8 Field exciters

The DCS 500 system has different options for the field supply. There are one and three phase field exciters available, which can be either integrated (diode field exciter SDCS-FEX-1 and half controlled field exciter SDCS-FEX-2A) or externally mounted (half controlled DCF503-0050 with the SDCS-FEX-32 board and fully controlled DCF504-0050 with the SDCS-FEX-31 board).

Three phase field exciters DCF 50xB/60x are converter modules themselves, similar to the DCS 501B/601 or DCS 502B/602 additionally a overvoltage protection unit is needed see chapter 8.4.

8.1 SDCS-FEX-1 (internal)

The Diode Field Exciter board SDCS-FEX-1 is a single phase diode rectifier for an AC input voltage up to 500 V and a DC output current of 6 A. The board has to be mounted inside the armature converter module. The excitation current is defined by the DC output voltage (line voltage multiplied by 0.9) and the resistance of the field winding. By using an external resistor in series with the field winding the field current can be adapted slightly.
If the SDCS-FEX-1 board isn't already installed it must be mechanically fixed beside the electronic power part SDCS-POW-1 and connected via a flat cable to the SDCS-CON-2 by using terminal X14.

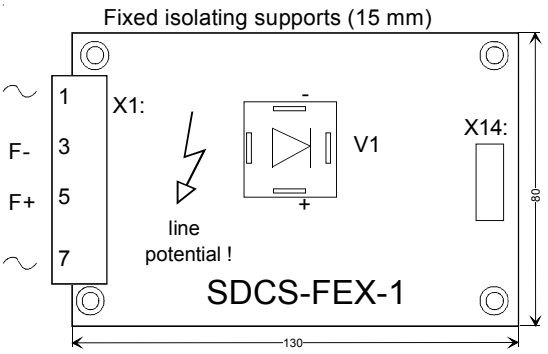

Fig. 8.1/1 Layout of the SDCS-FEX-1 field exciter board

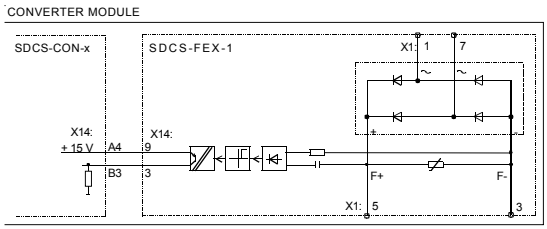

Fig. 8.1/2 Diode field exciter with field loss monitoring

8.1.1 Electrical data of FEX-1

AC input voltage:	110 V -15%...500 V +10%
max. DC output current:	6 A; $I_{F\,rated}$
DC output curr. monitoring:	20 mA...6 A
Power loss at $I_{F\,rated}$:	≤10 W
AC Isolating voltage:	600 V
Terminals X1: Cross sectional area	 2,5 mm²

The AC share of the output DC voltage is measured with a capacitor and an auxiliary rectifier and used for current monitoring.
Transistor relay is closed when the DC current is flowing (>0.02 A).

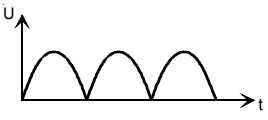

Fig. 8.1/3 Output voltage with inductive or resistive load - **High-signal at X14:B3**

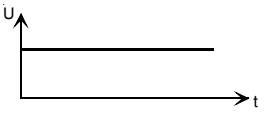

Fig. 8.1/4 Output voltage without load
Low-signal at X14:B3

8.2 SDCS-FEX-2 / SDCS-FEX-2A (internal)

The field exciter board SDCS-FEX-2 / FEX-2A consists of a power part and a control board, which connects all components electrically and mechanically to each other. This arrangement has to be mounted inside the armature converter module beside the electronic power supply SDCS-POW-1. This is intended to be done for DCS modules of type C1, C2 and A5, not for A6 and A7 (C4)!

The power part is build up with two power modules. Each of the modules consists of one diode and one thyristor, so they are wired up and controlled like a half controlled bridge.

The control is based on a fully digital system. The µ-processor reads all information from the power part, is supplied with all needed voltage levels and control signals via the flat cable X14 by the SDCS-CON-2 and generates the firing pulses for the power part.

The range of the single phase rated AC input voltage is 110 V to 500 V, the maximum current capability is 16 A. If this field exciter is used for smaller field current, the control unit automatically selects a lower current range between 3 A to 16 A to get the best resolution.

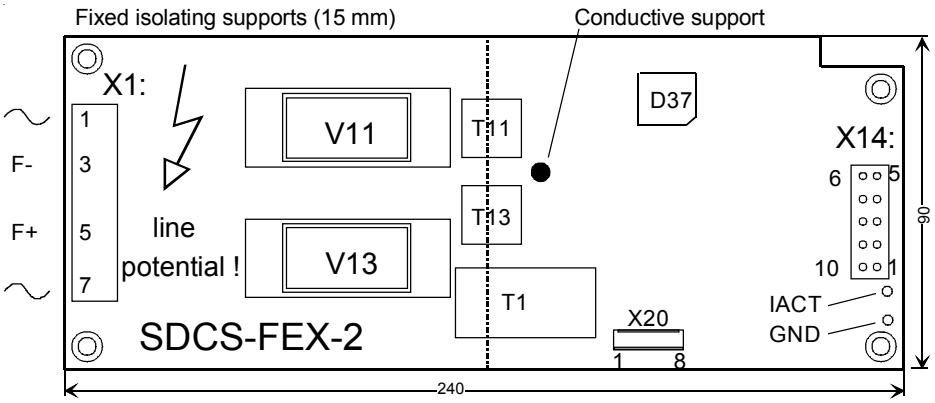

Fig. 8.2/1 Layout of the SDCS-FEX-2A field exciter board

8.2.1 Electrical data of SDCS-FEX-2 / FEX-2A

AC input voltage:	110 V -15%...500 V +10%; single phase
AC input current:	≤ output current
AC isolation voltage:	600 V
Frequency:	same as DCS converter module
DC output current: ①	0.3 A...8 A for armature converter module from 25 A to 75 A 0.3 A...16 A for armature converter mod. from 100 A to 2000 A
Power loss at $I_{F\ rated}$:	≤40 W
Output IACT:	U_{out} = 4 V *I_{act} / I_{lim}; I_{lim} = 3A, 5A, 7A, 9A, 11A, 13A, 15A, 17A
Terminal X1: Cross sectional area	 4 mm²

① If Field weakening is needed, actual field current of the motor at top speed must be higher than 0.3 A