MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with original ABB technical and safety excerpts; not a complete manual

DCS 500 C1/C2 / 3ADT306200R1

SDCS-PIN-21

CONVERTER POWER INTERFACE BOARD

OFFICIAL SOURCES

ABB Technical Data Rev F and Service Manual Rev H. Selected original reference and safety pages.

DCS Thyristor Power Converters

for DC drive systems

25 to 5150 A

Technical Data

DCS 400
DCS 500/500B
DCP 500/500B
DCS 600
DCF 500/600



5.2.1 Power Interface Board SDCS-PIN-2x

The power interface board is used for DCS 500 converter modules models C1 and C2. There are different versions in use. The used types are:

- SDCS-PIN-21 for **100 A...350 A** Converters at **500 V**
- SDCS-PIN-22 for **450 A...520 A** Converters at **500 V** ①
- SDCS-PIN-23 for **110 A...270 A** Converters at **600 V**
- SDCS-PIN-24 for **450 A** Converters at **600 V** ①
- SDCS-PIN-25 for **700 A** Converters at **500 V**

① at these boards the SDCS-PIR-21 is used

Resistors R112, R114 and R116 are fitted with MOV elements on the SDCS-PIN-23/24, and on all other PIN-boards with 0-Ω resistors.

The SDCS-PIN-2x board consists of:

- firing pulse circuits with pulse transformers
- measurement of the armature current
- snubber circuit for thyristors protection (consists of RC circuits and MOV elements)
- AC and DC high ohmic voltage measurement
- scaling for rated current, zero current detection and HW voltage type coding
- interface for heat sink temperature measurement with a PTC sensor
- fuses for overvoltage protection and voltage measuring
- If the SDCS-PIN-21/22 connection board is installed in a **DCF**50x-0100...0520 / **DCF**60x-0100...0520, then the components R112, R114 and R116 are not build-in

Note:
If this PCB is used as a spare part for a **DCF**.... , then the resistors R112/R114/R116 (value = 0 Ω) must be removed.

Spare part
The protection of the power part is done by using RC circuits and MOV elements. Snubber circuits are wired up in parallel to each thyristor directly without fuses in between. In addition to that MOV elements are wired up in between the phases and protected by the fuses F101 to F 103. The AC voltage measurement is taken from behind the fuse.

Fuse data: Bussmann KTK-R-6A (600V)

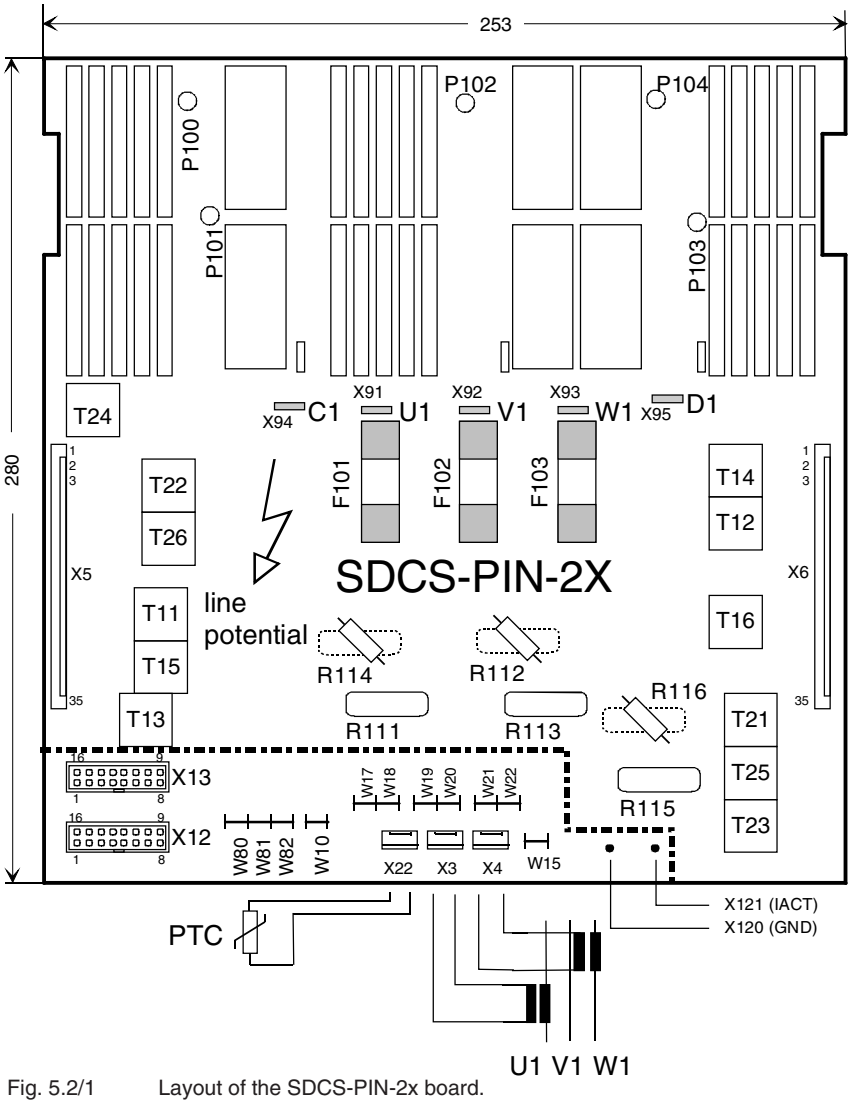


Fig. 5.2/1 Layout of the SDCS-PIN-2x board.

2-Q Converters

Board type		PIN 21					PIN 22		PIN 23		PIN 24	PIN 25
Current transformer ratio		1000:1					600:1		1000:1		600:1	2330:1
Rated voltage [V]		500	500	500	500	500	500	500	600	600	600	500
Rated current [A]		100	125	180	225	315	405	470	100	245	405	700
W10	2-Q/4-Q selection	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖
W15	zero current detection	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖
W17	rated current scaling	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖—⊖
W18	rated current scaling	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖X⊖
W19	rated current scaling	⊖X⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖
W20	rated current scaling	⊖X⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖X⊖
W21	rated current scaling	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖
W22	rated current scaling	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖X⊖
W80	HW type coding	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖
W81	HW type coding	⊖—⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖X⊖
W82	HW type coding	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖

Table 5.2/1 Settings of the SDCS-PIN-2x board for 2-Q converters if a DCS converter is equipped with it by ABB

⊖X⊖ indicates a removed jumper

4-Q Converters

Board type		PIN 21					PIN 22		PIN 23		PIN 24	PIN 25
Current transformer ratio		1000:1					600:1		1000:1		600:1	2330:1
Rated voltage [V]		500	500	500	500	500	500	500	600	600	600	500
Rated current [A]		100	140	200	250	350	450	520	110	270	450	700
W10	2-Q/4-Q selection	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖
W15	zero current detection	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖—⊖
W17	rated current scaling	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖
W18	rated current scaling	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖
W19	rated current scaling	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖
W20	rated current scaling	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖
W21	rated current scaling	⊖X⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖X⊖
W22	rated current scaling	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖	⊖X⊖
W80	HW type coding	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖—⊖
W81	HW type coding	⊖—⊖	⊖—⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖X⊖	⊖X⊖	⊖X⊖
W82	HW type coding	⊖X⊖	⊖—⊖	⊖X⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖

Table 5.2/2 Settings of the SDCS-PIN-2x board for 4-Q converters if a DCS converter is equipped with it by ABB

⊖X⊖ indicates a removed jumper

Board used as a spare part:
- default: all jumpers W10-W82 are in ⊖—⊖ condition
- ensure the correct converter type related settings

DCS Thyristor Power Converters

for DC Drive Systems
25 to 5200 A

Service Manual
DCS 500B
DCS 600 MultiDrive

Code: 3ADW 000 093 R0801 Rev H

S_M_E_G.DOC

EFFECTIVE: Oct. 27th, 2005
SUPERSEDES: Rev G Jul. 9th, 2004

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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.

Compatibility of SDCS-PIN-20x boards

The SDCS-PIN-20xB boards replaces SDCS-PIN-20xA and SDCS-PIN-20x boards, but not vice versa.
Note: SDCS-PIN-20xA replaces SDCS-PIN-20x, but not vice versa.

U_{AC}	400V/500V				600V	
I_{DC}	100A-350A	405A-520A	700A	610A-1000A	100A-270A	405A/450A
Type	C1/C2	C2	C2	C2b	C1/C2	C2
SDCS-PIN-205B	✓	✓	✓	✓	-	-
SDCS-PIN-206B	-	-	-	-	✓	✓
SDCS-PIN-21	✓	-	-	-	-	-
SDCS-PIN-22	-	✓ ①	-	-	-	-
SDCS-PIN-23	-	-	-	-	✓	-
SDCS-PIN-24	-	-	-	-	-	✓ ①
SDCS-PIN-25	-	-	✓ ②	-	-	-
SDCS-PIN-205A/205	✓	✓	✓	-	-	-
SDCS-PIN-206A/206	-	-	-	-	✓	✓
✓: possible	**-** : not possible	① together with SDCS-PIR-21		② together with RC network		

Table 10-1 Compatibility of SDCS-PIN-2xx boards

Compatibility of SDCS-PIN-20x and SDCS-PIN-2x boards

Converters 100A ≤ I_{DC} ≤ 350A and U_{AC}: 400V/500V
- SDCS-PIN-21 or
- SDCS-PIN-205B/205A/205 can be used as spare parts.

Converters 405A ≤ I_{DC} ≤ 520A and U_{AC}: 400V/500V
- SDCS-PIN-22 together with SDCS-PIR-21 or
- SDCS-PIN-205B/205A/205 can be used as spare parts.

Converters I_{DC} = 700A and U_{AC}: 400V/500V (type C2)
- SDCS-PIN-25 together with RC network (possible only in converters with an **A** in their serial number) or
- SDCS-PIN-205B/205A/205 can be used as spare parts (possible in converters with an **A** or **B** in their serial number). In an A converter do **not** connect the RC network.

Note: In a B converter only SDCS-PIN205B/205A/205 boards are usable, because the RC network is missing.

Converters 610A ≤ I_{DC} ≤ 1000A and U_{AC}: 400V/500V (type C2b) only
- SDCS-PIN-205B can be used as spare part.

Converters 100A ≤ I_{DC} ≤ 270A and U_{AC}: 600V
- SDCS-PIN-23
- SDCS-PIN-206B/206A/206 can be used as spare parts.

Converters I_{DC} = 405A/450A and U_{AC}: 600V
- SDCS-PIN-24 together with SDCS-PIR-21 or
- SDCS-PIN-206B/206A/206 can be used as spare parts.

Note: In addition to above mentioned limitations make sure that the resistors are cut properly according to the table 'Settings of the SDCS-PIN-20xB board' as described in the manual *Technical Data*. Especially when a board is reused!