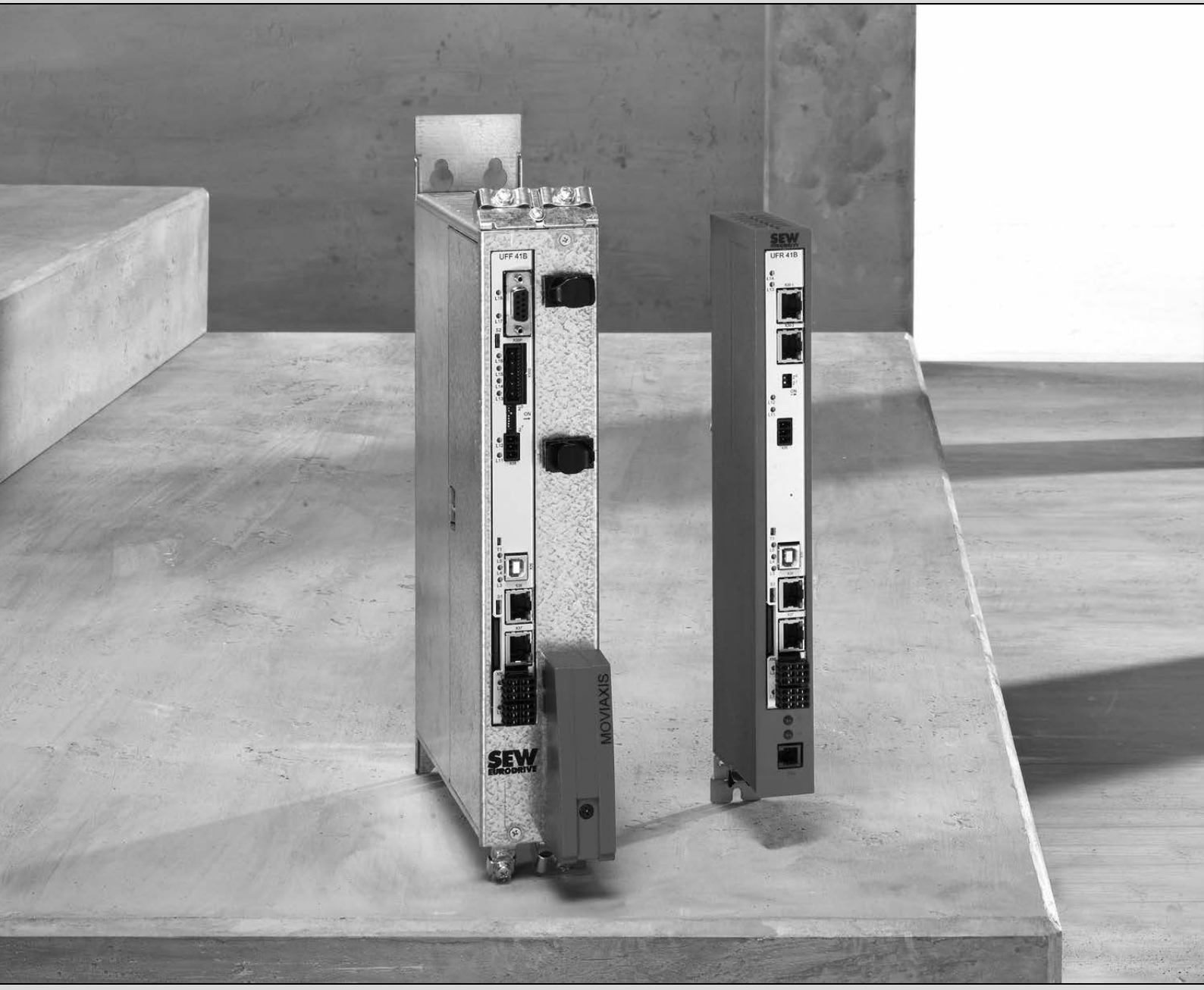
SEW EURODRIVE



Fieldbus Gateway UFF41B
DeviceNet and PROFIBUS DP

Edition 02/2009

16756428 / EN

Manual

SEW EURODRIVE

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1 General Information

1.1 Using the manual

The manual is part of the product and contains important information on operation and service. The manual is written for all employees who assemble, install, startup, and service the product.

The manual must be accessible and legible. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the manual carefully and understood it. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

The safety notes in this manual are structured as follows:

Pictogram	SIGNAL WORD
	Type and source of danger. Possible consequence(s) if the safety notes are disregarded. • Measure(s) to prevent the danger.

Pictogram	Signal word	Meaning	Consequences if disregarded
Example:  General danger  Specific danger, e.g. electric shock	DANGER	Imminent danger	Severe or fatal injuries
	WARNING	Possible dangerous situation	Severe or fatal injuries
	CAUTION	Possible dangerous situation	Minor injuries
	NOTICE	Possible damage to property	Damage to the drive system or its environment
	TIP	Useful information or tip. Simplifies the handling of the drive system.	

1.3 Rights to claim under limited warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the manual. Therefore, read the manual before you start operating the device!

1.4 Exclusion of liability

You must comply with the information in the manual and the documentation of the units connected to the fieldbus gateway to ensure safe operation and to achieve the specified product characteristics and performance features. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of the operating instructions. In such cases, any liability for defects is excluded.

1.5 Copyright notice

2 Safety Notes

2.1 Other applicable documentation

- Installation and startup only by trained personnel observing the relevant accident prevention regulations and the following documents:
  - "MOVIDRIVE® MDX60B/61B" operating instructions
  - "MOVITRAC® B" operating instructions
  - "MOVIAXIS®" operating instructions
- Read through these documents carefully before you commence installation and startup of the UFF41B fieldbus gateway.
- As a prerequisite to fault-free operation and fulfillment of warranty claims, you must adhere to the information in the documentation.

2.2 General safety notes for bus systems

This communication system lets you adjust inverters and servo inverters to a variety of different applications. 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 unit behavior. This may result in unexpected (not uncontrolled) system behavior.

2.3 Safety functions

The inverters and servo drives are not allowed to perform any safety functions unless they are subordinate to other safety systems. Use higher-level safety systems to ensure protection of equipment and personnel.

For safety applications, ensure that the information in the following publications is observed: "Safe Disconnection for MOVIDRIVE® B / MOVITRAC® B / MOVIAXIS®".

2.4 Hoist applications

MOVIDRIVE® MDX60B/61B, MOVITRAC® B and MOVIAXIS® must not be used as a safety device in hoist applications.

Use monitoring systems or mechanical protection devices as safety equipment to avoid possible damage to property or injury to people.

2.5 Product names and trademarks

The brands and product names contained within this manual are trademarks or registered trademarks of the titleholders.

2.6 Waste disposal

Observe the applicable national regulations.

Dispose of the following materials separately in accordance with the country-specific regulations in force, as:

- Electronics scrap
- Plastic
- Sheet metal
- Copper

3 Introduction

3.1 Content of the manual

This user manual describes how to:

- Connect the UFF41B fieldbus gateway to MOVIDRIVE® B, MOVITRAC® B inverters and to the MOVIAXIS® servo inverter.
- Startup MOVIDRIVE® B, MOVITRAC® B and MOVIAXIS® for gateway operation.
- Startup the UFF41B fieldbus gateway with the DeviceNet and PROFIBUS DP-V1 fieldbus systems.
- Configure the DeviceNet master with EDS files.
- Configure the PROFIBUS DP-V1 master using GSD files.

3.2 Characteristics

The powerful, universal fieldbus interfaces of the UFF41B option enable you to use the option to connect to higher-level automation systems via DeviceNet and PROFIBUS DP-V1.

3.2.1 Process data exchange

The UFF41B fieldbus gateway allows for digital access to most parameters and functions via the DeviceNet and PROFIBUS interfaces. Control is performed via fast, cyclic process data. Via this process data channel, you can enter setpoints and trigger various control functions, such as enable, normal stop, rapid stop, etc. At the same time you can also use this channel to read back actual values, such as actual speed, current, unit status, error number or reference signals. In DeviceNet operation, process data are exchanged with polled I/O and bit-strobe I/O. In PROFIBUS operation, they are exchanged via I/O data in the master.

3.2.2 Parameter access

In DeviceNet operation, the parameters of the inverter are set solely via *explicit messages*.

In PROFIBUS operation, the PROFIBUS DP-V1 parameter mechanisms lets you access any device information.

3.2.3 Monitoring functions

Using a fieldbus system requires additional monitoring functions, for example, time monitoring of the fieldbus (fieldbus timeout) or rapid stop concepts. You can determine, for instance, which fault responses should be triggered in the event of a bus error. The parameters for the fault response can be set in the servo inverter / inverter. A rapid stop is useful for many applications. This is why the fieldbus gateway will stop the lower-level drives in the event of a fieldbus timeout. As the range of functions for the control terminals is also guaranteed in fieldbus mode, you can continue to implement rapid stop concepts using the servo inverters/inverters connected to the fieldbus gateway.

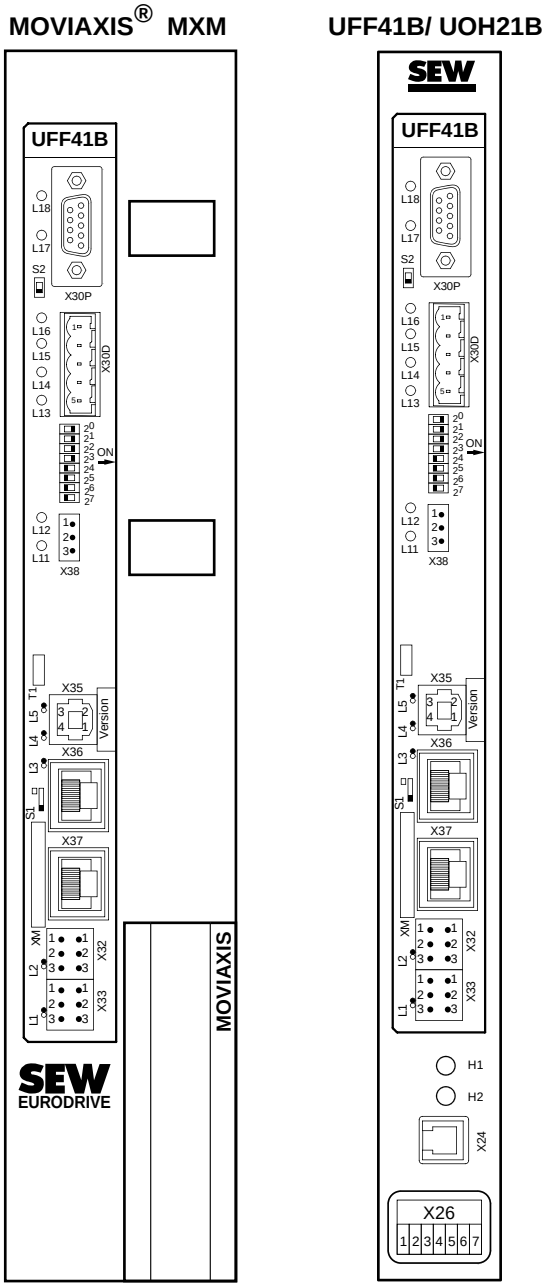
4 Assembly and Installation Instructions

This chapter contains information on the assembly and installation of the UFF41B fieldbus gateway in a MOVIAXIS® master module MXM or in an UOH21B gateway housing.

4.1 Installation options of the UFF41B fieldbus gateway

Observe the following installation instructions:

	TIP
	Only SEW-EURODRIVE is allowed to install/remove the UFF41B fieldbus gateway into/from a MOVIAXIS® master module MXM and an UOH21B gateway housing.



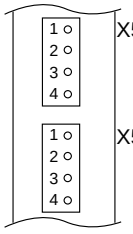
4.2 Voltage supply

Voltage supply, system bus and fieldbus interfaces as well as the engineering interface are located at different potential levels (see chapter 13.1).

4.2.1 Voltage supply in the MOVIAXIS® master module

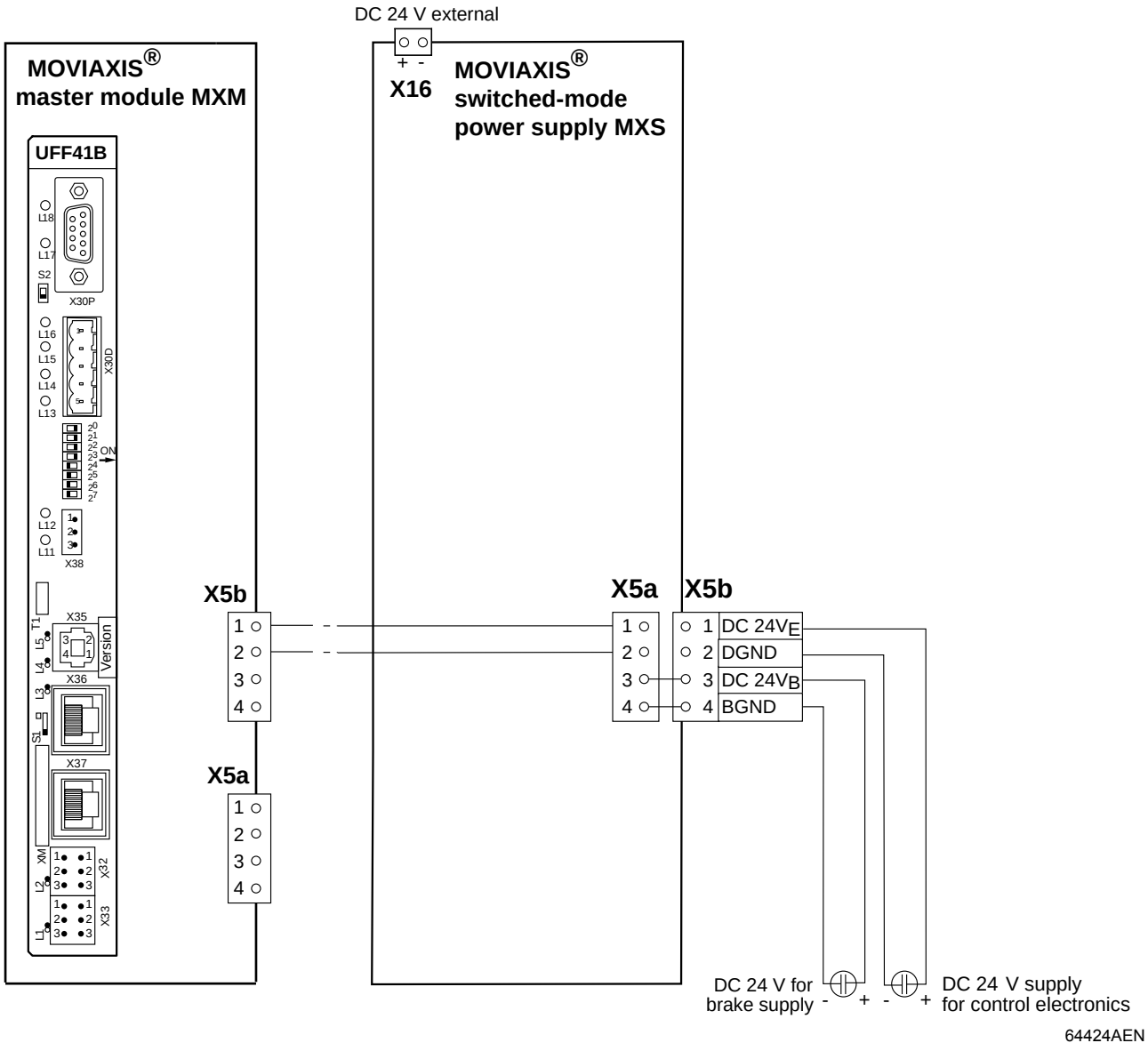
	TIP
	The MOVIAXIS® master module MXM provides additional connections that are described in the following section.

Functional description of the terminals, X5a/X5b (MOVIAXIS® master module)

MOVIAXIS® master module MXM	Designation	Terminal		Function
 59233AXX	**X5b connector**	**X5b:1** **X5b:2** **X5b:3** **X5b:4**	DC 24 V_E DGND DC 24 V_B BGND	Voltage supply for control electronics Reference potential for control electronics Voltage supply for brake Reference potential for brake connection
	Terminal X5a	**X5a:1** **X5a:2** **X5a:3** **X5a:4**	DC 24 V_E DGND DC 24 V_B BGND	Voltage supply for control electronics Reference potential for control electronics Voltage supply for brake Reference potential for brake connection

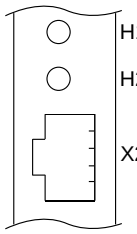
- The terminals X5a and X5b are connected in parallel. In this way, the voltage supply of the MOVIAXIS® master module can be provided from the right to X5b or from below to X5a. With connection to X5a, further modules can be connected via X5b (e.g. supply module, axis module). The voltage supply for the brake (X5a/b:3, 4) is fed through the MOVIAXIS® master module.
- The UFF41B fieldbus gateway can be supplied from the MOVIAXIS® switched-mode power supply (MXS) or from an external voltage source. To do so, connect X5 between the individual units.
- If the UFF41B fieldbus gateway is connected with DC 24 V from the MOVIAXIS® switched-mode power supply, the functioning of the option is maintained after disconnection from the power supply. This is the case if the DC link voltage is maintained or an external DC 24 V supply is present from the MOVIAXIS® switched-mode power supply.

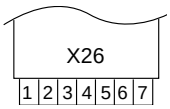
Wiring diagram



4.2.2 Voltage supply in the UOH21B gateway housing

Description of the terminals and LED functions

Front view MOVITRAC® B / compact controller	Designation	LED Terminal		Function
 58905AXX	**LED**	**H1** **H2**		Reserved Reserved
	Connector X24: RJ10 socket	**X24:4** **X24:3** **X24:2** **X24:1**		**No function.** Engineering cannot be performed using X24.

Side view compact controller	Designation	Terminal		Function
 58906AXX	**Connector X26: CAN 1 and voltage supply (plug-in terminal)**	**X26:1** **X24:2** **X24:3** **X24:4** **X26:5** **X26:6** **X26:7**	CAN1H CAN1L DGND Reserved Reserved DGND DC 24 V	System bus CAN 1 high System bus CAN 1 low Reference potential control/CAN1 - - Reference potential for UFF41B Voltage supply for controller

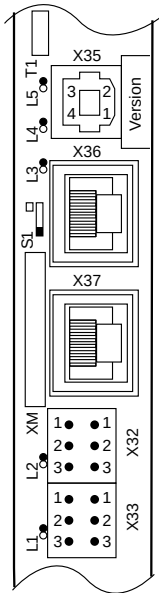
Connection of CAN 1 system bus / voltage supply (terminal X26)

The connections for CAN 1 (X26:1/2/3 and connector X33) are connected in parallel. The UFF41B fieldbus gateway is supplied with voltage in the UOH21B gateway housing via X26:6/7.

4.3 Connecting inverters and engineering PC

4.3.1 Functional description of the terminals, DIP switches and LEDs of the UFF41B option

Connectors, LEDs and DIP switches in the upper part of the UFF41B fieldbus gateway allow for connection to the fieldbus systems DeviceNet (see section "Connecting the UFF41B fieldbus gateway to a DeviceNet network") and PROFIBUS-DP (see section "Connecting the UFF41B fieldbus gateway to a PROFIBUS network").

Front view UFF41B fieldbus gateway	Designation	LED DIP switch Terminal		Function
UFF41B UFR41B  64418AXX	**LED**	**LED 1** **LED 2** **LED 3** **LED 4** **LED 5**	CAN 1 status CAN 2 status Program status Gateway status Gateway error	Status of CAN 1 system bus Status of CAN 2 system bus Status of gateway program Status of gateway firmware Status of gateway error (see section "Error messages of the fieldbus gateway")
	Terminal X35: **USB connection**	**X35:1** **X35:2** **X35:3** **X35:4**	USB+5 V USB- USB+ DGND	DC 5 V voltage supply Signal USB- Signal USB+ Reference potential
	Terminal X36: **Connection of an EtherCAT based system bus (RJ45 socket)**	**X36**	Standard Ethernet assignment	System bus SBUS^{plus} (in preparation)
	Terminal X37: **Ethernet connection (RJ45 socket)**	**X37**		Ethernet for engineering
	Terminal X32: **System bus CAN 2 (electrically isolated) (plug-in terminals)**	**X32:1** **X32:2** **X32:3**	BZG_CAN 2 CAN 2H CAN 2L	Reference potential for system bus CAN 2 System bus CAN 2 high System bus CAN 2 low
	Terminal X33: **System bus CAN 1 (plug-in terminals)**	**X33:1** **X33:2** **X33:3**	DGND CAN 1H CAN 1L	Reference potential for system bus CAN 1 System bus CAN 1 high System bus CAN 1 low
	DIP switch	**S1**	Top Bottom	Default IP address (192.168.10.4) IP parameter from SD memory card
	Memory card	**M1**		Memory for firmware, gateway application, gateway configuration, and inverter parameters
	Button	**T1**		For Bootloader update (see section "SD memory card OMG4.B")

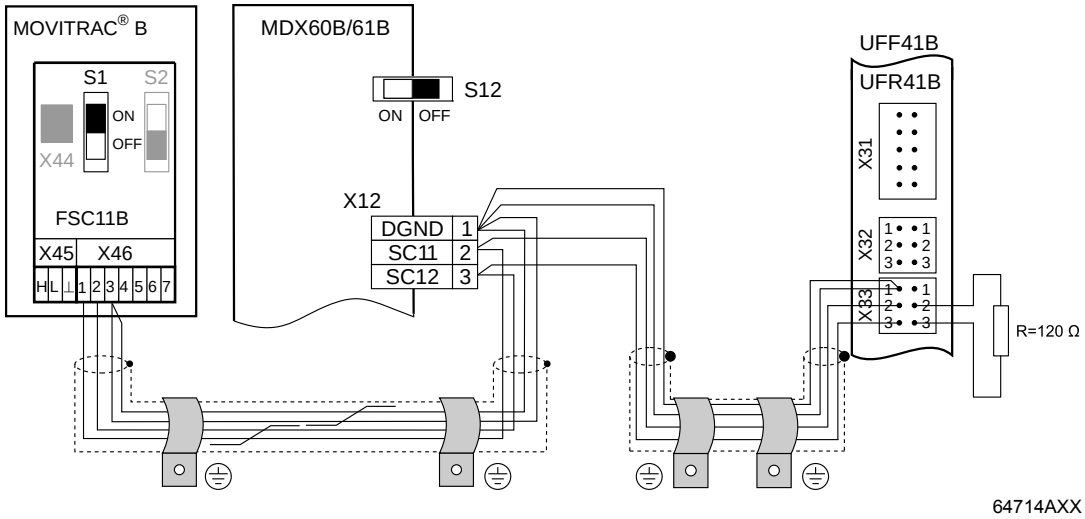
4.3.2 Connecting CAN 1 system bus (terminal X33) / CAN 2 (terminal X32)

Do not connect more than 64 units to the CAN 1 or CAN 2 system bus. The system bus supports the address range 0 to 63.

	TIPS
	• The CAN 1 system bus is **not** electrically isolated. Therefore, it is recommended to use the CAN 1 (X33 or X26 with UFF41B/UOH21B) interface to connect inverters via the system bus in the control cabinet. Set the *P881 SBus address* parameter in increasing order to values 1 - 16 if the slave unit is connected to CAN 1 or the fieldbus gateway. • The CAN 2 system bus is electrically isolated. Therefore, preferably use interface CAN 2 (X32) for connecting field units or units in other control cabinets. Set the *P881 SBus address* parameter in increasing order to values 17 - 34 if the unit is connected to CAN 2 or the fieldbus gateway.

The CAN system bus supports transmission systems compliant with ISO 11898. For detailed information on the CAN system bus, refer to the "MOVIDRIVE® Communication and Fieldbus Device Profile" manual. You can order this manual from SEW-EURODRIVE.

Wiring diagram for MOVIDRIVE® B, MOVITRAC® B on CAN 1 system bus



Cable specification

- Use a 2 x 2-core twisted and shielded copper cable (data transmission cable with braided copper shield). Clamping without conductor end sleeves is possible in accordance with IEC 60999. The cable must meet the following specifications:
  - Cable cross-section 0.2 to 1.0 mm^2 (AWG 24 - AWG 18)
  - Cable resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m at 1 kHz

  Suitable cables include CAN bus or DeviceNet cables.

Cable length

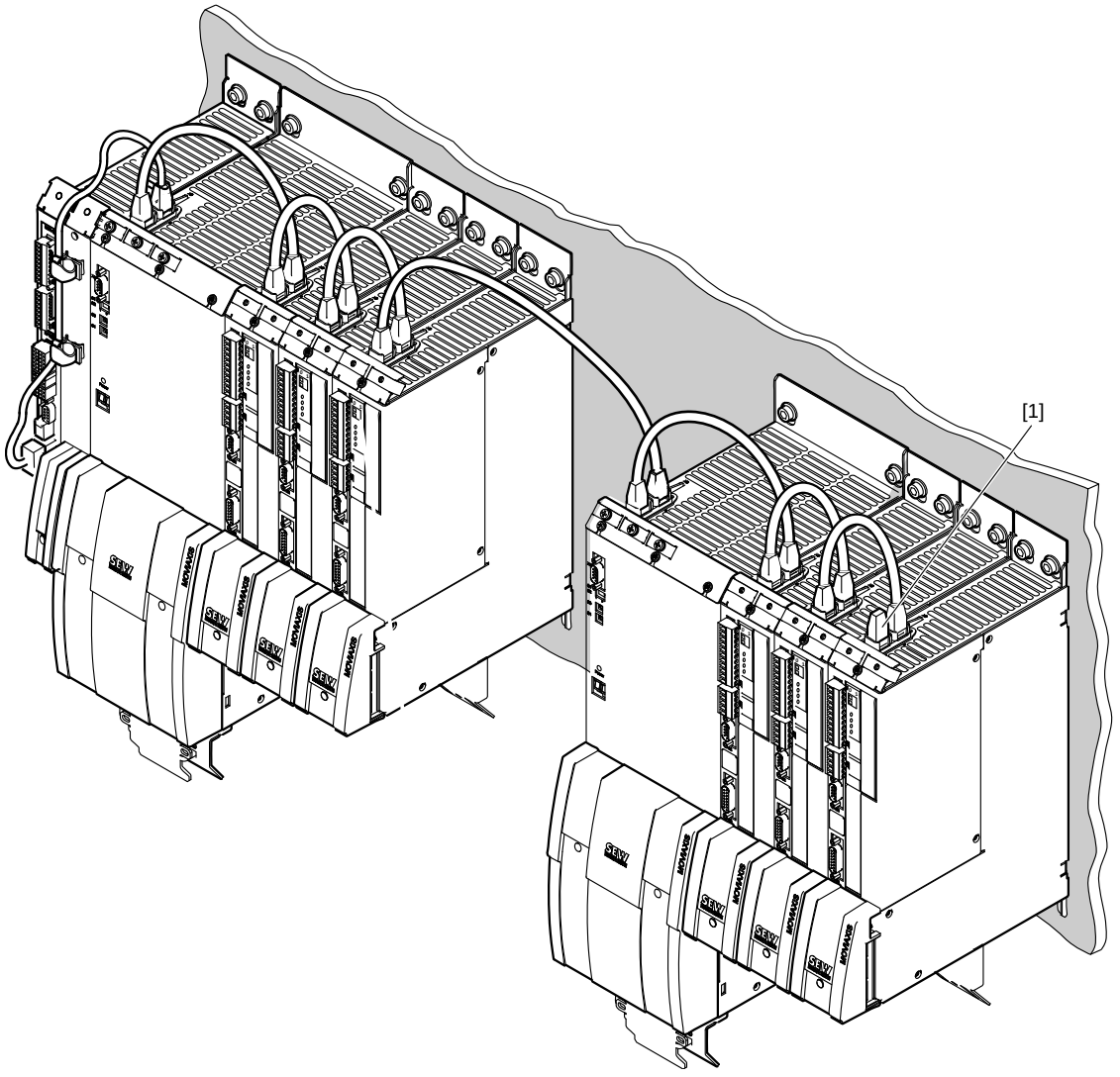
- The permitted total cable length depends on the baud rate setting of the system bus:
  - 125 kBaud → 500 m
  - 250 kBaud → 250 m
  - **500 kBaud → 100 m**
  - 1000 kBaud → 40 m

Terminating resistor

- Switch on the system bus terminating resistor at the start and end of the CAN system bus connection (MOVIDRIVE® B, DIP switch S12 = ON; MOVITRAC® B, DIP switch S1 = ON). For all other devices, switch off the terminating resistor (MOVIDRIVE® B, DIP switch S12 = OFF; MOVITRAC® B, DIP switch S1 = OFF). If the fieldbus gateway is, for example, located at the end of the CAN 2 system bus, you have to connect a terminating resistor of 120 Ω between pins X32:2 and X32:3 (for CAN 1: Terminating resistor between pins X33:2 and X33:3).

	CAUTION
	• There **must not** be any potential displacement between the units connected via the CAN 2 system bus. • There **must not** be any potential displacement between the units connected via the CAN 1 system bus. • Take suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.

Wiring diagram for MOVIAXIS® on CAN 1 system bus

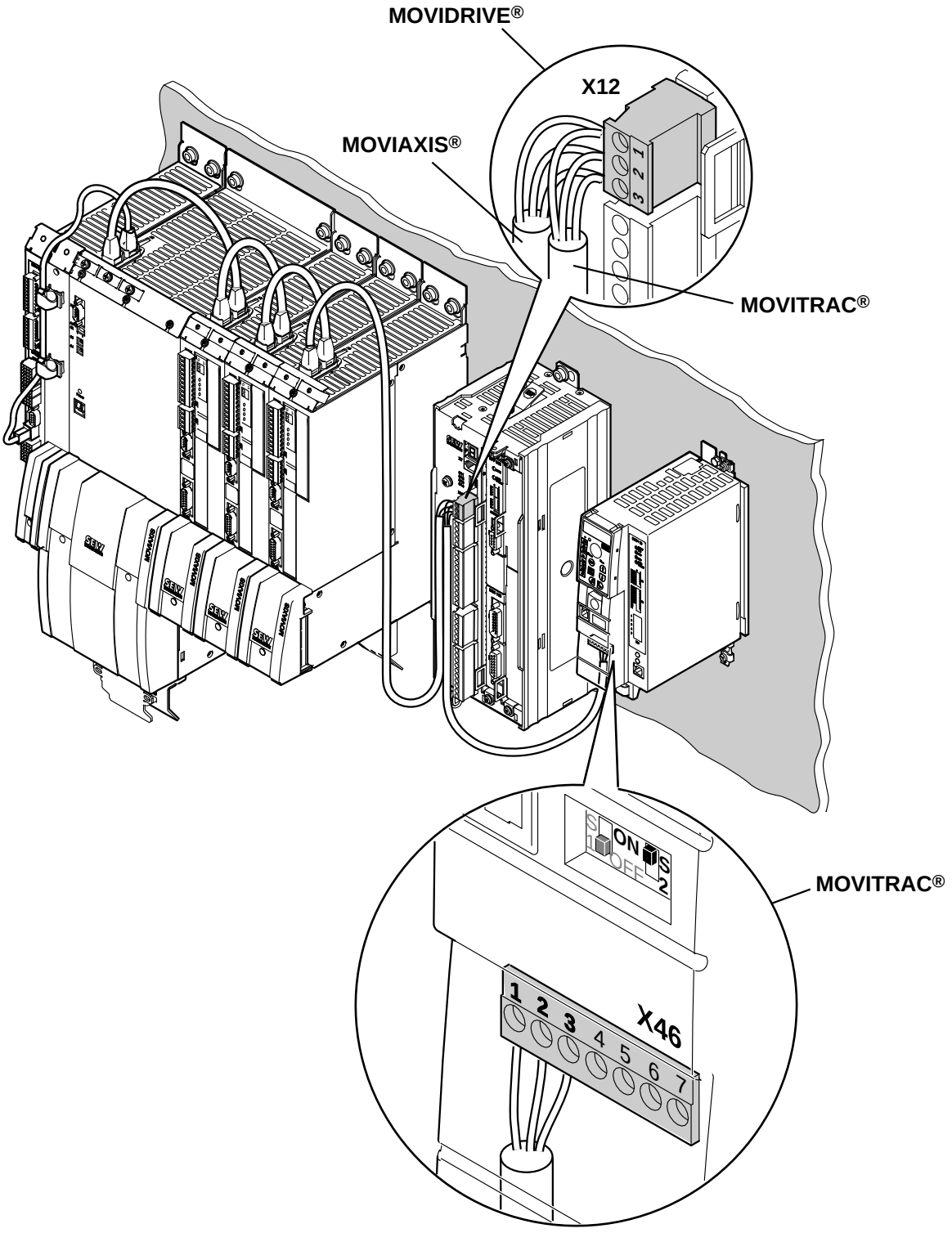


[1] Terminating resistor

Overview of system connection cables

Type	Part number	Description
CAN system cable	0819 692 3	System cable UFF41B gateway CAN 1 post connector (or CAN 2) to MOVIAXIS® supply/regenerative power module CAN 1 system bus RJ45, length: 750 mm
CAN1 connection cable, 750 mm, RJ45-RJ45	0819 7261	CAN1 connection cable between MOVIAXIS® axis system and MOVIAXIS® axis system, length: 750 mm
CAN1 connection cable, 3000 mm, RJ45-RJ45	0819 8993	CAN1 connection cable between MOVIAXIS® axis system and MOVIAXIS® axis system, length: 3000 mm
CAN2 adapter cable	1810 1607	CAN2 post connector between master module and CAN2 SUB-D9 MOVIAXIS®, length: 500 mm
CAN2 connection cable	1810 1585	CAN2 SUB-D9 MOVIAXIS® and CAN2 SUB-D9 MOVIAXIS®, to connect 3 axis modules
CAN2 connection cable	1810 1593	CAN2 SUB-D9 MOVIAXIS® and CAN2 SUB-D9 MOVIAXIS®, to connect 4 axis modules
Terminating resistor CAN 2	1810 1615	Terminating resistor for CAN 2 connections between axis modules

Wiring diagram for MOVIAXIS®, MOVIDRIVE® B and MOVITRAC® B on CAN 1 system bus



Overview of system connection cables

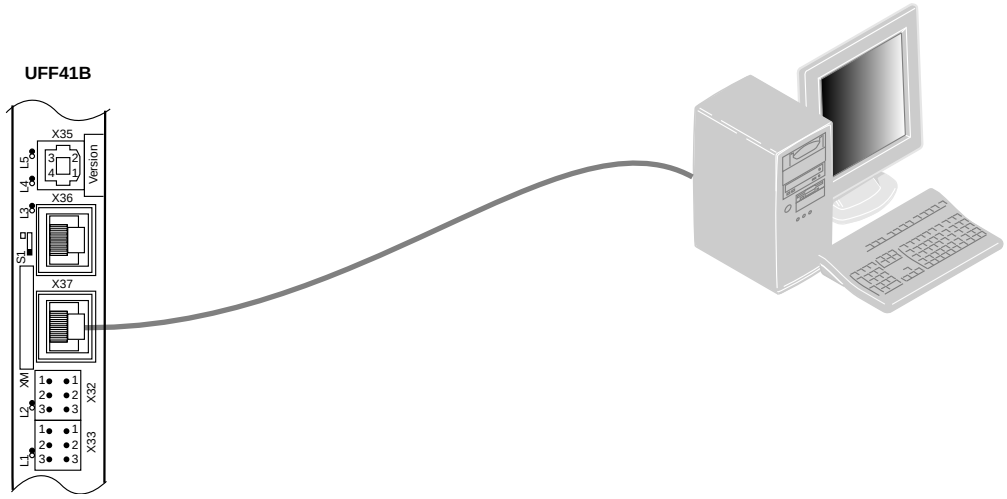
Type	Part number	Description
CAN1 connection cable, 750 mm, RJ45 litz wire	0819 7288	CAN connection cable MOVIAXIS® axis system to MOVIDRIVE® and MOVITRAC®, length: 750 mm
CAN1 connection cable, 3000 mm, RJ45 litz wire	0819 7563	CAN connection cable MOVIAXIS® axis system to MOVIDRIVE® and MOVITRAC®, length: 3000 mm

4.3.3 Connecting SBUS^{plus} system bus (terminal X36)

Terminal X36 is intended for connecting a system bus based on EtherCAT (SBUS^{plus}).

4.3.4 Ethernet interface terminal (terminal X37)

You can connect an engineering PC to the Ethernet interface (terminal X37).



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The Ethernet interface (X37) supports auto crossing auto negotiation for baud rate and duplex mode. The IP parameters are defined depending on DIP switch S1 (see section "DIP switches S1 default IP address").

In addition to the engineering access via terminal X37, there is another engineering access via PROFIBUS (see section "Operation of MOVITOOLS® MotionStudio").

4.3.5 Pin assignment X37 (Ethernet for engineering)

Use prefabricated, shielded RJ45 plug connectors compliant with IEC 11801 edition 2.0, category 5.

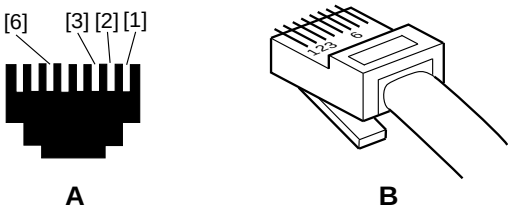

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Figure 1: Pin assignment of an RJ45 plug connector

A = Front view

B = View from back

[1] Pin 1 TX+ Transmit Plus

[2] Pin 2 TX- Transmit Minus

[3] Pin 3 RX+ Receive Plus

[6] Pin 6 RX- Receive Minus

Connecting UFF41B fieldbus gateway to Ethernet

To connect UFF41B to the Ethernet, connect the Ethernet interface X37 (RJ45 plug connector) to the other network stations using a category 5, class D twisted-pair cable in accordance with IEC 11801 edition 2.0. The interface supports auto crossing and high auto negotiation for baud rate and duplex mode.

	TIP
	According to IEC 802.3, the maximum cable length for 10/100 MBaud Ethernet (10BaseT / 100BaseT), e.g. between two network stations, is 100 m.

4.4 Status LED of the UFF41B fieldbus gateway

LED L1 (CAN 1 status)

The LED **L1** indicates the **status** of the **CAN 1** system bus.

Status of the L1 LED	Diagnostics	Remedy
Orange	The CAN 1 system bus is initialized.	-
Green	The CAN 1 system bus is initialized.	
Flashing green (0.5 Hz)	The CAN 1 system bus is currently in SCOM suspend mode.	
Flashing green (1 Hz)	The CAN 1 system bus is currently in SCOM On mode.	
Red	The CAN 1 system bus is off (BUS-OFF).	1. Check and correct the cabling of the CAN 1 system bus. 2. Check and correct the baud rate set for the CAN 1 system bus. 3. Check and correct the terminating resistors of the CAN 1 system bus.
Flashing red (1 Hz)	Warning on the CAN 1 system bus.	1. Check and correct the cabling of the CAN 1 system bus. 2. Check and correct the baud rate set for the CAN 1 system bus.

LED L2 (CAN 2 status)

The LED **L2** indicates the **status** of the **CAN 2** system bus.

Status of the L2 LED	Diagnostics	Remedy
Orange	The CAN 2 system bus is initialized.	-
Green	The CAN 2 system bus is initialized.	-
Flashing green (0.5 Hz)	The CAN 2 system bus is currently in SCOM suspend mode.	-
Flashing green (1 Hz)	The CAN 2 system bus is currently in SCOM On mode.	-
Red	The CAN 2 system bus is off (BUS-OFF).	1. Check and correct the cabling of the CAN 2 system bus. 2. Check and correct the baud rate set for the CAN 2 system bus. 3. Check and correct the terminating resistors of the CAN 2 system bus.
Flashing red (1 Hz)	Warning on the CAN 2 system bus.	1. Check and correct the cabling of the CAN 2 system bus. 2. Check and correct the baud rate set for the CAN 2 system bus.

LED L3 (program status)

LED **L3** indicates the **status** of the **gateway program**.

Status of L3	Diagnostics	Remedy
Green	Gateway program is running.	-
Off	No gateway program is loaded.	Load a gateway program into the controller.
Flashing orange (1 Hz)	Program has stopped.	Bootloader update required (see section "SD memory card type OMG4.B")

LED 4 (PLC status)

LED **L4** indicates the **firmware status** of the fieldbus gateway.

Status of the L4 LED	Diagnostics	Remedy
Flashing green (1 Hz)	The firmware of the fieldbus gateway is running properly.	-
Red	• No SD card plugged in. • File system of the SC card corrupt	
Flashing orange (1 Hz)	Program has stopped.	Bootloader update required (see section "SD memory card type OMG4.B")

LED L5 (user)

LED **L5** is lit up red if the gateway program has detected an error and if this error can only be eliminated after diagnostics with MOVITOOLS® MotionStudio.

4.5 DIP switch S1 default IP address

With DIP switch S1, you can set a default IP address for the Ethernet connection (X37). The set IP address is applied in the next boot process.

S1 switch setting	Meaning
Top	IP parameter: • IP address: 192.168.10.4 • Subnet mask: 255.255.255.0 • Standard gateway: 1.0.0.0
Bottom	The IP parameters defined on the memory card of the UFF41B gateway are used. The IP parameters for engineering interface X37 are entered in the file "...\System\NetConfig.cfg" in section "Ethernet 2". You can adjust the file using a text editor (e.g. Notepad).

4.5.1 TCP / IP addressing and subnetworks

Introduction

The settings for the address of the IP protocol are made using the following parameters:

- MAC address
- IP address
- Subnet mask
- Standard gateway

The addressing mechanisms and subdivision of the IP networks into sub-networks are explained in this chapter to help you set the parameters correctly.

MAC address

The MAC address (Media Access Controller) is the basis for all address settings. The MAC address is a worldwide unique 6-byte value (48 bits) assigned to the Ethernet device. SEW Ethernet devices have the MAC address 00-0F-69-xx-xx-xx. The MAC address is difficult to handle for larger networks. This is why freely assignable IP addresses are used.

IP address

The IP address is a 32 bit value that uniquely identifies a station in the network. An IP address is represented by four decimal numbers separated by decimal points.

Example: 192.168.10.4

Each decimal number stands for one byte (= 8 bits) of the address and can also be represented using binary code (see following table).

Byte 1		Byte 2		Byte 3		Byte 4
11000000	.	10101000	.	00001010	.	00000100

The IP address comprises a network address and a station address (see following table).

Network address	Station address
192.168.10	4

The part of the IP address that denotes the network and the part that identifies the station is determined by the network class and the subnetwork mask.

Station addresses cannot consist of only zeros or ones (binary) because they represent the network itself or a broadcast address.

Network classes

The first byte of the IP address determines the network class and as such represents the division into network addresses and station addresses.

Value range Byte 1	Network class	Complete network address (Example)	Meaning
0 - 127	A	10.1.22.3	10 = Network address 1.22.3 = Station address
128 - 191	B	172.16.52.4	172.16 = Network address 52.4 = Station address
192 - 223	C	192.168.10.4	192.168.10 = Network address 4 = Station address

This rough division is not sufficient for a number of networks. They also use an explicit, adjustable subnetwork mask.

Subnetwork mask

A subnetwork mask is used to divide the network classes into even finer sections. The subnetwork mask is represented by four decimal numbers separated by decimal points, in the same way as the IP address.

Example: 255.255.255.128

Each decimal number stands for one byte (= 8 bits) of the subnetwork mask and can also be represented using binary code (see following table).

Byte 1		Byte 2		Byte 3		Byte 4
11111111	.	11111111	.	11111111	.	10000000

If you compare the IP addresses with the subnetwork masks, you see that in the binary representation of the subnetwork mask all ones determine the network address and all the zeros determine the station address (see following table).

		Byte 1		Byte 2		Byte 3		Byte 4
IP address	decimal	192	.	168.	.	10	.	129
	binary	11000000	.	10101000	.	00001010	.	10000001
Subnet mask	decimal	255	.	255	.	255	.	128
	binary	11111111	.	11111111	.	11111111	.	10000000

The class C network with the address 192.168.10. is further subdivided into 255.255.255.128 using the subnetwork mask. Two networks are created with the address 192.168.10.0 and 192.168.10.128.

The following station addresses are permitted in the two networks:

- 192.168.10.1 - 192.168.10.126
- 192.168.10.129 - 192.168.10.254

The network stations use a logical AND operation for the IP address and the subnetwork mask to determine whether there is a communication partner in the same network or in another network. If the communication partner is in a different network, the standard gateway is addressed for passing on the data.

Standard gateway

The standard gateway is also addressed via a 32-bit address. The 32-bit address is represented by four decimal numbers separated by decimal points.

Example: 192.168.10.1

The standard gateway establishes a connection to other networks. In this way, a network station that wants to address another station can use a logical AND operation with the IP address and the subnetwork mask to decide whether the desired station is located in the same network. If this is not the case, the station addresses the standard gateway (router), which must be part of the actual network. The standard gateway then takes on the job of transmitting the data packages.

4.6 SD memory card type OMG4.B

The SD memory card type OMG4.B is required for operating the UFF41B fieldbus gateway and contains the firmware, the gateway program, and the gateway configuration. With a MOVIAXIS® axis module, it is also used for data backup and automatic parameterization in case an axis needs to be replaced.

The SD memory card type OMG4.B is included in the scope of delivery of the UFF41B fieldbus gateway.

Only use type OMG4.B memory cards in a UFF41B fieldbus gateway.

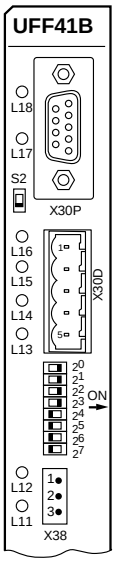
Bootloader update

When the LEDs L3 and L4 flash orange at a 1 Hz frequency after power-on, a bootloader update is required. Proceed as follows:

- Do not switch off the power supply during the entire process.
- Press the reset button T1 on the front of the UFF41B fieldbus gateway for 3 seconds. When the bootloader update starts, only LED 4 is flashing.
- The bootloader update has been successful when L4 flashes green.

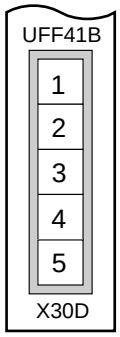
4.7 Connecting the UFF41B fieldbus gateway to a DeviceNet network

The following sections describes the terminals, DIP switches, and LEDs relevant for DeviceNet fieldbus operation.

Front view UFF41B fieldbus gateway	Designation	LED DIP switch Terminal		Function
 64775AXX	**LED**	**LED 18** **LED 17** **LED 16** **LED 15** **LED 14** **LED 13** **LED 12** **LED 11**	 Mod/Net Polled I/O Bit-strobe I/O BUSFAULT - -	LEDs 17 and 18 are reserved for PROFIBUS. LED 18 is lit orange: UFF41B option is being initialized The two-color LEDs 13 to 16 indicate the current status of the fieldbus interface and the DeviceNet system. Reserved Reserved
	Terminal X30D: **DeviceNet** **(plug-in terminals)**	**X30D:1** **X30D:2** **X30D:3** **X30D:4** **X30D:5**	V- CAN_L DRAIN CAN_H V+	0V24 CAN_L DRAIN CAN_H 24 V
	DIP switch S2 **Switching between PROFIBUS and DeviceNet**	**S2**	Top Bottom	Fieldbus interface PROFIBUS (X30P) active Fieldbus interface DeviceNet (X30D) active
	For operation via DeviceNet: **DIP switch** **for setting** **the MAC ID and the baud rate**	**2^0** **2^1** **2^2** **2^3** **2^4** **2^5** **2^6** **2^7**		The DIP switches 2^0 - 2^5 are used to set the MAC ID (**M**edia **A**ccess **C**ontrol **Id**entifier). The MAC ID represents the node address (address range 0 - 63) Baud rate setting Baud rate setting
	Terminal X38: **CAN for safety-relevant communication** **(plug-in terminals)**	**X38:1** **X38:2** **X38:3**		Reserved Reserved Reserved

4.7.1 Pin assignment X30D (DeviceNet)

The assignment of connecting terminals is described in the DeviceNet specification (Volume I, Appendix A).



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The UFF41B option is opto-decoupled on the driver side in accordance with the DeviceNet specification (Volume I, Chapter 9). This means the CAN bus driver must be powered with 24 V voltage via the bus cable. The cable to be used is also described in the DeviceNet specification (Volume I, Appendix B). The connection must be made according to the color code specified in the following table.

Pin no.	Signal	Meaning	Color coding
1	V-	0V24	BK
2	CAN_L	CAN_L	BU
3	DRAIN	DRAIN	blank
4	CAN_H	CAN_H	WH
5	V+	24 V	RD

UFF41B and DeviceNet connection

According to the DeviceNet specification, a linear bus structure without or with very short droplines is required.

The maximum permitted cable length depends on the baud rate setting:

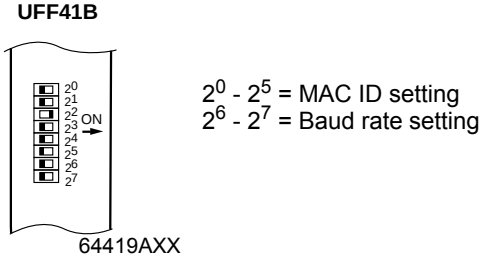
Baud rate	Maximum cable length
500 kBaud	100 m
250 kBaud	250 m
125 kBaud	500 m

4.7.2 Bus termination

In order to avoid disruptions in the bus system due to reflections, each DeviceNet segment must be terminated with 120 Ω bus terminating resistors at the first and last physical station. Connect the bus terminating resistor between connections 2 and 4 of the bus plug.

4.7.3 Setting the DIP switches

	TIP
	De-energize the UFF41B fieldbus gateway before you change the DIP switch settings. The DIP switch settings are adopted during initialization only.



Setting the MAC ID

The MAC ID (**M**edia **A**ccess **C**ontrol **Id**entifier) is set on the UFF41B option using DIP switches 2^0 - 2^5 in a binary coded manner. The MAC ID represents the node address of the UFF41B. The UFF41B supports the address range 0 - 63.

Setting the baud rate

The baud rate is set using DIP switches 2^6 and 2^7.

DIP switch		Baud rate
2^6	2^7	
0	0	125 kBaud
1	0	250 kBaud
0	1	500 kBaud
1	1	Invalid

A maximum of 64 DeviceNet data words can be exchanged between the DeviceNet module and the UFF41B option. The number is set using the DeviceNet scanner.

4.7.4 Status LED in DeviceNet operation

The UFF41B fieldbus gateway has four two-color LEDs for diagnostic of the DeviceNet system; they indicate the current status of the UFF41B and the DeviceNet system. The unit status corresponding to the status of the LED is described in chapter "Error diagnostics".

LED		
Designation	**Abbreviation**	**Complete LED designation**
L16	MOD/NET	Module/Network status
L15	PIO	Polled I/O
L14	BIO	Bit-strobe IO
L13	BUS FAULT	BUS FAULT

LED L16 (Mod/Net)

The function of the **L16 LED (Mod/Net =** Module/Network Status) described in the following table is specified in the DeviceNet specification.

Status of the L16 LED	Status	Meaning
Off	Not switched on/offline	• Unit is offline • Unit performs DUP MAC check • Unit is switched off
Flashing green (1 s cycle)	Online and in operational mode	• The unit is online and no connection has been established • DUP-MAC check performed successfully • A connection has not yet been established with a master • Missing, incorrect or incomplete configuration
Lights up green	Online, operational mode and connected	• Online • Connection to a master has been established • Connection is active (established state)
Flashing red (1 s cycle)	Minor fault or connection timeout	• A correctable fault has occurred • Polled I/O and/or bit strobe I/O connections are in the timeout status • DUP-MAC check has detected an error
Red light	Critical fault or critical link failure	• A correctable fault has occurred • BusOff • DUP-MAC check has detected an error

L15 LED (PIO)

The **L15 (Polled I/O)** LED monitors the polled I/O connection.

Status of the L15 LED	Status	Meaning
Flashing green (125 ms cycle)	DUP-MAC check	Unit is performing DUP-MAC check
Off	Not switched on / offline but not DUP-MAC check	• Unit is offline • Unit is switched off
Flashing green (1 s cycle)	Online and in operational mode	• Unit is online • DUP-MAC check performed successfully • A polled IO connection is being established with a master (configuring state) • Missing, incorrect or incomplete configuration
Lights up green	Online, operational mode and connected	• Online • A polled I/O connection has been established (established state)
Flashing red (1 s cycle)	Minor fault or connection timeout	• Invalid baud rate set via DIP switches • A correctable fault has occurred • Polled I/O connection is in timeout status
Red light	Critical fault or critical link failure	• A fault that cannot be remedied has occurred • BusOff • DUP-MAC check has detected an error

L14 LED (BIO)

The **L14 (bit-strobe I/O)** LED monitors the bit-strobe I/O connection.

Status of the L14 LED	Status	Meaning
Flashing green (125 ms cycle)	DUP-MAC check	Unit is performing DUP-MAC check
Off	Not switched on / offline but not DUP-MAC check	• Unit is offline • Unit is switched off
Flashing green (1 s cycle)	Online and in operational mode	• Unit is online • DUP-MAC check performed successfully • A BIO connection is being established with a master (configuring state) • Missing, incorrect or incomplete configuration
Lights up green	Online, operational mode and connected	• Online • A BIO connection has been established (established state)
Flashing red (1 s cycle)	Minor fault or connection timeout	• Invalid number of process data is set via DIP switches • A correctable fault has occurred • Bit-strobe I/O connection is in timeout state
Red light	Critical fault or critical link failure	• A fault that cannot be remedied has occurred • BusOff • DUP-MAC check has detected an error

L13 LED (BUS FAULT)

The **L13 (BUS-OFF)** LED indicates the physical status of the bus node.

Status of the L13 LED	Status	Meaning
Off	NO ERROR	The number of bus errors is in the normal range (error active status).
Flashing red (125 ms cycle)	BUS WARNING	The unit is performing a DUP-MAC check and cannot send any messages because no other stations are connected to the bus (error passive state)
Flashing red (1 s cycle)		The number of physical bus errors is too high. No more error telegrams are actively written to the bus (error passive state).
Red light	BUS ERROR	• BusOff state • The number of physical bus errors has increased despite a switch to the error-passive state. Access to the bus is switched off.
Yellow light	POWER OFF	External voltage supply has been turned off or is not connected.

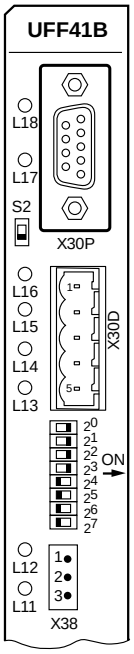
Power-UP test

A power-up test of all LEDs is performed once the drive inverter has been switched on. The LEDs are switched on in the following sequence:

Time [ms]	LED L16 MOD/NET	LED L15 PIO	LED L14 BIO	LED L13 BUS FAULT
0	Green	Off	Off	Off
250	Red	Off	Off	Off
500	Off	Green	Off	Off
750	Off	Red	Off	Off
1000	Off	Off	Green	Off
1250	Off	Off	Red	Off
1500	Off	Off	Off	Green
1750	Off	Off	Off	Red
2000	Off	Off	Off	Off

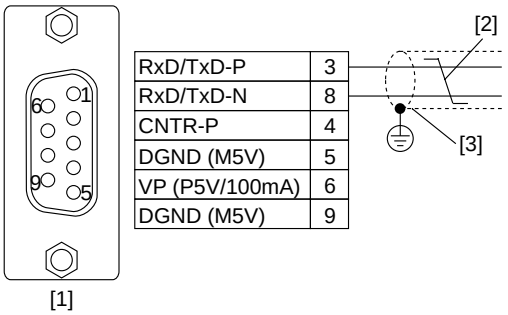
4.8 Connecting the UFF41B fieldbus gateway to a PROFIBUS network

The following sections describe the terminals, DIP switches, and LEDs relevant for PROFIBUS operation.

Front view UFF41B fieldbus gateway	Designation	LED DIP switch Terminal		Function
 64422AXX	**LED**	**LED 18** **LED 17** **LED 12** **LED 11**	Run PROFIBUS Fault PROFIBUS - -	Status of PROFIBUS communication Status of PROFIBUS bus electronics Reserved Reserved
	Terminal X30P: PROFIBUS (Sub-D9)	**X30P:9** **X30P:8** **X30P:7** **X30P:6** **X30P:5** **X30P:4** **X30P:3** **X30P:2** **X30P:1**	GND (M5V) RxD/TxD-N N.C. VP (P5V/100 mA) GND (M5V) CNTR-P RxD/TxD-P N.C. N.C.	Reference potential for PROFIBUS Signal receive transmit negative Terminal unassigned DC+5 V potential for bus terminator Reference potential for PROFIBUS PROFIBUS control signal for repeater Signal receive transmit positive Terminal unassigned Terminal unassigned
	DIP switch S2 Switching between PROFIBUS and DeviceNet	**S2**	Top Bottom	Fieldbus interface PROFIBUS (X30P) active Fieldbus interface DeviceNet (X30D) active
	For PROFIBUS mode: DIP switch for setting the PROFIBUS station address	**2^0** **2^1** **2^2** **2^3** **2^4** **2^5** **2^6** **2^7**		Significance: 1 Significance: 2 Significance: 4 Significance: 8 Significance: 16 Significance: 32 Significance: 64 In PROFIBUS operation without function
	Terminal X38: CAN for safety-relevant communication (plug-in terminals)	**X38:1** **X38:2** **X38:3**		Reserved Reserved Reserved

4.8.1 Pin assignment X30P (PROFIBUS)

Connection to the PROFIBUS system is made 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. The following figure shows the PROFIBUS connector that is connected to X30P of the UFF41B fieldbus gateway.



RxD/TxD-P	3
RxD/TxD-N	8
CNTR-P	4
DGND (M5V)	5
VP (P5V/100mA)	6
DGND (M5V)	9

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[1] 9-pin D-sub connector

[2] Signal line, twisted

[3] Conductive connection over a large area is necessary between plug housing and the shield

UFF41B gateway and PROFIBUS connection

As a rule, the UFF41B fieldbus gateway 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 at pin 3 (RxD/TxD-P) and pin 8 (RxD/TxD-N). Communication takes place using these two pins. The RS485 signals RxD/TxD-P and RxD/TxD-N must all be connected to the same contacts in all PROFIBUS stations. Else, the bus components cannot communicate 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 UFF41B fieldbus gateway with baud rates > 1.5 MBaud can only be operated with special 12-MBaud PROFIBUS connectors.

Bus termination

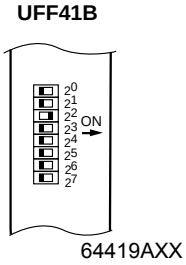
When the UFF41B fieldbus gateway is located at the start or end of a PROFIBUS segment and when there is only one PROFIBUS cable connected to the UFF41B fieldbus gateway, you must use a plug with an integrated bus terminating resistor.

Switch on the bus terminating resistors for this PROFIBUS connector.

Setting the station address

To set the PROFIBUS station address, use DIP switches 2^0 - 2^6 on the UFF41B fieldbus gateway. DIP switch 2^7 has no function in PROFIBUS operation.

The UFF41B fieldbus gateway supports the address range 0 - 125.



The default setting for the 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 of the PROFIBUS station address during ongoing operation does not take effect immediately. You have to switch the supply voltage of UFF41B off and then on again for the changes to take effect.

4.8.2 Status LED in PROFIBUS operation

The UFF41B fieldbus gateway has two two-color LEDs for diagnostic of the PROFIBUS system. They indicate the current status of the UFF41B and the PROFIBUS system. The unit status corresponding to the status of the LED is described in chapter "Error diagnostics".

LED L17 (FAULT PROFIBUS)

LED **L17 (FAULT** PROFIBUS) indicates that communication via the PROFIBUS interface is working properly.

Status of the L17 LED	Diagnostics	Remedy
Off	• The UFF41B fieldbus gateway exchanges data with the PROFIBUS-DP master (data exchange status).	-
Red	• Connection to the DP master has failed. • The UFF41B fieldbus gateway does not detect the PROFIBUS baud rate. • Bus interruption has occurred. • PROFIBUS-DP master not in operation.	• Check the PROFIBUS connection on the unit. • Check project planning of the PROFIBUS DP master. • Check all the cables in the PROFIBUS network.
Flashing red (1 Hz)	• The UFF41B fieldbus gateway does not detect the baud rate. However, the DP master does not address the UFF41B fieldbus gateway. • The UFF41B fieldbus gateway was not configured in the DP master or was configured incorrectly.	• Check and correct the PROFIBUS station address set in the UFF41B fieldbus gateway and in the configuration software of the DP master. • Check and correct the configuration of the DP master. • Use the GSD file **SEW_600D.GSD** with the designation *Adv.Gateway UFF* for configuration.

LED L18 (RUN PROFIBUS)

LED **L18 (RUN PROFIBUS)** indicates the proper functioning of the PROFIBUS electronics (hardware).

Status of the L18 LED	Diagnostics	Remedy
Green	• PROFIBUS hardware OK.	-
Flashing green (1 Hz)	• The PROFIBUS station address set on the DIP switches exceeds 125. If the PROFIBUS station address is set to a value greater than 125, the UFF41B fieldbus gateway will use PROFIBUS station address 4.	1. Check and correct the PROFIBUS station address on the DIP switches. 2. Switch on all drive inverters again. The modified PROFIBUS address will only take effect after a restart.
Orange	• UFF41B option is being initialized.	-

4.9 Shielding and routing bus cables

Only use shielded cables and connection elements that meet the requirements of category 5, class D according to IEC 11801 edition 2.0.

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

- Manually tighten the mounting screws on the connectors, modules, and equipotential bonding conductors.
- Use only connectors with a metal housing or a metallized housing.
- Connect the shielding in the connector over a wide surface area.
- Apply the shielding of the bus line on both ends.
- Route signal and bus cables in separate cable ducts. Do not route them parallel to power cables (motor leads).
- Use metallic, grounded cable racks in industrial environments.
- Route the signal cable and the corresponding equipotential bonding close to each other using the shortest possible route.
- Avoid using plug connectors to extend bus cables.
- Route the bus cables closely along existing grounding surfaces.

	CAUTION
	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 in accordance with relevant VDE regulations in such a case.

5 Configuring the UFx41B Fieldbus Gateway and the Inverter

5.1 Description of the gateway functions

5.1.1 Introduction

With the UFF41B and UFR41B fieldbus gateways, SEW-EURODRIVE offers innovative solutions for integrating SEW inverter technology in fieldbus systems.

For this purpose, process data of the higher-level control in the fieldbus gateway are processed and sent via CAN (SBus) to the devices connected to the fieldbus gateway. Type UFx41B fieldbus gateways can transmit up to 64 process data (PD) from the fieldbus to up to 16 lower-level slave units. The data length per slave unit is limited to 16 process data.

Two different unit configurations are supported:

- Autosetup configuration

  For automatic configuration of the fieldbus gateway and connected devices.

- Customized configuration

  For individual configuration of the process data length and the CAN connection of the individual slave units.

Special features of the UFx41B fieldbus gateways are data backup and data restoration (see chapter "Data Backup", section "Restore mechanism") after replacement of slave units. For this purpose, all parameters of the connected slave units are saved on the SD card of the fieldbus gateway and a possible unit replacement is monitored. When a unit is replaced, the fieldbus gateway automatically loads the unit parameters to the replaced unit.

The fieldbus gateway is configured in MOVITOOLS® MotionStudio using the "UFx Gateway Configurator" tool.

5.1.2 Autosetup

The "Autosetup" function is activated in the "UFx Gateway Configurator" tool. Autosetup results in automatic configuration of the fieldbus gateway and the slave units connected to it, which optimally cover a wide range of applications.

The "autosetup" functions performs the following configurations automatically:

- Stopping process data communication in direction of the SBus
- Scanning the CAN 1 system bus to detect the connected units (MOVIAXIS®, MOVIDRIVE® B and MOVITRAC® B; up to max. 16 units)
- Assigning the process data width: 6 process data with MOVIAXIS® and 3 process data with MOVIDRIVE® B and MOVITRAC® B
- Configuring the necessary process data objects (PDO) of the MOVIAXIS® axis modules
- Saving the configuration in the UFx41B fieldbus gateway (no data backup)

- Starting process data communication

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During unit scan, the first 16 units found in the slave unit configuration saved in the fieldbus gateway will apply.

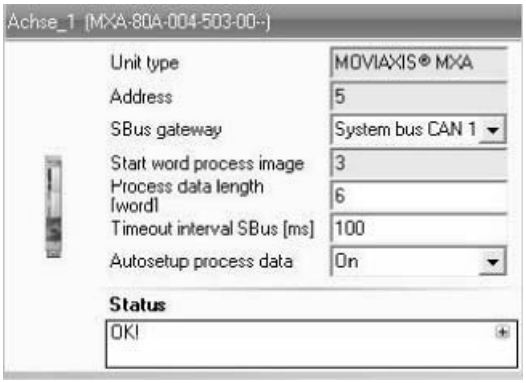
If the value of 64 PD is exceeded due to the process data lengths set for the individual slave units, the gateway application will automatically reduce the process data length of the slave units. In this case, 3 PD are set for MOVIDRIVE® B and MOVITRAC® B slave units. The remaining free PD length will be divided by the number of MOVIAXIS® slave units. This is the resulting process data length for the individual MOVIAXIS® units. The procedure applies no matter whether the autosetup function is enabled or not.

	TIP
	"Autosetup" assumes that all slave units are connected to the CAN 1 system bus. Scanning is performed using the CAN 1 system bus only. The start words in the process image are set in such a way that the data of the slaves follows one another without overlapping. The autosetup configuration is saved in the UFx41B fieldbus gateway and is checked by scanning the slave units each time the power supply is enabled. To ensure successful communication and configuration of MOVIAXIS® units, the MOVIAXIS® parameter setting level must be set to "Planning Engineer".

5.1.3 Customized configuration

The "customized configuration" function allows for configuring the process data width individually and for using the CAN 2 terminal on the fieldbus gateway. The CAN cycle time can be reduced by dividing the slave units among the two CAN interfaces of the fieldbus gateway. The data transmission performance can be increased in this way.

Customized configuration means that users can configure the process data length for each slave unit, the start word in the process image in direction of the fieldbus, and the SBus (CAN 1 or CAN 2). Status word and data length are the same both for the process input and process output data of the slave unit.



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The fieldbus gateway uses these data to automatically determine the cycle time for the CAN interfaces as well as the number, data length, and CAN-IDs of process data objects (PDO) on the SBus. The duration of the cycle time is always the same for both CAN interfaces.

Pressing the [Apply configuration] button saves the configuration data in the fieldbus gateway. These are the number of slave units, their process data width, their connection to the CAN1 or CAN2 system bus, and their timeout interval. Additionally, the settings required for establishing the communication with the fieldbus gateway are made automatically in the MOVIAXIS® slave units. For MOVIAXIS® units with disabled "autosetup of process data" function ("autosetup process data" selection field "off"), the user has to set the parameters for the process data in the slave units accordingly.

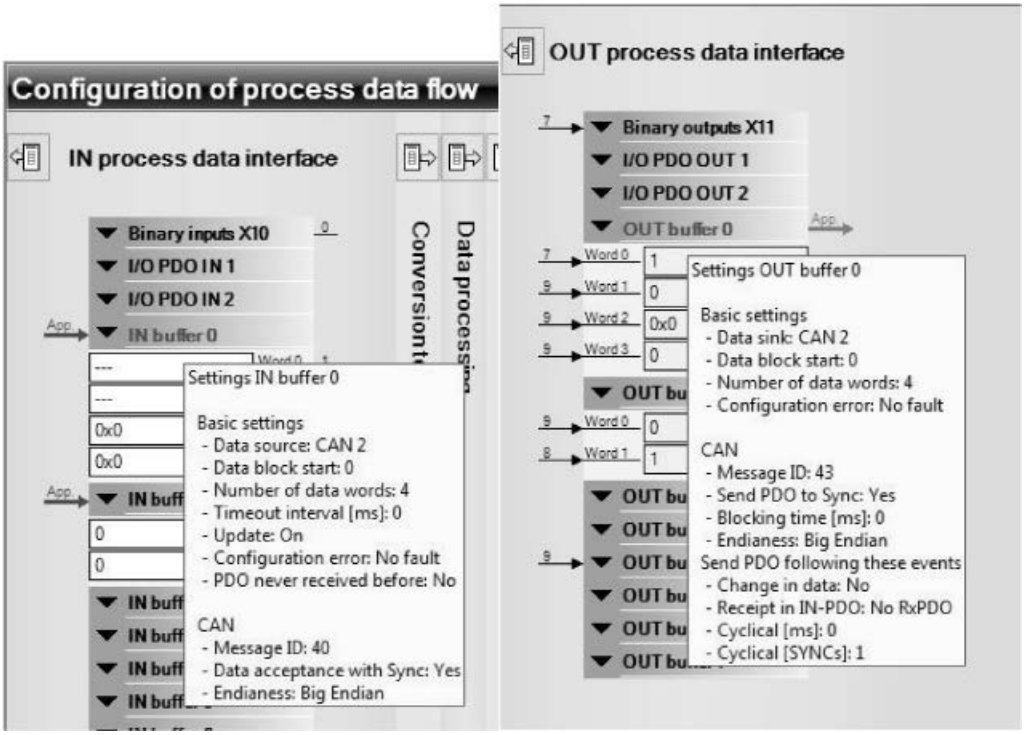
Changes made to the process data configuration in the fieldbus gateway will take effect in the fieldbus gateway by pressing the [Apply configuration] button.

5.1.4 Configuring fieldbus gateway and slave units

If the "autosetup" or "customized configuration" functions are performed using the UFx Gateway Configurator, then the slave unit parameters (MOVIAXIS®, MOVIDRIVE® B and MOVITRAC® B) described in the following sections have to be made.

Setting the MOVIAXIS® servo inverter

Process data communication is automatically configured in the axis module for each MOVIAXIS® slave unit if the fieldbus gateway was configured using the "autosetup" function, or, in the case of "customized configuration" of this slave unit, if the "autosetup process data" function is set to "OFF". Only the process data objects required for communication between fieldbus gateway and MOVIAXIS® axis module are configured. The unit-internal further processing of process data depends on the application and is not affected by the configuration by the fieldbus gateway.



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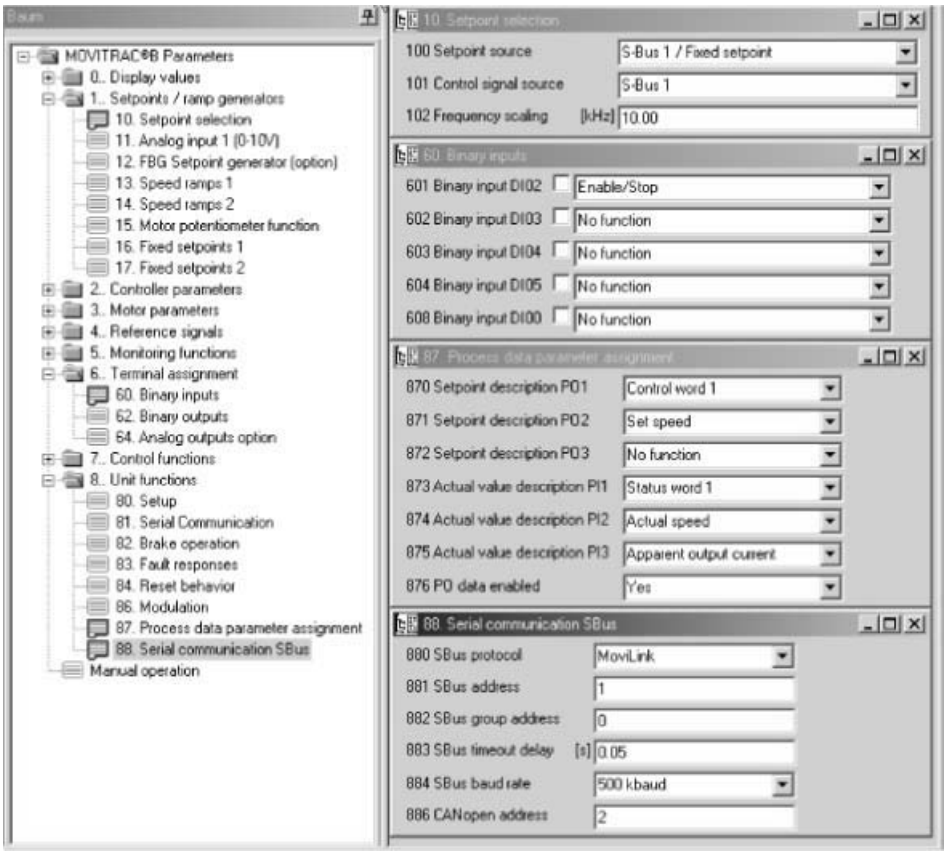
	TIP
	• It is important that no other axis-to-axis communication between the individual slave units was configured via the same CAN bus in order to ensure process data exchange and engineering between fieldbus gateway and slave units. • If the application requires axis-to-axis communication, use the CAN2 bus of the axis module for MOVIAXIS®, and the free CAN bus for MOVIDRIVE® B.

Setting the MOVIDRIVE® B and MOVITRAC® B inverters

With MOVIDRIVE® B and MOVITRAC® B, the "autosetup" function does not automatically set the parameters. In this case, the following settings have to be made via the UFx41B fieldbus gateway for operating the MOVIDRIVE® B or MOVITRAC® B inverters (see following figure).



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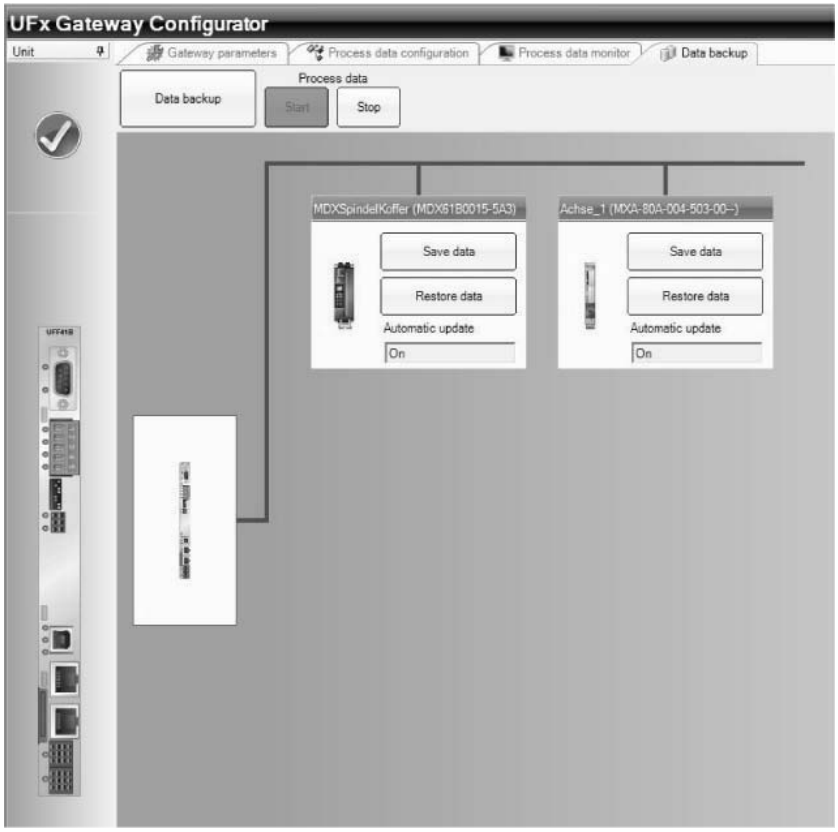
Before controlling the MOVIDRIVE® B or MOVITRAC® B inverter via the fieldbus gateway, you have to set *control signal source (P101)* and *setpoint source (P100)* to SBus1. The SBus setting1 means the inverter parameters are set for control and setpoint entry via fieldbus gateway. The inverter then responds to the process output data sent by the master programmable controller.

It is necessary to set the *SBus1 timeout interval (P883)* to a value other than 0 ms for the inverter to stop in the event of a faulty SBus communication. We recommend a value in the range 50 to 200 ms. Activation of the control signal source and setpoint source SBus is signaled to the higher-level controller using the "SBus mode active" bit in the status word.

Activation of the control signal source and setpoint source SBus is signaled to the machine controller using the "Fieldbus mode active" bit in the status word. For safety reasons, you must also enable the MOVIDRIVE® B inverter at the terminals for control via the fieldbus gateway. Consequently, you must wire and program the terminals in such a way that the inverter is enabled via the input terminals. The simplest way of enabling the inverter using terminals is, for example, to connect the DIØØ input terminal (function /CONTROLLER INHIBIT) for MOVIDRIVE® B, and DI01 = CW/stop for MOVITRAC® B to a +24 V signal and to program the remaining terminals to NO FUNCTION.

	TIPS
	• Set the *P881 SBus address* parameter in increasing order to values 1 - 16 if the slave unit is connected to the CAN 1 system bus of the fieldbus gateway. Set the basic address of the CAN 1 system bus of the axis block to values > 0 in particular when using MOVIAXIS® axis blocks. • Set the *P881 SBus address* parameter in increasing order to values 17 - 34 if the slave unit is connected to the CAN 2 system bus of the fieldbus gateway. • The SBus address 0 is used by the UFx41B fieldbus gateway and therefore must not be used. • Set *P883 SBus timeout* to values between 50 to 200 ms. • For MOVIDRIVE® B, set *P889 / P899 Parameter channel 2* to ON

5.1.5 Data backup



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The type UFx41B fieldbus gateway allows for saving all parameters of the connected slave units to the SD memory card of the fieldbus gateway. Besides, the fieldbus gateway monitors a possible unit replacement and in this case loads the unit parameters automatically to the replaced unit. The parameter sets of the slave units and the configuration data of the UFx41B fieldbus gateway are centrally saved on the SD memory card of the fieldbus gateway and will be used when replacing a unit.

This means the fieldbus gateway serves as data memory for the data sets of the slave units and of the startup data of the fieldbus gateway.

Once you have taken up operation of the drive system, the data sets are copied to the data memory (SD card) when pressing the [Data backup] button. This function lets you save the parameter sets of each slave unit, their UUID (Universally Unique Identifier) and the configuration data of the fieldbus gateway itself. If the parameters of individual slave units should change after the data backup, then the change will also have to be updated in the data backup. This can be easily done by pressing the [Save data] button of the relevant slave unit.

When restarting the system, the system checks whether an axis has been replaced. If yes, the data set saved at startup will automatically be loaded into the replaced axis. This mechanism only works for units with a UUID (Universally Unique Identifier) (so far only for MOVIAXIS®).

Automatic unit update is only performed for fieldbus gateway slave units, which means for units the user has manually entered in the device list of the fieldbus gateway either using the user interface or during the system bus auto scan. Units that are connected to the SBus but are not listed in the device list of the fieldbus gateway, will neither be included in the data backup nor in the unit replacement function.

Saving data to SD memory card

The prerequisite for automatic update after a unit replacement is that the system has been taken into operation and that its data sets are available on the data memory (SD memory card for UFx) of the fieldbus gateway. These data sets are created by activating the "Data backup" function using the UFx Gateway Configurator. Make sure that the unit replacement function of the fieldbus gateway is active. To do so, set the "Unit replacement function" to "ON" on the "Gateway parameters" tab of the UFx Gateway Configurator.

Data backup means the data sets of the connected units are saved as well as their UUIDs. The configuration of the fieldbus gateway is also saved.

If you want the unit replacement function to be active for all units included in the device list, you have to enable the relevant parameters **before** activating data backup.

The user has to restart the SBus process data once data backup is completed. Bit 9 ("configured") in the gateway status indicates that the data memory contains valid data.

Restore mechanism

If the unit replacement function of the fieldbus gateway is active and bit 9 ("configured") is set, all slave units will be checked for unit replacement during startup. If a replaced unit is detected and if the axis replacement function for this slave unit is also active, the unit will be updated with the data set saved in the data memory.

If the unit replacement function for the fieldbus gateway is disabled, the units will not be checked for replacements and, consequently, the slave units will not be updated.

If an error occurs during automatic update of a slave unit, no process data communication will be established with this unit. This applies for errors occurring during the update as well as for errors while reading the UUID.

	TIPS
	When replacing a unit, make sure that the previous SBus address is set on the replaced units. This is ensured when replacing a MOVIAXIS® unit if the address on the supply module is not changed and the fieldbus gateway is connected to the CAN 1 system bus of the MOVIAXIS® axis block. With MOVIDRIVE® B and MOVITRAC® B, the addresses have to be set using parameters. This also applies to MOVIAXIS® when the gateway is connected to CAN 2 of the axis module.

Automatic unit update after a slave timeout

A possible cause for a slave timeout is a unit replacement while the system is running. The UUID of the unit is read and compared with the saved UUID as soon as the slave timeout has elapsed.

If a unit replacement is detected and the unit replacement function is activated for the fieldbus gateway and the relevant slave, and bit 9 is set in the fieldbus gateway status, then the replaced slave unit will be updated with the data set in the data memory.

The fieldbus gateway continues to send the timeout status word in the process image of the relevant slave to the fieldbus master both while the UUID is being transmitted and during a possible update of the slave unit. The process data on the SBus are not stopped. The fieldbus gateway sends "0" signals in all process data words to the relevant slave unit.

If errors occur while checking the UUID or downloading the data set, "0" is continued to be sent to the slave unit via SBus. The fieldbus gateway enters the error bit and an error code in the process image of this slave.

If timeout monitoring is disabled for a slave, no slave timeout will be signaled. This is the reason why no unit replacement verification is carried out during gateway operation. The unit replacement function during startup of the fieldbus gateway is not affected by this setting.

5.2 Startup procedure

5.2.1 Checking hardware installation and communication settings

- Checking the CAN connection between fieldbus gateway and slave units according to the documentation.
- Checking the terminating resistors (120 ohms) on the UFx41B fieldbus gateway and the last slave unit (see also chapter 4.3).
- Setting the SBus address and baud rate (see also chapter 5.1.4).

  All slave units connected to the fieldbus gateway must have different SBus addresses but the same SBus baud rate.

  You can make these settings using the keypads DBG60B, FBG11B (only for MOVITRAC® B) or using MOVITOOLS® MotionStudio (see chapter 11.7.2).
  - Set the *P881 SBus address* parameter in increasing order to values 1 - 16 if the slave unit is connected to the CAN 1 system bus of the fieldbus gateway.
  - SBus address 0 is used by the UFx41B gateway and must therefore not be used.
  - Set *P883 SBus timeout* to values between 50 to 200 ms.

5.2.2 Establishing an engineering connection

Do the following for configuring units online using MOVITOOLS® MotionStudio:

1. Start MOVITOOLS® MotionStudio from the WINDOWS® start menu using the following path:

   Start\Programs\SEW\MOVITOOLS MotionStudio
2. Create a project with name and storage location.
3. Set up communication for communicating with your units.
4. Scan the network (unit scan). To do so, click the [Start network scan] button [1] in the toolbar.

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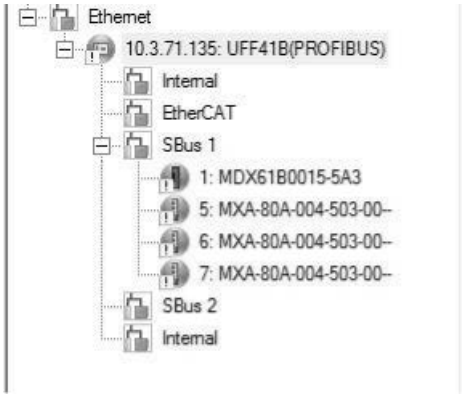
5. Make sure that all slave units connected to the fieldbus gateway are displayed after the unit scan. If no slave units are detected, check the installation (CAN bus terminating resistors). Also check whether all slave units have different SBus addresses with values higher than zero (see following figure).



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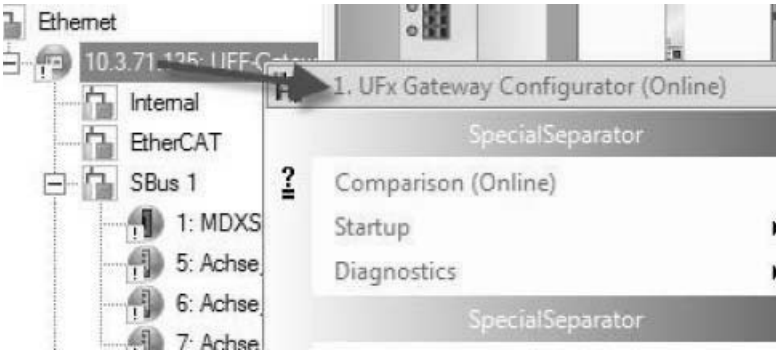
6. Select the UFx41B gateway you want to configure and open the context menu with a right mouse click. As a result you will see a number of unit-specific tools to execute various functions with the units.
7. Open the "UFx Gateway Configurator" tool (see following figure)



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5.2.3 Configuring the fieldbus gateways

Autosetup

If you want to carry out the configuration using the "autosetup" function, press the [Autosetup] button in the UFx Gateway Configurator. All drives will be stopped.

The slave units connected to the CAN 1 system bus will be scanned and configured automatically in the case of MOVIAXIS®. The UFx Gateway Configurator displays a symbol during execution of the "Autosetup" function.

The autosetup function assigns the following process data widths:

- 6 process data for MOVIAXIS®, and
- 3 process data for MOVIDRIVE® B and MOVITRAC® B.

With MOVIAXIS®, all necessary process data objects (PDO) of the MOVIAXIS® axis modules are configured automatically.

With MOVIDRIVE® B and MOVITRAC® B, the SBus address, SBus timeout, and SBus baud rate have to be configured for the slave units as described in chapter 5.1.4.

The number of slave units and their settings are saved in the fieldbus gateway and are checked by scanning the slave units each time power supply is enabled.

Observe that the "autosetup" function requires that all slave units are connected to the CAN 1 system bus. Scanning is performed using the CAN 1 system bus only.

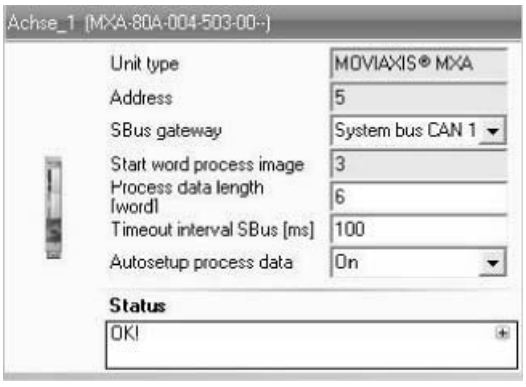
If the "Autosetup" function was executed successfully and if fieldbus communication has already been established, then the process data are started and the UFx Gateway Configurator indicates proper operation.

Customized configuration

If you want to carry out the configuration using the "customized" function, press the [Customized configuration] button in the UFx Gateway Configurator. The UFx Gateway Configurator opens the "Process data configuration" tab. Press the [Process data - Stop] button. All drives will be stopped.

The "customized configuration" functions lets you configure the process data width individually and is necessary if slave units are connected to the CAN 2 system bus of the fieldbus gateway.

The CAN cycle time can be reduced by dividing the slave units among the two CAN interfaces of the fieldbus gateway. The data transmission performance can be increased in this way.



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Set the following for each slave unit:

- Process data length
- SBus timeout interval
- CAN interface (CAN 1 or CAN 2 system bus) to which the slave unit is connected

The entry in the "Start word process image" is determined automatically.

The start word in the process image in direction of the fieldbus as well as the process data length is the same for the process input and output data of the slave unit.

Pressing the [Apply configuration] button will perform the settings automatically in the MOVIAXIS® units where the "autosetup process data" parameter is set to "ON". If the "autosetup process data" parameter is set to "OFF", the settings in the relevant MOVIAXIS® unit will not be made automatically so they have to be made by the user afterwards.

Pressing the [Process data - Start] button will start communication between fieldbus gateway and slave unit. The following symbol appears when communication has been established successfully.

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5.2.4 Last settings in the slave units

Now execute the "Startup wizard" tool for every unit as you have access to all parameters of the slave units via the engineering interface of the fieldbus gateway. Doing so will adjust the inverter to the connected motor and, if required, the control loops will be adjusted to the load conditions of the application.

If available, you can load a matching parameter file to the inverter / servo inverter. It is important that the SBus address and in particular the SBus baud rate are not changed.

	TIP
	In particular with MOVIAXIS®, you have to check the communication settings of the IN-PDOs and OUT-PDOs. If the communication settings were changed by loading the parameter set, you can correct these settings by reloading the customized configuration or by executing the "autosetup" function again.

- MOVIAXIS®

  Process data communication is automatically configured in the axis module for each MOVIAXIS® slave unit if the gateway parameter "autosetup process data" for this unit is set to "ON". Only the process data objects required for communication between fieldbus gateway and MOVIAXIS® axis module are configured.

The unit-internal further processing of process data depends on the application and is not affected by the configuration by the fieldbus gateway.

After having configured the fieldbus gateway, you can now set the parameters for the individual MOVIAXIS® axis modules. To do so, use the "PDO Editor" tool or "Parameter tree" to linking the necessary IN and OUT PDOs used by the fieldbus gateway to the relevant control and status words.

- MOVIDRIVE® B and MOVITRAC® B

  Since the fieldbus gateway does not perform an automatic configuration for these inverters, you have to check the settings again as described in chapter 5.1.4.

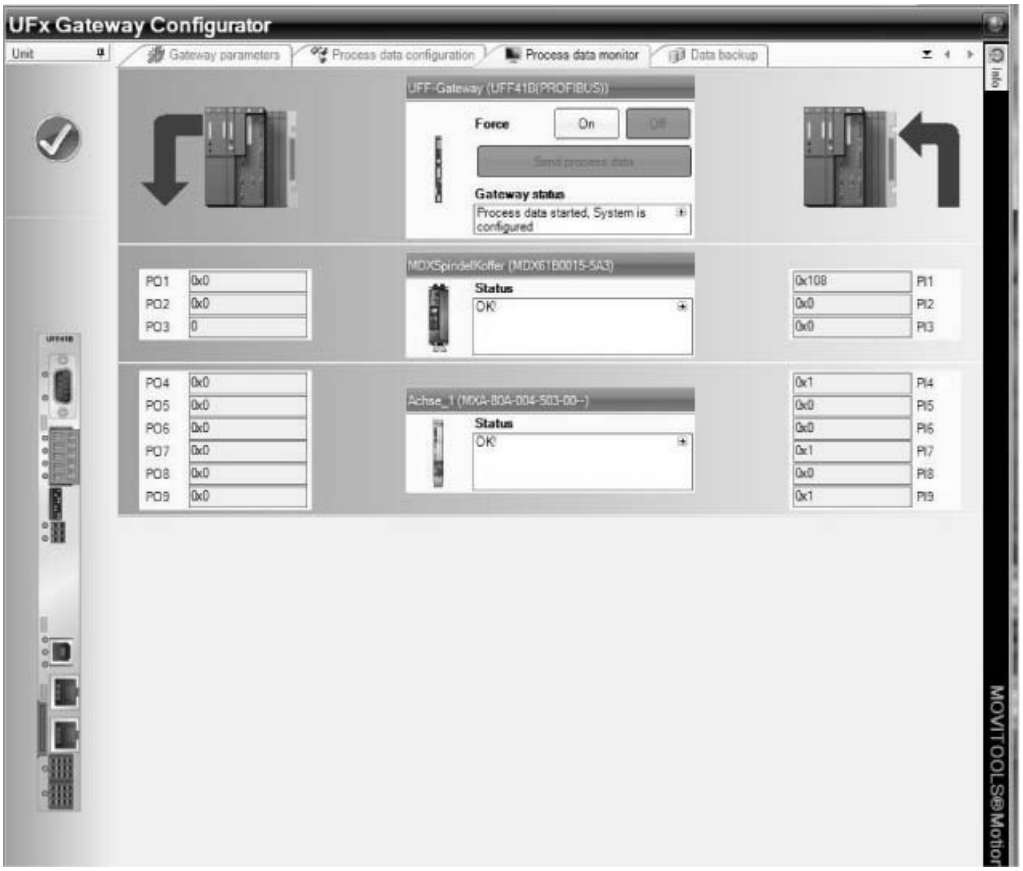
  Make sure that the following parameters are not changed when setting the inverter parameters to match your application:

  – P100 control signal source
  – P101 setpoint source
  – P880 / P890 SBus protocol
  – P881 / P891 SBus address
  – P884 / P894 SBus baud rate
  – P883 / P892 SBus timout interval

5.2.5 Monitoring and controlling process data

Process data diagnostics

In the UFx Gateway Configurator, open the "Process data monitor" tab (see following figure).



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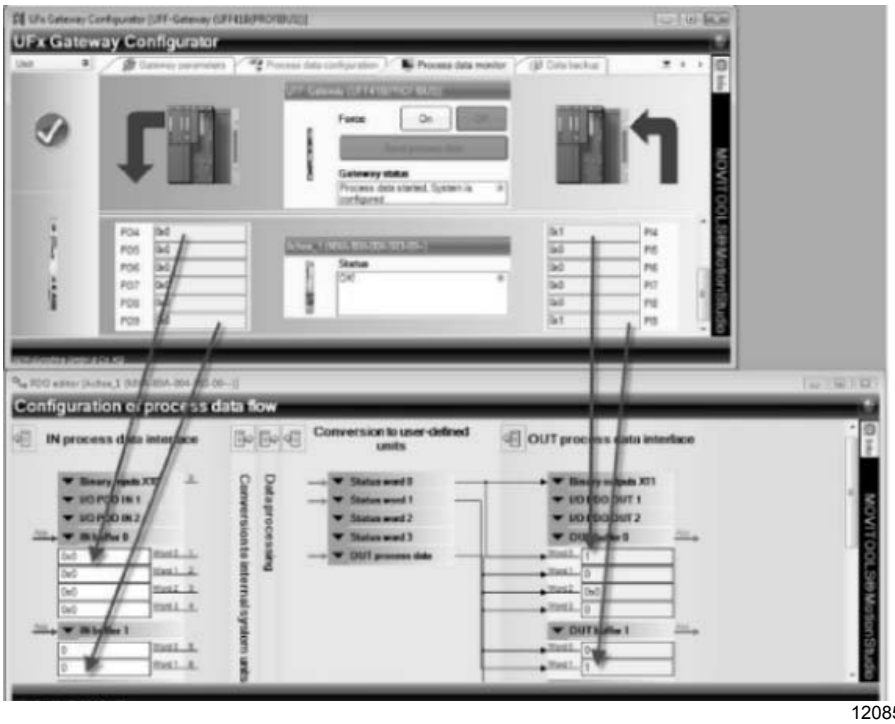
Check the data between fieldbus gateway and master controller. To apply different number formats to the individual numerical fields, make a right mouse click.

Checking process data in slave units

Do the following to check whether communication between fieldbus gateway and slave unit works properly:

- MOVIAXIS®

  You can use the PDO Editor to check process data. The input process data objects (IN-PDO) and output process data objects (OUT-PDO) are displayed (see following figure).



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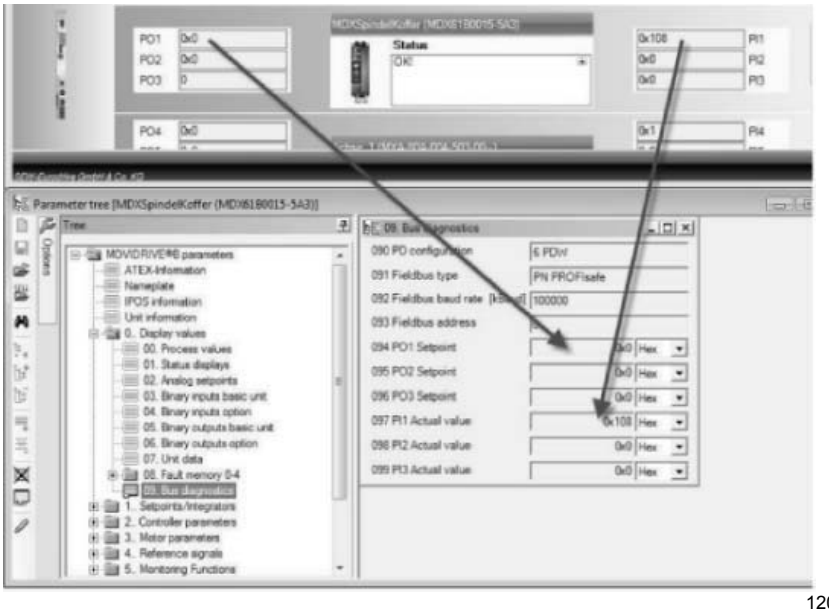
- MOVIDRIVE® B and MOVITRAC® B

  In MOVITOOLS® MotionStudio, you can check the process data using the "Parameter tree" tool in parameter group 09 "Bus diagnostics" (see following figure). The two tools "UFx Gateway Configurator" and "Parameter tree" can be open at the same time (see following figure).



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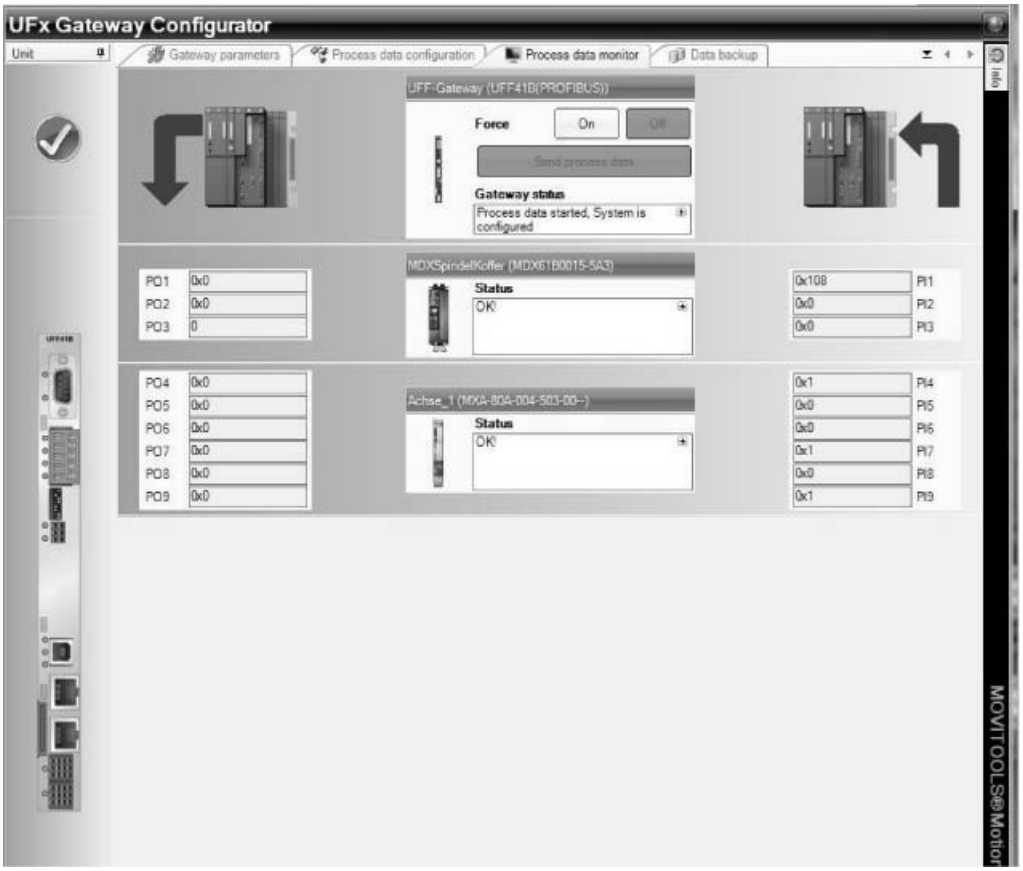
Manual specification (forcing) of process output data

The process data monitor also lets you manually specify process output data without master controller (referred to as forcing).



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Activate force mode and enter the values in the now active fields. Clicking the "Send process data" button will send the entered values to the slave units via SBus instead of the valued received via fieldbus. Process input data cannot be specified manually.

5.2.6 Saving inverter data in the fieldbus gateway and using MOVITOOLS® MotionStudio

After having successfully configured the fieldbus gateway and after complete and verified parameterization of the slave units, the inverter parameters of the slave units can be saved on the SD card of the fieldbus gateway and on your PC using the project management of MOVITOOLS® MotionStudio.

Saving data on the SD memory card of the fieldbus gateway

To save the data of the slave units on the SD memory card of the fieldbus gateway, click on the [Data backup] tab in the UFx Gateway Configurator and click the [Data backup] button. For this purpose, all drives must be at standstill and process data communication must be stopped.

Clicking the [Data backup] button of the displayed slave units will copy the parameter set of this unit to the SD card of the fieldbus gateway.

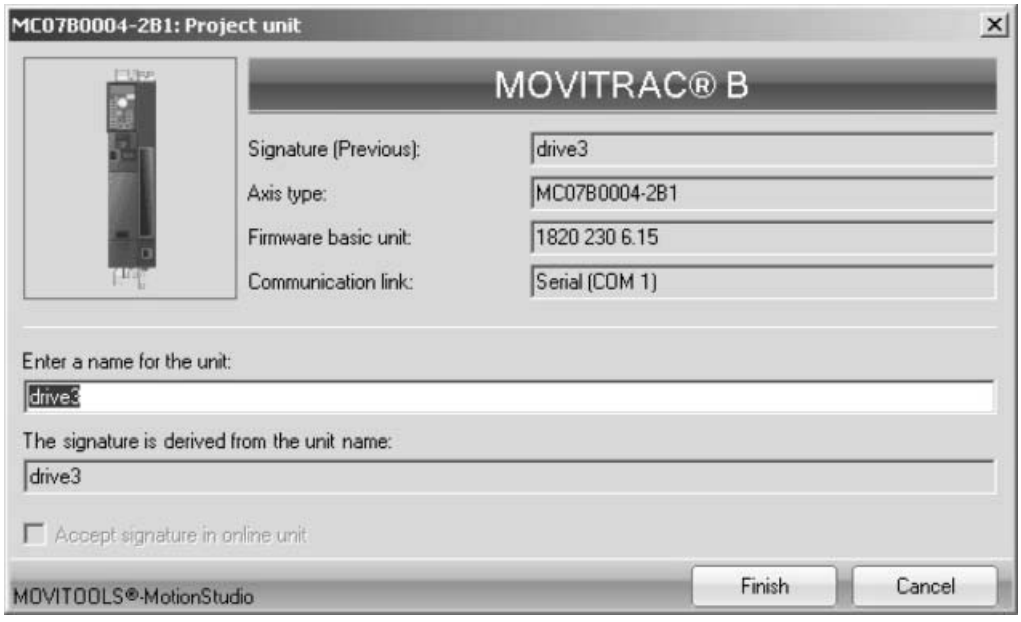
Setting the "Automatic update" function to "OFF" disables the restore function for this unit after unit replacement (see also chapter 5.1.5).

Saving data using the project management in MOVITOOLS® MotionStudio

Proceed as follows to configure existing units in the network:

1. Switch to the network view with the "Network view" tab.
2. Perform a unit scan.

   This will display all units that are physically connected and accessible online.
3. Select the unit you want to configure.
4. Drag the scanned unit from the network view into project view (drag and drop) or select the [Project unit] command from the context menu.



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   This opens the "Project unit" window.
5. Use the name (signature) of the unit that is accessible online.

	TIP
	Proceed as follows if you do **NOT** want to transfer the name (signature) from the unit that is available online: • Enter a new signature. • Activate the "Accept signature in online unit" control field. Doing so ensures that the unit can be clearly identified in the future.

6. Click [Finish].

   The parameters are then transferred from the unit, which can be accessed online, to the working memory.

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7. Confirm with [OK].

   The mini symbol on the unit node will then disappear in the network view.

8. Save your project.

   The parameter is then transferred from the working memory to the parameter file where it is permanently saved.

5.2.7 Error processing and status messages

The fieldbus gateway distinguishes between status and error messages of the fieldbus gateway and individual slave units. For every slave, a status word is stored in an individual parameter. The following table gives an overview of the assignment of individual bits of the slave status word.

Status word slave	
Bit	**Assignment**
2	Slave timeout
3	Configuration error in project planning
4	Configuration error in process data
5	Update error
9	Data backup
10	Update in progress
11	Replaced axis detected
15	Error while saving data
17	Error while reading UUID during data backup
30	Unit update after timeout

The status of the fieldbus gateway is stored in a parameter in bit code. The following table gives an overview of the assignment of individual bits of the fieldbus gateway status word. The fieldbus gateway status results from ORing the bits in the individual slave states if the bit assignment in the slave and fieldbus gateway states corresponds.

Fieldbus gateway status word	
Bit	**Assignment**
0	Malfunction
1	Fieldbus timeout
2	Slave timeout
3	Configuration error in project planning
4	Configuration error in process data
5	Update error
6	Process data started
7	Process data stopped
8	Configured
9	Data backup
10	Update in progress
11	Replaced axis detected
12	Bus scan
13	Autosetup slaves
14	SBus initialization
15	Error during data backup
30	Unit update after timeout

This allows for detailed error diagnostics. For example, if the fieldbus gateway indicates a configuration error during configuration (bit 3), the slave where this error has occurred can be determined from the status of the slaves. Bits indicating an error are reset during error reset (bits 0 - 5, bit 11, bit 15, bit 30).

Communication error between fieldbus gateway and slave unit

If the fieldbus gateway detects a timeout during communcation with a slave unit, then the fieldbus gateway automatically shows fault number F111 in the first word of the process image of the relevant slave unit.

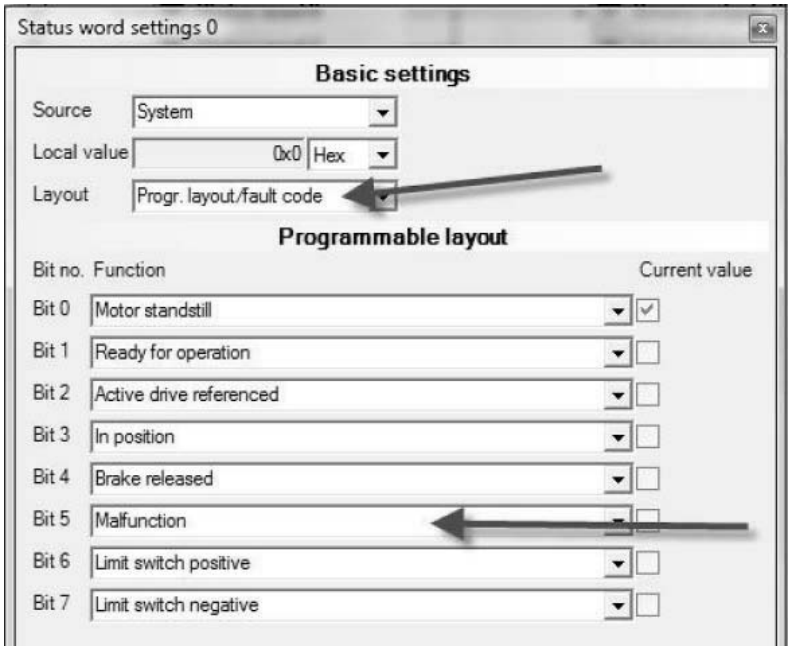
A timeout is detected by monitoring the process data communication between fieldbus gateway and slave. A communication error is automatically reset as soon as the malfunction is eliminated.

The following parameters must be set in these units to enable the fieldbus gateway to signal error states of connected units to the master controller:

- MOVIDRIVE® B, MOVITRAC® B

  P873 = Status word 1 or status word 3

- MOVIAXIS® (see following figure)



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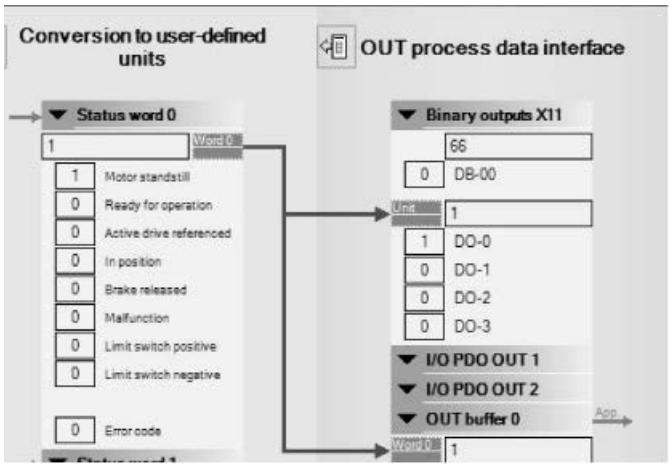
Status word settings:

– Selection field "Layout": Progr. layout/fault code
– Selection field "Bit 5: Malfunction"

This status word is linked with the corresponding output process data object (see following figure).



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	TIP
	The fieldbus gateway does not verify correct parameter setting of the status word. A deviating parameter setting will cause the controller to not correctly detect communication timeouts with the slave units or other errors.

Fieldbus timeout

The fieldbus gateway detects a failed communication with the master controller (fieldbus master). In this case, the fieldbus gateway sends "0" signals to all slave units in their process image and in this way stops all drives using the set rapid stop ramp. Fieldbus communication will automatically be resumed after a fieldbus timeout.

Used CAN IDs

The following CAN IDs are used for communication between fieldbus gateway and slave units.

Number of		Calculation of CAN IDs of	
process data per drive	**CAN telegrams**	**process inputs PI**	**process outputs PO**
3 process data for MOVIDRIVE® B and MOVITRAC® B	1 CAN telegram	8 x SBus address	8 x SBus address + 1
1 to 4 process data for MOVIAXIS®	1 CAN telegram	8 x SBus address + 3	8 x SBus address + 0
5 to 8 process data for MOVIAXIS®	2 CAN telegrams	1. CAN telegram: 8 x SBus address + 3 2. CAN telegram: 8 x SBus address + 4	1. CAN telegram: 8 x SBus address + 0 2. CAN telegram: 8 x SBus address + 1
9 to 12 process data for MOVIAXIS®	3 CAN telegrams	1. CAN telegram: 8 x SBus address + 3 2. CAN telegram: 8 x SBus address + 4 3. CAN telegram: 8 x SBus address + 5	1. CAN telegram: 8 x SBus address + 0 2. CAN telegram: 8 x SBus address + 1 3. CAN telegram: 8 x SBus address + 2
13 to 16 process data for MOVIAXIS®	4 CAN telegrams	1. CAN telegram: 8 x SBus address + 3 2. CAN telegram: 8 x SBus address + 4 3. CAN telegram: 8 x SBus address + 5 4. CAN telegram: 8 x SBus address + 7	1. CAN telegram: 8 x SBus address + 0 2. CAN telegram: 8 x SBus address + 1 3. CAN telegram: 8 x SBus address + 2 4. CAN telegram: 8 x SBus address + 6

	TIPS
	A sychronization telegram is also transmitted to ensure data consistency: SyncID for CAN 1 and CAN 2 = 1 This calculation directive ensures the consistency of IDs calculated for MOVIAXIS® using the "Single-axis positioning" technology editor.

6 Configuration and Startup on DeviceNet Fieldbus

This chapter provides you with information on project planning for the DeviceNet master and startup of the UFF41B fieldbus gateway for fieldbus operation.

	TIP
	The current versions of the EDS files for UFF41B are available on the SEW website under the heading "Software".

6.1 Validity of EDS files for the UFF41B option

	TIP
	Do not edit or amend the entries in the EDS file. SEW assumes no liability for inverter malfunctions caused by a modified EDS file!

The current EDS file SEW_GATEWAY_UFF.eds is available for configuring the master (DeviceNet scanner) for UFF41B:

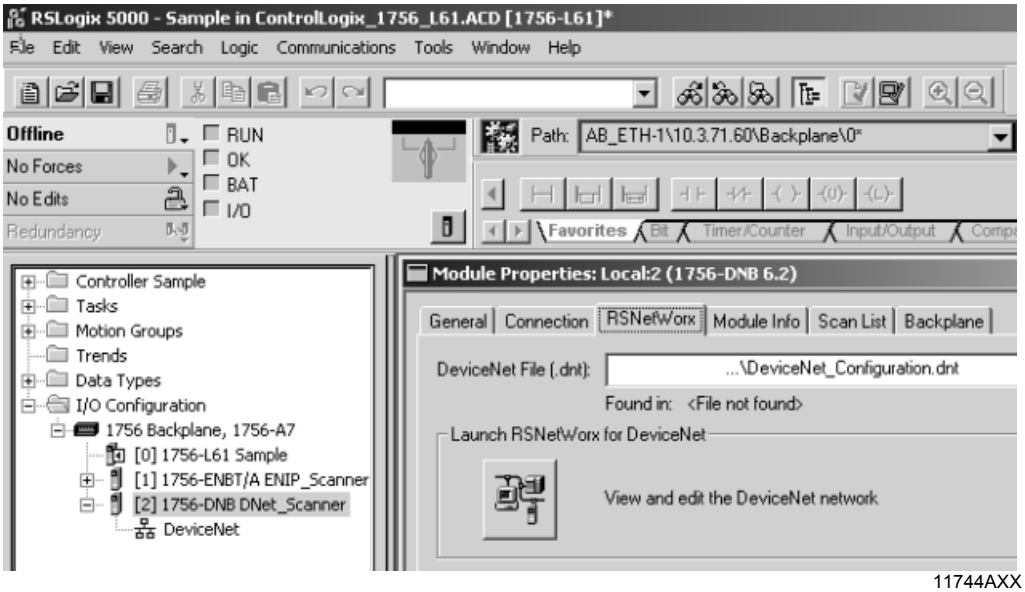
Install the following files using the RSNetWorx software to build the DeviceNet network via the UFF41B fieldbus gateway. Proceed as follows:

- Select the menu item [Tools] / [EDS Wizard] in RSNetWorx. You will be prompted to enter the names of the EDS and icon files.
- The files will be installed. For more details on the installation of the EDS file, refer to the Allen Bradley documentation for RSNetWorx.
- After installation, the device is available in the device list under the entry "Vendor/SEW EURODRIVE GmbH".

6.2 Configuring PLC and master (DeviceNet scanner)

The following examples refer to the usage of an Allen-Bradley-PLC ControlLogix 1756-L61 together with the RSLogix 5000 programming software and the DeviceNet RSNetWorx configuration software for DeviceNet.

After adding the DeviceNet Scanner to the I/O configuration, the file *.dnt containing the DeviceNet configuration is selected. To view and edit the DeviceNet configuration, you can launch RSNetWorx from this dialog (see following figure).



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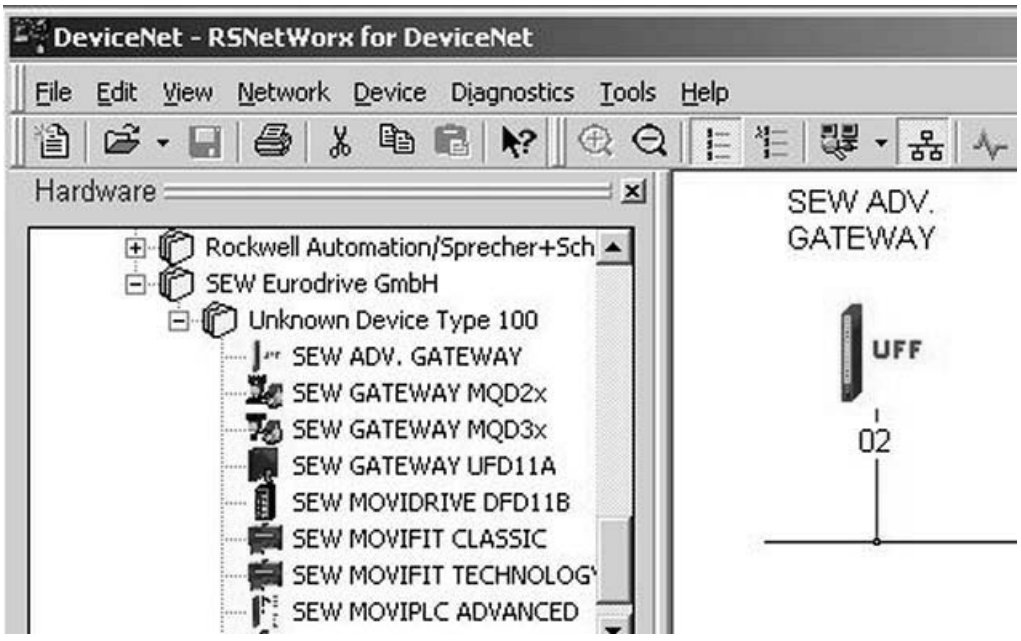
In RSNetWorx for DeviceNet (see following figure), either perform an online scan or add the required devices to the graph by drag and drop. The address specified under the symbol of the device (in the example: 02) must be identical with the MAC ID set on UFF41B using DIP switches. If the required devices are not in the selection list, corresponding EDS files have to be registered via [Tools] / [Wizard].



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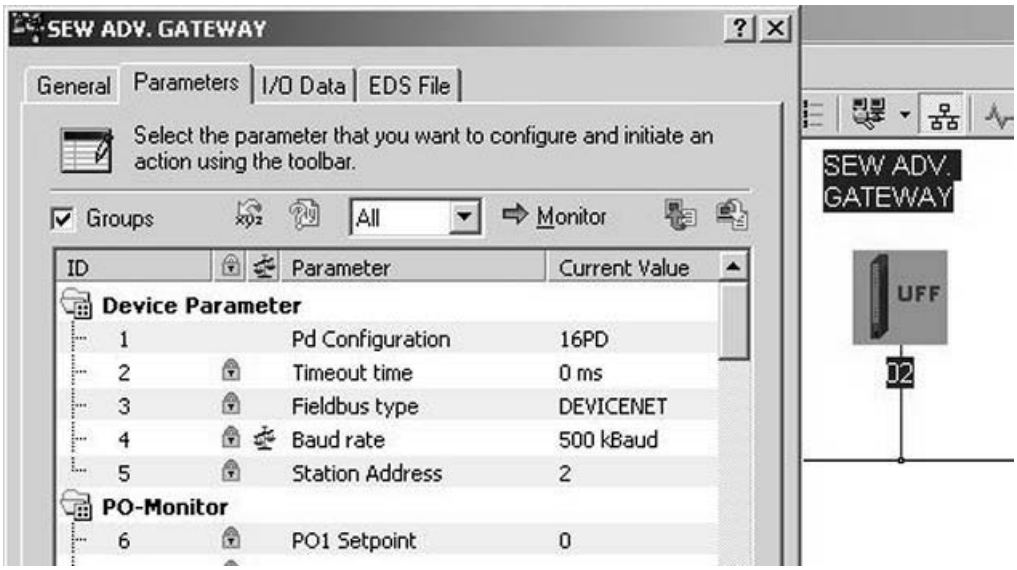
In online mode, you can check and set the "Pd configuration" (process data configuration) of UFF41B when reading out the device properties (see following figure).



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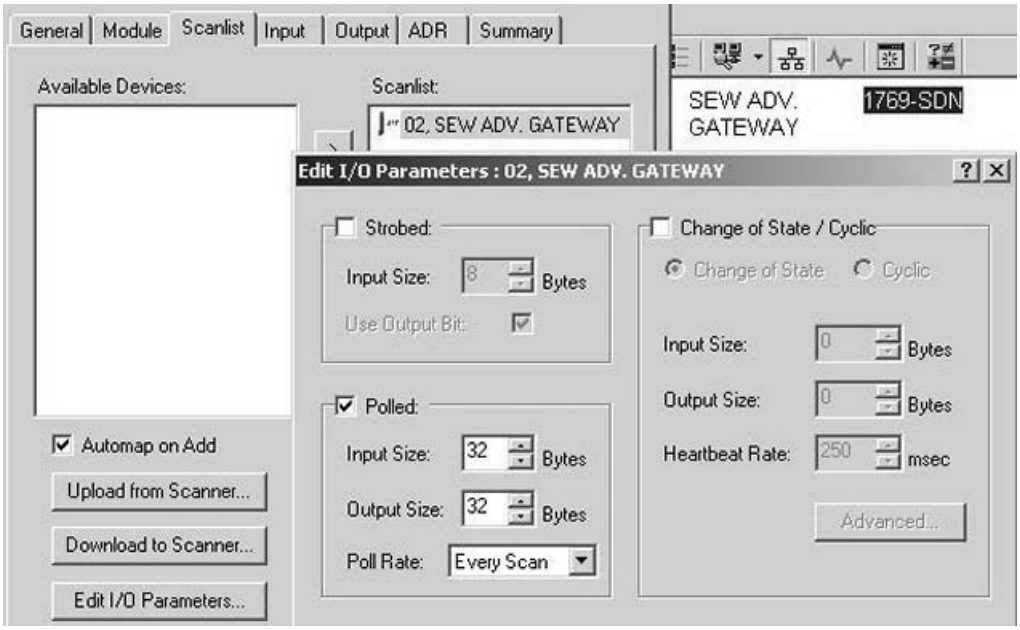
The parameter "Pd configuration" indicates the number (1 ... 64) of process data words set (16-bit) and defines the I/O parameters for the DeviceNet scanner (see following figure).



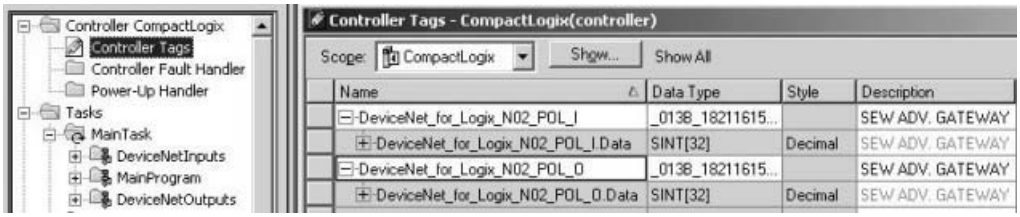
11960AXX

After adding the IFF41B fieldbus gateway to the scan list, the number of polled I/O Bytes must be set to 2 × number of PD (e. g. number of PD = 16, number of polled input bytes = 32 and output bytes = 32) via "Edit I/O Parameters". When the DeviceNet configuration is saved and downloaded into the scanner, RSNetWorx can be closed.

Depending on the DeviceNet configuration and the mapping rules in the scanner, the data from and to DeviceNet units is packed into a DINT array that is transferred from the scanner to the local I/O tags of the Logix processor.

In order not to have to search for the data from a certain device in this array manually, the "DeviceNet Tag Generator" tool automatically generates copy commands and two controller tags (input & output as byte arrays) for each DeviceNet device.

The tag name contains the MAC ID of the DeviceNet unit and *POL_I* for polled input data or *POL_O* for polled output data (see following figure).



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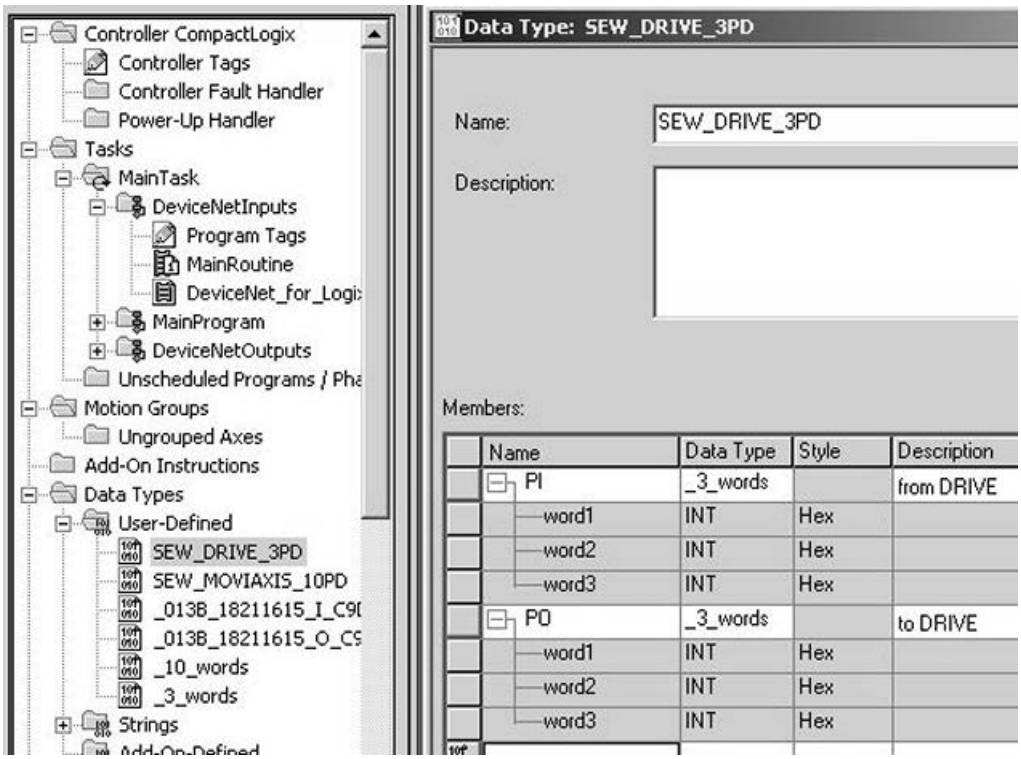
6.3 Configuration examples in RSLogix5000

6.3.1 UFF41B fieldbus gateway with 16 process data

1. Set the DIP switches on UFF41B to
   - Adjust the baud rate to the DeviceNet
   - Set the address (MAC-ID) to a value used by no other node
2. Insert the UFF41B fieldbus gateway in the DeviceNet configuration as shown in chapter "Configuring PLC and master (DeviceNet scanner)".
3. Set the number of process data words of the UFF41B fieldbus gateway to 16.
4. Integration into the RSLogix project can now begin.

   To do so, create a controller tag with a user-defined data type to create a simple interface to the inverter's process data (see following figure).

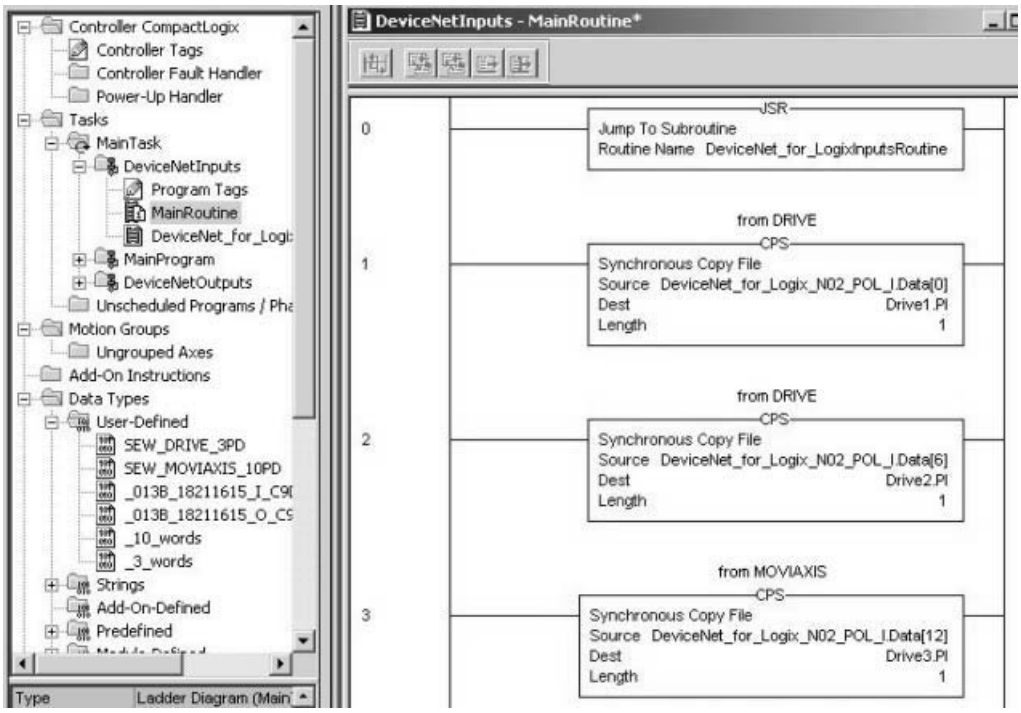


11962AXX

The description for the process input and output data of the controller tag can match the definition of the process data (PD) in the inverters.

5. In order to copy the data of the UFF41B fieldbus gateway to the new data structure, CPS commands are added into the "MainRoutine" that reads the data from the local I/O (see following figure).

Make sure that this CPS command is executed **after** the automatically generated (by DeviceNet Tag Generator) *DNet_ScannerInputsRoutine*.



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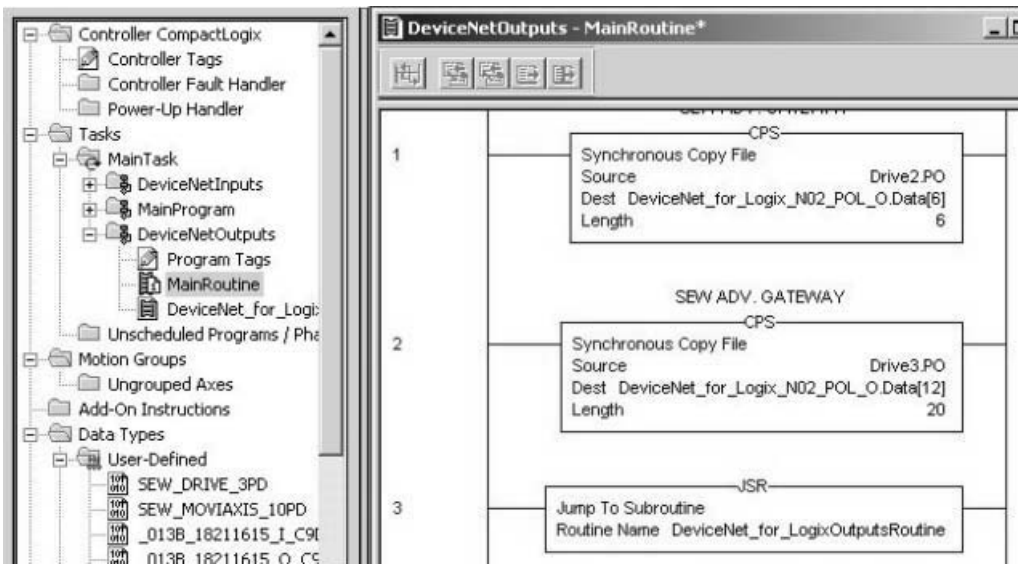
In order to copy the data from the new data structure to the UFF41B fieldbus gateway, CPS commands are added into the "MainRoutine" that writes the data to the local I/O.

These CPS commands are executed **after** the automatically generated (by DeviceNet Tag Generator) *DNet_Scanner_OutputsRoutine*.



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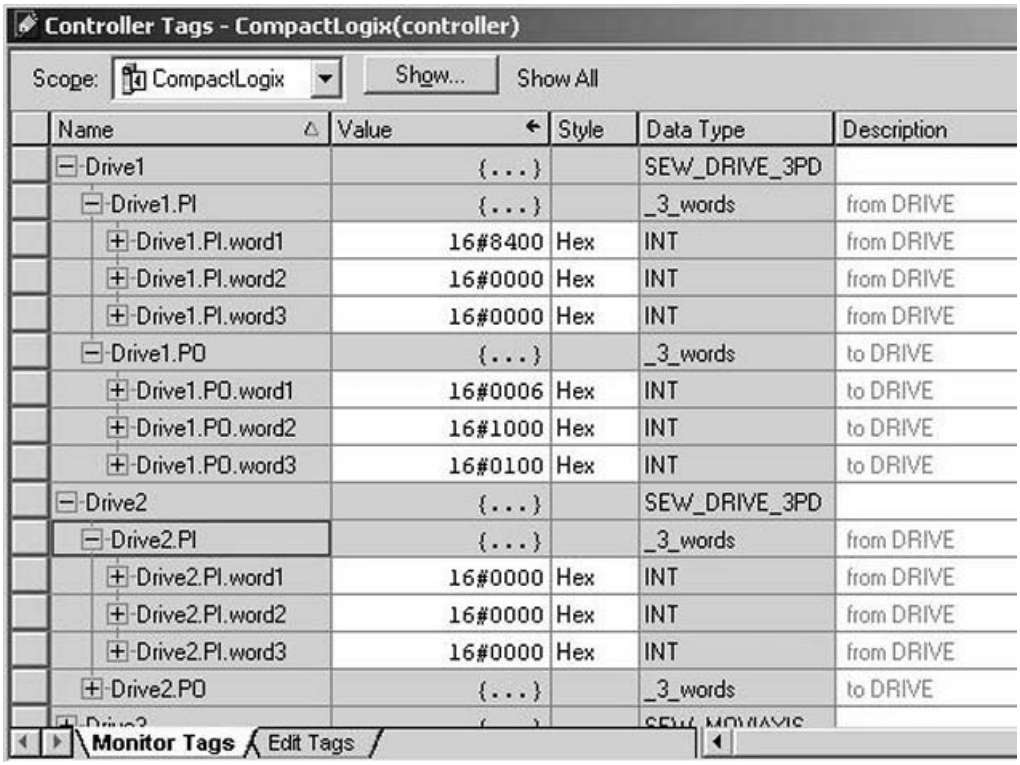
6. Now save the project and transfer it to the PLC. Set the PLC to Run Mode and set the **Scanner CommandRegister.Run** to "1" to activate the data exchange via DeviceNet.

   You can now read the actual values from the UFF41B fieldbus gateway and write setpoint values.



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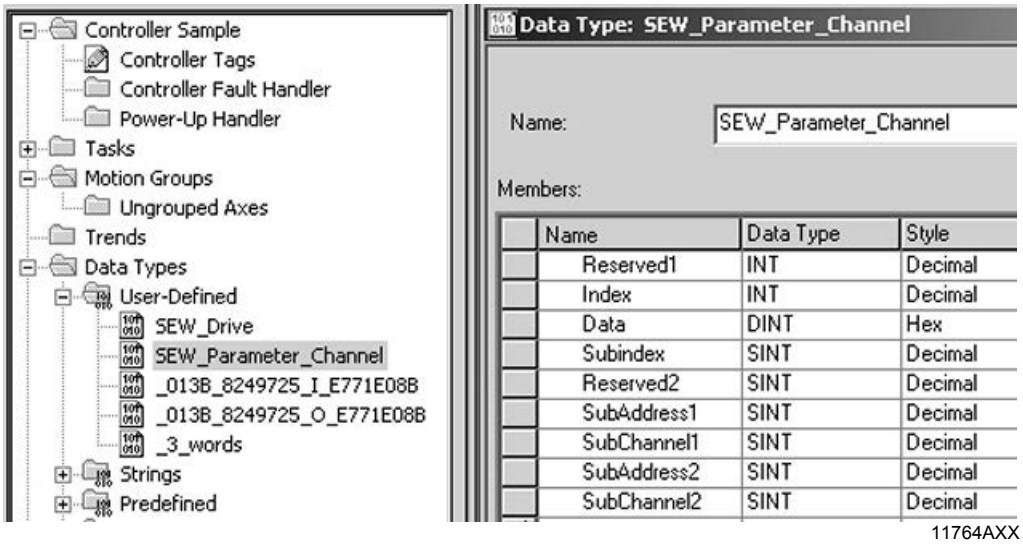
The process data should correspond with the values displayed in the Gateway Configurator in MOVITOOLS® MotionStudio (see chapter "Configuring the UFx41B fieldbus gateway and inverters").

6.3.2 Access to UFF41B fieldbus gateway parameters

In order to get an easy-to-use read access to parameters of the UFF41B fieldbus gateway via *explicit messages* and the *register object*, follow the following steps:

1. Create a user-defined data structure "SEW_Parameter_Channel" (see following figure).



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2. Define the following controller tags (see figure below).

Name	Data Type
ReadParameter	MESSAGE
ReadParameterRequest	SEW_Parameter_Channel
ReadParameterResponse	SEW_Parameter_Channel
ReadParameterStart	BOOL

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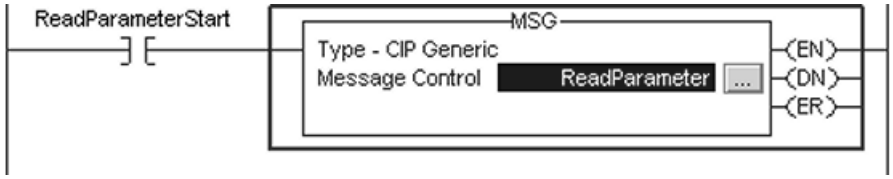
3. Create a rung for the "ReadParameter" execution (following figure).



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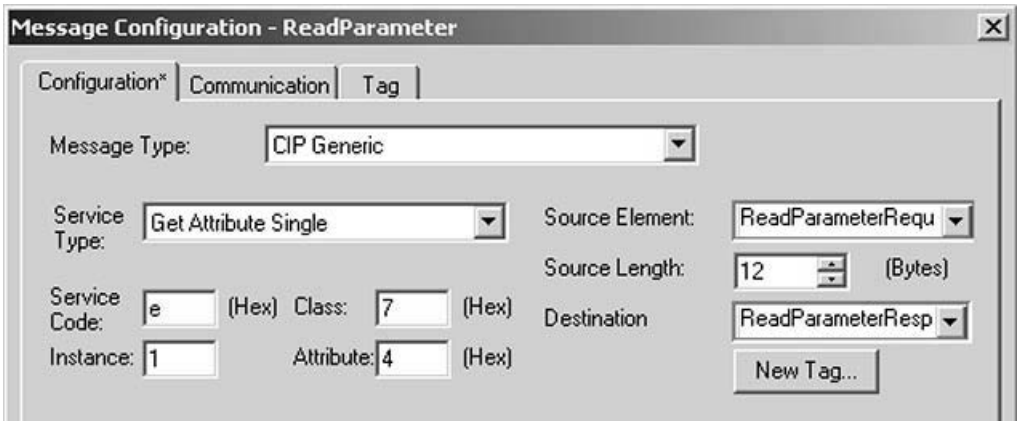
- For contact, select the tag "ReadParameterStart"
- For the Message Control, select the tag "ReadParameter"

4. Click on [...] in the MSG instruction to open the "Message Configuration" window (see following figure).



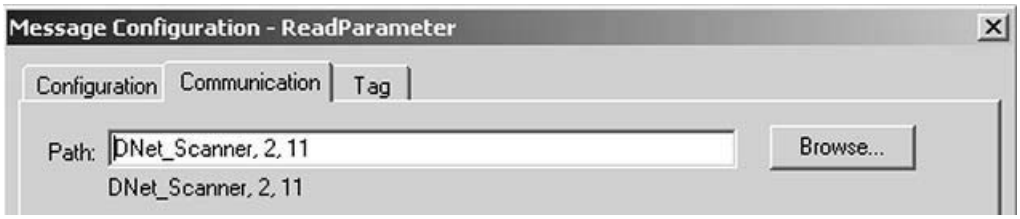
11767AXX

Select "CIP Generic" as "message type". Fill the other fields in the following order:

A Source Element = ReadParameterRequest.Index
B SourceLength = 12
C Destination = ReadParameterResponse.Index
D Class = 7_{hex}
E Instance = 1
F Attribute = 4_{hex}
G Service Code = e_{hex}

The service type is set automatically.

5. The target device is to be specified on the Communication tab (see following figure).



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The path consists of:

- Name of the scanner (e. g. DNet_Scanner)
- 2 (always 2)
- Slave address (e. g. 11)

6. After downloading the changes to the PLC, the index of the parameter to be read can be entered at *ReadParameterRequest.Index*. By altering *ReadParameterStart* to "1" the read request is executed once (see following figure).

Controller Tags - DeviceNet(controller)

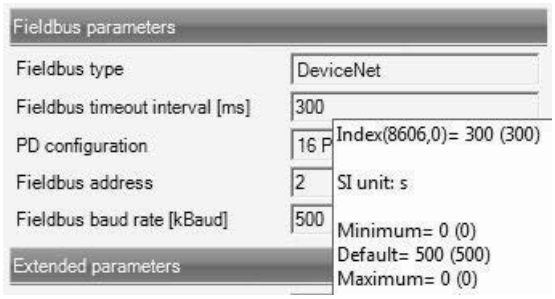
Scope: DeviceNet | Show... | SEW_Parameter_Channel, BOOL, MESSAGE

Name	Value	Style	Data Type
ReadParameter	{...}		MESSAGE
ReadParameterRequest	{...}		SEW_Parameter_C...
ReadParameterRequest.Reserved1	0	Decimal	INT
ReadParameterRequest.Index	8606	Decimal	INT
ReadParameterRequest.Data	16#0000_0000	Hex	DINT
ReadParameterRequest.Subindex	0	Decimal	SINT
ReadParameterRequest.Reserved2	0	Decimal	SINT
ReadParameterRequest.SubAddress1	0	Decimal	SINT
ReadParameterRequest.SubChannel1	0	Decimal	SINT
ReadParameterRequest.SubAddress2	0	Decimal	SINT
ReadParameterRequest.SubChannel2	0	Decimal	SINT
ReadParameterResponse	{...}		SEW_Parameter_C...
ReadParameterResponse.Reserved1	0	Decimal	INT
ReadParameterResponse.Index	8606	Decimal	INT
ReadParameterResponse.Data	16#0000_012c	Hex	DINT
ReadParameterResponse.Subindex	0	Decimal	SINT
ReadParameterResponse.Reserved2	0	Decimal	SINT
ReadParameterResponse.SubAddress1	0	Decimal	SINT
ReadParameterResponse.SubChannel1	0	Decimal	SINT
ReadParameterResponse.SubAddress2	0	Decimal	SINT
ReadParameterResponse.SubChannel2	0	Decimal	SINT
ReadParameterStart	1	Decimal	BOOL

11966BXX

On response to the read request, *ReadParameterResponse.Index* should indicate the read index and *ReadParameterResponse.Data* should contain the read data. In this example, the timeout interval of the UFF41B fieldbus gateway (index 8606) set by the scanner has been read ($012C_{hex}$ = 0.3 s).

You can check the value in the MOVITOOLS® MotionStudio parameter tree (see figure below). The tooltip of a parameter displays for example index, subindex, factor, etc. of the parameter.



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6.3.3 Access to unit parameters of lower-level units

Access to unit parameters of, for example MOVITRAC® B connected to the UFF41B fieldbus gateway via SBus, is the same as access to unit parameters of the UFF41B fieldbus gateway itself (see chapter "Accessing parameters of the UFF41B fieldbus gateway").

The only difference is that **Read/WriteParameterRequest.SubChannel1** is to be set to **3** and **Read/WriteParameterRequest.SubAddress1** must be set to the SBus address of MOVITRAC® B connected to UFF41B (see figure below).

Controller Tags - Sample(controller)

Scope: Sample | Show... | Show All

Name	Value	Style	Data Type
ReadParameter	{...}		MESSAGE
ReadParameterRequest	{...}		SEW_Parameter_Channel
ReadParameterRequest.Reserved1	0	Decimal	INT
ReadParameterRequest.Index	8489	Decimal	INT
ReadParameterRequest.Data	16#0000_0000	Hex	DINT
ReadParameterRequest.Subindex	0	Decimal	SINT
ReadParameterRequest.Reserved2	0	Decimal	SINT
ReadParameterRequest.SubAddress1	7	Decimal	SINT
ReadParameterRequest.SubChannel1	3	Decimal	SINT
ReadParameterRequest.SubAddress2	0	Decimal	SINT
ReadParameterRequest.SubChannel2	0	Decimal	SINT
ReadParameterResponse	{...}		SEW_Parameter_Channel
ReadParameterResponse.Reserved1	0	Decimal	INT
ReadParameterResponse.Index	8489	Decimal	INT
ReadParameterResponse.Data	150000	Decimal	DINT
ReadParameterResponse.Subindex	0	Decimal	SINT
ReadParameterResponse.Reserved2	0	Decimal	SINT
ReadParameterResponse.SubAddress1	7	Decimal	SINT
ReadParameterResponse.SubChannel1	3	Decimal	SINT
ReadParameterResponse.SubAddress2	0	Decimal	SINT
ReadParameterResponse.SubChannel2	0	Decimal	SINT
ReadParameterStart	1	Decimal	BOOL

11775BXX

In this example, MOVITRAC® B connected to a CAN 1 system bus of the UFF41B option with SBus address 7 read the value 150 rpm from *P160 Fixed setpoint n11* (index 8489).

For a list of subchannels and subaddresses, refer to the next chapter.

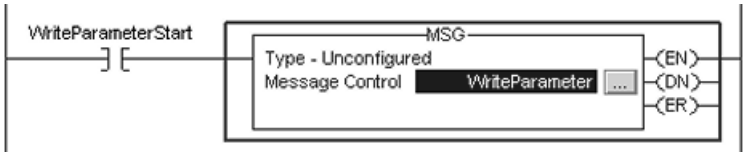
Only a few additions are necessary for activating write access to a parameter of lower-level units:

- Create the controller tags (see following figure)

Name	Data Type
⊞-WriteParameter	MESSAGE
⊞-WriteParameterRequest	SEW_Parameter_Channel
⊞-WriteParameterResponse	SEW_Parameter_Channel
WriteParameterStart	BOOL

11771AXX

- Create a rung for executing the "WriteParameter" command (see following figure).

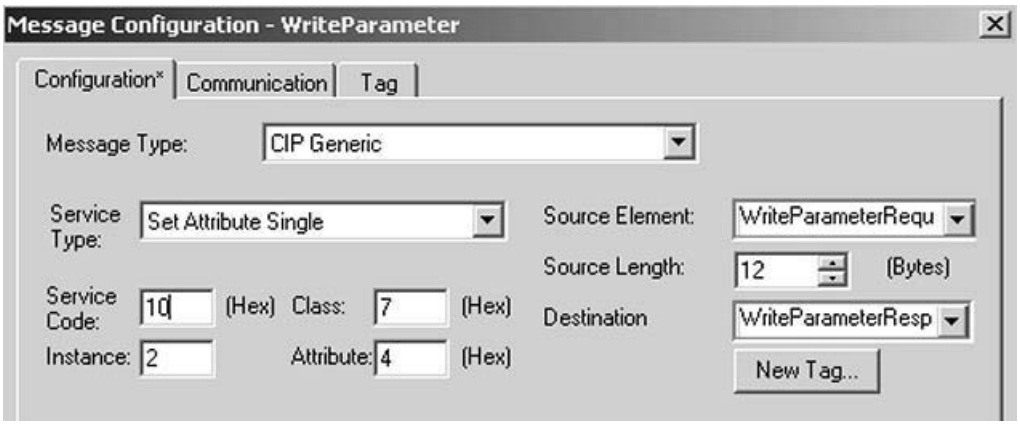


11772AXX

For contact, select the tag "WriteParameterStart"

For message control, select the tag "WriteParameter"

- Click on ... in the MSG instruction to open the "Message Configuration" window (see following figure).



11773AXX

Fill the other fields in the following sequence:

- Source Element = WriteParameterRequest.Index
- Source Length = 12
- Destination = WriteParameterResponse.Index
- Class = 7_{hex}
- Instance = 2
- Attribute = 4_{hex}
- Service Code = 10_{hex}

The service type is set automatically.

- After downloading the changes to the PLC, index and value to be written into the parameter can be entered at *WriteParameterRequest.Index* and *WriteParameter-Request.Data.* Changing the *WriteParameterStart* control bit to "1" executes the write command once (see following figure).

Name	Value	Style	Data Type
⊞ WriteParameter	{...}		MESSAGE
⊟ WriteParameterRequest	{...}		SEW_Parameter_C...
⊞ WriteParameterRequest.Reserved1	0	Decimal	INT
⊞ WriteParameterRequest.Index	11001	Decimal	INT
⊞ WriteParameterRequest.Data	16#0000_0021	Hex	DINT
⊞ WriteParameterRequest.Subindex	0	Decimal	SINT
⊞ WriteParameterRequest.Reserved2	0	Decimal	SINT
⊞ WriteParameterRequest.SubAddress1	0	Decimal	SINT
⊞ WriteParameterRequest.SubChannel1	0	Decimal	SINT
⊞ WriteParameterRequest.SubAddress2	0	Decimal	SINT
⊞ WriteParameterRequest.SubChannel2	0	Decimal	SINT
⊟ WriteParameterResponse	{...}		SEW_Parameter_C...
⊞ WriteParameterResponse.Reserved1	0	Decimal	INT
⊞ WriteParameterResponse.Index	11001	Decimal	INT
⊞ WriteParameterResponse.Data	16#0000_0021	Hex	DINT
⊞ WriteParameterResponse.Subindex	0	Decimal	SINT
⊞ WriteParameterResponse.Reserved2	0	Decimal	SINT
⊞ WriteParameterResponse.SubAddress1	0	Decimal	SINT
⊞ WriteParameterResponse.SubChannel1	0	Decimal	SINT
⊞ WriteParameterResponse.SubAddress2	0	Decimal	SINT
⊞ WriteParameterResponse.SubChannel2	0	Decimal	SINT
WriteParameterStart	1	Decimal	BOOL

11967BXX

On response to the write request, *WriteParameterResponse.Index* should give the written index and *WriteParameterResponse.Data* should contain the written data.

In this example, MOVITRAC® B connected to a CAN 1 system bus of the UFF41B option with SBus address 1 wrote the value 150 rpm to*P160 Fixed setpoint n11* (index 8489).

You can check the value in the MOVITOOLS® MotionStudio parameter tree or the PLC Editor. The tooltip of a parameter displays for example index, subindex, factor, etc. of the parameter.

7 DeviceNet Operating Characteristics

7.1 Process data exchange

Polled I/O

The polled I/O messages correspond to the process data telegrams sent to the UFF41B fieldbus gateway. Up to a maximum of 64 process data words can be exchanged between controller and UFF41B fieldbus gateway. The process data length is set using the DeviceNet scanner.

	TIP
	The set process data length influences the process data lengths of the polled I/O as well as of the bit-strobe I/O messages. The process data length of the bit-strobe I/O messages can include up to four process data words. If the value for the process data length set via DIP switches is less than four, it will be accepted. If the value is set greater than four, the process data length will be automatically limited to four.

Timeout response with polled I/O

The timeout is triggered by the UFF41B option. The timeout interval must be set by the master after the connection has been established. The DeviceNet specification refers to an "expected packet rate" rather than a timeout interval in this case. The expected packet rate is calculated on the basis of the timeout interval using the following formula:

$$t_{Timeout\_inverter} = t_{Timeout\_interval\_polled\_IO} = 4 \times t_{Expected\_packet\_rate\_polled\_IO}$$

The expected packet rate can be set using the connection object class 5, instance 2, attribute 9. The range of values runs from 0 ms to 65535 ms in 5 ms steps.

The expected packet rate for the polled I/O connection is converted into the timeout interval and displayed in the device as timeout interval in index 8606 in the bus diagnostics in the parameter tree.

This timeout interval is retained in the device when the polled I/O connection is disconnected, and the device switches to timeout status after the timeout interval has elapsed.

The timeout interval must only be set via bus.

If a timeout occurs for the polled I/O messages, this connection type enters timeout status. Incoming polled I/O messages are no longer accepted.

The timeout triggers the timeout response set in the inverter.

The timeout can be reset via DeviceNet using the reset service of the connection object (class 0x05, instance 0x02, undetermined attribute), by disconnecting the connection, by using the reset service of the identity object (class 0x01, instance 0x01, undetermined attribute), or by restarting the UFF41B fieldbus gateway.

Bit-strobe I/O

The SEW fieldbus device profile does not include the bit-strobe I/O messages. The messages represent a DeviceNet-specific process data exchange. The master sends a broadcast message that is 8 bytes (= 64 bits) long. One bit in this message is assigned to each station in accordance with its address. The value of this bit may be 0 or 1, triggering two different responses in the recipient.

Bit value	Meaning	LED BIO
0	Sends back process input data only	Green light
1	Trigger fieldbus timeout reaction and send back process input data	Flashing red

NOTICE

The LED L14 (BIO) on the front of the UFF41B option can be used for distinguishing between the timeout triggered by the bit-strobe telegram and a real timeout in the connection. The LED L14 (BIO) lights up green when bit-strobe messages are received cyclically.

LED L14 (BIO) flashing red means there is a timeout in the bit-strobe connection and no more bit-strobe telegrams are accepted. Each participant that has received this bit-strobe I/O message responds with its current process input data. The length of the process input data corresponds to the process data length for the polled I/O connection. The process input data length can be up to four process data.

The following table shows the data range of the bit-strobe request message which represents the allocation of stations (= station address) to data bits.

Example: For example, the participant with station address (MAC ID) 16 only processes bit 0 in data byte 2.

Byte offset	7	6	5	4	3	2	1	0
0	ID 7	ID 6	ID 5	ID 4	ID 3	ID 2	ID 1	ID 0
1	ID 15	ID 14	ID 13	ID 12	ID 11	ID 10	ID 9	ID 8
2	ID 23	ID 22	ID 21	ID 20	ID 19	ID 18	ID 17	ID 16
3	ID 31	ID 30	ID 29	ID 28	ID 27	ID 26	ID 25	ID 24
4	ID 39	ID 38	ID 37	ID 36	ID 35	ID 34	ID 33	ID 32
5	ID 47	ID 46	ID 45	ID 44	ID 43	ID 42	ID 41	ID 40
6	ID 55	ID 54	ID 53	ID 52	ID 51	ID 50	ID 49	ID 48
7	ID 63	ID 62	ID 61	ID 60	ID 59	ID 58	ID 57	ID 56

Timeout response with bit-strobe I/O

The timeout is triggered by the UFF41B option. The timeout interval must be set by the master after the connection has been established. The DeviceNet specification refers to an "expected packet rate" rather than a timeout interval in this case. The expected packet rate is calculated on the basis of the timeout interval using the following formula:

$t_{Timeout\_BitStrobe\_IO} = 4 \times t_{Expected\_Packet\_Rate\_BitStrobe\_IO}$

It can be set using connection object class 5, instance 3, attribute 9. The range of values runs from 0 ms to 65535 ms in 5 ms steps.

If a timeout occurs for the bit-strobe I/O messages, this connection type enters timeout status. Incoming bit-strobe I/O messages are no longer accepted. The timeout is not passed to the UFF41B fieldbus gateway.

The timeout can be reset as follows:

- Via DeviceNet using the reset service of the connection object (class 0x05, instance 0x03, undetermined attribute)
- By disconnecting the connection
- Using the reset service of the identity object (class 0x01, instance 0x01, undetermined attribute)

7.2 The Common Industrial Protocol (CIP)

DeviceNet is integrated into the Common Industrial Protocol (CIP).

In the Common Industrial Protocol, all unit data can be accessed via objects. The objects listed in the following table are integrated in the UFF41B option.

Class [hex]	Name
01	Identity object
03	DeviceNet Object
05	Connection Object
07	Register Object
0F	Parameter Object

7.2.1 CIP object directory

Identity object

- The identity object contains general information on the EtherNet/IP device.
- Class code: 01_{hex}

Class

None of the class attributes are supported.

Instance 1

Attri-bute	Access	Name	Data type	Default value [hex]	Description
1	Get	Vendor ID	UINT	013B	SEW-EURODRIVE GmbH & Co KG
2	Get	Device Type	UINT	0064	Manufacturer-specific type
3	Get	Product Code	UINT	000D	Product no.16: UFF41B gateway
4	Get	Revision	STRUCT of		Revision of the identity object, depends on firmware version
		Major Revision	USINT		
		Minor Revision	USINT		
5	Get	Status	WORD		See "Coding of attribute 5 status"
6	Get	Serial number	UDINT		Unique serial number
7	Get	Product Name	SHORT_STRING	SEW GATEWAY UFF41B	Product name

- Coding of attribute 5 "Status":

Bit	Name	Description
0	Owned	Controlling connection is active
1	-	Reserved
2	Configured	Configuration complete
3	-	Reserved
4 - 7	Extended Device Status	See "coding extended device status (bits 4 - 7)"
8	Minor Recoverable Fault	Minor fault that can be remedied
9	Minor Unrecoverable Fault	Minor fault that cannot be remedied
10	Major Recoverable Fault	Major fault that cannot be remedied
11	Major Unrecoverable Fault	Major fault that cannot be remedied
12 - 15	-	Reserved

- Coding of the "extended device status " (bits 4 - 7):

Value [binary]	Description
0000	Unknown
0010	At least one faulty IO connection
0101	No IO connection established
0110	At least one IO connection active

Supported services

Service code [hex]	Service name	Instance
05	Reset	X
0E	Get_Attribute_Single	X

DeviceNet object

- The DeviceNet object provides information on the DeviceNet communication interface.
- Class code: 03_{hex}

Class

Attri-bute	Access	Name	Data type	Default value [hex]	Description
1	Get	Revision	UINT	0002	Revision 2

Instance 1

Attribute	Access	Name	Description
1	Get	MAC ID	Depending on DIP switch (0 - 63)
2	Get	Baud rate	Depending on DIP switch (0 - 2)
3	Get	BOI	
4	Get/Set	Bus-off counter	Error counter of the physical CAN interface (0 - 255)
5	Get	Allocation information	
6	Get	MAC-ID switch changed	Information as to whether DIP switch settings vary from MAC ID
7	Get	Baud rate switch changed	Information as to whether DIP switch settings vary from baud rate
8	Get	MAC-ID switch value	DIP switch setting for MAC ID
9	Get	Baud rate switch value	Actual DIP switch settings for baud rate

Supported services

Service code [hex]	Service name	Class	Instance
0E	Get_Attribute_Single	X	X
10	Set_Attribute_Single	-	X

Connection object

- The process and parameter data connections are defined in the connection object.
- Class code: 05_{hex}

Class

None of the class attributes are supported.

Instance	Communication
1	Explicit message
2	Polled I/O
3	Bit-Strobe I/O

Instance 1 - 3

Attribute	Access	Name
1	Get	State
2	Get	Instance type
3	Get	Transport Class trigger
4	Get	Produce connection ID
5	Get	Consume connection ID
6	Get	Initial com characteristics
7	Get	Produced connection size
8	Get	Consumed connection size
9	Get/Set	Expected packet rate
12	Get	Watchdog time-out action
13	Get	Produced connection path len
14	Get	Produced connection path
15	Get	Consumed connection path len
16	Get	Consumed connection path
17	Get	Production inhibit time

Supported services

Service code [hex]	Service name	Instance
0x05	Reset	X
0x0E	Get_Attribute_Single	X
0x10	Set_Attribute_Single	X

Register object

- The register object is used to access an SEW parameter index.
- Class code: 07_{hex}

Class

None of the class attributes are supported.

The MOVILINK® parameter services are mapped in the nine instances of the register object. The "Get_Attribute_Single" and "Set_Attribute_Single" services are used for access.

As the register object is designed so that INPUT objects can only be read and OUTPUT objects can be read and written, the options listed in the following table are available for addressing the parameter channel.

Instance	INPUT OUTPUT	Resulting MOVILINK® service with	
		Get_Attribute_Single	Set_Attribute_Single
1	INPUT	READ parameter	Invalid
2	OUTPUT	READ	WRITE parameter
3	OUTPUT	READ	WRITE VOLATILE parameter
4	INPUT	READ MINIMUM	Invalid
5	INPUT	READ MAXIMUM	Invalid
6	INPUT	READ DEFAULT	Invalid
7	INPUT	READ SCALING	Invalid
8	INPUT	READ ATTRIBUTE	Invalid
9	INPUT	READ EEPROM	Invalid

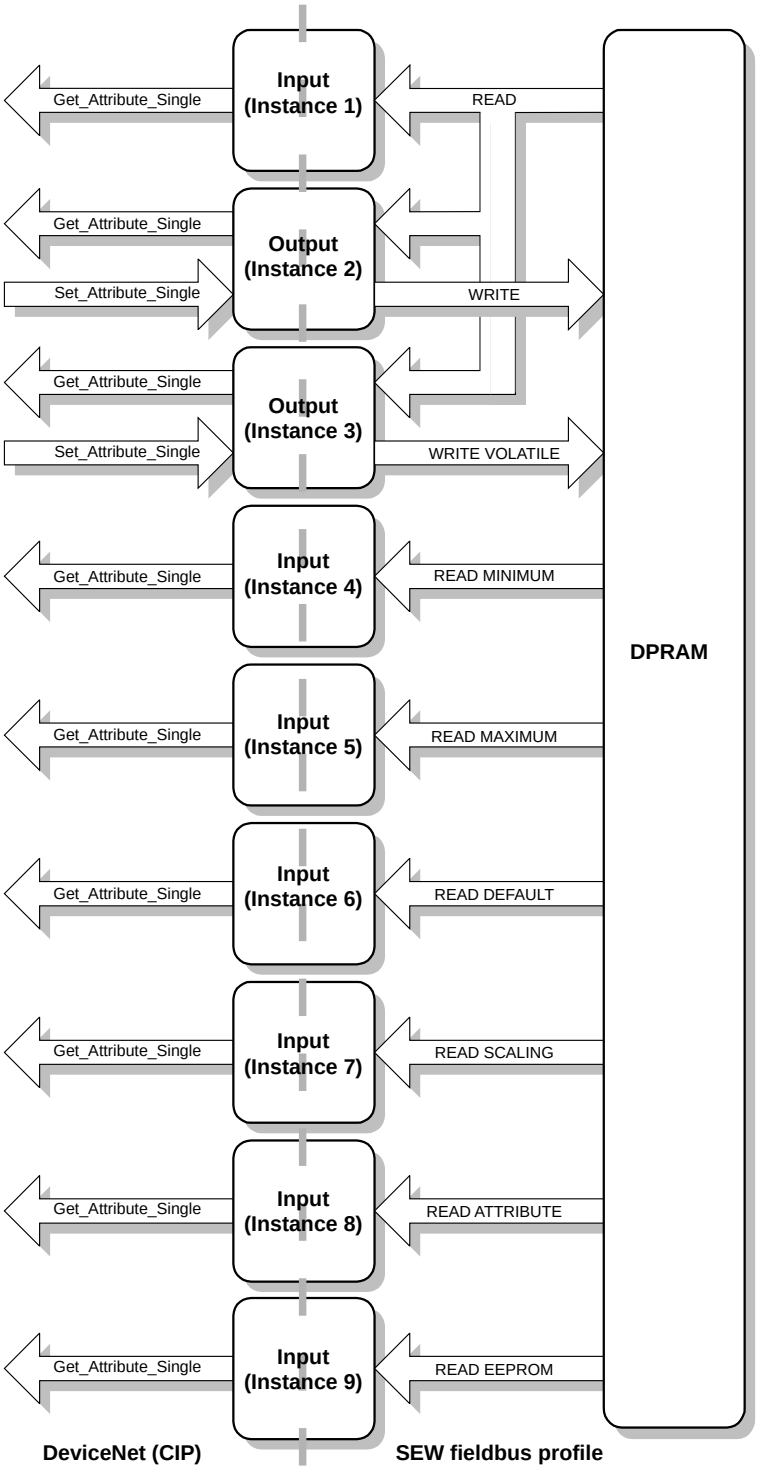


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Figure 2: Description of the parameter channel

Instance 1 - 9

Attribute	Access	Name	Data type	Default value [hex]	Description
1	Get	Bad Flag	BOOL	00	0 = good / 1 = bad
2	Get	Direction	BOOL	00 01	00 = Input register 01 = Output register
3	Get	Size	UINT	0060	Data length in bits (96 bits = 12 bytes)
4	Get/Set	Data	ARRAY of BITS		Data in format of the SEW parameter channel

TIPS

Explanation of the attributes:

- Attribute 1 indicates whether an error occurred during the previous access to the data field.
- Attribute 2 indicates the direction of the instance.
- Attribute 3 indicates the data length in bits
- Attribute 4 represents the parameter data. When accessing attribute 4, the SEW parameter channel must be attached to the service telegram. The SEW parameter channel consists of the elements listed in the following table.

Name	Data type	Description		
Index	UINT	SEW unit index		
Data	UDINT	Data (32 bit)		
Subindex	BYTE	SEW unit subindex		
Reserved	BYTE	Reserved (must be "0")		
Subaddress 1	BYTE	0 Parameter of the UFF41B itself	1 ...	e.g. SBus address of units connected to the SBus of UFF41B
Subchannel 1	BYTE	0	3	Lower-level bus system, e.g. SBus 1
Subaddress 2	BYTE	Reserved (must be "0")		
Subchannel 2	BYTE	Reserved (must be "0")		

The subchannels and subaddresses apply to the UFF41B fieldbus gateway depending on the lower-level bus system.

Subchannel 1	Interface	Value range subaddress 1
0	UFF41B itself	0
1	Reserved	0
2	EtherCAT X36 (in preparation)	
3	SBus1 (X33 and X26)	1 - 16
4	SBus2 (X32)	17 - 32

See the "Appendix" for a schematic representation of parameter access to lower-level units.

Supported services

Service code [hex]	Service name	Instance
0x0E	Get_Attribute_Single	X
0x10	Set_Attribute_Single	X

Parameter object

- The fieldbus parameters of the UFF41B option can be addressed directly via the instance using the parameter object.
- In exceptional cases, you can also use the parameter object to access SEW parameters.
- Class code: $0F_{hex}$

Class

Attribute	Access	Name	Data type	Default value [hex]	Description
2	Get	Max Instance	UINT	0085	Maximum instance = 133
8	Get	Parameter Class Descriptor	UINT	0009	Bit 0: Supports parameter instances Bit 3: Parameters are saved permanently
9	Get	Configuration Assembly Interface	UINT	0000	Configuration assembly is not supported.

Instance 1 - 133

Instances 1 - 133 provide access to the fieldbus parameters.

Attribute	Access	Name	Data type	Default value [hex]	Description
1	Set/Get	Parameter	UINT		Parameter that is to be read or written (see section "UFF41B fieldbus parameters")
2	Get	Link Path Size	USINT	00	No link is specified.
3	Get	Link Path	Packed EPATH	00	Not used
4	Get	Descriptor	WORD	0000	Read/write parameter
5	Get	Data type	EPATH	00C8	UDINT
6	Get	Data Size	USINT	04	Data length in bytes

UFF41B fieldbus parameters

Instance	Access	Group	Name	Meaning
1	Get/Set	Device parame-ters	PD configuration	Process data configuration
2	Get		Timeout time	Timeout interval
3	Get		Fieldbus type	DeviceNet
4	Get		Baud rate	Baud rate via DIP switches
5	Get		Station address	MAC-ID via DIP switches
6 - 69	Get	PO monitor	PO1 setpoint to PO64 setpoint	Monitor of the process output data words
70 - 133	Get	PI monitor	PI1 actual value to PI64 actual value	Monitor of the process input data words

TIP

The data format for these instances deviates from the SEW fieldbus profile to meet the DeviceNet specification.

Supported services

Service code [hex]	Service name	Class	Instance
0E	Get_Attribute_Single	X	X
10	Set_Attribute_Single	-	X

7.3 Return codes of the parameterization via explicit messages

SEW-specific return codes

The return codes that SEW units issue in case of incorrect parameterization are independent of the fieldbus. However, the return codes are sent back in a different format when using DeviceNet. The following table shows the data format for a parameter response message.

	Byte offset			
	0	**1**	**2**	**3**
Function	MAC ID	Service code [=94hex]	General Error Code	Additional code
Example	01_{hex}	94_{hex}	$1F_{hex}$	10_{hex}

- MAC ID is the DeviceNet address
- The *Service code* of an error telegram is always 94_{hex}
- The *general error code* of a manufacturer-specific return code is always $1F_{hex}$
- The additional code is described in the table in the "Additional code" section.
- *General Error Codes D0hex* and *D1hex* signal protocol-specific errors to MOVILINK®, such as incorrect address information (see section "MOVILINK®-specific return codes").

The table shows the proprietary error 10_{hex} = *Illegal parameter index* as an example.

Return codes from DeviceNet

DeviceNet-specific return codes are sent in the error message if the data format is not maintained during transmission or if a service is performed which has not been implemented. The coding of these return codes is described in the DeviceNet specification (see section "General Error Codes").

Timeout of explicit messages

The timeout is triggered by the UFF41B option. The timeout interval must be set by the master after the connection has been established. The DeviceNet specification refers to an "expected packet rate" rather than a timeout interval in this case. The expected packet rate is calculated on the basis of the timeout interval using the following formula:

$$t_{Timeout\_ExpliciteMessages} = 4 \times t_{Expected\_Packet\_Rate\_ExpliciteMessages}$$

It can be set using connection object class 5, instance 1, attribute 9. The range of values runs from 0 ms to 65535 ms in 5 ms steps.

If a timeout is triggered for the explicit messages, this connection type for the explicit messages is automatically dropped provided that the polled I/O or bit-strobe connections are not in the ESTABLISHED state. This is the default setting of DeviceNet. The connection for explicit messages must be re-established to communicate with these messages again. The timeout is **not** passed to the UFF41B fieldbus gateway.

General error codes

DeviceNet-specific error codes

General error code (hex)	Error name	Description
00 - 01		Reserved for DeviceNet
02	Resource unavailable	The source required for performing the service is unavailable
03 - 07		Reserved for DeviceNet
08	Service not supported	The service is not supported for the selected class/instance
09	Invalid attribute value	Invalid attribute data have been sent
0A		Reserved for DeviceNet
0B	Already in requested mode/state	The selected object is already in the requested mode/state
0C	Object state conflict	The selected object cannot perform the service in its current status
0D		Reserved for DeviceNet
0E	Attribute not settable	It is not possible to access the selected object for writing.
0F	Privilege violation	Violation of access right
10	Device state conflict	The current status of the device makes it impossible to perform the required service
11	Reply data too large	The length of the transmitted data is longer than the size of the receive buffer
12		Reserved for DeviceNet
13	Not enough data	The length of the transferred data is too short for the service to be performed
14	Attribute not supported	The selected attribute is not supported
15	Too much data	The length of the transferred data is too long for the service to be performed
16	Object does not exist	The selected object is not implemented in the device
17		Reserved for DeviceNet
18	No stored attribute data	The requested data have not been stored previously
19	Store operation failure	The data could not be stored because an error occurred while saving them
1A - 1E		Reserved for DeviceNet
1F	Vendor specific error	Vendor specific error (see "SEW Fieldbus Device Profile" manual)
20	Invalid parameter	Invalid parameter. This error message is used when a parameter does not satisfy the requirements of the specification and/or the requirements of the application.
21 - CF	Future extensions	Reserved by DeviceNet for additional definitions
D0 - DF	Reserved for Object Class and service errors	Use this area if an occurring error cannot be entered in one of the error groups listed above.

MOVILINK®-specific return codes

MOVILINK®-specific error codes.

General Error Code	Additional code	Description	Corresponds to	
			MOVILINK® Error Code	MOVILINK® Aditional Code
0xD0	0xF0	Unknown error	0x05	0x00
	0xF1	Illegal Service		0x01
	0xF2	No Response		0x02
	0xF3	Different Address		0x03
	0xF4	Different Type		0x04
	0xF5	Different Index		0x05
	0xF6	Different Service		0x06
	0xF7	Different Channel		0x07
	0xF8	Different Block		0x08
	0xF9	No Scope Data		0x09
	0xFA	Illegal Length		0x0A
	0xFB	Illegal Address		0x0B
	0xFC	Illegal Pointer		0x0C
	0xFD	Not enough memory		0x0D
	0xFE	System Error		0x0E
0xD1	0xF0	Communication does not exist		0x0F
	0xF1	Communication not initialized		0x10
	0xF2	Mouse conflict		0x11
	0xF3	Illegal Bus		0x12
	0xF4	FCS Error		0x13
	0xF5	PB Init		0x14
	0xF6	SBUS - Illegal Fragment Count		0x15
	0xF7	SBUS - Illegal Fragment Type		0x16
	0xF8	Access denied		0x17
	0xF9 - FE	Not used		

Additional code

The additional code contains SEW-specific return codes for incorrect parameter setting of the drive inverter.

Additional code (hex)	Meaning
00	No error
10	Illegal parameter index
11	Function/parameter not implemented
12	Read access only
13	Parameter lock is active
14	Factory setting is active
15	Value for parameter too large
16	Value for parameter too small
17	Required option card missing for this function/parameter
18	Error in system software
19	Parameter access only via RS-485 process interface to X13
1A	Parameter access only via RS485 diagnostics interface
1B	Parameter is access-protected
1C	Controller inhibit required
1D	Invalid value for parameter
1E	Factory setting was activated
1F	Parameter was not saved in EEPROM
20	Parameter cannot be changed with enabled output stage

7.4 Terms and definitions

Term	Description
Allocate	Provides a service for setting up a connection.
Attributes	Attribute of an object class or instance. Describes the characteristics of the object class or instance in more detail.
BIO - Bit-Strobe I/O	All stations can be addressed with a broadcast message. The addressed stations respond with the process input data.
Class	DeviceNet object class
Device-Net scanner	Plug-in module for the Allen Bradley PLC which connects the PLC fieldbus to the peripheral devices.
DUP-MAC check	Duplicate MAC ID test
Explicit message body	Includes the class no., instance no., attribute no. and the data.
Explicit message	Parameter data message; assists in addressing the DeviceNet objects.
Get_Attribute_Single	Read service for a parameter.
Instance	Instance of an object class. Divides the object classes into additional sub-groups.
MAC ID	Media Access Control Identifier: node address of the device.
M-File	Provides the data range between the PLC and the scanner module.
Mod/Net	Module/network
Node ID	Node address = MAC ID
PIO - Polled I/O	Process data channel of DeviceNet; allows process output data to be sent and process input data to be received.
Release	Provides a service for setting up a connection.
Reset	Provides a service for resetting an error.
Rung	SLC500 program line
Service	Service performed via bus, e.g. read service, write service, etc.
Set_Attribute_Single	Write service for a parameter.

8 Configuration and Startup on the PROFIBUS DP-V1 Fieldbus

8.1 Configuring a PROFIBUS DP master

You need a GSD file to configure a PROFIBUS DP master for the UFF41B fieldbus gateway.

	TIP
	The current version of the EDS file for UFF41B is available on the SEW website under the heading "Software".

GSD file for PROFIBUS DP/DP-V1

The **GSD file SEW_600D.GSD** corresponds to GSD revision 4. The device master data files standardized by the PROFIBUS user organization can be read by all PROFIBUS DP masters.

Configuration tool	DP master	File name
All DP configuration tools to IEC 61158	For DP master standard	SEW_600D.GSD
Siemens S7 hardware configuration	for all S7 DP masters	

	TIP
	Do not change or expand entries in the GSD file! SEW assumes no liability for UFF41B fieldbus gateway or connected inverter malfunctions caused by a modified GSD file.

General configuration procedure

Proceed as follows for configuring the UFF41B fieldbus gateway with PROFIBUS DP interface:

1. Install (copy) the GSD file according to the requirements of your configuration software (see manuals of your configuration software or the section "Installing the GSD file in STEP7", below). Once the file has been installed properly, the device appears next to the slave stations with the designation *Adv.Gateway UFF*.
2. To configure the UFF41B fieldbus gateway, now insert *Adv. Gateway UFF* in the PROFIBUS structure and assign the PROFIBUS station address.
3. Select the process data configuration required for your application (see section "DP Configurations").
4. Enter the I/O or peripheral addresses for the configured data widths.

After configuration, you can start PROFIBUS DP. The red *Fault Profibus* LED indicates the status of the configuration (OFF = configuration OK).

Installing the GSD file in STEP7

Proceed as follows to install the GSD file in STEP7:

1. Start the Simatic Manager.
2. Open an existing project and start the hardware configuration.
3. Close the project window in the HW Config. A new file version cannot be installed when the project window is open.
4. In the menu, click on [Extras] / [Install new GSD...] and select the new GSD file with the name SEW_600D.GSD.

The software installs the GSD file and the associated bitmap files in the STEP7 system.

The SEW drive is available under the following path in the hardware catalog: PROFIBUS DP

+--Additional PERIPHERAL UNITS

+--Drives

+---SEW

+--DPV1

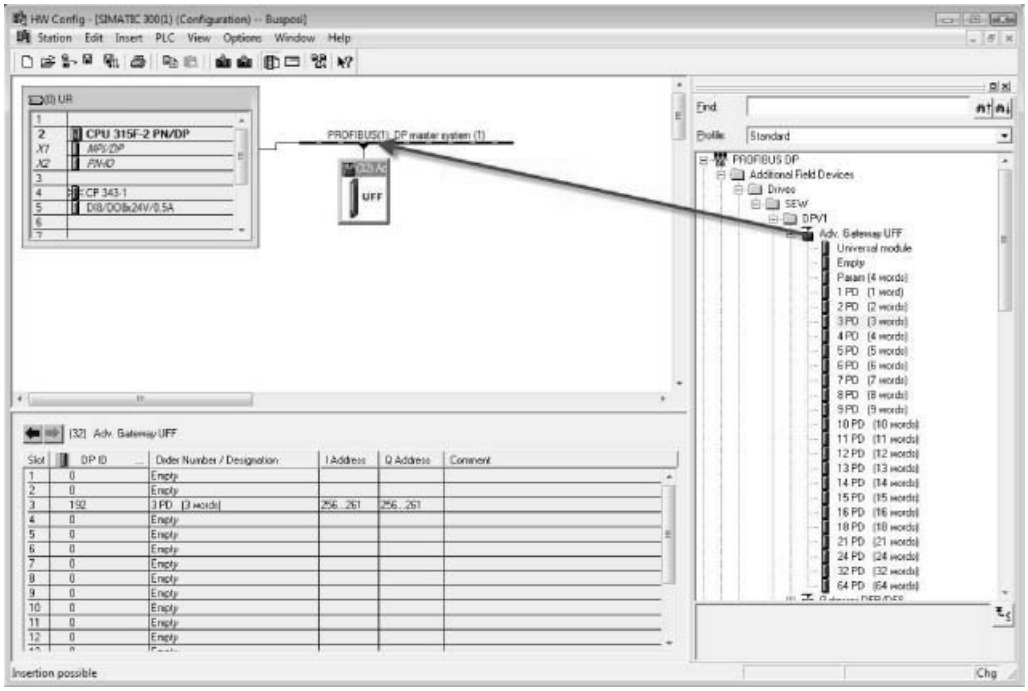
+---Adv. Gateway UFF

The installation of the new GSD file is now complete.

Configuration with STEP7

Proceed as follows for configuring the UFF41B fieldbus gateway with PROFIBUS DP interface:

1. Use drag and drop to add the interface module with the name "Adv. Gateway UFF" to the PROFIBUS structure and enter the station address (see figure below).



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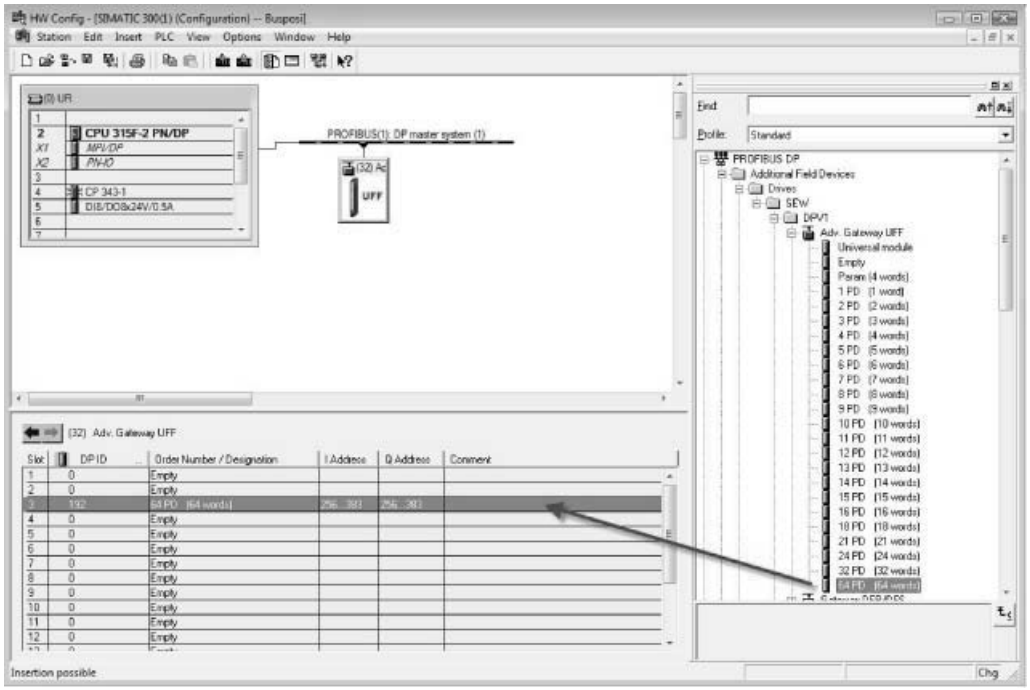
2. The UFF41B fieldbus gateway is now preconfigured with the 3PD configuration. To change the PD configuration, you have to delete the 3 PD module in slot 3. Next, add another PD module (e.g. the maximum configuration 64 PD) to slot 3 from the folder "Adv. Gateway UFF" (see figure below).



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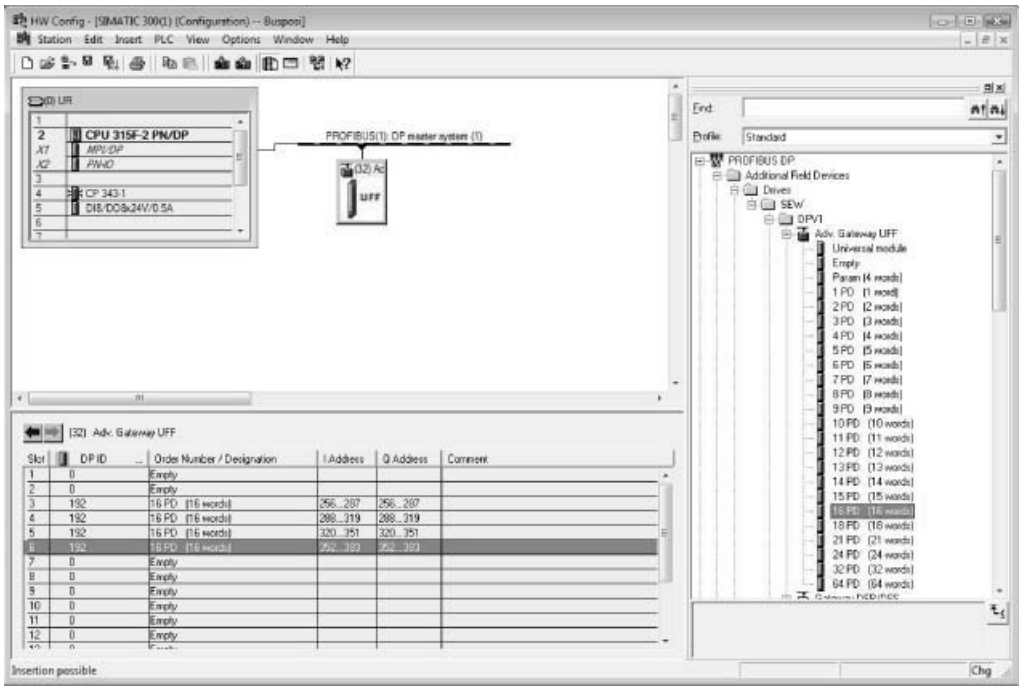
Slots 4 to 18 can be configured in the same way. In the following figure, the maximum configuration 64 PD is distributed among 4 slots (mapping 64 data words in smaller peripheral areas).



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Optionally, you can perform project planning for a MOVILINK® parameter channel in the cyclic process data. To do so, delete the "Empty" module from slot 2 and replace it with the module "Param (4 words)" using the drag and drop function.

Enter the I/O or peripheral addresses for the configured data widths in the 'I Address' [1] and 'Q Address' [2] columns.

DP configuration

To enable the UFF41B fieldbus gateway to support the type and number of the input and output data used for transmission, the DP master must transmit the corresponding DP configuration to the UFF41B fieldbus gateway. The configuration telegram comprises the DP configurations for slots 1 to 18. The number of process data depends on the number of slave units and their process data width.

You can:

- Control the UFF41B fieldbus gateway via process data
- Read or write parameters using the parameter channel

The following tables contain additional information on possible DP configurations.

- The "Parameter data/Process data configuration" column displays the name of the configuration. These names also appear in a selection list in the configuration software for the DP master.
- The "DP configurations" column shows the configuration data that are sent to the UFF41B fieldbus gateway when the link to the PROFIBUS DP system is being established.

Slot 1:

Parameter data configuration	Meaning / notes	DP configurations
Empty	Reserved	0x00

Slot 2:

Parameter data configuration	Meaning / notes	DP configurations
Empty	Reserved	0x00
Param (4words)	MOVILINK® parameter channel configured	0xC0, 0x87, 0x87

Slots 4 to 18:

Process data configuration	Meaning / notes	DP configurations
1 PD	Process data exchange via 1 process data word	0xC0, 0xC0, 0xC0
2 PD	Process data exchange via 2 process data words	0xC0, 0xC1, 0xC1
3 PD	Process data exchange via 3 process data words	0xC0, 0xC2, 0xC2
4 PD	Process data exchange via 4 process data words	0xC0, 0xC3, 0xC3
5 PD	Process data exchange via 5 process data words	0xC0, 0xC4, 0xC4
6 PD	Process data exchange via 6 process data words	0xC0, 0xC5, 0xC5
7 PD	Process data exchange via 7 process data words	0xC0, 0xC6, 0xC6
8 PD	Process data exchange via 8 process data words	0xC0, 0xC7, 0xC7

Process data configuration	Meaning / notes	DP configurations
9 PD	Process data exchange via 9 process data words	0xC0, 0xC8, 0xC8
10 PD	Process data exchange via 10 process data words	0xC0, 0xC9, 0xC9
11 PD	Process data exchange via 11 process data words	0xC0, 0xCA, 0xCA
12 PD	Process data exchange via 12 process data words	0xC0, 0xC7, 0xC7
13 PD	Process data exchange via 13 process data words	0xC0, 0xCC, 0xCC
14 PD	Process data exchange via 14 process data words	0xC0, 0xCD, 0xCD
15 PD	Process data exchange via 15 process data words	0xC0, 0xCE, 0xCE
16 PD	Process data exchange via 16 process data words	0xC0, 0xCF, 0xCF
32 PD	Process data exchange via 32 process data words	0xC0, 0xDF, 0xDF
64 PD	Process data exchange via 64 process data words	0xC0, 0xFF, 0xFF

Configuration example

Slot 1: Empty

Slot 2: Param (4 words)

Slot 3: 10 PD

Configuration telegram sent to the UFF41B fieldbus gateway: 0x00 0xC0 0xC87 0x87 0xC0 0xC9 0xC9

Data integrity

Consistent data is data that always has to be transmitted between the higher-level controller and the UFF41B fieldbus gateway as one block and must never be transmitted separately.

Data integrity is particularly important for transmitting position values or complete positioning tasks. The reason for this is that data which is not transmitted consistently could be from different program cycles of the higher-level controller, which would lead to undefined values being transmitted to the UFF41B fieldbus gateway.

For PROFIBUS DP, data communication between the higher-level controller and the UFF41B fieldbus gateway is carried out with the setting "Data integrity over entire length".

9 PROFIBUS DP-V1 Operating Characteristics

This chapter describes the basic characteristics of the UFF41B fieldbus gateway with PROFIBUS DP.

9.1 Process data exchange with the UFF41B fieldbus gateway

The UFF41B fieldbus gateway is controlled via the process data channel which is up to 64 I/O words in length. These process data words are reproduced in the I/O or peripheral area of the UFF41B fieldbus gateway, for example when a programmable logic controller is used as the DP master. As a result, they can be addressed in the usual manner.

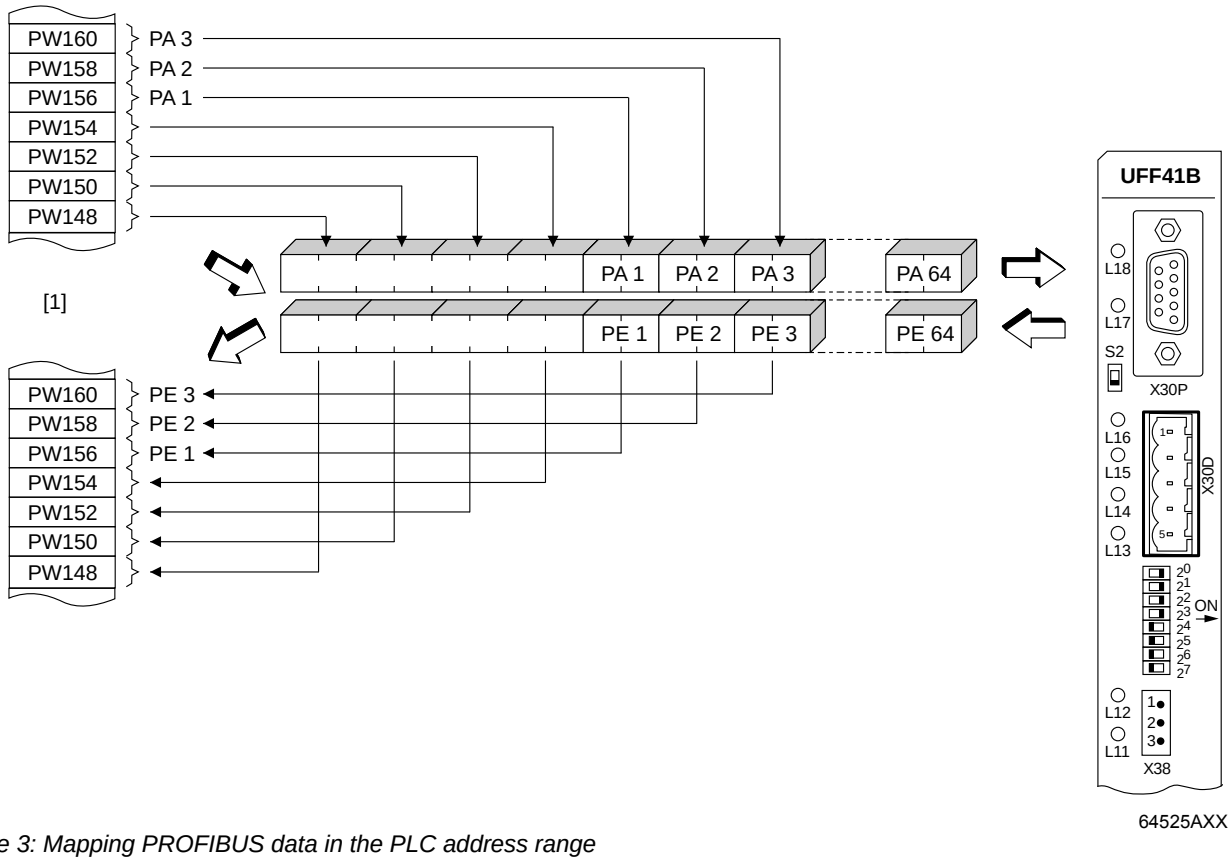


Figure 3: Mapping PROFIBUS data in the PLC address range

[1] Address range of the higher-level PLC

PI1 - PI64 Process input data

PO1 - PO64 Process output data

Control example for Simatic S7

Depending on the chosen process data configuration, process data are exchanged with the UFF41B fieldbus gateway via Simatic S7 either directly using load and transfer commands, or using the special system functions *SFC 14 DPRD_DAT* and *SFC15 DPWR_DAT*.

STEP7 example program

In this example, the UFF41B fieldbus gateway is configured with the process data configuration *10 PD* to the input addresses PEW512... and output addresses PAW512...

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

When SFC14 is called, the process input data is copied to data block DB3, data words

0 to 18. When SFC15 is called after the control program has been processed, the process output data is copied from data words 20 - 38 to the output address PAW 512.

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 the type DHF41B/UFF41B control card to DB3, words 0 -
18
CALL SFC  14 (DPRD_DAT) //Read DP Slave Record
  LADDR  := W#16#200       //Input address 512
  RET_VAL:= MW 30 //Result in flag word 30
  RECORD := P#DB3.DBX 0.0 BYTE 20 //Pointer

NETWORK
TITLE =PLC program with drive application
// PLC program uses the process data in DB3 for data exchange
// with the DHF41B/UFF41B control card

L  DB3.DBW 0   //Load PE1
L  DB3.DBW 2   //Load PE2
L  DB3.DBW 4   //Load PE3
// etc.

L  W#16#0006
T DB3.DBW 20   //Write 6hex to PO1
L 1500
T DB3.DBW 22   //Write 1500dec to PO2
L  W#16#0000
T DB3.DBW 24   //Write 0hex to PO3
// etc.

NETWORK
TITLE = Copy PO data from DB3, words 20...38 to DHF41B/UFF41B control card
CALL SFC  15 (DPWR_DAT)             //Write DP slave record
  LADDR  := W#16#200                //Output address 512 = 200hex
  RECORD := P#DB3.DBX 20.0 BYTE 20  //Pointer to DB/DW
  RET_VAL:= MW 32                   //Result in flag word 32
```

	TIP
	This sample program is a free service that demonstrates only the basic approach to generating a PLC program as a non-binding sample. SEW is not liable for the contents of the sample program.

9.2 PROFIBUS DP timeout

The response monitoring time of the UFF41B fieldbus gateway elapses if data transfer via the PROFIBUS DP system is disrupted or interrupted (if configured in the DP master). The *Fault Profibus* LED lights up to indicate that no new user data is being received. In this case, all inverters connected to the UFF41B fieldbus gateway are stopped.

10 Functions of PROFIBUS DP-V1

This section provides you with information about the PROFIBUS DP-V1 functions.

10.1 Introduction to PROFIBUS DP-V1

This chapter describes the functions and terms used for operating SEW units on PROFIBUS DP-V1. Refer to the PROFIBUS user organization or visit PROFIBUS website for detailed technical information on PROFIBUS DP-V1.

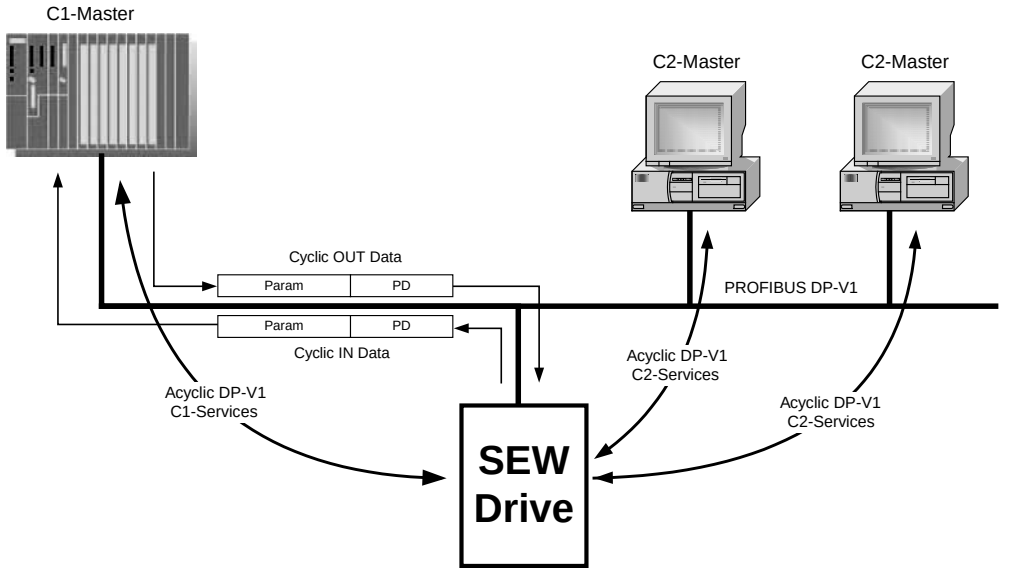
The PROFIBUS DP-V1 specification introduced new acyclical *READ / WRITE* services as part of the PROFIBUS DP-V1 expansions. These acyclical services are inserted into special telegrams during ongoing cyclical bus operation and therefore ensure compatibility between PROFIBUS DP (version 0) and PROFIBUS DP**V1** (**V**ersion **1**).

The acyclical *READ/WRITE* services can be used to exchange larger data quantities between master and slave (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 the 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 2 options:

- The higher-level controller can access all the device information of the SEW DP-V1 slaves. This means that cyclical process data and unit settings can be read, stored in the controller and modified in the slave.
- It is also possible to route the service and startup tool MOVITOOLS® MotionStudio via the DP-V1 parameter channel instead of using a proprietary RS485 connection. Once you have installed the MOVITOOLS® MotionStudio software, you can access detailed information in the folder ...\SEW\MOVITOOLS\Fieldbus.

The main features of PROFIBUS DP-V1 are explained below.



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10.1.1 Class 1 master (C1 master)

The PROFIBUS DP-V1 network differentiates between various 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 DP-V1 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-V1 is being established. Only one C1 master can be operated in a PROFIBUS DP-V1 network.

10.1.2 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 acyclic 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 cyclical 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 inverters support two parallel C2 connections.

10.1.3 Data sets (DS)

The user data transported via a DP-V1 service are 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 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 user organization. Different procedures for accessing parameter data in the inverter are provided via this parameter channel.

10.1.4 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

10.1.5 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 using the "DDLM_SlaveDiag" DP-V0 service. DP-V1 alarm handling has not been defined for drive engineering as an inverter does not usually transfer its status information via cyclical process data communication.

10.2 Features of SEW fieldbus interfaces

The SEW fieldbus interfaces to 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. The READ and WRITE services give the C1 master access to the parameters of the fieldbus gateway and lower-level stations 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® MotionStudio software.

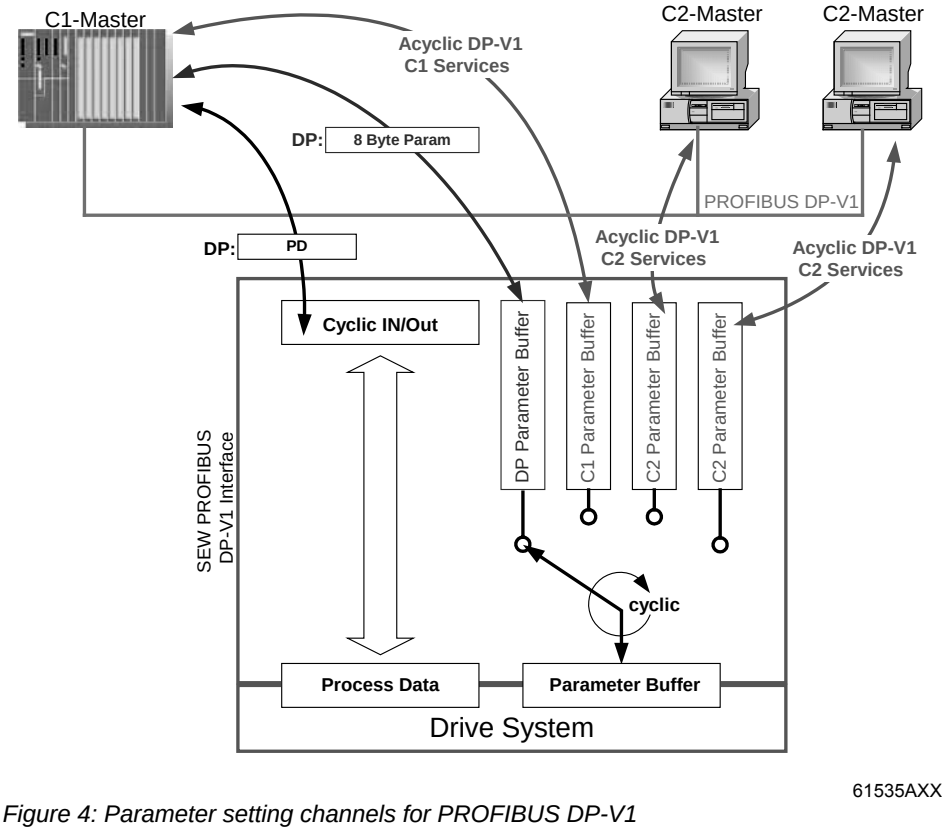

Figure 4: Parameter setting channels for PROFIBUS DP-V1

10.3 Structure of the DP-V1 parameter channel

Generally, the parameter setting of the drives to the PROFIdrive DP-V1 parameter channel of profile version 3.0 is implemented via data set 47. The *Request ID* entry is used to distinguish between parameter access based on PROFIdrive profile or via SEW-MOVILINK® services. The following table shows the possible codes of the individual elements. The data set structure is the same for PROFIdrive and MOVILINK® access.

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The following MOVILINK® services are supported:

- 8-byte MOVILINK® parameter channel with all the services supported by the SEW device, 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*

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 axes 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 parameters** **0x20 WRITE parameter** **0x30 WRITE Parameter volatile** **0x40 ... 0xF0 Reserved**
No. of elements	Unsigned8	0x00 for parameters that are not indexed 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®-Additional Code Low **For SEW MOVILINK® 16 Bit error value**

10.3.1 Parameterization procedure 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 parameter processing in the inverter is concluded, it answers with a positive response *READ.res*. The user data now contain the parameter setting response of the parameter setting order that was previously sent with *WRITE.req* (see the following figure). This mechanism applies to both a C1 and a C2 master.

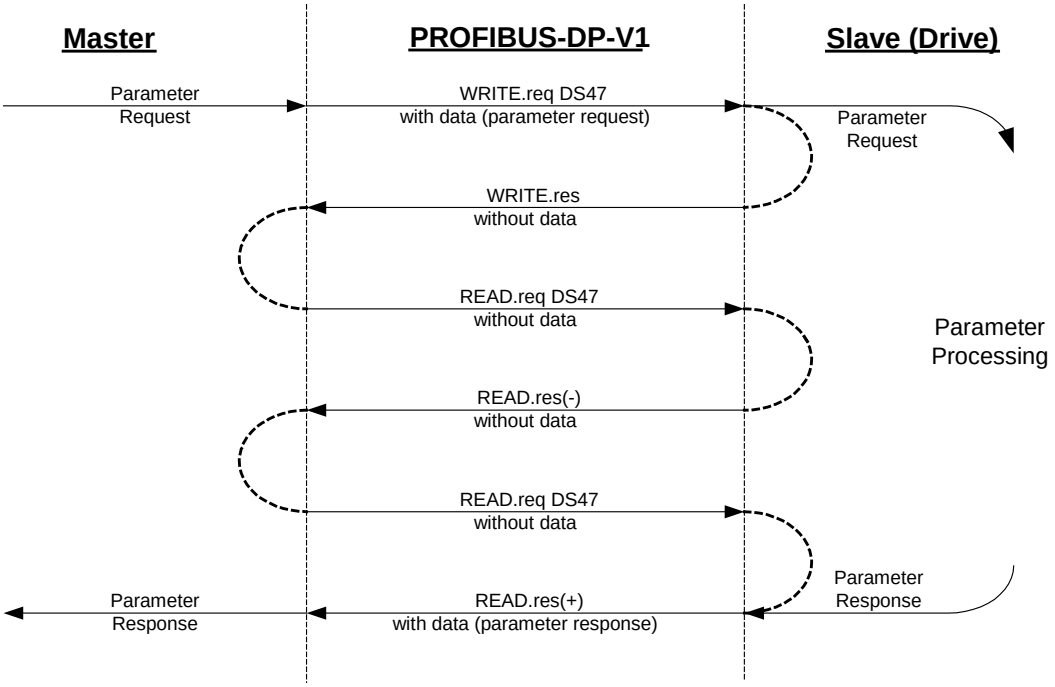
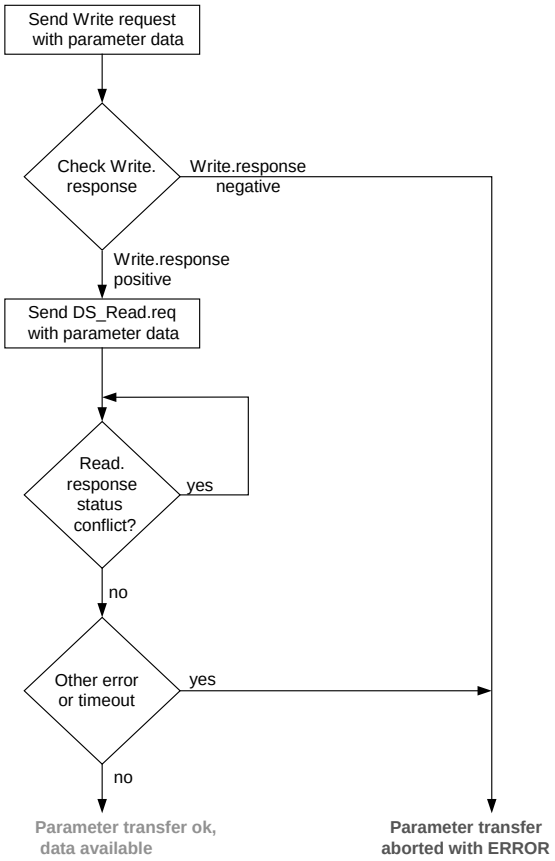


Figure 5: Telegram sequence for parameter access via PROFIBUS DP-V1

10.3.2 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 response from the inverter.



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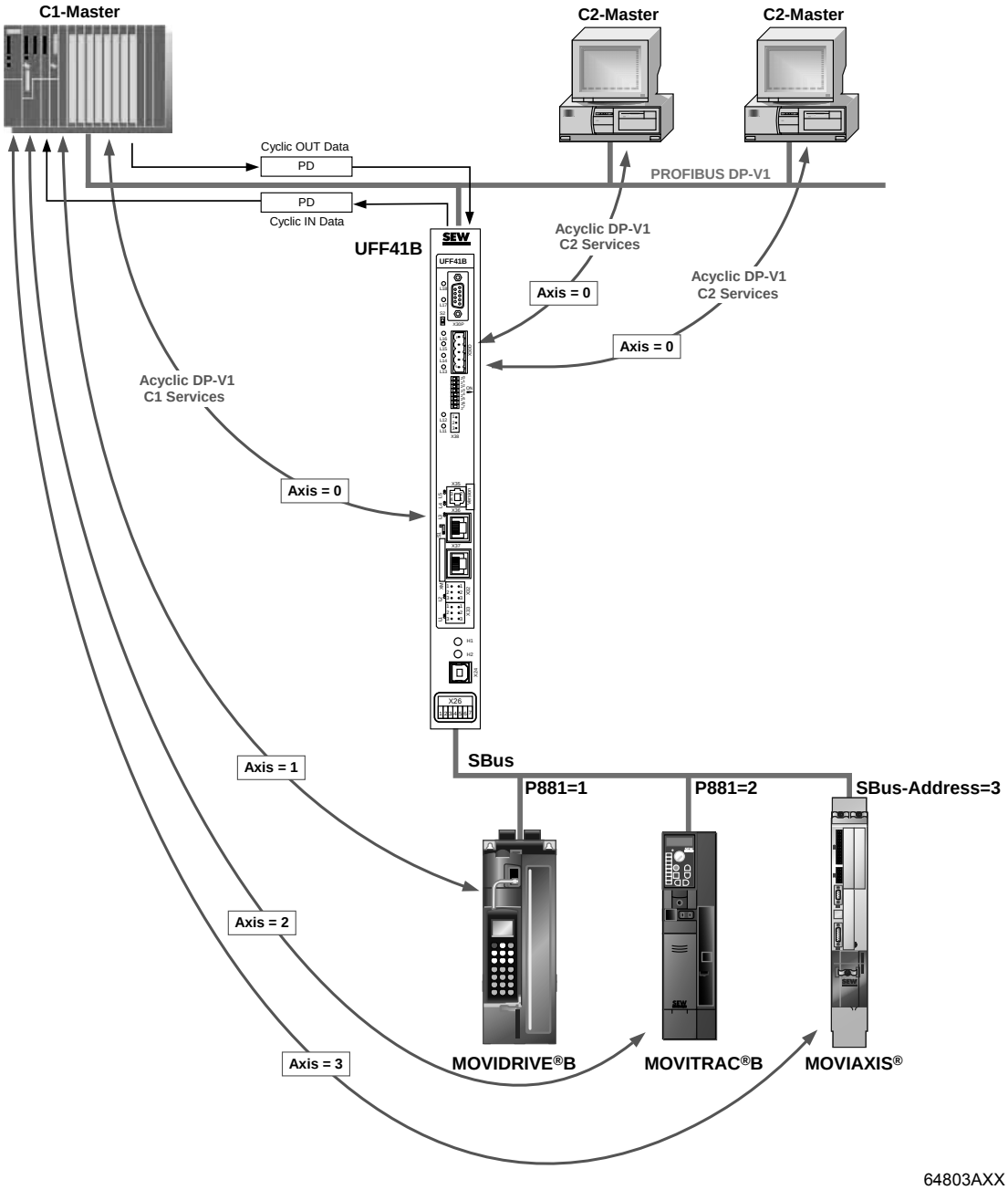
10.3.3 Addressing connected inverters

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 bus modules type DHF, UFF, MOVIFIT®, MQP for MOVIMOT ® or DFP for MOVITRAC® B.

Addressing a MOVIDRIVE® inverter at PROFIBUS DP-V1

With the setting *Axis = 0*, the parameters of the fieldbus gateway can be accessed directly. To being able to access slave units connected to the UFF41B fieldbus gateway, the setting must be *Axis = SBus address*. SBus address 15 must not be used when engineering via PROFIBUS or parameter services via PROFIBUS.



10.3.4 MOVILINK® parameter requests

The MOVILINK® parameter channel of the SEW 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 telegram sequence is used for data set 47.

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. In the example, the firmware of MOVIDRIVE® B connected to CAN 1 of the fieldbus gateway is read with SBus address 1.

Sending a parameter request

The following 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 request to the inverter. The firmware version is read.

Service:	WRITE.request	Description
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 request

Byte	Field	Value	Description
0	Request reference	0x01	Individual reference number for the parameter setting request is mirrored in the parameter response.
1	Request ID	0x40	SEW MOVILINK® service
2	SBus address of the unit connected to the gateway	0x01	Axis number; 1 = SBus address 1 at CAN 1
3	No. of parameters	0x01	1 parameter
4	Attribute	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

Query parameter response

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

Service:	READ.request	Description
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 request. The parameter value for index 8300 (firmware version) is returned as an example.

Service:	READ.request	Description
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

Byte	Field	Value	Description
0	Response reference	0x01	Mirrored reference number from the parameter setting request
1	Response ID	0x40	Positive MOVILINK® response
2	Axis	0x01	Mirrored axis number; 1 = SBus address 1
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 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. In this example as well, MOVIDRIVE® B with SBus address 1 is connected to the fieldbus gateway.

Send "WRITE parameter volatile" order

Service:	WRITE.request	Description
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

Byte	Field	Value	Description
0	Request reference	0x01	Individual reference number for the parameter setting request is mirrored in the parameter response.
1	Request ID	0x40	SEW MOVILINK® service
2	Axis	0x01	Axis number; 1 = SBus address of MDX
3	No. of parameters	0x01	1 parameter
4	Attribute	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, the WRITE.response is positive. Otherwise, the status fault is located in Error_code_1.

Query parameter response

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

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

Positive response to "WRITE Parameter volatile"

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

Byte	Field	Value	Description
0	Response reference	0x01	Mirrored reference number from the parameter setting request
1	Response ID	0x40	Positive MOVILINK® response
2	Axis	0x01	Mirrored axis number; 1 = SBus address 1
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 the response ID if the response is negative.

Service:	READ.response	Description
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	Mirrored reference number of the parameter setting request.
1	Response ID	0xC0	Negative MOVILINK® response
2	Axis	0x01	Mirrored axis number; 1 = SBus address 1
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 e.g. error class 0x08, Add. code 0x11 (see section "MOVILINK® configuration return codes for DP-V1" on page 106)

MOVILINK® configuration return codes for DP-V1

The following table shows the return codes that are returned by the SEW DP-V1 interface if an error occurs during DP-V1 parameter access.

MOVILINK® return code (hex)	Description
0x0810	Invalid index, parameter index does not exist in the unit
0x0811	Function/parameter not implemented
0x0812	Read access only
0x0813	Parameter lock activated
0x0814	Factory setting is active
0x0815	Value for parameter too large
0x0816	Value for parameter too small
0x0817	Required option card not installed
0x0818	Error in system software
0x0819	Parameter access only via RS-485 process interface
0x081A	Parameter access only via RS-485 diagnostics interface
0x081B	Parameter is access-protected
0x081C	Controller inhibit is required
0x081D	Invalid 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 at IPOS program stop
0x0824	Parameter may only be changed when auto setup is deactivated
0x0505	Incorrect coding of management and reserved byte
0x0602	Communication error between inverter system and fieldbus interface
0x0502	Timeout of secondary connection (e.g. during reset or with Sys-Fault)

10.3.5 PROFIdrive parameter orders

The PROFIdrive parameter channel of SEW inverters is directly mapped in the structure of dataset 47. Parameter access with PROFIdrive services usually takes place according to the structure described below. The typical telegram sequence is used for data set 47. 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.

	TIP
	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.

Reading a parameter according to PROFIdrive example

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 a parameter request

The following 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 request to the inverter.

Service:	WRITE.request	Description
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 request

Service:	WRITE.request	Description
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 request

Byte	Field	Value	Description
0	Request reference	0x01	Individual reference number for the parameter setting request is mirrored in the parameter response
1	Request ID	0x01	Request parameter (PROFIdrive)
2	Axis	0x01	Axis number; 1 = SBus address 1
3	No. of parameters	0x01	1 parameter
4	Attribute	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

Query parameter response

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

Service:	READ.request	Description
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 request. The parameter value for index 8300 (firmware version) is returned as an example.

Service:	READ.request	Description
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

Byte	Field	Value	Description
0	Response reference	0x01	Mirrored reference number from the parameter setting request
1	Response ID	0x01	Positive response for "Request Parameter"
2	Axis	0x01	Mirrored axis number; 1 = SBus address 1
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 according to 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 section "Example for writing a parameter via MOVILINK®", page 104). The PROFIdrive *Change Parameter* service is used for this purpose.

Send "WRITE parameter" request

Service:	WRITE.request	Description
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

Byte	Field	Value	Description
0	Request reference	0x01	Individual reference number for the parameter setting request is mirrored in the parameter response
1	Request ID	0x02	Change parameter (PROFIdrive)
2	Axis	0x01	Axis number; 1 = SBus address 1
3	No. of parameters	0x01	1 parameter
4	Attribute	0x10	Access to parameter value
5	No. of elements	0x00	0 = access to direct value, no subelement
6, 7	Parameter Number	0x2129	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, the WRITE.response is positive. Otherwise, the status fault is located in Error_code_1.

Query parameter response

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

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

Positive response to "WRITE Parameter"

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

Byte	Field	Value	Description
0	Response reference	0x01	Mirrored reference number from the parameter setting request
1	Response ID	0x02	Positive PROFIdrive response
2	Axis	0x01	Mirrored axis number; 1 = SBus address 1
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.

Service:	READ.response	Description
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	Mirrored reference number from the parameter setting request
1	Response ID	0x810x82	Negative response for "Request Parameter" Negative response for "Change Parameter"
2	Axis	0x01	Mirrored axis number; 1 = SBus address 1
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 e.g. error class 0x08, Add. code 0x11 (see section "MOVILINK® configuration return codes for DP-V1" on page 106)

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" and/or "Change Parameter".

Error no.	Meaning	Used for
0x00	Invalid parameter number.	Access to non-existent parameters
0x01	Parameter value cannot be changed	An attempt was made to change a parameter value that cannot be changed
0x02	Minimum or maximum value exceeded	An attempt was made to change a value to one that is outside of the limit values
0x03	Incorrect subindex	Access to non-existent subindex
0x04	No assignment	Access with subindex to parameter that is not indexed
0x05	Incorrect data type	An attempt was made to change a replace a value with one that does not correspond to the data type of the parameter
0x06	Setting not permitted (can only be reset)	An attempt was made to set a value to one larger than 0 where this is not permitted
0x07	Description element cannot be changed	Access to description element that cannot be changed
0x08	Reserved	(PROFIdrive Profile V2: PPO write query for IR not available)
0x09	Description does not exist	Access to description that is not accessible (parameter value exists)
0x0A	Reserved	(PROFIdrive Profile V2: incorrect access group)
0x0B	No operation priority	An attempt was made to change a parameter without change rights
0x0C	Reserved	(PROFIdrive Profile V2: incorrect 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 assignment available	Access to text assignment that is not accessible (parameter value exists)
0x10	Reserved	(PROFIdrive Profile V2: no PPO write)
0x11	Request cannot be executed due to the operating mode	Access is currently not possible and the reason is not explained
0x12	Reserved	(PROFIdrive Profile V2: other error)
0x13	Reserved	(PROFIdrive Profile V2: data cannot be read in cyclic exchange)
0x14	Incorrect value	An attempt was made to change a value to one that is in the permitted range but is not permitted due to other long-term reasons (parameter with specified individual values)
0x15	Response is too long	The length of the current response exceeds the maximum transmittable length
0x16	Invalid parameter address	Invalid value or value that is not valid for this attribute, number of elements, parameter number, subindex or a combination of these factors.
0x17	Incorrect format	Write request: Invalid format or parameter data format that is not supported
0x18	Number of values is not consistent	Write request: Number of values of parameter data does not correspond to the number of elements in the parameter address
0x19	Axis does not exist	Access to an axis that does not exist
up to 0x64	Reserved	-
0x65..0xFF	Depending on manufacturer	-

10.4 Configuring a C1 master

A special GSD file *SEW_600D.GSD* is required for configuring a DP-V1 C1 master. This file activates the DP-V1 functions of the UFF41B. The functions of the GSD file and the UFF41B firmware must correspond with one another.

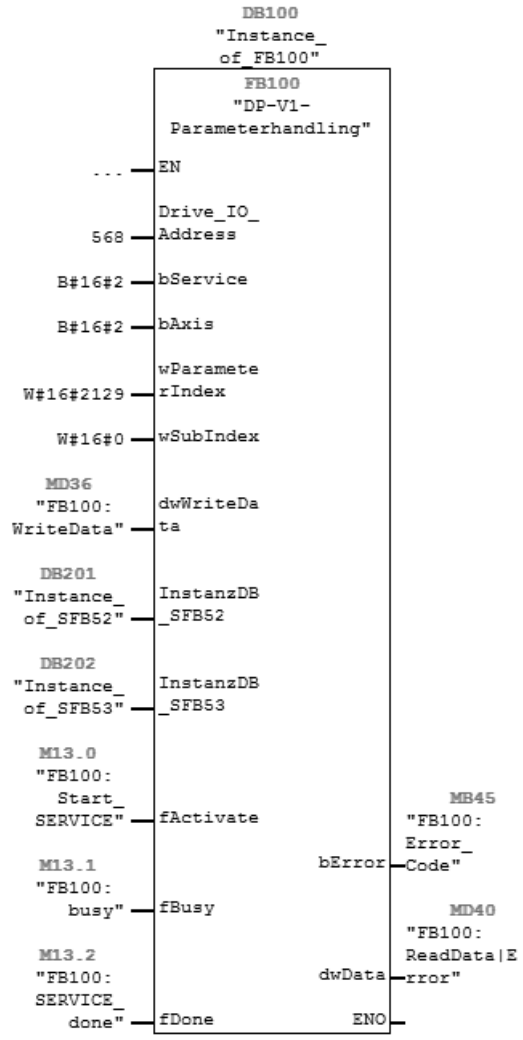
10.4.1 Operating mode (DP-V1 mode)

The DP-V1 operating mode can usually be activated for configuring 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 DP-V1 mode. Standard DP slaves will still run via PROFIBUS DP-V0. This ensures mixed mode for DP-V1 and DP-V0 capable modules. Depending on the master functionality, a DP-V1 capable station, that was configured using the DP-V1 GSD file, can run in the "DP-V0" operating mode.

10.4.2 Example program for SIMATIC S7

	TIPS
	The MOVILINK® parameter channel sample program is available from the SEW homepage under "Software". This example is a special and free service that demonstrates only the basic approach to generating a PLC program. SEW is not liable for the contents of the sample program.

- Calling the function module:



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- Comment on the function module:

```
Write service: x2h, fixed setpoint: P160, index 8489d = 2129h

Wiring of FB:
"Drive_IO_Address": (INT)  Input address of the process data =>Hardware config.
"bService":         (BYTE) Read: 01h;  Write 02h,  volatile writing 03h
"bAxis":            (BYTE) Sub address/SBUS address of lower-level MC07
"wParameterindex":  (WORD) Parameter index => "MC07 Communication" manual
"wSubIndex":        (WORD) MOVILINK subindex = 0
"dwWriteData":     (DWORD) Parameter data for WRITE service
"InstanzDB_SFB52(BLOCK_DB) Instance DB for the SFB52
"InstanzDB_SFB53(BLOCK_DB) Instance DB for the SFB53
"fActivate"         (BOOL) Activation bit
"fBusy":            (BOOL) Parameter service is active
"fDone":            (BOOL) Parameter service was executed
"bError"            (BYTE) No error = 0; S7 error = 1; TimeOut = 2;
                           MOVILINK error = 3
"dwData":           (DWORD)bError = 0 => Parameter value after READ service
                           bError = 1 => S7 error code
```

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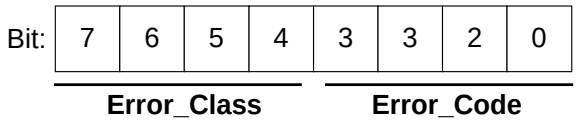
10.4.3 Technical data of DP-V1 for UFF41B fieldbus gateway

GSD file for DP-V1:	SEW_600D.GSD
Module name for project planning:	Adv. Gateway UFF
Number of parallel C2 connections:	2
Supported data set:	Index 47
Supported slot number:	Recommended: 0
Manufacturer code:	10A hex (SEW-EURODRIVE)
Profile ID:	3A
C2 response timeout:	1 s
Max. length C1 channel:	240 bytes
Max. length C2 channel:	240 bytes

10.4.4 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_Class (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		

11 Operating MOVITOOLS® MotionStudio

11.1 About MOVITOOLS® MotionStudio

11.1.1 Tasks

The MOVITOOLS® MotionStudio software package enables you to perform the following tasks:

- Establishing communication with units
- Executing functions with the units

11.1.2 Establishing communication with units

The SEW Communication Server is integrated into MOVITOOLS® MotionStudio for establishing communication with the units.

The SEW Communication Server allows you to create **communication channels**. Once the channels are established, the units communicate via these communication channels using their communication options. You can operate up to four communication channels at the same time.

Depending on the unit and its communication options, the following communication channels are available:

- Serial (RS485) via interface adapters
- System bus (SBus) via interface adapters
- Ethernet
- EtherCAT
- Fieldbus
- PROFIBUS DP/DP-V1
- S7-MPI

11.1.3 Executing functions with the units

MOVITOOLS® MotionStudio enables you to perform the following functions:

- Parameterization (for example in the parameter tree of the unit)
- Startup
- Visualization and diagnostics
- Programming

The following basic components are integrated into MOVITOOLS® MotionStudio allowing you to use the units to execute functions:

- MotionStudio
- MOVITOOLS®

All functions communicate using **tools**. MOVITOOLS® MotionStudio provides the right tools for every unit type.

11.2 First steps

11.2.1 Starting the software and creating a project

Proceed as follows to start MOVITOOLS® MotionStudio and create a project:

1. Start MOVITOOLS® MotionStudio in the WINDOWS® start menu via the following path:

   "Start\Program\SEW\MOVITOOLS MotionStudio\MOVITOOLS Motion-Studio"

2. Create a project with name and storage location.

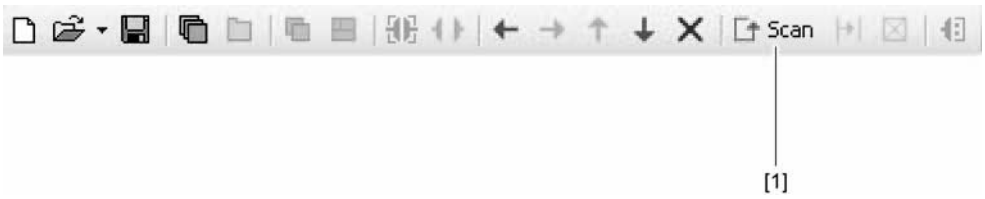
11.2.2 Establishing communication and scanning the network

Proceed as follows to establish a communication with MOVITOOLS® MotionStudio and scan your network:

1. Set up a communication channel to communicate with your units.

   Refer to the section dealing with the respective type of communication for detailed information.

2. Scan your network (unit scan). To do so, click the [Start network scan] button [1] in the toolbar.



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3. Select the unit you want to configure.
4. Open the context menu with a right mouse click.

   As a result you will see a number of unit-specific tools to execute various functions with the units.

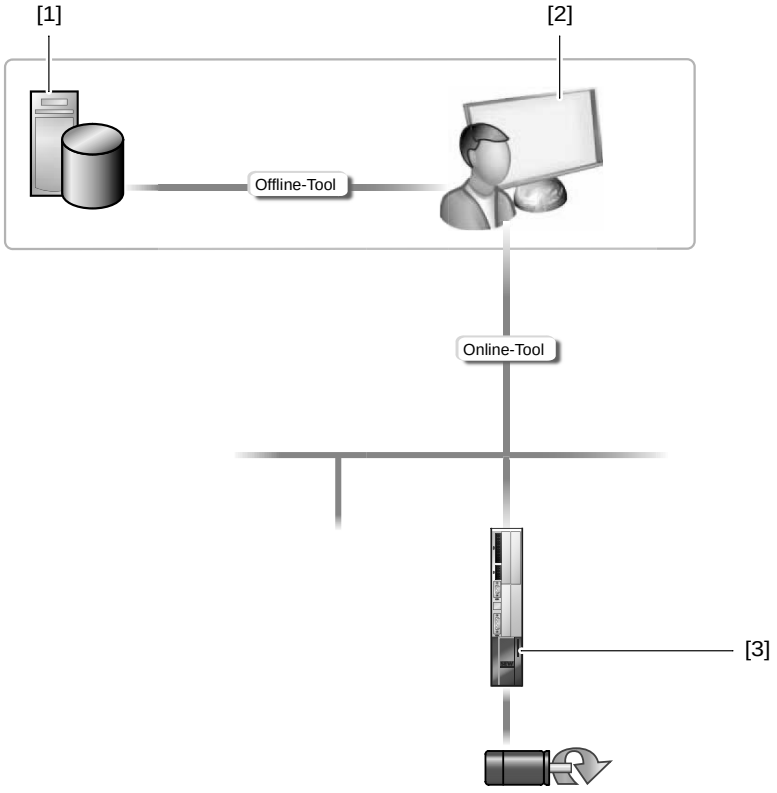
11.3 Communication mode

11.3.1 Overview

MOVITOOLS® MotionStudio differentiates between "online" and "offline" communication mode.

You can select the communication mode. Unit-specific offline or online tools are provided depending on the communication mode you have selected.

The following figure illustrates the two types of tools:



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Tools	Description
Offline tools	Changes made using offline tools affect **"'ONLY'"** the RAM [2]. • Save your project so that the changes can be stored on the hard disk [1] of your PC. • To transfer the changes also to your unit [3], perform a download.
Online tools	Changes made using online tools affect **"ONLY"** the unit [3]. • To transfer the changes to the RAM [2], perform an upload. • Save your project so that the changes can be stored on the hard disk [1] of your PC.

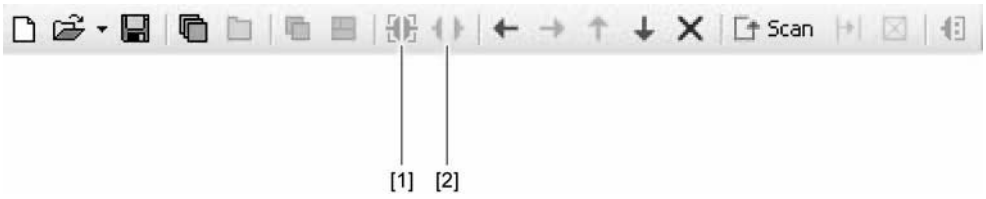
	TIP
	The "online" communication mode is "NOT" a response message which informs you that you are currently connected to the unit or that your unit is ready for communication. • Should you require this feedback, observe section "Setting the cyclical accessibility test" in the online help (or the manual) of MOVITOOLS® MotionStudio.

	TIP
	• Project management commands (such as "download" and "upload"), the online unit status, and the "unit scan" operate independently of the set communication mode. • MOVITOOLS® MotionStudio starts up in the communication mode that you set before you closed down.

11.3.2 Selecting communication mode (online or offline)

Proceed as follows to select a communication mode:

1. Select the communication mode:
   - "Online" [1] for functions (online tools) that should directly influence the unit.
   - "Offline" [2] for functions (offline tools) that should influence your project.



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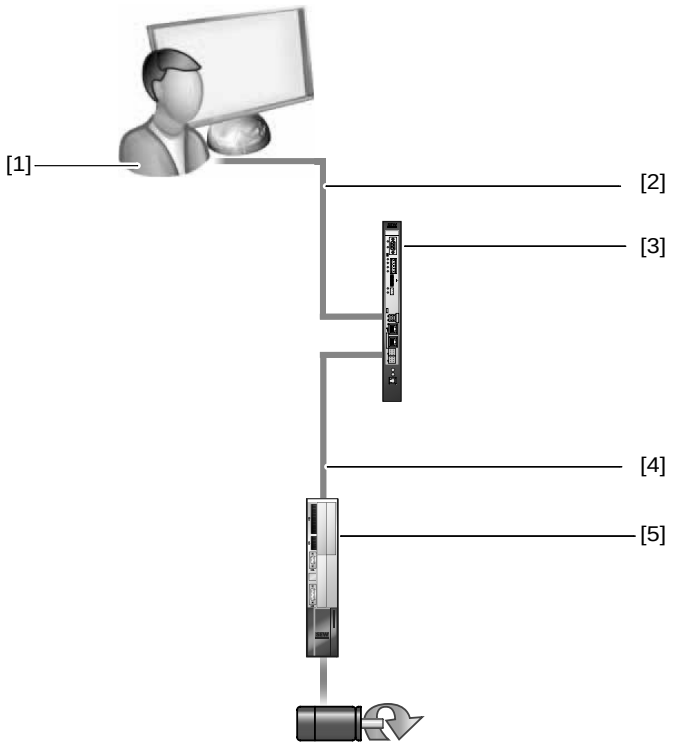
2. Select the unit node.
3. Right-click to open the context menu and display the tools for configuring the unit.

11.4 Communication via USB (direct)

11.4.1 Connect the unit with the PC using USB connection cables

The illustration shows how the unit (in the example a fieldbus gateway [3]) is connected with the PC [1] using a USB connection cable [2]. It also shows how the fieldbus gateway [3] is connected with the lower-level unit [5] via SBus (CAN).



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[1] PC with USB interface
[2] USB connection cable
[3] Fieldbus gateway (UFx41 for example)
[4] SBus connection (CAN based) between fieldbus gateway and lower-level unit
[5] Lower-level unit (MOVIAXIS® for example)

Do the following to connect the UFx41B fieldbus gateway with the PC and the lower-level units:

1. Insert the **A** connector of the USB cable [2] into a free USB port on your PC [1].
2. Insert the **B** connector of the USB cable [2] into the USB port on your fieldbus gateway [3].
3. Connect the SBus interface of the fieldbus gateway [3] with the SBus interface of the lower-level unit [5].

11.4.2 Installing the driver

Before you can communicate with the unit via USB (direct), you have to install the required driver file from the installation path of MOVITOOLS® MotionStudio.

Follow the instructions below to install the driver for USB communication:

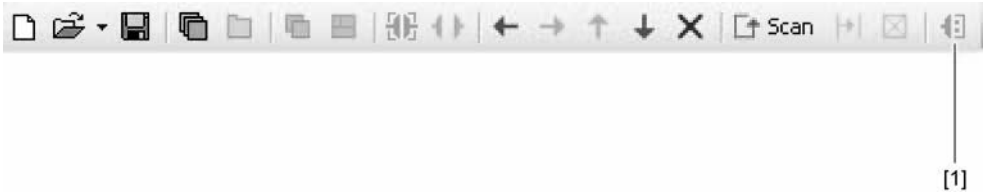
1. Connect the unit to a free USB port on your PC.
   Your PC will detect the new hardware and launch the hardware wizard.
2. Follow the instructions of the hardware wizard.
3. Click on [Browse] and go to the MOVITOOLS® MotionStudio installation folder.
4. Enter the following path:
   `"..\Program Files\SEW\MotionStudo\Driver\SEW_USBWIN32_051120"`
5. Click the [Next] button to install the driver.

11.4.3 Configuring USB communication

You need a USB connection between your PC and the units you want to configure.

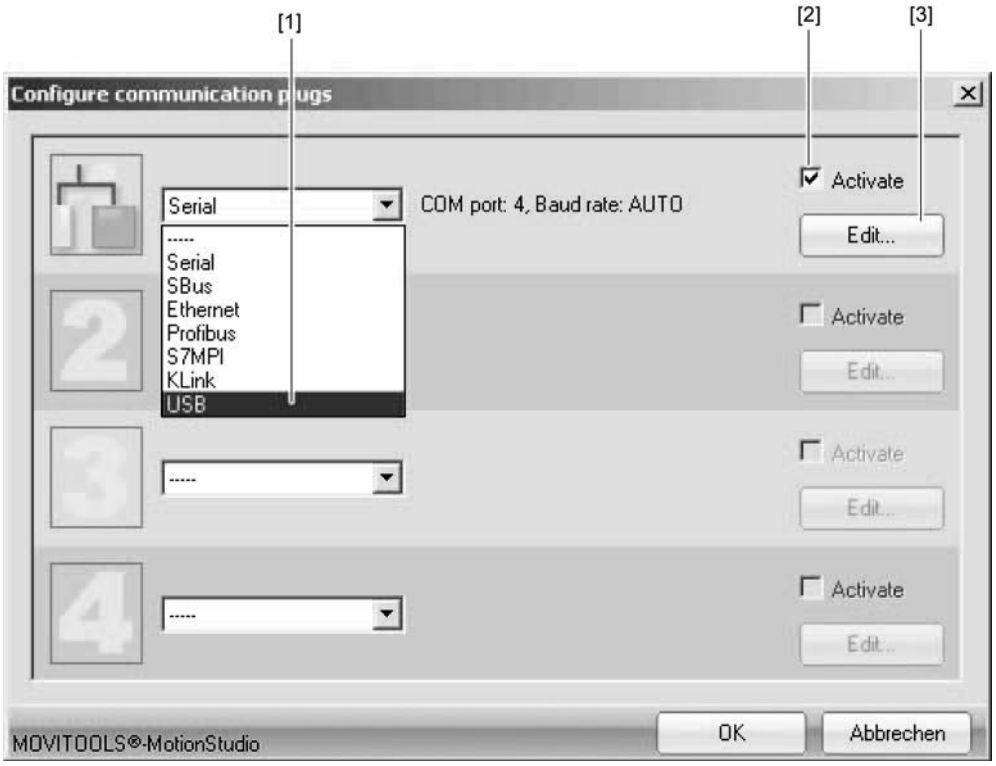
Proceed as follows to configure USB communication:

1. Click "Configure communication connections" [1] in the toolbar.



[1] Configure communication connections

This will open the "Configure communication connections" window.



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[1] "Communication type" selection field

[2] "Activated" check box

[3] "Edit" button

2. From selection field [1], choose the communication type "USB (direct)".

   In the example, "USB" is activated as the communication type for the first communication channel [2].

3. Press the [Edit] button [3] on the right side of the "Configure communication connections" window.

This will display the settings for the "USB" communication type.

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4. Change the set communication parameters if necessary. When doing so, refer to the detailed description of the communication parameters.

11.4.4 USB communication parameters

The following table describes the communication parameters for the USB communication channel:

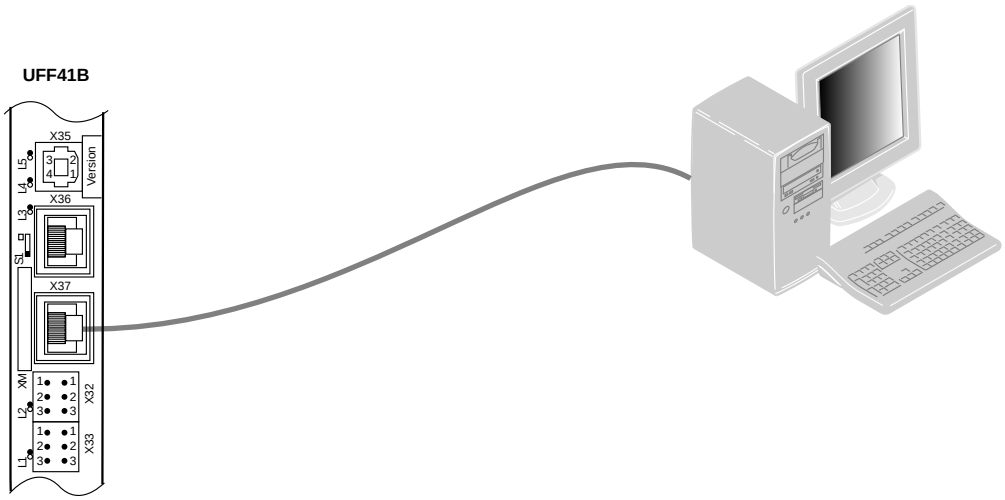
Communication parameters	Description	Note
Timeout	Waiting time in milliseconds that the master waits for a response from a slave after it has sent a request.	Default setting: 350 ms

11.5 Communication via Ethernet

11.5.1 Connecting the unit with the PC via Ethernet

Connecting the Ethernet interface of UFx41B to the PC

The following figure shows the connection between the PC/laptop and the UFx41B.



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The UFx41B can be connected either directly to the PC or via an Ethernet network.

The Ethernet interface X37 supports auto crossing and auto negotiation for baud rate and duplex mode. Set the IP parameters of UFF41B as described in chapter 4.5.

Adjusting the engineering PC to the network (address)

To set the engineering PC appropriately for the network (addressing), proceed as follows:

1. Under [Start] / [Settings] / [Network and Dial-up Connections], select the PC interface you require.
2. Select "Properties" from the context menu.
3. Activate the check box by entering "Internet protocol (TCP/IP)".
4. Click on the "Properties" button.
5. For the subnetwork mask and standard gateway, enter the same IP addresses that are used for other Ethernet stations in this local network.
6. For the engineering PC, enter an IP address that meets the following conditions:
   - In the blocks that define the **network**, the address section of the engineering PC must correspond with the address section of the other Ethernet stations.
   - In the blocks that define the **station**, the address section of the engineering PC must be different from the address section of the other Ethernet stations.
   - Do not assign the values "0", "4", "127" and "255" in the last block.

	TIP
	In the IP address of the subnetwork mask (e.g. 255.255.255.0), the values in the blocks have the following meaning: • "255" defines the address of the network where the stations are located. • "0" defines the address of the actual station to differentiate it from the others.

11.5.2 Configuring the communication channel via Ethernet

Proceed as follows to configure a communication channel for Ethernet:

1. Click on [Configure communication plugs] [1] in the toolbar.

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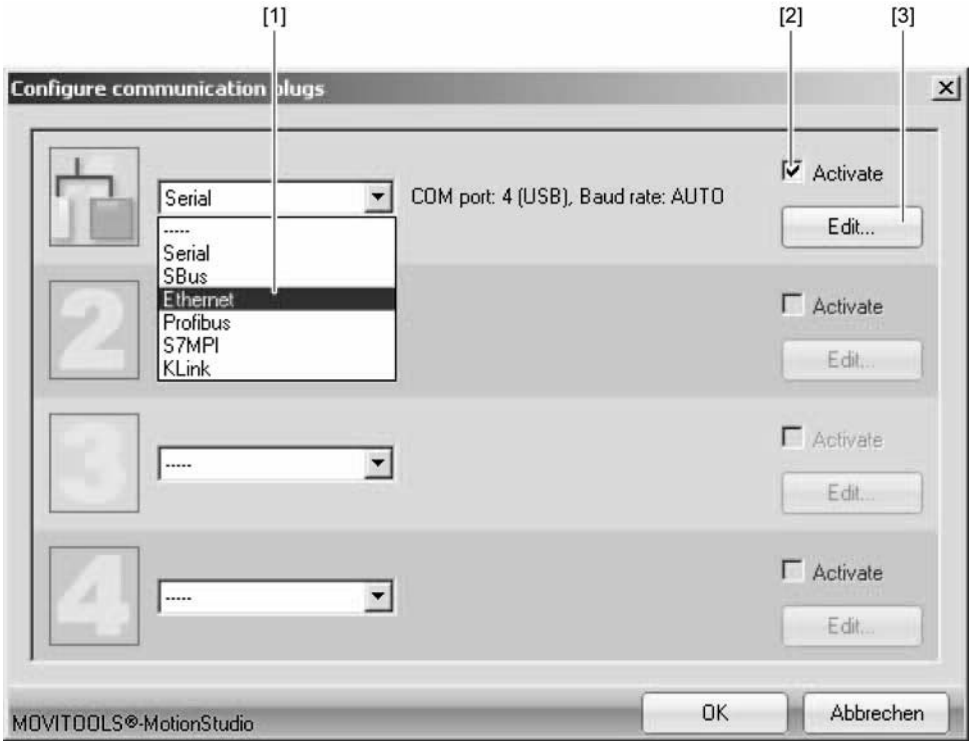
2. This opens the "Configure communication plugs" window. From the list [1], select "Ethernet" as the communication type. In the example, "Ethernet" is activated as the communication type for the first communication channel [2].



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3. Press the "Edit" button [3] in the right section of the window. This displays the settings for the "Ethernet" communication type.
4. Set up the SMLP protocol. To do so, select the "SMLP settings" tab.
5. Set the parameters. Follow the instructions described in the section 'Setting parameters for SMLP'.

	TIP
	SMLP stands for **S**imple **M**OVI**L**INK® **P**rotocol. It is the unit protocol from SEW-EURODRIVE.

11.5.3 Setting communication parameters for SMLP

SMLP communication parameters

The following table describes the communication parameters for SMLP:

Communication parameters or the simple MOVILINK® protocol	Description	Note
Timeout	Waiting time in [ms] that the client waits for a response from the server after it has made a request.	• Default setting: 1000 ms • Increase the value as required if a delay in communication is causing malfunctions.
Broadcast IP address	IP address of the local network segment **within** which the unit scan is carried out.	In the default setting, the unit scan only detects units that are in the local network segment.
IP address of SMLP server	IP address of the SMLP server or of other units that are to be included in the unit scan but are **outside the local network segment.**	• Enter the IP address of units that are to be included in the unit scan but are **outside** the local network segment.
Excluded IP address	IP addresses of units that should **not** be included in the unit scan.	Enter the IP address of units that should **not** be included in the unit scan. This can be units that are not ready for communication (for example because they have not been started up yet)

To set up communication parameters for communicating via Ethernet, proceed as follows:

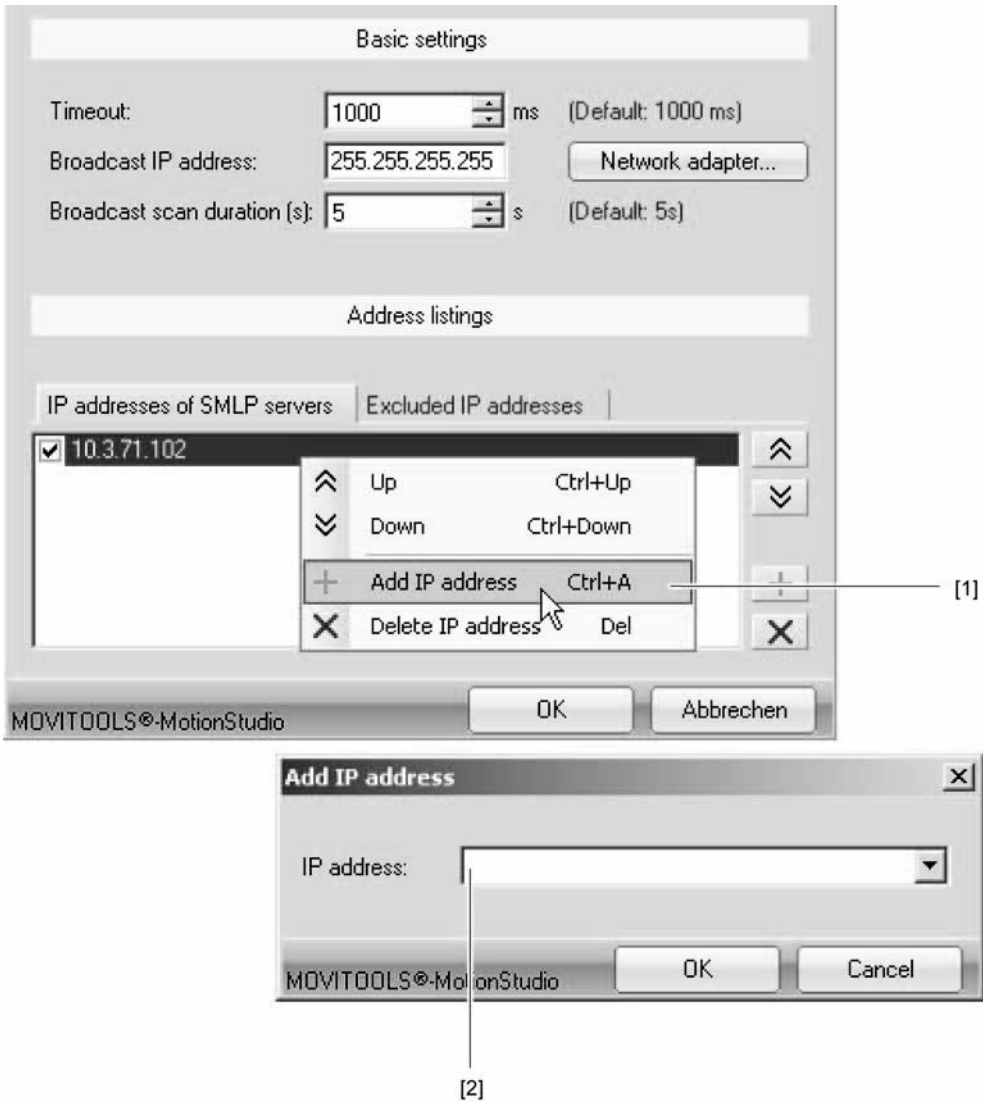
1. If necessary, change the preset communication parameters. Refer to the detailed description of the communication parameters for SMLP.

TIP

During a unit scan, the system recognizes only units that are in the same (local) network segment as the PC that is running on MOVITOOLS® MotionStudio.

- If you have units that are **OUTSIDE** the local network segment, add the IP addresses of these units to the list of SMLP servers.

2. To add an IP address, open the context menu and select [Add IP address] [1].



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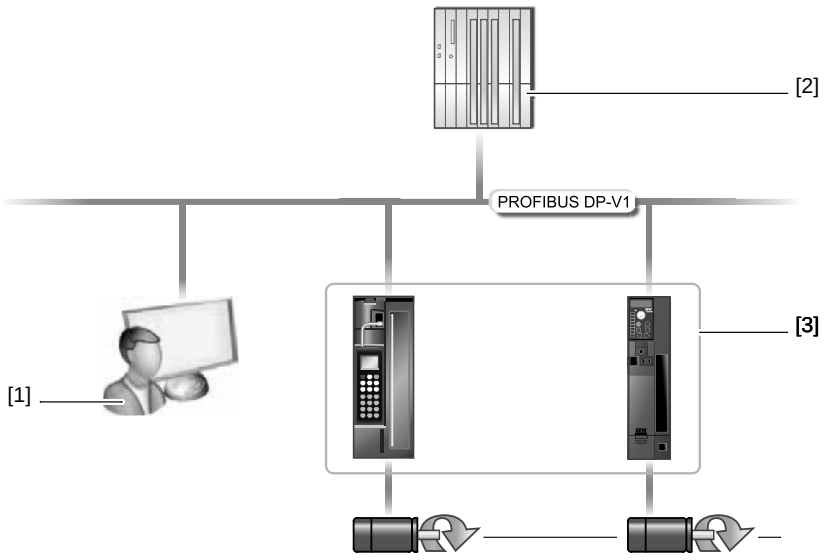
3. Enter the IP address [2]

11.6 Communication via PROFIBUS DP/DP-V1

11.6.1 Communication via C2 master

Overview The figure shows the network with a direct PROFIBUS communication via C2 master:



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[1] C2 master (as PC with installed Softnet DP driver and installed PROFIBUS master card)

[2] C1 master

[3] Units (examples) with DP-V1 capable PROFIBUS interfaces

C2 master C2 master [1] can be a PC, for example, which you can use as diagnostic and visualization PC.

For this purpose, the PC has to be equipped wtih additional hardware and software as described in the next section.

Function The C2 master [1] sends parameter requests from MOVITOOLS® MotionStudio to the PROFIBUS interfaces in the units [3] via PROFIBUS (acyclic C2 services). In this case, SIMATIC S7 [2] does not perform any routing.

Advantage The C2 master works independently of the C1 master. This means you can establish a communication with your units even when the C1 master fails.

11.6.2 Additionally required hardware and software

Prerequisite

	**TIP**
	If you run and configure PROFIBUS stations in your network, you need additional hardware and software from Siemens. • Note the prerequisites regarding license rights for Siemens software products used. • Observe the documentation provided by Siemens for the hardware and software products used.

Required hardware

The following table shows the PROFIBUS master cards available from Siemens:

Designation of the PROFIBUS master card	Order number	Type of PROFIBUS master card
SIMATIC NET CP5611	6GK1561-1AA00	PCI card for PCs
SIMATIC NET CP5512	6GK1561-2AA00	PCMCIA card (32-bit card bus) for notebooks

Required software

The following table shows the software available from Siemens:

Designation of the software	Order number	Type of software
SIMATIC NET PB Softnet-DP Edition 2007	6GK1704-5DW00-3AE1	Driver package

Starting up hardware and software

Do the following to install the additionally required hardware and software:

1. Observe the documentation provided by Siemens for the hardware and software products used.
2. Install the PROFIBUS master card.
3. Install the software.

11.6.3 Parameterize C2 master with SIMATIC NET

SIMATIC NET versions and operating system

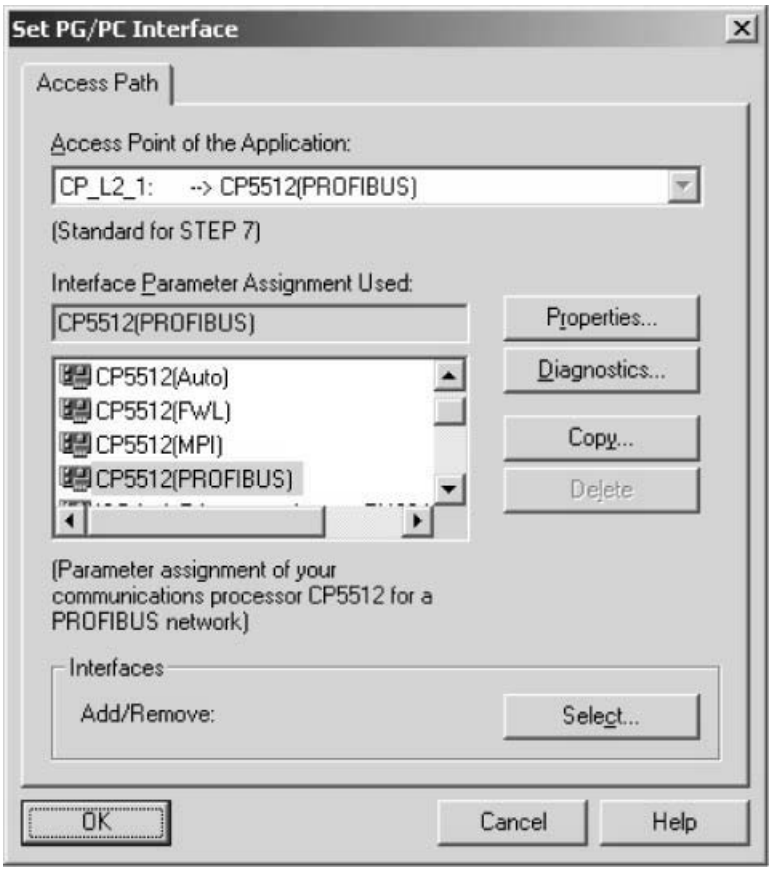
TIP
The following description might deviate slightly (in part due to the language) depending on the SIMATIC NET version and the operating system in use. This concerns the representation and designations in windows as well as designations in the menu path of the start menu.

Starting SIMATIC NET and setting the PG/PC interface

Do the following to start SIMATIC NET:

1. From the Start menu of Windows, start the program "Set PG/PC Interface" under the following menu item:

   The "Set PG/PC interface" window opens:



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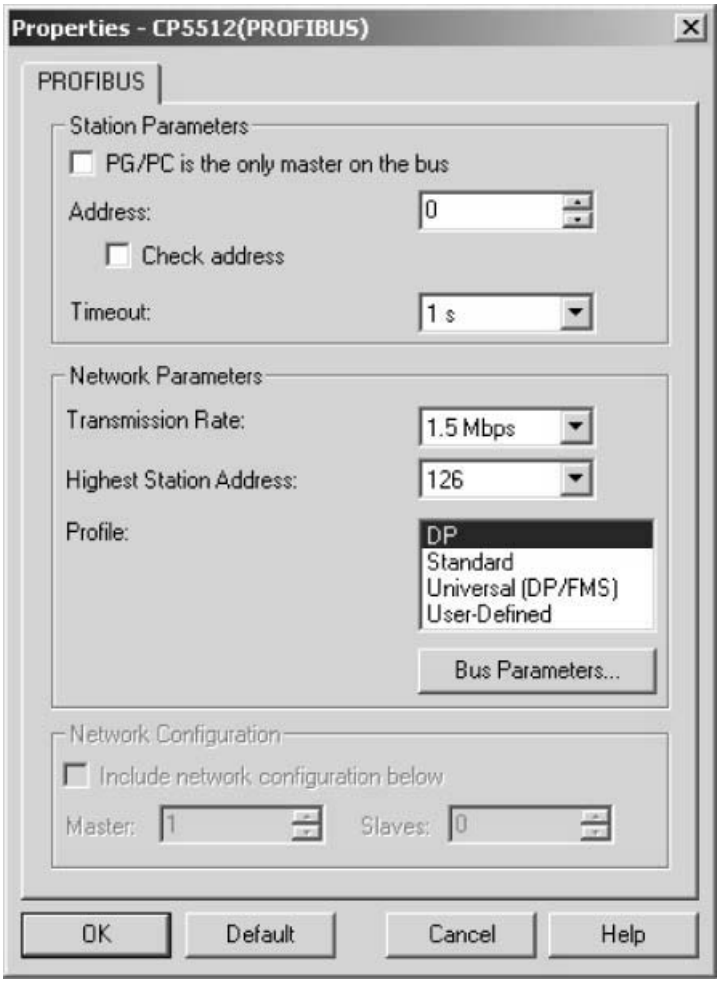
2. Set the access path of the application as shown in the figure.

TIP
If you cannot set the access path because the selection field "Access point of the application" is disabled, the reason might be the following: You have opened the "Set PG/PC interface" program from SIMATIC STEP 7 and have therefore occupied the access path. • Start the "Set PG/PC Interface" program from the Windows Start menu.

Configuring a C2 master

Proceed as follows to configure a C2 master:

1. In the "Set PG/PC interface", click on the [Properties] button. This opens the "Properties" window.



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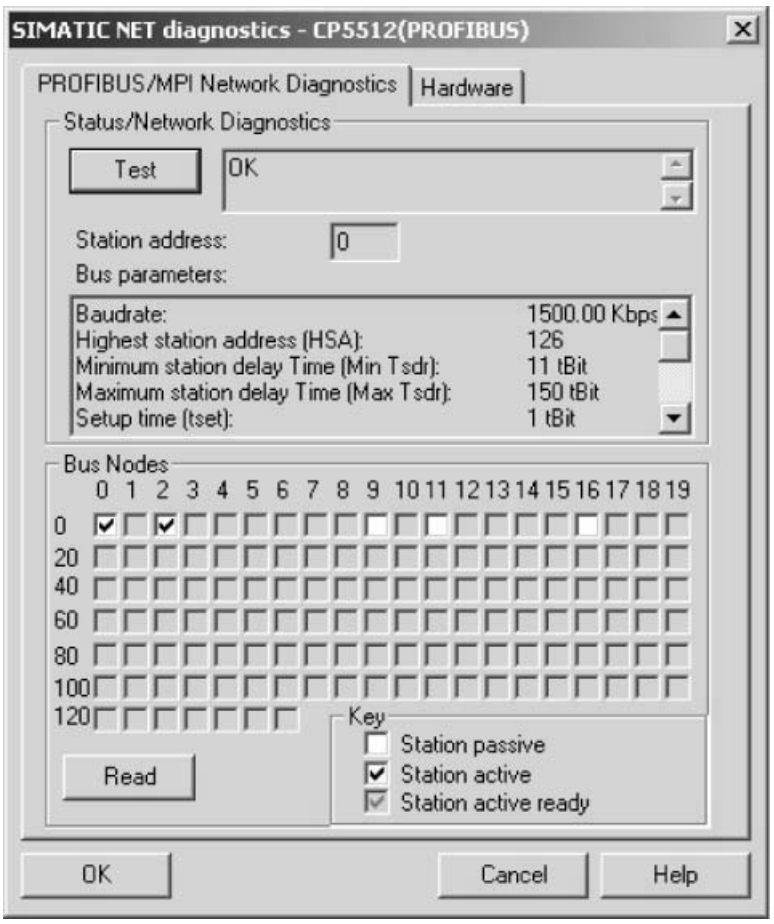
2. If a C1 master is active, disable the "PG/PC is the only master on the bus" check box.
3. Assign the PC a free address that is not yet reserved by other stations (masters or slaves).
4. Set the baud rate (transmission speed) matching your PROFIBUS network. If you operate a C1 master, set the baud rate of the C1 master.
5. Select "DP" as the profile or set the bus timing according to the existing PROFIBUS network.

Checking the PROFIBUS station parameters

Do the following to check the parameters of the PROFIBUS stations:

1. Close the "Properties" window to return to the "Set PG/PC interface" window.
2. Click the [Diagnostics] button.
   This opens the "SIMATIC NET diagnostics" window.



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3. Check the parameters you have set. To do so, click on [Test].
   If your parameter setting is valid, "OK" will be displayed.
4. To have all bus stations displayed, click on [Read].
5. Make sure that all bus stations were parameterized correctly.
6. Open the MOVITOOLS® MotionStudio engineering software.
7. Set the communication parameters in MOVITOOLS® MotionStudio. Refer to the next section "Configuring communication via PROFIBUS".

11.6.4 Configuring communication via PROFIBUS

Prerequisites

	TIP
	The following steps describe only how you configure PROFIBUS communication in MOVITOOLS® MotionStudio. • **First** make all the required settings in the project planning software. Refer to the previous section "Configuring C2 master with SIMATIC NET".

Configuring a communication channel via PROFIBUS

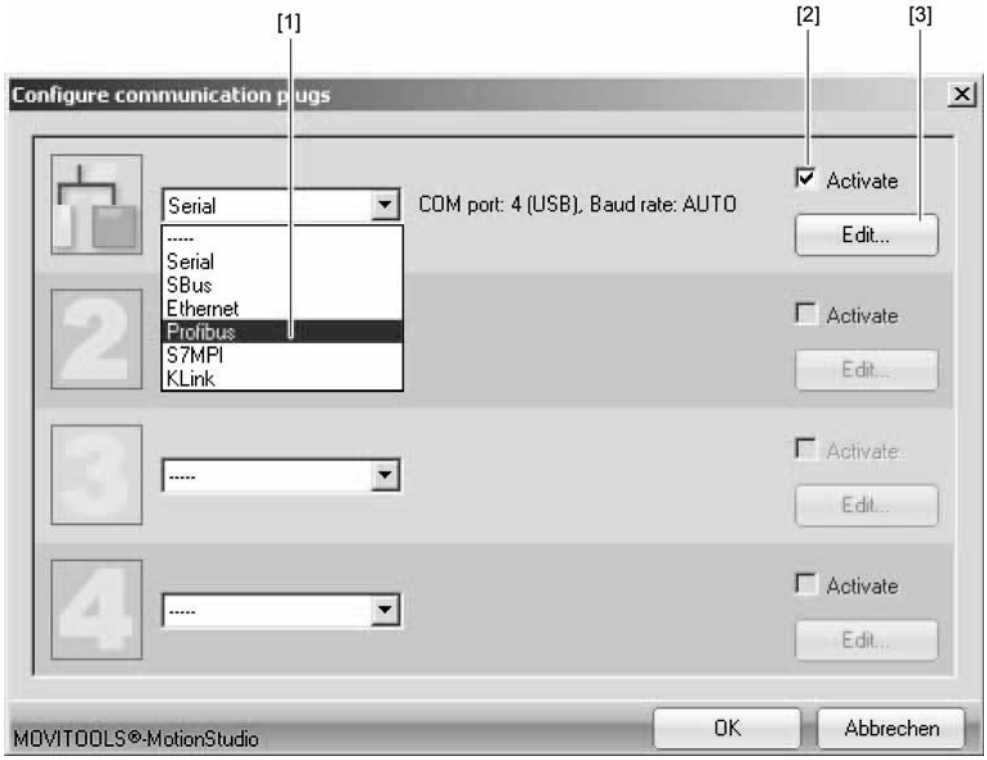
Proceed as follows to configure PROFIBUS communication:

1. Make sure that all the required settings have been made in the project planning software.
2. Start MOVITOOLS® MotionStudio and create a project following the instructions described in the section "First Steps".
3. Click on "Configure communication plugs" [1] in the toolbar.

[1] Configure communication connections

This will open the "Configure communication plugs" window.

4. From the list [1], select "PROFIBUS" as the communication type.



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[1] "Communication type" selection list

[2] "Activated" check box

[3] "Edit" button

In the example, "PROFIBUS" is activated as the communication type for the first communication channel [2].

5. Click "Edit" [3] in the right section of the window.

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6. Select the "Start automatically" check box if you want to launch the PROFIBUS server every time the SEW Communication Server is started.
7. Click the "Restart server" button to start the PROFIBUS server.

   Windows displays the activated PROFIBUS server using the following ICON in the status bar:

11.6.5 Communication parameters for PROFIBUS DP/DP-V1

The following table describes the communication parameters for the PROFIBUS DP/DP-V1 communication channel:

Communication parameters	Description	Note
PROFIBUS server	Select the "Start automatically" check box if you want to launch the PROFIBUS server every time the SEW Communication Server is started.	The Windows status bar displays the active PROFIBUS server

11.7 Executing functions with the units

11.7.1 Parameterizing units in the parameter tree

The parameter tree displays all unit parameters arranged in folders.

You can manage the unit parameters via the context menu or the toolbar. The following section describes how to read or change unit parameters.

11.7.2 Reading/changing unit parameters

To read or change unit parameters, proceed as follows:

1. Switch to the required view (project view or network view).
2. Select the communication mode:
   - Click the "Switch to online mode" button [1] if you want to read or change parameters directly on the **unit**.
   - Click the "Switch to offline mode" button [2] if you want to read or change parameters in the **project**.

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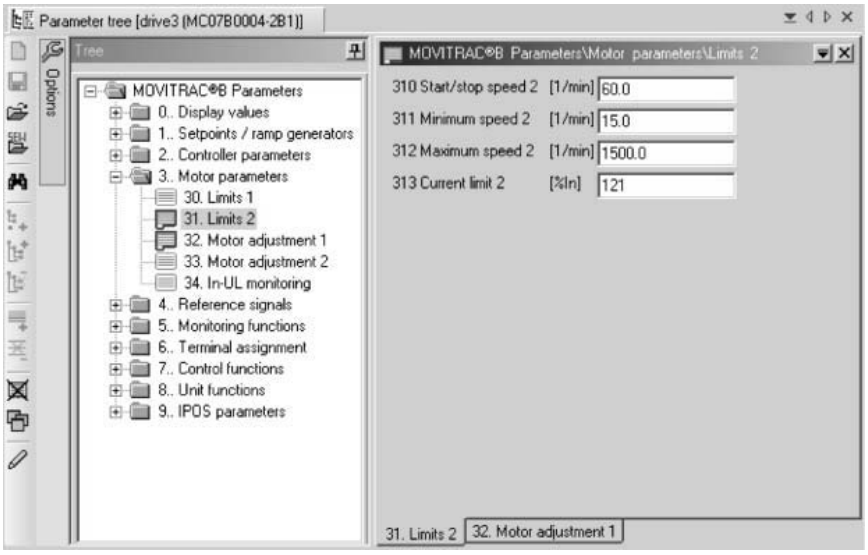
3. Select the unit you want to set parameters for.
4. Open the context menu and select the "Parameter tree" command.

   This opens the "Parameter tree" view on the right section of the screen.
5. Expand the "Parameter tree" up to the node you require.



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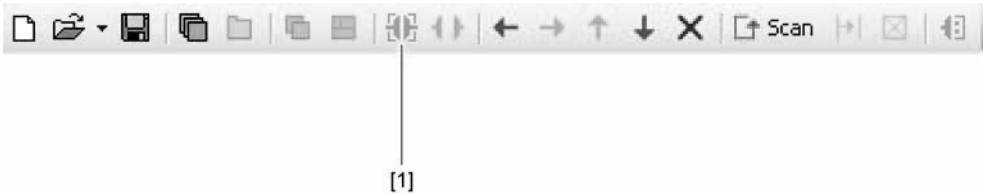
6. Double-click to display a particular group of unit parameters.
7. Press the enter key to finalize any changes you make to numerical values in the input fields.

11.7.3 Starting up the units (online)

To startup units (online), proceed as follows:

1. Switch to the network view.
2. Click the "Switch to online mode" button [1].



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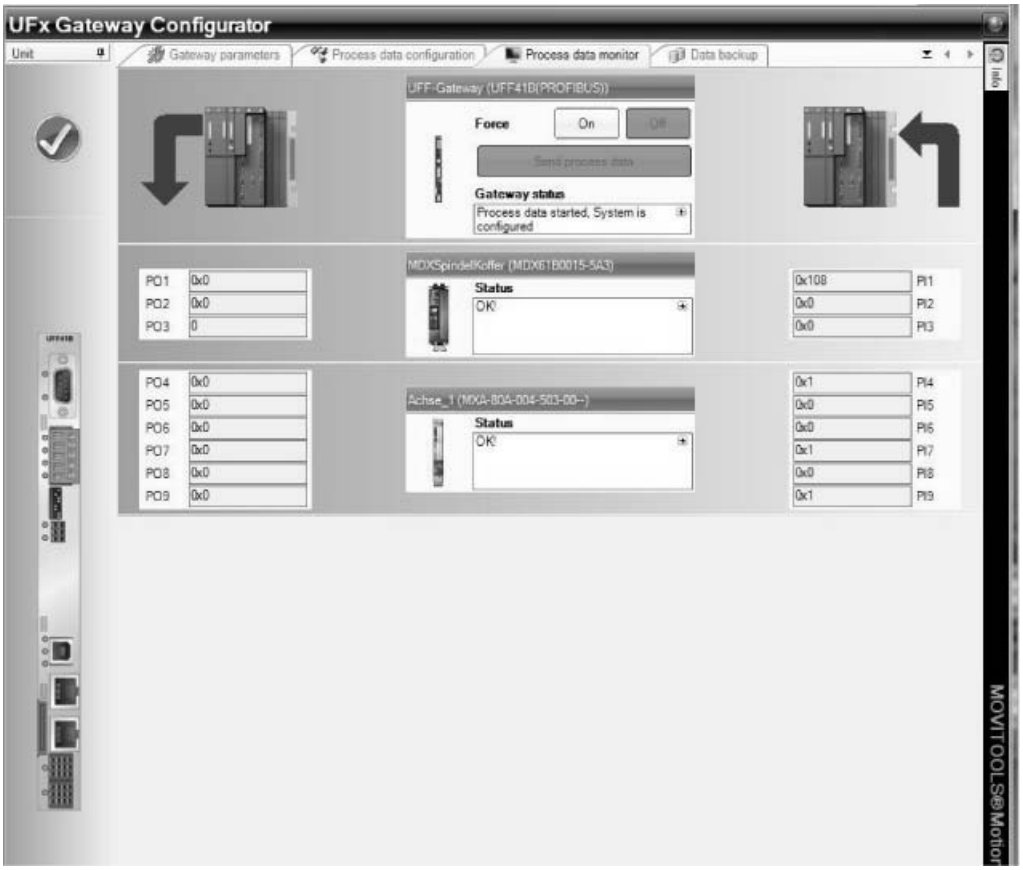
3. Select the unit you want to startup.
4. Open the context menu and select the command [Diagnostics] / [UFx Gateway Configurator].

   The Gateway Configurator opens.

	TIPS
	• For detailed information about the unit parameters, refer to parameter list for the unit. • For detailed information about using the startup wizard, refer to the MOVITOOLS® MotionStudio online help.

11.8 Special configuration and diagnostics tools

To configure the UFF41B in gateway operation, you can use the context menu to start both the "UFx gateway configurator" and the parameter tree. In addition to configuration, this function provides information for diagnostics of gateway operation and displays the transmitted process data.



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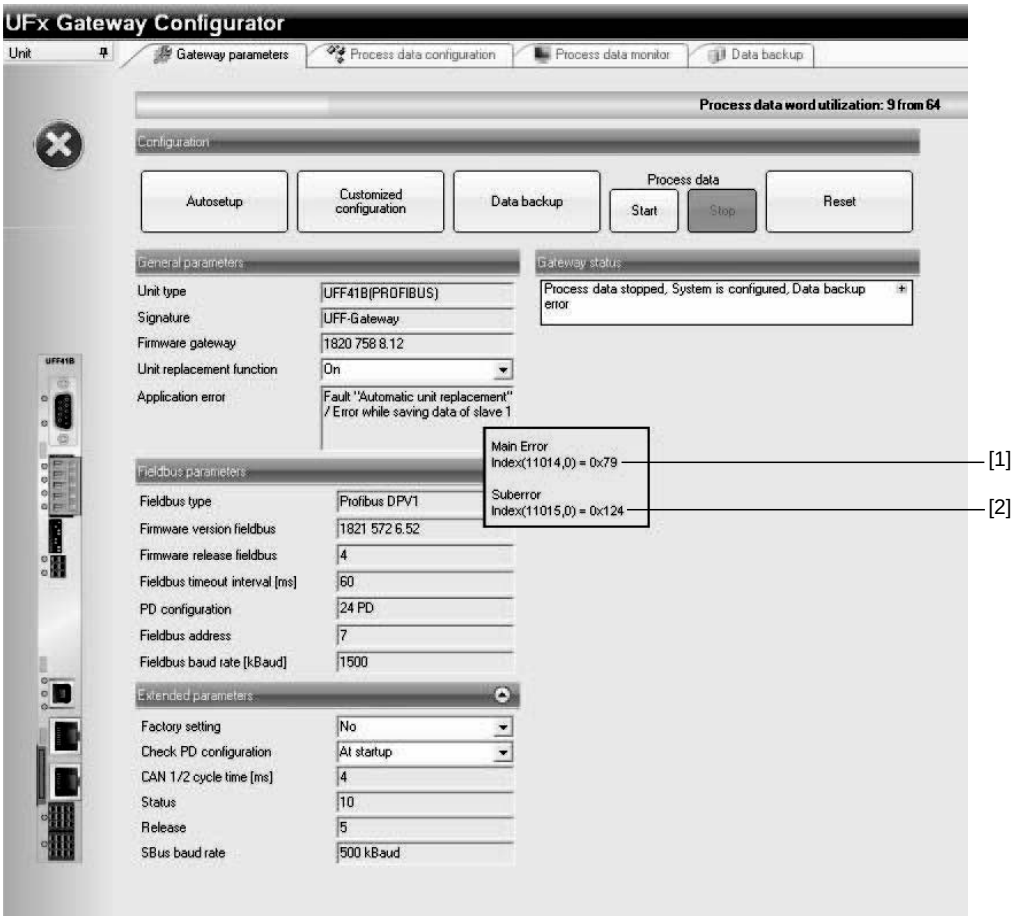
12 Troubleshooting

12.1 Error messages of the fieldbus gateway

Error messages of the fieldbus gateway are displayed in MOVITOOLS® MotionStudio via the "UFx Gateway Configurator" tool (Gateway parameter tab). The fieldbus gateway diagnoses an error number [1] with the associated suberror number [2]. In the following tables, this suberror number [2] is given in hexadecimal notation. It can be used to generate a suberror code referring to the relevant slave unit (see figure below).



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12.1.1 General errors of the fieldbus gateway

Error			
Description	**Number (hex)**	**Response**	**Remedy**
Wrong unit as fieldbus gateway. The SD card of the fieldbus gateway was instered in a MOVI-PLC® *advanced* DHF41B or DHR41B.	239.0	Fieldbus gateway remains in "Initialization" state.	Use the SD card of the fieldbus gateway only with UFx41B fieldbus gateway.
Error during communication between gateway program and gateway hardware. The error occurs when starting the unit.	239.1		Use the SD card of the fieldbus gateway only with an UFx41B fieldbus gateway. Contact SEW service.
Error while scanning the slave units. Error while reading the unit type of the slave unit.	239.[No. of the slave unit]01	Fieldbus gateway initializes completely and starts process data communication with the other slave units.	The SBus addresses of various unit types were changed. Check for correct addressing of all slave units.
Error while scanning the slave units. Configured slave unit not found	111. [No. of the slave unit]02		Check whether all slave units are switched on when starting the fieldbus gateway and whether they have the correct SBus address. Check the SBus installation and the terminating resistors.

12.1.2 Error during process data processing

Error			
Description	**Number (hex)**	**Response**	**Remedy**
Master/slave configuration error: The total of configured process data of the slave units is higher than the fieldbus process image.	238.10100	Process data are not started.	The fieldbus process data configuration has to be expanded.
Master/slave configuration error: Process data length of slave unit too short	238.[No. of the slave unit]10		Configure the slave units with a minimum number of one PD per slave unit.
Master/slave configuration error: Process data length of slave unit too short	238.[No. of the slave unit]11		Check the following limit values of the process data configuration: • MOVIAXIS®: Max. 16 PDs • MOVIDRIVE® B: Max. 10 PDs • MOVITRAC® B: Max. 3 PDs
Error while scanning the slave units: Configured slave unit not found	111.[No. of the slave unit]02	Fieldbus gateway initializes completely and starts process data communication with the other slave units.	Check whether all slave units are switched on when starting the fieldbus gateway and whether they have the correct SBus address. Check the SBus installation and the terminating resistors.
Error while stopping/starting the process data of the MOVIAXIS® slave unit	239.[No. of the slave unit]12	This slave does not contain any process data.	Check whether the MOVIAXIS® parameter setting level is set to "planning engineer".
Error during automatic setting of the MOVIAXIS® PDO configuration: Error while setting the parameters for the process data of the MOVIAXIS® slave unit.	238.[No. of the slave unit]13		Check whether the MOVIAXIS® parameter setting level is set to "planning engineer". Check whether process data objects (PDOs) in the axis modules were configured with CAN IDs which are needed by the gateway for communication.
Error during PDO configuration of the MOVIAXIS® slave unit	238.[No. of the slave unit]14		
Internal system error in the fieldbus gateway	239.10600 239.10610 239.10620 239.10630	Process data are neither initialized nor started.	Switch fieldbus gateway on and off again. If the error persists, replace the fieldbus gateway or contact SEW Service.
Error while initializing CAN 1 or CAN 2 system bus.	239.10710	Process data are not initialized.	Check the SBus installation and the terminating resistors. Check whether several slave units use the same SBus addresses.

12.1.3 Error during unit replacement

Error			
Description	**Number (hex)**	**Response**	**Remedy**
Error during data backup: Error while accessing memory.	121.28	Fieldbus gateway initializes normally and starts the process data. Restore function not ensured.	Remove write protection from SD memory card.
Invalid data in memory.	121.29		Repeat the "data backup" function
Error during automatic update: Error while reading UUID (Universally Unique Identifier) of slave unit.	121.[No. of the slave unit]20	Gateway initializes normally and starts the process data. The restore function to this slave unit is not ensured.	Slave does not have UUID: • MOVIDRIVE® B: unit firmware .13 required • MOVITRAC® B: unit firmware .17 required
"Restore" function error. Error while reading data from the SD card for the replaced slave unit.	121.[No. of the slave unit]22		Check whether the new unit has the same SBus address as the unit it replaces.
"Restore function" error: Error while transferring the parameter set to the slave unit.	121.[No. of the slave unit]23		The slave unit must be in "Controller inhibit" condition (with MOVITRAC® B "No enable").
Error during data backup: Error while transferring the parameter set from the slave unit to the SD memory card of the fieldbus gateway.	121.[No. of the slave unit]24		MOVIDRIVE® A and MOVITRAC® 07A do not support this function. Check whether another axis-to-axis communication in addition to the gateway communication takes place using the same CAN bus. Use the second CAN bus of MOVIDRIVE® B or MOVIAXIS® for this axis-to-axis communication.

12.2 Diagnostic procedure for operation on DeviceNet

The diagnostic procedures described in the following section demonstrate the error analysis methods for the following problems:

- The UFF41B fieldbus gateway does not operate on the DeviceNet
- No drive can be controlled with the DeviceNet master via the UFF41B fieldbus gateway

Step 1: Check the status LED and status display of the DeviceNet scanner

See documentation of the DeviceNet scanner.

Step 2: Check the status LEDs of UFF41B and DIP switch S2

The explanation of the different LEDs can be found in section 4. The following table shows the corresponding unit states and their causes. An "X" indicates that the state of the respective LED is not relevant.

LED				UFF41B	
L16 MOD/NET	**L15 (PIO)**	**L14 (BIO)**	**L13 (BUS FAULT)**	**Status**	**Cause**
Off	Off	Off	Off	Off	No voltage supply of UFF41B, e.g. via X26. DIP switch S2 is not set to the DeviceNet fieldbus interface (see chapter 4.7). No memory card in the UFF41B or necessary files are missing (see chapter 4).
Off	Yellow	Off	Off	Booting	During boot up and internal synchronization,
Off	Flashing red	X	Off	Baud rate invalid	Invalid baud rate setting via DIP switches
Off	Flashing green	Flashing green	Yellow	No power via X30	Voltage supply via X30D not connected / switched on
Off	Flashing green	Flashing green	Flashing red	Error pas-sive	Wrong baud rate or no other DeviceNet node connected
Red	Red	Red	Off	DUP-MAC error	Address (MAC-ID) is assigned twice in the network
Flashing green	Off	Off	X	Operational	UFF41B active on the bus but with-out connection to the master (scanner)
Flashing red	Flashing red	X	X	Timeout	Timeout of the PIO connection to the master
Green	Green	X	X	Connected	UFF41B active on the bus with active PIO connection to the master
Flashing red	Green	X	X	Module error	UFF41B with active PIO connection and active error of UFF41B

Step 3: Error diagnostics

Data exchange between master (scanner) and slave (UFF41B) is active when UFF41B is in "Connected" or "Module error" status. If it is still not possible to transmit data to the UFF41B fieldbus gateway or lower-level drives across DeviceNet, the following steps should help you to diagnose the error.

A Are the correct values for the process data words displayed in the Gateway Configurator?

If yes, continue with F.

B Is bit 0 in DeviceNet control register of the PLC set to "1" to activate the process data exchange?

C Are the process data words copied to the right offset in the Local I/O tag of the DeviceNet scanner? Check the tags and scanner mapping.

D Is the PLC in RUN mode or does active forcing overwrite the transfer of the normal process data words?

E If the PLC does not transmit data to UFF41B, refer to the documentation of the PLC manufacturer for support.

F Was the UFF41B fieldbus gateway configured properly and are all drives configured in the UFF41B online?

G What errors are indicated in the status displays of the Gateway Configurator?

H If the cycle time for exchanging process data is longer than expected, calculate the bus load.

Example:

64 process data words from and to a DeviceNet slave are transmitted in ca. 11 ms at a baud rate of 500 kBaud. When operating 2 units with 64 process data words each, the shortest possible cycle time is about twice as long: ca. 22 ms. Dividing the baud rate in half means the cycle time doubles.

12.3 Diagnostic procedure for operation on PROFIBUS DP-V1

Diagnostic problem: The UFF41B fieldbus gateway does not operate on PROFIBUS.
Initial status:
- The UFF41B fieldbus gateway is physically connected to PROFIBUS.
- The UFF41B fieldbus gateway is configured in the PROFIBUS DP master and bus communication is active.

↓

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

Yes ↓

Response of the LED Profibus fault? — OFF → **[B]**; ON → **[C]**

FLASHES ↓

The UFF41B fieldbus gateway detects the baud rate but it was not configured in the PROFIBUS DP master or was configured incorrectly.

↓

Check whether the configured PROFIBUS address is the same as the address set on the DIP switches.

↓

PROFIBUS addresses identical? — No → **[D]**

Yes ↓

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

↓

Delete the configuration for the UFF41B fieldbus gateway from the DP network.

↓

Configure the UFF41B fieldbus gateway again, choosing the unit designation "MOVI-PLC".
Use a predefined configuration to simplify the process. Do not change any of the preset configuration data.
Assign the address range for your control system.

↓

Load the configuration into the PROFIBUS DP master and start the bus communication again.

[A]	Check the bus cabling.
[B]	The UFF41B fieldbus gateway is exchanging data cyclically with the DP master.
[C]	The UFF41B fieldbus gateway does **not** detect the baud rate. Check the bus cabling.
[D]	Adapt the bus addresses.

13 Technical Data

13.1 General technical data

Part number	1821 624 2 (UFF41B without gateway housing UOH21B)
Interference immunity	Meets EN 61800-3
Ambient temperature	Installed in the MOVIAXIS® master module: • 0 °C - +45 °C In the UOH21B gateway housing: • (-10 °C) - +60 °C
Climate class	EN 60721-3-3, class 3K3
Storage temperature	(-25 °C) - +70 °C
Climate class	EN 60721-3-3, class 3K3
Type of cooling	Convection cooling
Degree of protection	IP20
Pollution class	2 according to IEC 60664-1 (VDE0110-1)
Installation altitude	max. 4000 m (NN)

13.2 UFF41B fieldbus gateway

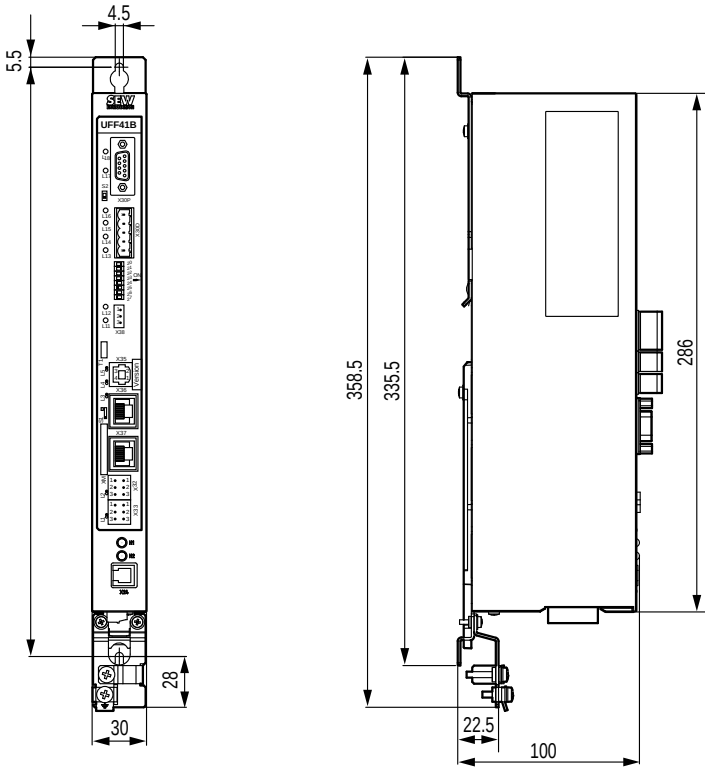
UFF41B fieldbus gateway	
Electrical supply	Integrated in MOVIAXIS® master module (MXM) or in UOH21B gateway housing: • Power consumption: P_{max} = 10 W • U = DC 24 V (-15 % / +20 %) • I_{max} = 600 mA • The UFF41B fieldbus gateway can be supplied from the MOVIAXIS® switched-mode power supply (MXS) or from an external voltage source. To do so, connect X5 between the individual units. • If the UFF41B fieldbus gateway is supplied with DC 24 V from the MOVIAXIS® switched-mode power supply, then the function of the UFF41B fieldbus gateway is ensured when power supply is switched off (external DC 24 V supply at X16 of the MOVIAXIS® switched-mode power supply).
Potential levels	The UFF41B fieldbus gateway has the following potential levels: • Potential control / CAN 1 • Potential PROFIBUS • Potential DeviceNet • Potential system bus CAN 2
Memory	• Program memory: 8 MByte • Data memory: 4 MByte • Retain data: 32 kByte • System variables (retain): 8 kByte
System bus CAN 2 X32:1 - X32:3 **System bus CAN 1** X33:1 - X33:3	• System bus CAN 1 and CAN 2 to CAN specification 2.0, parts A and B, transmission technology to ISO 11898 • The CAN 2 system bus is electrically isolated • Max. 64 stations per CAN system bus • Address range 0 - 63 • Baud rate: 125 kBaud - 1 MBaud • If X32 or X33 is the bus terminator, you must connect a terminating resistor (120 Ω) externally. • You can remove connector X32 or X33 without interrupting the system bus
Ethernet 1	System bus, system bus SBUS^{plus} in preparation)
Ethernet 2	• TCP/IP • Connection options: Engineering PC, other controller, Intranet
USB	USB 1.0 for connecting an engineering PC
SD memory card **OMH41B-T0...T10**	• PC-readable • Includes: – Firmware – Gateway application – Data • At least 128 MB memory
Engineering	Engineering takes place using the Ethernet interface (X37), PROFIBUS (X30) or USB (X35) The engineering of all SEW components connected to the UFF41B fieldbus gateway can be carried out using the UFF41B option. • Engineering software MOVITOOLS® MotionStudio V5.5x

13.3 Bus connection

PROFIBUS connection X30P:1 - X30P:9	9-pin sub D connector, pin assignment to IEC 61158
Bus termination	Not integrated. Activate bus termination with suitable PROFIBUS connector with switchable terminating resistors.
Automatic baud rate detection	9.6 kBaud - 12 MBaud
Protocol options	PROFIBUS DP and DP-V1 to IEC 61158
GSD file	SEW_6007.GSD
DP ID number	Not yet assigned
Engineering	Additional engineering access via the PROFIBUS interface (X30P)
DeviceNet connection X30D:1 - X30D:5	• 2-wire bus and 2-wire supply voltage DC 24 V with 5-pole Phoenix terminal • Pin assignment according to DeviceNet specification
Communication protocol	Master/slave connection set according to DeviceNet specification version 2.0
Baud rate	125, 250 or 500 kBaud, can be set using DIP switches 2^6 and 2^7
Bus cable length	For thick cable according to DeviceNet specification 2.0 appendix B: • 500 m at 125 kbaud • 250 m at 250 kbaud • 100 m at 500 kbaud
Transmission level	ISO 11 98 - 24 V
MAC ID	0 - 63, can be set using DIP switch 2^0 - 2^5 Max. 64 stations
Supported services	• Polled I/O: 1 - 64 words • Bit-strobe I/O: 1 - 4 words • Explicit messages: – Get_Attribute_Single – Set_Attribute_Single – Reset – Allocate_MS_Connection_Set – Release_MS_Connection_Set
EDS	SEW_GATEWAY_UFF.eds
Vendor ID	0x13B

13.4 Dimension drawings

13.4.1 Dimension drawing for fieldbus gateway UFF41B / UOH21B



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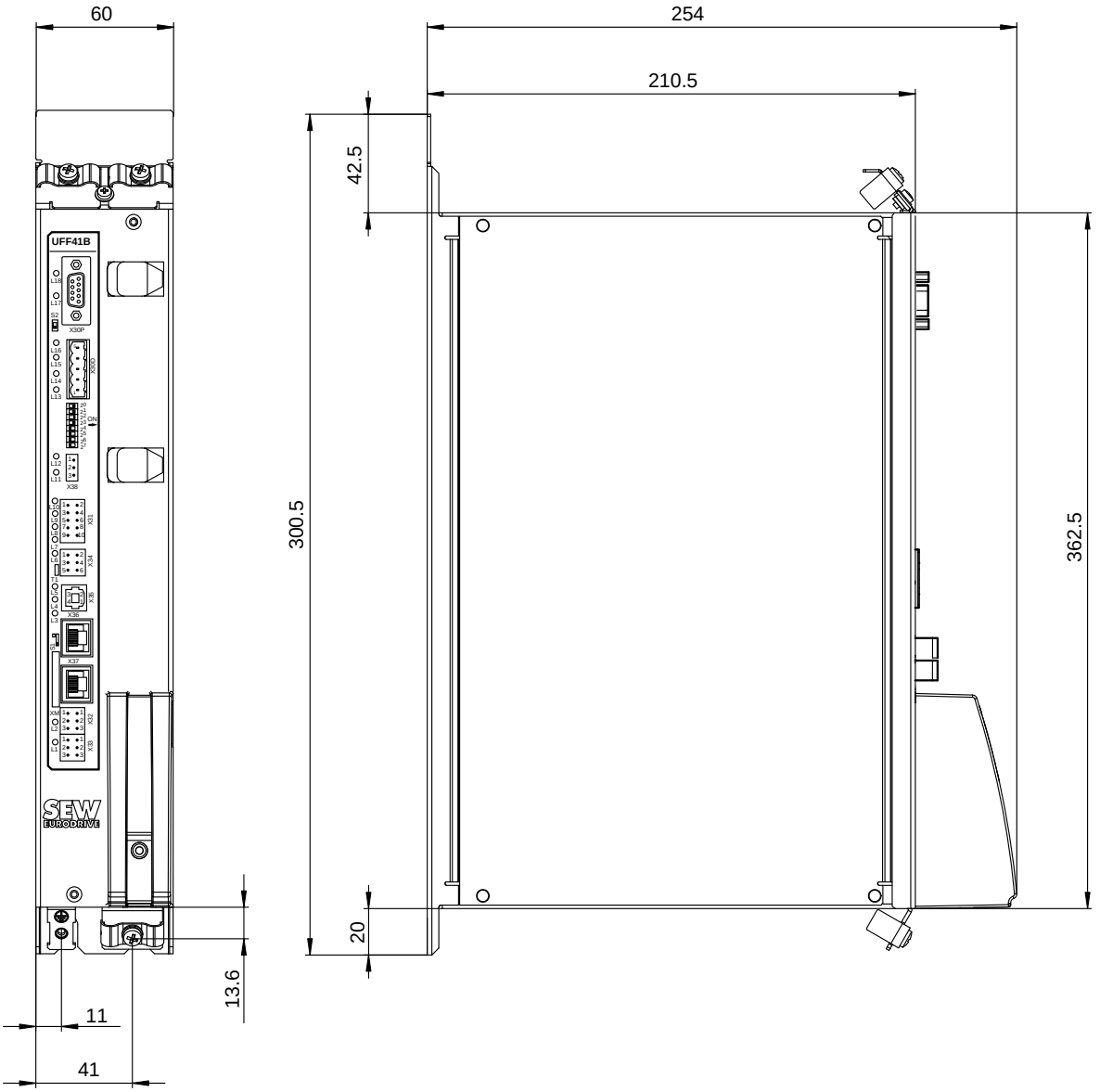
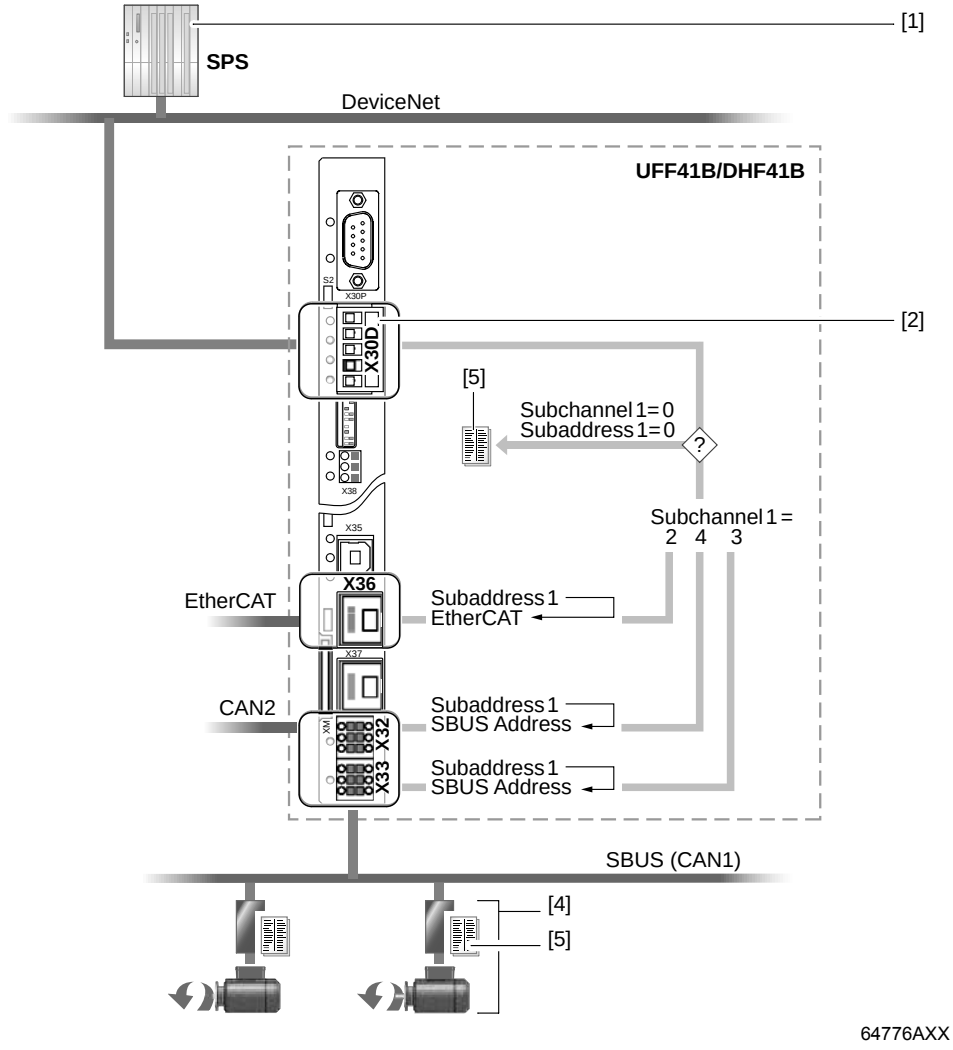
13.4.2 Dimension drawing MOVIAXIS® master module MXM / UFF41B



14 Appendix

14.1 Parameter access to lower-level units via DeviceNet



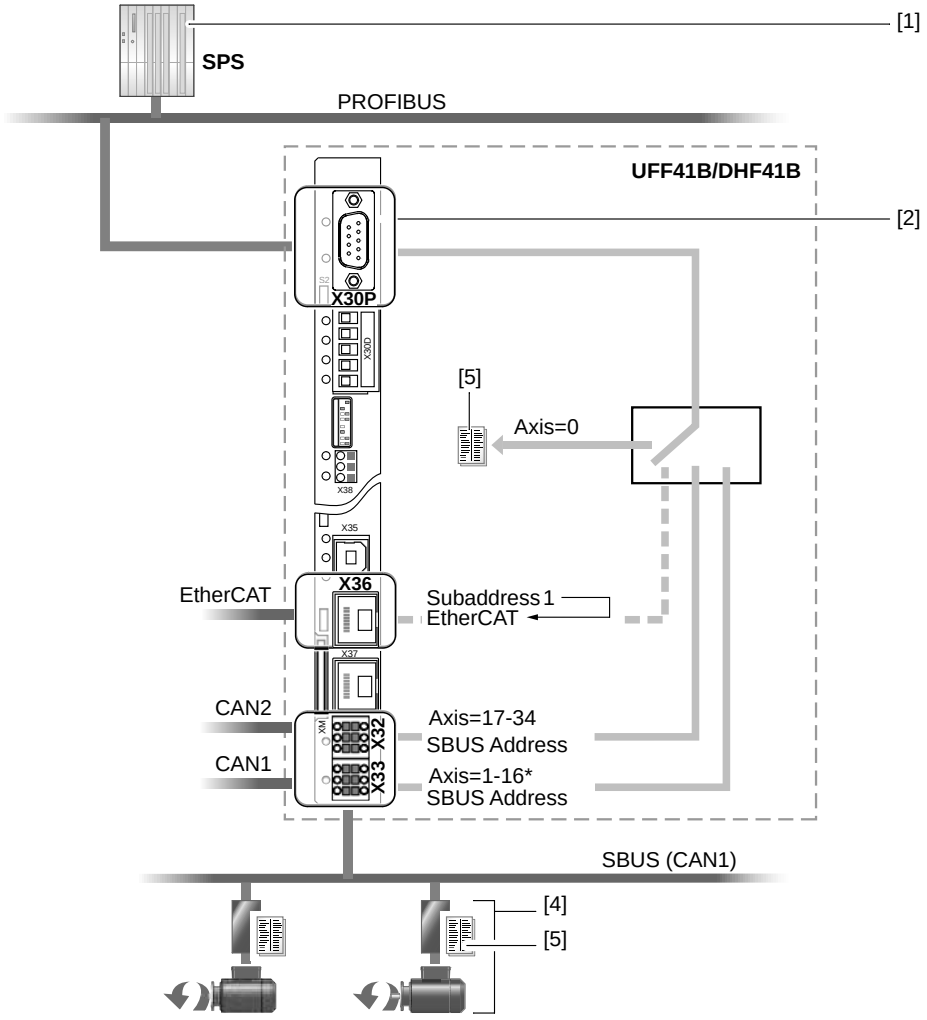
[1] PLC with DeviceNet scanner (master)

[2] DeviceNet interface

[4] SEW inverter with SBus interface

[5] Index and parameter list of the unit

14.2 Parameter access to lower-level units via PROFIBUS DP-V1



* SBus address 15 must not be used when engineering via PROFIBUS or parameter services via PROFIBUS.

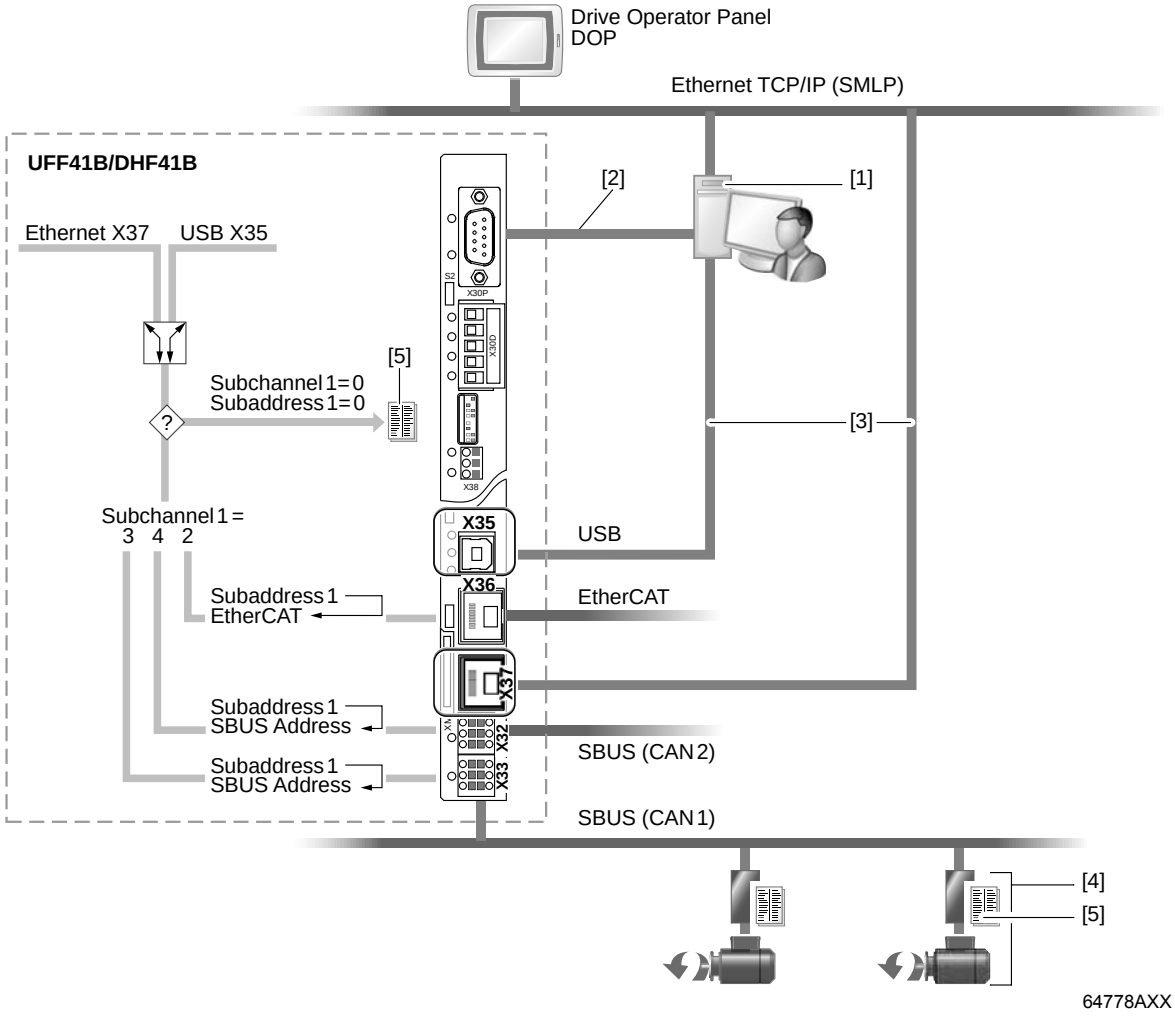
[1] PLC with PROFIBUS DP-V1 master

[2] PROFIBUS interface

[4] SEW inverter with SBus interface

[5] Index and parameter list of the unit

14.3 Parameter access to lower-level units via engineering interfaces



[1] Engineering PC
[2] PROFIBUS interface (for engineering)
[3] USB/Ethernet engineering interface
[4] SEW inverter with SBus interface
[5] Index and parameter list of the unit
[6] SEW inverter with EtherCAT interface

15 Index

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