

Size	Converter type (2-Q)	Converter type (4-Q)	Fuse	Fuse holder	Fuse type	Fuse holder
					North America	
D1	DCS800-S01-0020-04/05	DCS800-S02-0025-04/05	50A 660V UR	OFAX 00 S3L	FWP-50B	1BS101
	DCS800-S01-0045-04/05	DCS800-S02-0050-04/05	80A 660V UR	OFAX 00 S3L	FWP-80B	1BS101
	DCS800-S01-0065-04/05	DCS800-S02-0075-04/05	125A 660V UR	OFAX 00 S3L	FWP-125A	1BS103
	DCS800-S01-0090-04/05	DCS800-S02-0100-04/05	125A 660V UR	OFAX 00 S3L	FWP-125A	1BS103
	DCS800-S01-0125-04/05	DCS800-S02-0140-04/05	200A 660V UR	OFAX 1 S3	FWP-200A	1BS103
D2	DCS800-S01-0180-04/05	DCS800-S02-0200-04/05	250A 660V UR	OFAX 1 S3	FWP-250A	1BS103
	DCS800-S01-0230-04/05	DCS800-S02-0260-04/05	315A 660V UR	OFAX 2 S3	FWP-300A	1BS103
D3	DCS800-S01-0315-04/05	DCS800-S02-0350-04/05	500A 660V UR	OFAX 3 S3	FWP-500A	1BS103
	DCS800-S01-0405-04/05	DCS800-S02-0450-04/05	700A 660V UR	OFAX 3 S3	FWP-700A	See Note 1
	DCS800-S01-0470-04/05	DCS800-S02-0520-04/05	700A 660V UR	OFAX 3 S3	FWP-700A	See Note 1
D4	DCS800-S01-0610-04/05	DCS800-S02-0680-04/05	900A 660V UR	3x 170H 3006	FWP-900A	See Note 1
	DCS800-S01-0740-04/05	DCS800-S02-0820-04/05	900A 660V UR	3x 170H 3006	FWP-900A	See Note 1
	DCS800-S01-0900-04/05	DCS800-S02-1000-04/05	1250A 660V UR	3x 170H 3006	FWP-1200A	See Note 1
D3	DCS800-S01-0290-06	DCS800-S02-0320-06	500A 660V UR	OFAX 3 S3	FWP-500A	See Note 1
D4	DCS800-S01-0590-06	DCS800-S02-0650-06	900A 660V UR	3x 170H 3006	FWP-900A	See Note 1

Note 1: No fuse holder is available; attach the fuses directly to the busbar.

Fuses and fuse holders for armature circuit (details see chapter [Fuses and fuse holders IEC](#))

Fuses (F3.x) and fuse holders for field circuit

Depending on the protection strategy different types of fuses are used. The fuses can be sized according to the maximum field current. In this case take the fuse, which fits to the rated field current levels. If the field converter is connected to two phases of a network, two fuses should be used. In case the unit is connected to one phase and neutral only one fuse at the phase can be used. The table below lists the fuse currents depending on the table above.

Field converter type	Field current	F3.1	F3.2	F 3.3
DCF803-0016	$I_F \leq 6 \text{ A}$	10 A 660 V UR*	OFAA 00 H10	10 A
FEX-425-Int *	$I_F \leq 12 \text{ A}$	16 A 660 V UR*	OFAA 00 H16	16 A
DCF803-0035	$I_F \leq 16 \text{ A}$	25 A 660 V UR*	OFAA 00 H25	25 A
DCF803-0050				
DCF804-0050				
FEX-425-Int*	$I_F \leq 25 \text{ A}$	50 A 660 V UR*	OFAA 00 H50	35 A
DCF803-0035				
DCF803-0050				
DCF804-0050				
DCF803-0035	$I_F \leq 35 \text{ A}$			50 A
DCF803-0050				
DCF804-0050				
DCF803-0050	$I_F \leq 50 \text{ A}$	80 A 660 V UR	OFAA 00 H80	63 A
DCF804-0050				
DCF803-0060	$I_F \leq 60 \text{ A}$			80 A
DCF804-0060				
Type of protection elements		Semiconductor fuse fuse holder OFAX 00 S3L	LV HRC type for 690 V, fuse holder OFAX 00 S3L	Circuit breaker for 500 V or 690 V

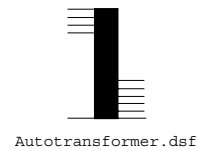
* Fuse (F3.1) KTK25 included in FEX-425-Int package. D4+ field fuses are external. D5 field fuses are internal.

Fuses and fuse holders for field circuit

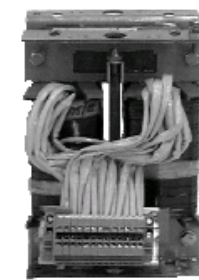
Single-phase autotransformer (T3) for field circuit (adapt voltage)

The field converters insulation voltage is higher than its rated voltage (see chapter [Accessories](#)). This provides the possibility in systems with more than 500 V mains voltage to supply the field converter directly. An autotransformer is used to match the mains voltage to the field voltage. Moreover, the autotransformer reduces the voltage ripple. Different autotransformer types (primary voltages from 400 to 500 V and from 525 to 690 V) with several rated currents are available.

Field converter type	Field current	Autotransformer type
DCF803-0016 FEX-425-Int DCF803-0035 DCF803-0050 DCF804-0050	$I_F \leq 6 \text{ A}$, $I_F \leq 12 \text{ A}$ $I_F \leq 16 \text{ A}$	$U_{\text{prim}} = \leq 500 \text{ V}$ T 3.01, T 3.02, T 3.03
DCF803-0035 DCF803-0050 DCF804-0050	$I_F \leq 30 \text{ A}$	T 3.04
DCF803-0050 DCF804-0050	$I_F \leq 50 \text{ A}$	T 3.05
DCF803-0060 DCF804-0060	$I_F \leq 60 \text{ A}$	on request
DCF803-0016 FEX-425-Int DCF803-0035 DCF803-0050 DCF804-0050	$I_F \leq 6 \text{ A}$, $I_F \leq 12 \text{ A}$ $I_F \leq 16 \text{ A}$	$U_{\text{prim}} = \leq 600 \text{ V}$ T 3.11, T 3.12, T 3.13
DCF803-0035 DCF803-0050 DCF804-0050	$I_F \leq 30 \text{ A}$	T 3.14
DCF803-0050 DCF804-0050	$I_F \leq 50 \text{ A}$	T 3.15
DCF803-0060 DCF804-0060	$I_F \leq 60 \text{ A}$	on request
DCF803-0050 DCF804-0050	$I_F \leq 6 \text{ A}$, $I_F \leq 12 \text{ A}$, $I_F \leq 16 \text{ A}$, $I_F \leq 30 \text{ A}$, $I_F \leq 50 \text{ A}$	$U_{\text{prim}} = \leq 690 \text{ V}$ T 3.11, T 3.12, T 3.13, T 3.14, T 3.15
DCF803-0060, DCF804-0060	$I_F \leq 60 \text{ A}$	on request



ND30



ND401

ND402

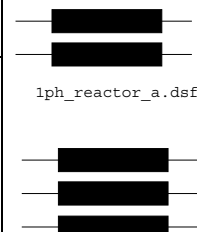
Autotransformer (T3)

Autotransformer data, details see chapter [Autotransformer \(T3\)](#)

Line reactors for single- and 3-phase connection of field converters

Field converters DCF803-0016, FEX-425-Int and DCF803-0035 need additional external line reactors. Field converters DCF803-0050, DCF804-0050, DCF803-0060 and DCF804-0060 do **not** need additional line reactors since they already have internal line reactors.

Field converter type	Field current	Line reactor type			
DCF803-0016 FEX-425-Int. DCF803-0035		IEC		US	
		Single-phase	3-phase	Single-phase	3-phase
	$I_F \leq 16 \text{ A}$	ND30	ND401 *	KLR 45 CTB*	
FEX-425-Int. DCF803-0035	$I_F \leq 25 \text{ A}$	ND402 *			
DCF803-0035	$I_F \leq 35 \text{ A}$				



* 3-phase operation or single-phase operation

Line reactors (details see chapter [Line reactors IEC](#))

Auxiliary transformer (T2) for electronic system / fan supply

The converter requires various auxiliary voltages, e.g. the unit's electronics require 115 V or 230 V single-phase. The fans require 230 V single-phase or 400 V / 690 V 3-phases, according to their size. The auxiliary transformer (T2) is designed to supply the unit's electronic system and all the single-phase fans including the fan for converter sizes D4+ and D5.



Input voltage: 380 - 690 V single-phase; 50 / 60 Hz
 Output voltage: 115 / 230 V single-phase
 Power: 1400 VA

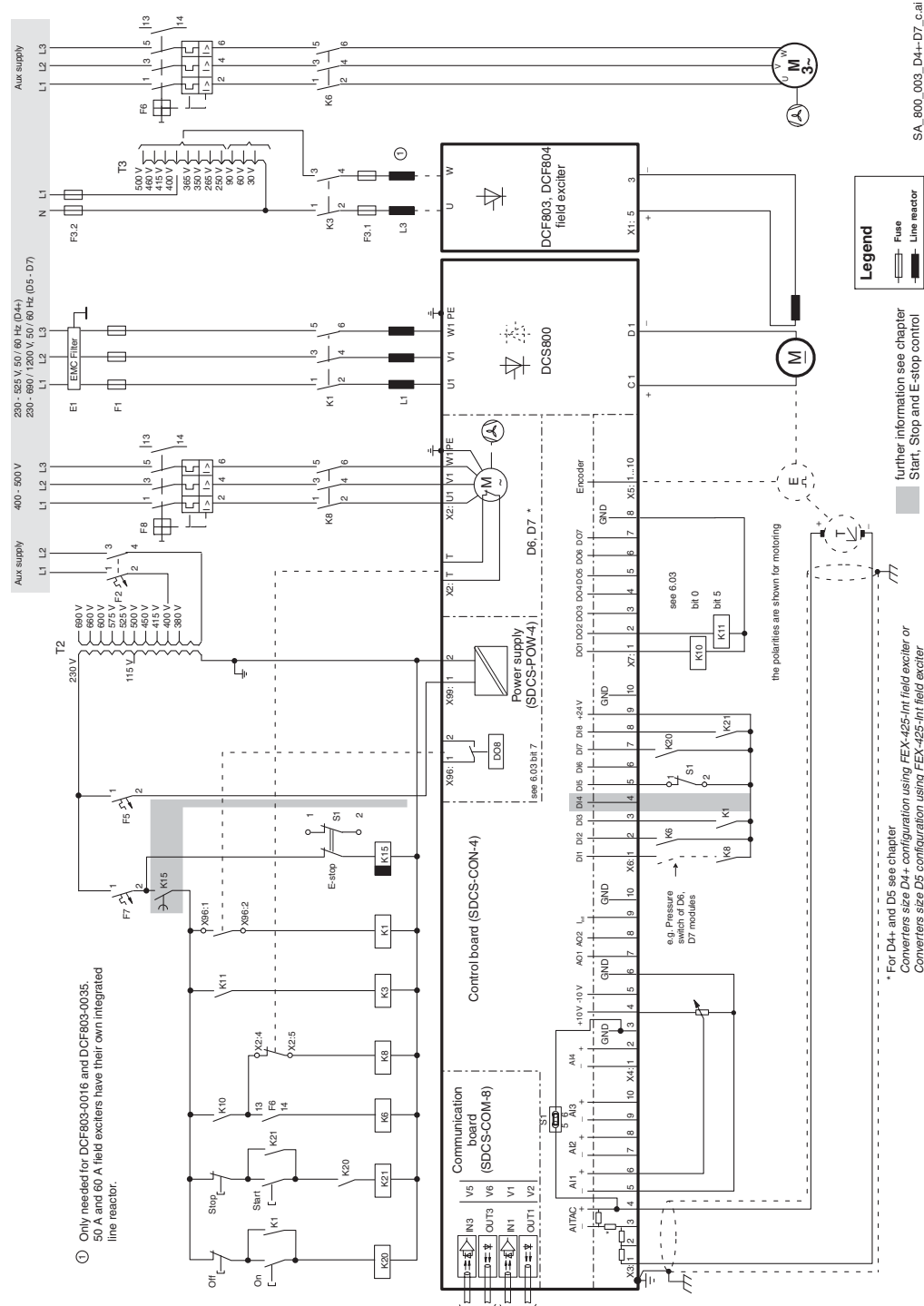
Auxiliary transformer data, details see chapter [Auxiliary transformer \(T2\)](#)

Residual current detection

This function detects current to ground. If needed, activate analog input AI4 of the SDCS-IOB-3. A current signal of the three phase currents has to be supplied to AI4 via a special current transformer (details see chapter [Residual current detection](#)).

Converters size D4+ - D7 configuration using external field exciters DCF803, DCF804

Wiring the drive according to this diagram offers the highest degree of monitoring functions done by the drive. Field converters DCF803 / DCF804 are equipped with their own synchronization and must be supplied from independent mains supply voltage max. 500 V (single-phase or 3-phase).

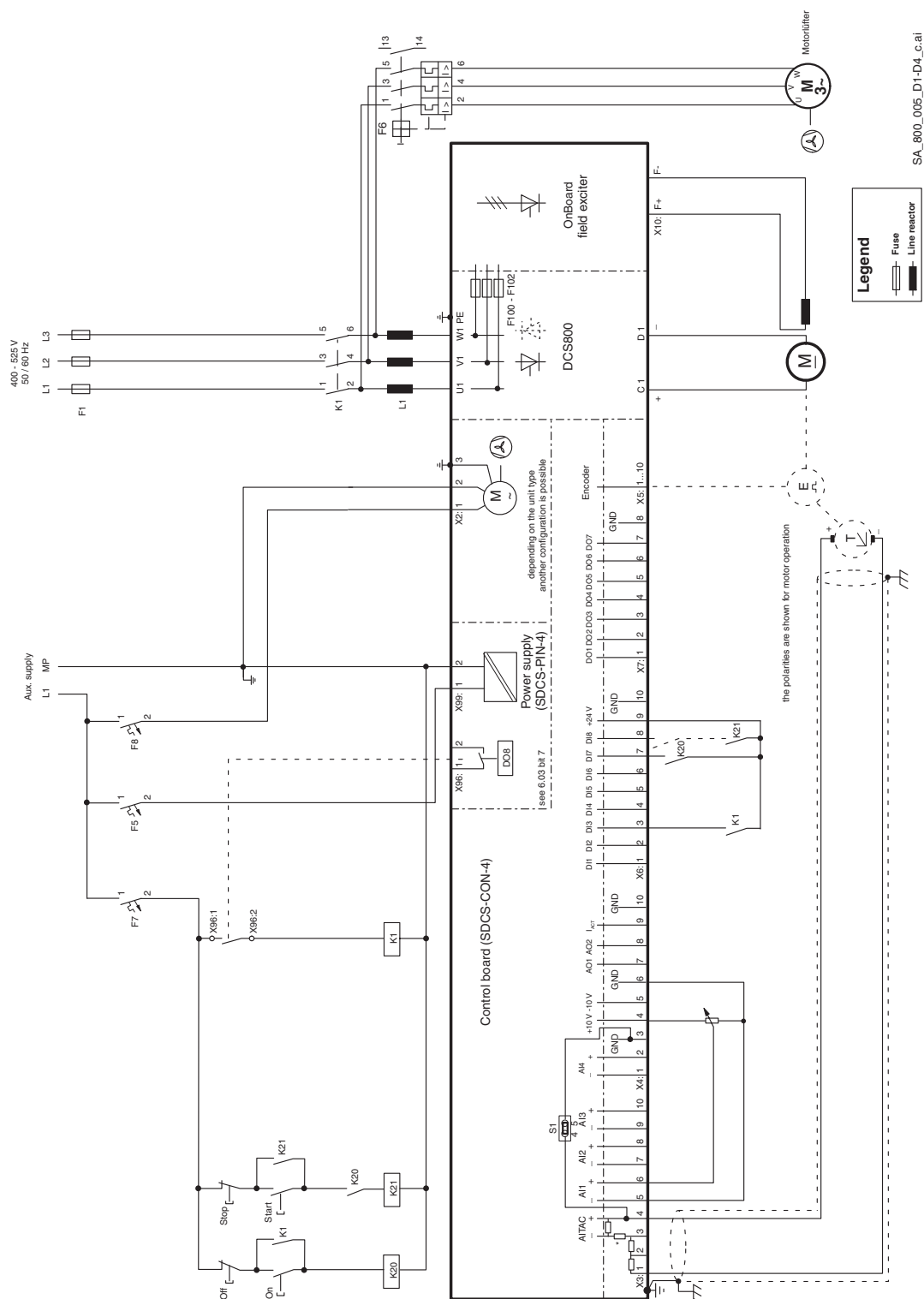


SA_800_003_D4-D7_cal

Drive configuration with reduced components

Converters size D1 - D4, 400 - 525 V using OnBoard field exciters.

Wiring the drive according to this diagram gives the same control performance, but a lower degree of monitoring functions.

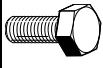


Selection of components: The wiring diagram is valid for a DCS800 converters size D1 - D4 ≤ 525 V. The OnBoard field exciter can be used for line voltages up to 525 V. Field currents up to 6 / 15 / 20 / 25 A depending on the converter size are possible. For larger field currents use a DCF803/804 or a large field exciter (DCS800).

Cross-sectional areas - Tightening torques

Recommended cross-sectional area to **DIN VDE 0276-1000** and **DIN VDE 0100-540 (PE)** trefoil arrangement, up to 50°C ambient temperature.

Armature:

Converter type	C1, D1			U1, V1, W1			PE		
	I_{DC} [A]	1  [mm²]	(2.)  [mm²]	I_V [A]	1  [mm²]	(2.)  [mm²]	[mm²]		
DCS800-S0x-0025-xx	25	1 x 6	-	21	1 x 4	-	1x 4	1 x M6	6
DCS800-S0x-0050-xx	50	1 x 10	-	41	1 x 6	-	1x 6	1 x M6	6
DCS800-S0x-0075-xx	75	1 x 25	-	61	1 x 25	-	1x 16	1 x M6	6
DCS800-S0x-0100-xx	100	1 x 25	-	82	1 x 25	-	1x 16	1 x M6	6
DCS800-S0x-0140-xx	140	1 x 35	-	114	1 x 35	-	1x 16	1 x M6	6
DCS800-S0x-0200-xx	200	2 x 35	1 x 95	163	2 x 25	1 x 95	1x 25	1 x M10	25
DCS800-S0x-0260-xx	260	2 x 35	1 x 95	204	2 x 25	1 x 95	1x 25	1 x M10	25
DCS800-S0x-0320-xx	320	2 x 70	1 x 95	220	2 x 50	1 x 95	1x 50	1 x M10	25
DCS800-S0x-0350-xx	350	2 x 70	-	286	2 x 50	-	1x 50	1 x M10	25
DCS800-S0x-0450-xx	450	2 x 95	-	367	2 x 95	-	1x 50	1 x M10	25
DCS800-S0x-0520-xx	520	2 x 95	-	424	2 x 95	-	1x 50	1 x M10	25
DCS800-S0x-0650-xx	650	2 x 120	-	555	2 x 120	-	1x120	1 x M12	50
DCS800-S0x-0680-xx	680	2 x 120	-	555	2 x 120	-	1x120	1 x M12	50
DCS800-S0x-0820-xx	820	2 x 150	-	669	2 x 120	-	1x120	1 x M12	50
DCS800-S0x-0900-6/7	900	4 x 95	3 x 150	734	4 x 70	3 x 95	1x150	2 x M12	50
DCS800-S0x-1000-xx	1000	2 x 185	-	816	2 x 150	-	1x150	1 x M12	50
DCS800-S0x-1190-xx	1190	4 x 120	-	971	4 x 95	3 x 120	1x185	2 x M12	50
DCS800-S0x-1200-xx	1200	4 x 120	-	979	4 x 95	3 x 120	1x185	2 x M12	50
DCS800-S0x-1500-xx	1500	4 x 185	-	1224	4 x 150	-	2x150	2 x M12	50
DCS800-S0x-2000-xx	2000	8 x 120	6 x 185	1632	4 x 240	-	2x240	2 x M12	50
DCS800-S0x-1900-xx ②	1900	8 x 120	6 x 185	1550	4 x 240	-	3x120	4 x M12	50
DCS800-S0x-2050-xx ②	2050	8 x 120	6 x 185	1673	6 x 120	5 x 150	3x120	4 x M12	50
DCS800-S0x-2500-xx ②	2500	7 x 185	-	2040	8 x 120	6 x 185	4x120	4 x M12	50
DCS800-S0x-2600-xx	2600	7 x 185	-	2122	8 x 120	6 x 185	4x120	4 x M12	50
DCS800-S0x-3000-xx ②	3000	8 x 185	-	2448	7 x 185	-	4x150	4 x M12	50
DCS800-S0x-3300-xx	3300	8 x 185	-	2693	7 x 185	-	4x150	4 x M12	50
DCS800-S0x-4000-xx	4000	7 x 300	-	3264	8 x 240	-	4x240	4 x M12	50
DCS800-S0x-4800-xx ①	4800	8 x 300	-	3876	6 x 300	-	3x300	4 x M12	50
DCS800-S0x-5200-xx ①	5200	8 x 300	-	4202	6 x 300	-	3x300	4 x M12	50

① Reduced ambient temperature 40°C

② Option for more flexible cable connection available

You will find instructions on how to calculate the PE conductor's cross-sectional area in VDE 0100 or in equivalent national standards. We would remind you that power converters may have a current-limiting effect.

Excitation:

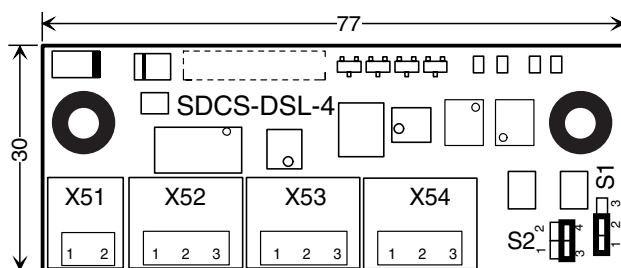
Size	D1	D2	D3	D4, D4+, D5	DCF803-0035
DC output current	6 A	15 A	20 A	25 A	35 A
max. cross sectional area	6 mm²/ AWG 10	6 mm²/ AWG 10	6 mm²/ AWG 10	6 mm²/ AWG 10	6 mm²/ AWG 10
min. cross sectional area	1 mm²/ AWG 16	2.5 mm²/ AWG 13	4 mm²/ AWG 11	6 mm²/ AWG 10	6 mm²/ AWG 10
Tightening torque	1.5 - 1.7 Nm				

Drive-to-drive board SDCS-DSL-4

The SDCS-DSL-4 provides a communication between drives. The communication hardware and protocol is based on CAN bus.

This communication will be used for drive-to-drive communication (e.g. master-follower), 12-pulse operation and communication to field exciters.

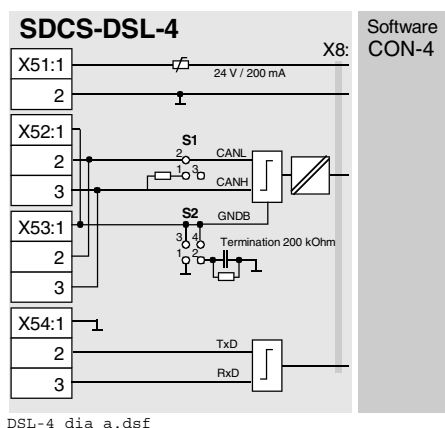
The communication hardware is equipped with an isolated power supply and an isolated transmitter. The bus termination can be set by jumper S1. See also chapter [DCSLink communication](#).



Jumper coding	
S1 Bus termination	
	120 Ohm
	* no termination, park position
S2 Ground termination	
	0 Ohm (direct) ground termination
	200 kOhm R-C ground termination
	* no termination, park position
* Default value	

BL_DSL4_001_+Tab_a.dsf

- X51 supplies 24 V_{DC}
- X52 and X53 are connected in parallel and provide two connectors for the DCSLink
- X54 is not used



DSL-4_dia_a.dsf

Supply		Remarks
24 V	≤ 200 mA	24 V grounded supply for DCF803-0016, FEX-425-Int and DCF803-0035 field exciters; short circuit protected 250 mA

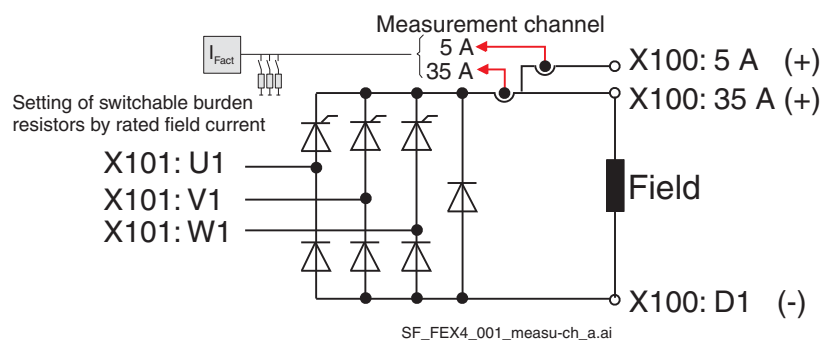
DSL communication		Remarks
Bus termination		
S1	1-2	120 Ohm
	2-3	no termination; park position
Ground termination		
S2	2-4	200 kOhm R-C ground termination
	1-3	0 Ohm ground termination
	3-4	no termination; park position
RS 485 communication		Remarks
		no isolation

Accessories

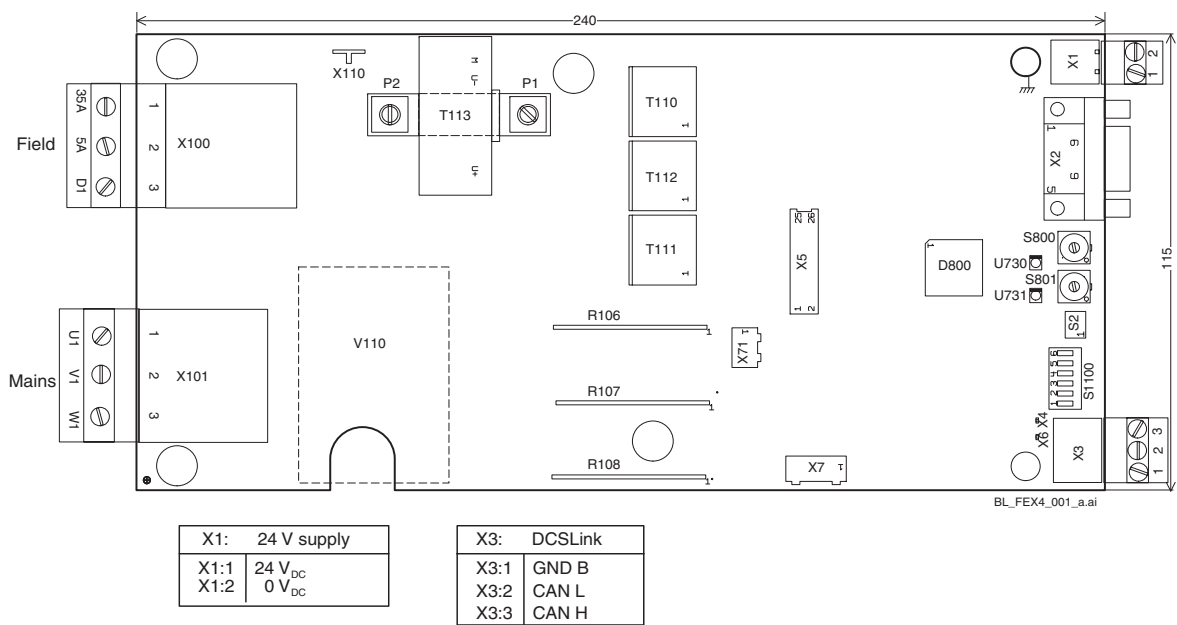
DCF803-0016, FEX-425-Int and DCF803-0035

The field exciters DCF803-0016, FEX-425-Int and DCF803-0035 are half controlled 3-phase converters. All field exciters are based on the same control board SDCS-FEX-4. The board is equipped with its own synchronization and current control. The current measurement circuit is automatically scaled depending on the rated field current of the motor. The field exciter is fully controlled and monitored by the armature converter via drive-to-drive communication.

The field exciter is prepared to operate as 3-phase as well as single-phase converter. For single-phase operation connect terminals U and W.



Layout of the SDCS-FEX-4



Electrical data

Power part	
AC input voltage	110 V -15% - 500 V +10%; single or 3-phase
AC input current	< DC output current
Frequency	Same as DCS converter
AC isolation voltage	600 V
Line reactor	External
Line fuses	KTk25 for FEX-425-Int; external for DCF803-0016 and DCF803-0035
DC output current *	0.3 A - 16 A = DCF803-0016 0.3 A - 25 A = FEX-425-Int 0.3 A - 35 A = DCF803-0035
Powerloss	< 130 W (at rated current)
Auxiliary supply	
DC input voltage	24 V _{DC}
DC input current	< 200 mA supplied via X51 of SDCS-DSL-4
Buffering	10 ms

* 3-phase or single-phase operation

Control unit

The control includes the following main blocks:

- Micro controller H8 for current control, synchronization and fault handling.
- 2 channel measurement of actual field current in the DC circuit.
- High ohmic measurement of AC voltage. Residual resistance to ground $\approx 1.6 \text{ M}\Omega$
- H8 controller for drive-to-drive communication based on CAN standard.
- Driver circuit to fire the half control bridge.
- The firmware is stored in a flash memory and contains:
The PI current controller for the field circuit.
The fault and reset logic.
The synchronization and PLL function.
The setting of the current measurement channel.

All parameters are set from the armature converter via drive-to-drive communication. The field current reference, actual field current, current control and status bits are cyclic sent via drive-to-drive communication.

The field exciter is equipped with an autoscaling function of the burden resistors based on the nominal field current of the motor.

Power part

The power part is a 3-phase half controlled bridge with free-wheeling diode.

The external field exciter DCF803-0016 and DCF803-0035 are 3-phase half controlled bridges including snubbers based on the SDCS-FEX-4. Line fuses, line reactors and transformers are installed outside the housing.

The FEX-425-Int (internal field exciter) can be installed in D4+ and D5 converters. The unit is based on a SDCS-FEX-4. For a D4+ the supply must be connected via line reactors and fuses located outside of the module.

For a D5 the supply must be connected via line reactors outside of the module. The fuses are installed in the module.

For single-phase operation connect terminals U and W. For single-phase operation an autotransformer for voltage adaptation is recommended.

Please see comparison of output voltage ripple between single-phase and 3-phase operation.