



DP/DP coupler

700-158-0AD02

Manual

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Note:

The contents of this manual have been checked by us so as to ensure that they match the hardware and software described. However, we assume no liability for any existing differences, as these cannot be fully ruled out. The information in this manual is, however, updated on a regular basis. When using your purchased products, please make sure to use the latest version of this manual, which can be viewed and downloaded on the Internet at www.helmholz.de.

Our customers are at the center of everything we do. We welcome all ideas and suggestions.

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1 Safety instructions

Observe the listed safety instructions for your own safety and the safety of others. The safety instructions list possible hazards and provide instructions for avoiding dangerous situations.

1.1 Instruction symbols used

The following instruction symbols are used in this manual:



Attention, draws attention to hazards and sources of error



General or specific danger



Danger of electrical shock



Provides a general instruction

1.2 General safety instructions



The operator of the machinery is responsible for the observance of the applicable safety and accident prevention regulations.



The use-specific safety and accident prevention regulations are to be observed when planning the project.



Emergency stop devices as per EN 60204/IEC 204 must remain fully functional and effective in all of the equipment's operating modes. The equipment must not be able to restart in an undefined manner.



Any errors occurring in the equipment that have the potential to cause property damage or bodily injury must be safeguarded with the use of additional external devices. This equipment must also ensure safe operation even in the event of an error. These devices include electromechanical safety switches, mechanical locks, etc. (please refer to EN 954-1, Risk Assessment).



Never carry out or initiate functions of relevance to safety using the operating terminal.



*Access to modules only
for authorized personnel!*

1.3 Access restriction

The DP/DP coupler is open operating equipment and may only be installed in electrical equipment rooms, cabinets, or housings. Access to the electrical equipment rooms, cabinets, or housings must only be possible using a tool or key, and access should only be granted to trained or authorized personnel. See also Chapter 2.

1.4 Target group for these instructions

This manual is oriented to project planners and installers of the DP/DP coupler. Qualified training in the field of automation technology is presumed.

Knowledge of the programming language STEP 7 is required to program the DP/DP coupler.

The standards, safety and accident prevention regulations applicable to the respective individual case must absolutely be observed by project planners, users and installers. The operator of the automation system is responsible for the observance of these regulations.



*Functions of relevance to
safety may not be con-
trolled exclusively via the
DP/DP coupler!*

1.5 Proper usage

The DP/DP coupler may only be used as described in this manual.

2 Installation and assembly

Installation of the DP/DP coupler must take place in accordance with VDE 0100

IEC 364. Because this is an "OPEN Type" module, it must be installed in a control cabinet. Ambient temperature: 0 °C – 60 °C.



All system components must be deenergized prior to commencing with installation work.



Danger of electrical shock!



The use-specific safety and accident prevention regulations are to be observed when assembling.



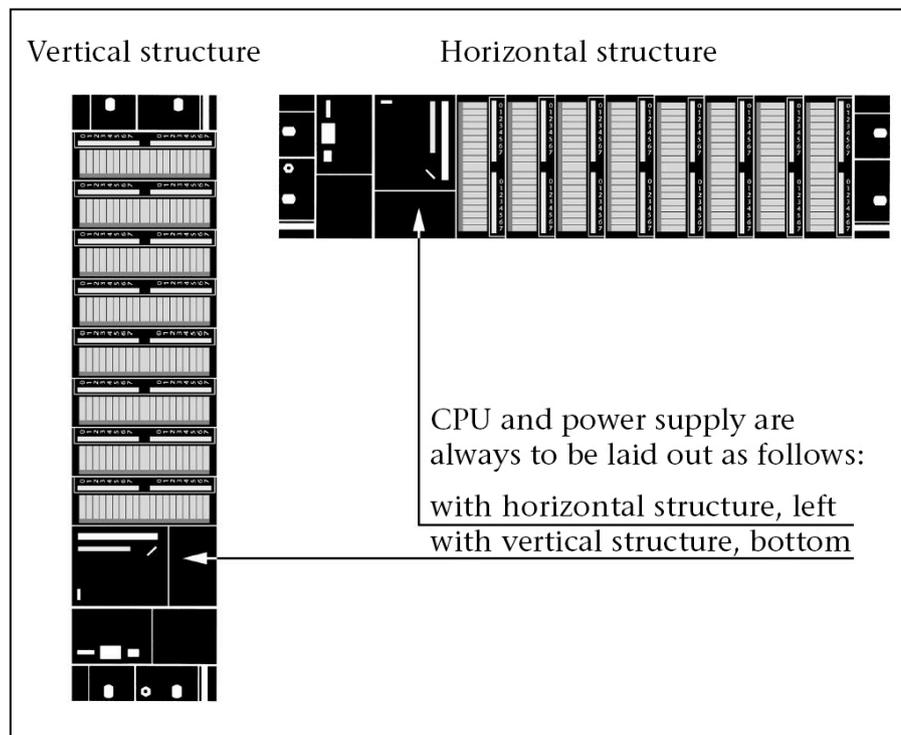
All emergency stop devices as per IEC 6204 (corresponds to VDE 113) must remain fully effective in all of the system's operating modes!

2.1 Vertical and horizontal setup

The modules can be set up either vertically or horizontally.

Permissible ambient temperature:

- with vertical setup 40 °C
- with horizontal setup 60 °C



2.2 Minimum clearance

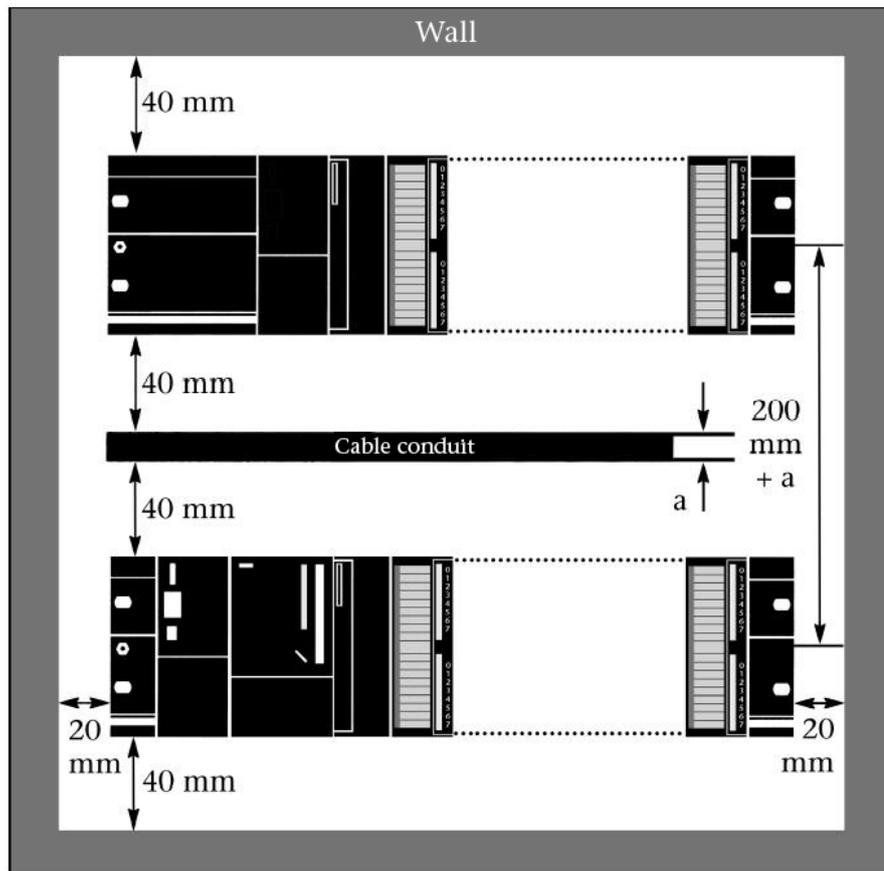
Adhering to these minimum clearances

- ensures adequate cooling of the DP/DP couplers
- ensures adequate space for the insertion and removal of the modules
- ensures adequate space for the laying of lines
- increases the installation height of the module carrier to 185 mm, whereby the clearance measurement of 40 mm must be observed.

The minimum clearance measurements between the respective module carriers and to neighboring cabinet walls, operating materials, cable conduits, etc. are indicated in the following figure for S7-300 structures on several module carriers.

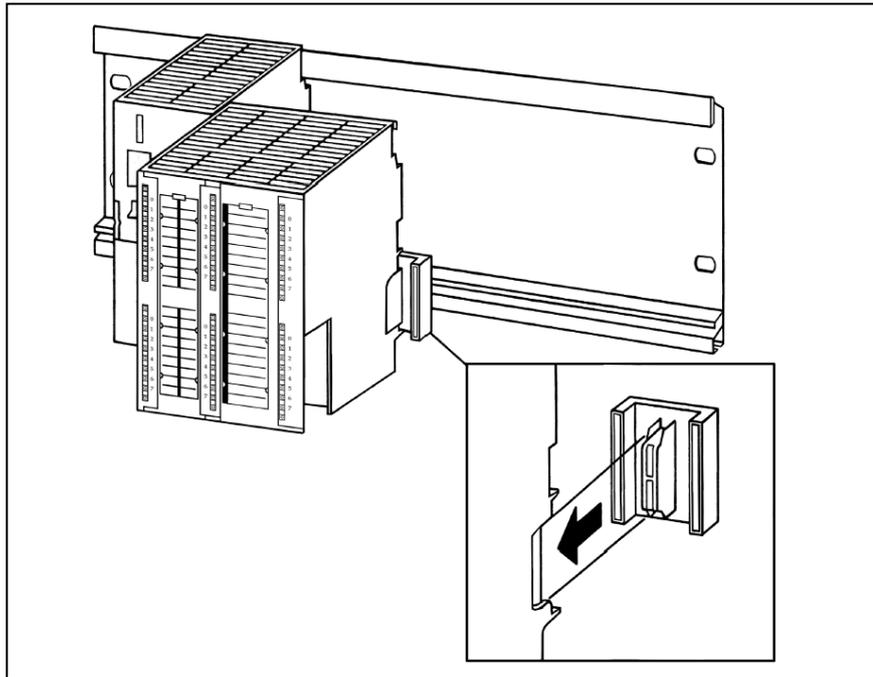


Failure to observe the minimum clearances can destroy the module in the event of high ambient temperatures!

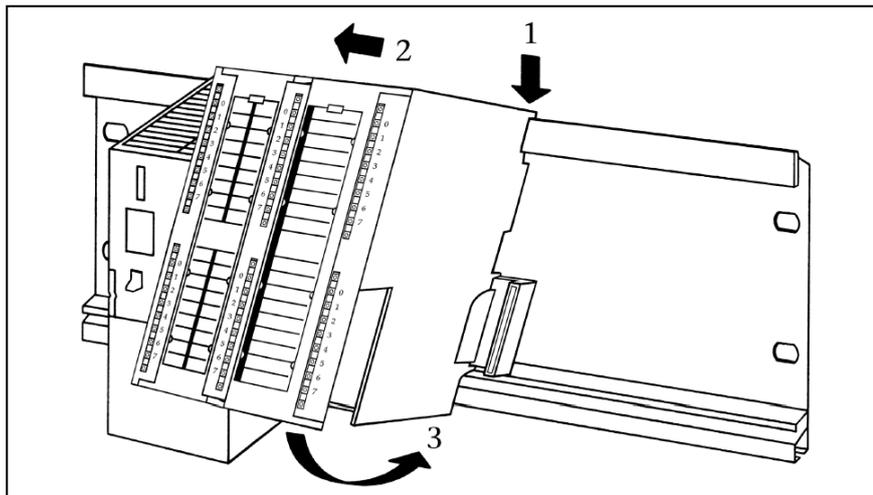


2.3 Assembly of the module on the mounting rail

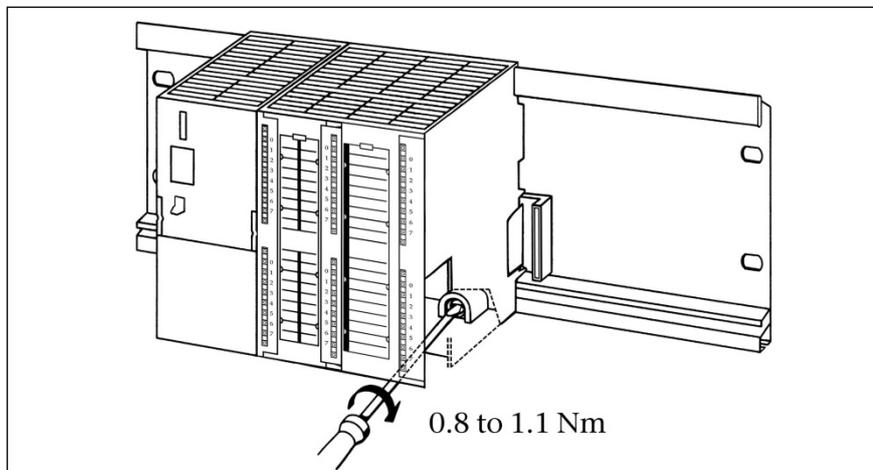
The DP/DP coupler can be mounted on standard mounting rails and on S7 mounting rails. The minimum clearances indicated above must be observed in the process.



Insert the DP/DP coupler (1), push toward the module to the left (2) and pivot downward (3).



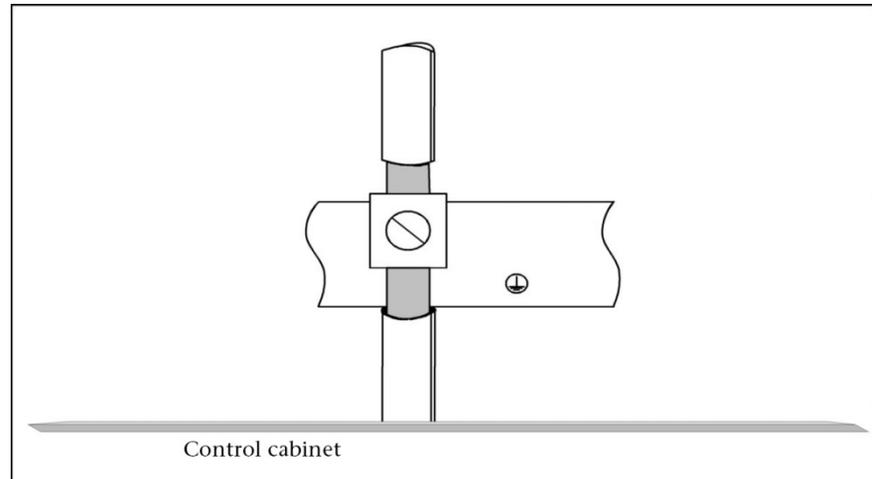
Screw the DP/DP coupler tight with a torque of 0.8 to 1.1 Nm.



2.4 Wiring

Connection of the PROFIBUS cable

The shielding braid of the PROFIBUS cable is to be connected extensively with the shielding bus near the entry point into the control cabinet with a metal cable clamp. Attention is to be paid to impeccable contact.



Wiring the power connection:

You need a screwdriver with a blade width of 2.5 mm.

Proceed as follows:

- Insulate the wires to 10 mm
- Screw the wires tight at the connection plug
- Plug the plug into the socket
- Set the "PS" switch for each connected power source to the "ON" position, otherwise to "OFF"

2.5 Connect PROFIBUS-DP

You need a screwdriver with a blade width of 3 mm.

- Plug the sub-D plugs into the PROFIBUS sockets.
- Tighten the fastening screws of the sub-D plugs


Now use the accessories indicated in the appendix.



*Failure to observe:
The DP/DP coupler can
only be operated with a
grounded 24 V DC power
supply. Operation with a
non-grounded 24 V power
supply is not possible.*

2.6 Operation with grounded power supply

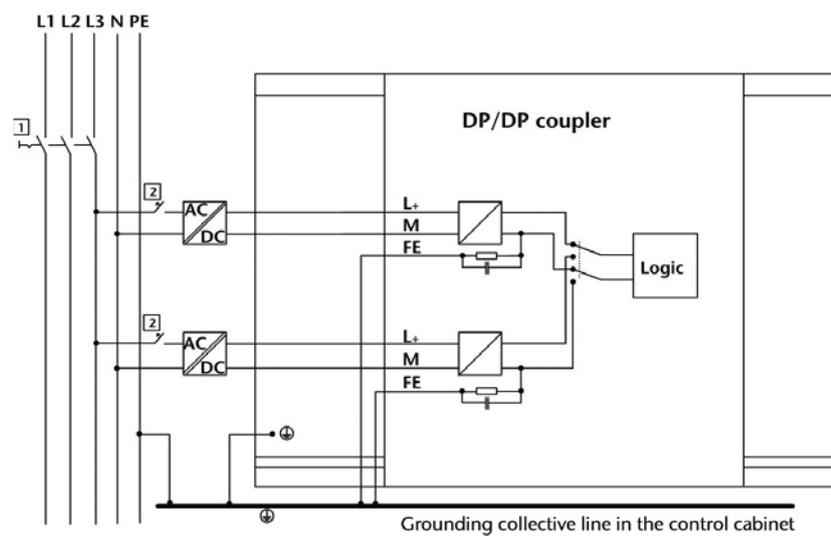
One refers to a "grounded power supply" when the neutral conductor of the mains power supply is grounded. If contact between a live conductor and a grounded part of the system occurs with a grounded power supply, the protective equipment is addressed.

Certain components and protective measures are prescribed for the setting up of a system with a grounded power supply. Components and protective measures depend upon which DIN VDE regulation is applicable for the setting up of the system. A differentiation is made between:

Main switch (in Fig. [1](#)): DIN VDE 0100 Part 460

Disconnecter (in Fig. [2](#)): DIN VDE 0113 Part 1

The following illustration shows the position of the modules with feed from a TN system network.



2.7 Replacement of a defective DP/DP coupler

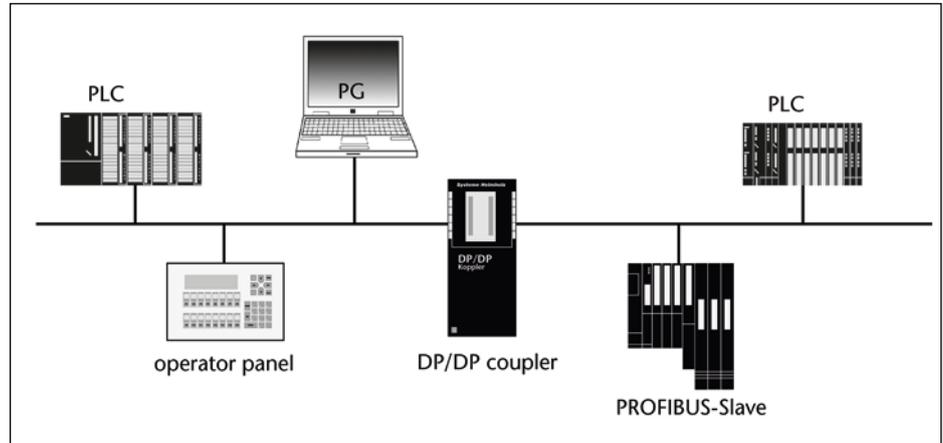
In order to replace a defective DP/DP coupler, proceed as follows:

- Remove the bus connection plugs from the PROFIBUS DP interfaces.
- Disconnect the power supply of the defective DP/DP coupler.
- Replace the defective DP/DP coupler.
- Plug the power supply into the new DP/DP coupler.
- Plug the bus connection plugs into the PROFIBUS DP interfaces of the new DP/DP coupler.

3 System overview

3.1 Application and functional description

Two PROFIBUS -DP networks can be connected with the DP/DP coupler.



Both PROFIBUS-DP networks and the two 24 V DC power supplies are galvanically isolated from one another.

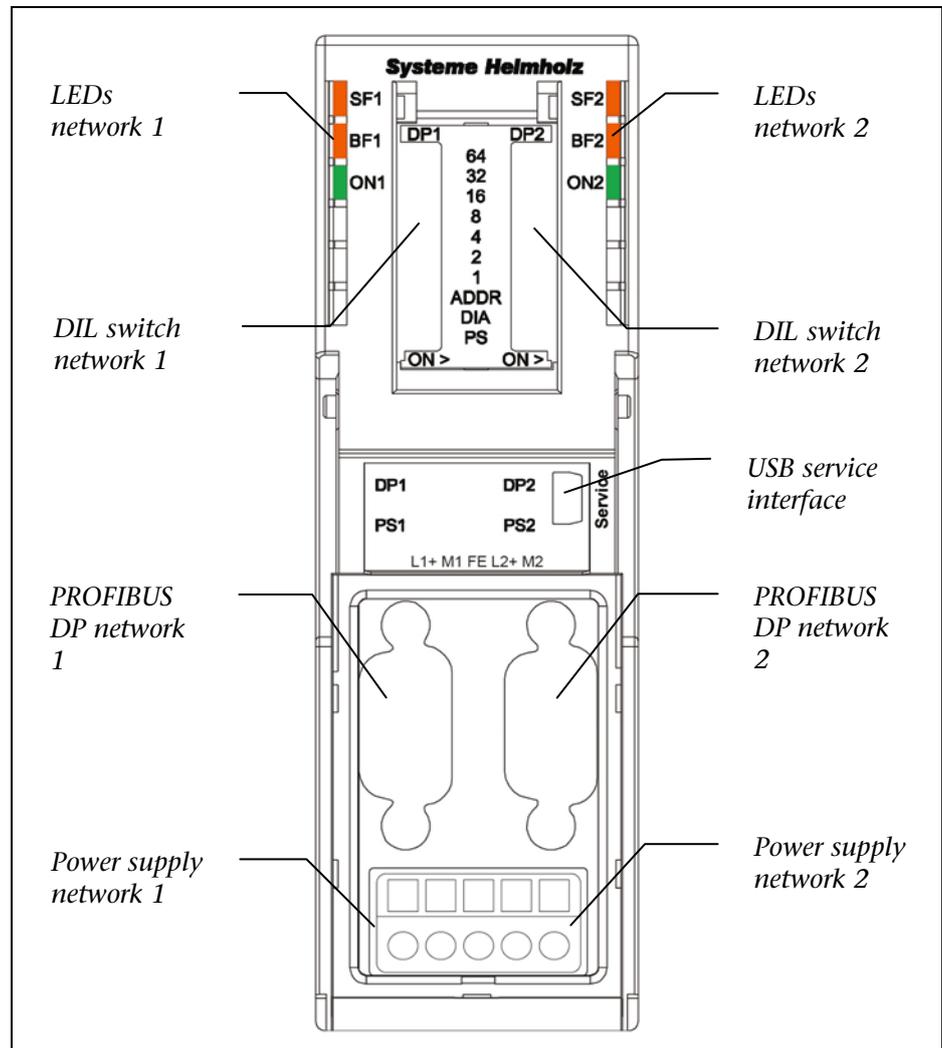
The logic of the DP/DP coupler and the PROFIBUS-DP network 1 are galvanically connected.

The DP/DP coupler has the following properties:

- Exchange of data packages up to 244 bytes in size, of these 128 bytes consistent (meaning all data are logically and chronologically coherent)
- Maximum of 16 input and output areas for data exchange
- Should one side fail, the outputs of the other side are maintained at the last value
- Support of the protocol DPV1 with complete and uniform diagnosis
- Setting of the PROFIBUS address either with the switch on the DP/DP coupler or with a project planning tool (e.g. STEP 7)
- Setting of various baud rates and PROFIBUS addresses on both sides of the DP/DP coupler
- Potential separation between both DP networks
- Two-side power supply
- Automatic baud rate recognition

3.2 Displays, setting elements and connections

The DP/DP coupler is equipped with the following displays, setting elements and connections:



3.3 Power supply

For purposes of safety, the DP/DP coupler can be connected to two different power sources simultaneously.

When two power sources are connected, the DP/DP coupler automatically switches to the power source at connection 1.

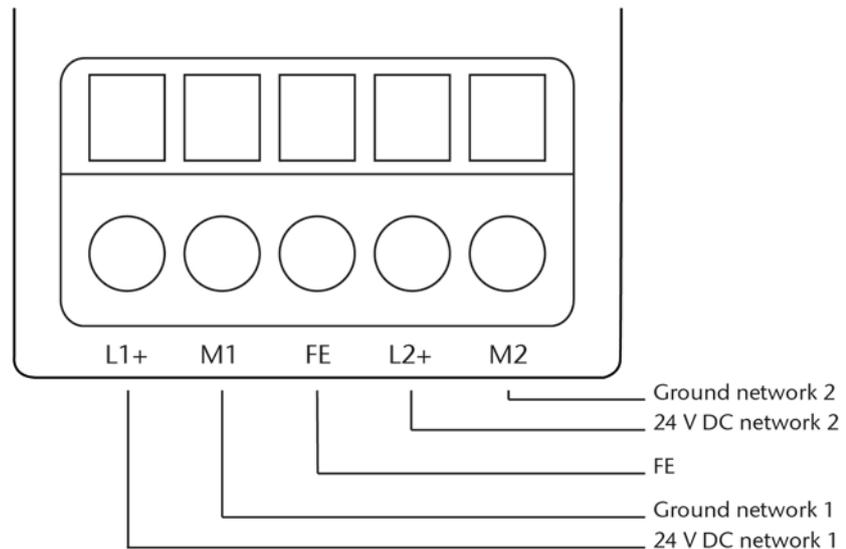
If one of the two power sources fails, the DP/DP coupler switches automatically to the other power source.

When only one power source is connected, this should be connected with connection 1n.

With the "Diagnosis" you can determine whether the DP/DP coupler is connected with the power supply. The "PS" DIL switch must be brought into the correct position.

For setting the DIL switches see Section 4.1.

The power connections are found at the front on the DP/DP coupler:



The maximum wire cross-section is 2.5 mm².

3.4 LED displays

The six LEDs on the front of the DP/DP coupler (see above, Section 3.2) provide information on the operation status.

They mean:

<i>GE1 (red):</i>	<i>General error PROFIBUS DP network 1</i>
<i>GE2 (red):</i>	<i>General error PROFIBUS DP network 2</i>
<i>BE1 (red)</i>	<i>Bus error PROFIBUS DP network 1</i>
<i>BE2 (red)</i>	<i>Bus error PROFIBUS DP network 2</i>
<i>ON1 (green)</i>	<i>24 V power supply network 1</i>
<i>ON2 (green)</i>	<i>24 V power supply network 2</i>

Status and error displays of the DP/DP coupler


LEDs ON1 or ON2 must
light up

Should one of the ON1 and ON2 LEDs not light up, check the power supply from the respective network. When the two applied supply voltages are within the permissible range, a hardware error in the DP/DP coupler is probable. Replace the DP/DP coupler in this case.

3.4.1 LED statuses

LEDs					Meaning	Remedy
ON1 and/ or ON2	GE1	GE2	BE1	BE2		
on	on	on	on	on	After switching on for approx. 1s.: Startup of the DP/DP coupler	-
on	on				Diagnostic message on network 1	Evaluate diagnostic message
on		on			Diagnostic message on network 2	Evaluate diagnostic message
on			on		No connection to the DP master in network 1. Poss. causes: Bus communication with the DP/DP coupler interrupted. DP master network 1 not in operation	Check for correct fit of the bus connection plug Check bus cable to the DP master for possible interruption
on				on	No connection to the DP master in network 2. Poss. causes: Bus communication with the DP/DP coupler interrupted DP master network 2 not in operation	Switch power supply of network 1 or 2 off and on again
on			blinking		No data exchange between DP master and DP/DP coupler in network 1	Check project planning
on				blinking	No data exchange between DP master and DP/DP coupler in network 2	Check PROFIBUS addresses
blinking	blinking	blinking	blinking	blinking	Invalid PROFIBUS address set (Addr. 0 or 127) Internal error in the DP/DP coupler.	Check PROFIBUS addresses Contact manufacturer

3.5 USB service interface

The USB service interface may be used to load a firmware update. In case of requiring an update please contact Helmholtz support department (mail: support@helmholz.de).

3.6 Reaction times of the DP/DP coupler

The reaction times of the DP/DP coupler indicate how it takes on average to transfer data from one DP master via the DP/DP coupler to the other master.

The amount of time that passes between the writing of the data of the first master into the output process image and the reading of the data in the process image of the second master depends upon the following parameters:

- CPU cycle time of the two DP masters
- Bus circulation period of the affiliated DP masters
- T_{copy} = copying duration within the DP-DP coupler
- N = number of data bytes to be copied (input and output)

The copying duration of the DP/DP coupler is independent of the data transfer rates used. The following applies:

$$T_{\text{copy}} = 84 \mu\text{s} + (12 \mu\text{s} * N)$$

The following applies to applications for which time is critical:

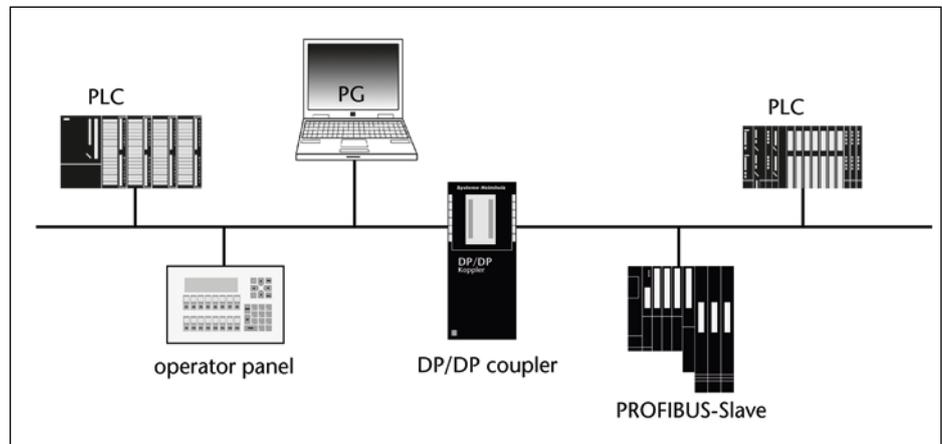
- Exchange as little data as possible via the DP/DP coupler.
- Do not request diagnostic data from the DP master.
- Do not use Global Control commands (FREEZE, SYNCH) for the DP/DP coupler, but instead define an own group as necessary.
- Use high data transfer rate (12 MBd).

!
For low data rates you can generally neglect the copying duration

4 Project planning

The DP/DP coupler has the task of connecting two PROFIBUS DP networks with one another. This makes it possible to exchange data between the masters of the connected networks.

The data is exchanged in packages. Such data packages can be up to 244 bytes in size.

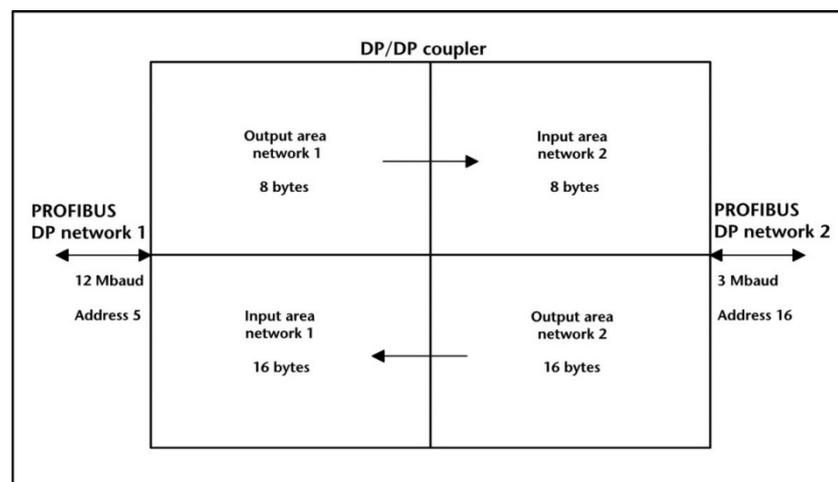


An appropriate project planning tool is required for project planning of the DP/DP coupler, for example, STEP 7. The length of the input and output data is set with the project planning tool. The input and output areas are entered in STEP 7 as plug points with codes.

Example

The two networks connected by the DP/DP coupler are independent of one another. For this reason, the DP/DP coupler in each network is assigned its own address. If the baud rates in both networks differ, this affects the data exchange between the networks.

The coupling principle is shown in the following illustration:



!
Please make sure that input and output areas of both networks are harmonized.

In this example, the DP/DP coupler in network 1 has the address 5 and the address 16 in network 2. Network 1 works with a baud rate of 12 MBd, while network 2 works with 3 MBd.

Network 1 fills the output buffer much more slowly than it is read from network 2. Network 2 thus reads the same data several times consecutively. The opposite is the case in the other direction: Network 2 overwrites the output buffer several times before network 1 reads out its input buffer. Network 1 thus receives only the most recently written data.

4.1 Set DIL switches

For the project planning of the DP/DP coupler you must

- set the DIL switch "PS"
- set the DIL switch "DIA"
- set the DIL switch "ADDR"
- set the PROFIBUS address at the DIL switch.

4.1.1 Set the DIL switch "PS"

With the "PS" switch you inform the DP/DP coupler of the connections to which the power supply is connected. This way you can later use the diagnostics to determine whether a power supply has failed.

This means:

- PS (DP1) to "ON": L1+/M1 (PS1) is connected to DC 24 V
- PS (DP2) to "ON": L2+/M2 (PS2) is connected to DC 24 V

!
Changes to the settings on the "PS" switch take effect immediately.

!
Changes to the settings on the "DIA" switch take effect immediately.

4.1.2 Set DIL switch "DIA"

With the DIL switch "DIA", you can evaluate the validity of the data within the input and output data.

The DP/DP coupler carries out the data exchange between two DP networks. When one of the DP masters is not active or doesn't occur due to a line malfunction, the other DP master must detect that the data transmitted via the DP/DP coupler is invalid.

The validity can be evaluated either via the slave diagnostics, when "DIA" is switched on, or directly within the input and output data.

"DIA" switch setting	Meaning
"ON"	Input and output data are checked for validity
"OFF"	Input and output data are not checked for validity

The first bit in the LSB byte of the first configured input byte is used for this purpose:

Bit 1 (LSB inputs) = 1: Data from the DP/DP coupler are valid

Bit 1 (LSB inputs) = 0: Data from the DP/DP coupler are invalid

Example

Network 1: 8 bytes of input data - 16 bytes of output data

Network 2: 16 bytes of input data - 8 bytes of output data

The first bit of the 8 bytes of input data displays the validity of the data from network 2; the first bit of the 16 bytes of input data displays the validity of the data from network 1.

When "DIA" is set to "ON", the first bit in the LSB byte of the first configured input byte is not used for normal input data.

When using the data validity display, we recommend excluding the first byte of the input data from use for inputs.

4.1.3 Set the DIL switch "ADDR"

With the "ADDR" switch, you define whether the PROFIBUS address of the DP/DP coupler is set directly on the device or is assigned via a project planning tool.

"ADDR" switch setting	Meaning
"ON"	PROFIBUS address is assigned via a project planning tool (see Section 4.2)
"OFF"	PROFIBUS address is set at the DIL switch on the DP/DP coupler

This decision can also be different for each of the two networks, so that, for example, the address on the one network is set with the DIL switch and with the project planning tool in the other network.

Set the PROFIBUS address at the DIL switch

Each bus participant requires a PROFIBUS address, which exists only once in the network, for clear identification. The DP/DP coupler requires its own address for each of the two networks. The address of the DP/DP coupler can be set independently for each network, either via the DIL switches or directly on the DP/DP coupler.

The PROFIBUS address must be located in the range from 1 ... 125.

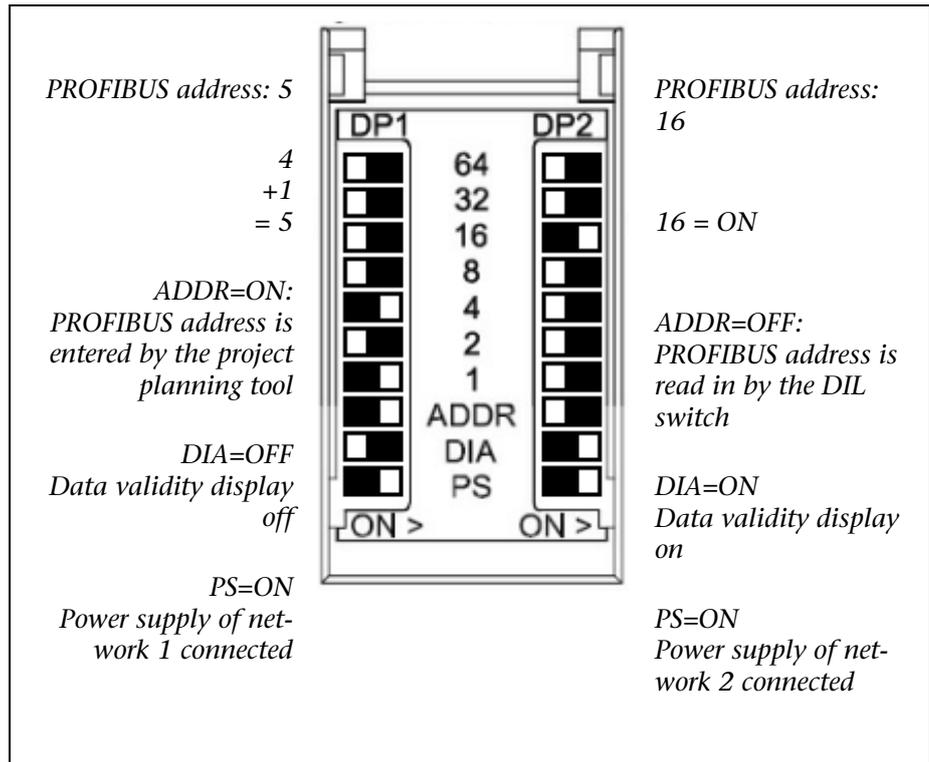
!
In order to set the address via the DIL switches, you require a small screwdriver with a blade width of approx. 3 mm.

Proceed as follows:

- Switch off the 24 V power supply(supplies) for the DP/DP coupler.
- Fold up the transparent protective flap on the housing front.
- Set the desired PROFIBUS address with the screwdriver. The PROFIBUS address is the total of the values of all switches found in the "ON" position (right position).
- Set the "ADDR" switch to "OFF" (outward position). This results in the PROFIBUS address being read out by the DIL switches and not from the memory of the DP/DP coupler.
- Switch the power supply for the DP/DP coupler on again. The DP/DP coupler now takes on the address you have set per DIL switch.

Example:

!
Changes to the settings of the "ADDR" DIL switches first take effect after the entire 24 V power supply is switched on and off again.



4.2 Project planning using project planning tool



Please make sure that input and output areas of both networks are harmonized!

If you wish to carry out project planning for the DP/DP coupler with STEP 7, you require the GSD file SI018070.GSxx. Incorporate the GSD file into your project planning tool. This GSD file is contained in STEP 7 as of version 5.3.

This GSD file (SI018070.GSxx) can be downloaded for free under the address

<http://support.automation.siemens.com/WW/view/de/113602> with the designation 'DP/DP Koppler_Rel2.zip'.

The DP/DP coupler must be planned as a project in both DP networks in their own respective master systems.

Proceed as follows when using STEP 7:

1. Start STEP 7 and open "HW config".
2. Drag the DP/DP coupler from the hardware catalog in the "PROFIBUS-DP\Other field\Gateway\DP/DP coupler, version number 2" directory.
The properties dialogue for the PROFIBUS interface of the DP/DP coupler is displayed.
3. Switch the PROFIBUS address for the DP/DP coupler on.
The PROFIBUS address must agree with the PROFIBUS address set on the DP/DP coupler. Confirm with "OK."
The DP/DP coupler is inserted into the master system.

4. Plan the plug points of the DP/DP coupler:
Starting with plug point 1, enter the corresponding DP codes for the input or output data. If you have mixed input and output data, use a universal module as the DP code.
5. Enter an input and/or an output address for each plug point.
6. Confirm the entries with OK. The project planning for one side of the DP/DP coupler is thus completed.

Repeat steps 2-6 for the second PROFIBUS DP system to which the DP/DP coupler is connected.

Please note: *Inputs of network 1 are outputs of network 2, outputs of network 1 are inputs of network 2!*

Only for project planning of both sides of the DP/DP coupler: *If, when project planning, the plug points don't harmonize (inputs/outputs are not planned precisely mirror-inverted), the DP/DP coupler reports a configuration error to both network 1 and network 2.*

Set PROFIBUS address via STEP 7

In order to set the PROFIBUS address of the DP/DP coupler via STEP 7, the DP/DP coupler must already be planned with STEP 7.

Permitted PROFIBUS addresses: 1 to 125

Proceed as follows:

1. Set the DIL switch "ADDR" to the "ON" position (middle).
This results in the PROFIBUS address of the DP/DP coupler being read out from the non-volatile memory of the DP/DP coupler.
2. Switch on the 24 V power supply(supplies) for the DP/DP coupler. The LED(s) ON1 and/or ON2 must light up.
3. Connect PG/PC with a PG cable to the DP network or to the DP/DP coupler.
4. Open STEP 7 "HW config" and plan the DP/DP coupler.
5. Activate the planned DP/DP coupler in "HW config".
6. Go to "Target system > PROFIBUS > Assign PROFIBUS address". The "PROFIBUS address" appears.
7. Enter the planned PROFIBUS address and confirm with OK.
The indicated PROFIBUS address is transmitted to the DP/DP coupler and entered in the non-volatile memory of the DP/DP coupler.

Set properties of the DP/DP coupler via STEP 7

You can set the following properties in the dialogue "Properties – DP slave" in the "Parameterize" tab:

- DP alarm mode: DPV0 or DPV1 slave
- Allow external diagnosis

DP alarm mode

The DP/DP coupler can only be operated in combination with a DPV1 master as DPV1 slave. This is because only then can the additional functions (non-cyclical services) of a DPV1 slave be used.

In the case of DP slaves that are specified via their GSD file, the operating mode DPV1 or DPV0 can be selected in a drop-down list box.

External diagnostics

The "Expanded diagnostics bit on" is planned for the current operation. When the DP/DP coupler on network 1 reports a diagnostics event (e.g. bus connection plug on network 1 pulled), then the OB 82 is processed. The LED SF2 also lights up. "Module disrupted" is entered in the diagnostics buffer of the CPU.

The "Expanded diagnostics bit off" setting is planned for the commissioning of the system. When the DP/DP coupler on network 1 reports a diagnostics event (e.g. bus connection plug in network 1 pulled), then the OB 82 is also processed. However, the LED SF2 doesn't light up and nothing is entered in the diagnostics buffer of the CPU.

- Upon conclusion of the commissioning, set the diagnostics back to "Expanded diagnostics bit on".

Example of project planning of the inputs/outputs of the DP/DP coupler with STEP 7

Network 1: The DP/DP coupler has the address 3

The following data should be transmitted to the DP master in network 2:

- 1 byte outputs
- 2 bytes inputs
- 4 bytes outputs (consistent)
- 8 bytes inputs (consistent)
- 10 bytes inputs / 12 bytes outputs

Network 2: The DP/DP coupler has the address 16

The following data should be transmitted to the DP master in network 2:

- 1 byte inputs
- 2 bytes outputs
- 4 bytes inputs (consistent)
- 8 bytes outputs (consistent)
- 12 bytes inputs / 10 bytes outputs

Project planning of the DP/DP coupler in network 1 with STEP7:

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	8D0	1 Byte Output		0	
2	16D1	2 Bytes Input	0...1		
3	163	4 Bytes Output consistent		256...259	
4	151	8 Bytes Input consistent	256...263		
5	192	Universal module	2...11	1...12	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Project planning of the DP/DP coupler in network 2 with STEP7:

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	8D1	1 Byte Input	0		
2	16D0	2 Bytes Output		0...1	
3	147	4 Bytes Input consistent	256...259		
4	167	8 Bytes Output consistent		256...263	
5	192	Universal module	1...12	2...11	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

4.2.1 Plan a DP/DP coupler with a different project planning tool

Use the GSD file to plan the DP/DP coupler with a different project planning tool (e.g. COM PROFIBUS). This GSD file (SIO18070.GSxx) can be downloaded for free under the address <http://support.automation.siemens.com/WW/view/de/113602> with the designation 'DP/DP Koppler_Rel2.zip'.

Plan the DP/DP coupler with your project planning tool like any other DP slave on the PROFIBUS DP.

To this purpose, download the complete GSD file for the DP/DP coupler in your project planning tool.

The length of the parameterization frame is 15 bytes. You can find instructions on the parameterization frame under the following Internet address:

<http://support.automation.siemens.com/>

4.3 Commissioning the DP/DP coupler

- Before you commission the DP/DP coupler, check whether the following prerequisites have been met:
 - DP/DP coupler is completely set up and wired
 - Both networks of the PROFIBUS DP completely set up and ready to operate
 - DP/DP coupler planned

Proceed as follows to commission the DP/DP coupler:

- Switch the power supply for the DP/DP coupler on.
- Load the project planning into the target system via Target system > Load into module.

4.4 Diagnostics

There are extensive diagnostic possibilities in the PROFIBUS DP. The slave diagnostics correspond to IEC 61784-1:2002 Ed1 CP 3/1. It can be queried at the DP slave by a DP master at any time and evaluated with a project planning tool, for example, STEP 7.

The setup of the slave diagnostics depends upon the DP master on which the DP/DP coupler is operated. The DP/DP coupler works with the DPV0 protocol, DPV1 protocol, S7 protocol, or in spare parts operation for the DP/DP coupler with the Siemens order number 6ES7 158-0AD00-0XA0.

The diagnostics blocks consist of several parts. The first 6 bytes and their meaning are defined by the standard. This is followed by one or more diagnostics block parts that can have a different format.

The diagnostics blocks in the DPV1 or S7 protocol are 26 bytes long:

Diagnostics block	Block length	Starting address
Standard diagnostics	6 bytes	0
Reserved	11 bytes	6
Status message (device-related diagnostics)	9	17

The diagnostics blocks in the DPV0 protocol or in spare parts operation are 11 bytes long.

Diagnostics block	Block length	Starting address
Standard diagnostics	6 bytes	0
Status message (device-related diagnostics)	5 bytes	6

4.4.1 Standard diagnostics

The structure of the standard diagnosis (first 6 bytes) thus appears as follows:

Status 1	Status 2	Status 3	Address	Device code H	Device code L
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The three status bytes describe the momentary status of the DP/DP coupler.

Status byte 1:

Bit	Meaning, when "1"	Cause/remedy
0	DP/DP coupler cannot be addressed	Set correct PROFIBUS address Check bus connection plug for correct fit Check power supply at the DP/DP coupler
1	DP/DP coupler not ready for data exchange	Wait, DP/DP coupler starting up
2	Project planning data do not agree with the setup of the DP/DP coupler	Project planning of the I/O data of both networks do not agree
3	Device-related diagnostics to follow	Evaluate device-related diagnostics When all errors have been corrected, bit 3 is set to "0" with the following diagnostics message.
4	The requested function is not supported by the DP/DP coupler	Check project planning
5	Invalid response from DP/DP coupler	Check bus structure
6	Planned station type doesn't agree with DP/DP coupler	Indicate correct station type in project planning software
7	DP/DP coupler has been parameterized by another master	Evaluate PROFIBUS address in byte 4 (see below)

Status byte 2:

Bit	Meaning
0	"1"= DP/DP must be re-parameterized
1	"1"= diagnostics message present (static diagnostics); the DP/DP coupler can only continue to work following correction of the error.
2	Bit is always "1"
3	"1"= Watchdog switched on
4	"1"= "Freeze" command received
5	"1"= "Sync" command received
6	Bit is always "0"
7	Bit is always "0"

Status byte 3

The bits 0-7 of the status byte 3 are always "0"

The "Address" byte (byte 4 of the standard diagnostics) contains the PROFIBUS address of the DP master that parameterized the DP/DP coupler. This is the DP master that has reading and writing access to the DP/DP coupler.

The device code (bytes 5 and 6 of the standard diagnostics) indicates the type of the DP slave in encoded form:

Device code H	Device code L	Type of DP slave
80 _H	70 _H	DP/DP coupler

The bytes 7 to 17 are reserved.

4.4.2 Status message

The status message contains detailed information about the momentary status of the DP/DP coupler. It encompasses 9 bytes, starting with the 18th byte of the diagnostics block and ends with the 26th byte. The structure of the status message depends upon the protocol under which the DP/DP coupler is working.

Status message (device-related diagnostics) in the DPV1 or S7 protocol

Byte 18	0	0	0	0	1	0	0	1
	"00" for "device-related diagnostics"		Number of diagnostics bytes incl. byte 18, here: 9					
Byte 19	81 _H							
	Status type: Status message							
Byte 20	Not relevant							
Byte 21	Not relevant							
Byte 22	00 _H = data invalid 01 _H = data valid							
Byte 23	Number of inputs (in bytes) of the respective other DP side							
Byte 24	Number of outputs (in bytes) of the respective other DP side							

Byte 25 Bit	7	6	5	4	3	2	1	0
	Reserved							
	"1" = CPU on the other DP network has issued CLEAR (outputs set to "0")							
	"1" = other side has changed to the UN-FREEZE status							
	"1" = other side has changed to the FREEZE status							
	"1" = other side has changed to the UNSYNC status							
Reserved								

Byte 26	7	6	5	4	3	2	1	0
	0	0	0	0	0	0	"1" = power supply PS1 on the DP/DP coupler has failed (only relevant when DIL switch "PS" (DP1) set to ON)	
								"1" = power supply PS2 on the DP/DP coupler has failed (only relevant when DIL switch "PS" (DP2) set to ON)

Status message (device-related diagnostics) in the DPV0 protocol or spare parts operation

Byte 7	0	0	0	0	0	1	0	1
	"00" for "device-related diagnostics"			Number of diagnostics bytes incl. byte 7, here: 5				
Byte 8	00 _H = data invalid 01 _H = data valid							
Byte 9	Number of inputs (in bytes) of the respective other DP side							
Byte 10	Number of outputs (in bytes) of the respective other DP side							
Byte 11 Bit	7	6	5	4	3	2	1	0
	Reserved							
	"1": CPU on the other DP network has issued CLEAR (outputs set to "0")							
	"1": other side has changed to the UNFREEZE status							
	"1"= other side has changed to the FREEZE status							
"1"= other side has changed to the UNSYNC status								
"1"= other side has changed to the SYNC status								
Reserved								

5 Appendix

5.1 Technical specifications

Order number	700-158-0AD02
Dimensions	40 x 127 x 117 mm (LxWxH)
Weight	Approx. 250 g
Power supply	
Supply rated voltage	DC 24 V (20.4 V ... 28.8 V)
Reverse polarity protection	yes
Power outage bridging	min. 5 ms
Potential isolation of the 24 V power supply	
▪ to PROFIBUS DP	yes
▪ to one another	yes
Special features	
Transmission speed:	9.6; 19.2; 45.45; 93.75; 187.5; 500 kBd; 1.5; 3; 6; 12 MBd
Bus protocol	PROFIBUS DP
Message length I/O data	max. 244 bytes inputs/ 244 bytes outputs
Length of diagnostics frame	max. 26 bytes
Length of parameterization frame	max. 15 bytes
suitable for system change during running operations	no
Status, alarms, diagnostics	
Status indicator	no
Alarms	no
Diagnostics function	yes
▪ General error PROFIBUS DP network 1	red LED "GE1"
▪ General error PROFIBUS DP network 2	red LED "GE 2"
▪ Bus error PROFIBUS DP network 1	red LED "BE1"
▪ Bus error PROFIBUS DP network 2	red LED "BE 2"
▪ Monitoring of 24 V power supply of network 1	green LED "ON 1"
▪ Monitoring of 24 V power supply of network 2	green LED "ON 2"

5.2 Accessories and order numbers

Components	Order number
<p>Mounting rail for the S7 setup technology</p> <ul style="list-style-type: none"> ▪ 160 mm ▪ 320 mm ▪ 482 mm ▪ 530 mm ▪ 830 mm ▪ 2000 mm 	<p>700-390-1AB60</p> <p>700-390-1SO01</p> <p>700-390-1AE80</p> <p>700-390-1AF30</p> <p>700-390-1AJ30</p> <p>700-390-1BC00</p>
<p>PROFIBUS connector for further grinding of PROFIBUS DP</p> <ul style="list-style-type: none"> ▪ PROFIBUS connector, 90° without PG connection socket, screw terminal ▪ PROFIBUS connector, 90° with PG connection socket, screw terminal ▪ PROFIBUS connector, 90° EasyConnect® for rigid/flexible cable, without PG socket ▪ PROFIBUS connector, 90° EasyConnect® for rigid/flexible cable, with PG socket 	<p>700-972-0BA12</p> <p>700-972-0BB12</p> <p>700-972-0BA50</p> <p>700-972-0BB50</p>

Notes