MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with selected ABB PIN-41A reference pages; not the complete installation manual

DCR500B / DCR600 / 3BSE004939R1

SDCS-PIN-41A

THYRISTOR PULSE TRANSFORMER BOARD

OFFICIAL SOURCES

ABB3ADW000092R0301 RevC and 3ADW000093R0701 RevG. Original publisher, safety and PIN41A reference pages unchanged.

DCS Thyristor Power Converters

for DC Drive Systems
25 to 5200 A

Service Manual
DCS 500B
DCS 600 MultiDrive

Code: 3ADW 000 093 R0701 Rev G

S_M_E_G.DOC

EFFECTIVE: Jul. 9th, 2004
SUPERSEDES: Rev F Jul. 4th, 2002

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Safety Instructions

Attention

The manual *Safety and operating instructions for drive converters* (3ADW 000 033) has to be followed strictly.

Overview

This chapter contains safety instructions which must be complied with during installation, operation and maintenance of the power converters series **DCS 500B or DCS 600**. If these instructions are not complied with, this may result in injuries (perhaps even with fatal) or in damage to the power converter, the motor and the driven machine. Before starting with any work whatsoever at or with this unit, you must read the information given in this chapter.

Warnings

Warnings provide information on states which if the specified procedure for the state concerned is not meticulously complied with may result in a serious error, in major damage to the unit, in injury to persons and even in death.
They are identified by the following symbols:



Danger: High Voltage! This symbol warns you of high voltages which may result in injuries to persons and/or damage to equipment. Where appropriate, the text printed adjacent to this symbol describes how risks of this kind may be avoided.

- All electrical installation and maintenance work on the thyristor power converter must be carried out by properly qualified staff who have been thoroughly trained in electrical engineering.
- The thyristor power converter and its adjacent units must be properly earthed by qualified professionals.
- You must NEVER perform any work on the thyristor power converter while it is still switched on. First switch the unit off, use a measuring instrument to make absolutely sure that the power converter has really been de-energized, and only then you may start with the work concerned.
- Due to external control circuits, there may be dangerously high voltages present at the thyristor power converter even after the line voltage has been switched off. So always work at the unit with appropriate caution! Non-compliance with these instructions may result in injury (or even death!).



General warning: this symbol warns you of non-electrical risks and dangers which may result in serious or even fatal injury to persons and/or in damage to equipment. Where appropriate, the text printed adjacent to this symbol describes how risks of this kind may be avoided.

- When thyristor power converters are in use, the electric motors, power transmission elements and the driven machines are working in an extended operating range, which means they have to cope with a relatively high loading.
- You should have made sure that all units, devices and appliances used are actually suitable for this higher loading.
- If you have to operate the thyristor power converter at a rated motor voltage and/or a rated motor current significantly below the figures stated in the thyristor power converter's output data, you must take appropriate precautionary measures to protect the unit against overspeed, overload, breakage, etc., by modifying the software or hardware appropriately.
- For insulation testing, you must disconnect all cables from the thyristor power converter. You should avoid operating your unit at values other than the rated data. Non-compliance with these instructions may cause lasting damage to the thyristor power converter.

- The thyristor power converter possesses a number of automatic reset functions. When these functions are executed, the unit will be reset after an error and will then resume operation. These functions should not be used if other units and devices are not suitable for an operating mode of this kind, or if their use might entail dangerous situations.



Warning of electrostatic discharge:
this symbol warns you against electrostatic discharges which may damage the unit. Where appropriate, the text printed next to this symbol describes how a risk of this kind may be avoided.

Notes

Notes supply information on states requiring particular attention, or indicate that additional information is available on a specific topic. For this purpose, the following symbols are used:

CAUTION! **Cautions** are designed to draw your attention to a particular state of affairs.

Note A **note** contains or refers you to additional information available on the particular topic concerned.

Mains connection

You can use a switch disconnector (with fuses) in the power supply of the thyristor power converter to disconnect the electrical components of the unit from the power supply for installation and maintenance work. The type of disconnector used must be a switch disconnector as per EN 60947-3, Class B, so as to comply with EU regulations, or a circuit-breaker type which switches off the load circuit by means of an auxiliary contact causing the breaker's main contacts to open. The mains disconnector must be locked in its "OPEN" position during any installation and maintenance work.

EMERGENCY STOP buttons

EMERGENCY STOP buttons must be installed at each control desk and at all other control panels requiring an emergency stop function. Pressing the STOP button on the CDP 31x control panel of the thyristor power converter will neither cause an emergency motor stop, nor will the drive be disconnected from any dangerous potential.

To avoid unintentional operating states, or to shut the unit down in case of any imminent danger according to the standards in the safety instructions it is **not** sufficient to **merely** shut down the drive via signals „RUN“, „drive OFF“ or „Emergency Stop“ respectively „control panel“ or „PC tool“.

Intended use

The operating instructions cannot take into consideration every possible case of configuration, operation or maintenance. Thus, they mainly give such advice only, which is required by qualified personnel for normal operation of the machines and devices in industrial installations.

If in special cases the electrical machines and devices are intended for use in non-industrial installations - which may require stricter safety regulations (e.g. protection against contact by children or similar) -, these additional safety measures for the installation must be provided by the customer during assembly.

2.30	COMMON PARTS FOR CONV. DCS500/DCS600 and DCF500/600				
DESCRIPTION	QTY		CODE	TYPE/DATA	NOTES
*)DI/DO connection board	1*		3BSE005176R1	SDCS-IOB-21	24V DC-48V DC; digital (A9)
*)DI/DO connection board	1*		3BSE005177R1	SDCS-IOB-22	115V AC ; digital (A9)
*)DI/DO connection board	1*		3BSE005178R1	SDCS-IOB-23	230V AC ; digital (A9)
AI/AO connection board	1		3BSE004086R1	SDCS-IOB-3	analog (A 10)
Communication Board	1		3ADT220059R1	SCDS-COM-5	separate
AMC-Communic. Board DCS600	1		3ADT312700R1	AMC-DC-2 Board	without Software f. DCS600
AMC-Communic. Board DCS600	1		3ADT312700R2	AMC-DC-Clas-2 B.	without Software f. DCS600
Control Panel CDP312	1		3ADT220071R5	CDP312 Rev.F	For DCS500B & DCS600
I/O Extension Board	1		3BSE005851R1	SDCS-IOE-1	
Adapt. Board /Analog Tacho	1		3ADT300600R1	PS 5311- SET	

*) Select only one Board

DCR-Kit contains:	2Q	4Q

2.40	PARTS FOR DCR REBUILD KITS, (12 Pulse etc. see item 2.41)				
DESCRIPTION	2Q	4Q	CODE	TYPE/DATA	NOTES
Cooling fan	1	1	DCA0017670P1	CN52B2	for DCR500B/600 Type
Pulse Interface Board	1	1	DCF1154914R1	SDCS-REB-1	DCR >= 1 Stage
Pulse Amplifier Board	1	1	DCF1192115R1	SDCS-REB-2	DCR >= 2 Stages
Pulse Distribution Board	1	1	3ADT309300R1	SDCS-REB-3	DCR >= 3 Stages
Power Supply for REB-2	2	2	DCE8920037P1	NPSM-01	230V/24V DC/ 2A >= 2 Stages
below listed SDCS- PIN- 41A and PIN-51 are identical with A5/A6/A7 and C4 Modules					
Pulstransformer Board	1	2	3BSE004939R1	SDCS-PIN-41 A	
Power interface board	1	1	3BSE004940R1	SDCS-PIN-51	for 400V up to 1000V AC
Current Transformer 2500/1A	2	2	3ADT751010P1	LT2032 2500/1A	T51/T52 for A5 and A6 Range
Current Transformer 4000/1A	2	2	3ADT751007P1	4000/1A	T51/T52 for A7/C4 Range

2.41	PARTS FOR 12 PULSE SYST.; SUPPLY > 800V-AC & HARD PAR. CONV. A7P				
DESCRIPTION	2Q	4Q	CODE	TYPE/DATA	NOTES
Current Measurement Aid	1	1	3ADT220090R22	SDCS-CMA-2	12 Pulse and Paralleling Converter
Insulation Monitor (10V)	1	1	DCA0019192P1	IRDH 265-4	mounted inside Cab.10-990kOhm
Insulation Monitor (10V)	1	1	3ADV050058P5	IRDH 365-4	Door mounted Vers.10- -990kOhm
Insulation Monitor (10V)	1	1	3ADV050058P1	IRDH 265-3	inside Cab.-EMBR; 2 - 200kOhm
Volt. Adapt. Board f. IRDH 6P.	1	1	DCA0019711P1	AGH 204 S	For IRDH >= 690V-AC 6Pulse
Volt. Adapt. Board f. IRDH 12P.	1	1	3ADV050058P2	AGH 150 W-4	For IRDH >= 690V-AC 12Pulse
DC-DC Transducer (Knick) A92	1	1	3ADN260004P1	8680 A1/A92	For U-AC > 800V & 12 Pulse ser.
High Volt. Transformer T 90	1	1	3ADT745047P1	T 90; 500-1200V-AC	For U-AC > 800V & 12 Pulse ser.
High Volt. Fuses for U >800V-AC	5	5	DCE8063614P1	CC 1500CP GRD 20	2 pcs. for A92; 3 pcs. for T90 ;
Paralleling Interface Board 1	1	1	3ADT220090R31	SDCS-PAR-1-coat	Paralleling Master Conv.
Paralleling Interface Board 2	1	1	3ADT220090R32	SDCS-PAR-2-coat	Paralleling Slave Conv.

2.50	2-PHASE FIELD EXCITERS				
DESCRIPTION	QTY		CODE	TYPE/DATA	NOTES
Integrated uncontr. 6 A;FEX-1	1		DCA0012317R1	SDCS-FEX-1	Sep. compl. Unit; incl. Diode M.
Integrated single 16 A;FEX-2A	1		DCA0012325R1	SDCS-FEX-2 A	Sep. compl. Unit; incl. Thyristor M.
Control Board DCF503A0050	1		3ADT312400R2	SDCS-FEX-32A	Control Board f. DCF503A0050
Thyristor/Diode Module 1Q 50A	2		DCA0003270P1	SKKH 57	for DCF503A0050
Control Board DCF504A0050	1		3ADT312400R1	SDCS-FEX-31A	Control Board f.DCF504A0050
Thyristor modules 4Q 50A	2		DCA0011132P1	SKKT 42	for DCF504A0050
Ext. DCF503A0050; 1Q 50 A	1		3ADT209019R1	DCF503A0050	Complete unit DCF503A0050
Ext. DCF504A0050; 4Q 50 A	1		3ADT209019R2	DCF504A0050	Complete unit DCF504A0050
Ext. DCF503A0060; 1Q 60 A	1		3ADT209019R11	DCF503A00**60**	Complete unit DCF503A0060
Ext. DCF504A0060; 4Q 60 A	1		3ADT209019R12	DCF504A00**60**	Complete unit DCF504A0060
Addit. Fan for DCFxxxA0060	2		GHSN700002P1	AC220V 8556V	Fan M55/M56 f. DCFxxxA0060

2.60	Parts for Three-Phase Fieldexc.; 25A ---520A; Overvolt.Protect. DCF506-..				
DESCRIPTION		4 Q	CODE	TYPE/DATA	NOTES
Control Board for DCF505/506 Units		1	3BSE006309R1	SDCS-FEP-1	(1400V) for DCF505/506
Overvolt. Protect. for Motorfieldexc.		1	DCF1127101R1	DCF506-0140-51	3-Phase Fieldexc. 25A - 100A
Overvolt. Protect. for Motorfieldexc.		1	DCF1127119R1	DCF506-0520-51	3-Phase Fieldexc. 200A - 520A
Overvolt. Protect. for inductive Load		1	DCF1216235R1	DCF506-1200-51	3-Phase EMBR's 820-1200A

Thyristor Power Converters

Series

DCR 500B
DCR 600

Selection, Installation and Start-Up Manual for Rebuild Kits

Code: 3ADW 000 092 R0301 Rev C

IND/AME: DCR_S_E_C.DOC

EFFECTIVE: April. 7th, 2004
SUPERSEDES: Rev B June. 6th, 2001

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The boards serve for different purposes:

- **SDCS-PIN41A:**
  Pulse transformer board is mounted on a card holder. For the interconnections 6 firing leads (twisted pair; system plug on one end) and a shielded flat cable (round; 20 pole) will come with the kit. For cable length, please refer to chapter 5.
- **SDCS-PIN51:**
  Measuring board is mounted on a card holder. For the interconnections 5 leads for the AC and DC voltage measurement (single core; 6,3mm faston on one end), 2 leads for the current measurement (twisted pair; system plug on one end), 2 shielded flat cable (round; 16 pole) and a plugable resistor for X22 will come with the kit. For cable length, please refer to chapter 5.
- **SDCS-REB-1:** (Interface board)
- **NPSM-01:** (Power supply)
- **SDCS-REB2:**
  Pulse amplification board is mounted on a card holder. For the interconnections 2 flat cable (20 pole) will come with the kit. For cable length, please refer to chapter 5.
- **SDCS-REB-3:**
  Firing pulse routing board is mounted on a card holder. For the interconnections 2 flat cable (20 pole) will come with the kit. For cable length, please refer to chapter 5.

Optional parts

If the subassembly **SDCS-IOB-2x/IOB3** has been ordered as:

- **build-in**, the two boards and the PS 5311 will be mounted on a card holder, which is shown on fig. 3-1; this card holder will be mounted already on the fastening plate; the flat cables between the boards and between the micro-processor board will be plugged-in; the length of the flat cables is according to the mechanics.

- **not build-in/separate**, the two boards and the PS 5311 will be mounted on a card holder, which is shown on fig. 3-1. Three flat cables will be delivered as separate parts; two of them will have a length of 4 m, one of 0.26 m.

Pulse transformer board SDCS-PIN-41

This board is always required in a DCR kit.
Normally one SDCS-PIN-41 board per 6 thyristors, if the board can be placed close (gate wires <1 m) to all 6 thyristors.

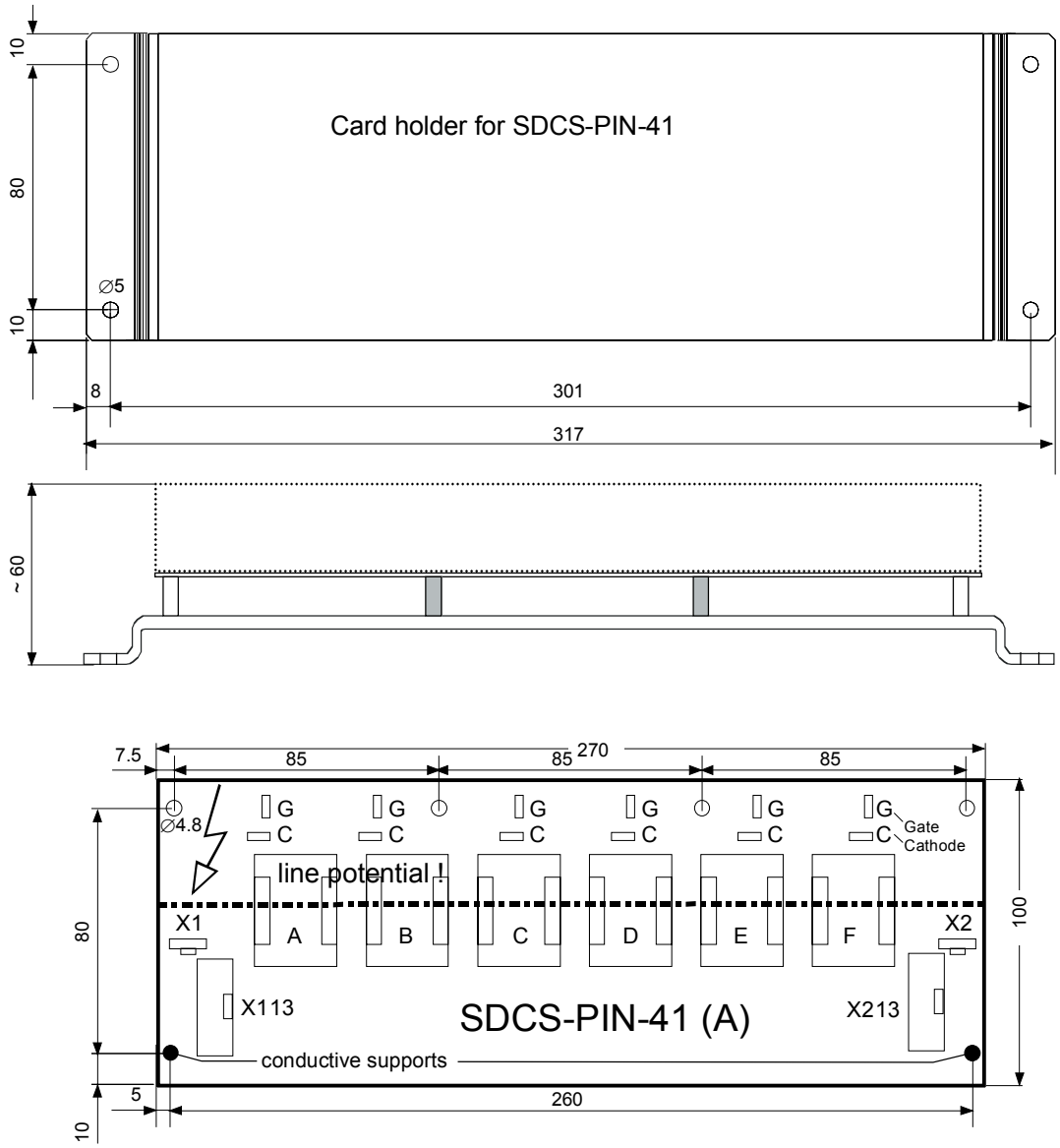


Figure 3 - 2 SDCS-PIN-41 board and card holder

Wiring

The gate-cathode wires, which are a part of the DCR kit delivery, have to be handled in this way:

- One end is equipped with a coded plug, which fits the C and G pins on the SDCS-PIN-41(A)
- The cable length in the delivery condition is 2 m. The cable routing should be done, to end up with a cable length as short as possible; the max. cable length is 1 m. The cables have to be shortened and have to be equipped with the plug connector, demanded by the thyristor type in use.