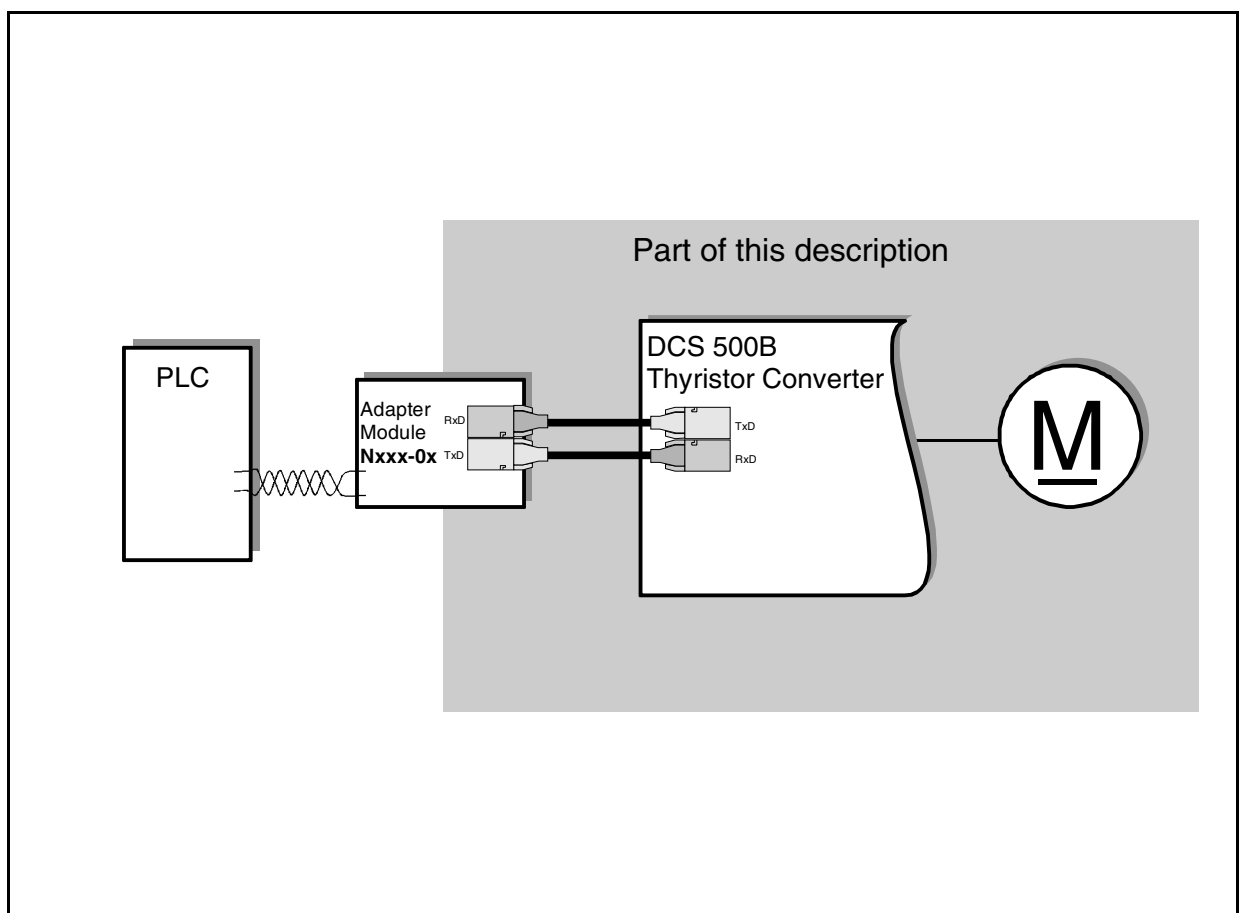


DCS 500B Thyristor Converter

for DC drive systems
25 to 5150 A

Description of the drive-specific
serial link interconnections

PROFIBUS	NPBA-12
PROFIBUS	NPBA-02
MODBUS	NMBA-01
MODBUS+	NMBP-01
AC 31	NCSA-01
DeviceNet	NDNA-02
CANopen	NCAN-02



Description of the drive-specific serial link interconnections

3ADW 000 086 R0201 Rev B

EFFECTIVE: 15.oct. 01
SUPERSEDES: 06.feb. 98

Table of Contents

Chapter 1 – General

Overview	1 - 1
Safety Instructions	1 - 1
Procedure	1 - 1

Chapter 2 – Fieldbus Adapter

Overview	2 - 1
Modules available	2 - 1
Structure of this chapter	2 - 1
NPBA-12 PROFIBUS	2 - 2
Connections	2 - 2
Datasets	2 - 2
Parameter transfer	2 - 2
Parameter settings	2 - 2
Available data file	2 - 3
NPBA-02 PROFIBUS	2 - 4
Connections	2 - 4
Datasets	2 - 4
Parameter transfer	2 - 4
Parameter settings	2 - 5
Available data file	2 - 5
NMBA-01 MODBUS	2 - 6
Connections	2 - 6
Datasets	2 - 6
Parameter transfer	2 - 6
Parameter settings	2 - 7
Available data file	2 - 7
NMBP-01 MODBUS+	2 - 8
Connections	2 - 8
Datasets	2 - 8
Parameter transfer	2 - 8
Parameter settings	2 - 9
Available data file	2 - 9
NCSA-01 AC31 / CS 31	2 - 10
Connections	2 - 10
Datasets	2 - 10
Parameter transfer	2 - 10
Parameter settings	2 - 11
Available data file	2 - 11
NCAN-02 CANopen	2 - 12
Connections	2 - 12
Datasets	2 - 12
Parameter transfer	2 - 12
Parameter settings	2 - 13
Available data file	2 - 13

NDNA-02 DEVICENET	2 - 14
Connections	2 - 14
Datasets	2 - 14
Parameter transfer	2 - 14
Parameter settings	2 - 15
Available data file	2 - 16

Chapter 3 – Serial Communication with DCS 500B

Adapter Connection	3 - 1
Adapter Initialization	3 - 2
New Initialization	3 - 2
Normal Initialization	3 - 2
Dataset	3 - 2
Parameter Transmission	3 - 4
Communication Fault Handler	3 - 4
Activation the communication	3 - 5
Rescue specific parameter values	3 - 5
Start-up	3 - 5
Macro 4	3 - 5
Application download	3 - 5

Chapter 4 – Field Bus Application version 1.5

Datasets 1 and 3	4 - 1
Control Word	4 - 2
Speed Reference	4 - 3
Datasets 1.3 & 3.1...3.3	4 - 3
Datasets 2 and 4	4 - 3
Status Word	4 - 3
Feedback	4 - 3
Datasets 4.1...4.3	4 - 3
Further description of the Field Bus application	4 - 4
Local Mode	4 - 4
Controlling via terminals	4 - 4
Faults and Warnings	4 - 4
Switch on sequence via Field Bus	4 - 5

Appendix A – Parameter Tables

Appendix B – Fieldbus Application (FIBU1_5)

Appendix C – GSD / EDS files

Appendix D – Application Download with CMTool

General	D - 1
Setting DCS 500B to the default values	D - 1
Rescue specific parameter values	D - 1
Creating setup file for the CMTool	D - 3

Download an application or parameter file	D - 3
Adapter initialization	D - 3
Download with CMTTool	D - 3
Check and adjust parameter settings	D - 4
 Appendix E – Macro 4 Handling	
General	E -1
Activating Macro 4	E -1
Deactivating Macro 4	E -1
Up- and Downloading of parameter settings	E -2
By using the	
CDP 312 panel	E -2
By using the CMTTool	E -2
Alarm A143 Macro change failed	E -2
 Appendix F – Distinction of FIBU1_4 and FIBU1_5	
Data set 1.1 and 1.2	F - 1
Data set 2.1, 2.2 and 2.3	F - 2

Chapter 1 – General

Overview

This manual describes the DCS 500B drive specific part of the serial communication via different field bus adapter modules (e.g. PROFIBUS adapter NPBA-12, MODBUS adapter NMBA-01, DeviceNet adapter NDNA-02, ...).

This documentation includes the information about available adapter modules and has to be used together with the appropriate adapter module's Installation and Start-up Guide.

It includes also a description of a Standard application for field bus operation, **which is necessary** for the connections of the datasets (data words) to the standard software functions of the converter.

Safety Instructions

Observe the Safety Instruction made in the Installation and Start-up guide of the module and these of the DCS 500B documentations.

Procedure

First work through the chapters of the Installation and Start-up guide of the corresponding adapter module. In that documentation the **fieldbus-specific** information is found.

Then go to this manual and take the **drive-specific** information.

Chapter 2 – Fieldbus Adapter

Overview

This chapter contains the available and described serial link Bus Adapter Modules for DC Drives.

Modules available

	Adapter	(Software)	DCS 500B (Software)
PROFIBUS	NPBA-12	(Rev. 1.1 upwards)	(DC21x230 upwards)
PROFIBUS	NPBA-02	(Rev. 2.1 upwards)	(DC21x226 upwards)
MODBUS	NMBA-01	(Rev. 1.5 upwards)	(DC21x226 upwards)
MODBUS+	NMBP-01	(Rev. 1.2 upwards)	(DC21x226 upwards)
AC31	NCSA-01	(Rev. 1.6 upwards)	(DC21x226 upwards)
CANOPEN	NCAN-02	(Rev. 2.0 upwards)	(DC21x226 upwards)
DEVICENET	NDNA-02	(Rev. 2.1 upwards)	(DC21x233 upwards)

Structure of this chapter

This chapter shows the adapter modules with the belonging information about

- Connections between the adapter module and the DCS 500B
- Datasets and parameter transfer
- Parameter settings group 40
- Available data file

NPBA-12 PROFIBUS

Connections

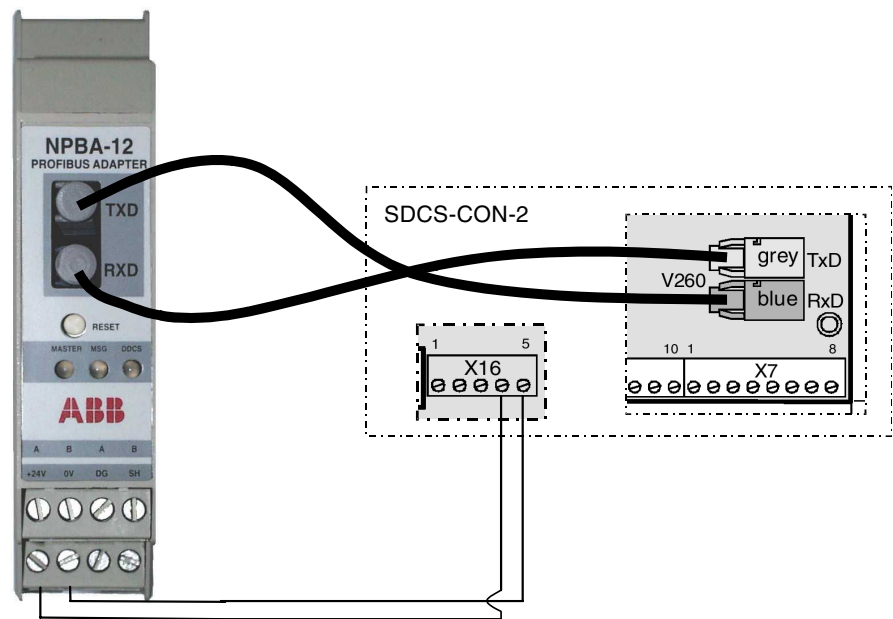


Figure 2-1 Connections between NPBA-12 and DCS 500B converter

Datasets Table 2-1 Datasets NPBA-12

Dataset / Data word	minimal	maximum
Datasets in each direction	1	2
Data words in each direction	2	6

With e.g. selected PPO1 or PPO3 there are two data words in each direction; two data words from the PLC to the DCS 500B and two from the DCS 500B to the PLC.

The function of these data words is depending on the application, which has to be loaded (see chapter *Fieldbus application*).

Note: The communication is also running with the selection of PPO5, which contents 10 data words. The data word 7...10 to the DCS 500B can not be used in the DCS 500B and the data word 7...10 from the DCS 500B will be zero.

Parameter transfer Parameters of group 1...39 can be transmitted. Please see the list of available parameters (*Appendix A*). The meaning of **parameters** is here like ramp times, constant speed reference and other application parameters. **It is not usual to change connections!**

Parameter settings Please see also the detailed parameter description, chapter 5 of the *Installation and Start-up guide* of the appropriate adapter module.

Table 2-2 Parameter settings group 40

Param.	Description	Available Value	Default	Remark
4001	Module Type		NPBA-12 V1.x	
4002	Protocol	0 DP 1 DPV1	0	
4003	PPO Type	0 PPO1 1 PPO2 2 PPO3 3 PPO4 (4 PPO5)	1	*1
4004	Node Number	2...126	2	
4005	No. of Dataset	1..4	1	
4006	Dataset Index	0 FBA DSET 1 1 FBA DSET 10	0	
4007	Cut-Off Timeout	0...255	30	
4008	CommProfile	0 ABB Drives (1 CSA2.8/3.0)	0	
4009	Control Zero Mode	0 STOP 1 FREEZE	0	
4010	not used			
4011				
4012				
4013				
4014				
4015				
*1 => PPO5 can be handled by the adapter. The first six data words will be transmitted to the DCS 500B. As the feedback the PLC will get the value of zero for the data word 7...10.				

Available data file The GSD File is a configuration file and contents information for the PLC configuration program.

The GSD file is available via internet (see *Appendix C*)

Parameter settings Please see also the detailed parameter description, chapter 5 of the *Installation and Start-up guide* of the appropriate adapter module.

Table 2-4 Parameter settings group 40

Param.	Description	Available Value	Default	Remark
4001	Module Type		NPBA-02 Vx.y	
4002	Mode FMS/PPO	0 FMS 1 DP-PPO1 2 DP-PPO2 3 DP-PPO3 4 DP-PPO4 (5 PPO5)	0	*1
4003	Station Number	2...126	2	
4004	Bit Rate Select	0 9.6 kBit 1 19.2 kBit 2 93.75 kBit 3 187.5 kBit 4 500 kBit 5 1.5 MBit 6 Auto	6	
4005	No. of Dataset	1..4	2	*2
4006	Number of first Dataset	0...255	0	
4007	Cut-Off Timeout	0...255	30	
4008	CommProfile	0 ABB Drives (1 CSA2.8/3.0)	0	
4009	Control Zero Mode	0	0	*3
4010	not used			
4011				
4012				
4013				
4014				
4015				

*1 => PPO5 can be handled by the adapter.
The first six data words will be transmitted to the DCS 500B.
As the feedback the PLC will get the value of zero for the data word 7...10.

*2 => for NPBA-02 V1.0 with DCS 500 (CON-1) : **40.05 = 3** ; **40.06 = 4**

*3 => for NPBA-02 V2.4 and higher

Available data file The GSD File is a configuration file and contents information for the PLC configuration program.

The GSD file is available via internet (see *Appendix C*)

NMBA-01 MODBUS

Connections

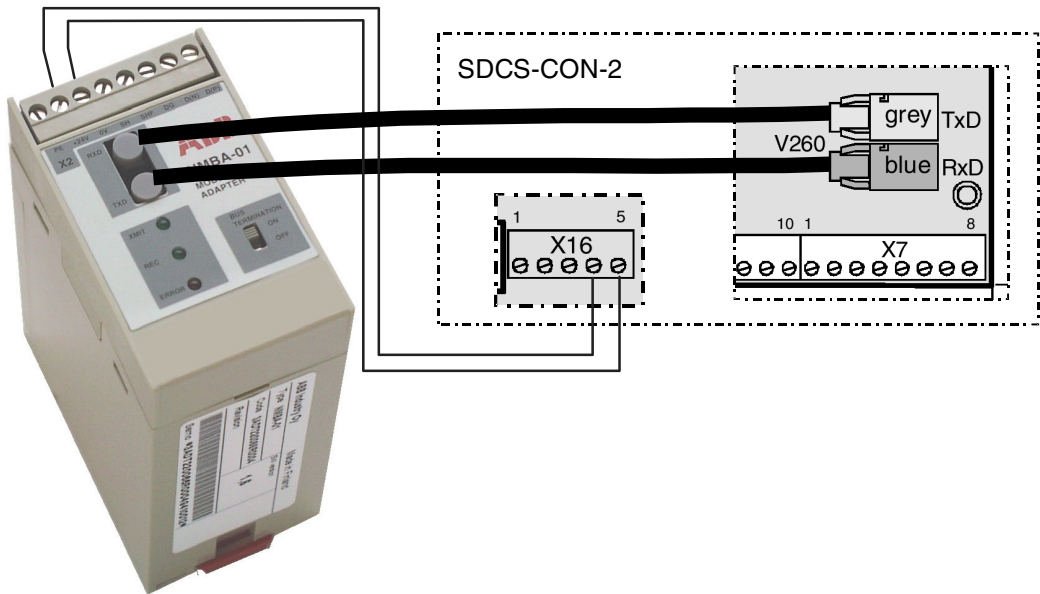


Figure 2-3 Connections between NMBA-01 and DCS 500B converter

Datasets Table 2-5 Datasets NMBA-0

Dataset / Data word	minimal	maximum
Datasets in each direction	1	2
Data words in each direction	2	6

With e.g. selected two data words in each direction these are two data words from the PLC to the DCS 500B and two data words from the DCS 500B to the PLC.

The function of these data words is depending on the application, which has to be loaded (see chapter *Fieldbus application*).

Parameter transfer Parameters of group 1...24 can be transmitted.

Formula: Parameter no. of

MODBUS = 40000 + parameter of DCS 500B

e.g. for DCS 500B parameter 1708 (ACCEL1):

40000 + 1708 = **41708**

Parameter settings Please see also the detailed parameter description, chapter 5 of the "Installation and Start-up guide" of the appropriate adapter module.

Table 2-6 Parameter settings group 40

Param.	Description	Available Value	Default	Remark
4001	Module Type		NMBA-01 Vx.y	
4002	Mode	0 RTU wdg:flt 1 RTU wdg:rst	0	
4003	Station Number	1...247	1	
4004	Baud Rate	0 1200 1 2400 2 4800 3 9600 4 19200	3	
4005	Parity	0 EVEN 1 ODD 2 NONE	2	
4006	Good Message	0...32767		*S
4007	Bad Message	0...32767		*S
4008	not used			
4009				
4010				
4011				
4012				
4013				
4014				
4015				
*S => Staus message, written by the adapter				

Available data file No data file necessary.

NMBP-01 MODBUS+
Connections

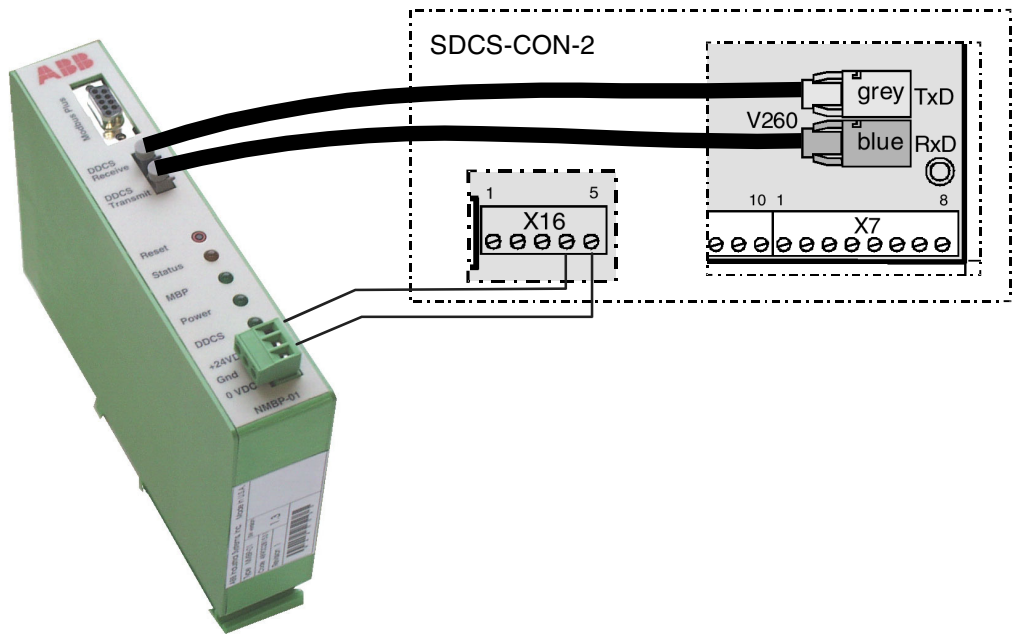


Figure 2-4 Connections between NMBP-01 and DCS 500B converter

Datasets Table 2-7 Datasets NMBP-01

Dataset / Data word	minimal	maximum
Datasets in each direction	1	2
Data words in each direction	2	6

With e.g. selected two data words in each direction these are two data words from the PLC to the DCS 500B and two data words from the DCS 500B to the PLC.

The function of these data words is depending on the application, which has to be loaded (see chapter *Fieldbus application*).

Parameter transfer Parameters of group 1...39 can be transmitted.

Formula: Parameter no. of

MODBUS+ = 40000 + parameter of DCS 500B

e.g. for DCS 500B parameter 1708 (ACCEL1):

$40000 + 1708 = 41708$

Parameter settings Please see also the detailed parameter description, chapter 5 of the *Installation and Start-up guide* of the appropriate adapter module.

Table 2-8 Parameter settings group 40

Param.	Description	Available Value	Default	Remark
4001	Module Type		NMBP-01 Vx.y	
4002	Protocol	0 MODBUS PLUS 1 MBP FAST	0	
4003	Station Number	1...64	64	
4004	Good Message	0...32767		*S
4005	Bad Message	0...32767		*S
4006	Global Data Out 1	0 nothing selected 1 CNTRL WORD 2 REFERENCE 1 3 REFERENCE 2 4 STATUS 5 ACTUAL 1 6 ACTUAL 2	0	
4007	Global Data Out 2	0 nothing selected 1 CNTRL WORD 2 REFERENCE 1 3 REFERENCE 2 4 STATUS 5 ACTUAL 1 6 ACTUAL 2	0	
4008	Global Data Out 3	0 nothing selected 1 CNTRL WORD 2 REFERENCE 1 3 REFERENCE 2 4 STATUS 5 ACTUAL 1 6 ACTUAL 2	0	
4009	Global Data In 1 Station	0...64	0	
4010	Global Data In 1 Word	0...31	0	
4011	Global Data In 2 Station	0...64	0	
4012	Global Data In 2 Word	0...31	0	
4013	Global Data In 3 Station	0...64	0	
4014	Global Data In 3 Word	0...31	0	
4015	not used			
*S => Staus message, written by the adapter				

Available data file No data file necessary.

NCSA-01 AC31 / CS 31

Connections

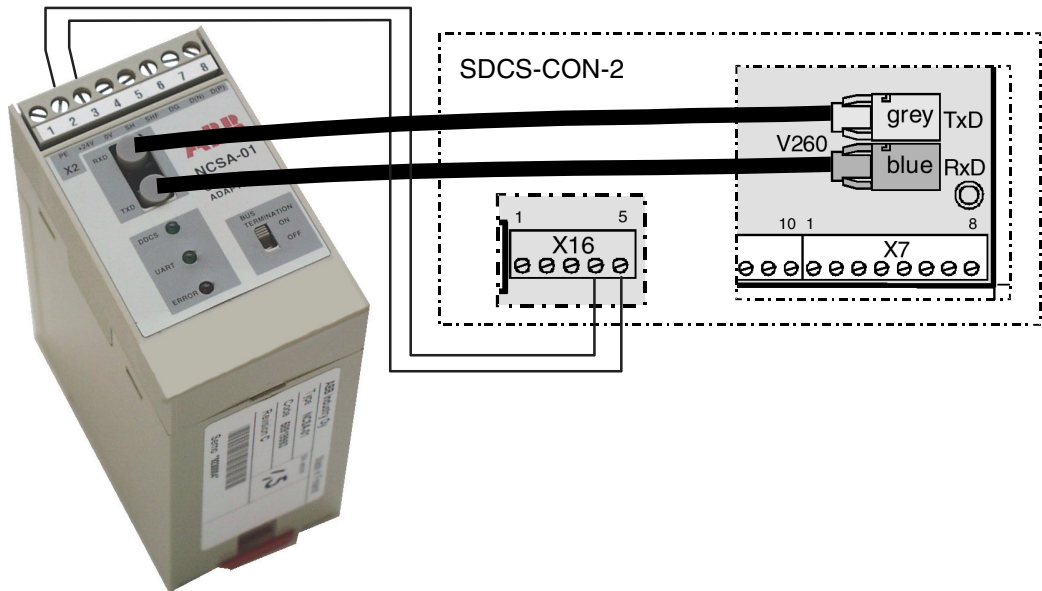


Figure 2-5 Connections between NCSA-01 and DCS 500B converter

Datasets Table 2-9 Datasets NCSA-01

Dataset / Data word	minimal	maximum
Datasets in each direction	1	2
Data words in each direction	2	6

With e.g. selected two data words in each direction these are two data words from the PLC to the DCS 500B and two data words from the DCS 500B to the PLC.

The function of these data words is depending on the application, which has to be loaded (see chapter *Fieldbus application*).

Parameter transfer Parameters can not be transmitted with this communication.

Parameter settings Please see also the detailed parameter description, chapter 5 of the *Installation and Start-up guide* of the appropriate adapter module.

Table 2-10 Parameter settings group 40

Param.	Description	Available Value	Default	Remark
4001	Module Type		NCSA-01 Vx.y	
4002	Protocol	1	1	
4003	Module ID	0...1	0	
4004	Station Number	0...5	1	
4005	Addr. Index	0 LOWER 1 UPPER	0	
4006	Datasets	0 one Dataset 1 two Datasets 3 six Datasets	1	
4007	Dataset 1 const	1	1	
4008	Dataset 1 const	1	1	
4009	Dataset 1 const	1	1	
4010	Dataset Offset	1	1	
4011	not used			
4012				
4013				
4014				
4015				

Available data file No data file necessary.

NCAN-02 CANopen

Connections

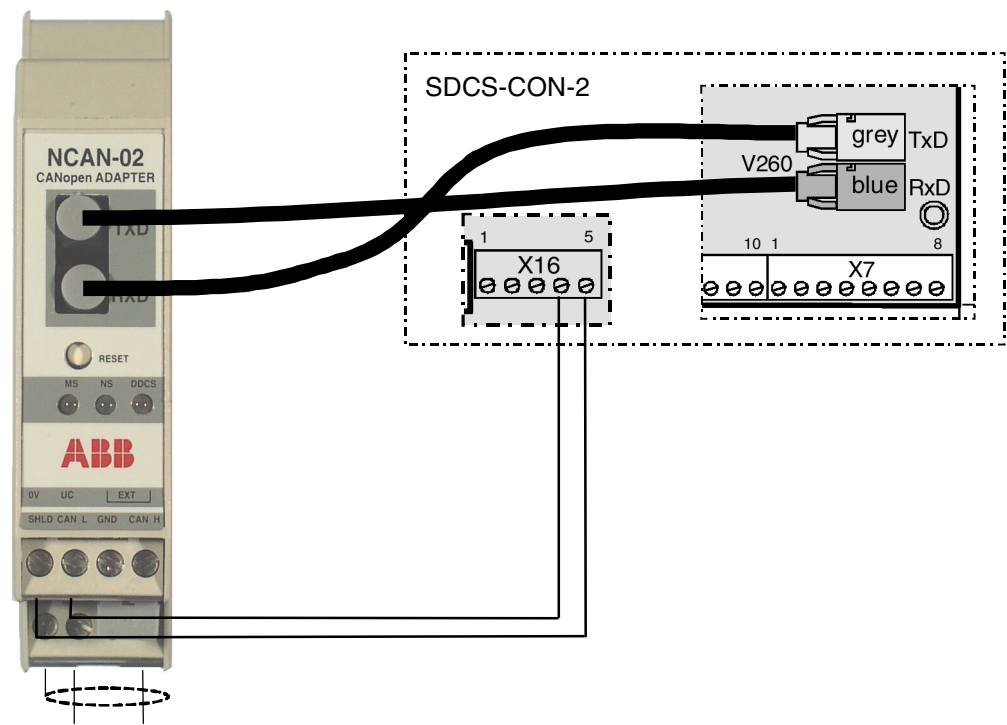


Figure 2-6 Connections between NCAN-01 and DCS 500B converter

Datasets Table 2-11Datasets NCAN-01

Dataset / Data word	minimal	maximum
Datasets in each direction	1	2
Data words in each direction	2	6

With e.g. selected two data words in each direction these are two data words from the PLC to the DCS 500B and two data words from the DCS 500B to the PLC.

The function of these data words is depending on the application, which has to be loaded (see chapter *Fieldbus application*).

Parameter transfer Parameters of group 1...39 can be transmitted.

Formula: Parameter no. of

CANopen = 3000H + parameter of DCS 500B in Hex

e.g. for DCS 500B parameter 1708 (ACCEL1):

3000H + 6ACH = 36ACH

Parameter settings Please see also the detailed parameter description, chapter 5 of the *Installation and Start-up guide* of the appropriate adapter module.

Table 2-12 Parameter settings group 40

Param.	Description	Available Value	Default	Remark
4001	Module Type		NCAN-02 Vx.y	
4002	WD Mode	0 FAULT 1 Auto RESET	1	
4003	Node ID	0...127	1	
4004	Baud Rate	0 1 Mbit/s 1 500 kbit/s 2 250 kbit/s 3 125 kbit/s 4 100 kbit/s 5 50 kbit/s 6 20 kbit/s 7 10 kbit/s	3	
4005	CODD-Profile	0 CSA 2.8/3.0 1 ABB DRIVES 2 TRANSPARENT	1	*1
4006	CUT-OFF Timeout	0...255	10	
4007	Status	0 SELF TEST 1 RX Q OVERRUN 2 CAN OVERRUN 3 BUS OFF 4 ERROR SET 5 ERROR RESET 6 TX Q OVERRUN 7 DISCONNECTED 8 STARTED 9 STOPPED 10 G FAILS 11 PRE-OPERAT. 12 RESET COMM. 13 RESET NODE		*S
4008	Dataset Index	0 FBA D SET 1 1 FBA D SET 10	0	
4009	No. of Datasets	1 1 DATASET 2 2 DATASET	1	
4010	not used			
...				
4015				

*1 => For DCS 500B only (2 TRANSPARENT)

*S => Staus message, written by the adapter

Available data file An EDS file (Electronic Data Sheet) is not yet available.
In future it will be found via internet: (see *Appendix C*)

NDNA-02 DEVICENET

Connections

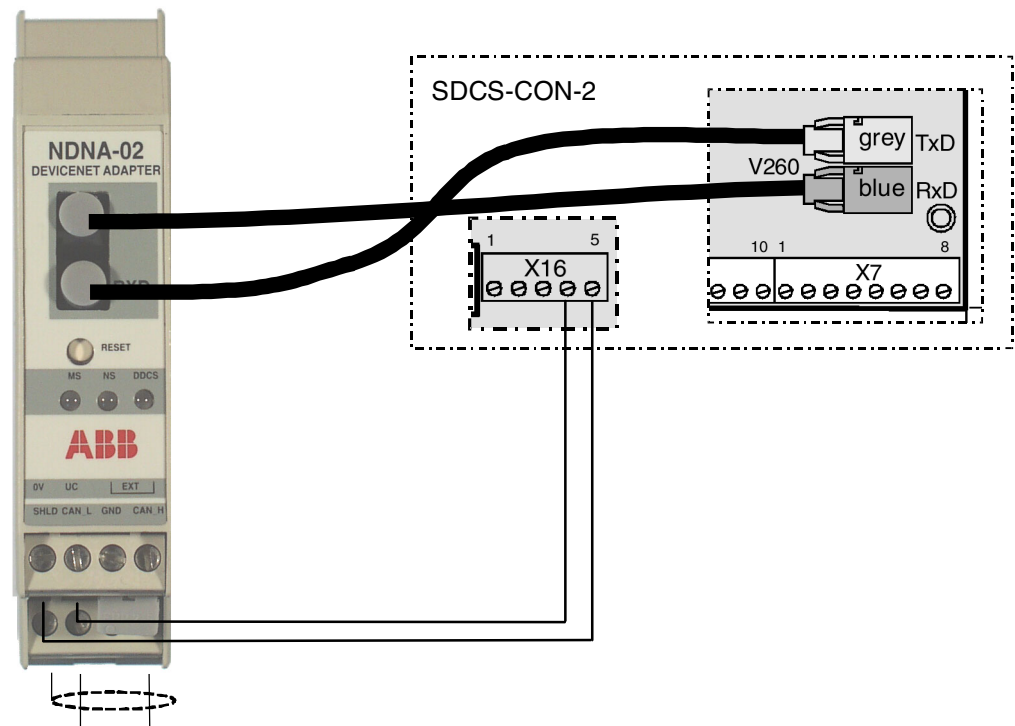


Figure 2-7 Connections between NDNA-01 and DCS 500B converter

Datasets Table 2-13 Datasets NDNA-01

Dataset / Data word	minimal	maximum
Datasets in each direction	1	2
Data words in each direction	2	6

With e.g. selected two data words in each direction these are two data words from the PLC to the DCS 500B and two data words from the DCS 500B to the PLC.

The function of these data words is depending on the application, which has to be loaded (see chapter *Fieldbus application*).

Parameter transfer Parameters of group 1...39 can be transmitted. The EDS-file has to be used.

Parameter settings

Please see also the detailed parameter description, chapter 5 of the *Installation and Start-up guide* of the appropriate adapter module.

Table 2-14 Parameter settings group 40

Param.	Description	Available Value	Default	Remark
4001	Module Type		NDNA-02 Vx.y	
4002	MAC ID	0...63	63	
4003	Baud Rate	0 125 kbit/s 1 250 kbit/s 2 500 kbit/s	1	
4004	Status	0 SELF TEST 1 NO CONNECT 2 CONNECTED 3 TIMEOUT 4 DUP.MAC ERR 5 BUS_OFF 6 COM.ERROR 7 WRONG ASMBLY		*S
4005	Profile Selection	0 ABB DRIVES 1 CSA2.8/3.0	0	
4006	Poll Output Select	0 BASIC SPEED 1 TRANSPARENT 2 PARAMETERS 3 MUL. DATASETS	0	*1
4007	Poll/Cos Input Sel	0 BASIC SPEED 1 TRANSPARENT 2 PARAMETERS 3 MUL. DATASETS	0	*1
4008	Cos Data Output	0 BASIC SPEED 1 TRANSPARENT 2 PARAMETERS 3 MUL. DATASETS	0	*1
4009	Bit Strobe Output	0 BASIC SPEED 1 TRANSPARENT 2 PARAMETERS	0	*2
4010	Dataset Indexes	0 FBA DSET 1 1 FBA DSET 10	0	*3
4011	Speed Ref. Scale	0...3276	1500	*4
4012	Speed Act. Scale	0...3276	1500	*4
4013	ABB Drives Stop M.	0 COAST STOP 1 EAMP STOP	0	*4
4014	Ramp Stop Level	0...2000	1000	*4
4015	No. of Datasets	0 1 DATASET 1 2 DATASET	1	*4

Param.	Description	Available Value	Default	Remark
*S => Staus message, written by the adapter *1 => For DCS 500B only (1 TRANSPARENT) or (3 MUL. DATASETS) *2 => For DCS 500B only (1 TRANSPARENT) *3 => For DCS 500B only (0 FBA DSET 1) *4 => This parameter, only for BASIC SPEED, is not relevant for DCS 500B				

Available data file An EDS file (Electronic Data Sheet) is available via internet: (see *Appendix C*)

Chapter 3 – Serial Communication with DCS 500B

Adapter Connection

The fieldbus is connected with two or three wires to the adapter. The fieldbus adapter is the device for fieldbus communication. All functions and services concerning the fieldbus are handled by this adapter.

The protocol between the adapter and the drive is based on DDCS protocol (Distributed Drive Communication System).

The communication link between the fieldbus adapter and the DCS 500B is via an optical fibre cable, with a blue and a grey plug, which has to be connected to the same colour of the devices.



Alternative optical fibre cable:

The black plug of the cable has to be connected to the grey of the devices:



The adapter needs a supply voltage of +24V DC, which can be supplied from the DCS 500B.

X16:4 = +24V (only for one Fieldbus adapter module); X16:5 = 0V.

The adapter gets the necessary parameter out of the parameter group 40 of DCS 500B only during the initialization. After parameter changing of group 40 it will be necessary to switch the electronic supply of the adapter off and on again to render the new values active. With some adapters, the RESET button can be used instead of switching off and on.

Adapter Initialization

After switching on the supply voltage of the fieldbus adapter it will start a check routine and the initialization with the DCS 500B. During initialization, the adapter checks the string, which will be saved in the parameter 4001. Regarding the result of the read string, one of the following steps are used:

- The string is not equal to the adapter see
New Initialization of the Adapter
- The string is equal to the adapter see
Normal Initialization of the Adapter

New Initialization **Note:** Applies only with DCS 500B firmware DC21.230 and higher.

When the DCS 500B is switched on for the first time with an adapter, the adapter will log on automatically. Note that the default values are written from the adapter into Group 40 of the DCS 500B. If system-specific values have already been entered in this group, they will be overwritten. To detect that the adapter has logged on, the adapter's name and software version (e.g. NPBA-02 V2.4), can be seen in Parameter 40.01 instead of the word FIELDBUS. In the case of using the CMTTool, a new upload is required for this purpose.

After log on, the system-referenced values can be entered into Group 40. After the parameters have been stored in the drive, and the adapter's electronics power supply has been switched off and on again, the adapter is initialized as described in the next section.

Normal Initialization

After switching on the adapter's power supply, communication to the DCS 500B is established from the adapter. Following successful establishment, the parameters from Group 40 of the drive are transferred into the adapter.

When this part of the initialization routine has been completed, communication with the control system can be established. Once this initialization routine has also been completed, proper data communication can begin.

Dataset

The fieldbus adapter module communicates with the DCS 500B using what are called **Datasets**. The software (firmware) of the DCS 500B supports the use of two datasets in each direction. Datasets in the direction from

- PLC to the DCS 500B are designated as **Dataset 1** and **Dataset 3**
- DCS 500B to the PLC are designated as **Dataset 2** and **Dataset 4**.

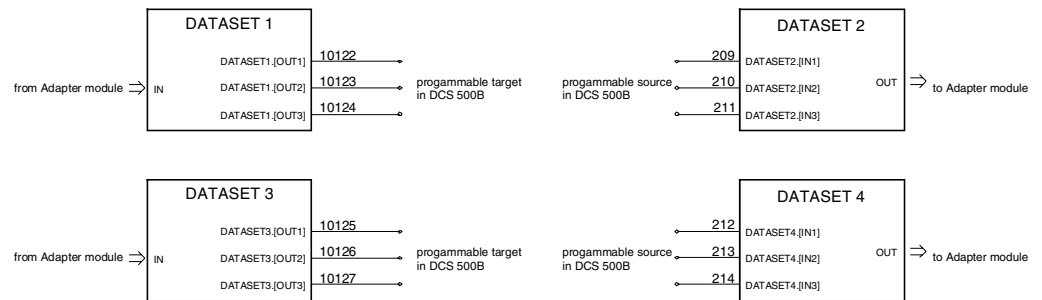


Figure 3-1 Datasets in DCS 500B

Dataset	Data word	DCS 500B address	normally used as
Dataset 1	Dataset 1.1	101 22 input	Control Word
	Dataset 1.2	101 23 input	Speed reference
	Dataset 1.3	101 24 input	
Dataset 2	Dataset 2.1	2 09 output	Status Word
	Dataset 2.2	2 10 output	Actual speed
	Dataset 2.3	2 11 output	
Dataset 3	Dataset 3.1	101 25 input	
	Dataset 3.2	101 26 input	
	Dataset 3.3	101 27 input	
Dataset 4	Dataset 4.1	2 12 output	
	Dataset 4.2	2 13 output	
	Dataset 4.3	2 14 output	

Table 3-1 Dataset allocation

One dataset contains three 16-bit words. The data words in the datasets are designated in accordance with their position in the dataset; e.g. the first data word in Dataset 1 as Dataset 1.1, the second data word in Dataset 1 as Dataset 1.2, etc.

The drive always transmits only as many datasets as it also receives; i.e. if two datasets are required from the drive, then two data sets also have to be sent to the drive.

The inputs and outputs of the datasets are freely available in the as-delivered state of the DCS 500B. Depending on the application desired, these can be connected to the standard software functions.

Chapter 4 - *Fieldbus application version 1.5* describes a **standard** application for fieldbus operation, which can be loaded into the DCS 500B.

**Parameter
Transmission**

The possibility of parameter transmission depends on the type of adapter involved. Please see *Chapter 2*.

It is possible to transmit parameters for values. It is **not** recommended to transmit parameters for connections.

Parameter transmission is asynchronous, that means that the time between the request from the PLC to the new value is in the drive, some cycles can last.

Note: Please don't transmit the parameter 4001 from the PLC to the DCS 500B. This parameter contains the string of the adapter, which is needed for the next correct initialization of the fieldbus adapter.

**Communication Fault
Handler**

The Communication Fault Handler controls the drive's reaction to communication faults and is integrated in the Drive Logic function block of the DCS 500B firmware.

When no valid DDCS messages are received by the drive within a time given by Parameter 9.21 (COMF-TIMEOUT), the COMM FAULT signal (109.15) is set.

With Parameter 9.20 COMFAULT-MODE, the drive's reaction to communication faults can be set. When this fault occurs, the fault F60 will be displayed on LED, if the parameter is between 0 and 2.

- 9.20 = (0) Stop by Ramp
- (1) Stop by Torq. lim
- (2) Stop by Coasting
- (3) Nothing

9.21 = 1 .. 50 (1 = 20 ms)

109.15 = 0 .. -1 This signal is set to -1, when a communication timeout occurs. It is reset when a signal at the RESET-INPUT [907] (Drive Logic) is given.

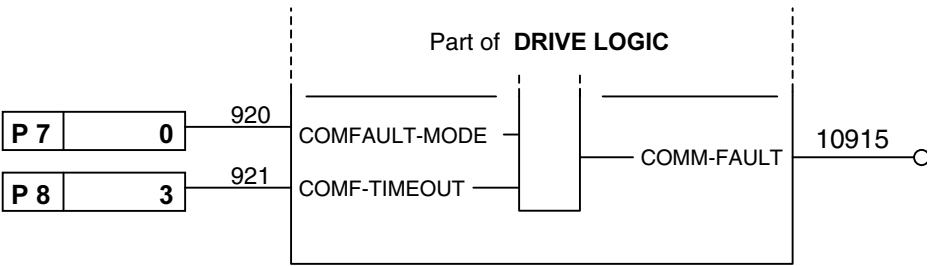


Figure 3-2 Adjustment of Communication Fault Handler

Activation the communication

For start-up, please follow step by step:

Please start with the disconnected field bus adapter; disconnected from the DCS 500B and disconnected from the fieldbus link (PLC).

Rescue specific parameter values

Only if relevant settings have been made before in fieldbus Group 40 of DCS 500B: First please write down the values of parameter group 40.

Start-up

Switch off the electronics.

Connect the field bus adapter via the optical fibre cable and connect the supply voltage +24 V of the adapter.



Switch on the supply voltage of the fieldbus adapter and of the DCS 500B.

If the DCS 500B has the firmware DC21.230 or later, after some seconds the string of the fieldbus adapter can be read in the parameter 4001 by using the CDP312 panel.

The DCS 500B can handle one application. You **must not** download more than one application. The Macro 4 (fieldbus operation) is part of the drive software and must be treated like an application, that means you either activate the macro or download an application software file or download a file with a complete parameter setting.

Macro 4 **Either** activate Macro 4 with firmware DC21.233 and higher, which contains the application of standard fieldbus operation FIBU1_5 (see Chapter 4 - *Fieldbus application version 1.5*).

See further information in Appendix E - *Macro 4 Handling*.

Application download

... **or** download an application software file with field bus functions or a relevant (must be able to handle fieldbus communication) parameter setting.

see further information in Appendix D - *Application download with CMTTool*.

Save Parameters

Important! Save the altered values in non-volatile memory!



11202 = SAVE MOT1 SET

11202 = SAVE MOT2 SET

Note: While the parameter set is being saved, no parameters may be altered; please bear this in mind for the panel (CDP312), for the CMTTool and for serial communication.



Switch off the electronics.

DCS 500B and adapter; after switching off, wait briefly until LEDs and display have gone out.

Now connect the field bus adapter with the fieldbus link (PLC).



Switch on the supply voltage of the fieldbus adapter and DCS 500B.

Chapter 4 – Field Bus Application version 1.5

With the serial communication function, the data words sent over the fieldbus are written onto the addresses specified in chapter 3. From there, the data words can be collected and further processed.

Note: Without additional connections these data words will be ignored.

The field bus application is a solution for standard connections, and the application function blocks required in order to connect the data words to the standard drive functions. The application described below has the Version 1.5 and the abbreviated designation FIBU1_5.

If you want to activate this application, the following options are available:

- The application file can be loaded into the DCS 500B with the CM Tool (CMTDCS50). See Appendix D - *Application download with CMTool*
- The connections and the application function blocks required can be activated by means of a list with the CDP312 Panel. This, however, is more time-consuming.
- From software version DC21.233, this application is also available as Macro 4. See Appendix E - *Macro 4 Handling*

Note: **Only one application at a time may be loaded into the DCS 500B.**

If the drive requires functions from two applications, a new application must be created, for example by using the PC program GAD.

Activation of the macro is also regarded as an application here.

Datasets 1 and 3

Dataset 1 contains the first three data words from the PLC to the DCS 500B, Dataset 3 contains the next three Data words. Each data word is a 16-bit word. In the fieldbus application FIBU1_5, the first two data words are connected as Control word and as Speed reference.

Control Word (Dataset 1.1) The meaning of the Control Word is listed in the following table:

Table 4-1 Control word

Bit	Parameter	Value	Description	Rem.
0	ON/OFF	0	MAIN CONTACTOR OFF (Current = 0)	*0
		1	MAIN CONTACTOR ON	
1	OFF_2	0	START INHIBIT (Alarm 101)	*1
		1	No START INHIBIT	
2	EME_STOP	0	EMERGENCY STOP (concerning selected Emergency Stop Mode)	*2
		1	No EMERGENCY STOP	
3	RUN	0	STOP (concerning selected Run Stop Mode)	*1, *3
		1	RUN (with field bus speed reference)	
4	RES_OUT	0	SETS SPEED REFERENCE TO ZERO AFTER RAMP	
		1	NORMAL SPEED REFERENCE	
5	RES_HOLD	0	HOLD ON OF THE RAMP	
		1	NORMAL SPEED REFERENCE	
6	RES_IN	0	SETS SPEED REFERENCE TO ZERO BEFORE RAMP	
		1	NORMAL SPEED REFERENCE	
7	RESET	0	No RESET PERFORMED	*4
		0 => 1	RESET	
8	INCHING 1	0	No inching with ref. 1	*1
		1	Inching with ref 1 (parameter 1906) (This bit has precedence above bit 9.)	*5
9	INCHING 2	0	No inching with ref. 2	*1
		1	Inching with ref 2 (parameter 1907)	*5
10		0		
		1	The PROFIBUS adapter needs the bit 10 = 1 to enable the field bus control	
11 to 15			unused	

Remarks:

- *0 This bit and the digital input DI7 are connected with an AND function to the drive software.
- *1 These bits are different to the field bus application version FIBU1_4.
- *2 This bit and the digital input DI5 are connected with an AND function to the drive software.
- *3 This bit and the digital input DI8 are not connected with an AND function to the drive software.
- *4 This bit and the digital input DI6 are connected with an OR function to the drive software.
- *5 The RUN command (bit 3) has precedence above inching (bit 8, bit 9).

Speed Reference **Dataset 1.2** is connected to the input of the speed reference selection. With Bit 3 of the Control word this reference is activated.

The range of this value is ± 20000 for $\pm 100\%$ speed.

Datasets 1.3 & 3.1...3.3 These datasets are not used in this application. They can be connected for further functions.

Datasets 2 and 4 **Dataset 2** contains the first three data words from the DCS 500B to the PLC, **Dataset 4** contains the next three Data word. Each data word is a 16-bit word. In the application FIBU1_5, the first three data words are connected as Status word, as Actual speed and as Armature current feedback.

Status Word (**Dataset 2.1**) The meaning of the Status Word is listed in the following table.

Table 4-2 Status Word

Bit	Parameter	Value	Description	Rem.
0	RDY ON	0	INITIALIZATION NOT READY OR NOT OK (Drive not ready for ON command)	
		1	READY ON (Initialization ok, Drive ready for ON)	
1	RDY	0	DRIVE NOT READY FOR RUNNING	
		1	DRIVE READY FOR RUNNING	
2	RUNNING	0	NOT RUNNING	
		1	RUNNING	
3	FAULT	0	No FAULT	
		1	FAULT or FAULTS	
4			unused	
5	No EME STOP	0	Emergency Stop active	
		1	No Emergency Stop active	
6			unused	
7	ALARM	0	No ALARM	
		1	ALARM or ALARMS	
8			unused	
9	Local not act.	0	LOCAL MODE IS ACTIVE	
		1	REMOTE MODE IS ACTIVE	
10	SPEED > L1	0	Actual speed is not higher than level of parameter 2202	
		1	Actual speed is higher than level of parameter 2202	
11 to 15			unused	

Feedback The filtered value of the actual speed is connected to **Dataset 2.2**, the armature current feedback to **Dataset 2.3**.

Datasets 4.1...4.3 These data sets are not used in this application.
They can be connected for other functions.

Further description of the Field Bus application

Local Mode If operator control has been set to "Local", the complete control word is replaced by an internal parameter word. Depending on the local requirement involved, this means the drive can be switched on with the CDP312 Panel or the CMTool.

Note: The bit from the control system for the emergency stop will no longer be taken into account. Input X6:5 of the terminal strip continues to be active.

Controlling via terminals Provision has been made for control via the terminal strip, but this has not been activated. If you want to control the drive not only from the PLC, but also via the terminal strip, you must connect a digital input to the OR and the switch over building block.

e.g. with X6:4 = DI4

2630 = 10707(linking the OR building block to the digital input)

3016 = 10707(linking the switch-over building block to the digital input)

When you have set your chosen digital input, you can run the drive with digital inputs X6:7 (ON) and X6:8 (RUN). If at switch-over these inputs are at logic 1, the drive with the switch-over will be enabled, provided no fault is ongoing.

If nothing else has been altered, the reference value of analog input AI1 is active.

Note: Since the control word is replaced by an internal parameter value, the bit from the control system for the emergency stop is not taken into account. Input X6:5 of the terminal strip continues to be active.

Faults and Warnings The fault and warning words are written onto parameters, so that the fault/warning words can be interrogated as parameters by the PLC.

Table 4-3 Faults and Warnings

Fault/Alarmword	Parameter
FAULT WORD 1	3301
FAULT WORD 2	3302
FAULT WORD 3	3303
ALARM WORD 1	3304
ALARM WORD 2	3305

Switch on sequence via Field Bus

Example of control word:

Table 4-4 Example

						*2	INCH2	INCH1	Reset	Res_In	RES_Hold	Res_Out	RUN	EME_STOP	OFF_2	ON/OFF	Dec.	Hex.
	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00		
Reset						1	0	0	1	x	x	x	0	1	1	0	1158	486
Main cont. ON						1	0	0	0	x	x	x	0	1	1	1	1031	407
Inching 1						1	0	1	0	1	1	1	0	1	1	1	1399	577
Inching 2						1	1	0	0	1	1	1	0	1	1	1	1655	677
Run with speed reference						1	0	0	0	1	1	1	1	1	1	1	1151	47F
Emergency Stop						1	x	x	x	x	x	1	x	0	1	*1	1043	413
Start inhibit						1	x	x	x	x	x	x	x	x	0	x	1024	400

x : 0 or 1

*1 : concerning the DriveLogic

: only if Bit 2 is 0 before Bit 0 goes to 0 (or at the same time) the function is concerning Emergency Stop; otherwise the main contactor opens without the Emergency Stop

*2 1 is only relevant with PROFIBUS adapter NPBA-0x
with 0 the PROFIBUS adapter will not send the datasets to the DCS 500B

Appendix A – Parameter Tables

PROFIBUS Para. No.	DCS 500B Para. No.	Group 1 ANALOG INPUTS:
100	101	AITAC CONV MODE
101	102	AITAC HIGH VALUE
102	103	AITAC LOW VALUE
103	104	AI1 CONV MODE
104	105	AI1 HIGH VALUE
105	106	AI1 LOW VALUE
106	107	AI2 CONV MODE
107	108	AI2 HIGH VALUE
108	109	AI2 LOW VALUE
109	110	AI3 CONV MODE
110	111	AI3 HIGH VALUE
111	112	AI3 LOW VALUE
112	113	AI4 CONV MODE
113	114	AI4 HIGH VALUE
114	115	AI4 LOW VALUE
115	116	AI5 CONV MODE
116	117	AI5 HIGH VALUE
117	118	AI5 LOW VALUE
118	119	AI6 CONV MODE
119	120	AI6 HIGH VALUE
120	121	AI6 LOW VALUE

PROFIBUS Para. No.	DCS 500B Para. No.	Group 4 CURRENT REG.:
199	401	[TORQ REF]
200	402	[CURR REF]
201	403	[CURR STEP]
202	404	[BLOCK]
203	405	REF TYPE SEL
204	406	ARM CURR REF SLP
205	407	ARM CURR PI KP
206	408	ARM CURR PI KI
207	409	ARM CONT CURR LIM
208	410	ARM L
209	411	ARM R
210	412	ARM ALPHA LIM MAX
211	413	ARM ALPHA LIM MIN
212	414	DXN
213	415	[ARM CURR LIM P]
214	416	[ARM CURR LIM N]
215	417	ARM CURR CLAMP
216	418	CURRENT RISE MAX
217	419	ZERO CUR DETECT
218	420	CUR RIPPLE MONIT
219	421	CUR RIPPLE LIM

PROFIBUS Para. No.	DCS 500B Para. No.	Group 2 ANALOG OUTPUTS:
133	201	AO1.[IN]
134	202	AO1 NOMINAL V
135	203	AO1 OFFSET V
136	204	AO1 NOMINAL VAL
137	205	AO2.[IN]
138	206	AO2 NOMINAL V
139	207	AO2 OFFSET V
140	208	AO2 NOMINAL VAL
141	209	DATASET2.[IN1]
142	210	DATASET2.[IN2]
143	211	DATASET2.[IN3]
144	212	DATASET4.[IN1]
145	213	DATASET4.[IN2]
146	214	DATASET4.[IN3]

PROFIBUS Para. No.	DCS 500B Para. No.	Group 5 CONVERTER,MOTOR:
232	501	U MOTN V
233	502	I MOTN A
234	503	I MOT1 FIELDN A
235	504	I MOT2 FIELDN A
236	505	FEXC SEL
237	506	PHASE SEQ CW
238	507	U SUPPLY
239	508	U NET MIN1
240	509	U NET MIN2
241	510	PWR DOWN TIME
242	511	ARM OVERVOLT LEV
243	512	ARM OVERCURR LEV
244	513	EMF FILT TC
245	514	EARTH.CURR SEL
246	515	EARTH.FLT LEV
247	516	EARTH.FLT DLY
248	517	SET I CONV A
249	518	SET U CONV V
250	519	SET MAX BR TEMP
251	520	SET CONV TYPE
252	521	SET QUADR TYPE
253	522	LANGUAGE
254	523	CURR ACT FILT TC
255	524	PLL CONTROL
256	525	UNI FILT TC
257	526	OFFSET UDC
258	527	CONV TEMP DELAY
259	528	PLL DEV LIM

PROFIBUS Para. No.	DCS 500B Para. No.	Group 3 BRAKE CONTROL:
166	301	[HOLD REF]
167	302	[BR RELEASE]
168	303	[MIN SP IND]
169	304	[ACK BRAKE]
170	305	START DELAY
171	306	STOP DELAY
172	307	HOLD TORQ
173	308	EMESTOP BRAKE

Appendix A – Parameter Tables

PROFIBUS Para. No.	DCS 500B Para. No.	Group 6 DATA LOGGER:
265	601	DLOG.[IN1]
266	602	DLOG.[IN2]
267	603	DLOG.[IN3]
268	604	DLOG.[IN4]
269	605	DLOG.[IN5]
270	606	DLOG.[IN6]
271	607	DLOG.TRIGG COND
272	608	DLOG.TRIGG VALUE
273	609	DLOG.TRIGG DELAY
274	610	DLOG.SAMPL INT
275	611	DLOG.TRIG
276	612	DLOG.STOP
277	613	DLOG.RESTART

PROFIBUS Para. No.	DCS 500B Para. No.	Group 8 DIGITAL OUTPUTS:
331	801	DO1.[IN]
332	802	DO1.[INV_IN]
333	803	DO2.[IN]
334	804	DO2.[INV_IN]
335	805	DO3.[IN]
336	806	DO3.[INV_IN]
337	807	DO4.[IN]
338	808	DO4.[INV_IN]
339	809	DO5.[IN]
340	810	DO5.[INV_IN]
341	811	DO6.[IN]
342	812	DO6.[INV_IN]
343	813	DO7.[IN]
344	814	DO7.[INV_IN]
345	815	DO8.[IN]
346	816	DO8.[INV_IN]

PROFIBUS Para. No.	DCS 500B Para. No.	Group 9 DRIVE LOGIC:
364	901	[ON/OFF]
365	902	[RUN1]
366	903	[RUN2]
367	904	[RUN3]
368	905	[COAST STOP]
369	906	[EME STOP]
370	907	[RESET]
371	908	[START INHIBIT]
372	909	[DISABLE LOCAL]
373	910	[ACK CONV FAN]
374	911	[ACK MOTOR FAN]
375	912	[ACK MAIN CONT]
376	913	[MOTOR 2]
377	914	FIELD HEAT SEL
378	915	MAIN CONT MODE
379	916	STOP MODE
380	917	EME STOP MODE
381	918	PANEL DISC MODE
382	919	PWR LOSS MODE
383	920	COMFAULT MODE
384	921	COMFAULT TIMEOUT

PROFIBUS Para. No.	DCS 500B Para. No.	Group 10 EMF CONTROL:
397	1001	FIELD MODE
398	1002	[FLUX REF]
399	1003	[EMF REF]
400	1004	[FLUX REF SEL]
401	1005	[EMF REF SEL]
402	1006	LOCAL EMF REF
403	1007	EMF KP
404	1008	EMF KI
405	1009	EMF REG LIM P
406	1010	EMF REG LIM N
407	1011	EMF REL LEV
408	1012	FIELD WEAK POINT
409	1013	FIELD CONST 1
410	1014	FIELD CONST 2
411	1015	FIELD CONST 3
412	1016	GENER.EMF REF
413	1017	GENER.WEAK POINT
414	1018	FIELD WEAK DELAY

PROFIBUS Para. No.	DCS 500B Para. No.	Group 11 FAULTS,ALARMS:
430	1101	USER EVENT1.[IN]
431	1102	USER EVENT1.TYPE
432	1103	USER EVENT1.TEXT
433	1104	USER EVENT1.DLY
434	1105	USER EVENT2.[IN]
435	1106	USER EVENT2.TYPE
436	1107	USER EVENT2.TEXT
437	1108	USER EVENT2.DLY
438	1109	USER EVENT3.[IN]
439	1110	USER EVENT3.TYPE
440	1111	USER EVENT3.TEXT
441	1112	USER EVENT3.DLY
442	1113	USER EVENT4.[IN]
443	1114	USER EVENT4.TYPE
444	1115	USER EVENT4.TEXT
445	1116	USER EVENT4.DLY
446	1117	USER EVENT5.[IN]
447	1118	USER EVENT5.TYPE
448	1119	USER EVENT5.TEXT
449	1120	USER EVENT5.DLY
450	1121	USER EVENT6.[IN]
451	1122	USER EVENT6.TYPE
452	1123	USER EVENT6.TEXT
453	1124	USER EVENT6.DLY

PROFIBUS Para. No.	DCS 500B Para. No.	Group 12 MAINTENANCE:
463	1201	DRIVEMODE
464	1202	CMT DCS 500 ADDR
465	1203	DRIVE ID
466	1204	POT1 VALUE
467	1205	POT2 VALUE
468	1206	PERIOD BTW.POT1/2
469	1207	WRITE ENABLE KEY
470	1208	WRITE ENABLE PIN
471	1209	SELECT OPER.SYST.
472	1210	ACTUAL VALUE 1
473	1211	ACTUAL VALUE 2
474	1212	ACTUAL VALUE 3
475	1213	FIELDBUS NODE ADD
476	1214	MACRO SELECT
477	1215	DCF MODE
478	1216	[DI/OVP]
479	1217	OVP SELECT

PROFIBUS Para. No.	DCS 500B Para. No.	Group 13 MOTOR 1 FIELD
496	1301	[F1 REF]
497	1302	[F1 FORCE FWD]
498	1303	[F1 FORCE REV]
499	1304	[F1 ACK]
500	1305	F1 CURR GT MIN L
501	1306	F1 OVERCURR L
502	1307	F1 CURR TC
503	1308	F1 KP
504	1309	F1 KI
505	1310	F1 U AC DIFF MAX
506	1311	F1 U LIM N
507	1312	F1 U LIM P
508	1313	F1 RED.SEL
509	1314	F1 RED.REF
510	1315	OPTI.REF GAIN
511	1316	OPTI.REF MIN L
512	1317	OPTI.REF MIN TD
513	1318	REV.REV HYST
514	1319	REV.REF HYST
515	1320	REV.FLUX TD
516	1321	CURR MIN TD

PROFIBUS Para. No.	DCS 500B Para. No.	Group 14 MOTOR 1 PROTECT.:
529	1401	MOT1.[TEMP IN]
530	1402	MOT1.TEMP ALARM L
531	1403	MOT1.TEMP FAULT L
532	1404	[KLIXON IN]
533	1405	MODEL1.SEL
534	1406	MODEL1.CURR
535	1407	MODEL1.ALARM L
536	1408	MODEL1.TRIP L
537	1409	MODEL1.TC

PROFIBUS Para. No.	DCS 500B Para. No.	Group 15 MOTOR 2 FIELD:
562	1501	[F2 REF]
563	1502	F2 CURR GT MIN L
564	1503	F2 OVERCURR L
565	1504	F2 CURR TC
566	1505	F2 KP
567	1506	F2 KI
568	1507	F2 U AC DIFF MAX
569	1508	F2 U LIM N
570	1509	F2 U LIM P
571	1510	F2 RED.SEL
572	1511	F2 RED.REF

PROFIBUS Para. No.	DCS 500B Para. No.	Group 16 MOTOR 2 PROTECT.:
595	1601	MOT2.[TEMP IN]
596	1602	MOT2.TEMP ALARM L
597	1603	MOT2.TEMP FAULT L
598	1604	MODEL2.SEL
599	1605	MODEL2.CURR
600	1606	MODEL2.ALARM L
601	1607	MODEL2.TRIP L
602	1608	MODEL2.TC

PROFIBUS Para. No.	DCS 500B Para. No.	Group 17 RAMP GENERATOR
628	1701	RAMP.[IN]
629	1702	RAMP.[RES IN]
630	1703	RAMP.[HOLD]
631	1704	RAMP.[FOLLOW IN]
632	1705	RAMP.[FOLL ACT]
633	1706	RAMP.[RES OUT]
634	1707	RAMP.[T1/T2]
635	1708	ACCEL 1
636	1709	DECEL 1
637	1710	SMOOTH 1
638	1711	ACCEL 2
639	1712	DECEL 2
640	1713	SMOOTH 2
641	1714	EMESTOP RAMP
642	1715	SPEEDMAX
643	1716	SPEEDMIN
644	1717	STARTSEL
645	1718	ACC COMP.MODE
646	1719	ACC COMP.TRMIN
647	1720	RAMP.[SPEED SET]

PROFIBUS Para. No.	DCS 500B Para. No.	Group 18 REFERENCE CHAIN
661	1801	REF SUM.[IN1]
662	1802	REF SUM.[IN2]

Appendix A – Parameter Tables

PROFIBUS Para. No.	DCS 500B Para. No.	Group 19 REF. SOURCE
694	1901	CONST REF.[ACT1]
695	1902	CONST REF.[ACT2]
696	1903	CONST REF.[ACT3]
697	1904	CONST REF.[ACT4]
698	1905	CONST REF.DEF
699	1906	CONST REF.REF1
700	1907	CONST REF.REF2
701	1908	CONST REF.REF3
702	1909	CONST REF.REF4
703	1910	REF SEL.[IN1]
704	1911	REF SEL.[SEL1]
705	1912	REF SEL.[IN2]
706	1913	REF SEL.[SEL2]
707	1914	REF SEL.[IN3]
708	1915	REF SEL.[SEL3]
709	1916	REF SEL.[ADD]
710	1917	REF SEL.[REV]
711	1918	SOFTPOT.[INCR]
712	1919	SOFTPOT.[DECR]
713	1920	SOFTPOT.[FOLLOW]
714	1921	SOFTPOT.OHL
715	1922	SOFTPOT.OLL
716	1923	SOFTPOT.[ENABLE]

PROFIBUS Para. No.	DCS 500B Para. No.	Group 20 SPEED CONTROLLER:
727	2001	ERR.[IN]
728	2002	ERR.[STEP]
729	2003	ERR.[WIN MODE]
730	2004	ERR.WIN SIZE
731	2005	ERR.FRS
732	2006	SPC.[IN]
733	2007	SPC.[RINT]
734	2008	SPC.[BAL]
735	2009	SPC.[BALREF]
736	2010	SPC.[BAL2]
737	2011	SPC.[BAL2REF]
738	2012	SPC.[HOLD]
739	2013	SPC.DROOPING
740	2014	SPC.KP
741	2015	SPC.KPSMIN
742	2016	SPC.KPSPOINT
743	2017	SPC.KPSWEAKFILT
744	2018	SPC.KI
745	2019	SPC.TD
746	2020	SPC.TF
747	2021	ERR.[SPEED ACT]

PROFIBUS Para. No.	DCS 500B Para. No.	Group 21 SPEED MEASUREM.
760	2101	TACHOPULS NR
761	2102	SPEED MEAS MODE
762	2103	SPEED SCALING
763	2104	SPEED ACT FTR
764	2105	SPEED ACT FLT FTR

PROFIBUS Para. No.	DCS 500B Para. No.	Group 22 SPEED MONITOR:
793	2201	MIN SPEED L
794	2202	SPEED L1
795	2203	SPEED L2
796	2204	OVERSPEEDLIMIT
797	2205	STALL.SEL
798	2206	STALL.SPEED
799	2207	STALL.TORQUE
800	2208	STALL.TIME
801	2209	MON.MEAS LEV
802	2210	MON.EMF V

PROFIBUS Para. No.	DCS 500B Para. No.	Group 23 TORQ,CURR LIMITS:
826	2301	[SPC TORQ MAX]
827	2302	[SPC TORQ MIN]
828	2303	[TREF TORQ MAX]
829	2304	[TREF TORQ MIN]
830	2305	TORQ MAX
831	2306	TORQ MIN
832	2307	ARM CURR LIM P
833	2308	ARM CURR LIM N
834	2309	MAX CURR LIM SPD
835	2310	MAX CURR LIM N1
836	2311	MAX CURR LIM N2
837	2312	MAX CURR LIM N3
838	2313	MAX CURR LIM N4
839	2314	MAX CURR LIM N5
840	2315	GEAR.START TORQ
841	2316	GEAR.TORQ TIME
842	2317	GEAR.TORQ RAMP

PROFIBUS Para. No.	DCS 500B Para. No.	Group 24 TORQUE REF CHAIN:
859	2401	SEL1.[TREF A]
860	2402	SEL1.TREF A FTC
861	2403	SEL1.[LOAD SHARE]
862	2404	SEL1.[TREF B]
863	2405	SEL1.TREF B SLOPE
864	2406	SEL2.TREF SEL
865	2407	SEL2.[TREF SPC]
866	2408	SEL2.[TREF EXT]
867	2409	SEL2.[TORQ STEP]

PROFIBUS Para. No.	DCS 500B Para. No.	Group 25 FB EXECUTION:

PROFIBUS Para. No.	DCS 500B Para. No.	Group 26 FUNCT. BLOCKS 1:

PROFIBUS Para. No.	DCS 500B Para. No.	Group 27 FUNCT. BLOCKS 2:

PROFIBUS Para. No.	DCS 500B Para. No.	Group 28 FUNCT. BLOCKS 3:

PROFIBUS Para. No.	DCS 500B Para. No.	Group 29 FUNCT. BLOCKS 4

PROFIBUS Para. No.	DCS 500B Para. No.	Group 30 FUNCT. BLOCKS 5:
1000	3072	TON.TD
1001	3074	TON.TD
1002	3076	TON.TD
1003	3078	TON.TD
1004	3080	TON.TD
1005	3082	TON.TD
1006	3084	TON.TD
1007	3086	TON.TD
1008	3088	TON.TD
1009	3090	TON.TD
1010	3092	TON.TD
1011	3094	TON.TD
1012	3096	TON.TD
1013	3098	TON.TD

PROFIBUS Para. No.	DCS 500B Para. No.	Group 31 FUNCT. BLOCKS 6:
1014	3101	TON.TD
1030	3103	TOFF.TD
1031	3105	TOFF.TD
1032	3107	TOFF.TD
1033	3109	TOFF.TD
1034	3111	TOFF.TD
1035	3113	TOFF.TD
1036	3115	TOFF.TD
1037	3117	TOFF.TD
1038	3119	TOFF.TD
1039	3121	TOFF.TD
1040	3122	MONO.RTG
1041	3124	MONO.TP
1042	3125	MONO.RTG
1043	3127	MONO.TP
1044	3128	MONO.RTG
1045	3130	MONO.TP
1046	3131	MONO.RTG
1047	3133	MONO.TP
1048	3134	MONO.RTG
1049	3136	MONO.TP
1050	3150	OSC.TP
1051	3151	OSC.TC
1052	3174	LIM-N1.HLA1
1053	3175	LIM-N1.LLA1
1054	3178	LIM-N1.HLA1
1055	3179	LIM-N1.LLA1
1056	3182	LIM-N1.HLA1
1057	3183	LIM-N1.LLA1
1058	3186	LIM-N1.HLA1
1059	3187	LIM-N1.LLA1
1060	3190	LIM-N1.HLA1
1061	3191	LIM-N1.LLA1
1062	3193	FILT-I.T1
1063	3195	FILT-I.T1
1064	3197	FILT-I.T1
1065	3199	FILT-I.T1

PROFIBUS Para. No.	DCS 500B Para. No.	Group 32 FUNCT. BLOCKS 7:
1066	3202	FILT-I.T1
1080	3204	INT.K
1081	3205	INT.TI
1082	3209	INT.OHL
1083	3210	INT.OLL
1084	3212	INT.K
1085	3213	INT.TI
1086	3217	INT.OHL
1087	3218	INT.OLL
1088	3220	PI-I.K
1089	3221	PI-I.TI
1090	3225	PI-I.OHL
1091	3226	PI-I.OLL
1092	3230	FUNG-1V.X1
1093	3231	FUNG-1V.Y1
1094	3232	FUNG-1V.X2
1095	3233	FUNG-1V.Y2
1096	3234	FUNG-1V.X3
1097	3235	FUNG-1V.Y3
1098	3236	FUNG-1V.X4
1099	3237	FUNG-1V.Y4
1100	3238	FUNG-1V.X5
1101	3239	FUNG-1V.Y5
1102	3288	PAR.VALUE
1103	3289	PAR.VALUE
1104	3290	PAR.VALUE
1105	3291	PAR.VALUE
1106	3292	PAR.VALUE
1107	3293	PAR.VALUE
1108	3294	PAR.VALUE
1109	3295	PAR.VALUE
1110	3296	PAR.VALUE
1111	3297	PAR.VALUE
1112	3298	PAR.VALUE
1113	3299	PAR.VALUE

PROFIBUS Para. No.	DCS 500B Para. No.	Group 33 FUNCT. BLOCKS 8:
1114	3301	PAR.VALUE
1115	3302	PAR.VALUE
1116	3303	PAR.VALUE
1117	3304	PAR.VALUE
1118	3305	PAR.VALUE
1119	3306	PAR.VALUE
1120	3307	PAR.VALUE
1121	3308	PAR.VALUE

PROFIBUS Para. No.	DCS 500B Para. No.	Group 34 FUNCT. BLOCKS 9:

PROFIBUS Para. No.	DCS 500B Para. No.	Group 36 12Pulse Oper
1140	3601	REV_DELAY
1141	3602	REV_GAP
1142	3603	FREV_DELAY
1143	3605	DIFF_CURRENT
1144	3606	DIFF_CURR_DELAY
---	3615	ADJ_REF1

Appendix A – Parameter Tables

PROFIBUS Para. No.	DCS 500B Para. No.	Group 37 WINDER PARAMETER:
1180	3701	DIAREL
1181	3702	PARW.VALUE
1182	3703	PARW.VALUE
1183	3704	PARW.VALUE
1184	3705	PARW.VALUE
1185	3706	PARW.VALUE
1186	3707	PARW.VALUE
1187	3708	PARW.VALUE
1188	3709	PARW.VALUE
1189	3710	PARW.VALUE
1190	3711	PARW.VALUE
1191	3712	PARW.VALUE
1192	3713	PARW.VALUE
1193	3714	PARW.VALUE
1194	3715	PARW.VALUE
1195	3716	PARW.VALUE
1196	3717	PARW.VALUE
1197	3718	PARW.VALUE
1198	3719	PARW.VALUE
1199	3720	PARW.VALUE
1200	3721	PARW.VALUE
1201	3722	PARW.VALUE
1202	3723	PARW.VALUE
1203	3724	PARW.VALUE
1204	3725	PARW.VALUE
1205	3726	PARW.VALUE

PROFIBUS Para. No.	DCS 500B Para. No.	Group 38 FB WINDER
1230	3807	DIAC.[LEVVEL]
1231	3808	DIAC.[LIMWR]
1232	3809	DIAC.[LIMRI]
1233	3810	DIAC.[TN]
1234	3811	DIAC.[TDEDIA]
1235	3812	DIAC.[LEVSP]
1236	3817	VERE.[ADDVAL1]
1237	3818	VERE.[MUL1]
1238	3821	LSW.[MUL1]
1239	3822	LSW.[MUL2]
1240	3830	SSL.[INTVAL]
1241	3837	SC.[K1]
1242	3838	SC.[TN]
1243	3839	SC.[LEV_K2]
1244	3840	SC.[K2]
1245	3841	SC.[WEIGHT]
1246	3843	ACW.[SWLEV]
1247	3844	ACW.[WEI-MP]
1248	3845	ACW.[WEI-MN]
1249	3846	ACW.[WEI-RP]
1250	3847	ACW.[WEI-RN]
1251	3848	ACW.[WEWI]
1252	3855	TERE.[MINREF]
1253	3856	TERE.[INREF]
1254	3857	TERE.[DIARED]
1255	3858	TERE.[TRED_IN]
1256	3859	TERE.[T]
1257	3864	TOTE.[WEIGHT]
1258	3867	WILO.[T_ON]

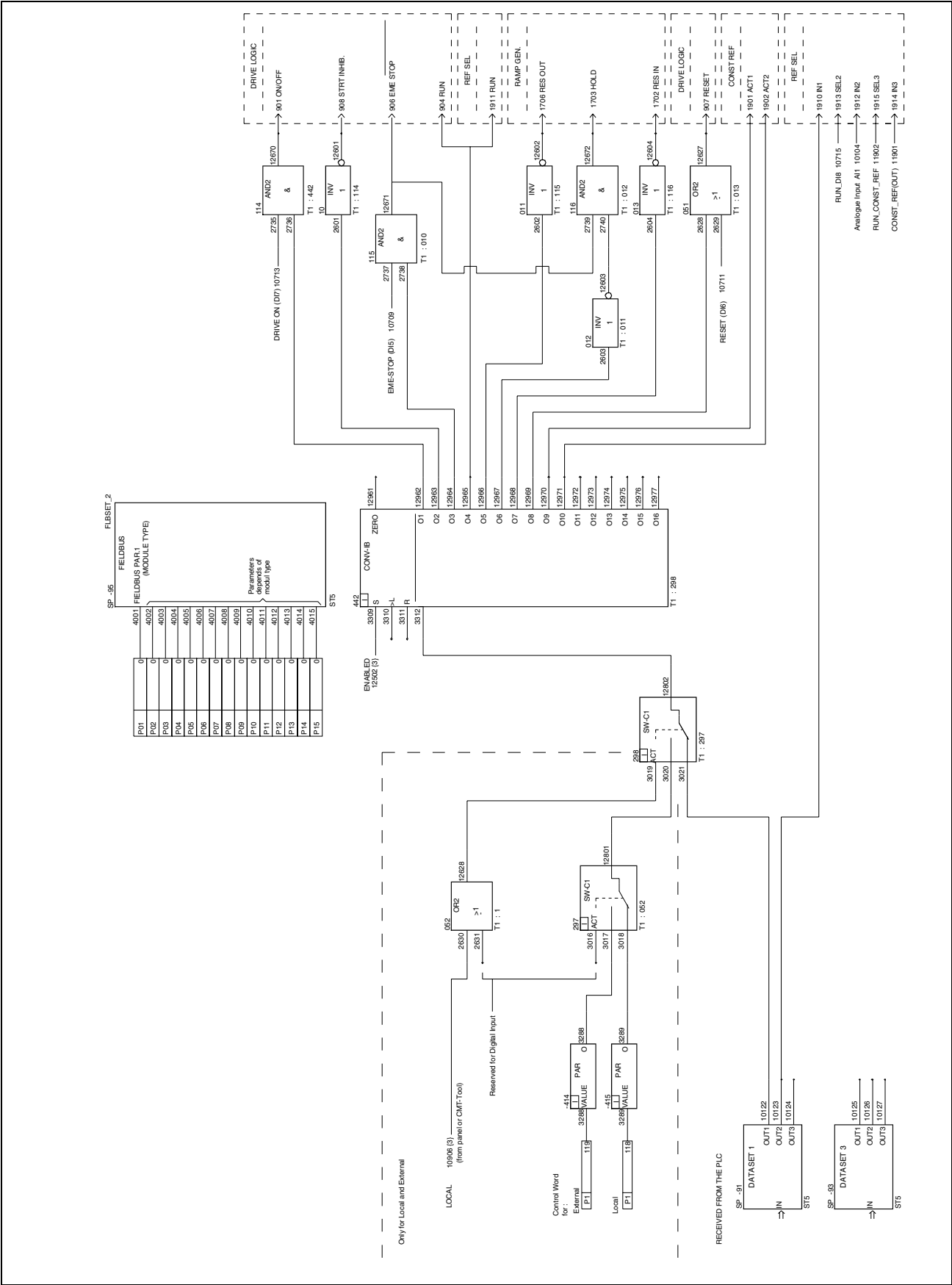
PROFIBUS Para. No.	DCS 500B Para. No.	Group 39 FUNCT. BLOCKS 10:
1270	3902	DT.[K]
1271	3903	DT.[TN/TZ]
1272	3905	DT.[K]
1273	3906	DT.[TN/TZ]
1274	3925	SW_P_T.IN1.1
1275	3926	SW_P_T.IN1.2
1276	3928	SW_P_T.IN2.1
1277	3929	SW_P_T.IN2.2
1278	3931	SW_P_T.IN3.1
1279	3932	SW_P_T.IN3.2
1280	3936	SW_P_T.IN1.1
1281	3937	SW_P_T.IN1.2
1282	3939	SW_P_T.IN1.1
1283	3940	SW_P_T.IN2.2
1284	3942	SW_P_T.IN3.1
1285	3943	SW_P_T.IN3.2
1286	3947	SW_P_T.IN1.1
1287	3948	SW_P_T.IN1.2
1288	3950	SW_P_T.IN2.1
1289	3951	SW_P_T.IN2.2
1290	3953	SW_P_T.IN3.1
1291	3954	SW_P_T.IN3.2
1292	3958	SW_P_T.IN1.1
1293	3959	SW_P_T.IN1.2
1294	3961	SW_P_T.IN2.1
1295	3962	SW_P_T.IN2.2
1296	3964	SW_P_T.IN3.1
1297	3965	SW_P_T.IN3.2
1298	3969	SW_P_T.IN1.1
1299	3970	SW_P_T.IN1.2
1300	3972	SW_P_T.IN2.1
1301	3973	SW_P_T.IN2.2
1302	3975	SW_P_T.IN3.1
1303	3976	SW_P_T.IN3.2
1304	3980	SW_P_T.IN1.1
1305	3981	SW_P_T.IN1.2
1306	3983	SW_P_T.IN2.1
1307	3984	SW_P_T.IN2.2
1308	3986	SW_P_T.IN3.1
1309	3987	SW_P_T.IN3.2

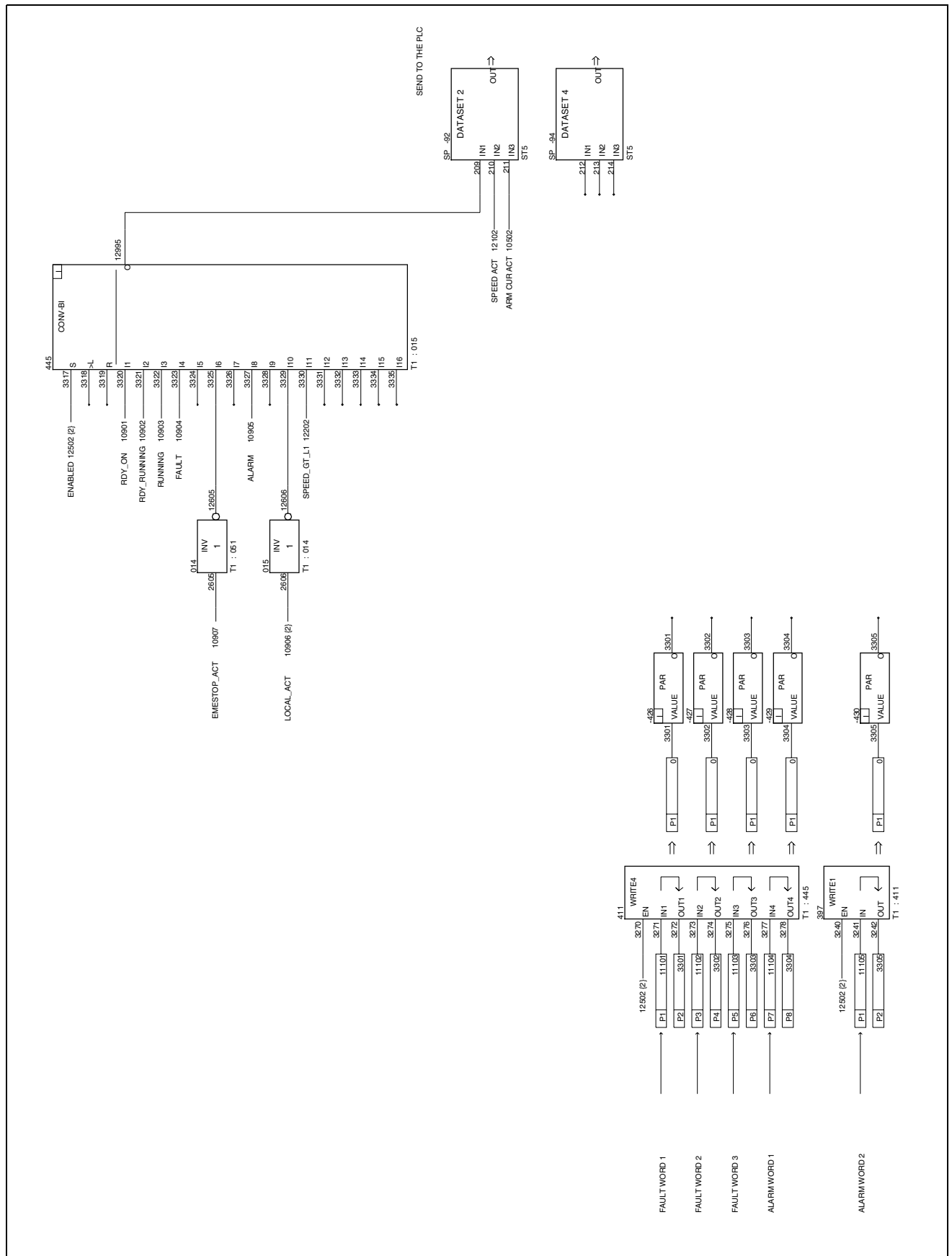
Appendix B – Fieldbus Application (FIBU1_5)

APPL		DCS500B FIELDBUS APPLICATION		TARGET	
Name		SOFTWARE >= DC21x230		Target	
Version		FIELDBUS APPLICATION		Version	
Description				Library	
Compiled				Version	

Used application function blocks		
Task 1	Task 2	Task 3
OR2_052 SWC1_297 SWC1_298 CVIB_442 AND2_114 INV_010 AND2_115 INV_011 INV_012 AND2_116 INV_013 OR2_051 INV_014 INV_015 CVBL_445 WR14_411 WR11_397		PAR_414 PAR_415 PAR_426 PAR_427 PAR_428 PAR_429 PAR_430

After downloading this application the following parameters have to be set :	
302 = 0 901 = 12670 904 = 12665 906 = 12671 907 = 12627 908 = 12601 1702 = 12604 1703 = 12672 1706 = 12602	1901 = 12970 1902 = 12971 1906 = 1000 *1 1907 = -1000 *1 1910 = 10123 1911 = 12965 1912 = 10104 1913 = 10715 1914 = 11901 1915 = 11902 2504 = 1
*1 Speed values for jogging These parameters are not set with Macro4.	





Appendix C – GSD / EDS files

The documentation is available via internet:

www.abb.com/dc

select **DC-Drives**

then **Downloads**

then the converter type **DCS 500**

you will find ***Serial communication***

Appendix D – Application Download with CMTool

General

This appendix describes how to download an application or an existing parameter setting for fieldbus operation to the DCS 500B converter.

Setting DCS 500B to the default values

It is permissible to download **only one** application. Before downloading an application, make sure that no application is present in the DCS 500B.

To be sure, set the default values (factory setting) with the following steps.

Rescue specific parameter values

The DCS 500B converters with

- modified voltage- or current-measurement by hardware (e.g. PIN board)
- all DCS 500B with a nominal current of $\geq 2050\text{A}$
- all DCR's and all DCP's

have one or more parameters from 517 up to 521, which are not equal to zero. Please check these parameters and write down these values.

517 = _____ 518 = _____ 519 = _____

520 = _____ 521 = _____

These parameters are to be checked and set to these "old" values after

- downloading the default values (factory setting)
- after downloading an application
- after downloading another parameter setting

Erasing RAM



Switch off the electronics.



Plug in Jumper S2 at 5-6; Jumper S2 is located on the SDCS-CON-2 computer PCB at the middle of the top edge.



Switch on the electronics

Wait for **u** on the LED display of the SDCS-CON-2.
When the letter **u** appears, this means the RAM has been erased.

Download default values



Switch off the electronics.



Plug in Jumper S2 at 1-2 for parameter download.



Switch on the electronics

Wait for **A129** on the LED display of the SDCS-CON-2.



Save the values in non-volatile memory!

11202 = SAVE MOT1 SET

11202 = SAVE MOT2 SET

Note: While the parameter set is being saved, no parameters may be altered; please bear this in mind for the panel (CDP312), for the CMTTool and for serial communication



Switch off the electronics.



Plug in Jumper S2 at 3-4 for normal operation.

Creating setup file for the CMTool

If no default parameter set for the CMTool is available do the following procedure.

In the CMTool choose: **ParSig: Upload**

This will Start the upload function of DCS 500B parameters. After completion *Save to **Startup File*** and for the firmware with *Save As...* an identically file named **S21.230** (e.g.)

Download an application or parameter file

For fieldbus operation you can download an application file or a parameter setting file which include the relevant fieldbus capability

Adapter initialization



In switched-off condition, now connect the fibre-optic link between the DCS 500B and the field bus adapter, and the cable link for the adapter's power supply.

Switch on the electronics of DCS 500B incl. the Adapter module

Wait approx. 10 seconds.
The adapter is detected by the DCS 500B, and sets its default values into Parameter Group 40.
Parameter 40.01 should now have the string of the connected field bus adapter.
Shown by using the CDP312 panel.

When using the CMTool a new upload is necessary.

Download with CMTool

Now either the application software can be loaded (e.g. FIBU1_5.**QOA**) or an existing parameter setting for fieldbus operation (*.**QOP**), which is saved in the past with the option "All items" (this parameter setting also contains the application function blocks).

Application software

In CMTool:

Connect: Download Application => Open the relevant application file (*.**QOA**) and start downloading.

Parameter setting file

CMTool:

ParSig: Open => Open the relevant parameter setting

ParSig: Download => Start downloading to the DCS 500B

Note: Is the DCS 500B a C4, a DCR or a DCP unit or is the parameter setting from a such unit, then please check the parameters from 517 up to 521 after downloading.

**Check and adjust
parameter settings**

Check and / or adjust the fieldbus parameter of DCS 500B (parameter group 40) of appropriate values, either with panel CDP312 or CMTool.



40.01 = ?

Take care that the value is set to the string of the connected adapter.

When you use the CM tool **without** having performed a new upload, you will see "Fieldbus".

40.02 ... 40.15 = ?

Check and / or set parameters 4002 to 4015 to the required adapter-specific and application-specific data.

Enable application Function Blocks.



25.04 = 1 Enables the application function blocks.

Save Parameters

Saves the altered values in non-volatile memory of DCS 500B!



11202 = SAVE MOT1 SET

11202 = SAVE MOT2 SET

Note: While the parameter set is being saved, no parameters may be altered; please bear this in mind for the panel (CDP312), for the CMTool and for serial communication.



Switch off the electronics.

DCS 500B and adapter; after switching off, wait briefly until LEDs and display have gone out.

CMTool After start-up, we recommend executing a new upload, and saving the result with the "All items" option as a file on a floppy together with an appropriate comment.

Continue with the normal drive start-up procedure.

Appendix E – Macro 4 Handling

How to handle the Macro 4 with the DCS 500B converter.

General

The macro 4 of the DCS 500B contains a list of connections and application function blocks. The macro can be activated instead of downloading an application file (*.qoa) or a parameter file (*.qop) which contains an application. With the DCS 500B it is possible to have **only one** software application. If more application functions are necessary, then it would be better not to activate the macro.

The macro procedure will be started immediately after changing the value of parameter 1214.

This procedure works as follows:

- All connections and parameters which have to be changed by this procedure will be checked to ensure that the current values are equal to the values of the macro list of the macro activated before.
 - If this check is ok, the procedure changes all connections and parameters concerning the internal macro list.
 - If this check is **not** ok, the procedure will set the alarm A143. In this case no pointer or parameter has been changed and the macro parameter 1214 is set to the values set before the check.

Important!

Before activating the macro function (Parameter 1214), take care that the DCS 500B has no function blocks loaded and active. An easy check option here is Parameter 2504, which has to have the value of 0. Otherwise set the DCS 500B to the default values.

If the DCS 500B has already modified connections, please check the modification after activating the macro.

Activating Macro 4

Using the CDP312 panel or the CMTTool, select Parameter 1214 and set the value to **4** = MACRO 4. Press the ENTER button. After the Macro 4 (field bus application) has set the connections and the application functions blocks, the field bus application will be active. The alarms A101 and A102 are normal, if the DCS 500B is not in local mode.

Deactivating Macro 4

By using the CDP312 panel or the CMTTool select parameter 1214 and set the value to **0** = NONE. Press the ENTER button. After the macro has reset the connections and the application functions blocks

concerning the internal macro list, the fieldbus application is no longer active.

The alarm A143 (Macro change failed) appears, if a connection or an application function block has changed after activating this macro. The macro can not be deactivated with the macro function. For deactivating, a complete reset of the parameters to the default values (factory setting) is necessary (e.g. by using the jumper S2); see also Appendix D.

Up- and Downloading of parameter settings

By using the CDP 312 panel

After uploading the parameter setting, the parameters which are different to the default values and the function blocks are stored in the panel.

This saved setting can be downloaded into a DCS 500B with default values.

After downloading, the alarm A143 will be shown and Parameter 1214 has the value 0 = NONE. This is a reaction of the macro checking procedure. This alarm doesn't matter, because all parameters and function blocks are downloaded except Parameter 1214.

Save the parameter setting with 11202 (backup save mode). The alarm is reset by switching the electronics supply off and on again.

By using the CMTool

After uploading the setting, please save this setting with the selected option "All items".

This saved setting can be downloaded into a DCS 500B with default values.

After downloading, the alarm A143 will be shown and Parameter 1214 has the value 0 = NONE. This is a reaction by the macro checking routine. This alarm doesn't matter, because all parameters and function blocks are downloaded except Parameters 1214 and 2504.

Set the parameter 2504 to 1 and save the parameter setting with 11202 (backup store mode). The alarm can be reset by switching the electronic supply off and on again.

Alarm A143 Macro change failed

This alarm will always be shown if the macro function is started. The macro function will be started when the value of Parameter 1214 has changed. This alarm cannot be reset; for a reset please switch the electronics supply of the DCS 500B off and on again.

After downloading with A143, the value of Parameter 1214 is no longer an indication of the macro function currently is running. What's important is the parameter setting and the activated application function blocks.

Appendix F – Distinction of FIBU1_4 and FIBU1_5

The field bus application FIBU1_5 has some more activated application function blocks and some changed bits of the control and status words. The parameters 1906 and 1907 contents the speed references for inching.

Data set 1.1 and 1.2 Control word and Speed reference

Data set	Bit	FIBU1_4	FIBU1_5
1.1 Control-word	0	ON/OFF	
	1	Run	Strt Inhibit (OFF_2)
	2	EmeStop	
	3	Res_In	Run (*1) (with Bus Ref)
	4	Res_Out	
	5	Hold	Hold (*2)
	6	Res_In	
	7	Reset	
	8	unused	Inching 1
	9	unused	Inching 2
	10	Sel. BusRef	
	11 ... 15	unused	
1.2		Speed reference	

| means that the signal is inverted (e.g. 0 is Emergency Stop)

*1 FIBU1_4: The bit 1 (Run command) has an AND function with the terminal X6:8
FIBU1_5: The bit 1 gives the Run command to the drives with the speed reference via the field bus. The terminal X6:8 give the Run command with the speed reference from the analogues Input AI1, if the bit 1 is zero.

*2 FIBU1_4: If the bit 5 and the bit 2 is zero, the ramp generator is hold and the drive could not stop via Emergency Stop.
FIBU1_5: If the bit 5 and the bit 2 is zero, the hold is internally reset and the drive can stop concerning the selected mode.

Data set 2.1, 2.2 and 2.3 Statusword and actual values

Data set	Bit	FIBU1_4	FIBU1_5
2.1 Status-word	0	Rdy_On	
	1	Rdy_Running	
	2	Running	
	3	Fault	
	4	Running	
	5	EmeStop	EmeStop
	6	unused	
	7	Alarm	
	8	unused	
	9		Local not active
	10		Speed > L1
	11 ... 15	unused	unused
2.2		Actual Speed	
2.3			Armature Current

| means that the signal is inverted (e.g. 0 is Emergency Stop)



ABB Industrietechnik GmbH
ABB Automation Products GmbH
Postfach 1180
D-68619 Lampertheim
Tel: +49 (0) 62 06-5 03-0
Fax: +49 (0) 62 06-5 03-6 09
www.abb.com/dc



086R0201A1470000

3ADW 000086 R0201 Rev B

11.01