EN

G3

CM-DPV1

User Manual

Communication Module for PROFIBUS-DP

Project planning, installation and commissioning of the CDA3000/CDD3000/CTC3000 on the field bus

LUST

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Overview of documentation

Before purchase

Catalog

Selecting and ordering a drive system

With delivery (depending on supply package)

Operation Manual

Quick and easy initial commissioning

Operation Manual KEYPAD KP200

Operation via KEYPAD KP200

Application Manual

Adaptation of the drive system to the application

CAN_{Lust} Communication Module Manual

Project planning, installation and commissioning of the CDA3000/CDD3000/ CTC3000 on the field bus

CAN_{open} Communication Module Manual

Project planning, installation and commissioning of the CDA3000/CDD3000/ CTC3000 on the field bus

PROFIBUS-DP Communication Module Manual

Project planning, installation and commissioning of the CDA3000/CDD3000/ CTC3000 on the field bus

User Manual CM-DPV1
Communication Module for PROFIBUS-DP

ID no.: 0916.20B.1-00

Date: March 2003

Applicable as from software version V1.40 CDA3000
Applicable as from software version V1.10 CDD3000
Applicable as from software version V130.20 CTC3000

Subject to technical changes.

LUST

Dear User,

This manual is intended for you as a **project engineer, commissioning engineer or programmer** of drive and automation solutions on the PROFIBUS-DP field bus. It is assumed that you are already familiar with this field bus on the basis of appropriate training and reading of the relevant literature.

For commissioning of the drive controller refer to the Operation Manual, then use this User Manual for commissioning on the PROFIBUS network.

How to use this manual

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EN

Pictograms

> **Attention!** Misoperation may result in damage to the drive or malfunctions.

> **Danger from electrical tension!** Improper behaviour may endanger human life.

> **Danger from rotating parts!** The drive may start running automatically.

> **Note:** Useful information

> Note: This section describes only operation with the CDA3000 frequency inverter

> Note: This section describes only operation with the CDD3000 servocontroller

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Appendix

Appendix Parameters for bus operation

Appendix Glossary

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1 General introduction

The term “**master**” as used in the following designates a higher-order controller which organizes the bus system.

The terms “**drive unit**” and “**slave**” as used in the following represent an inverter or servocontroller.

1.1 Measures for your safety

The CDA3000 and CDD3000 inverter drives are quick and safe to handle. For your own safety and for the safe functioning of your device, please be sure to observe the following points:

Read the Operation Manual first!

- Follow the safety instructions!

Electric drives are dangerous:

- Electrical voltages > 230 V/460 V:
  Dangerously high voltages may still be present 10 minutes after the power is cut. You should therefore always check that no power is being applied!
- Rotating parts
- Hot surfaces

Your qualification:

- In order to prevent personal injury and damage to property, only personnel with electrical engineering qualifications may work on the device.
- Knowledge of national accident prevention regulations (e.g. VBG 4 in Germany)
- Knowledge of layout and interconnection with the PROFIBUS-DPV1 field bus

During installation observe the following instructions:

- Always comply with the connection conditions and technical specifications.
- Electrical installation standards, such as cable cross-section, shielding, etc.
- Do not touch electronic components and contacts (electrostatic discharge may destroy components).

1.2 Scope

This description applies to all LUST drive controllers interconnected via the CM-DPV1 communication module with the PROFIBUS.

All information given relating to the CDD3000 drive controller also applies to the direct drive controller CTC3000.

1.3 Ident number (ID)

The CM-DPV1 communication module is certified by the PROFIBUS user organization and registered with the following data.

Ident number:	**0564 Hex**	
Name of GSD file:	**LUST0564.GSD**	**V1.55**

For bus operation the GSD file V1.55 or higher must be used.

By way of this number the master makes the link to the GSD file containing the device master data. For user data transfer, the ident number must be recognized together with the correct bus address.

1.4 Notes on operation over PROFIBUS

The PROFIBUS interface operates at a relatively high user level. This means that parameters are accessible which cannot be accessed by the user by way of the KEYPAD.

Attention: Some of the parameters at those user levels are service parameters, and are not documented in the standard operation manuals of the individual devices. Unintentional write access to such parameters may severely impair the functioning of the device!

1.5 Further documentation

Further information to assist in commissioning of the LUST drive units:

- Communication module installation instructions
- Operation Manual, for commissioning of the drive unit
- Application Manual, for additional parameter setting to adapt to the application. The Application Manual can be downloaded as a PDF file from our website at http://www.lust-tec.de. Follow the Service link.

Further information on PROFIBUS, relating to installation and profile definition:

- PROFIBUS Technical Description, version: April 1997, order number 4.001
- PROFIBUS Installation Guideline for PROFIBUS-DP/FMS, version: October 1997, order number 2.111

You can obtain the PROFIBUS information from:

PROFIBUS Nutzerorganisation e.V.
Haid- und Neustraße 7
D-76131 Karlsruhe
Tel.: +49 (0) 721 / 96 58 590
Fax: +49 (0) 721 / 96 58 589
Internet: http://www.profibus.com

2 Installation and commissioning

Attention: Do not insert or withdraw modules **in operation!**

2.1 Mounting

2.1.1 Size (BG1...5)

Step	Action	Comment
1	Make sure the power supply to the drive unit is cut.	
2	Connect the CM-DPV1 to the drive unit as shown in Figure 2.1. Use only the slot at the top.	The module lock must engage audibly. The bottom slot is reserved for the UM-xxxx module.
3	When mounting the next device maintain a mounting distance of 35 mm; see Figure 2.1 (B).	Mounting distance 50 mm if CM-xxxx module is to be mounted/removed while drive controllers are fitted.
	Mounting is complete. To continue see section 2.2 “Installation”.	

CDA

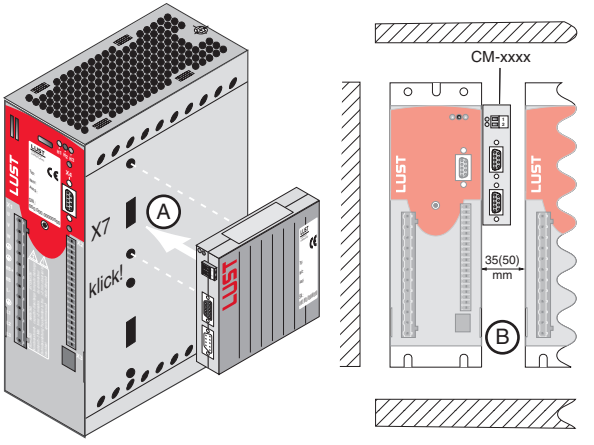
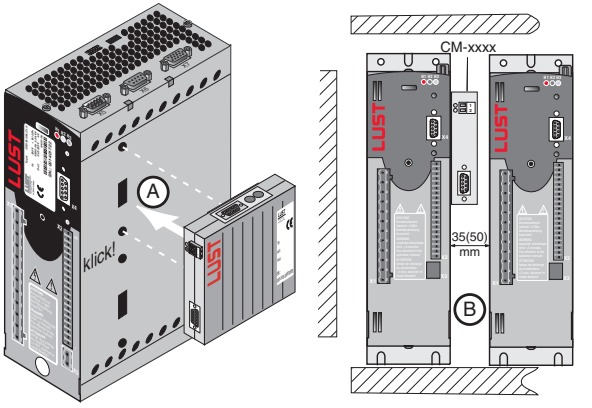


Figure 2.1 Mounting for BG1...5

CDD



2.1.2 Size (BG6...8)

Step	Action	Comment
1	Make sure the power supply to the drive unit is cut.	
2	Open the device cover.	
3	Click the module into the mounting bracket. For positioning and orientation refer to Figure 2.3 (A).	The bracket is part of the MP-UMCM mounting package (see Figure 2.2).
4	Bolt the bracket onto the bottom slot position - see Figure 2.3 (B).	The CM module is thereby placed on its head and the rear of the module is facing forward.
5	Connect the module by the ribbon cable as shown in Figure 2.3 (C).	The ribbon cable is part of the MP-UMCM mounting package (see Figure 2.2).
	Mounting is complete. To continue see section 2.2 “Installation”.	

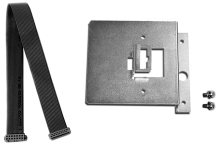


Figure 2.2 Mounting package

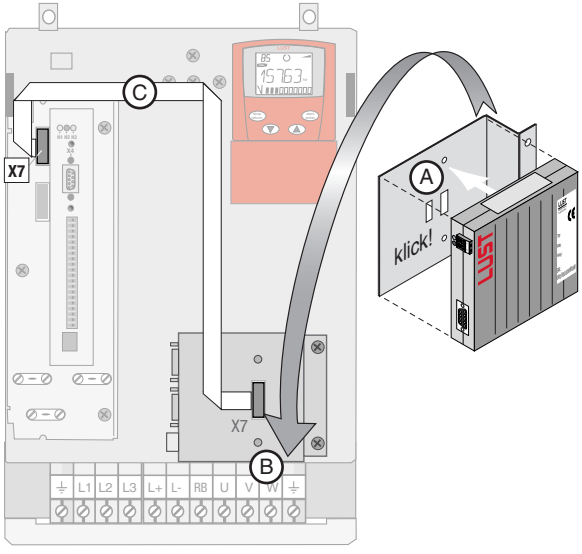


Figure 2.3 Mounting for size BG6...8

2.2 Installation

Step	Action	Comment
1	Connect the module to the field bus. Use a cable conforming to the specification.	Use a bus termination plug (120 Ω) on the last module or switch on, see Figure 2.4.
2	Wire the hardware enable on the CDA3000/CDD3000.	see section 2.2.1
3	Wire up the supply voltage for the module to X10.	18 ...30 VDC, see Table 2.1 and section 2.2.2.
4	Switch on the drive unit.	
	Installation is complete. To continue see section 2.3 “Commissioning”.	

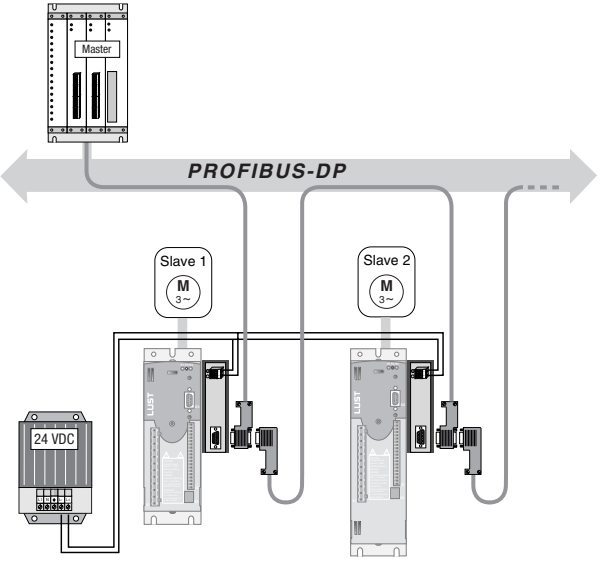


Figure 2.4 System connection

Characteristics	CM-DPV1
Voltage supply	24 V (18 ... 30 V DC), supply via X10
Voltage ripple	max. 3 Vss
Current consumption	typ. 100 mA, max. 250 mA per user
Cable type	9-wire, surge impedance 120 Ω

Table 2.1 Specification, see also appendix A.4

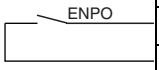
2.2.1 Hardware enable (ENPO)

The drive units have an additional power stage hardware enable (ENPO) via the control terminal

- X2/8 (on CDA3000)
- X2/7 (on CDD3000)

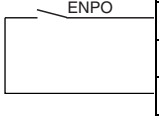
(also termed “controller enable”). This signal must also be configured for operation over the field bus.

This control signal is high-active. When this control signal is removed the motor runs down uncontrolled (refer also to the description in the Operation Manual).



X2	Des.	Function:
9	ISD00	Digital input 1
8	ENPO	Power stage hardware enable
7	U_V	Auxiliary voltage 24 V DC
6	U_V	

Figure 2.5 Configuration of controller enable ENPO on the CDA3000



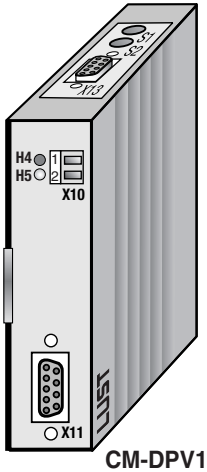
X2	Des.	Function
7	ENPO	Power stage hardware enable
6	DGND	Auxiliary voltage 24 V DC
5	U_V	

Figure 2.6 Configuration of controller enable ENPO on the CDD3000

Note: After a failure of the external 24V supply the PROFIBUS system is automatically initialized as soon as the 24 V is restored. No mains reset of the drive unit (switching the mains power off and back on) is required.

Note: As a result of the hardware enable (ENPO) being activated the drive may start running automatically if the start signal is set via the bus or terminal.

2.2.2 Pin assignment X10, X11, X13



CM-DPV1

X10	Assignment
1	+24 V DC
2	CAN_GND

X11	Assignment
1	n.c.
2	n.c.
3	RxD/TxD-P
4	n.c.
5	DGND
6	VP (+ 5 V DC)
7	n.c.
8	RxD/TxD-N
9	n.c.

X13	Assignment
1	ADR_POT +5 V
2	ADR0
3	ADR1
4	ADR2
5	ADR3
6	ADR4
7	ADR5
8	ADR6
9	n.c.

Table 2.2 Pin assignment

Note:

- CAN-GND (X10/2) and DGND (X11/5) are interconnected in the CM-DPV1 module.
- The +24 V DC supply voltage (X10/1) and CAN-GND (X10/2) are electrically isolated from the ground of the CDA/CDD drive controllers.
- The PROFIBUS data lines RxD/TxD-P (X11/3) and RxD/TxD-N are isolated from the CDA/CDD drive controllers by optocouplers.
  The drivers of the PROFIBUS data line are powered by the +24 V DC supply voltage (X10/1) via a 5 V voltage regulator.
  The VP +5 V voltage (X11/6) is generated from the +24 V DC supply voltage via a voltage regulator.
- The control voltage ADR_POT +5 V (X13/1) is generated, electrically isolated, from the +24 V DC supply voltage (X10/1). The reference potential for X13/1 is the ground of the CDA/CDD drive controllers.

Attention: X13 may only be used as a coding plug (not for cable connection).

2.3 Commissioning

2.3.1 Serial commissioning

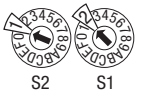
Only carry out this commissioning process if

- you have already carried out initial commissioning of at least one drive (see section 2.3.2) and
- your control is configured for PROFIBUS and your control program has been written.

Step	Action	Comment
1	Mount the communication module on the drive unit and install the PROFIBUS network.	See installation instructions and sections 2.1 and 2.2
2	Set the desired **address** on the CM-DPV1. Select the mode of addressing: • by bus address parameter or • by coding on connector X13 or • by coding switches S1 and S2.	See under “Addressing options”
3	**Install** the drive unit and carry out the **serial commissioning** according to the Operation Manual. Then **save the parameters** by clicking the --> button	Save setting in device
4	**Load the** existing **control program** into the controller.	
5	Switch the CDA3000/CDD3000 and CM-DPV1 components **off** and back **on** to initialize the interface configurations.	
	Serial commissioning is finished. Test all drive functions.	

Addressing options

1. Coding switches S1 and S2
By way of the two coding switches on the top of the CM-DPV1 a hexadecimal address between 1 and 126 can be selected.



Example for address 18 Dec = 12 Hex

Figure 2.7 Example of use of the coding switches

2. Connector coding via connector X13
By way of the pins on connector X13 labeled ADRx, the device address can be binary coded with pin 1 in the connector by soldering-in jumpers. A valid address between 1 and 126 can be selected in binary format.

X13	Assignment
1	ADR_POT
2	ADR0 (2^0)
3	ADR1 (2^1)
4	ADR2 (2^2)
5	ADR3 (2^3)
6	ADR4 (2^4)
7	ADR5 (2^5)
8	ADR6 (2^6)
9	n.c.

Example for address 18 Dec:

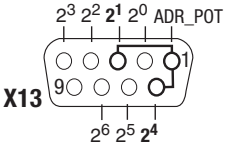


Table 2.3 Pin assignment X13 with an example of connector coding

3. Bus address parameter 582-PBADR:
By way of parameter 582-PBADR in subject area _57OP Option modules, a decimal address between 1 and 126 can be set.

Attention: To set the device address via X13 or S1 and S2, parameter 582-PBADR = 0 must be set!
All hardware codings of the connector (X13) and the coding switches (S1 and S2) are internally linked by a logical OR operator. After a change of address a mains reset of the CM-DPV1 is required.

2.3.2 Initial commissioning

This section describes how the drive unit can be integrated most simply, and thus quickly, into a PROFIBUS system.

Step	Action	Comment
1	Mount the communication module on the drive unit and install the PROFIBUS network.	See installation instructions and sections 2.1 and 2.2
2	Set the desired **address** on the CM-DPV1. Select the mode of addressing: • by bus address parameter or • by coding on connector X13 or • by coding switches S1 and S2.	See under “Addressing options”
3	**Install** the drive unit and carry out the **initial commissioning** according to the Operation Manual.	Commissioning of the motor is carried out prior to commissioning of the bus system.
4a	Carry out **commissioning of the CDA3000** as described in section 3.5 of the Application Manual, using the **BUS_1 preset solution** (field bus operation).	**Important note:** Then save parameter by clicking button Save setting in device
4b	Carry out **commissioning of the CDD3000** as described in section 4.3 of the Operation Manual, using the **SCB_5** preset solution (field bus operation).	**Important note:** Then save parameter by clicking button Save setting in device
5	Configure the controller.	see section 2.4
6	Switch the CDA3000/CDD3000 and CM-DPV1 components **off** and back **on** to initialize the interface configurations.	
7	**Program** the **control program**.	see section 2.5
	Commissioning is complete.	

2.4 Hardware configuration based on the example of the S7-300

The following controller configuration can be performed in any control environment. In this example we refer to the Siemens S7-300 controller and the SIMATIC STEP7[1] V5.0 software.

Example project: “testproj”

The example project is located on the CD-ROM supplied with the package with the order designation “CM-DPV1 + GSD”. The “testproj” example project is designed for the Siemens CPU 315-DP. The modules of the S7 used are presented in appendix A.3.

You will save commissioning time if you use the example project. You can then begin directly with step 6.

Attention: The example can be used to optimize the commissioning time of plant, but does **not** conform to the specifications applicable to your plant control.

Step	Action	Comment
1	Integrate the GSD file “Lust0564.GSD” supplied with the CM-DPV1+GSD into the hardware catalogue. This can be done using the hardware configurator (menu: Tools > Install New GSD).	see Figure 2.8 The GSD file “ CM-DPV1.GSD” can also be obtained on the Internet at http:// www.profibus.com.
2	Under the properties of the DP master the PROFIBUS properties must be set to “networked” to enable the hardware configurator to make the PROFIBUS network connection. The address of the PROFIBUS Master can also be changed here. The factory set default address is 2.	see Figure 2.9

Continued on page 2-12

1. SIMATIC is a registered trademark of Siemens AG.

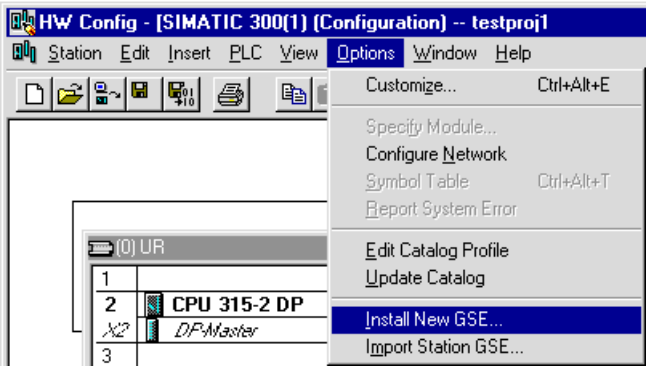


Figure 2.8 Installing a new GSD

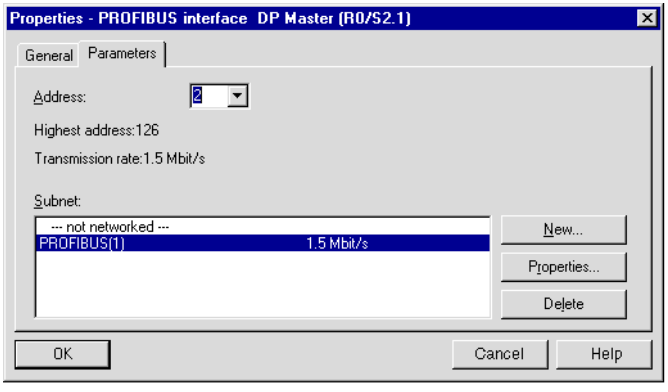


Figure 2.9 Activating PROFIBUS interface in the controller

To reach the window manually from Figure 2.9:

- Select X2 “DP-Master” in the subrack (see Figure 2.8 in the “(0)UR” subrack).
- Open the pop-up menu using the reverse mouse button and click on “Object properties”.
- On the “General” tab click in the “Interface” area on the “Properties” button.

Hardware configuration continued

Step	Action	Comment
3	In the hardware catalogue “drag and drop” the folder “PROFIBUS/Other field devices/Drives/LUST CM-DPV1” onto the PROFIBUS network connection. The hardware configurator then opens up the dialog box for input of the PROFIBUS Slave address (CM-DPV1). Here the PROFIBUS Slave address set in section 2.3.2 in step 2 is parameterized.	see Figure 2.11 see Figure 2.10
4	When you confirm with “OK” the slot assignment table of the CM-DPV1 communication module appears in the hardware configurator.	
5	Then drag into the **slot assignment table** the order number for “**PKW parameter data**” to slot 0 and the “**PZD EasyDrive Basic**” order number to slot 1. The I/O addresses of the “PKW parameter data” and the “PZD EasyDrive Basic” process data are assigned by the Step7 program and can be altered by double-clicking on the slot assignment table.	see Figure 2.11 **Note:** The S7 “testproj” from LUST starts from the initial I/O address 256 or 264 respectively.
6	The **hardware configuration** of the S7 is thereby completed and must be **saved** to the S7 and the S7 project.	
7	Finally, save the setting in the drive unit with the -> button.	
8	After parameter setting the CDA3000/ CDD3000 and CM-DPV1 components must be switched **off** and back **on** again to initialize the interface configurations.	
	The hardware configuration is then finished.	

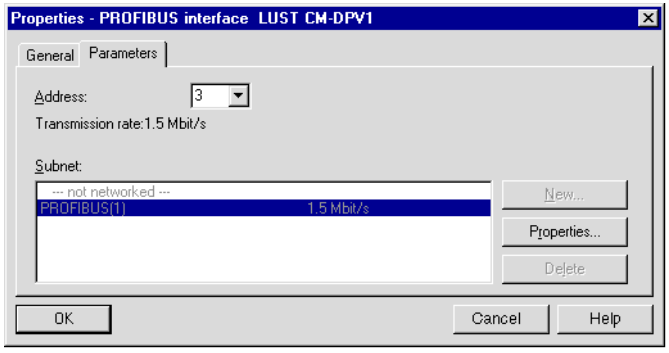


Figure 2.10 Setting the PROFIBUS Slave address

To reach the window manually from Figure 2.10:

- Select the DP-Slave (see Figure 2.11 “(3) LUST CM-DPV1”).
- Open the pop-up menu using the reverse mouse button and click on “Object properties”.
- On the “General” tab click in the “User” area on the “PROFIBUS ...” button.

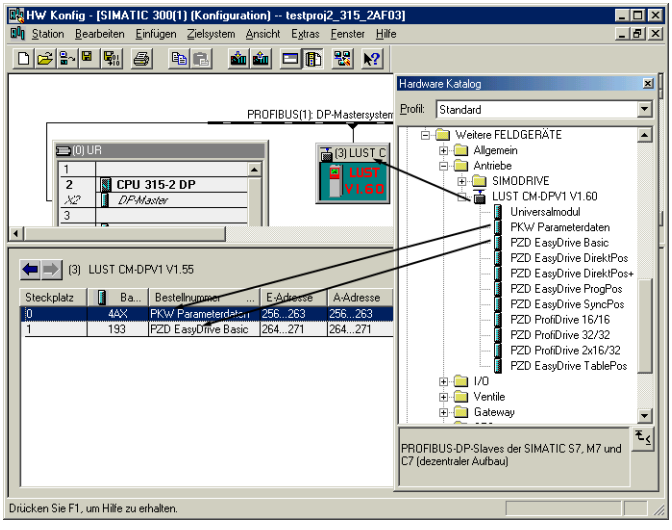


Figure 2.11 Hardware configuration of the S7

2.5 Communication based on the example of a variables table

The following activation of the CDA3000 can be carried out with any control environment. In this example we refer to the Siemens S7-300 controller and the Simatic Manager STEP7 V5.0.

The programming of the OB1 as well as the FC15 function and the variables table VAT15 are included in the “testproj” example project, which you will find on the CD-ROM supplied with the package with the order designation “CM-DPV1 + GSD”. The “testproj” example project is designed for the Siemens CPU 315-DP.

Attention: The example can be used to optimize the commissioning time of plant, and does **not** conform to the specifications applicable to your plant control.

The variables table VAT15 lists the flag words (MW) which are transmitted in the FC15 function to the PROFIBUS. The FC15 function copies the flag words entered in VAT15 to the PROFIBUS I/O addresses 256 and 264.

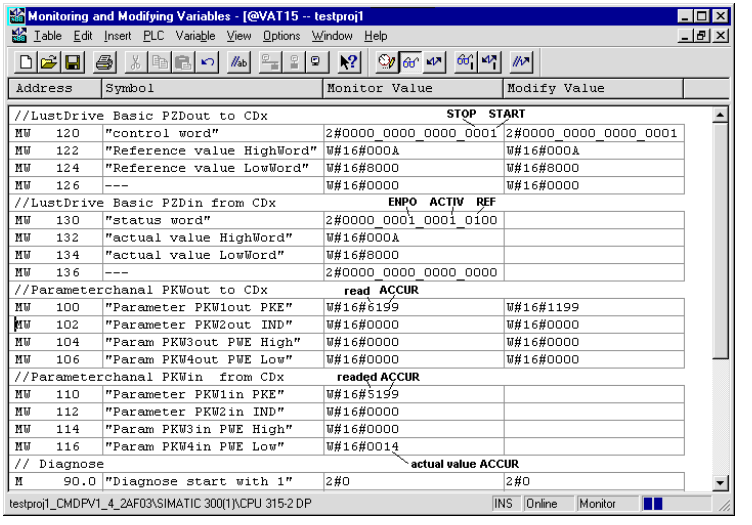


Figure 2.12 VAT15 for activation of the drive unit

2.5.1 Control word and reference input

Since in the hardware configurator “PZD EasyDrive Basic” is selected as the PZD for control and reference transfer, the control functions of the device are activated with the individual control bits. Thus, for example, the START (Start Clockwise) function can be selected by setting just one control bit (bit 0). The reference is also transmitted via the PZD.

PZD EasyDrive Basic

PLC flag words	MW120		MW122		MW124	
Significance	2^{15}... 2^{8}	2^{7}... 2^{0}	2^{15}... 2^{8}	2^{7}... 2^{0}	2^{-1}... 2^{-8}	2^{-9}.. 2^{-16}
Function	Control word		Reference*			
Contents	Bit: 8 = CUSEL 9 = UM0 10= UM1 11= vacant 12= vacant 13= OSD02 14= OSD01 15= OSD00	Bit: 0 = **START** 1 = INV 2 = STOP 3 = E_EXT 4 = FFTB0 5 = FFTB1 6 = FFTB2 7 = ERES	High Word High Byte Example:** 00 h 0000 0000 b	High Word Low Byte 32 h 0011 0010 b	Low Word High Byte C0 h 1100 0000 b	Low Word Low Byte 00 h 0000 0000 b

Table 2.4 Control word and reference input

** Example: 0032,C000 h = 50,75 d
The data format of the reference value is Int32Q16 -> Value range: -32767.999 to +32768.999, thus the High Word contains the pre-decimal place and the Low Word the post-decimal place.

The data formats used are listed in appendix A.2.

Note: Controller enable (**ENPO**): With control via PROFIBUS the **hardware enable** via the control terminal ENPO is required.
- (X2/8) on CDA3000
- (X2/7) on CDD3000

If the ENPO is inactive the motor runs down uncontrolled.

Note: Parameter 597-RFO = (0)OFF in the BUS_x application data sets. As a result, current is only applied to the motor at reference values > 0 Hz.

Attention: Before changing the content of parameter RF0, refer to the notes presented in the Application Manual: “_59DP-Driving profile generator”.

Regarding Figure 2.12 on page 2-14:

The PZD (output data) is entered from flags MW120 to MW126 in the VAT15.

Figure 2.12 shows how bit no. 0 of the control word (MW120) is set and thus how the controller (where ENPO = high) is enabled. The motor is driven with reference MW122 and MW124 000A 8000 h = 10.5 Hz.

For detailed descriptions of the individual control bits refer to section 5.4.1 ““PZD EasyDrive Basic” control word”.

2.5.2 Status word and actual value output

Since in the hardware configurator “PZD EasyDrive Basic” is selected for status and actual value transfer, the states of the device are displayed with the individual status bits. In this way, for example, general errors can be detected in the CDA3000 by monitoring the status bit (bit 0).

The actual value of the drive unit is also transmitted via the PZD.

PZD EasyDrive Basic

PLC flag words	MW130		MW132		MW134	
Significance	2^{15}... 2^{8}	2^{7}... 2^{0}	2^{15}... 2^{8}	2^{7}... 2^{0}	2^{-1}... 2^{-8}	2^{-9}.. 2^{-16}
Function	Status word		Actual value*			
Contents	Bit: 8 = **ENPO** 9 = OS00 10 = OS01 11 = vacant 12 = ISD03 13 = ISD02 14 = ISD01 15 = ISD00	Bit: 0 = **ERROR** 1 = CAN status 2 = REF 3 = LIMIT 4 = ACTIV 5 = ROT_0 6 = BRK 7 = S_RDY	High Word High Byte Example:** 00 h 0000 0000 b	High Word Low Byte 32 h 0011 0010 b	Low Word High Byte C0 h 1100 0000 b	Low Word Low Byte 00 h 0000 0000 b

Table 2.5 Reading status word and actual value

** Example: 0032,C000 h = 50,75 d
The data format of the reference value is Int32Q16 -> Value range: -32767.999 to +32768.999, thus the High Word contains the pre-decimal place and the Low Word the post-decimal place.

The data formats used are listed in appendix A.2.

Regarding Figure 2.12 on page 2-14:

The PZD (input data) is entered from flags MW130 to MW134 in the VAT15.

Figure 2.12 shows how bit no. 2 of the status word is set. The drive unit thereby signals “reference reached”.

The motor is driven with reference MW132 and MW134 000A 8000 h = 10.5 Hz.

For detailed descriptions of the individual status bits refer to section 5.4.2 ““PZD EasyDrive Basic” status word”.

2.5.3 Fault evaluation

In the event of an error in the CM-DPV1, the drive unit responds with the error response programmed in parameter 527-R-OP2
CDA3000: (in factory setting: STOP, i.e. disable power stage).
CDD3000: (in factory setting: STOP, i.e. execute emergency stop).

Errors in the bus system and errors originating from the drive unit are delivered to the PROFIBUS Master by means of the error numbers via the diagnostic message from the slave (see section 4).

Faults involving causes other than the bus system (e.g.: PLC program, drive unit) must be rectified using the relevant documentation (see section 7).

If the bus system is not correctly configured, the error is signaled as a flash code on LEDs H4 and H5.

Red LED H4	Green LED H5	CM-DPV1 status
❍	❍	24V supply to drive unit missing or drive unit is off.
❍	●	Started and communicating without error
●	☸1	PROFIBUS address of CM-DPV1 is less than 1 or greater than 126. This error message is generated, for example, when 'address 0' is set both in the CDA (PBADR=0) and on the rotary switches (see also section 2.3).
●	☸2	No communication between CM-DPV1 and drive unit possible. The PROFIBUS communication continues if the communication between the CM-DPV1 and the drive unit was running previously.
●	☸3	No PROFIBUS communication possible with PROFIBUS Master. There is communication with the drive unit. The PROFIBUS cable may be faulty or not plugged in, or the hardware configuration may be faulty (see section 2.4) or an incorrect GSD file is being used (correct: LUST0564). PROFIBUS communication is only initiated when at least one identifier (PKW.. or PZD...) has been configured. The PKW identifier (“PKW parameter data”) may be configured only once. The PZD identifier (e.g.: “PZD EasyDrive Basic”) may be configured only once.
●	☸4	Collective error message from H5 = ☸2 and H5 = ☸3
●	❍	Internal error in communication module
●	●	
Key: ❍ LED off ● LED on ☸n LED flashing n times		

Table 2.6 LED status display on the CM-DPV1

2.5.4 Reading and writing parameters

Since in the hardware configurator “PKW parameter data” is selected for parameter transfer, parameters in the controller can be polled and written in parallel with the control functionality.

Example for CDA3000:
In this way, for example, the effective value of the active current can be monitored by reading parameter 409-ACCUR.

Example for CDD3000:
In this way, for example, the torque can be monitored by reading parameter 76-TORQE.

PKW parameter data

MW100				MW102		MW104		MW106	
PKE				IND		PWE			
AK = Job ID	SPM	PNU = Parameter number		IND = Index		Parameter value			
2^{15}... 2^{12}	2^{11}	2^{10}... 2^{8}	2^{7}... 2^{0}	2^{15}... 2^{8}	2^{7}... 2^{0}	2^{31}... 2^{24}	2^{23}... 2^{16}	2^{15}... 2^{8}	2^{7}... 2^{0}
06 = Request 08 = Write	Not supported	High Bit 8-10	Low Byte	Index for field parameters		High Word High Byte	High Word Low Byte	Low Word High Byte	Low Word Low Byte
Example - CDA3000:* 06 h	x h	1 h	99 h	00 h		xx h	xx h	xx h	xx h
Example - CDD3000:** 06 h	x h	0 h	4C h	00 h		xx h	xx h	xx h	xx h

Table 2.7 Writing and reading parameters

* Example: Enquiry for parameter ACCUR 199 h = 409 d

** Example: Enquiry for parameter TORQE 4Ch = 76d

xx h means that these bytes in the parameter value are of no significance for requesting parameters

Regarding Figure 2.12 on page 2-14:

The PKW (output data) is entered from flags MW100 to MW106 in the VAT15.

Figure 2.12 shows how the enquiry from the drive unit for parameter 409-ACCUR (corresponds to parameter number 199 h) is structured.

The PKW (input data) is entered from flags MW110 to MW116 in the VAT15.

Figure 2.12 shows how the reply from the drive unit for parameter 409-ACCUR is returned. Effective active current is 1.00 Amperes (format FIXPT16: 14 h = 20 d * 0.05 = 1.00).

Note: If parameter jobs other than those presented in the example are required, refer to section 6.2.

3 Parameter-setting data

In commissioning of a PROFIBUS-DP slave the PROFIBUS Master sends a parameter-setting telegram to the slave (CM-DPV1).

The DP standard parameters are created independently by the hardware configurator based on the GSD file. In many hardware configurators these DP standard parameters are not visualized, which means only the parameters as from byte 7 are made available for editing; see also Figure 3.1.

Only the DPV1 and user parameters can be changed in the hardware configurator of the controller.

Byte	Function	Standard definition	Change permitted	GSD default (for example see Figure 3.1)
0-6	Communication between the PROFIBUS Master and CM-DPV1 is created independently by the hardware configurator of the PROFIBUS Master.	(DP standard)	no	–
7	Bit7= 0, DPV1 support inactive Bit7= 1, DPV1 support active	(DPV1)	yes	Bit 7= 0, DPV1 support inactive
8-9	DPV1 alarm mode (inactive)	(DPV1)	no	Alarm mode of CM-DPV1 not supported

Table 3.1 Parameter-setting data of the CM-DPV1

Byte	Function	Standard definition	Change permitted	GSD default (for example see Figure 3.1)
10	Activate warning message: 1 = Forward warning messages of the drive unit to the PROFIBUS Master. 0 = Do NOT forward warning messages of the drive unit to the PROFIBUS Master.	(User)	yes	1 = enabled
11	Scaling value for the drive unit (High Byte)	(User)	yes	40 h
12	Scaling value for the drive unit (Low Byte)	(User)	yes	00 h

Table 3.1 Parameter-setting data of the CM-DPV1

Byte 11+12: Scaling via CM-DPV1

16-bit and 32-bit speed references can also be transmitted in scaled form. The reference variable (scaling value) is entered in bytes 11 and 12.

The presetting via the GSD file for the scaling value (byte11+12) is 4000 h, as a result of which the PROFIBUS reference values (PZD2+3, see section 5.4.3) are transmitted “unscaled”.

The reference value transmitted to the drive units is calculated as follows:

$$\text{Reference (in drive unit)} = \frac{\text{PROFIBUS reference}}{4000\text{h}} \cdot \text{Scaling value}$$

➢ 100% PROFIBUS reference (PZD2+3) = 4000 h

➢ 16-bit reference is optimally resolved with value range ± 100 %

Use of scaling via CM-DPV1

Task:

- The reference value is to be preset as a percentage in the setting range ± 200 % (- 200 % = 8000 h ... + 200 % = 7FFF h).

Solution:

- The scaling value is set to the rated frequency of the motor.

Example:

- Motor with 50 Hz rated frequency, i.e. scaling value = 32 h. With a reference input of 12.5 % of the rated frequency the reference of 4000 h · 12.5% = 800 h is transferred over PROFIBUS.

$$\text{Reference (in drive unit)} = \frac{4000\text{h} \cdot 12.5\%}{4000\text{h}} \cdot 32\text{h}$$

$$\text{Reference (in drive unit)} = 6.25\ \text{Hz}$$

Result: The motor rotates at 6.25 Hz.

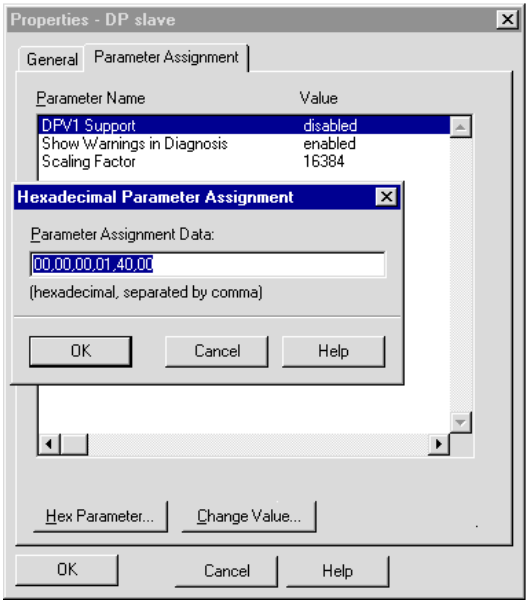


Figure 3.1 Configuration, CM-DPV1 parameter setting

To reach the window manually from Figure 3.1:

- Open the hardware configurator.
- Select the DP-Slave (see Figure 3.1 “(3) LUST CM-DPV1”).
- Open the pop-up menu using the reverse mouse button and click on “Object properties”.
- On the “Parameter Assignment” tab click on the “Hex Parameter ...” button.

4 Diagnostic data

The diagnosis is retrieved by the PROFIBUS Master and enables the control programmer to respond to errors and warnings in the drive controller or the CM-DPV1.

By way of the hardware configurators of the control manufacturers it is possible to display the online diagnosis of the drive.

In the Siemens controller the SFC 13 offers the facility to read out the diagnosis and continue processing in the program (see example project “testproj1” FC15).

Byte	Meaning	Standard definition	Example (Hex)	Description
0	Station status 1 (standard)	(DP standard)		1)
1	Station status 2 (standard)	(DP standard)	0C	1)
2	Station status 3 (standard)	(DP standard)		1)
3	Station address of DP master (standard)	(DP standard)	02	1)
4	Ident number (most significant byte)	(DP standard)	05 2)	Ident number of communication module LUST CM-DPV1
5	Ident number (least significant byte)	(DP standard)	64 2)	

1) Evaluated by the PROFIBUS Masters and available for reference in the PROFIBUS Master documentation.

2) Dependent on module

Table 4.1 Diagnostic data

Byte	Meaning	Standard definition	Example (Hex)	Description
6	Header of CM-DPV1 diagnosis	(DP standard)	0F	1)
7	DPV1 status Type (81 Hex, status message)	(DPV1)	81	1)
8	DPV1 slot (00 Hex)	(DPV1)	00	1)
9	DPV1 status Info (always 0)	(DPV1)	00	1)
10	Status of communication CM-DPV1<->drive controller	Manufacturer-specific	00	Communication is OK, see section 4.1
11	Drive controller detected by CM-DPV1		01	Drive controller is active (see appendix B.3 under “571-CLADR - CAN_{LUST} address”).
12	Parameterized process data (PZD) configuration		04	“PZD EasyDrive Basic” (see appendix B.4 under “492-CACNF - CAN configuration”)
13	vacant			
14	Error number	Manufacturer-specific	07	E-OTM (motor overheating), see section 7.4
15	Error location		01	see section 7.4
16,17	Warning word bit-coded = 120-WRN from drive controller		00,00	No warning active , see section 4.3 and 7.4
18,19	1st error word drive controller bit-coded		12,01	Bit 0,9,12 set (see section 4.2 “Bit-coded error word”)
20,21	2nd error word drive controller bit-coded (currently unused)		00	

1) Evaluated by the PROFIBUS Masters and available for reference in the PROFIBUS Master documentation.

2) Dependent on module

Table 4.1 Diagnostic data

4.1 Communication status

The communication status relates only to communication between the CM-DPV1 and the drive controller (byte 10 from the diagnostic data).

Bit	Function
7	Bus off Status
6	Error Warning Status
3..5	Reserved
0..2	"last error code" value => 0 No Error 1 Stuff Error 2 Form Error 3 Ack Error 4 Bit1 Error 5 Bit0 Error 6 CRC Error

Table 4.2 Status of communication between CM-DPV1 and drive unit

4.2 Bit-coded error word

The "bit-coded error word" is formed from the error number and the error location of the drive unit (bytes 18 and 19 from the diagnostic data).

Note: The "bit-coded error word" only works correctly on the basis of a fully planned and programmed plant system. The error word is responsible for errors which occur during the lifetime of the system, resulting in **user-friendly servicing for plant manufacturers**.

The errors in the drive unit which occur during programming and project planning can be rectified by reference to section 7.4.

Bit	Meaning	Error rectification
0	General error	General error, servo is in fault state
1	Call Service Center	If you have checked all the causes of error listed, carry out a mains reset. If this does not rectify the error: ascertain a) the error number, error number the error location number and c) the software version and contact your Service Center.
2	No ENPO	Set ENPO
3	Activation (controller, PLC program)	The activation of the PLC does not match the parameter setting of the controller. There may be an error in the PLC program.
4	Parameter setting (Para,Verf,Progr.)	Error in device parameter setting (active data set, parameter setting, positioning data, sequence program). Reset the device and its parameters.
5	Limit switches (hardware/software)	Check software and hardware limit switches
6	Check mains voltage	Check mains voltage
7	Controller overload	Reduce electrical overload of controller
8	Controller overheating	Reduce ambient temperature of controller
9	Reduce mechanical load, clear blockage	Reduce mechanical load, clear blockage
10	Error external	Rectify error in external device, check installation
11	Encoder / cable	Encoder or cable faulty, check installation
12	Motor / cable / wiring	Motor or cable faulty, check installation
13	Bus error / Module 1/2	Check bus/module supply voltage, check mounting, replace module
14	vacant	
15	vacant	

Table 4.3 Diagnosis error word CDA3000 (bytes 18,19)

4.3 Bit-coded warning messages

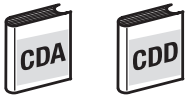
Bit-coded warning messages

Bit in data byte 16, 17	Hex value	Function
0	0001 h	Warning message when heat sink temperature has exceeded value in parameter 500-WLTI
1	0002 h	Warning message when interior temperature has exceeded value in parameter 501-WLTD
2	0004 h	Warning message when motor temperature has exceeded value in parameter 502-WLTM
3	0008 h	Warning message when DC-link voltage has exceeded value in parameter 504-WLOV
4	0010 h	Warning message when DC-link voltage has fallen below value in parameter 503-WLUV
5	0020 h	Warning message when output frequency has exceeded value in parameter 505-WLF
6	0040 h	Warning message when apparent current has exceeded value in parameter 506-WLIS
7	0080 h	Warning message when I^2*t integrator of device is active
8	0100 h	Warning message from slave when reference value from master is faulty in Master/Slave operation
9	0200 h	Warning message when Ixt integrator of motor is active
10 - 15		Reserved

Table 4.4 Warning messages (byte 16, 17; corresponds to status word: Warnings parameter 120-WRN in subject area _50WA)

Note: Several warning messages may be delivered at one time.

5 Process data PZD



5.1 Selection of process data word

The CDA3000 and CDD3000 drive controllers offer preset drive solutions to which the appropriate process data word is allocated in the following table (Control status communication).

Preset solution*	Appropriate process data word
CDA3000	
BUS_1: Field bus operation, control and reference via bus BUS_2: Field bus operation, manual mode with analog reference BUS_3: Field bus operation, manual mode with analog reference, limit switches	PZD EasyDrive Basic
CDD3000	
SCB_2: Speed control, +/-10V reference, control via field bus SCB_3: Speed control, fixed speeds, control via field bus SCB_4: Speed control, pulse input, control via field bus SCB_5: Speed control, reference and control via field bus	PZD EasyDrive Basic
PCB_2: Positioning, reference and control via field bus	EasyDrive DirectPos or EasyDrive DirectPos+
PCB_4: Positioning, fully programmable, control via field bus	EasyDrive ProgPos
PCB_3: Positioning, fixed positions, control via field bus	EasyDrive TablePos
PCB_1: Electronic gearing, control via field bus	EasyDrive SyncPos

*Selected by initial commissioning - see CDA3000 and CDD3000 Operation Manuals.

5.2 Process data, general

The PROFIBUS-DP logically subdivides its telegram into “identifiers”. An identifier stands for a virtual I/O module. It contains information on the data length (1..16 bytes or word) and consistency. The identifiers are defined offline with the configuration tool of the PROFIBUS Master.

PROFIBUS communication is only initiated when:

- at least one identifier (PKW.. or PZD...) is configured;
- PKW identifier (“PKW parameter data”) is configured only once;
- PZD identifier (e.g.: “PZD EasyDrive Basic”) is configured only once.

The **process data channel (PZD)** of the PROFIBUS protocol contains the functions: Control; Accept status; Reference input; and Display actual values.

The process data area may be configured differently, although “PZD EasyDrive Basic” is the simplest configuration for CDA3000/CDD3000 velocity mode (see section 5.3).

For the CDD3000 in positioning mode the “PZD EasyDrive DirectPos” setting is the simplest configuration.

Note: All data transfers are executed in Motorola format. Consistent data transfer must be ensured.
In the Simatic S7 from Siemens, PROFIBUS communication of PZD and PKW is only possible via SFC14&SFC15 with a data length of 4 words (EasyDrive DirectPos+ = 5 words).

5.3 EasyDrive Modes

Control and reference input in EasyDrive mode is the simplest way of operating the drive system via the PROFIBUS. The telegram structure is tailored to the operation mode selected in the drive system.

For the CDA3000 the preset process data object is “PZD EasyDrive Basic”.

For the CDD3000 “PCB_2 = Positioning, control and reference via field bus” mode the “PZD Easydrive DirectPos(+)” process data object is provided.

5.4 EasyDrive Basic

Control and reference input in EasyDrive mode is the simplest way of operating the drive system via the PROFIBUS. The telegram structure is tailored to the “preset solutions” selected in the drive system.

See section 5.1 “Selection of process data word”.

5.4.1 "PZD EasyDrive Basic" control word

PZD ProfiDrive x/x			
1-Control	2	3	4

Functions of the bits of the PZD1 control word:

Bit no.	Function	
0	1 = Start if ENPO set	
1	1 = Inverts the preceding sign of the reference value	
2	1 = Activate emergency stop	
3	1 = Trigger ext. error in device	
4	Bit 0	Binary selection of a table reference, where parameter RSSL1 = (8) FFTB on CDA where parameter RSSL1 = (7) RFIX on CDD/CTC
5	Bit 1	
6	Bit 2	
7	0->1 = Reset current device error	
8[1)]	0 = Characteristic data set 1, where parameter CDSSL = (6) OPTN2 1 = Characteristic data set 2, where parameter CDSSL = (6) OPTN2	
9[1)]	Bit 0	Binary selection of the active user data set, where parameter UDSSL = (4) OPTN2
10[1)]	Bit 1	
11	--	
12[2)]	1 = Output OSD03 is active, where parameter FOS01 =OPTN2	
13	1 = Output OSD02 is active, where parameter FOS02 =OPTN2	
14	1 = Output OSD01 is active, where parameter FOS01 =OPTN2	
15	1 = Output OSD00 is active, where parameter FOS00 =OPTN2	

[1)]Only CDA3000
[2)]Only CDD3000

Table 4.5 PZD1 control word

Note: Controller enable (**ENPO**): With control via PROFIBUS the **hardware enable** via the control terminal ENPO on the drive unit is required.
- (X2/8) on CDA3000
- (X2/7) on CDD3000

If the ENPO is inactive the motor runs down uncontrolled.

Note: Parameter 597-RFO = (0) OFF in the BUS_x application data sets. As a result, current is only applied to the motor at reference values > 0 Hz.
Important note: Before changing the content of parameter RF0, refer to the notes presented in the Application CDA3000 Application Manual: "_59DP-Driving profile generator".

5.4.2 "PZD EasyDrive Basic" status word

PZD EasyDrive Basic			
1-Status	2	3	4

The functions of the bits of the PZD1 status word are listed in the following table:

Bit no.	Function
0	1 = General error
1	1 = CAN status word: System Start
2	1 = Reference reached
3	1 = Reference limited by FMIN or FMAX
4	1 = Power stage active
5	1 = Speed 0
6	1 = Emergency stop active
7	1 = Ready to start
8	Status of input ENPO (hardware enable)
9	Status of output OSD00
10	Status of output OSD01
11[1)]	Status of input ISD04
12	Status of input ISD03
13	Status of input ISD02
14	Status of input ISD01
15	Status of input ISD00
[1)]Only CDD3000	

Table 4.6 PZD1 status word

5.4.3 "PZD EasyDrive Basic" reference

PZD EasyDrive Basic			
1	2-Refer-enceHigh	3-Refer-enceLow	4

The reference value is transmitted via the PZD2+3.

PZD2 reference High		PZD3 reference Low	
2^{15}... 2^{0}		2^{-1}... 2^{-16}	
High Word High Byte	High Word Low Byte	Low Word High Byte	Low Word Low Byte
Example:*			
00 h 0000 0000 b	32 h 0011 0010 b	C0 h 1100 000 b	00 h 0000 0000 b

Table 4.7 Reference

* Example: 0032,0003 h = 50,75 d

The reference is transferred on the CDA3000 to parameter 288-FOPT2 and ROPT2 on the CDD3000 in data format Int32Q16, i.e. the value range is from 32767,999 to +32768,999 (High Word = pre-decimal place, Low Word = post-decimal place).

The data formats used in the drive unit are listed in appendix A.2.

Note:

Parameter 597-RFO = (0) OFF in the BUS_x application data sets. As a result, current is only applied to the motor at reference values > 0 Hz.
Important note: Before changing the content of parameter RF0, refer to the notes presented in the Application CDA3000 Application Manual: "_59DP-Driving profile generator".

5.4.4 "PZD EasyDrive Basic" actual value

PZD EasyDrive Basic			
1	2-Actual High	3-Actual Low	4

The actual value is transmitted via the PZD2+3.

PZD2 actual value High		PZD3 actual value Low	
2^{15}... 2^{0}		2^{-1}... 2^{-16}	
High Word High Byte	High Word Low Byte	Low Word High Byte	Low Word Low Byte
Example:*			
00 h 0000 0000 b	32 h 0011 0010 b	80 h 1000 0000 b	00 h 0000 0000 b

Table 4.8 Actual

* Example: 0032,8000 h = 50,5 d

The data format of the actual value is Int32Q16, i.e. the value range is from 32767,999 to +32768,999 (High Word = pre-decimal place, Low Word = post-decimal place).

The data formats used in the drive unit are listed in appendix A.2.

5.5 EasyDrive DirectPos(+)

5.5.1 "PZD EasyDrive DirectPos(+)" startup sequence

PZD EasyDrive DirektPos(+)				
1	2	3	4	5

For the CDD3000 "PCB_2 = Positioning, control and reference via field bus" mode the "PZD Easydrive DirectPos(+)" process data object is provided.

The "PZD Easydrive DirectPos" and "PZD Easydrive DirectPos+" process data objects differ in that "DirectPos+" additionally has a PZD5. The PZD5 is responsible for transferring the maximum velocity value.

PLC-Control A/ Status E	PZD1 EasyDrive	PZD2 DirectPos	PZD3+4 Position	PZD5 Velocity*	Comment
E	0426h	0000h	Actual position		ENPO not yet set
E	X7A6h	0000h	Actual position		ENPO set
A	0001h	0000h			Start loop control
E	X7B6h	0000h	Actual position		Control enabled
Referencing					
E	X7B6h	0000h	Actual position		Control enabled
A	0001h	0200h			Start referencing
E	X392h	0400h	Actual position		Reference cam search
E	X7B6h	0100h	Actual position		Referencing completed
Execute driving job					
E	X7B6h	0100h	Actual position		Referencing completed
A	0001h	0100h	xxxx1000h		Driving profile generator and target position
E	X7B6h	0300h	Actual position		Driving profile generator enabled
A	0001h	0300h	xxxx1000h		Execute driving job
E	X392h	0700h	Actual position		Driving job in progress
E	X7B6h	0300h	Actual position (xxxx1000h)		Target position reached

* PZD EasyDrive DirectPos+ only

5.5.2 “PZD EasyDrive DirectPos(+)” control word

PZD EasyDriveDirektPos(+)				
1	2	3	4	5

Functions of the bits of the PZD1 and PZD2 control word:

Bit no.	Function PZD1 control word	Function PZD2 control word
0	1 = Start if ENPO set	-
1	-	-
2	1 = Activate emergency stop	-
3	1 = Trigger ext. error in device	-
4	-	-
5	-	-
6	-	-
7	0->1 = Reset current device error	-
8	-	0= Activate reference run generator and jog mode 1 = Enable driving profile generator
9	-	0->1 = Execute driving job** / Execute reference run
10	-	Driving job activation***
11	-	0 = Feed hold* active
12	1 = Output OSD03 is active, where parameter FOS03=OPTN2	0= Absolute positioning 1= Relative positioning
13	1 = Output OSD02 is active, where parameter FOS02=OPTN2	1= Activate velocity mode ****
14	1 = Output OSD01 is active, where parameter FOS01=OPTN2	1= Jog +
15	1 = Output OSD00 is active, where parameter FOS00=OPTN2	1= Jog -

Table 4.9 1.0 PZD1 and PZD2 control word

* Feed hold: Feed hold controls processing of the driving profile generator. When the feed hold bit is not set (PZD2 bit11=1), the current positioning command is interrupted, the drive brakes on the braking ramp down to a standstill.

** Execute driving job: With a Low-High edge at bit 9 the driving job is set valid. The timing of the execution is defined by bit 10, “Driving job activation”.

***Driving job activation: Bit 10 = 0 The current driving job is executed as soon as any possible older driving job has reached its target position. Bit 10 = 1 Driving job is executed immediately. The driving jobs still in progress are not completed.

****Velocity mode: The drive can be moved in an endless loop by way of a velocity mode. The velocity is transferred with parameter OISMX (for parameter transfer see section 6 “Parameter data PKW/DPV1”).

Note: Controller enable (ENPO): With control via PROFIBUS the hardware enable via the control terminal ENPO (X2/7) on the drive unit is required. If the ENPO is inactive the motor runs down uncontrolled.

5.5.3 "PZD EasyDrive DirectPos(+)" status word

The functions of the bits of the PZD1 and PZD2 status word are listed in the following table:

Bit no.	Function of PZD1 status word	PZD2 status word
0	1 = General error	-
1	Always =1	-
2	1 = Reference reached (position)	-
3	1 = Reference limit reached	-
4	1 = Power stage active	-
5	1 = Speed 0	-
6	1 = Emergency stop active	-
7	1 = Ready to start and control initialized	-
8	Status of input ENPO (hardware enable)	1= Reference point defined
9	Status of output OSD00	1 = Driving profile generator enabled
10	Status of output OSD01	1 = Driving job being executed
11	Status of input ISD04	-
12	Status of input ISD03	0 = Feed hold set
13	Status of input ISD02	-
14	Status of input ISD01	-
15	Status of input ISD00	1 = Lag distance active

Table 4.10 PZD1 and PZD2 status word

5.5.4 "PZD EasyDrive DirectPos(+)" reference

PZD EasyDriveDirektPos(+)				
1	2	3	4	5

The target input is transferred via the PZD3+4, with DirectPos+ the velocity reference is transferred via PDZ5.

PZD3 **Target High***		**PZD4** **Target Low***		**PZD5** **Reference velocity****	
2^{31}... 2^{17}		2^{16}... 2^{0}		2^{16}... 2^{0}	
High Word High Byte Example: *** 00 h 0000 0000 b	High Word Low Byte 32 h 0011 0010 b	Low Word High Byte C0 h 1100 000 b	Low Word Low Byte 00 h 0000 0000 b	High Byte 01 h 0000 001 b	Low Byte 00 h 0000 0000 b

Table 4.11 Reference

**PZD EasyDrive DirectPos+ only

* The reference values (target and velocity) are transferred in application units - see Application Manual section 4. The target in increments is set by the CDD3000 in parameter 561-OIREF. The maximum velocity in incr/ms is entered in parameter 562-OISMX.

***Example: A target of 0032C000h=3325952d is set with a maximum velocity of 0100h=256d.

5.5.5 "PZD EasyDrive DirectPos(+)" actual value

PZD EasyDriveDirektPos(+)				
1	2	3	4	5

The actual position is transferred via the PZD3+4, with DirectPos+ the actual velocity is transferred via PDZ5.

PZD3 **Actual position High***		**PZD4** **Actual position Low***		**PZD5** **Actual velocity****	
2^{31}... 2^{17}		2^{16}... 2^{0}		2^{16}... 2^{0}	
High Word High Byte Example: *** 00 h 0000 0000 b	High Word Low Byte 32 h 0011 0010 b	Low Word High Byte 80 h 1000 000 b	Low Word Low Byte 00 h 0000 0000 b	High Byte 01 h 0000 001 b	Low Byte 00 h 0000 0000 b

Table 4.12 Actual

**PZD EasyDrive DirectPos+ only

* The actual position and velocity are transferred in application units - see Application Manual section 4.

***Example: The drive is at the actual position 00328000h=3309568d moving at the velocity 0100h=256d.

5.6 PZD EasyDrive ProgPos

For the CDD3000 “PCB_2 = Positioning, fully programmable, control and reference via field bus” mode the “PZD Easydrive ProgPos” process data object is provided. In this mode a sequence program must be installed in the CDD3000 for positioning to be executed. See “CDD3000 Application Manual”

The controller's sequence program is started and stopped by way of the bus system.

5.6.1 “ProgPos” startup sequence

PZD Easy Drive ProgPos			
1	2	3	4

PLC Control A/ Status E	PZD1 EasyDrive	PZD2 ProgPos	PZD3	Comment
E	0422h	0000h	Actual position	ENPO not yet set
E	X7A2h	0000h	Actual position	ENPO set
A	0001h	0000h		Start loop control
E	X7B6h	0000h	Actual position	Control enabled
Referencing				
E	X7B6h	0000h	Actual position	Control enabled
A	0001h	0200h		Start referencing
E	X392h	0000h	Actual position	Reference cam search
E	X7B2h	0100h	Actual position	Referencing completed
Start sequence program				
E	X7B2h	0100h	Actual position	Referencing completed
A	0001h	0100h		Automatic
E	X7B2h	0300h	Actual position	Automatic set
A	0001h	0300h		Start sequence program
E	X7B2h	0700h	Actual position	Start sequence program set

5.6.2 "PZD EasyDrive ProgPos" control word

PZD EasyDrive ProgPos			
1	2	3	4

Functions of the bits of the PZD1 and PZD2 control word:

Bit no.	Function of PZD1 control word	PZD2 control word
0	1 = Start if ENPO set	1= POMER[90][1]=1
1	-	1= POMER[91] [1]=1
2	1 = Activate emergency stop	1= POMER[92] [1]=1
3	1 = Trigger ext. error in device	1= POMER[93] [1]=1
4	-	1= POMER[94] [1]=1
5	-	1= POMER[95] [1]=1
6	-	1= POMER[96] [1]=1
7	0->1 = Reset current device error	1= POMER[97] [1]=1
8	-	0= Activate manual mode* 1 = Enable automatic mode*
9	-	0->1 = Start sequence program** if bit 8 = 1 0->1= Execute reference run*** if bit 8 = 0
10	-	0 = Update**** set
11	-	0 = Feed hold***** set
12	1 = Output OSD03 is active, where parameter FOS03=OPTN2	-
13	1 = Output OSD02 is active, where parameter FOS02=OPTN2	-
14	1 = Output OSD01 is active, with parameter FOS01=OPTN2	1= Jog + ; where bit 0 = 0
15	1 = Output OSD00 is active, where parameter FOS00=OPTN2	1= Jog - ; where bit 0 = 0

Table 4.13 PZD1 and PZD2 control word

[1] POMER[xx]: Flag parameters in CDD3000. Used to transfer information into and out of the sequence program.

The following terms are described in more detail in the Application Manual, section 4.

* Manual mode / Automatic mode: In manual mode the control location of ProgPos is switched to the "Referencing and jog" manual mode functions. In automatic mode the control location is switched to ProgPos, so the axis can be moved by way of the sequence program. As soon as the sequence program** is started.

** Sequence program: The sequence program is stored on the controller and is started by way of a Low-High edge at PZD2 bit 9, if bit 8 =1 (automatic mode).

**** Referencing: The reference run is started by way of a Low-High edge at bit 9 PZD2, if bit 8 = 0 (manual mode).

**** Update: The update controls processing of the lines in the sequence program. If update is not set (PZD2 bit 10 = 1) the program sequence is aborted.

***** Feed hold: Feed hold controls processing of the driving profile generator. When the feed hold bit is not set (PZD2 bit11=1), the current positioning command is interrupted, the drive brakes on the braking ramp down to a standstill.

Note: Controller enable (**ENPO**): With control via PROFIBUS the **hardware enable** via the control terminal ENPO (X2/7) on the drive unit is required. If the ENPO is inactive the motor runs down uncontrolled.

5.6.3 "PZD EasyDrive ProgPos" status word

PZD EasyDrive ProgPos			
1	2	3	4

Functions of the bits of the PZD1 and PZD2 status word:

Bit no.	Function of PZD1 status word	PZD2 status word
0	1 = General error	1= POMER[80][1]=1
1	Always =1	1= POMER[81] [1]=1
2	1 = Reference reached (position)	1= POMER[82] [1]=1
3	1 = Reference limit reached	1= POMER[83] [1]=1
4	1 = Power stage active	1= POMER[84] [1]=1
5	1 = Speed 0	1= POMER[85] [1]=1
6	1 = Emergency stop active	1= POMER[86] [1]=1
7	1 = Ready to start and control initialized	1= POMER[87] [1]=1
8	Status of input ENPO (hardware enable)	Reference point is defined***
9	Status of output OSD00	0= Manual mode* active 1 = Automatic mode* active
10	Status of output OSD01	1 = Sequence program** active
11	Status of input ISD04	-
12	Status of input ISD03	0 = Feed hold***** set
13	Status of input ISD02	0 = Update**** set
14	Status of input ISD01	1= Synchronism (electronic gearing) activated
15	Status of input ISD00	1= Lag distance (PODMX)

Table 4.14 PZD1 and PZD2 status word

[1] POMER[xx]: Flag parameters in CDD3000. Used to transfer information into and out of the sequence program to the PLC.

The following terms are described in more detail in the Application Manual, section 4.

* Manual mode / Automatic mode: In manual mode the control location of ProgPos is switched to the “Referencing and jog” manual mode functions. In automatic mode the control location is switched to ProgPos, so the drive can be moved by way of the sequence program. As soon as the sequence program** is started.

** Sequence program: The sequence program is started in the controller when the PZD2 bit 10 is set.

*** Reference point defined: As soon as referencing is complete PZD2 bit 8 is set.

**** Update: The update controls processing of the lines in the sequence program. If update is not set (PZD2 bit 13 = 1) the program sequence is aborted.

***** Feed hold: Feed hold controls processing of the driving profile generator. When the feed hold bit is not set (PZD2 bit12=1), the current positioning command is interrupted, the drive brakes on the braking ramp down to a standstill.

5.6.4 Transfer ProgPos variable H98

PZD Easy Drive ProgPos			
1	2	3	4

Parameter POVAR[98](ProgPosVariable) is transferred via PZD3+4,

PZD3- POVAR[98] High		**PZD4- POVAR[98] Low**	
2^{31}... 2^{17}		2^{16}... 2^{0}	
High Word High Byte Example: *** 00 h 0000 0000 b	High Word Low Byte 32 h 0011 0010 b	Low Word High Byte C0 h 1100 000 b	Low Word Low Byte 00 h 0000 0000 b

Table 4.15 Transfer ProgPos variable H98

5.6.5 "PZD EasyDrive ProgPos" actual value

PZD EasyDrive ProgPos			
1	2	3	4

The actual value is transmitted via PZD3+4.

PZD3 actual position High*		**PZD4 actual position Low***	
2^{31}... 2^{17}		2^{16}... 2^{0}	
High Word High Byte Example: *** 00 h 0000 0000 b	High Word Low Byte 32 h 0011 0010 b	Low Word High Byte 80 h 1000 000 b	Low Word Low Byte 00 h 0000 0000 b

Table 4.16 Actual

* The actual position and velocity are transferred in application units - see Application Manual section 4.

***Example: The drive is at the actual position 00328000h=3309568d.

5.7 EasyDrive TablePos

5.7.1 “PZD EasyDrive TablePos” startup sequence

PZD EasyDriveTablePos			
1	2	3	4

The “PZD Easy Drive Table Pos” process data object is only intended for CDD3000.

PLC Control A/ Status E	PZD1 EasyDrive	PZD2 TablePos	PZD3+4 Position	Comment
E	0426h	0000h	Actual position	ENPO not yet set
E	X7A6h	0000h	Actual position	ENPO set
A	0001h	0000h		Start loop control
E	X7B6h	0000h	Actual position	Control enabled
Referencing				
E	X7B6h	0000h	Actual position	Control enabled
A	0001h	0200h		Start referencing
E	X392h	0400h	Actual position	Reference cam search
E	X7B6h	0100h	Actual position	Referencing completed
Execute driving job				
E	X7B6h	0100h	Actual position	Referencing completed
A	0001h	0101h		Driving profile generator and driving set 1 selected
E	X7B6h	0300h	Actual position	Driving profile generator enabled
A	0001h	0301h		Execute driving set 1
E	X392h	0701h	Actual position	Driving set 1 in progress
E	X7B6h	0301h	Actual position (driving set 1)	Target position reached

5.7.2 "PZD EasyDrive TablePos" control word

PZD Easy Drive TablePos			
1	2	3	4

Functions of the bits of the PZD1 and PZD2 control word:

Bit no.	Function of PZD1 control word	PZD2 control word
0	1 = Start if ENPO set	Table index 0
1	-	Table index 1
2	1 = Activate emergency stop	Table index 2
3	1 = Trigger ext. error in device	Table index 3
4	-	Table index 4
5	-	-
6	-	-
7	0->1 = Reset current device error	-
8	-	0= Activate reference run generator and jog mode 1 = Enable driving profile generator
9	-	0->1 = Execute driving job** / Execute reference run
10	-	Driving job activation***
11	-	0 = Feed hold* active
12	1 = Output OSD03 is active, where parameter FOS03=OPTN2	-
13	1 = Output OSD02 is active, where parameter FOS02=OPTN2	-
14	1 = Output OSD01 is active, with parameter FOS01=OPTN2	1= Jog +
15	1 = Output OSD00 is active, where parameter FOS00=OPTN2	1= Jog -

Table 4.17 PZD1 and PZD2 control word

* Feed hold: Feed hold controls processing of the driving profile generator. When the feed hold bit is not set (PZD2 bit11=1), the current positioning command is interrupted, the drive brakes on the braking ramp down to a standstill.

**)Execute driving job: With a Low-High edge at bit 9 the driving job is set valid. The timing of its execution is defined by bit 10, "Driving job activation".

***) Driving job activation Bit 10 = 0 The current driving job is executed as soon as any possible older driving job has reached its target position. Bit 10 = 1 Driving job is executed immediately. The driving jobs still in progress are not completed.

Note: Controller enable (**ENPO**): With control via PROFIBUS the **hardware enable** via the control terminal ENPO (X2/7) on the drive unit is required. If the ENPO is inactive the motor runs down uncontrolled.

5.7.3 "PZD EasyDrive TablePos" status word

PZD EasyDriveTablePos			
1	2	3	4

The functions of the bits of the PZD1 and PZD2 status word are listed in the following table:

Bit no.	Function of PZD1 status word	PZD2 status word
0	1 = General error	Current table index 0
1	Always =1	Current table index 1
2	1 = Reference reached (position)	Current table index 2
3	1 = Reference limit reached	Current table index 3
4	1 = Power stage active	Current table index 4
5	1 = Speed 0	-
6	1 = Emergency stop active	-
7	1 = Ready to start and control initialized	-
8	Status of input ENPO (hardware enable)	1= Reference point defined
9	Status of output OSD00	1 = Driving profile generator enabled
10	Status of output OSD01	1 = Driving job being executed
11	Status of input ISD04	-
12	Status of input ISD03	0 = Feed hold set
13	Status of input ISD02	-
14	Status of input ISD01	-
15	Status of input ISD00	1 = Lag distance active

Table 4.18 PZD1 and PZD2 status word

5.7.4 "PZD EasyDrive TablePos" actual value

PZD TablePos			
1	2	3	4

The actual value is transmitted via PZD3+4.

PZD3 actual position High*		PZD4 actual position Low*	
2^{31}... 2^{17}		2^{16}... 2^{0}	
High Word High Byte	High Word Low Byte	Low Word High Byte	Low Word Low Byte
Example: *** 00 h 0000 0000 b	32 h 0011 0010 b	80 h 1000 000 b	00 h 0000 0000 b

Table 4.19 Actual

* The actual position is transferred in applications units - see Application Manual.
***Example: The drive is at the actual position 00328000h=3309568d.

5.8 EasyDriveSyncPos

The “PZD EasyDriveSyncPos” process data object is only intended for CDD3000. The following description of the EasyDrive SyncPos is provisional, as the “preset solution” was not implemented at the time of going to press.

5.8.1 “PZD EasyDrive SyncPos” startup sequence

PZD EasyDrive SyncPos			
1	2	3	4

PLC Control A/ Status E	PZD1 EasyDrive	PZD2 SyncPos	PZD3+4 Position	Comment
E	0422h	0000h	Actual position	ENPO not yet set
E	X7A2h	0000h	Actual position	ENPO set
A	0001h	0000h		Start loop control
E	X7B2h	0000h	Actual position	Control enabled
Referencing				
E	X7B6h	0000h	Actual position	Control enabled
A	0001h	0200h		Start referencing
E	X392h	0400h	Actual position	Reference cam search
E	X7B6h	0100h	Actual position	Referencing completed
Execute driving job				
E	X7B6h	0100h	Actual position	Referencing completed
A	0001h	0100h		Enable synchronism
E	X7B6h	0300h	Actual position	Synchronism enabled
A	0001h	0300h		Engage drive
E	X392h	0700h	Actual position	Drive engaged

5.8.2 "PZD EasyDrive SyncPos" control word

PZD EasyDrive SyncPos			
1	2	3	4

Functions of the bits of the PZD1 and PZD2 control word:

Bit no.	PZD1 control word	PZD2 control word
0	1 = Start if ENPO set	
1	Always =1	-
2	1 = Activate emergency stop	-
3	1 = Trigger ext. error in device	-
4	-	-
5	-	-
6	-	-
7	0->1 = Reset current device error	-
8	-	0 = Reference run generator and jog Activate 1 = Enable synchronism
9	-	1 = Engage if bit 8=1
		1 = Execute reference run if bit 8 = 0
10	-	-
11	-	-
12	1 = Output OSD03 is active, where parameter FOS03=OPTN2	Register offset +*
13	1 = Output OSD02 is active, where parameter FOS02=OPTN2	Register offset -*
14	1 = Output OSD01 is active, with parameter FOS01=OPTN2	1 = Jog+ if bit 8 = 0
15	1 = Output OSD00 is active, where parameter FOS00=OPTN2	1 = Jog- if bit 8 = 0

Table 4.20 PZD1 and PZD2 control word

* For a more detailed description of the register offset function refer to the Application Manual, section 4.

Note: Controller enable (**ENPO**): With control via PROFIBUS the **hardware enable** via the control terminal ENPO (X2/7) on the drive unit is required. If the ENPO is inactive the motor runs down uncontrolled.

5.8.3 "PZD EasyDrive SyncPos" status word

PZD EasyDrive SyncPos			
1	2	3	4

The functions of the bits of the PZD1 and PZD2 status word are listed in the following table:

Bit no.	PZD1 status word	PZD2 status word
0	1 = General error	-
1	Always =1	-
2	1 = Reference reached	-
3	1 = Reference limit reached	-
4	1 = Power stage active	-
5	1 = Speed 0	-
6	1 = Emergency stop active	-
7	1 = Ready to start and control initialized	-
8	Status of input ENPO (hardware enable)	1= Reference point defined*
9	Status of output OSD00	1 = Synchronism enabled
10	Status of output OSD01	1 = Drive engaged
11	Status of input ISD04	-
12	Status of input ISD03	-
13	Status of input ISD02	-
14	Status of input ISD01	-
15	Status of input ISD00	1 = Lag distance active

Table 4.21 PZD1 and PZD2 status word

*Reference point defined: As soon as referencing is complete PZD2 bit 8 is set.

5.8.4 “PZD EasyDrive SyncPos” actual value

PZD EasyDrive SyncPos			
1	2	3	4

The actual value is transmitted via PZD3+4.

PZD3- **Actual position High***		**PZD4-** **Actual position Low***	
2^{31}... 2^{17}		2^{16}... 2^{0}	
High Word High Byte Example: *** 00 h 0000 0000 b	High Word Low Byte 32 h 0011 0010 b	Low Word High Byte 80 h 1000 000 b	Low Word Low Byte 00 h 0000 0000 b

Table 4.22 Actual

* For more information on transferring the actual position refer to the Application Manual.

***Example: The drive is at the actual position 00328000h=3309568d.

5.9 ProfiDrive Mode

In the case of “PZD ProfiDrive x/x” the content of the protocol is based on the ProfiDrive profile and so the PLC program is usable across-the-board for all drive manufacturers who support ProfiDrive.

The ProfiDrive profile specifies a state machine for activation of the drive units. This state machine is worked through by the internal state machine of the drive unit.

The positioning modes of the CDD3000 are only supported in the EasyDrive Mode, see section 5.3 “EasyDrive Modes”.

5.9.1 State machine ProfiDrive

PZD ProfiDrive x/x			
1	2	3	4

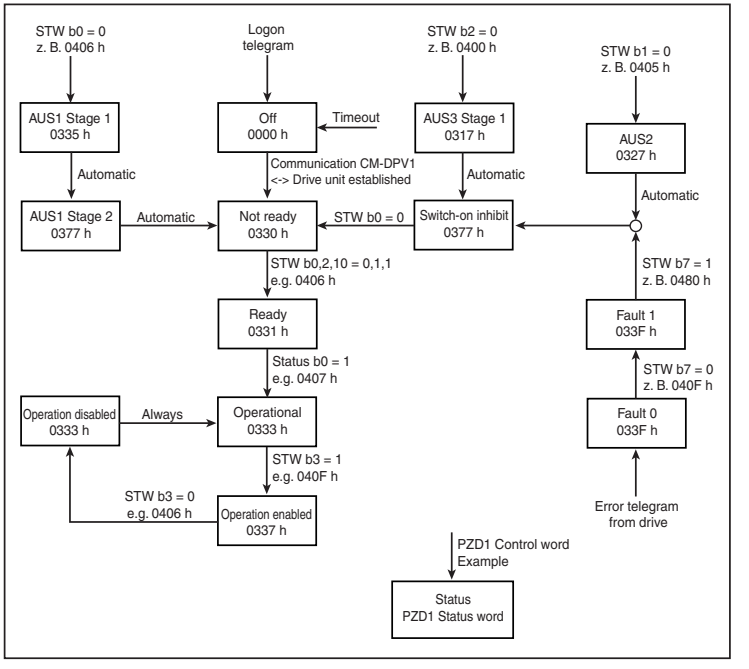


Figure 5.1 ProfiDrive state machine

Control word (Hex)	Status word appearing (Hex)	State reached	Comments
0400	0317	Switch-on inhibit	after power-on
0406	0331	Ready for power-up	
0407	0333	Ready to start	
040F	0337	Operation enabled	Reference can be input

Table 4.23 Example sequence, ProfiDrive state machine

5.9.2 "PZD ProfiDrive x/x" control word

PZD ProfiDrive x/x			
1-Control	2	3	4

The functions of the bits of the PZD1 control word are listed in the following table:

Bit	Function	
	= 1	= 0
0	ON	OFF 1
1	Operating condition	OFF 2
2	Operating condition	OFF 3
3	Enable operation	Disable operation
4	--	--
5	--	--
6	--	--
7	Acknowledge error	No Meaning
8	--	--
9	--	--
10	Control of automation unit (must be set for open-loop control)	No control
11-15	--	--

Table 4.24 PZD1 control word

Note: **Bit 10** must be set to permit the control to be passed to the PLC and the control word to be passed on to the drive unit.

Note: Controller enable (**ENPO**): With control via PROFIBUS the **hardware enable** via the control terminal ENPO (X2/8) on the CDA3000 is required. This control signal is high-active. When this control signal is removed the motor runs out freely. Refer also to the description in the CDA3000 Application Manual.

Note: Parameter 597-RFO = (0) OFF in the BUS_x application data sets. As a result, current is only applied to the motor at reference values > 0 Hz.
Important note: Before changing the content of parameter RF0, refer to the notes presented in the Application CDA3000 Application Manual: "_59DP-Driving profile generator".

5.9.3 “PZD ProfiDrive x/x” status word

PZD ProfiDrive x/x			
1-Status	2	3	4

The functions of the bits of the PZD1 status word are listed in the following table:

Bit	Function
0	1 = Ready to start
1	1 = Ready to start
2	1 = Operation enabled
3	1 = Fault
4	1 = No OFF 2
5	1 = No OFF 3
6	1 = Switch-on inhibit
7	--
8	--
9	1 = Control required
10	--
11-15	--

Table 4.25 PZD1 status word

5.9.4 "PZD ProfiDrive x/ x" reference

PZD ProfiDrive x/x			
1	2-ReferenceHigh	3-ReferenceLow	4

The reference is transmitted via the PZD2+3, in speed controlled mode (SFC and FOR) directly in revolutions on the motor shaft.

	PZD2 reference High	PZD3 reference Low
	2^{15}... 2^{0}	2^{-1}... 2^{-16}
ProfiDrive 16/16	16-bit reference frequency (Int16Q0)	Not used
ProfiDrive 32/32	32-bit reference frequency (Int32Q16)	
ProfiDrive 32/2x16	32-bit reference frequency (Int32Q16)	

Table 4.26 Reference transfer via PZD2+3

Note: The data formats used in the drive unit are listed in appendix A.2.

5.9.5 "PZD ProfiDrive x/ x" actual value

PZD ProfiDrive x/x			
1	2-Actual High	3-Actual Low	4

The actual value* is transmitted via the PZD2+3.

	PZD2 actual value High	PZD3 actual value Low
ProfiDrive 16/16	2^{15}... 2^{0} 16-bit actual frequency (Int16Q0)*	Not used
ProfiDrive 32/32	2^{15}... 2^{0} 2^{-1}... 2^{-16} 32-bit actual frequency (Int32Q16)*	
ProfiDrive 32/2x16	2^{15}... 2^{0} 16-bit actual frequency (Int16Q0)*	2^{15}... 2^{0} 16-bit actual torque (Int16Q0)**

Table 4.27 Actual value via PZD2+3

* In speed controlled mode (SFC and FOR) directly in revolutions on the motor shaft

** Only in controlled mode

Note: The data formats used in the drive unit are listed in appendix A.2.

6 Parameter data PKW/DPV1

6.1 Introduction, parameter data PKW/DPV1

The parameter channel PKW (not to be confused with parameter setting of the CM-DPV1) is used to transfer parameters into the drive unit and to read parameters from the drive unit. A parameter job is always cyclical, and the process data too are transferred cyclically.

The DPV1 data block transfer is an acyclic data transfer of parameter values, and is described in section 6.3.

Note: All data are transferred in Motorola format. Consistent data transfer must be ensured.
In the Simatic S7 from Siemens, PROFIBUS communication of PZD and PKW is only possible via SFC14&SFC15 with a data length of 4 words (EasyDrive DirectPos+ = 5 words).

If in the hardware configurator of the control “PKW parameter data” is selected for parameter transfer, parameters in the controller can be polled and written in parallel with the open-loop control functionality.

Note: Some parameters of the drive unit are only initialized after the drive is restarted; see Application Manual of drive unit.

6.2 Job ID for control of parameter transfer

PKW Parameter data					
	1			2	3	4-Value Low
AK	SPM	PNU			Error no.

In the job ID the mode of parameter transfer is entered (request, write, error in transmission etc. ...).

The value of the job ID is dependent on the transfer direction (PROFIBUS Master <=> CM-DPV1):

PKW1 (bits 15-12)- AK = Job ID					
Job: PROFIBUS Master =>CM-DPV1		Reply: CM-DPV1 => PROFIBUS Master			
Job value		Positive (successful)		Negative (not successful)	
0	No job	0	No reply	7	Job not executable (error number see Table 5.2)
6	Read parameter	5	Parameter is read		
8	Write parameter	5	Parameter transferred	8	No operator control priority for PKW interface (cause: no drive unit connected to CM-DPV1)

Table 5.1 Job and reply IDs

If the parameter access is faulty, reply ID 7 is signaled. The error number is displayed in PKW4.

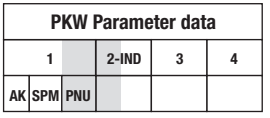
Value	Description
0	Impermissible parameter numbers
1	Parameter value not changeable
2	Upper or lower limit value infringed
3	Faulty parameter number index
18	Unknown job ID
19	Value not readable

Table 5.2 PKW4 error numbers in reply ID = 7

Note: The spontaneous message SPM (bit 11) is not supported.

6.2.1 Parameter number index

A parameter is selected by its parameter number and the index. The parameter numbers from 1 to 999 are reserved for the drive controller (see Application Manual). The parameters with numbers greater than 1000 are parameters of the CM-DPV1; see Table 5.4.



PKW1 (bit 10-0)-Parameter number		PKW2 (bit 8-15) index
High Bits	Low Byte	Index for field parameter transfer (byte)

Table 5.3 Parameter number index

The parameter transfer is executed as a field parameter transfer. Consequently, for parameters with only one field (al standard parameters) index = 0 must be set.

.

Parameter no.	Value range	Data format	Default values	Explanation	Parameter setting
1000	2	U16	2 = 500 KBaud	Baud rate of communication between CM-DPV1 and drive unit	Read-only
1001	0-4000h	U16	4000h	Scaling value (byte 11 + 12 of parameter-setting data, see Chapter 3)	Writable
1002	0,1	U16	1	Warning message active (byte 10 of parameter-setting data, see Chapter 3)	Writable
1003	0-126	U16	See Installation section 2.2	PROFIBUS address of CM-DPV1	Read-only

Table 5.4 Parameters of the CM-DPV1

6.2.2 Parameter value

The parameter values are transferred in the parameter data PKW3 and PKW4.

The parameter value is always returned with the correct preceding sign as a 32-bit variable, regardless of the parameter data format.

PKW Parameter data					
1			2	3-Value High	4-Value Low
AK	SPM	PNU			

Typical parameter Data formats	PKW3 parameter value High Word	PKW4 parameter value Low Word
USIGN8/INT8 USIGN16/INT16 USIGN32/INT32	2^{31}... 2^{16}	2^{15}... 2^{0}
INT32Q16	2^{15}... 2^{0}	2^{-1}... 2^{16}
FIXPOINT16	00 h	2^{15}... 2^{0} x 0.05
FLOAT32	IEEE format	
ERR_STRUC	Operating hours	Error location / error number

Table 5.5 Typical parameter data formats

All data formats used in the drive unit are listed in appendix A.2.

6.3 Parameter data transfer in DPV1 data blocks

This section was not available at the time of going to press.

7 Error rectification

7.1 Fault response

In the event of an error in the CM-DPV1, all drive units are set to emergency stop (precondition: communication between CM-DPV1 and drive unit is operational).

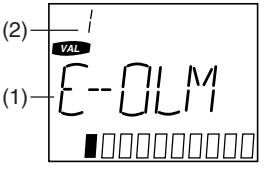
Errors in the bus system and errors originating from the drive unit are delivered to the PROFIBUS Master by means of the error numbers and locations via the diagnostic message from the slave (see section 4).

If the bus system is not correctly configured, the error is signaled as a flash code on LEDs H4 and H5 (see section 7.3).

Note: Faults involving causes other than the bus system (e.g.: PLC program, drive unit) must be rectified using the Application Manual:

Notes on error handling in the drive unit

Error location: In the KEYPAD the error (1) and - to localize the error - the error location (2) are shown at the top left of the display. In the DRIVEMANAGER in case of error a window appears showing the possible cause of the error and a remedy.



Error memory: The last four error messages are stored in the device in parameters 95-ERR1 to 98-ERR4.

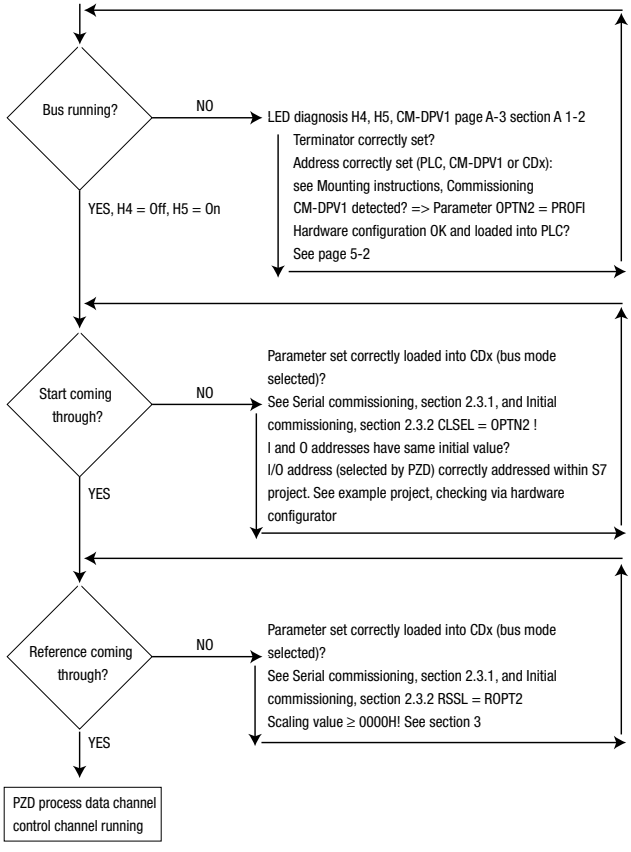
The error message **E-OFF** (power failure) is only entered in the error memory in the event of brief power failures (the device does not shut down completely before the power is restored).

Warning message: If the parameter setting for response to an error is a warning message (WRN), the device indicates the warning by way of an appropriately parameterized digital output (e.g.: 242-FOS02 = WARN). No other device response occurs. Safety-related errors cannot be set as warnings in the parameters.

The “Warning” error response (0) must not be confused with the parameterizable warning messages shown in parameter 120-WARN.

7.2 Service strategy – drive not running

This flowchart serves to reveal and eliminate fundamental faults in communication.



7.3 LED status display on the CM-DPV1

Red LED H4	Green LED H5	CM-DPV1 status
❍	❍	24V supply to drive unit missing or drive unit is off. 24V supply to CM-DPV1 missing.
❍	●	Started and communicating without error
●	☸1	PROFIBUS address of CM-DPV1 is less than 1 or greater than 126. This error message is generated, for example, when 'address 0' is set both in the CDA (PBADR=0) and on the rotary switches (see also section 2).
●	☸2	No communication between CM-DPV1 and drive unit possible, PROFIBUS communication is restarted as a result[1)].
●	☸3	No PROFIBUS communication possible with PROFIBUS Master. There is communication with the drive unit. The PROFIBUS cable may be faulty or not plugged in, or the hardware configuration may be faulty (see section 2.4) or an incorrect GSD file is being used (correct: LUST0564). PROFIBUS communication is only initiated when at least one identifier (PKW.. or PZD...) has been configured. The PKW identifier (“PKW parameter data”) may be configured only once. The PZD identifier (e.g.: “PZD EasyDrive Basic”) may be configured only once.
●	☸4	Collective error message from H5 = ☸2 + ☸3
●	❍	Internal error in communication module
●	●	

Key: ❍ LED off ● LED on ☸n LED flashing n times

Table 7.1 LED status display on CM-DPV1

1) PROFIBUS communication continues if communication between the CM-DPV1 and the drive unit was running previously.

7.4 Bus error message of CDA3000

Faults in the drive unit are signaled by way of the fault bit of the status word. The CM-DPV1 then sets the diagnosis request bit. Errors originating from the drive unit are delivered to the PROFIBUS Master by means of the error numbers and locations via the diagnostic message from the slave (see section 4).

Errors connected with the CM-DPV1

Bus	DM/KP	Error location no.	Error cause	Possible remedy	Response no.
16	E-OP2	170	Error in module at option slot 2	Check module and identifier	STOP *
		171	Error at option slot 2: BUS-OFF state detected.	Check contacting of module. If the error still occurs after switching off and back on again, the device or the module is faulty. The error may also be caused by an external PROFIBUS.	
		172	Error at option slot 2: Transmit protocol could not be sent.	Check contacting of module. If the error still occurs after switching off and back on again, the device or the module is faulty. Check supply voltage (24V) to CM-DPV1.	
		173	Error at option slot 2: Module not responding.	Check contacting of module. If the error still occurs after switching off and back on again, the device or the module is faulty. PROFIBUS address = 0 or >126.	

* The error response is programmable (see Application Manual). The factory set default response is STOP, i.e. disable power stage.

Table 7.2 CDA3000 errors

7.5 Acknowledgment of error messages

- “PZD EasyDrive”: by setting the ERROR_RESET bit in the control word (bit 7 = 1 Low-High edge);
- ProfiDrive X/X control word: by change of state: “Acknowledge error rectified” (bit 7 = 1 Low-High edge);
- via the KEYPAD200 (see KEYPAD200 instructions);
- via control terminals (only with appropriate parameter setting - see CDA3000 Application Manual, section “_21ID-Digital inputs”);
- via the hardware enable ENPO: by resetting the ENPO signal or
- by switching the supply voltage off and back on.
- by writing the value 1 to parameter 74-ERES by way of the control unit or bus. The entry is automatically deleted.

Following an error reset the state machine of the device (EasyDrive or DriveCom) resumes the same state as after power-up. That means the control must be restarted.

7.6 Overview of all CDA3000 error messages

Error no.	Error	Description
1	E-CPU	Hardware or software error
2	OFF	Power failure
3	E-OC	Current overload shut-off
4	E-OV	Voltage overload shut-off
5	E-OLI	IxIxt shut-off
6	E-OLM	Ixt shut-off
7	E-OTM	Motor overheating
8	E-OTI	Drive unit overheating
9	E-PLS	Plausibility error in parameter or program sequence
10	E-PAR	Faulty parameter setting
11	E-FLT	Floating point error
12	E-PWR	Power pack not recognized
13	E-EXT	External error message (input)
14	E-USR	Reserved for modified software
15	E-OP1	Error in module in option slot 1
16	E-OP2	Error in module in option slot 2
17	-	-
18	E-SIO	Error in serial interface
19	E-EEP	Faulty EEPROM
20	E-WBK	Wire break
21	E-SC	Auto-tuning
22	E-PF	PowerFail
23	E-RM	InitRunMode
24	E-FDG	Transmission error in reference coupling
25	E-LSW	Limit switches reversed
26	E-OL5	Ixt shut-off below 5 Hz to protect power stage

Table 7.3 Error message in the CDA3000

7.7 Overview of all CDD3000 error messages

Error no.	Error	Description
1	E-CPU	Hardware or software error
2	OFF	Power failure
3	E-OC	Current overload shut-off
4	E-OV	Voltage overload shut-off
5	E-OLI	Ixlxt shut-off
6	E-OLM	Ixt shut-off
7	E-OTM	Motor overheating
8	E-OTI	Drive unit overheating
9	E-PLS	Plausibility error in parameter or program sequence
10	E-PAR	Faulty parameter setting
11	E-FLT	Floating point error
12	E-PWR	Power pack not recognized
13	E-EXT	External error message (input)
14	E-USR	Reserved for modified software
15	E-OP1	Error in module in option slot 1
16	E-OP2	Error in module in option slot 2
17	-	-
18	E-SIO	Error in serial interface
19	E-EEP	Faulty EEPROM
20	E-WBK	-
21	E-SC	-
22	E-PF	-
23	E-RM	-
24	E-FDG	-
25	E-LSW	D-HWE/limit switches interchanged
26	E-OL5	
30	E-ENC	Error in encoder monitoring
31	E-TIM	Runtime monitoring
32	E-FLW	Tracking error
33	E-WDG	Watchdog RS232
34	E-VEC	Internal memory error
35	EBRK	Error at output OSD03: 1.Wire break 2. Short 3. Overload

Table 7.4 CDD3000 error messages

Error no.	Error	Description
36	E-POS	210: Positive hardware limit switch approached 211: Negative hardware limit switch approached 212: Positive software limit switch approached 213: Negative software limit switch approached 214: Reference point not defined 215: Error accessing optional hardware Possible remedies: If this error recurs, please contact your Service Partner.
		216: Selected program not available 217: Jump to non-existent record number 218: Called subroutine not available 219: Target position outside positioning range 220: Division by zero
		221: Max. subroutine nesting depth exceeded 222: Timeout in manual mode 223: Target position not reached 224: No feed hold 225: Selection (Automatic/Referencing/Jog mode) not permitted, control location conflict
		226: Index overflow (indexed addressing) 230: Max. servo speed exceeded 232: No controller enable (ENPO)
		233: Error in parameter access of position and sequence control Possible remedies: If this error recurs, please contact your Service Partner. 234: Error processing a Touchprobe positioning command 235: Impermissible command during axle movement 236: Hardware limit switches interchanged
37	E-FLH	Error in flash memory
38	E-HW	Hardware limit switch approached
39	E-HWE	Hardware limit switches interchanged
40	E-WRN	The preset maximum torque (parameter TCMMX) is greater than the maximum torque attainable with the motor or the device

Table 7.4 CDD3000 error messages

Note: For a detailed list of all error messages together with remedial measures refer to the Application Manual.

Appendix A

A.1 Special features of the CM-DPV1

To be able to control the drive unit via the PROFIBUS-DP and input reference values, one of the preset solutions must be activated.

A.1.1 Presettings for control and reference input

As a result the process data channel (e.g. PZD EasyDrive Basic) in the drive unit is activated.

Preset solution*	Appropriate process data word
CDA3000	
BUS_1: Field bus operation, control and reference via bus BUS_2: Field bus operation, manual mode with analog reference BUS_3: Field bus operation, manual mode with analog reference, limit switches	PZD EasyDrive Basic
CDD3000	
SCB_2: Speed control, +/-10V reference, control via field bus SCB_3: Speed control, fixed speeds, control via field bus SCB_4: Speed control, pulse input, control via field bus SCB_5: Speed control, reference and control via field bus	PZD EasyDrive Basic
PCB_2: Positioning, reference and control via field bus	EasyDrive DirectPos or EasyDrive Direct-Pos+
PCB_4: Positioning, fully programmable, control via field bus	EasyDrive PosMod
PCB_3: Positioning, fixed positions, control via field bus	EasyDrive TablePos
PCB_1: Electronic gearing, control via field bus	EasyDrive SyncPos

*Selected by initial commissioning - see CDA3000 + CDD3000 Operation Manuals

Variation of control location:

The control location indicates the control source from which the drive is started and stopped. With parameter 260-CLSEL (e.g. for Bus_x: CLSEL = OPT2) the control location is defined. The possible control locations are set out in the appendix B.4.

Variation of reference:

The reference source is defined by way of parameter 281-RSSL1 (e.g. for Bus_x: RSSL1 = OPT2). The possible reference sources are set out in the appendix B.4.

Note: The parameters of the drive unit are set by default such that the drive unit can be activated via terminals and the reference values can be entered via the analog inputs (application data set DRV_1, on CDA3000). Be sure to select one of the preset solutions for bus operation in order to control and input references via the PROFIBUS-DP.

A.1.2 CM-DPV1 startup

The CM-DPV1 is started up in four steps:

1. When the CM-DPV1 is supplied with power it enters the following state:

Red LED H4	Green LED H5	CM-DPV1 status
●	☸2	No communication possible between CM-DPV1 and drive unit, PROFIBUS communication is stopped as a result.

2. When the drive unit has been switched on and the CM-DPV1 installed and supplied with power, the drive unit automatically detects the communication module (OPTN2) plugged into the communication slot. A communication link is established between the drive unit and the CM-DPV1.

Red LED H4	Green LED H5	CM-DPV1 status
●	☸3	No PROFIBUS communication with PROFIBUS Master possible; communication with drive unit OK.

3. When communication has been successfully established between the drive unit and the CM-DPV1, PROFIBUS communication with the PROFIBUS Master is activated. The configuration of the CM-DPV1 is imported from the PROFIBUS Master. If the configuration is successful, the CM-DPV1 status is:

Red LED H4	Green LED H5	CM-DPV1 status
❍	●	Started and communicating without error
Key: ❍ LED off ● LED on ☸n LED flashing n times		

4. Depending on the hardware configuration selected in the PROFIBUS Master (e.g. “PZD EasyDrive Basic”), parameter 492 -CACNF of the drive unit is set; see appendix B.4.

Then the PROFIBUS system has started up and can be used by the PLC.

Note: After a failure of the external 24V supply, the PROFIBUS system automatically starts up as soon as the 24 V is restored. It is not necessary to reset the drive unit by switching off and back on.

A.1.3 Automatic interventions of the CM-DPV1 in parameter setting

After bus system power-up parameter 574-CAWDG is set by the CM-DPV1 to 250 ms and thereby activated. This watchdog relates only to communication between the drive unit and the CM-DPV1.

Depending on the hardware configuration selected in the PROFIBUS Master (e.g. “PZD EasyDrive Basic”), parameter 492-CACNF = (4) on the drive unit is set; see appendix B.4.

A.2 Parameter data formats

The drive units support the following parameter data formats:

Data type	Value range	Function
USIGN8	0 ... 255	unsigned
USIGN16	0 ... 65535	
USIGN32	0 ... 4294967295	
INT8	-128 ... 127	Integer, signed
INT16	-32768 ... 32767	
INT32	-2147483648 ... 2147483647	
INT32Q16	-32767,99 ... 32766,99	32-bit number with scaling 1/65536, i.e. the Low word indicates the number of decimal places.
FIXPOINT16	0,00 ... 3276,80	Fixed point number with scaling 1/20, i.e. increment size 0.05
FLOAT32	see IEEE	32-bit floating point number in IEEE format
ERR_STRUC	–	Error number (1 byte), error location (1 byte), error time (2 bytes)
STRING	–	ASCII characters, max. 100 bytes in bus operation incl. zero terminator, only accessible over the acyclic channel (DPV1, see section 6.3)

Table A.1 Data types

A.2.1 Structure of data types

All data types are represented appropriate to their preceding sign as 32-bit variables in **Motorola format**.

Byte	1	2	3	4
USIGN8/INT8 * USIGN16/INT16 * USIGN32/INT32	High Word High Byte	High Word Low Byte	Low Word High Byte	Low Word Low Byte
INT32Q16	Pre-point H	Pre-point L	Post-point H	Post-point L
FIXPOINT16 *	See examples, Table A.3			
FLOAT32	IEEE format			
ERR_STRUC	TOP H	TOP L	Error location	Error no.

* Filled out appropriate to preceding sign (00 h or FF h)
TOP = Time of Operation in full hours

Table A.2 Arrangement of data types in the data field

Examples:

Data type	Example	HH 1	HL 2	LH 3	LL 4
INT32Q16	10.5 Dec	00 0A h (10 Dec)		80 00 h (0.5 Dec)	
FIXPOINT16	10.05 Dec [* 20 = 201 FIXPOINT16]	00 00 00 C9 h (201)			
ERR_STRUC	E-OP2 with error location 172 with 85 operating hours	00 55 h (85 hours TOP)		10 h (16 Dec = E-OP2)	AC h (172 Dec)

Table A.3 Examples of structure of data types

A.3 Example project: “testproj”

The example project is located on the CD-ROM supplied with the package with the order designation “CM-DPV1 + GSD”. The “testproj” example project is designed for the Siemens CPU 315-DP.

Modules of the S7 used

FC15	Send flag word of VAT15 to PROFIBUS via SFC14+SFC15
VAT15	Activate CDA via PROFIBUS with “PZD EasyDrive Basic”
SFC14	Read consistent data of a DP standard slave with SFC 14 “DPRD_DAT”
SFC15	Write consistent data of a DP standard slave with SFC 14 “DPRD_DAT”
SFC13	Read diagnostic data (slave diagnosis) of a DP slave with SFC13 “DPNRM_DG”
OB1	Main program
OB87	Communication error (also PROFIBUS)
OB82	Diagnosis alarm module (also PROFIBUS)

A.4 Technical data, CM-DPV1

Technical data	CM-DPV1 (Communication module for PROFIBUS-DPV1)
Standardization	EN 50170
Communication	Directive 2.084
Device profile	PROFIBUS-DPV1
Transfer technique	RS-485 interface with 9-pin D-SUB socket
Voltage supply	18 ... 30 VDC
Current consumption	typ. 100 mA, max. 250 mA
Dimensions (W x H x D)	28 x 90 x 90 [mm]

Table A.4 Technical data of the communication module

A.4.1 Transmission speeds

The following transmission speeds are supported:

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

Table A.5 Range dependent on transfer rate

For higher transmission speeds, in particular, please refer to the application notes of the PNO.

Parameter transfer, PKW	Process data transfer, PZD
Read or write parameter*	Read or write process data*
< 10 ms	**1 to 2 ms**
*Execution time in drive unit, i.e. without taking into account the bus load	

Table A.6 Transmission speeds, PKW and PZD

A.4.2 Number of users (stations)

In the PROFIBUS-DP 32 stations are permitted in each segment; with repeaters a maximum of 126 stations can be used.

Appendix B Parameters for bus operation

B.1 Configuration by way of preset application data sets

All parameters necessary for bus operation are set to logical factory defaults when the application data sets Bus_x are loaded (see table below).

The following parameters are changed automatically in the device with the setting 152-ASTER = BUS_1:

Parameter	Factory setting	Changed value	Function
151 -ASTPR	DRV_1	BUS_1	Original application data set
152 -ASTER	DRV_1	BUS_1	Current application data set
180 -FISA0	OFF	OPTN2	Function selector analog standard input ISA00
181 -FISA1	OFF	OPTN2	Function selector analog standard input ISA01
210-FIS00	STR	OPTN2	Function selector digital standard input ISD00
211-FIS01	STL	OPTN2	Function selector digital standard input ISD01
212-FIS02	SADD1	OPTN2	Function selector digital standard input ISD02
213-FIS03	OFF	OPTN2	Function selector digital standard input ISD03
240 -FOS00	BRK1	OPTN2	Function selector digital standard output OSD00
241 -FOS01	REF	OPTN2	Function selector digital standard output OSD01
242 -FOS02	S_RDY	OPTN2	Function selector digital standard output OSD02
260 -CLSEL	TERM	OPTN2	Control location selector
280 -RSSL1	FMAX	FOPT2	Reference selector 1
289 -SADD1	10	0	Reference selector 2
571-CLADR	0	0	CAN_{Lust} device address
582-PBADR	0	0	PROFIBUS Slave address (CM-DPV1)
492 -CACNF	4	4	“PZD EasyDrive Basic” process data transfer

Table B.1 Presetting based on the example of BUS_1

To configure a PROFIBUS system it is, however, possible to modify specific parameters. The following sections detail the parameters which may need to be set specifically.

Note: **Parameter backup** in the drive unit: Before the mains power is cut the parameter settings must be saved in the device by setting parameter 150-SAVE = (1) START.

150-SAVE - Back-up device setup

Parameter to back-up the complete device setup to the EEPROM. All parameters are first held only in the RAM. So that the parameters are available again after power-off, they must be backed-up. To do so, parameter 150-SAVE is set to (1) “START” after all other parameters have been set. The save operation takes a few hundred milliseconds. During that time the drive unit must not be switched off, otherwise the settings will be lost. Parameter 150-SAVE is automatically set to 0 = “STOP” by the device after the save operation. This process can be used for timeout monitoring of the function.

Subject area CDA/CDD	Value range	Factory set.	Unit	Data type	Memory type
_15FC / _CONF	0 (STOP) ... 1 (START)	0 (STOP)	–	USIGN8	RAM control value

B.2 Diagnostic parameters of the option module

577-OP2RV - Software version CM-DPV1

In parameter OP2RV the software version (as from V. 0.45) of the CM-DPV1 is displayed.

Subject area CDA/CDD	Value range	Factory set.	Unit	Data type	Memory type
_570P / _0PT		0.00	–	FIXPT16	RAM A C

578-OPTN2 - Module slot 2 assignment

When the drive unit has been switched on and the CM-DPV1 installed and supplied with power, the drive unit automatically detects the communication module plugged into the communication slot.

In parameter OPTN2 the connected communication module is displayed.

For the PROFIBUS interface to function correctly, OPTN2 = “PROFI” must be set.

If OPTN2 = NONE, your communication module is not being powered, is not properly plugged in or is faulty.

Subject area CDA/CDD	Value range	Factory set.	Unit	Data type	Memory type
_570P / _0PT	NONE ... PROFI	NONE	–	USIGN8	RAM A C

B.3 General bus settings

582-PBADR - PROFIBUS Slave address

Value of parameter 582-PBADR =	Effect on addressing
0 (preset in application data set Bus_x)	The hardware address coding of the CM-DPV1 is evaluated for addressing purposes. After the mains reset the drive unit starts up with the hardware-coded device address.
1 ... 126	The address of the PROFIBUS Slave corresponds to the value of PBADR. The hardware address coding is deactivated as a result. After the mains reset the drive unit starts up with the device address set in PBADR.

Table B.2 Address setting with parameter 582-PBADR

By way of the pins on connector X13 labeled 2^x **or** by way of the two rotary coding switches S1, S2, the device address can be coded.

An address between 1 and 126 can be selected.

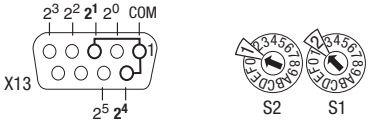


Figure B.1 Address setting via X13 or S1 and S2

Attention: This hardware address coding is only taken into account if parameter 582-PBADR is set to 0 (defined by the project engineer in first commissioning). The hardware codings of connector X13 and of the coding switches (S1 and S2) are internally linked by a logical OR operator.

571-CLADR - CAN_{LUST} address

The CAN_{LUST} device address is necessary for communication between the drive unit and the CM-DPV1 and must be set to “0”.

Subject area CDA/CDD	Value range	Factory set.	Unit	Data type	Memory type
_570P / _0PT	0 ... 99	0	–	USIGN8	FLASH

574-CAWDG - CAN$_{LUST\ watchdog\ time}$

After bus system power-up CAWDG is set by the CM-DPV1 to 250 ms and thereby activated. This watchdog relates only to communication between the drive unit and the CM-DPV1.

Subject area CDA/CDD	Value range	Factory set.	Unit	Data type	Memory type
_570P / _0PT	0 ... 255	0	ms	USIGN8	FLASH

575-CASCY - Sampling time of status message in ms

This sampling time is only decisive for communication between the drive unit and the CM-DPV1.

Reducing this sampling time only makes sense if the PROFIBUS network capacity is also able to implement the update.

Subject area CDA / CDD	Value range	Factory set.	Unit	Data type	Memory type
_570P / _0PT	1 ... 32000	80	ms	USIGN16	FLASH

B.4 Definition of control location and reference channel

260-CLSEL - Control location

The control location is selected by way of parameter 260-CLSEL. With CLSEL = OPTN2 the control word for the drive unit is formed from bytes 0 and 1 of the “PZD xxxxDrive”.

Subject area CDA/CDD	Value range	Factory set.	Unit	Data type	Memory type
_26CL / _CONF	0 (TERM) ... 4 (OPTN2)	0 (TERM)	–	USIGN8	FLASH

Note: Reference and control values and the content of “PZD xxxxDrive” are only evaluated when the bus system has started.

492-CACNF - CAN configuration

This parameter is set by the CM-DPV1 communication module in the drive unit. It should not be changed manually. This parameter represents the selected PROFIBUS-PZD type.

Subject area CDA/CDD	Value range	Factory set.	Unit	Data type	Memory type
_570P / _0PT	0 ... 4	4	–	USIGN8	FLASH

CACNF	Reference	Actual	Activation/ PZD type	Identifier
0	No reference transfer	No actual value transfer	No activation	--
1	16-bit reference frequency (Q0)	16-bit actual frequency (Q0)	ProfiDrive state machine/ PZD ProfiDrive16/16	0xC1, 0xC3, 0xC3, 0x01
2	32-bit reference frequency (Q16)	32-bit actual frequency (Q16)	ProfiDrive state machine/ PZD ProfiDrive32/32	0xC1, 0xC3, 0xC3, 0x02
3	32-bit reference frequency (Q16)	16-bit actual frequency (Q0) 16-bit actual torque (Q0) *	ProfiDrive state machine/ PZD ProfiDrive32/2*16	0xC1, 0xC3, 0xC3, 0x03
4	32-bit reference frequency (Q16)	32-bit actual frequency (Q16)	CDA3000-specific /**PZD EasyDrive Basic factory setting**	0xC1, 0xC3, 0xC3, 0x04
5**	PosMod control bits, POMER[90-97], POVAR[98]	PosMod status bits, POMER[80-87], actual position in distance unit	EasyDrive PosMod	0xC1, 0xC3, 0xC3, 0x05
6**	Status bits, P-to-P positioning, table index	Status bits, P-to-P positioning, actual position	EasyDrive TabPos	0xC1, 0xC3, 0xC3, 0x06
7**	Status bits, P-to-P positioning, position reference	Status bits, P-to-P positioning, actual position	EasyDrive DirectPos	0xC1, 0xC3, 0xC3, 0x07
8**	Status bits, electronic gearing	Status bits, electronic gearing, actual position	EasyDrive Synchron	0xC1, 0xC3, 0xC3, 0x08
*Only in loop controlled operation, ** Only on CDD3000				

Table B.3 Configuration with 492-CACNF

280-RSSL1 - Reference selector

Set RSSL1 = FOPT2 so the reference is formed from bytes 2-5 in “PZD ProfiDrive x/x” and “PZD EasyDrive Basic”.

Subject area CDA / CDD	Value range	Factory set.	Unit	Data type	Memory type
_28RS / _REF	0 (FCON) ... 11 (FMAX)	11 (FMAX)	–	USIGN8	FLASH

Note: Reference and control values and the content of “PZD xxxxDrive” are only evaluated when the bus system has started.

Other logical settings may also be selected as the reference source:

CDA

RSSL1	Function
1 - FA0	Analog input 0
2 - FA1	Analog input 1
4 – FPOT	MOP function, only in conjunction with appropriately configured inputs
5 - FDIG	Digital reference, see device operation manual
7 - FOPT2	Reference from option slot 2, here PROFIBUS-DP (process data channel)
8 - TBSEL	Table references incl. acceleration and braking ramps, selection of table position via bits in the control word “PZD EasyDrive Basic” or directly in parameter TBSEL or via inputs with function FFTBx
9 - FFIX1/2	Fixed frequency *
10 - FMIN1/ 2	Minimum output frequency *
11 - FMAX1/2	Maximum output frequency *
* Switchable with characteristic data set switchover, e.g. via bits in the “PZD EasyDrive Basic” control word	

Table B.4 Settings for reference selector RSSL1

CDD

RSSL1	Function
1 - RA0	Analog input 0
2 - RA1	Analog input 1
4 - RDIG	Digital reference, see device operation manual
6 - ROPT2	Reference from option slot 2, here CAN_{LUST}
7 - RFIX	Speed table references incl. acceleration and braking ramps, selection of table position via bits in the control word or directly in parameter RFIX or via inputs with function TBx
8 - PTAB	Position table references
9 - PMOD	POSMOD positioning and sequence control

Table B.5 ***CDD3000:*** *Settings for reference selector 280-RSSL1*

Online switching between the reference sources is only possible by way of appropriately parameterized digital inputs (see functions of digital inputs) or directly in parameter RSSL1 or RSSL2.

573-CACTR - Control word

The control word received via the bus is entered in parameter 573 - CACTR. During commissioning the parameter can be used to check the reception of control data.

Subject area CDA/CDD	Value range	Factory set.	Unit	Data type	Memory type
_57OP / _0PT	0000H ... FFFFH	0000H	–	USIGN16	RAM actual value

572-CASTA - Status word

The status is entered in parameter 572-CASTA. The data content of the parameter corresponds to PZD1 in the process data channel.

Subject area CDA/CDD	Value range	Factory set.	Unit	Data type	Memory type
_57OP / _0PT	0000H ... FFFFH	0000H	–	USIGN16	RAM actual value

597-RF0 - Response to reference value 0

RF0 = OFF: If the reference value is 0 Hz, closed-loop control of the drive unit is deactivated; no more current is applied to the motor.

RF0 = ON: With reference value 0 Hz, closed-loop control of the drive unit remains active; current remains applied to the motor.

Attention: Before changing the content of parameter RF0, refer to the notes presented in the Application Manual: “_59DP-Driving profile generator”.

Subject area	Value range	Factory set.	Unit	Data type	Memory type
_59DP	OFF/ON	OFF	–	USIGN8	FLASH

288-FOPT2 - Reference from option slot CDA

288-ROPT2 - Reference from option slot CDD

The reference value received via the process data channel is entered in parameter FOPT2. The data content of the parameter corresponds to PZD2 + PZD3. The interpretation of the value is dependent on the selected control mode.

Subject area CDA/CDD	Value range	Factory set.	Unit	Data type	Memory type
_28RS / _REF	-32764 ... 32764	0	Hz	INT32Q16	RAM actual value

148-TXEV1 - Event to send 1st status identifier

TXEV1 = 1 (factory setting) As a result the status word is transmitted cyclically

Subject area	Value range	Factory set.	Unit	Data type	Memory type
_OPT	0 ... 65555	1	-	USIGN16	Flash

149-TXEV2 - Event to send 2nd status identifier

TXEV2 = 1 if EasyDrive DirectPos+ is used. As a result the velocity is transmitted cyclically.

Subject area	Value range	Factory set.	Unit	Data type	Memory type
_OPT	0 ... 65555	0	-	USIGN16	Flash

Appendix Glossary

AK	Job ID
Application data set	Factory predefined parameter data set to solve typical applications.
Diagnostic data	The master reads the diagnostic data of the slaves, thereby enabling a centralized response to fault in the slave.
DP	Decentralized Peripherals
DPV1	Add-on to the PROFIBUS-DP
EasyDrive mode	This is the most simple configuration of the process data channel, as it is tailored to the drive unit. The user can trigger defined events in the drive unit by setting individual bits in the control word. Examples: Set drive, Trigger emergency stop, Reset error.
Master	he higher-order control which handles communication.
MW (FW)	Flag word
Parameter Data menu	By way of the parameter channel PKW parameters are cyclically transferred from and to the drive unit.
PKW	Parameter identifier value
PNU	Parameter number
ProfiDrive mode	Configuration of the process data channel in conformance with the ProfiDrive profile. In contrast to EasyDrive mode, the system states are changed by a defined series of control sequences. The system state machine defined in the PROFIBUS standard determines the individual system state transitions.

PZD	Process data: The process data channel contains the functions: Control; Accept status; Reference input; and Display actual values.
Slave	A slave is a bus user on the PROFIBUS-DP which, in contrast to the master, merely responds to the enquiries addressed to it.
SPM	Spontaneous message
State machine	It describes the transitions of the various system states. A state transition is triggered by a defined event, such as a control sequence or setting of an input.

Appendix Index

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