SEW EURODRIVE

MOVIDRIVE® MDX61B Fieldbus Interface
DFP21B PROFIBUS DP (12 MBaud)

Edition

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Manual

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SEW
EURODRIVE

SEW-EURODRIVE

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1 Important Notes

- **This manual does not replace the detailed operating instructions!**
- **Only electrical specialists are allowed to perform installation and startup observing relevant accident prevention regulations and the MOVIDRIVE® MDX60B/61B operating instructions!**

Documentation

- Read through this manual carefully before you start installation and startup of MOVIDRIVE® drive inverters with the DFP21B PROFIBUS option card.
- This manual assumes that the user has access to and is familiar with the MOVIDRIVE® documentation, in particular the MOVIDRIVE ®MDX60B/61B system manual.
- In this manual, cross references are marked with "→". For example, (→ Sec. X.X) means: Further information can be found in section X.X of this manual.
- A requirement of fault-free operation and fulfillment of any rights to claim under guarantee is that you observe the information in the documentation.

Bus systems

General safety notes on bus systems:

This communication system allows you to adjust the MOVIDRIVE® drive inverter to your specific application very accurately. As with all bus systems, there is a danger of invisible, external (as far as the inverter is concerned) modifications to the parameters which give rise to changes in the inverter's behavior. This may result in unexpected (not uncontrolled) system behavior.

Safety and warning notes

Always observe the safety and warning instructions contained in this publication!

Electrical hazard
Possible consequences: Severe or fatal injuries.

Hazard
Possible consequences: Severe or fatal injuries.

Hazardous situation
Possible consequences: Slight or minor injuries.

Harmful situation
Possible consequences: Damage to the unit and the environment.

Tips and useful information.

2 Introduction

Contents of this manual

This user manual describes how to install the PROFIBUS DFP21B option card in the MOVIDRIVE® MDX61B drive inverter and how to start up MOVIDRIVE® with the PROFIBUS fieldbus system.

Additional documentation

For information on how to connect MOVIDRIVE® easily and effectively to the PROFIBUS fieldbus system, in addition to this user manual about the PROFIBUS option, you should request the following publication about fieldbus technology:

- MOVIDRIVE® Fieldbus Unit Profile manual

The MOVIDRIVE® Fieldbus Unit Profile manual describes the fieldbus parameters and their coding, as well as explaining the whole range of control concepts and application options in the form of brief examples.

The MOVIDRIVE® Fieldbus Unit Profile manual contains a list of all parameters of the drive inverter which can be read or written via the various communication interfaces, such as System bus, RS-485 and also via the fieldbus interface.

Features

The MOVIDRIVE® MDX61B drive inverter enables you to use the DFP21B option to connect to higher-level programmable controllers via PROFIBUS thanks to its powerful, universal fieldbus interface.

MOVIDRIVE® and PROFIBUS

The unit behavior of the inverter which forms the basis of PROFIBUS operation is referred to as the unit profile. It is independent of any particular fieldbus and is therefore a uniform feature. This provides you, the user, with the opportunity of developing applications regardless of the fieldbus. This makes it much easier to change to other bus systems, such as INTERBUS (option DFI).

Access to all information

MOVIDRIVE® MDX61B offers digital access to all drive parameters and functions via the PROFIBUS interface. The drive inverter is controlled via the high-speed, cyclical process data. Via this process data channel, you have the opportunity of entering setpoints such as the setpoint speed, ramp generator time for acceleration/deceleration, etc. as well as triggering various drive functions such as enable, control inhibit, normal stop, rapid stop, etc. However, at the same time you can also use this channel to read back actual values from the drive inverter, such as the actual speed, current, unit status, fault number and reference signals.

Cyclical and acyclical data exchange via PROFIBUS DPV0 (version 0)

While process data exchange usually takes place cyclically, drive parameters can be read or written acyclically via functions such as READ or WRITE or via the MOVILINK® parameter channel. This parameter data exchange enables you to implement applications in which all the important drive parameters are stored in the master programmable controller, so that there is no need to make manual parameter settings on the drive inverter itself.

Cyclical and acyclical data exchange via PROFIBUS DPV1 (version 1)

The PROFIBUS-DPV1 specification introduced new acyclical read/write services within the context of the PROFIBUS-DP expansions. These acyclical services are inserted into special telegrams during ongoing cyclical bus operation and thus ensure compatibility between PROFIBUS-DP (version 0) and PROFIBUS-DP**V1** (**V**ersion **1**).

Configuring the PROFIBUS option card

Generally, the PROFIBUS option card has been designed so that all fieldbus-specific settings, such as the station address and the default bus parameter can be made using the hardware switch on the option card. This manual setting means the drive inverter can be integrated into the PROFIBUS environment and switched on within a very short period of time. The parameter setting process can be performed in a completely automated process by the PROFIBUS master (parameter download). This forward-looking variant shortens the system startup time and simplifies the documentation of your application program, because all the important drive parameters can now be stored directly in your control program.

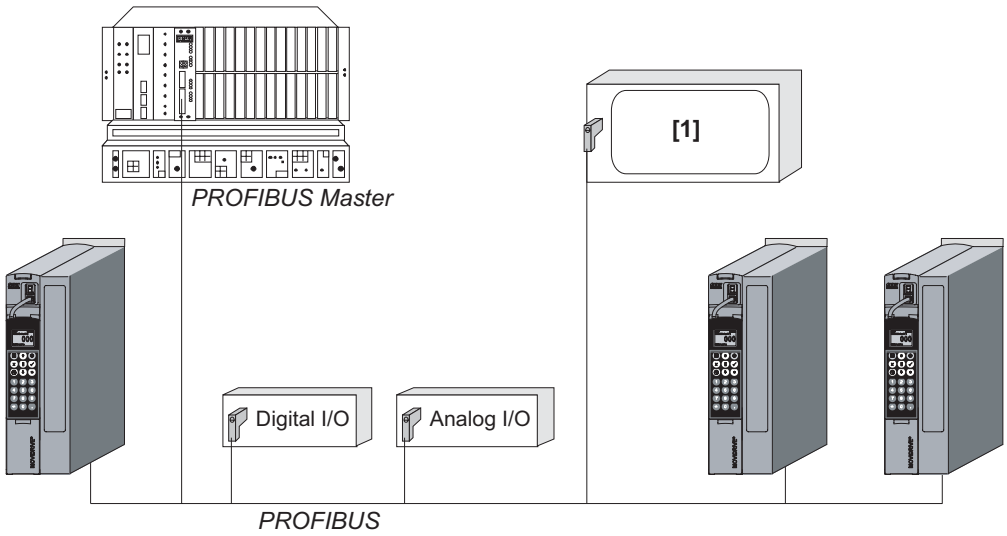


Figure 1: PROFIBUS with MOVIDRIVE® ([1] = visualization)

Monitoring functions

Using a fieldbus system demands additional monitoring functions in the drive engineering, for example, time monitoring of the fieldbus (fieldbus timeout) or rapid stop concepts. You can, for example, adapt the monitoring functions of MOVIDRIVE® specifically to your application. You can determine, for instance, which of the drive inverter's fault responses should be triggered in the event of a bus error. A rapid stop is a good idea for many applications, although this can also be achieved by 'freezing' the last setpoints so the drive continues operating with the most recently valid setpoints (for example, conveyor belt). As the range of functions of the control terminals is also assured in fieldbus mode, you can continue to implement rapid stop concepts, regardless of the fieldbus, using the terminals of the drive inverter.

Diagnostics

The MOVIDRIVE® drive inverter offers you numerous diagnostic options for startup and service. For example, you can use the integrated fieldbus monitor to check both the setpoints sent by the master control and the actual values.

Fieldbus monitor

Furthermore, you are supplied with a variety of additional information about the status of the fieldbus option card. The fieldbus monitor function in conjunction with the MOVITOOLS® PC software offers you an easy-to-use diagnostic tool allowing all drive parameters to be set (including the fieldbus parameters) as well as displaying the fieldbus and device status information in detail.

3 Assembly / Installation Notes

3.1 Installing the DFP21B option card

Only SEW-EURODRIVE engineers can install or remove option cards for MOVIDRIVE® MDX61B size 0.

- **Option cards can only be installed and removed for MOVIDRIVE® MDX61B sizes 1 to 6.**

Before you begin

The DFP21B option card must be plugged into the fieldbus slot.

Observe the following notes before installing or removing an option card:

- De-energize the inverter. Switch off the 24 V_{DC} and the supply voltage.
- Take appropriate measures to protect the option card from electrostatic charge (use discharge strap, conductive shoes, etc.) before touching it.
- **Before installing** the option card, remove the keypad and the front cover.
- **After installing** the option card, replace the front cover and the keypad.
- Keep the option card in its original packaging. Do not remove the option card from the packaging until immediatley before you are ready to install it.
- Hold the option card by its edges only. Do not touch any components.

Installing and removing the option card

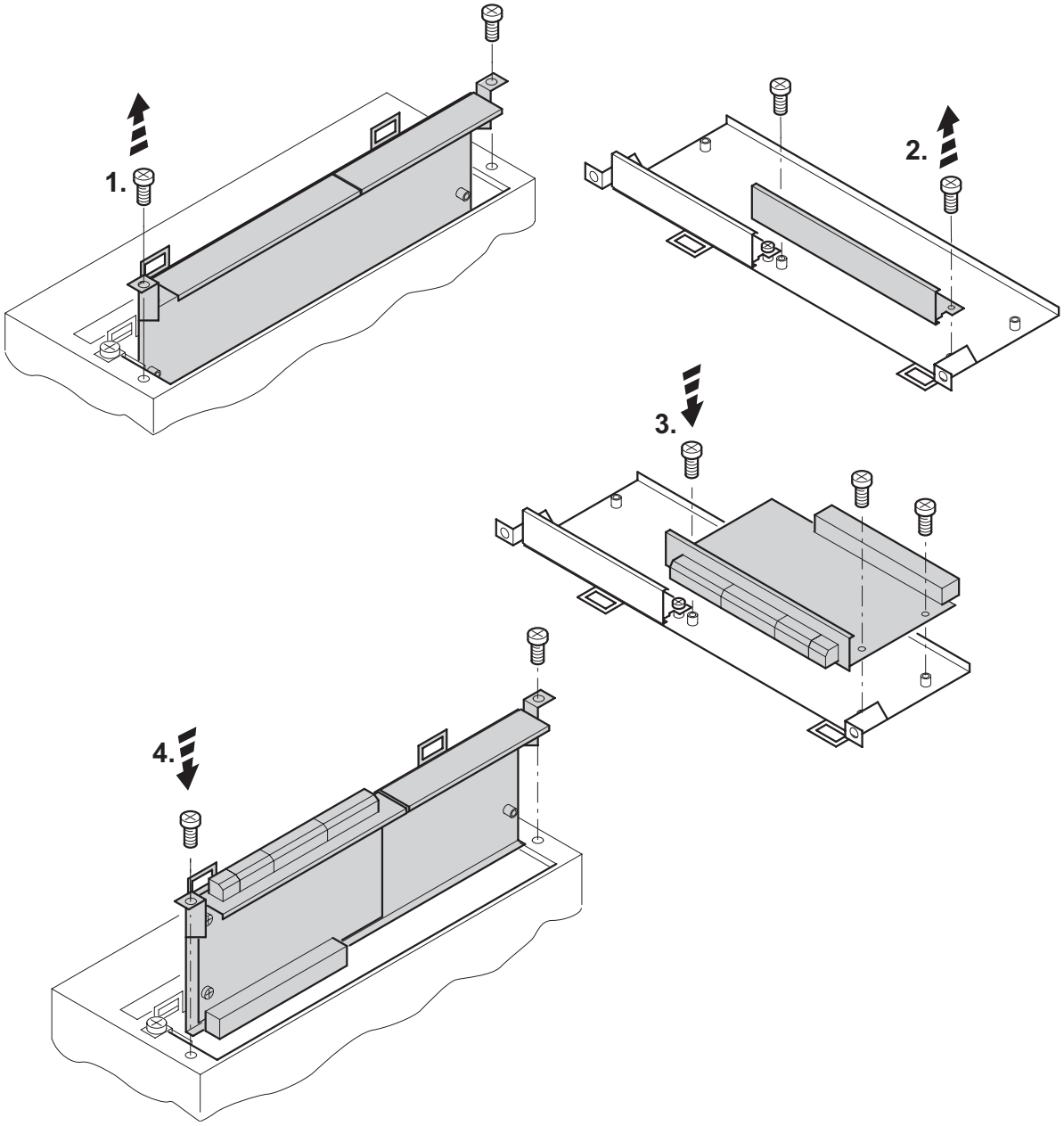


Figure 2: Installing an option card in MOVIDRIVE® MDX61B sizes 1 to 6

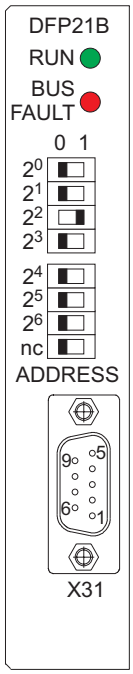
1. Remove the two retaining screws holding the card retaining bracket. Evenly pull the card retaining bracket out from the slot (do not twist!).
2. Remove the two retaining screws of the black cover plate on the card retaining bracket. Remove the black cover plate.
3. Position the option card onto the retaining bracket so that the three retaining screws fit into the corresponding holes on the card retaining bracket.
4. Insert the retaining bracket with installed option card into the slot, pressing slightly so it is seated properly. Secure the card retaining bracket with the two retaining screws.
5. To remove the option card, follow the instructions in reverse order.

3.2 Connection and terminal description of the DFP21B option

Part number PROFIBUS interface type DFP21B option: 824 240 2

The "PROFIBUS interface type DFP21B" option is only possible in conjunction with MOVIDRIVE® MDX61B, not with MDX60B.

The DFP21B option must be plugged into the fieldbus slot.

Front view of DFP21B	Description	DIP switch Terminal	Function
 06226AXX	**RUN: PROFIBUS operation LED (green)** **BUS FAULT: PROFIBUS error LED (red)**		Indicates that the bus electronics are operating correctly. Indicates PROFIBUS-DP error.
	ADDRESS: DIP switch for setting the PROFIBUS station address	**2^0** **2^1** **2^2** **2^3** **2^4** **2^5** **2^6** **nc**	Significance: 1 Significance: 2 Significance: 4 Significance: 8 Significance: 16 Significance: 32 Significance: 64 Reserved
	X31: PROFIBUS connection	**X31:1** **X31:2** **X31:3** **X31:4** **X31:5** **X31:6** **X31:7** **X31:8** **X31:9**	N.C. N.C. RxD/TxD-P CNTR-P DGND (M5V) VP (P5V/100 mA) N.C. RxD/TxD-N DGND (M5V)

3.3 Pin assignment

Connection to the PROFIBUS network using a 9-pin sub D plug according to IEC 61158. The T-bus connection must be made using a plug with the corresponding configuration.

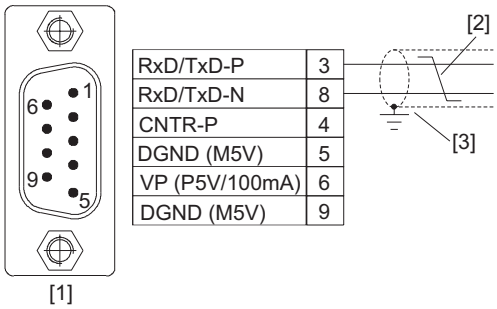


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Figure 3: Assignment of 9-pin sub D plug to IEC 61158

[1] 9-pin sub D connector

[2] Signal cable, twisted

[3] Conductive, wide area connection is necessary between the plug housing and the shield

MOVIDRIVE® / PROFIBUS connection

As a rule, the DFP21B option is connected to the PROFIBUS system using a shielded twisted-pair cable. Observe the maximum supported transmission rate when selecting the bus connector.

The twisted-pair cable is connected to the PROFIBUS connector using pin 3 (RxD/TxD-P) and pin 8 (RxD/TxD-N). Communication takes place via these two contacts. The RS-485 signals RxD/TxD-P and RxD/TxD-N must be connected to the same contacts in all PROFIBUS stations. Otherwise, communication is not possible via the bus medium.

The PROFIBUS interface sends a TTL control signal for a repeater or fiber optic adapter (reference = pin 9) via pin 4 (CNTR-P).

Baud rates greater than 1.5 MBaud

The DFP21B option with baud rates > 1.5 MBaud can only be operated with special 12 MBaud profibus connectors.

3.4 Shielding and routing bus cables

The PROFIBUS interface supports RS-485 transmission technology and requires the cable type A to IEC 61158 specified as the physical medium for PROFIBUS. This cable must be a shielded, twisted-pair cable.

Correct shielding of the bus cable attenuates electrical interference that may occur in industrial environments. The following measures ensure the best possible shielding:

- Tighten the mounting screws on the connectors, modules and equipotential bonding conductors by hand.
- Only use connectors with a metal housing or a metallized housing.
- Connect the shielding in the connector with the greatest possible surface area.
- Attach the shielding of the bus line on both sides.
- Do not route signal and bus cables parallel to power cables (motor leads). They must be routed in separate cable ducts.
- Use metallic, grounded cable racks in industrial environments.
- Route the signal cable and the corresponding equipotential bonding in close proximity using the shortest way possible.
- Avoid using plug connectors to extend bus cables.
- Route the bus cables closely along existing grounding surfaces.

In case of fluctuations in the earth potential, a compensating current may flow via the bilaterally connected shield that is also connected to the protective earth (PE). Make sure you supply adequate equipotential bonding according to relevant VDE regulations in such a case.

3.5 Bus termination

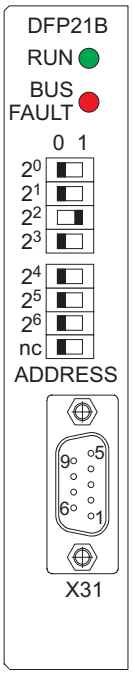
The DFP21B option is not provided with bus terminating resistors. This enables the bus system to be put into operation more easily and reduces the number of error sources.

Use a plug with an integrated bus terminating resistor if the DFP21B option is at the beginning or end of a PROFIBUS segment and only one PROFIBUS cable leads to the DFP21B.

Switch on the bus terminating resistors on this PROFIBUS plug.

3.6 Setting the station address

The PROFIBUS station address is set using DIP switches 2^0 to 2^6 on the option card. MOVIDRIVE® supports the address range 0 to 125.



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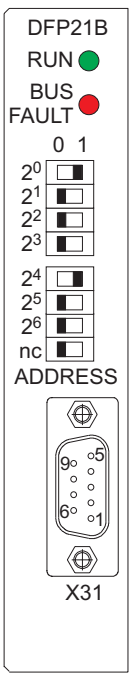
The default setting for the PROFIBUS station address is 4:

$2^0 \rightarrow$ Significance: $1 \times 0 = 0$
$2^1 \rightarrow$ Significance: $2 \times 0 = 0$
$2^2 \rightarrow$ Significance: $4 \times 1 = 4$
$2^3 \rightarrow$ Significance: $8 \times 0 = 0$
$2^4 \rightarrow$ Significance: $16 \times 0 = 0$
$2^5 \rightarrow$ Significance: $32 \times 0 = 0$
$2^6 \rightarrow$ Significance: $64 \times 0 = 0$

Any change made to the PROFIBUS station address during ongoing operation does not take effect immediately. The change only comes into effect when the inverter is switched on again (power supply + 24 V OFF/ON). The inverter displays the current station address in fieldbus monitor parameter P092 "Fieldbus address" (display with DBG60B or MOVITOOLS®/SHELL).



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Example: Setting the PROFIBUS station address 17

$2^0 \rightarrow$ Significance: $1 \times 1 = 1$
$2^1 \rightarrow$ Significance: $2 \times 0 = 0$
$2^2 \rightarrow$ Significance: $4 \times 0 = 0$
$2^3 \rightarrow$ Significance: $8 \times 0 = 0$
$2^4 \rightarrow$ Significance: $16 \times 1 = 16$
$2^5 \rightarrow$ Significance: $32 \times 0 = 0$
$2^6 \rightarrow$ Significance: $64 \times 0 = 0$

3.7 Operating mode displays: option DFP21B

PROFIBUS LEDs The PROFIBUS interface DFP21B option card has two LEDs that indicate the current status of the DFP21B option and the PROFIBUS system.

LED RUN (green)

- The **RUN** LED (green) indicates that the bus electronics are operating correctly

RUN	Fault cause	Fault repair
On	• PROFIBUS hardware OK.	-
Off	• Hardware defect in the bus electronics.	• Switch MOVIDRIVE® on again. Contact SEW service if the error occurs again.
Flashes	• PROFIBUS address is set higher than 125.	• Use parameter *P093 Fieldbus Address* to check the address set with the DIP switches

LED BUS FAULT (red)

- The **BUS FAULT** LED (red) indicates a PROFIBUS-DP fault.

BUS FAULT	Fault cause	Fault repair
On	• Connection to the DP master has failed • Unit does not detect PROFIBUS baud rate. • Possible bus interruption. • DP master not in operation	• Check the PROFIBUS-DP connection on the unit. • Check the project planning of the DP master. • Check all cables in your PROFIBUS-DP network.
Off	• Unit is currently exchanging data with the DP master (data exchange).	-
Flashes	• Unit has detected the baud rate, however it is not being addressed by the DP master. • Unit was not configured in DP master or configured incorrectly.	• Check the PROFIBUS address setting on the DFP21B and in the project planning software of the DP master. • Check the project planning of the DP master. • Use the GSD file **SEWA_6003.GSD** with the identifier *MOVIDRIVE-DFP21B* for project planning.

3.8 GSD files

Current versions of the GSD files for the DFP21B option are available on the SEW homepage (http://www.sew-eurodrive.de) under the heading "Software". Both GSD files can be used at the same time in one STEP7 project. Once you have downloaded and unpacked the software, two directories for the operating modes PROFIBUS DP and PROFIBUS DP-V1 are displayed.

GSD file for PROFIBUS DP

Use the **GSD file SEW_6003.GSD** from the "DP" directory if you want to use the standard PROFIBUS-DP communication to control the drive inverter. This GSD file corresponds to the GSD revision 1 and must be copied to a special directory of your project planning software. Refer to the manuals for the appropriate project planning software for details on the procedure.

The unit master data files standardized by the PROFIBUS user group can be read by all PROFIBUS DP masters.

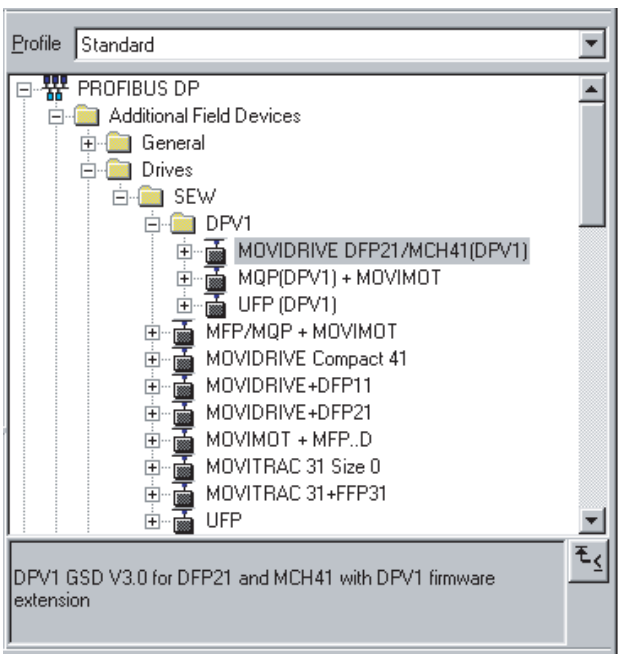
Project planning tool	DP master	File name
All DP project planning tools to EN 50170 (V2)	For DP master standard	SEW_6003.GSD
Siemens S7 hardware configuration	For all S7 DP masters	
Siemens S5 COM PROFIBUS	For IM 308C etc.	

GSD file for PROFIBUS-DPV1

Use the **GSD file SEWA6003.GSD** from the "DP-V1" if you want to use the parameter setting options of DP-V1 in addition to the standard PROFIBUS DP communication to control the drive inverter.

This GSD file corresponds to GSD revision 3. If you use older, non-DP-V1-capable PROFIBUS options, a connection is not established between the DP-V1 master and DFP21B. In this case, the "Bus Fault" LED of DFP21B remains switched on after the DP-V1 master has started. The DP V1 master will indicate that connection cannot be established.

So that the GSD files are easy to identify, they are assigned the name for PROFIBUS-DP-V1 and displayed in a special subdirectory in the project planning software for the DP-V1 master → following screen shot).



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Validity of the GSD file for DFP21B

PROFIBUS option DFP21B 074 Firmware option 1:	SEW_6003.GSD for DP	SEWA6003.GSD for DP-V1
824,399 9.10 and higher	ok	ok

Entries in the GSD file must not be changed or expanded. SEW assumes no liability for inverter malfunctions caused by a modified GSD file!

4 Project Planning and Startup

This section provides you with infromation on project planning for the DP master and startup of the drive inverter for fieldbus operation.

4.1 Project planning for the DP master

A GSD file is provided for project planning for the DP master. This file must be copied into a special folder for your project planning software.

Refer to the manuals for the appropriate project planning software for details on the procedure.

Project planning procedure

Proceed as follows for project planning for MOVIDRIVE® with PROFIBUS-DP interface:

1. Read the *README_GSD6003.PDF* file that you received with the GSD file to obtain further up-to-date information on project planning.
2. Install (copy) the GSD file according to the requirements of your project planning software. Once the file has been installed correctly, the device appears next to the slave stations with the designation *MOVIDRIVE+DFP21*.
3. Add the interface module under the name *MOVIDRIVE+DFP21* to the PROFIBUS structure and assign the station address.
4. Select the process data configuration required for your application (see also the chapter "DP Confiugration").
5. Enter the I/O or peripheral addresses for the configured data widths.

After project planning you can start PROFIBUS-DP. The red *"BUS-FAULT"* LED indicates the status of the project planning (OFF = project planning OK).

DP configurations

The drive inverter must be given a specific DP configuration by the DP master to define the type and number of input and output data used for transmission. You have the option of:

- Controlling the drive using process data
- Reading and writing all drive parameters using the parameter channel
- Using a data exchange medium of your choice between IPOS plus® and the controllor.

MOVIDRIVE® drive inverters make it possible to have different DP configurations for exchanging data between the DP master and the inverter. The following table provides additional information about all possible DP configurations for the MOVIDRIVE® range. The "Process data configuration" column shows the name of the configuration. These texts also appear as a selection list in your project planning software for the DP master. The DP configurations column shows which configuration data is sent to the inverter when the PROFIBUS DP connection is being established.

Process data configuration	Meaning / notes	DP configurations	
		0	1
1 PD	MOVIDRIVE® control via 1 process data word	240_{dec}	-
2 PD	MOVIDRIVE® control via 2 process data words	241_{dec}	-
3 PD	MOVIDRIVE® control via 3 process data words	242_{dec}	-
6 PD	MOVIDRIVE® control via 6 process data words (PD4-PD6 can only be used with IPOSplus)	0_{dec}	245_{dec}
10 PD	MOVIDRIVE® control via 10 process data words (PD4-PD10 can only be used with IPOSplus)	0_{dec}	249_{dec}
Param +1 PD	MOVIDRIVE® control via 1 process data word Parameter setting using 8-byte parameter channel	243_{dec}	240_{dec}
Param +2 PD	MOVIDRIVE® control via 2 process data word Parameter setting using 8-byte parameter channel	243_{dec}	241_{dec}
Param +3 PD	MOVIDRIVE® control via 3 process data word Parameter setting using 8-byte parameter channel	243_{dec}	242_{dec}
Param +6 PD	MOVIDRIVE® control via 6 process data word Parameter setting using 8-byte parameter channel (PD4-PD10 can only be used with IPOS$^{plus®}$)	243_{dec}	245_{dec}
Param + 10 PD	MOVIDRIVE® control via 10 process data word Parameter setting using 8-byte parameter channel (PD4-PD10 can only be used with IPOS$^{plus®}$)	243_{dec}	249_{dec}

Universal DP configuration

If you select the "Universal Module" DP configuration (S7 HWConfig), you can structure the DP configuration individually, although the following conditions must be complied with.

Module 0 (DP identifier 0) defines the parameter channel of the inverter.

To ensure the parameter settings are made correctly, you must always transfer the parameter channel consistently for the entire length.

Length	Function
0	Parameter channel switched off
8 I/O bytes or 4 I/O words	Parameter channel is being used

Module 1 (DP identifier 1) defines the process data channel of the inverter.

In addition to the process data configurations predefined in the GSD file, you can also specify process data configurations with 4, 5, 7, 8 and 9 process data words. Note that the number of input and output words is always the same. If the lengths are different, data cannot be exchanged. In this case, the Bus Fault LED flashes; the parameter *P090 PD Configuration* indicates the configuration error with **0PD**.

Length	Function
2 I/O bytes or 1 I/O word	1 process data word
4 I/O bytes or 2 I/O words	2 process data words
6 I/O bytes or 3 I/O words	3 process data words
8 I/O bytes or 4 I/O words	4 process data words
10 I/O bytes or 5 I/O words	5 process data words
12 I/O bytes or 6 I/O words	6 process data words
14 I/O bytes or 7 I/O words	7 process data words
16 I/O bytes or 8 I/O words	8 process data words
18 I/O bytes or 9 I/O words	9 process data words
20 I/O bytes or 10 I/O words	10 process data words

The following figure shows the structure of the configuration data defined in EN 50170 (V2). This configuration data is transmitted to the drive inverter during the initial start of the DP master.

<table>
<tr><th>7 / MSB</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0 / LSB</th></tr>
<tr><td rowspan="4"></td><td rowspan="3"></td><td colspan="3"></td><td colspan="4">Data length
0000 = 1 byte/word
1111 = 16 bytes/words</td></tr>
<tr><td colspan="7">Input/output
00 = Special identifier formats
01 = input
10 = Output
11 = input/output</td></tr>
<tr><td colspan="7">Format
0 = byte structure
1 = word structure</td></tr>
<tr><td colspan="8">Integrity over
0 = byte or word
1 = entire length</td></tr>
</table>

Note:

MOVIDRIVE® does not support the "Special identifier formats" coding!

Use only the setting "Integrity over entire length" for data transmission!

Data consistency

Consistent data is data that has to be transmitted between the programmable controller and the drive inverter as one block at all times and must never be transmitted separately.

Data consistency is especially important for transmitting position values or complete positioning tasks. This is because data that is not transmitted consistently could be from different program cycles of the programmable controller, which would lead to undefined values being transmitted to the drive inverter.

For PROFIBUS DP, data communication between the programmable controller and drive engineering devices is usually carried out with the setting "Data integrity over entire length".

4.2 External diagnostics

For MOVIDRIVE® MDX61B drive inverters with option DFP21B, it is possible to activate automatic generation of external diagnostic alarms via PROFIBUS-DP during the project planning in the DP master. If this function has been activated, the inverter sends an external diagnostic signal to the DP master every time a malfunction occurs. You must then program corresponding algorithms in the program of the DP master system in order to evaluate the diagnostic information. These algorithms can sometimes be quite complex.

Recommendation

It is basically not necessary to activate the external diagnostic function because MOVIDRIVE® transmits the current drive status via status word 1 during every PROFIBUS-DP cycle.

The structure of the unit-specific diagnostics was redefined for PROFIBUS DP-V1. The mechanism described here can only be used with PROFIBUS DP (without DP-V1 expansions). We recommend that you do not use this mechanism for new applications.

Note on Simatic S7 master systems!

Diagnostic alarms may be triggered by the PROFIBUS-DP system in the DP master at any time even when external diagnostic signal generation is inactive. This means the corresponding operation blocks (e.g. OB84 for S7-400 or OB82 for S7-300) should always be created in the controller.

Procedure

Additional application-specific parameters can be defined in every DP master during the configuration of a DP slave. These parameters are transferred to the slave when the PROFIBUS-DP starts up. Nine application-specific parameter data items are provided for MOVIDRIVE® with the following functions:

Byte:	Permitted value	Function
0	00 hex	Reserved for DP-V1
1	00 hex	Reserved for DP-V1
2	00 hex	Reserved for DP-V1
3	06 hex	Structured user parameter block with a length of 6 bytes
4	81 hex	Structure type: User (proprietary)
5	00 hex	Slot number: 0 = complete unit
6	00 hex	Reserved
7	01 hex	SEW user parameter version: 1
8	00 hex	DFP21 generates diagnostic alarm when a malfunction occurs.
	01 hex	DFP21 does not generate a diagnostic alarm when a malfunction occurs (factory setting)

Values not listed here are not permitted as they can cause malfunctions in the DFP21B!

Example for project planning

The project planning programs of the DP master systems either offer the option of activating the external diagnostics in plain text format, such as with STEP7 (Figure 4), or of specifying the information directly in hex code (table x).

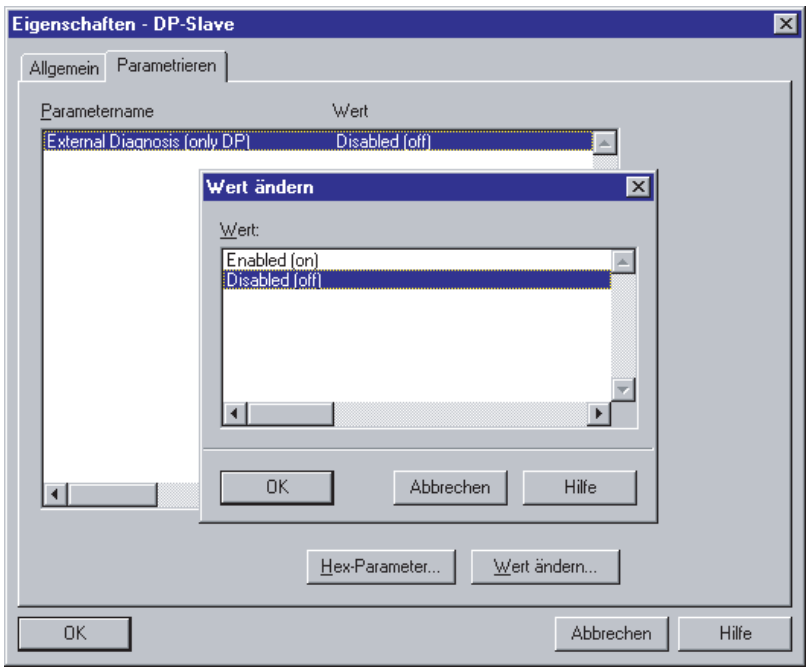

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Figure 4: Activating external diagnostics with STEP7

Parameterization data (hex)	Function
00, 00 ,00 ,06 ,81 ,00 ,00 ,01 ,00	Diagnostic alarms are also generated if there is a fault (enabled = on)
00, 00, 00, 06, 81, 00, 00, 01, 01	Diagnostic alarms are **not** generated if there is a fault (disabled = off, factory setting)

4.3 Startup of the drive inverter

The parameters of the MOVIDRIVE® drive inverter can be set straight away via PROFIBUS without any further settings once the PROFIBUS option card has been installed. As a result, for example, all parameters can be set by the master programmable controller after switch-on.

However, to control the drive inverter via PROFIBUS, it must be switched to control signal source (P101) and setpoint source (P100) = FIELDBUS beforehand. The FIELDBUS setting means the drive inverter parameters are set for control and setpoint entry via PROFIBUS. The MOVIDRIVE® drive inverter then responds to the process output data transmitted from the master programmable controller.

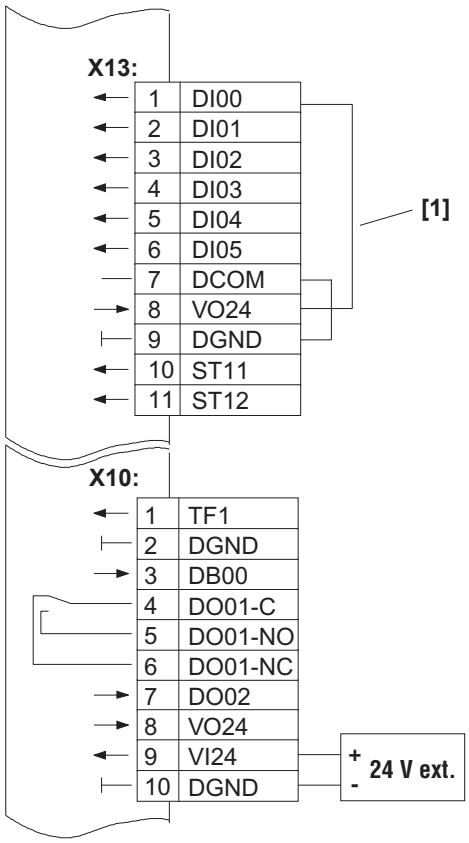
Activation of the control signal source and setpoint source FIELDBUS is signaled to the machine controller using the "Fieldbus mode active" bit in the status word.

For safety reasons, the drive inverter must also be enabled at the terminals for control via the fieldbus system. Consequently, the terminals must be wired or programmed in such a way that the inverter is enabled via the input terminals. The simplest way of enabling the drive inverter at the terminals is, for example, to connect the DIØØ (function /CONTROLLER INHIBIT) input terminal to a +24 V signal and to program input terminals DIØ1 DIØ3 to NO FUNCTION. The procedure for startup of the MOVIDRIVE® drive inverter with a fieldbus connection is described on the next page.

Procedure for startup of the MOVIDRIVE® drive inverter

1. Enable the power output stage at the terminals.

   Wire up the input terminal DIØØ / X13.1 (function /REGLERSPERRE) to a +24 V signal (for example, using a device jumper).



DI00 = /Controller inhibit
DI01 = no function
DI02 = no function
DI03 = no function
DI04 = no function
DI05 = no function
DCOM = Reference X13:DI00 ... DI05
VO24 = + 24 V
DGND = Reference pot. for binary signals
ST11 = RS-485 +
ST12 = RS-485 -
TF1 = TF input
DGND = Reference pot. for binary signals
DB00 = /Brake
DO01-C = Relay contact
DO01-NO = Normally open contact
DO01-NC = Normally closed contact
DO02 = /Malfunction
VO24 = + 24 V
VI24 = + 24 V (external supply)
DGND = Reference pot. for binary signals

Enabling the power output stage using a unit jumper [1]
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2. Switch on the 24 V voltage supply.

   Only switch on the external 24 V voltage supply (not the supply voltage!) so that the parameters for the drive inverter can be set.

3. Setpoint source = FIELDBUS / control signal source = FIELDBUS

   Set the setpoint source and control signal source parameters to FIELDBUS to control the drive inverter via a fieldbus.

P100 Setpoint source = FIELDBUS
P101 Control signal source = FIELDBUS

4. Input terminals DIØ1 DIØ3 = NO FUNCTION.

   Set the function of the input terminals to NO FUNCTION.

P600 Terminal programming DIØ1 = NO FUNCTION
P601 Terminal programming DIØ2 = NO FUNCTION
P602 Terminal programming DIØ3 = NO FUNCTION

For more information on startup and control of the MOVIDRIVE® drive inverter, refer to the Fieldbus Unit Profile manual.

5 PROFIBUS-DP Operating Characteristics

This chapter describes the basic characteristics of the drive inverter with PROFIBUS-DP.

5.1 Controlling the drive inverter

The drive inverter is controlled via the process data channel which is up to ten I/O words in length. These process data words may be mapped in the I/O or peripheral area of the controller if a programmable controller is used as DP master and can be addressed as usual.

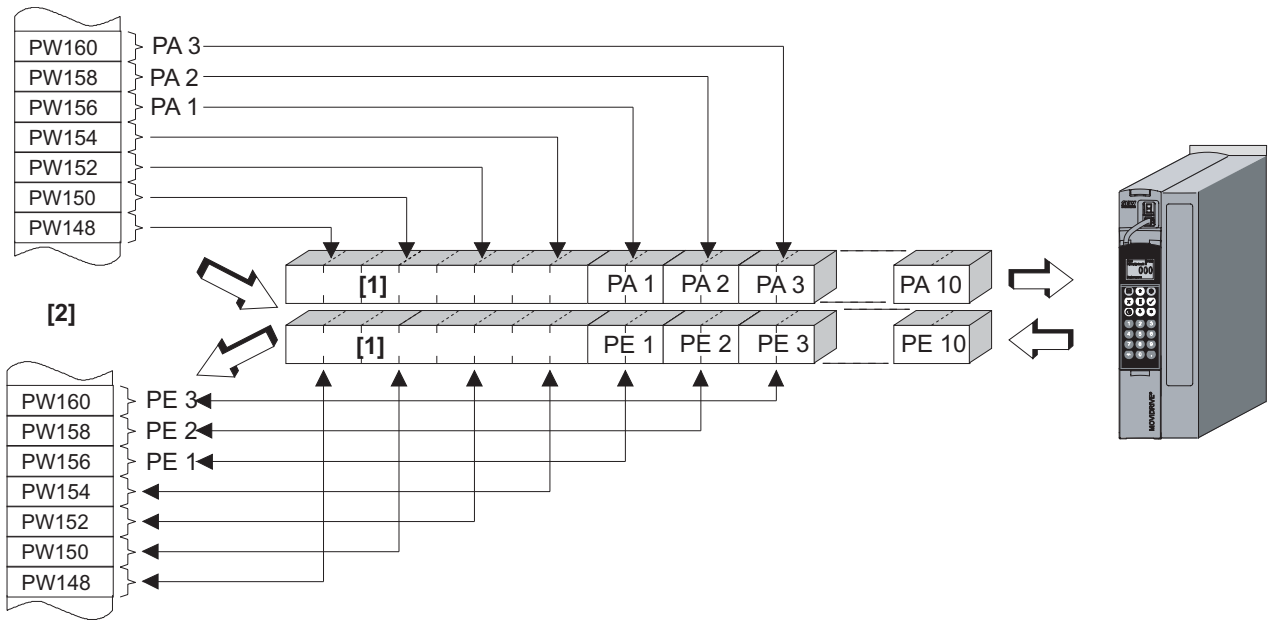

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Figure 5: Mapping PROFIBUS data in the PLC address range

[1] 8 byte MOVILINK® parameter channel

[2] PLC address range

PE1 ... PE10 Process input data

PA1 ... PA10 Process output data

- For additional information on programming and project planning, refer to the README_GSD6003.PDF file included in the GSD file.
- For more information about controlling via the process data channel, in particular regarding the coding of the control and status word, refer to the Fieldbus Unit Profile manual.

Control example for Simatic S7

The drive inverter is controlled via Simatic S7 depending on the selected process data configuration, either directly via load and transfer commands or via the special system functions *SFC 14 DPRD_DAT* and *SFC15 DPWR_DAT*.

In principle, S7 data lengths of 3 bytes or more than 4 bytes must be transmitted using system functions SFC14 and SFC15.

Consequently, the data in the following table applies:

Process data configuration	STEP7 access via
1 PD	Load/transfer commands
2 PD	Load/transfer commands
3 PD	System functions SFC14/15 (length 6 bytes)
6 PD	System functions SFC14/15 (length 12 bytes)
10 PD	System functions SFC14/15 (length 20 bytes)
Param +1 PD	Parameter channel: System functions SFC14/15 (length 8 bytes) Process data: Load/transfer commands
Param +2 PD	Parameter channel: System functions SFC14/15 (length 8 bytes) Process data: Load/transfer commands
Param +3 PD	Parameter channel: System functions SFC14/15 (length 8 bytes) Process data: System functions SFC14/15 (length 6 bytes)
Param +6 PD	Parameter channel: System functions SFC14/15 (length 8 bytes) Process data: System functions SFC14/15 (length 12 bytes)
Param + 10 PD	Parameter channel: System functions SFC14/15 (length 8 bytes) Process data: System functions SFC14/15 (length 20 bytes)

STEP7 programming example

In this example, the project planning for MOVIDRIVE® has the process data configuration "3 PD" on input addresses PIW576... and output addresses POW576....

A data block DB3 is created with about 50 data words.

When SFC14 is called, the process input data are copied into data block DB3, data words 0, 2 and 4. When SFC15 is called after the control program has been processed, the process output data are copied from data words 20, 22 and 24 into output address POW 576 .

Note the length information in bytes for the RECORD parameter. The length information must correspond to the configured length.

Refer to the online help for STEP7 for further information about the system functions.

```
//Start of cyclical program processing in OB1
BEGIN
NETWORK
TITLE = Copy PI data from inverter to DB3, word 0/2/4
CALL SFC  14 (DPRD_DAT)    //Read DP slave record
  LADDR  := W#16#240    //Input address 576
  RET_VAL:= MW 30         //Result in flag word 30
  RECORD := P#DB3.DBX 0.0 BYTE 6 //Pointer

NETWORK
TITLE = PLC program with drive application
// PLC program uses the process data in DB3 for
// controlling the drive

L  DB3.DBW 0//Load PI1 (status word 1)
L  DB3.DBW 2      //Load PI2 (actual speed value)
L  DB3.DBW 4      //Load PI3 (no function)

L  W#16#0006
T DB3.DBW 20//Write 6hex to PO1 (control word = enable)
L  1500
T DB3.DBW 22//Write 1500dec to PO2 (speed setpoint = 300 rpm)
L  W#16#0000
T DB3.DBW 24//Write 0hex to PO3 (however, it has no function)

//End of cyclical program processing in OB1
NETWORK
TITLE = Copy PO data from DB3, word 20/22/24 to inverter
CALL SFC  15 (DPWR_DAT)            //Write DP slave record
  LADDR  := W#16#240               //Output address 576 = 240hex
  RECORD := P#DB3.DBX 20.0 BYTE 6  //Pointer to DB/DW
  RET_VAL:= MW 32                  //Result in flag word 32
```

5.2 PROFIBUS-DP Timeout

If the data transfer via PROFIBUS-DP is faulty or interrupted, the response monitoring time in MOVIDRIVE® elapses (if configured in the DP master). The *"BUS-FAULT"* LED lights up (or flashes) to indicate that no new user data is being received. At the same time, MOVIDRIVE® performs the fault response selected with *P831 Fieldbus timeout response*.

P819 Fieldbus timeout displays the response monitoring time specified by the DP master during the PROFIBUS-DP startup. It is only possible to alter this timeout time using the DP master. Although modifications made using the keypad or MOVITOOLS® are displayed, they do not have any effect and are overwritten when the DP is next started up.

5.3 Response fieldbus timeout

P831 is used to sets the parameters for the fault response, which is triggered by the fieldbus timeout monitoring. The setting made here must correspond to the setting in the master system (S7 reponse monitoring).

5.4 Parameter setting via PROFIBUS-DP

With PROFIBUS-DP, the drive parameters are accessed via the 8 byte MOVILINK® parameter channel. This channel offers extra parameter services in addition to the conventional READ and WRITE services.

Structure of the 8 byte MOVILINK® parameter channel

PROFIBUS-DP enables access to the inverter drive parameters via the "parameter process data object" (PPO). This PPO is transmitted cyclically and contains the process data channel [2] and a parameter channel [1] that can be used to exchange acyclical parameter values.

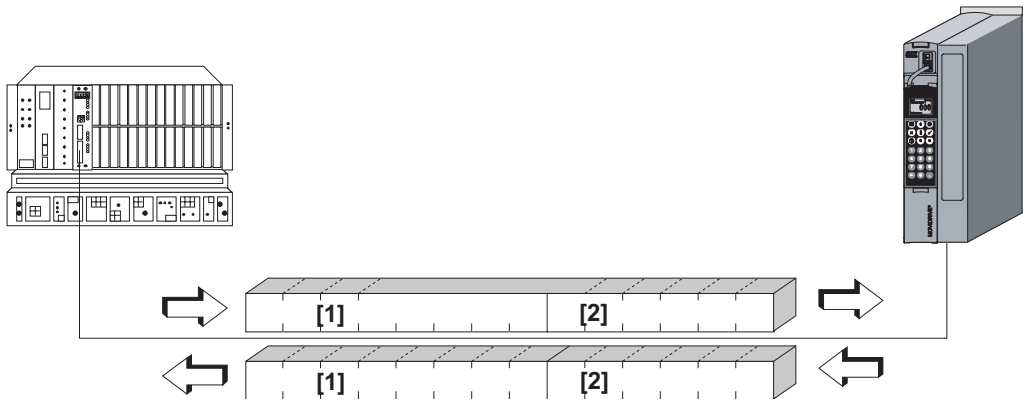

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Figure 6: Communication via PROFIBUS-DP

The following table shows the structure of the 8 byte MOVILINK® parameter channel. In principle, the parameter channel is made up of a management byte, an index word, a reserved byte and four data bytes.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Management	Reserved	Index high	Index low	Data MSB	Data	Data	Data LSB
		Parameter index		4 byte data			

Management of the 8 byte MOVILINK® parameter channel

The entire parameter setting sequence is coordinated with byte 0: Management byte. This byte provides important service parameters such as service identifier, data length, version and status of the service performed. The following table shows that bits 0, 1, 2 and 3 contain the service identifier, and define which service is performed. Bit 4 and bit 5 specify the data length in bytes for the write service. This should be set to 4 bytes for all SEW drive inverters.

7 / MSB	6	5	4	3	2	1	0 / LSB
				Service identifier 0000 = No service 0001 = Read parameter 0010 = Write parameter 0011 = Write parameter volatile 0100 = Read minimum 0101 = Read maximum 0110 = Read default 0111 = Read scale 1000 = Read attribute			
		Data length 00 = 1 byte 01 = 2 bytes 10 = 3 bytes 11 = 4 bytes (must be set!)					
	Handshake bit Must be changed on every new job in cyclical transmission.						
Status bit 0 = No fault in service execution 1 = Fault in service execution							

Bit 6 is used as an acknowledgment between the controller and the drive inverter. It triggers the implementation of the transferred service in the drive inverter. In PROFIBUS-DP the parameter channel is transmitted cyclically with the process data. For this reason, the implementation of the service in the drive inverter must be triggered by edge control using the handshake bit 6. To permit this, the value of this bit is altered for each new service to be performed (toggle). The drive inverter uses the handshake bit to signal whether the service was performed or not. The service has been performed as soon as the handshake bit received in the control corresponds to the one which was sent. Status bit 7 indicates whether it was possible to carry out the service properly or if there were errors.

Index addressing

Byte 2: Index high and byte 3: Index low determines the parameter read or written via the fieldbus system. The parameters of a drive inverter are addressed with a uniform index regardless of the fieldbus system which is connected. Byte 1 should be viewed as reserved and must always be set to 0x00.

Data range

As can be seen in the following table, the data is contained in byte 4 through byte 7 of the parameter channel. This means up to 4 bytes of data can be transmitted per service. The data is always entered with right-justification; that is, byte 7 contains the least significant data byte (Data LSB) whereas byte 4 is the most significant data byte (Data MSB).

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Management	Reserved	Index high	Index low	Data MSB	Data	Data	Data LSB
				High byte 1	Low byte 1	High byte 2	Low byte 2
				High word		Low word	
				Double word			

Incorrect performance of service

The status bit in the management byte is set to signal that a service has been performed incorrectly. The service was performed by the drive inverter if the received handshake bit is the same as the sent handshake bit. If the status bit now signals an error, the error code is entered in the data range of the parameter telegram. Bytes 4-7 send back the return code in a structured format.(→ see the chapter "Return Codes").

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Manage-ment	Reserved	Index high	Index low	Error class	Error code	Add. code high:	Add. code low
Status bit = 1: Incorrect execution of a service							

Reading a parameter with PROFIBUS-DP (Read)

Due to the cyclical transfer of the parameter channel, to execute a READ service via the 8 byte MOVILINK® parameter channel, the handshake bit may only be changed if the complete parameter channel has been set up for the specific service. As a result, adhere to the following sequence when reading a parameter:

1. Enter the index of the parameter to be read in byte 2 (Index high) and byte 3 (Index low).
2. Enter the service identifier for the read service in the management byte (byte 0).
3. Transfer the read service to the inverter by changing the handshake bit.

Since this is a read service, the sent data bytes (bytes 4...7) and the data length (in the management byte) are ignored and do not need to be set.

The inverter now processes the read service and sends the service confirmation back by changing the handshake bit.

7 / MSB	6	5	4	3	2	1	0 / LSB
0	0/1[1)]	X[2)]	X[2)]	0	0	0	1
				Service identifier 0001 = Read parameter			
		Data length Not relevant for Read service					
	Handshake bit Must be changed on every new job in cyclical transmission.						
Status bit 0 = No fault in service execution 1 = Fault in service execution							

1) Bit value is changed

2) Not relevant

The above table shows how a READ service is coded in the management byte. The data length is not relevant; only the service identifier for the READ service should be entered. This service is now activated in the drive inverter when the handshake bit changes. For example, it would be possible to activate the read service with the management byte coding 01hex or 41hex.

Writing a parameter with PROFIBUS-DP (Write)

Due to the cyclical transfer of the parameter channel, to execute a WRITE service via the 8 byte MOVILINK® parameter channel, the handshake bit may only be changed if the complete parameter channel has been set up for the specific service. Observe the following sequence when writing a parameter:

1. Enter the index of the parameter to be written in byte 2 (Index high) and byte 3 (Index low).
2. Enter the data to be written in bytes 4 7.
3. Enter the service identifier and the data length for the write service in the management byte (byte 0).
4. Transfer the write service to the inverter by changing the handshake bit.

The inverter now processes the write service and sends the service confirmation back by changing the handshake bit.

The following table shows how a WRITE service is coded in the management byte. The data length is 4 bytes for all parameters in SEW drive inverters. This service is now transferred to the drive inverter when the handshake bit changes. As a result, a write service on SEW drive inverters always has the management byte coding 32hex or 72hex.

7 / MSB	6	5	4	3	2	1	0 / LSB
0	0/1[1)]	1	1	0	0	1	0
				Service identifier 0010 = Write parameter			
		Data length 11 = 4 bytes					
	Handshake bit Must be changed on every new job in cyclical transmission.						
Status bit 0 = No fault in service execution 1 = Fault in service execution							

1) Bit value is changed

Procedure for setting parameters with PROFIBUS-DP

Taking the example of the WRITE service, the following figure represents a process of setting parameters between the controller and the drive inverter via PROFIBUS-DP. To simplify the sequence, the following figure only shows the management byte of the parameter channel.

The parameter channel is only received and returned by the drive inverter whilst the controller is preparing the parameter channel for the write service. The service is not activated until the moment when the handshake bit is changed (in this example, when it changes from 0 to 1). The drive inverter now interprets the parameter channel and processes the write service, but continues to answer all messages with h\andshake bit = 0. The executed service is acknowledged with a change of the handshake bit in the response message of the drive inverter. The controller now detects that the received handshake bit is once again the same as the one which was sent. It can now prepare another parameter setting procedure.

Controller	PROFIBUS-DP(V0)			Drive inverter (slave)
	--	00110010XXX...	→	Parameter channel is received, but not evaluated
	←	00110010XXX...	--	
Parameter channel is prepared for the write service				
Handshake bit is changed and the service is transferred to the drive inverter	--	01110010XXX...	→	
	←	00110010XXX...	--	
	--	01110010XXX...	→	
	←	00110010XXX...	--	Write service is performed, handshake bit is changed
Service confirmation is received as the send and receive handshake bits are the same again	←	01110010XXX...	--	
	--	01110010XXX...	→	Parameter channel is received, but not evaluated

Parameter data format

When parameters are set via the fieldbus interface, the same parameter coding is used as with the serial RS-485 interfaces or the system bus.

The data formats and ranges of values for the individual parameters can be found in the publication MOVIDRIVE® "Parameter list".

5.5 Return codes for parameter setting

Elements

If a parameter setting is incorrect, the drive inverter sends back various return codes to the master that set the parameters. These codes provide detailed information about the cause of the error. Generally, these return codes are structured. The system distinguishes between the following elements:

- Error class
- Error code
- Additional code

These return codes are described in detail in the Fieldbus Communications Profile manual and do not form part of this documentation. However, the following special cases can occur in connection with PROFIBUS:

Error class

The error class element classifies the type of error more precisely. MOVIDRIVE® supports the following error classes defined in accordance with EN 50170(V2):

Class (hex)	Designation	Meaning
1	vfd-state	Status error of the virtual field unit
2	application-reference	Error in application program
3	definition	Definition error
4	resource	Resource error
5	service	Error in execution of service
6	access	Access error
7	ov	Error in object list
8	other	Other error (see Additional code)

The error class is generated by the communication software of the fieldbus interface if there is an error in communication. However, this does not apply to *error class 8, Other error*. Return codes sent from the drive inverter system are all included in *Error class 8 = Other error*. The error can be identified more precisely using the additional code element.

Error code

The error code element provides a means for more precisely identifying the cause of the error within the error class. It is generated by the communication software of the fieldbus card in the event of an error in communication. For *Error class 8 = Other error*, only *Error code = 0 (Other error code)* is defined. In this case, detailed identification is made using the *additional code*.

Additional code

The additional code contains the return codes specific to SEW dealing with incorrect parameter settings of the drive inverter. These codes are returned to the master under *Error class 8 = Other error*. The following table shows all possible codings for the additional code.

Add. code high (hex)	Add. code low (hex)	Meaning
00	00	No error
00	10	Invalid parameter index
00	11	Function/parameter not implemented
00	12	Read access only
00	13	Parameter lock is active
00	14	Factory setting is active
00	15	Value too large for parameter
00	16	Value too small for parameter
00	17	Option card required for this function/parameter is missing
00	18	Error in system software
00	19	Parameter access only via RS-485 process interface on X13
00	1A	Parameter access only via RS-485 diagnostic interface
00	1B	Parameter has access protection
00	1C	Controller inhibit required
00	1D	Illegal value for parameter
00	1E	Factory setting was activated
00	1F	Parameter was not saved in EEPROM
00	20	Parameter cannot be changed with output stage enabled

5.6 Special cases

Special return codes

Errors in the parameter settings that cannot be identified either automatically by the application layer of the fieldbus system or by the system software of the drive inverter are treated as special cases. The following is a list of errors that can occur depending on the fieldbus option card used:

- Incorrect coding of a service via parameter channel
- Incorrect length specification of a service via parameter channel
- Internal communication error

Incorrect service coding in the parameter channel

Incorrect coding was specified in the management or reserved byte during parameter setting via the parameter channel. The following table shows the return code for this special case.

	Code (dec)	Meaning
Error class:	5	Service
Error code:	5	Illegal parameter
Add. code high:	0	-
Add. code low:	0	-

Troubleshooting:

Check bits 0 and 1 in the parameter channel.

Incorrect length specification in parameter channel

A data length other than 4 data bytes was specified in a read or write service during parameter setting via the parameter channel. The following table displays the return code.

	Code (dec)	Meaning
Error class:	6	Access
Error code:	8	Type conflict
Add. code high:	0	-
Add. code low:	0	-

Troubleshooting:

Check bit 4 and bit 5 for the data length in the management byte of the parameter channel. Both bits must be assigned the value 1.

Internal communication error

The return code listed in the following table is sent back if an internal communication error has occurred. The parameter service transferred via the fieldbus may not have been performed and should be repeated. If this error reoccurs, switch off the drive inverter completely and then back on again so it is re-initialized.

	Code (dec)	Meaning
Error class:	6	Access
Error code:	2	Hardware fault
Add. code high:	0	-
Add. code low:	0	-

Troubleshooting:

Repeat the read or write service. If this error occurs again, disconnect the drive inverter from the supply system and then reconnect it. Contact SEW Service for advice if this error occurs continuously.

6 DP-V1 Functions

6.1 *Introduction to PROFIBUS DP-V1*

This chapter describes the functions and terms used for operating SEW drive inverters with PROFIBUS-DP-V1. Refer to the PROFIBUS user organization or visit www.profibus.com for detailed technical information on PROFIBUS-DPV1.

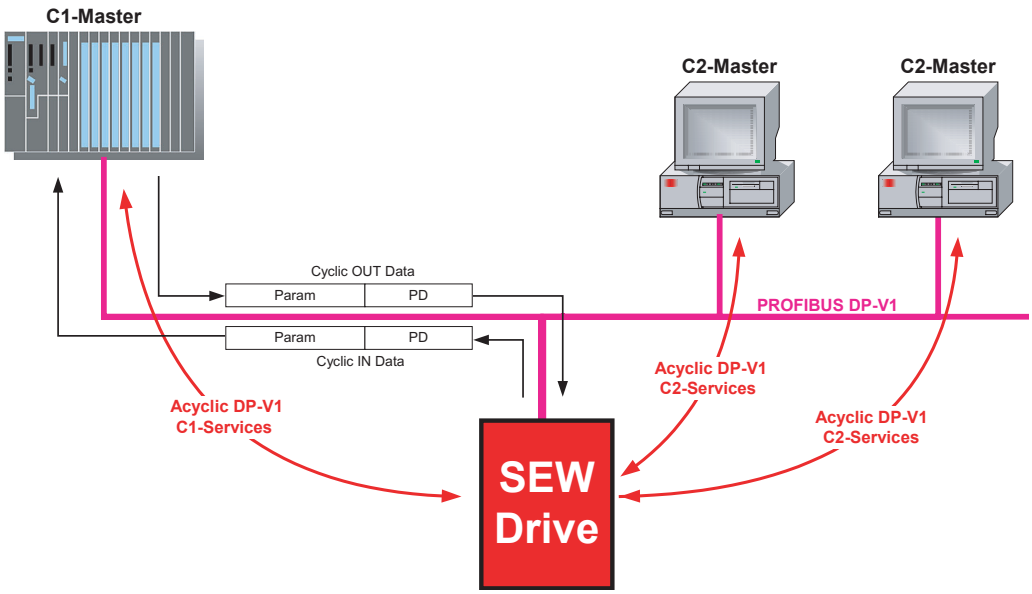
The PROFIBUS-DPV1 specification introduced new acyclical *read/write* services within the context of the PROFIBUS-DPV1 expansions. These acyclical services are inserted into special telegrams during cyclical bus operation and thus ensure compatibility between PROFIBUS-DP (version 0) and PROFIBUS-DP**V1** (**V**ersion **1**).

The acyclical *read/write* services can be used to exchange larger data quantities between master and slave (drive inverter) than it would be possible to transfer in the cyclical input or output data using the 8-byte parameter channel, for example. The advantage of acyclical data exchange via DP-V1 lies in the minimum load on the cyclical bus operation since DP-V1 telegrams are only added to the bus cycle if required.

The DP-V1 parameter channel provides the user with two options:

- The higher-level controller can access all the inverter information of the SEW DP-V1 slaves. This means that cyclical process data and unit settings can be read and stored in the controller and modified in the slave.
- It is also possible to route the service and startup tool MOVITOOLS® via the DP-V1 parameter channel instead of using a proprietary RS-485 connection. Once you have installed the MOVITOOLS® software, you can access detailed infromation in the folder ...\SEW\MOVITOOLS\Fieldbus.

The main features of PROFIBUS-DPV1 are explained below.



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Class 1 master (C1 master)

The PROFIBUS DP-V1 network differentiates between master classes. The C1 master essentially performs the cyclical data exchange with the slaves. A typical C1 master is a control system, such as a PLC, that exchanges cyclical process data with the slave. If the DPV1 function has been activated via the GSD file, the acyclical connection between C1 master and slave is established automatically when the cyclical connection of the PROFIBUS-DP is being established. Only one C1 master can be operated in a PROFIBUS-DPV1 network.

Class 2 master (C2 master)

The C2 master itself does not perform cyclical data exchange with the slaves. Examples for a typical C2 master are visualization systems or temporary installed programming devices (Notebook / PC). The C2 master uses exclusively acyclic connections for communication with the slaves. The acyclical connections between C2 master and slave are established by the *Initiate* service. The connection is established once the *Initiate* service has been performed successfully. An established connection enables acyclical data exchange with the slaves using *Read* or *Write* services. Several C2 masters can be active in a DP-V1 network. The number of C2 connections, established simultaneously for a slave, is determined by the slave. SEW drive inverters support two parallel C2 connections.

Data sets (DS)

The user data transported via DP-V1 service is collected in data sets. Each data set is represented uniquely by its length, a slot number and an index. The structure of data set 47 is used for DP-V1 communication with the SEW drive inverter. This data set is defined as the DP-V1 parameter channel for drives as of V3.1 in the PROFIdrive profile drive engineering of the PROFIBUS Nutzerorganisation (user group). Different procedures for accessing parameter data in the drive inverter are provided via this parameter channel.

DP-V1 services

The DP-V1 expansions offer new services, which can be used for acyclical data exchange between master and slave. The system distinguishes between the following services:

C1 master	Connection type: MSAC1 (master/slave acyclical C1)
Read	Read data set
Write	Write data set

C2 master	Connection type: MSAC2 (master/slave acyclical C2)
INITIATE	Establish C2 connection
ABORT	Disconnect C2 connection
Read	Read data set
Write	Write data set

DP-V1 alarm handling

In addition to the acyclical services, the DP-V1 specification also defines extended alarm handling. Alarm handling now distinguishes between different alarm types. As a result, unit-specific diagnostics cannot be evaluated in DP-V1 operation via the 'DDLM_SlaveDiag' DP-V1 service. DP-V1 alarm handling has not been defined for drive engineering as a drive inverter does not ususlly transfer its status information via cyclical process data communication.

6.2 Features of SEW drive inverters

The SEW fieldbus interfaces with PROFIBUS DP-V1 have the same communication features for the DP-V1 interface. The drives are usually controlled via a C1 master with cyclical process data in accordance with the DP-V1 standard. This C1 master (usually a PLC) can also use an 8-byte MOVILINK® parameter channel during cyclical data exchange to perform the parameter services with DFP21B. The read and write services give the C1 master access to connected stations via the DP-V1 C1 channel.

Two additional C2 channels can be connected in parallel to these parameter setting channels. The first C2 master as a visualization device, for example could use these channels to read parameter data, and a second C2 master in the form of a notebook could use them to configure the drive using the MOVITOOLS® software.

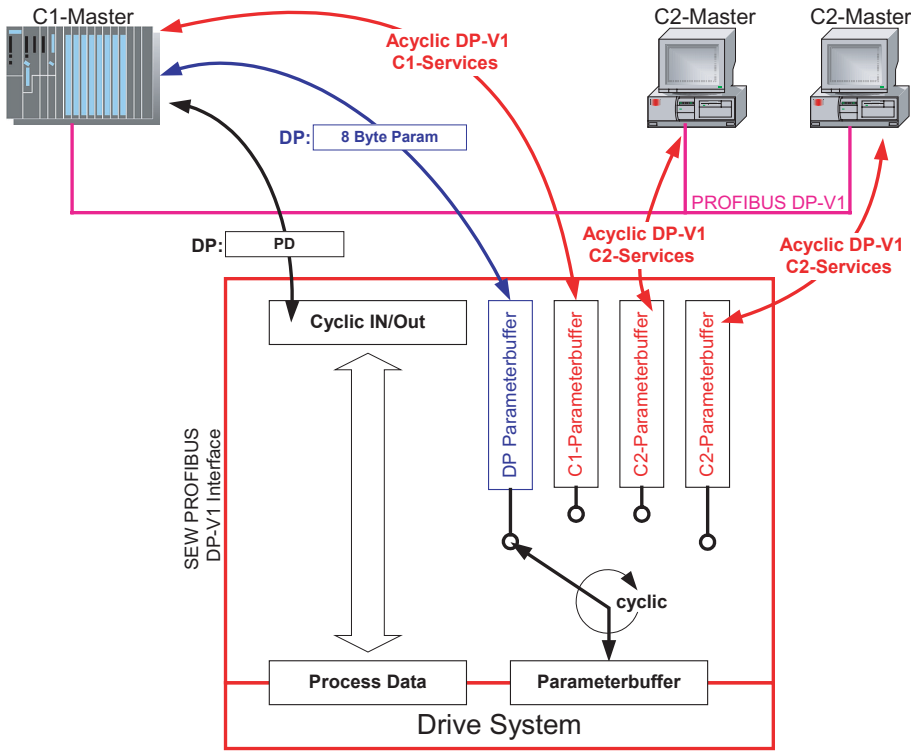

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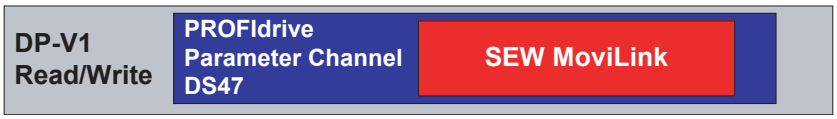
Figure 7: Parameter setting channels for PROFIBUS DP-V1

6.3 Structure of the DP-V1 parameter channel

Generally, the process of setting parameters for the drives to the PROFIdrive DPV1 parameter channel of profile version 3.0 is carried out via data set index 47. The *Request ID* entry is used to distinguish between parameter access based on the PROFIdrive profile or via SEW MOVILINK® services. The following table shows the possible codings of the individual elements. The data set structure is the same for accessing PROFIdrive and MOVILINK®.



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The following MOVILINK® services are supported:

- 8-byte MOVILINK® parameter channel with all the services supported by the drive inverter such as:
  - Read parameter
  - Write parameter
  - Write parameter volatile
  - etc.

The following PROFIdrive services are supported:

- Reading (request parameter) individual parameters of the type *double word*
- Writing (change parameter) individual parameters of the type *double word*

Table 1: Elements of data set DS47

Field	Data type	Values
Request Reference	Unsigned8	0x00 Reserved 0x01 ... 0xFF
Request ID	Unsigned8	0x01 Request parameter (PROFIdrive) 0x02 Change parameter (PROFIdrive) 0x40 SEW MOVILINK® service
Response ID	Unsigned8	Response (+): 0x00 Reserved 0x01 Request parameter (+) (PROFIdrive) 0x02 Change parameter (+) (PROFIdrive) **0x40 SEW MOVILINK® service (+)** Response (–): 0x81 Request parameter (–) (PROFIdrive) 0x82 Change parameter (–) (PROFIdrive) **0xC0 SEW MOVILINK® service (–)**
Axis	Unsigned8	0x00 ... 0xFF Number of axis 0 ... 255
No. of parameters	Unsigned8	0x01 ... 0x13 1 ... 19 DWORDs (240 DP-V1 data bytes)
Attributes	Unsigned8	0x10 Value **For SEW MOVILINK® (Request ID = 0x40):** **0x00 No service** **0x10 Read Parameter** **0x20 Write Parameter** **0x30 Write Parameter volatile** **0x40 ... 0xF0 Reserved**
No. of Elements	Unsigned8	0x00 for non-indexed parameters 0x01 ... 0x75 Quantity 1 ... 117
Parameter Number	Unsigned16	0x0000 ... 0xFFFF MOVILINK® parameter index
Subindex	Unsigned16	0x0000 SEW: always 0
Format	Unsigned8	0x43 Double word 0x44 Error
No. of Values	Unsigned8	0x00 ... 0xEA Quantity 0 ... 234
Error Value	Unsigned16	0x0000 ... 0x0064 PROFIdrive error codes 0x0080 + MOVILINK®-AdditionalCode Low **For SEW MOVILINK® 16 Bit Error Value**

Procedure for setting parameters via data set 47

Parameter access takes place with the combination of the DP-V1 services *Write* and *Read*. The parameter setting order is transferred to the slave using the *Write.req*, followed by slave-internal processing.

The master now sends a *Read.req* to pick up the parameter setting response. The master repeats the *Read.req* if the *Read.res* from the slave is negative. As soon as the pararmeter processing in the drive inverter is concluded, it answers with a positive response *Read.res*. The user data now contains the parameter setting response of the parameter setting order that was previously sent with *Write.req* (→ following figure). This mechanism applies to a C1 as well as a C2 master.

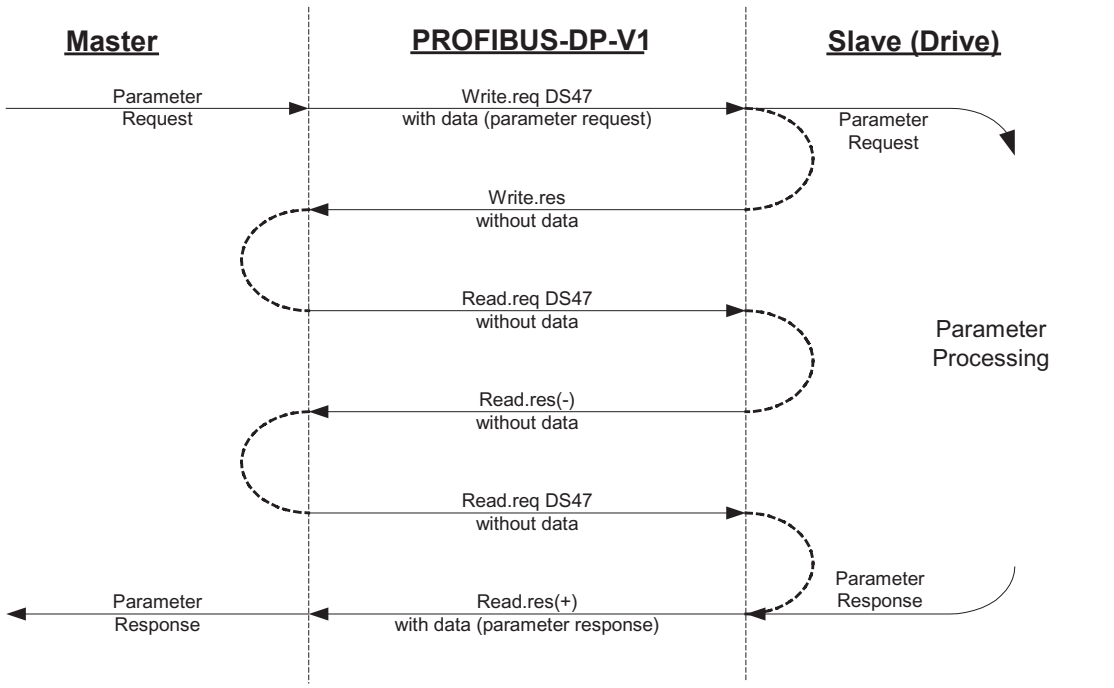
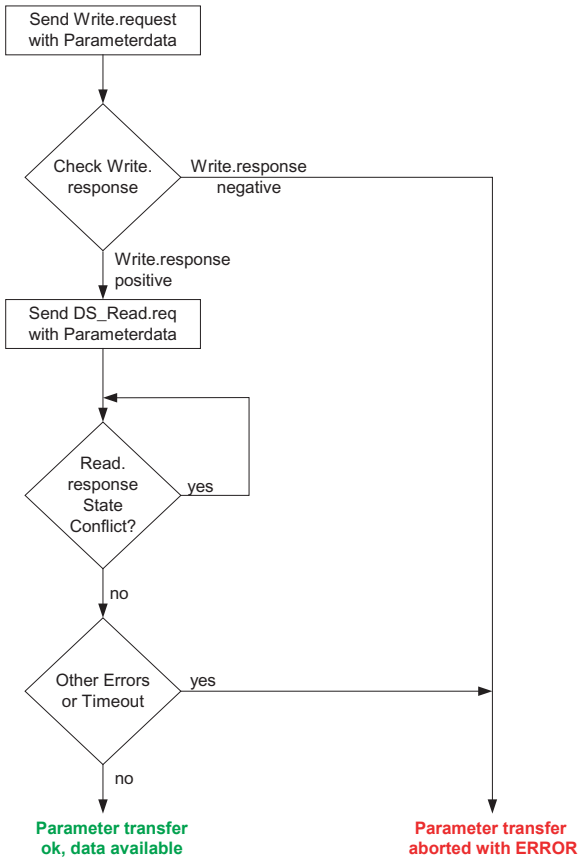


Figure 8: Telegram sequence for parameter access via PROFIBUS DP-V1

DP-V1 master processing sequence

If the bus cycles are very short, the request for the parameter response arrives before the inverter has concluded parameter access in the device. This means that the response data from the inverter is not yet available. In this case, the inverter sends a negative answer with the **Error_Code _1 = 0xB5 (status conflict)** to the DP-V1 level. The DP-V1 master must then repeat the request with the Read.req header until it receives a positive answer from the drive inverter.



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Addressing connected drive inverter

The structure of the DS47 data set defines an axis element. This element is used to reach multi-axis drives that are operated via one PROFIBUS interface. The Axis element addresses one of the devices connected via the PROFIBUS interface. This mechanism can be used, for example, by the SEW MQP bus modules for MOVIMOT® or UFP for MOVITRAC® 07.

Addressing a MOVIDRIVE® inverter at PROFIBUS-DPV1

With the setting *Axis = 0*, the parameter of the drive inverters can be accessed directly. Since there are no drive devices connected to MOVIDRIVE®, access with *Axis > 0* is returned with an error code.

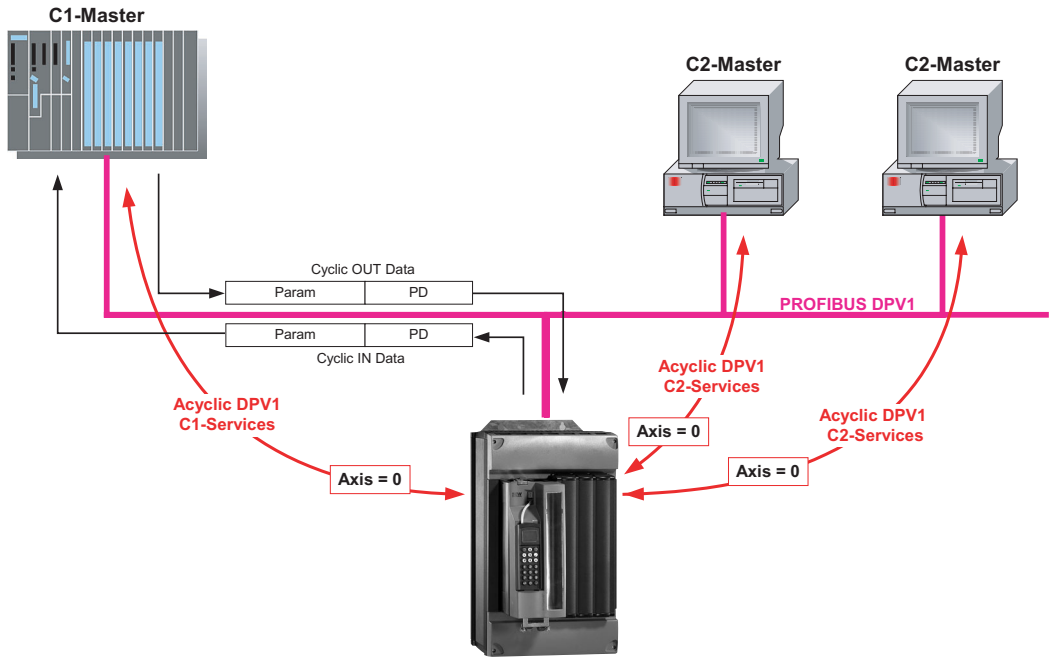


Figure 9: Addressing a MOVIDRIVE® inverter directly via PROFIBUS DP-V1 with Axis = 0.

MOVILINK® parameter orders

The MOVILINK® parameter channel of the SEW drive inverter is directly mapped in the structure of data set 47. The Request ID 0x40 (SEW MOVILINK® service) is used for the exchange of MOVILINK® parameter setting orders. Parameter access with MOVILINK® services usually takes place according to the structure described below. The typical message sequence for data set 47 is used.

Request ID: 0x40 SEW MOVILINK® service

The actual service is defined by the data set element *Attribute* in the MOVILINK® parameter channel. The high nibble of this element corresponds to the service nibble in the management byte of the DP parameter channel.

Example for reading a parameter via MOVILINK®

The following tables show an example of the structure of the Write.request and Read.res user data for reading an individual parameter via the MOVILINK® parameter channel.

Sending parameter order

The following tables show the coding of the user data for the *Write.req* service specifying the DP-V1 header. The *Write.req* service is used to transfer the parameter setting order to the drive inverter. It uses the firmware version.

Table 2: Write.request header for transferring the parameter order

Service:	Write.request	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	10	10 byte user data for parameter order

Table 3: Write.req USER DATA for MOVILINK ®"Read parameter"

Byte	Field	Value	Description
0	Request Reference	0x01	Individual reference number for the parameter setting order that is reflected in the parameter response
1	Request ID	0x40	SEW MOVILINK® service
2	Axis	0x00	Axis number; 0 = single axis
3	No. of parameters	0x01	1 parameter
4	Attributes	0x10	MOVILINK® service “Read parameter”
5	No. of elements	0x00	0 = access to direct value, no subelement
6..7	Parameter Number	0x206C	MOVILINK® index 8300 = “firmware version”
8..9	Subindex	0x0000	Subindex 0

Requesting the parameter response

The following table shows the coding of the Read.req user data including the DP-V1 header.

Table 4: Read.req for requesting the parameter response

Service:	Read.request	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	240	Maximum length of response buffer in the DP-V1 master

Positive MOVILINK® parameter setting response

The table shows the Read.res USER DATA with the positive response data of the parameter setting order. For example, the parameter value for index 8300 (firmware version) is returned.

Table 5: DP-V1 header of the positive Read.response with parameter response

Service:	Read.request	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	10	10 byte user data in response buffer

Table 6: Positive response for MOVILINK® service

Byte	Field	Value	Description
0	Response reference	0x01	Reflected reference number from the parameter setting order

Table 6: Positive response for MOVILINK® service

Byte	Field	Value	Description
1	Response ID	0x40	Positive MOVILINK® response
2	Axis	0x00	Reflected axis number; 0 = single axis
3	No. of parameters	0x01	1 parameter
4	Format	0x43	Parameter format: Double word
5	No. of values	0x01	1 value
6..7	Value Hi	0x311C	Higher-order part of the parameter
8..9	Value Lo	0x7289	Lower-order part of the parameter
			Decoding: 0x 311C 7289 = 823947913 dec >> firmware version 823 947 9.13

Example for writing a parameter via MOVILINK®

The following tables show the sequence of the *Write* and *Read* services for non-volatile writing of the value 12345 to IPOS®plus variable H0 (parameter index 11000) as an example. The MOVILINK® service *Write Parameter volatile* is used for this purpose.

Send "Write parameter volatile" order

Table 7: DP-V1 header of the Write.request with parameter order

Service:	Write.request	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	16	16 byte user data for order buffer

Table 8: Write.req user data for MOVILINK® service "Write parameter volatile"

Byte	Field	Value	Description
0	Request Reference	0x01	Individual reference number for the parameter setting order that is reflected in the parameter response
1	Request ID	0x40	SEW MOVILINK® service
2	Axis	0x00	Axis number; 0 = single axis
3	No. of parameters	0x01	1 parameter
4	Attributes	0x30	MOVILINK® service “Write parameter volatile”
5	No. of elements	0x00	0 = access to direct value, no subelement
6..7	Parameter Number	0x2AF8	Parameter index 11000 = "IPOS variable H0"
8..9	Subindex	0x0000	Subindex 0
10	Format	0x43	Double word
11	No. of values	0x01	Change 1 parameter value
12..13	Value HiWord	0x0000	Higher-order part of the parameter value
14..15	Value LoWord	0x0BB8	Lower-order part of the parameter value

After sending this Write.request, the Write.response is received. If there was no status conflict in processing the parameter channel, a positive Write.response occurs. Otherwise, the status fault is located in Error_code_1.

Requesting the parameter response

The following table shows the coding of the Write.req USER DATA including the DP-V1 header.

Table 9: Read.req for requesting the parameter response

Field	Value	Description
Function_Num		Read.req
Slot_Number	X	Slot_Number not used
Index	47	Index of data set
Length	240	Maximum length of response buffer in DP-Master

Positive response to "Write Parameter volatile"

Table 10: DP-V1 header of the positive Read.response with parameter response

Service:	Read.response	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	4	12 byte user data in response buffer

Table 11: Positive response for MOVILINK® service "Write Parameter"

Byte	Field	Value	Description
0	Response reference	0x01	Reflected reference number from the parameter setting order
1	Response ID	0x40	Positive MOVILINK® response
2	Axis	0x00	Reflected axis number; 0 = single axis
3	No. of parameters	0x01	1 parameter

Negative parameter response

The following table shows the coding of a negative response of a MOVILINK® service. Bit 7 is entered in the Response ID if the response is negative.

Table 12: Negative response for MOVILINK® service

Service:	Read.response	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	8	8 byte user data in response buffer

Byte	Field	Value	Description
0	Response reference	0x01	Reflected reference number from the parameter setting order
1	Response ID	0xC0	Negative MOVILINK® response
2	Axis	0x00	Reflected axis number; 0 = single axis
3	No. of parameters	0x01	1 parameter
4	Format	0x44	Error
5	No. of values	0x01	1 error code
6..7	Error value	0x0811	MOVILINK® return code z. B. ErrorClass 0x08, Add. Code 0x11 (see the table MOVILINK® return codes for DP-V1)

MOVILINK® return codes for parameter setting for DP-V1

The following table shows the return codes that are returned by the SEW DP-V1 interface in case of an error in DP-V1 parameter access.

MOVILINK® Return code (hex)	Description
0x0810	Illegal index, parameter index does not exist in the unit
0x0811	Function/parameter not implemented
0x0812	Read access only
0x0813	Parameter lock is active
0x0814	Factory setting is active
0x0815	Value too large for parameter
0x0816	Value too small for parameter
0x0817	Required option card not installed
0x0818	Error in system software
0x0819	Parameter access via RS-485 process interface only
0x081A	Parameter access via RS-485 diagnostic interface only
0x081B	Parameter has access protection
0x081C	Controller inhibit is required
0x081D	Illegal value for parameter
0x081E	Factory setting was activated
0x081F	Parameter was not saved in EEPROM
0x0820	Parameter cannot be changed with output stage enabled / reserved
0x0821	Reserved
0x0822	Reserved
0x0823	Parameter may only be changed with IPOS program stop
0x0824	Parameter may only be changed with deactivated Autosetup
0x0505	Incorrect coding of management and reserved byte
0x0602	Communication error between inverter system and fieldbus option card
0x0502	Timeout of secondary connection (e.g. during reset or with Sys-Fault)

PROFIdrive parameter orders

The PROFIdrive parameter channel of SEW drive inverters is directly mapped in the structure of data set 47. Parameter access with PROFIdrive services usually takes place according to the structure described below. The typical message sequence for data set 47 is used. PROFIdrive only defines the two request IDs

Request ID:0x01Request Parameter (PROFIdrive)

Request ID:0x02Change Parameter (PROFIdrive)

This means there is restricted data access in comparison with the MOVILINK® services.

The request ID = 0x02 = Change Parameter (PROFIdrive) results in remanent write access to the selected parameter. Consequently, the internal flash/EEPROM of the inverter is written with each write access. Use the MOVILINK® service "Write Parameter volatile" if parameters must be written cyclically at short intervals. With this service, you only alter the parameter values in the RAM of the inverter.

Example for reading a parameter via PROFIdrive

The following tables show an example of the structure of the Write.request and Read.res user data for reading an individual parameter via the MOVILINK® parameter channel.

Sending parameter order

The table shows the coding of the user data for the Write.req service specifying the DP-V1 header. The Write.req service is used to transfer the parameter setting order to the drive inverter.

Table 13: Write.request header for transferring the parameter order

Service:	Write.request	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	10	10 byte user data for parameter order

Table 14: Write.req USER DATA for MOVILINK®"Read parameter"

Byte	Field	Value	Description
0	Request Reference	0x01	Individual reference number for the parameter setting order that is reflected in the parameter response
1	Request ID	0x01	Request parameter (PROFIdrive)
2	Axis	0x00	Axis number; 0 = single axis
3	No. of parameters	0x01	1 parameter
4	Attributes	0x10	Access to parameter value
5	No. of elements	0x00	0 = access to direct value, no subelement
6..7	Parameter Number	0x206C	MOVILINK® index 8300 = “firmware version”
8..9	Subindex	0x0000	Subindex 0

Requesting the parameter response

The following table shows the coding of the Read.req user data including the DP-V1 header.

Table 15: Read.req for requesting the parameter response

Service:	Read.request	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	240	Maximum length of response buffer in the DP-V1 master

Positive PROFIdrive parameter response

The table shows the Read.res user data with the positive response data of the parameter setting order. For example, the parameter value for index 8300 (firmware version) is returned.

Table 16: DP-V1 header of the positive Read.response with parameter response

Service:	Read.request	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	10	10 byte user data in response buffer

Table 17: Positive response for MOVILINK® service

Byte	Field	Value	Description
0	Response reference	0x01	Reflected reference number from the parameter setting order
1	Response ID	0x01	Positive response for „Request Parameter“
2	Axis	0x00	Reflected axis number; 0 = single axis
3	No. of parameters	0x01	1 parameter
4	Format	0x43	Parameter format: Double word
5	No. of values	0x01	1 value
6..7	Value Hi	0x311C	Higher-order part of the parameter
8..9	Value Lo	0x7289	Lower-order part of the parameter
			Decoding: 0x 311C 7289 = 823947913 dec >> firmware version 823 947 9.13

Example for writing a parameter via PROFIdrive

The following tables show an example of the structure of the *Write* and *Read* services for the **remanent** writing of the internal setpoint n11 (see "Example for writing a parameter via MOVILINK®"). The PROFIdrive service *Change Parameter* is used for this purpose.

Send "Write parameter volatile" order

Table 18: DP-V1 header of the Write.request with parameter order

Service:	Write.request	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	16	16 byte user data for order buffer

Table 19: Write.req user data for MOVILINK® service "Write parameter volatile"

Byte	Field	Value	Description
0	Request Reference	0x01	Individual reference number for the parameter setting order that is reflected in the parameter response
1	Request ID	0x02	Change parameter (PROFIdrive)
2	Axis	0x01	Axis number; 0 = single axis
3	No. of parameters	0x01	1 parameter
4	Attributes	0x10	Access to parameter value
5	No. of elements	0x00	0 = access to direct value, no subelement
6..7	Parameter Number	0x7129	Parameter index 8489 = P160 n11
8..9	Subindex	0x0000	Subindex 0
10	Format	0x43	Double word
11	No. of values	0x01	Change 1 parameter value
12..13	Value HiWord	0x0000	Higher-order part of the parameter value
14..15	Value LoWord	0x0BB8	Lower-order part of the parameter value

After sending this Write.request, the Write.response is received. If there was no status conflict in processing the parameter channel, a positive Write.response occurs. Otherwise, the status fault is located in Error_code_1.

Requesting the parameter response

The table shows the coding of the Write.req user data including the DP-V1 header.

Table 20: Read.req for requesting the parameter response

Field	Value	Description
Function_Num		Read.req
Slot_Number	X	Slot_Number not used
Index	47	Index of data set
Length	240	Maximum length of response buffer in DP-V1 master

Positive response to “Write Parameter volatile”

Table 21: DP-V1 header of the positive Read.response with parameter response

Service:	Read.response	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	4	12 byte user data in response buffer

Table 22: Positive response for MOVILINK® service "Write Parameter"

Byte	Field	Value	Description
0	Response reference	0x01	Reflected reference number from the parameter setting order
1	Response ID	0x02	Positive MOVILINK® response
2	Axis	0x01	Reflected axis number; 0 = single axis
3	No. of parameters	0x01	1 parameter

Negative parameter response

The following table shows the coding of a negative response of a PROFIdrive service. Bit 7 is entered in the Response ID if the response is negative.

Table 23: Negative response for PROFdrive service

Service:	Read.response	
Slot_Number	0	random, (is not evaluated)
Index	47	Index of the data set; constant index 47
Length	8	8 byte user data in response buffer

Byte	Field	Value	Description
0	Response reference	0x01	Reflected reference number from the parameter setting order
1	Response ID	0x810x82	Negative response for “Request Parameter” Negative response for “Change Parameter”
2	Axis	0x00	Reflected axis number; 0 = single axis
3	No. of parameters	0x01	1 parameter
4	Format	0x44	Error
5	No. of values	0x01	1 error code
6..7	Error value	0x0811	MOVILINK® return code z. B. ErrorClass 0x08, Add. Code 0x11 (see the table MOVILINK® return codes for DP-V1)

PROFIdrive return codes for DP-V1

The following table shows the coding of the error number in the PROFIdrive DP-V1 parameter response according to PROFIdrive profile V3.1. This table applies if you use the PROFIdrive services "Request Parameter“ or "Change Parameter.“

Error no.	Meaning	Used at	Supplem. Info
0x00	Impermissible parameter number	Access to unavailable parameter	0
0x01	Parameter value cannot be changed	Change access to a parameter value that cannot be changed	Subindex
0x02	Low or high limit exceeded	Change access with value outside the value limits	Subindex
0x03	Faulty subindex	Access to unavailable subindex	Subindex
0x04	No array	Access with subindex to non-indexed parameter	0
0x05	Incorrect data type	Change access with value that does not match the data type of the parameter	0
0x06	Setting not permitted (can only be reset)	Change access with value unequal to 0 where this is not permitted	Subindex
0x07	Description element cannot be changed	Change access to a description element that cannot be changed	Subindex
0x08	Reserved	(PROFIdrive Profile V2: PPO-Write requested in IR not available)	-
0x09	No description data available	Access to unavailable description (parameter value is available)	0
0x0A	Reserved	(PROFIdrive Profile V2: Access group wrong)	-
0x0B	No operation priority	Change access without rights to change parameters	0
0x0C	Reserved	(PROFIdrive Profile V2: wrong password)	-
0x0D	Reserved	(PROFIdrive Profile V2: Text cannot be read in cyclic data transfer)	-
0x0E	Reserved	(PROFIdrive Profile V2: Name cannot be read in cyclic data transfer)	-
0x0F	No text array available	Access to text array that is not available (parameter value is available)	0
0x10	Reserved	(PROFIdrive Profile V2: No PPO-Write) -	
0x11	Request cannot be executed because of operating state	Access is temporarily not possible for reasons that are not specified in detail	0
0x12	Reserved	(PROFIdrive Profile V2: other error)	
0x13	Reserved	(PROFIdrive Profile V2: Data cannot be read in cyclic interchange)	
0x14	Value impermissible	Change access with a value that is within the value limits but is not permissible for other long-term reasons (parameter with defined single values)	Subindex
0x15	Response too long	The length of the current response exceeds the maximum transmittable length	0
0x16	Parameter address impermissible	Illegal value or value which is not supported for the attribute, number of elements, parameter number or subindex or a combination	0
0x17	Illegal format	Write request: Illegal format or format of the parameter data which is not supported	0
0x18	Number of values is not consistent	Write request: Number of parameter data values that do not match the number of elements in the parameter address	0

Error no.	Meaning	Used at	Supplem. Info
0x19	axis nonexistent	Access to an axis which does not exist	-
up to 0x64	Reserved	-	-
0x65..0xFF	Manufacturer-specific	-	-

6.4 Project planning for a C1 master

A special GSD file *SEWA6003.GSD* is required for the project planning of a DP-V1 C1 master. This file activates the DP-V1 functions of the DFP21B. Therefore, the fucntions of the GSD file and the DFP21B firmware must correspond with one another. When you implement the DP-V1 functions, SEW-EURODRIVE provides you with two GSD files (→ chapter "GSD files").

Operating mode (DP-V1 mode)

As a rule, the operating mode DP-V1 can be activated during project planning for a C1 master. All DP slaves, which have the DP-V1 functions enabled in their GSD files and which support DP-V1, will then be operated in the DP-V1 mode. Standard DP slaves will still be run via PROFIBUS-DP. This ensures mixed mode is run for DP-V1 and DP-capable modules. Depending on the specifiction of the master functionality, a DP-V1-capable station, that was configured using the DP-V1 GSD file, can run in the "DP" operating mode.

6.5 Appendix

Example program for SIMATIC S7

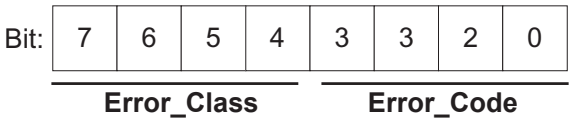
The STEP7 code stored in the GSD file shows how parameters are accessed via the STEP7 system function blocks SFB 52/53. You can copy the STEP7 code and import/compile it as STEP7 source.

DP-V1 technical data for MOVIDRIVE® DFP21/MCH41

GSD file for DP-V1:	SEWA6003.GSD
Module name for project planning:	MOVIDRIVE DFP21B/MCH (DP-V1)
Number of parallel C2 connections:	2
Supported data set:	Index 47
Supported slot number:	Recommendation: 0
Manufacturer code:	10A hex (SEW-EURODRIVE)
Profile ID:	0
C2-Response Timeout	1 s
Max. length C1 channel:	240 bytes
Max. length C2 channel:	240 bytes

Error codes of the DP-V1 services

This table shows possible error codes of DP-V1 services that may occur in the event of an error in the communication on DP-V1 telegram level. This table is relevant if you want to write your own parameter assignment block based on the DP-V1 services because the error codes are reported directly back on the telegram level.



Error_Class (from DP-V1 specification)	Error_Code (from DP-V1 specification)	DP-V1 parameter channel
0x0 ... 0x9 hex = reserved		
0xA = application	0x0 = read error 0x1 = write error 0x2 = module failure 0x3 to 0x7 = reserved 0x8 = version conflict 0x9 = feature not supported 0xA to 0xF = user specific	
0xB = access	0x0 = invalid index	0xB0 = No data block Index 47 (DB47); parameter requests are not supported
	0x1 = write length error 0x2 = invalid slot 0x3 = type conflict 0x4 = invalid area	
	0x5 = state conflict	0xB5 = Access to DB 47 temporarily not possible due to internal processing status
	0x6 = access denied	
	0x7 = invalid range	0xB7 = Write DB 47 with error in the DB 47 header
	0x8 = invalid parameter 0x9 = invalid type 0xA to 0xF = user specific	
0xC = resource	0x0 = read constraint conflict 0x1 = write constraint conflict 0x2 = resource busy 0x3 = resource unavailable 0x4..0x7 = reserved 0x8..0xF = user specific	
0xD...0xF = user specific		

7 Fault Diagnostics

7.1 Diagnostic procedures

The diagnostic procedures described in the following section demonstrate the fault analysis methods for the most frequent problems:

- Inverter does not work with PROFIBUS-DP
- Inverter cannot be controlled using the DP master

For more information dealing specifically with the inverter parameter settings for various fieldbus applications, refer to the *Fieldbus Unit Profile manual and the MOVIDRIVE® parameter list*. Also read the current information on the GSD disk.

Diagnostic problem 1: Inverter does not work with PROFIBUS.
Initial status:
- Inverter is connected to PROFIBUS
- Inverter configured in DP master and bus communication is active

↓

Is the bus connector plugged in? — No → **[A]**

Yes ↓

Response of the LED BUS FAULT? — OFF → **[B]**; ON → **[C]**

FLASHING ↓

Inverter detects baud rate (P092 Baud rate fieldbus). However it was not configured, or was configured incorrectly, in the DP master.

↓

Check the configured bus address and the bus address set using the DIP switches (P093 Fieldbus address)

↓

Are the bus addresses the same? — No → **[D]**

Yes ↓

You may have configured an incorrect unit type or defined the configuration incorrectly

↓

Delete the project planning for the inverter from the DP network.

↓

Perform project planning for the inverter again, choosing the unit designation "MOVIDRIVE+DFP21".
To simplify the project planning process, use a predefined configuration (for example, "Param + 3PD"). Do not change any of the preset configuration data!
Assign the address range for your control system.

↓

Load the configuration in the DP master and start the bus communication again.

[A]	Check the bus cabling!
[B]	Inverter is currently exchanging data cyclically with the DP master. P090 PD configuration displays the configuration with which the inverter is controlled via DP.
	↓
	Bus communication is functioning properly (for problems with controlling or setpoint selection via PROFIBUS DP, continue with **Diagnostic problem 2**).
[C]	Inverter does **not** detect the baud rate (P092 Baud rate fieldbus)!
	↓
	Check the bus cabling!
[D]	Adapt the bus addresses!

Diagnostic problem 2:
Inverter cannot be controlled using the DP master.
Initial status:
- Bus communication with inverter OK (LED BUS FAULT off)
- Inverter running with 24 V (no supply voltage)

↓

The problem is either caused by incorrect parameter settings in the inverter or a faulty control program in the DP master.

↓

Use P094 ... P097 (setpoint description PA1 ... PA3) to check whether the setpoints sent by the controller are received correctly.
To do so, send a setpoint other than 0 as a test in each output word.

↓

Setpoints received? Yes → **[A]**

No

↓

Check that the correct settings have been made for the following drive parameters:
- P100 SETPOINT SOURCE FIELDBUS
- P101 CTRL SIGNAL SOURCE FIELDBUS
- P876 ENABLE PO DATA YES

↓

Settings OK? No → **[B]**

Yes

↓

The problem may be caused by your control program in the DP master.

↓

Check that the address used in the program is the same as the address for project planning.
Note that the inverter requires consistent data and access must take place within the control program, if necessary, via special system functions (for example, Simatic S7, SFC 14/15).

[A]	Setpoints are not transferred. Check whether the drive inverter has been enabled at the terminals.

[B]	Correct settings.

8 Technical Data

8.1 DFP21B option

DFP21B option	
Part number	824 240 2
Power consumption	P = 3 W
PROFIBUS protocol options	PROFIBUS-DP and DP-V1 to IEC 61158
Automatic baud rate detection	9.6 kbaud ... 12 Mbaud
Connection technology	• Via 9-pin sub D plug • Pin assignment to IEC 61158
Bus termination	Not integrated, implement using suitable PROFIBUS plug with terminating resistors that can be switched on.
Station address	0 ... 125, can be set using DIP switch
Name of the GSD file	• SEW_6003.GSD (PROFIBUS-DP) • SEWA6003.GSD (PROFIBUS-DP-V1)
DP identity number	$6003_{hex} = 24579_{dec}$
Application-specific parameter-setting data (Set-Prm application data)	• Length: 9 bytes • Hex parameter settings 00,00,00,06,81,00,00,01,**01** = DP diagnostics alarm = **OFF** • Hex parameter settings 00,00,00,06,81,00,00,01,**00** = DP diagnostics alarm = **ON**
DP configurations for DDLM_Chk_Cfg	• F0hex = 1 process data word (1 I/O word) • F1hex = 2 process data words (2 I/O words) • F2hex = 3 process data words (3 I/O words) • 0hex, F5hex = 6 process data words (6 I/O words) • 0hex, F9hex = 10 process data words (10 I/O words) • F3hex, F0hex = parameter channel + 1 process data word (5 I/O words) • F3hex, F1hex = parameter channel + 2 process data words (6 I/O words) • F3hex, F2hex = parameter channel + 3 process data words (7 I/O words) • F3hex, F5hex = parameter channel + 6 process data words (10 I/O words) • F3hex, F9hex = parameter channel +10 process data words (14 I/O words)
Diagnostics data	• Max. 8 bytes • Standard diagnostics: 6 bytes
Tools for startup	• MOVITOOLS® PC program • DBG11B keypad

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SEW-EURODRIVE GmbH & Co KG · P.O. Box 3023 · D-76642 Bruchsal/Germany
Phone +49 7251 75-0 · Fax +49 7251 75-1970
http://www.sew-eurodrive.com · sew@sew-eurodrive.com

SEW EURODRIVE