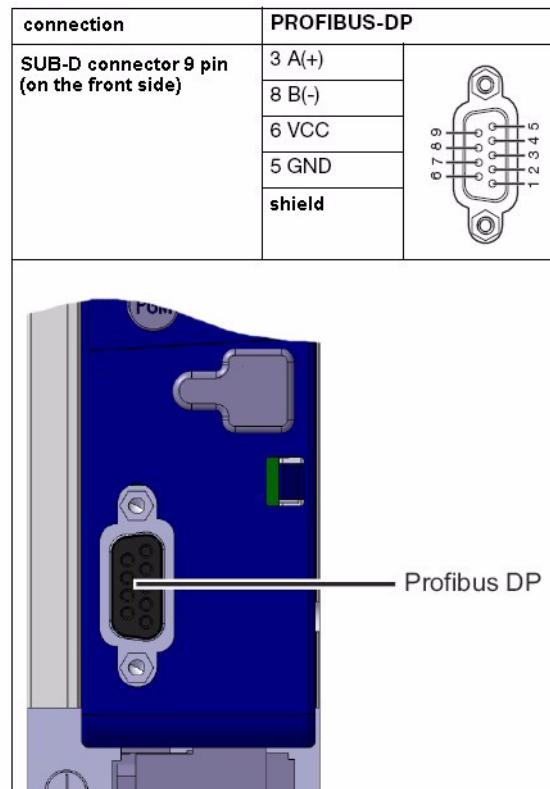
Depending on the device version, the rear panel layout can be as follows:



* Check on the device type plate if the device is equipped with the PROFIBUS-DP interface (option).

⇒ see operating manual B70.9061.0

Assignment of the 9-pin SUB-D connector



5 Technical data of the devices

5.2 Interface configuration

The parameters of the profibus interface are set in the configuration level:


Config level → PROFIBUS DP → Device addr. PROFIBUS


Device addr. PROFIBUS
Specif. In
125

.Config level → PROFIBUS DP → Data format PROFIBUS

Data format PROFIBUS
Motorola

Configuration	Value range	Default value	Description
Device address	0 ... 125	125	
Data format	Motorola Intel	Motorola	Motorola: Big Endian Intel: Little Endian ⇒ Section 4 “Data format of the JUMO devices”

 If the address 0 is set, no communication takes place via the PROFIBUS. Then the device operates as if no PROFIBUS interface is available. This can be used to suppress the "Bus error malfunction" on the device equipped with PROFIBUS interface.

 Changing the device address using the bus is not supported by the device.

The baud rate is automatically calculated (max. 12MBit/s).

5.3 Diagnostic and status messages

In the event of communication problems with the device, the "Bus error malfunction" message appears in the display.

Mains voltage
24.0 v
Fault Bus error

Please check the wiring, the device address and the master (PLC). A new start of the plant may be necessary.

This error message can be suppressed by setting slave address 0.



When slave address 0 is set, communication via Profibus is not possible.

5.3.1 Faults

If a communication malfunction occurs, all values transmitted prior to the malfunction remain saved.

**Exception:
set point value**

The set point value to be used in the event of a malfunction can be configured in the device:

Config level → *Set point value config.* → *Default values for errors*

- last value (of data transmission)
- Value of the voltage or current input
- adjustable fixed set point value

5 Technical data of the devices

5.4 Time grid for data processing in the TYA 200

The TYA 200 processes interface data cyclically in a time grid of 60 ms.

Data can be transmitted/received at faster cycles by the PLC via the profibus interface, however, data processing in the TYA 200 is only carried out every 60 ms.

For this reason, switching individual sinusoidal cycles (20 ms at 50 Hz mains frequency), for example, are not possible via the profibus interface.



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