DCS800

DCS800 replaces the DCS500(B)
Upgrade support
Parameter comparison

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Overview

Among the advantages of replacing a drive unit is that one additional functionality or another will be obtained for increasing productivity. The drive unit will also often have to be replaced, to obviate the need for expensive or no-longer-available spares.

The following document deals with the operation of DC motors; other applications are not addressed in detail here.
This document, moreover, relates only to the DCS500B. If there is no field bus interface, then it is also applicable for the DCS500.

As-is analysis

The requirements for the drives can be highly disparate, which is why these have to be determined first of all.

Mechanics

There will be no space problems, since the DCS800s are smaller than the DCS500B series.

Connections

It is essential to check the existing system (DCS500B), so as to record all connections being used and options being deployed.

The computer boards of the DCS500B (SDCS-CON-2) and of the DCS800 (SDCS-CON-4) are fitted with the same plug-connector and terminal numbers for the conventional connections.
For the eliminated plug connectors X16 (for the FEX link) and X17 (for the SDCS-IOE-1 expansion), an alternative solution is available.
The power supply of the SDCS-CON-2 has provided +48 V for the digital inputs. This voltage source has been reduced to 24 V in the case of the SDCS-CON-4.

Software

It is important to have an up-to-date parameter set of the DCS500B, to enable a detailed checking. If such a parameter set isn't available, please see appendix B for saving parameter set by using DDCTool.
If a customized software application is used, these documents and the contact person are of vital importance. Otherwise, time-consuming reconstruction will be required.

Software and parameters

A DCS500 that uses the standard (default) structure can be replaced; this is because both drive units, the DCS500B and the DCS800, have a setpoint-value ramp, a speed controller and a current controller.

Implementation may become more elaborate and time-consuming if the application concerned deviates from the standard structure. The DCS500 structure could be modified using parameters or also expanded using application function blocks.

Recognizing a structural change

A structural change can best be recognized by comparing the parameters concerned with a default set. Here are a few (though important) parameters for initial checking:

Parameter	Default value	Remark	
401	12402	Current setpoint value	
405	0 = TORQ_REF	Current setpoint value	
1209	6P-Single	6- or 12-pulse	
1215	Disable (0)	DCF mode	
1701	11903	Ramp input	
1801	11701	Speed intermediate value	
2001	11802	Speed setpoint value	
2006	12001	Speed controller input	
2021	12102	Speed actual value	
2406	Speed_Controlled (1)	Torque source	
2407	12004	Torque setpoint value	

Recognizing a software application

Parameter 2504 can be used to determine whether an application is active in the DCS500B.

Parameter	Default value	Remark	
1214	None (0)	Macro	
2504	0	Application function blocks **not** active	
	1	Application function blocks active	
4001	Disable	Field bus interfacing	
11218	x	Firmware version	

The further procedure will be governed by the following parameter combinations:

A1. **2504 = 0**

No application function blocks are active here. This means that parameters **1214 = None (0)** and **4001 = Disable (0)** will be inactive too.

In the case of this application, modifications shall be performed only by using the parameter list. A parameter comparison with the as-delivered status will enable most modifications to be converted by means of the list provided in Appendix A.

A2. **2504 = 1**

and 1214 = None (0)
Application function blocks are active here.

The further procedure will be simplified if plans or diagrams are available; where appropriate, the “author” must be determined.

For your own researches, a parameter set is required that completely images the data series from Parameters 2501, 2502 and 2503. These data series contain the execution order and the numbers of the application function blocks activated.

Depending on the structure of the application involved, a decision will have to be taken on whether the changeover from DCS500B to DCS800 is best performed by means of a parameter setting (AP = Adaptive Programming) or ControlBuilder DCS800.

Note:
If a serial communication, i.e. 4001 ≠ Disable (0), is additionally active, it could involve a pure or modified interfacing application (see also A6).

A3. **2504 = 1**

and 1214 = Macro 1
The application relates to a predefined setting that can be implemented onto the DCS800.

A4. **2504 = 1**

and 1214 = Macro 2
The application relates to a predefined setting that can be implemented onto the DCS800.

A5. **2504 = 1**

and 1214 = Macro 3
The application relates to a predefined setting that can be implemented onto the DCS800.

A6. **2504 = 1**

and 1214 = Macro 4
This macro involves interfacing the data words from serial communication (field bus) to DCS500(B) standard functions.

The DCS800 already offers this interface in the standard version. However, the data words, the bits and the individual control sequences

have to be checked also best in the PLC program.

A7. **4001 ≠ Disable (0)** A serial communication function is active. The internal interface is written using A2 and A6.

Important note:
Apart from a few exceptions, e.g. Modbus and CANopen adapter, each field bus adapter has an unalterable identifier (ID), which is known to the communication master (PLC) thanks to the PLC configuration. Replacement with a different or newer type of adapter is thus always conditional upon an action in the PLC program.
If the program can no longer be altered, then in each individual case it is essential to check whether the “old” field bus adapter is also supported by the DCS800.

Field bus communication

Nxxx + DCS500B		**Rxxx + DCS800**
NCAN-02	CANopen	RCAN-01
NCNA-01	ControlNet (EDS file !)	RCNA-01
NCSA-01	CS31 bus	not available
	=> upgrade to Profibus	RPBA-01
NDNA-02	DeviceNet (EDS file !)	RDNA-01
NMBA-01	Modbus RTU	RMBA-01
NMBP-01	Modbus Plus	not available
	=> upgrade to Modbus TCP	RETA-01
NPBA-02	Profibus DP (GSD File)	RPBA-01
NPBA-12	Profibus DP (GSD file) Profibus DPV1 (GSD file)	RPBA-01

Please note: In the case of the DCS500B, a fast stop (E stop) has to be acknowledged. This is not necessary in the case of DCS800, but the DCS800 requires the 0 → 1 edge of ON, bit 0, and RUN, bit 3.

Appendix A

Parameter table

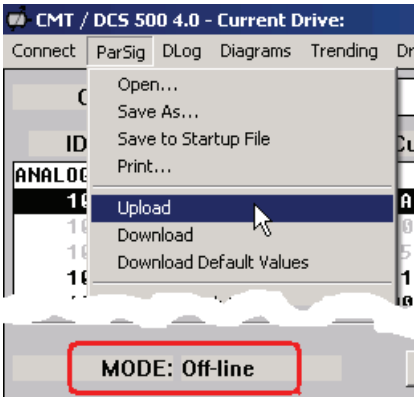
DCS500B Group		Group Name		DCS800
Input	Output			Group
1	101	ANALOG INPUTS	→	13
2		ANALOG OUTPUTS	→	15
3	103	BRAKE CONTROL	→	42
4	104	CURRENT CONTROL	→	43
5	105	CONVERTER AND MOTOR	→	99
6	106	DATA LOGGER		- -
	107	DIGITAL INPUTS	→	10
8		DIGITAL OUTPUTS	→	14
9	109	DRIVE LOGIC	→	21
10	110	EMF CONTROL	→	44
11	111	FAULTS, ALARMS	→	- -
12	112	MAINTENANCE	→	4, 16, 99
13	113	MOTOR 1 FIELD	→	44, 45
14	114	MOTOR 1 PROTECT.	→	31
15	115	MOTOR 2 FIELD	→	49
16	116	MOTOR 2 PROTECT.	→	45, 49
17	117	RAMP GENERATOR	→	22
18	118	REFERENCE CHAIN		- -
19	119	REFERENCE SOURCES	→	23
20	120	SPEED CONTROLLER	→	11, 24
21	121	SPEED MEASUREMENT	→	50
22	122	SPEED MONITOR	→	30
23	123	TORQUE and CURRENT LIMITS	→	20
24	124	TORQUE REFERENCE CHAIN	→	25, 26
25	125	FB EXECUTION	→	83
25…34 37…39	126..130 138..139	APPLICATION FUNCTION BLOCKS x		83...86 (AP) 60..69 (CB)
	135	DDC TOOL	→	- - .
36	136	12-PULSE OPERATING		47
40		FIELDBUS		51

AP → Adaptive programming
CB → ControlBuilder DCS800

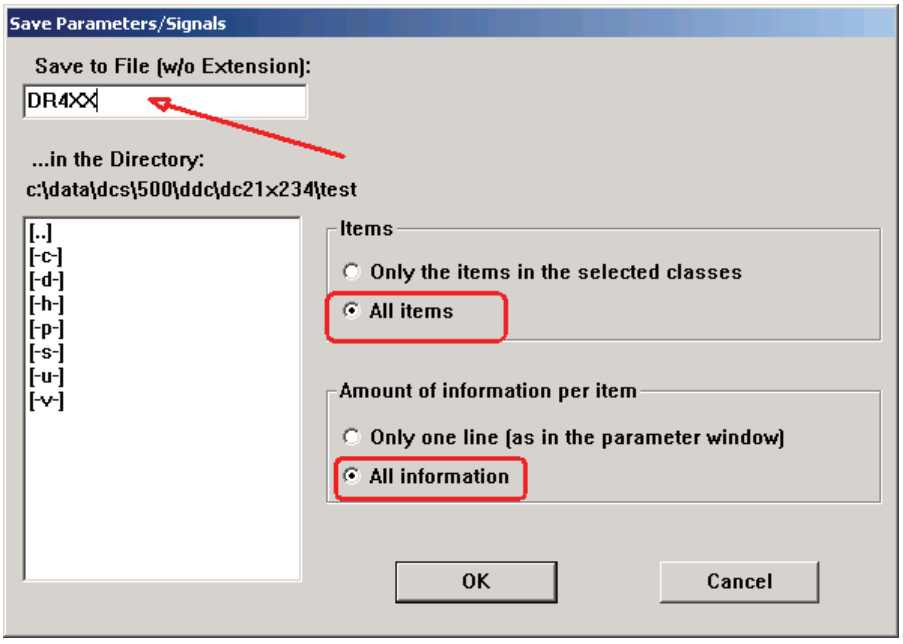
Appendix B

Saving a parameter set of DCS500(B) by using DDCTool 4.x

- Take a laptop with a proper working DDCTool 4.
- Connect the optical fibre cable of DDCTool to V1 and V2 of board COM-5 (or COM-1)
- In Off-line mode select Upload of the menu ParSig
- After successful uploading write a comment into the field on top of the ParSig window.



- From menu ParSig please select “Save as …”
- Fill out a file name without extension. Please note, maximum 8 characters can be used; mark also “All item” and “All information”.
- Press OK



- After this procedure there are saved two files with the desired file name and different extensions:

  *.QOP are to be used with DDCTool; e.g. for comparing.

  *.TXT can be read by using an editor; helpful for reconstruction.

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