

LOW VOLTAGE DC DRIVES

## **ABB industrial drives**

DCS880-A enclosed converters  
80 to 9800 A / 19600 A





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## Creating a safer environment

without compromising productivity

The all-compatible drives are designed to provide customers across industries and applications with unprecedented levels of compatibility and flexibility.

### DC drives

Our DCS880 industrial drives are customized to meet the precise needs of industries such as oil and gas, mining, metals, cement, non motoric, material handling, pulp and paper, rubber and plastics, marine, water and wastewater, food and beverage and automotive. They control a wide range of applications such as cranes, extruders, winches, winders, conveyors, mixers, millstands, centrifuges, test benches, elevators, electrolysis, kiln.



#### DC motor control

ABB's motor control technology provides precise speed and torque control for all applications.



#### Adaptive programming

Adaptive programming is ideal for creating simple control programs for various applications. It does not require expertise in programming and is offered as a standard in all-compatible drives.



#### Removable memory unit

Stores all the firmware and parameter configurations in an easily replaceable and simple-to-install module.



#### All typical DC configurations

DCS880 standard firmware supports all standard configurations present in DC drive applications such as 6-pulse, 12-pulse parallel, serial and serial sequential, 24-pulse, M3, M6 and field reversal.



#### Remote monitoring

With a built-in web server, NETA-21 makes worldwide access easy for industry applications.



#### Drive-to-drive link (D2D)

Allows fast communication between drives including master-follower configurations as standard.





## Drive application programming

Customizable to meet the precise application needs based on IEC 61131-3. Uses the same programming environment and is also easy to integrate with other ABB components such as PLCs and HMIs.



## Safety

DCS880 offers safe torque off (STO) built in as a standard. It can be used in safety functions up to SIL3 /PLe enabling you to achieve every safety requirement.



## Drives going mobile

We offer several smartphone applications to ease and enhance the use of ABB drives. These tools provide a user-friendly and easy-to-use approach for the commissioning, servicing and operation of ABB drives.



### Intuitive human-machine interface

User-friendly, high-contrast and high-resolution display enabling easy navigation in multiple languages. Allows USB and Bluetooth connection.



### Startup and maintenance tool

Drive composer PC tool for drive startup, configuration and daily use and process tuning. PC tool is connected to the drive via Ethernet or USB interface.



### Communication with all major automation networks

Fieldbus adapters enable connectivity with all major automation networks.



### Flexible product configurations

Drives are built to order with a wide range of options. Ready made cabinets with or without transformer are available up to 20 MW.



### Extended connectivity

In addition to the standard interfaces, the drive has three built-in slots for additional input/output extension modules and speed feedback interfaces.

## DCS880-A, cabinet-built DC drives

### DCS880-A enclosed converters

DCS880-A enclosed converters are available as 6- / 12-pulse and in 2- or 4-quadrant, with current ranges from 80 to 9800/19600 A and supply voltages of 230 ... 990 (1200) V<sub>AC</sub>. A selection of options is available to provide the user with a system meeting the most demanding technical requirements and performance expectations. Common control electronics throughout the product range reduce spare parts inventory and training requirements.

DCS880-A enclosed converters (size H1 to H6) with rated DC current from 80 A up to 1850 A are available in two different layouts:

- Single drive configuration without horizontal busbars therefore AC cable connection
- Group drive configuration with horizontal busbars (size-dependent on rated amps)

Group drives from sizes H7 and H8 on request.

The drives comply with IEC 61800 standard. The basic design is made for 65 kA short circuit rating. Different IP protection classes are available to meet environmental condition on site.

Standard color is light grey RAL7035. Outside color of a cabinet can be chosen freely according to RAL standard. Special colors on request.

### DCS880-A Concept

- A single drive control technology is available for a wide power range to reduce training costs and meet the requirements of various applications.
- Common AC busbar designs for group drives are available for the most cost-efficient and functional system structure.
- Incoming supply section for group drives can be equipped with air circuit breakers or isolation switches.
- Control cubicles offer various I/O solutions in combination with ABB controls e.g. AC800M.
- Approval for many application specific standards (e.g. IEC, UL, CSA) can be ordered as option.
- Flexible design of power cable entry provide simple installation and minimum down time especially for upgrades.

### What is a DCS880 DC drive?

The DCS880 DC Drive is simple to install, easy to configure and handle and therefore saving considerable time.

- Precise delivery
- Quick installation
- Rapid start-up

The drive has common user and process interface with fieldbus, common software tools for sizing, commissioning, maintenance and common spare parts.

Where can it be used?

DCS880 can be used in the wide range of all industrial application of

- |                     |             |
|---------------------|-------------|
| • Metals            | • Vessels   |
| • Pulp & Paper      | • Ski lifts |
| • Material handling | • Cement    |
| • Automotive        | • Mining    |
| • Food & Beverage   | • Oil & Gas |
| • Printing          | • and more  |
| • Plastic & Rubber  |             |

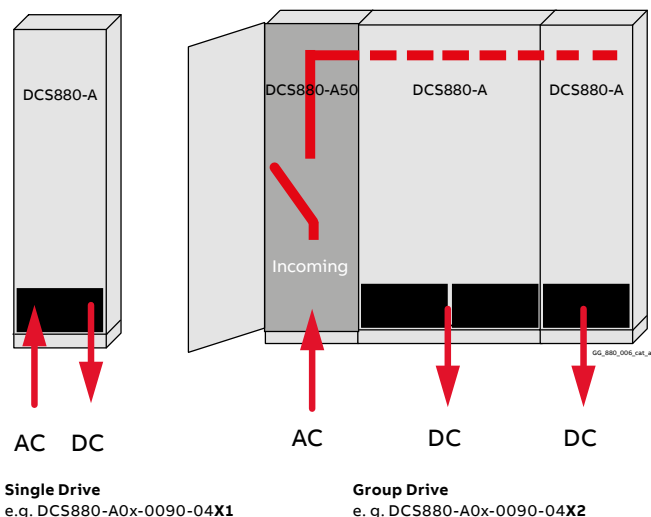
### DCS880 DC drive promises

The drive meet the requirement of all demanding drive application like:

- Testrig
- Mine hoist
- Rolling mill

as well as non motoric applications like:

- Electrolysis & hydrogen production
- Magnetics
- Battery charger

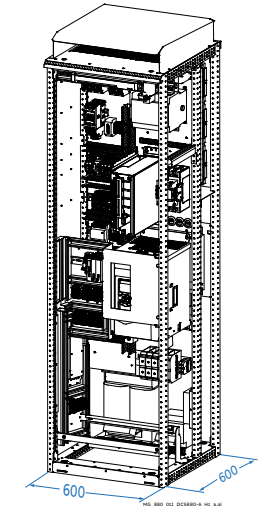


## Description of DCS880-A Enclosed converters

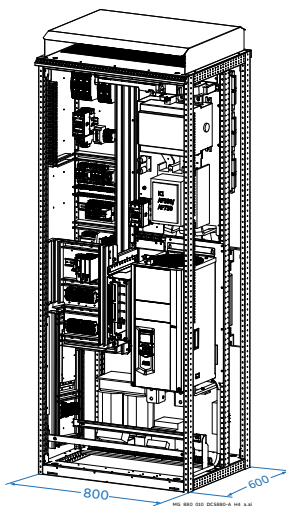
### Mechanics

The robust and strong frame body of the cabinets is made from steel with a thickness of 2.5 mm and all metal sheets are softline design to avoid accidents and are 1.5 mm thick. Protection against corrosion is given by a hot zinc galvanisation of all metal work. The standard height is 2120 mm (height is including detachable hood (120 mm)) with various widths (200/400/600/800/1200 mm) and depth (600 mm) depending on the power and the size of the converter.

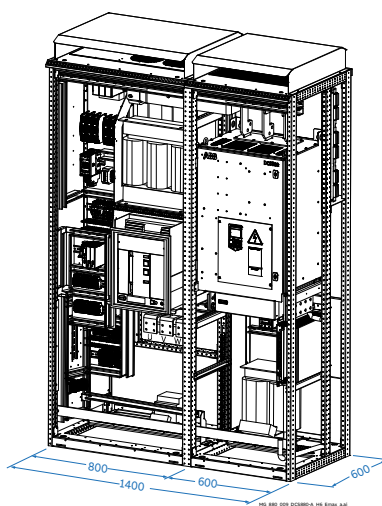
All dimensions in mm.



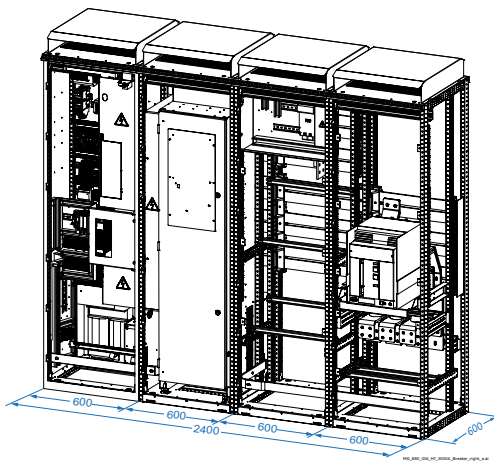
0090 A ... 0350 A (H1/H2/H3-350)



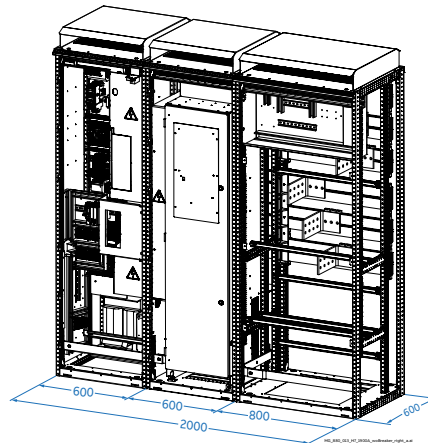
0405 A ... 1000 A (H3/H4)



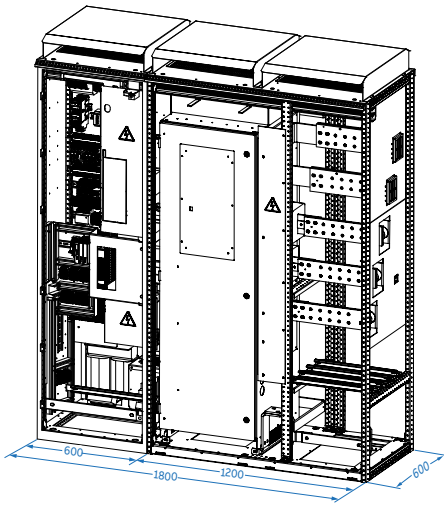
0900 A ... 2000 A (H6 with breaker Emax 2.2)



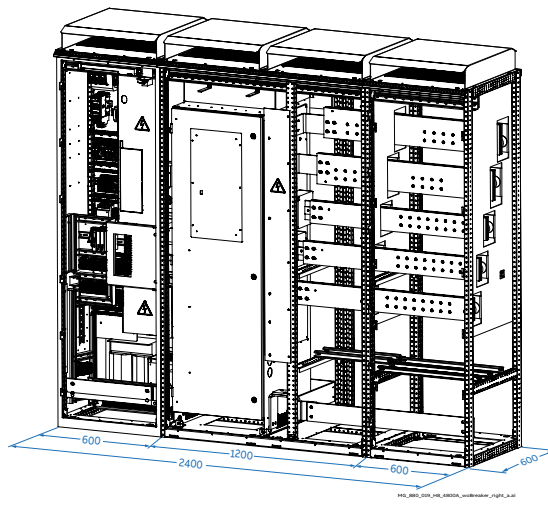
1900 A ... 3000 A (H7 with breaker Emax 2.2)



1900 A ... 3000 A (H7 without breaker +05775)



2050 A ... 3300 A (H8 without breaker)



4000 A ... 5200 A (H8 without breaker)

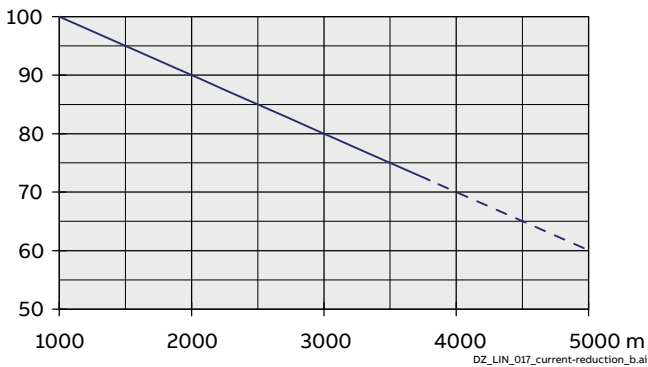
# Environmental conditions

System connection	
Voltage, 3-phase:	230 to 1000 V acc. to IEC 60038
Voltage deviation:	±10 % continuous; ±15 % short-time *
Rated frequency:	50 Hz or 60 Hz
Static frequency deviation:	50 Hz ± 2 %; 60 Hz ± 2 %
Dynamic: frequency range:	50 Hz: ± 5 Hz; 60 Hz: ± 5 Hz
df/dt:	17 % / s
* = 0.5 to 30 cycles.	
<b>Please note:</b> Special consideration must be taken for voltage deviation in regenerative mode.	
Degree of protection	
Converter module and options (line chokes, fuse holder, field supply unit, etc.):	IP 00
Enclosed converters:	IP 21/42/54
Paint finish	
Converter module:	Body RAL 7012; Cover RAL 9017 & RAL 9002
Enclosed converter	Front, light grey RAL 7035 Side, traffic black RAL 9017

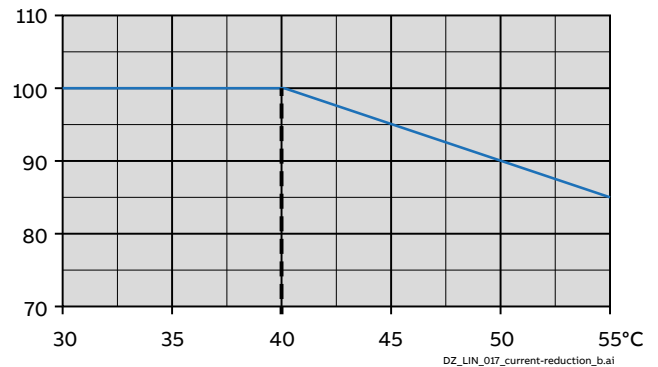
Environmental limit values	
Permissible cooling air temperature	
• at converter module air inlet:	0 to +55°C
with rated DC current:	0 to +40°C
with different DC current:	+30 to +55°C
• Options:	0 to +40°C
Relative humidity (at 5 ... +40°C):	5 to 95 %, no condensation
Relative humidity (at 0 ... +5°C):	5 to 50 %, no condensation
Change of the ambient temp.:	< 0.5°C / minute
Storage temperature:	-40 to +55°C
Transport temperature:	-40 to +70°C
Pollution degree (IEC 60664-1, IEC 60439-1):	2
Site elevation	
<1000 m above M.S.L.:	100 %, without current reduction
>1000 m above M.S.L.:	with current reduction

## Sound pressure level

Size	Sound pressure level L <sub>p</sub> (1 m distance)		Vibrations
	as module	enclosed conv.	
H1	55 dBA	68 dBA	3 mm, 2 ... 9 Hz 1 g, 9 ... 200 Hz
H2	55 dBA	72 dBA	
H3	60 dBA	78 dBA	
H4	66 ... 70 dBA, depending on fan	77 dBA	
H5	75 dBA		0,075 mm, 10 ... 57 Hz 1 g, 57 ... 150 Hz
H6	73 dBA	78 dBA	
H7	75 dBA	73 dBA	
H8	82 dBA	80 dBA	



Current reduction to % of nominal converter current



Current reduction to % of nominal converter current

### North American Standards

In North America the system components fulfil the requirements of the table below.

#### DCS880-S01/S02 module sizes H1 ... H8

	US	Canada
Standard	UL 61800-5-1	CSA 22.2 No. 274-17
Certificate no.	(TÜV-SÜD) U8 045204 0008	

#### Field exciter DCF803/804-0016, -0035, -0050, -0060 and FEX-425 Overvoltage protection DCF505/506

	US	Canada
Standard	UL 61800-5-1	CSA 22.2 No. 274-17
Certificate no.	(TÜV-SÜD) U8V 045204 0011	

#### DCS880-A01/A02 cabinet sizes H1 ... H8P, Incomings & Empty cabinets

	US	Canada
Standard	on request	
Certificate no.		

### UK Legislation - UKCA

In UK the system components fulfil the following regulations

#### DCS880-S01/S02 module sizes H1 ... H8

Electrical Equipment (Safety) Regulations	2016 UK Safety
Electromagnetic Compatibility Regulations	2016 UK EMC
Supply of Machinery (Safety) Regulations	2008 UK Machinery
Restriction of the Use of Certain Hazardous Substances Regulations	2012 UK RoHS

### Regulatory compliance

The converter module and enclosed converter components are designed for use in industrial environments. In EEA countries, the components fulfil the requirements of the EU directives, see table below.

European union directive	Manufacturer's assurance	Harmonized standards	Converter module	Enclosed converter
Machine Directive				
2006/42/EU	Declaration of Conformity	EN 61800-5-2:2017	x	
		EN 62061: 2005 + A1:2013	x	
		EN ISO 13849-1:2015 + A1:2015	x	
		EN ISO 13849-2:2012	x	
		IEC 61508-2:2010	x	
		EN 60204-1:2018	x	x
		EN ISO 14118: 2018	x	
Low Voltage Directive				
2014/35/EU	Declaration of Conformity	EN 61800-5-1:2017	x	x
EMC Directive				
2014/30/EU	Declaration of Conformity	EN 61800-3:2018	x	x
RoHS & WEEE				
2011/65/EU & 2012/19/EU	Declaration of Conformity		x	x
Relevant standards for DC				
	Declaration of Conformity	EN 61800-1:1998	x	x
		EN 60146-1-1:2010	x	x

## DCS880-A Enclosed Converter unit types

Unit type	DC I *	DC II current		DC III current		DC IV current		int. field current	Power loss	Frame size
		100 %	150 %	100 %	150 %	100 %	200 %			
		15 min	60 sec.	15 min	120 sec.	15 min	10 sec.			
	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[kW]	
400 V / 525 V										
DCS880-A01-0090-04/05	81	60	90	57	85	57	114	12	<0.90	H1
DCS880-A02-0100-04/05	90	68	100	64	95	64	128	12	<0.90	
DCS880-A01-0270-04/05	240	180	270	170	255	150	300	18	<1.75	H2
DCS880-A02-0300-04/05	270	205	300	190	285	170	340	18	<1.75	
DCS880-A01-0315-04/05	285	219	329	211	316	192	384	25	<1.89	H3
DCS880-A02-0350-04/05	315	239	359	233	350	210	420	25	<1.89	
DCS880-A01-0405-04/05	360	275	410	260	390	235	470	25	<2.23	
DCS880-A02-0450-04/05	390	289	433	274	409	246	491	25	<2.23	
DCS880-A01-0470-04/05	410	316	474	297	446	282	564	25	<2.57	
DCS880-A02-0520-04/05	450	345	517	330	495	308	616	25	<2.57	
DCS880-A01-0610-04/05	540	432	648	427	641	391	781	30	<3.01	H4
DCS880-A02-0680-04/05	600	480	720	475	712	434	868	30	<3.01	
DCS880-A01-0740-04/05	670	543	814	529	794	481	963	30	<3.65	
DCS880-A02-0820-04/05	740	599	899	585	877	532	1063	30	<3.65	
DCS880-A01-0900-04/05	810	620	931	596	894	547	1094	30	<4.80	
DCS880-A02-1000-04/05	900	689	1034	662	994	608	1215	30	<4.80	
400 V / 525 V										
DCS880-A0x-1200-04/05	1140	843	1265	820	1230	731	1461	25 ⑤	<7.64	H6
DCS880-A0x-1500-04/05	1425	1140	1709	1048	1573	1048	2097	25 ⑤	<10.34	
DCS880-A0x-2000-04/05	1850	1368	2052	1259	1889	1259	2518	25 ⑤	<10.62	
DCS880-A0x-2050-05 ③	1950	1550	2325	1480	2220	1450	2900		<9.70	H7 ⑥
DCS880-A01-2500-04/05 ③	2450	1980	2970	1880	2820	1920	3840		<10.20	
DCS880-A02-2500-04/05 ③	2450	2000	3000	1930	2895	1790	3580		<11.20	
DCS880-A01-3000-04/05	3000	2350	3525	2220	3330	2280	4560		<11.90	
DCS880-A02-3000-04/05	3000	2330	3495	2250	3375	2080	4160		<13.70	
DCS880-A0x-3300-04/05 ①	3300	2300	3450	2250	3375	2130	4260		<17.20	H8 ⑦
DCS880-A0x-4000-04/05 ②	4000	2800	4200	2730	4095	2600	5200		<18.00	
DCS880-A0x-5200-04/05 ②	5100 ④	3850	5775	3750	5625	3650	7300		<23.50	
DCS880-A0x-6600-04/05P1 ②	6200	4370	6555	4275	6412	4047	8094		<34.40	H8P ⑦
DCS880-A0x-8000-04/05P1 ②	7600	5320	7980	5187	7780	4940	9880		<36.00	
DCS880-A0x-9999-04/05P1 ②	9800	7315	10971	7125	10687	6935	13870		<47.00	
600 V / 690 V										
DCS880-A01-0290-06	220	174	260	152	228	152	304		<1.81	H3
DCS880-A02-0320-06	240	190	285	166	249	166	332		<1.81	
DCS880-A01-0590-06	370	290	435	258	387	258	516		<2.47	H4
DCS880-A02-0650-06	400	313	469	279	418	279	558		<2.47	
DCS880-A0x-0900-06/07	855	650	974	565	847	565	1129	25 ⑤	<7.20	H6
DCS880-A0x-1500-06/07	1425	1140	1709	1048	1573	1048	2097	25 ⑤	<10.34	
DCS880-A01-2000-06/07	1850	1368	2052	1259	1889	1259	2518	25 ⑤	<10.62	
DCS880-A0x-2050-06/07 ③	1950	1520	2280	1450	2175	1430	2860		<10.70	H7 ⑥
DCS880-A01-2500-06/07 ③	2450	1940	2910	1840	2760	1880	3760		<11.70	
DCS880-A02-2500-06/07 ③	2450	1940	2910	1870	2805	1740	3480		<12.80	
DCS880-A01-3000-06/07	3000	2530	3795	2410	3615	2430	4860		<13.10	
DCS880-A02-3000-06/07	3000	2270	3405	2190	3285	2030	4060		<14.50	
DCS880-A0x-3300-06/07 ①	3300	2360	3540	2310	3465	2180	4360		<17.90	H8 ⑦
DCS880-A0x-4000-06/07 ②	4000	3000	4500	2850	4275	2900	5800		<20.10	
DCS880-A0x-4800-06/07 ②	4700 ④	3600	5400	3500	5250	3600	7200		<23.70	
DCS880-A0x-6600-06/07P1 ②	6200	4484	6726	4389	6583	4142	8284		<35.70	H8P ⑦
DCS880-A0x-8000-06/07P1 ②	7600	5700	8550	5415	8122	5510	11020		<40.20	
DCS880-A0x-9600-06/07P1 ②	9000	6840	10260	6650	9975	6840	13680		<47.30	
800 V										
DCS880-A0x-1900-08	1900	1500	2250	1430	2145	1400	2800		<9.90	H7 ⑥
DCS880-A01-2500-08	2500	1920	2880	1820	2730	1860	3720		<11.00	
DCS880-A02-2500-08	2500	1910	2865	1850	2775	1710	3420		<11.50	
DCS880-A01-3000-08	3000	2500	3750	2400	3600	2400	4800		<12.50	
DCS880-A02-3000-08	3000	2250	3375	2160	3240	2000	4000		<13.90	
DCS880-A0x-3300-08 ②	3300	2350	3525	2300	3450	2170	4340		<18.10	H8 ⑦
DCS880-A0x-4000-08 ②	4000	2950	4425	2800	4200	2800	5600		<20.30	
DCS880-A0x-4800-08 ②	4700 ④	3600	5400	3500	5250	3500	7000		<23.90	
DCS880-A0x-6600-08P1 ②	6200	4465	6697	4370	6555	4123	8246		<36.00	H8P ⑦
DCS880-A0x-8000-08P1 ②	7600	5605	8407	5320	7980	5320	10640		<40.50	
DCS880-A0x-9600-08P1 ②	9000	6840	10260	6650	9975	6650	13300		<46.50	
990 V										
DCS880-A0x-2050-10 ②	2050	1500	2250	1450	2175	1350	2700		<15.10	H8 ⑦
DCS880-A0x-2600-10 ②	2600	1850	2275	1800	2700	1700	3400		<18.50	
DCS880-A0x-3300-10 ②	3300	2450	3675	2350	3525	2300	4600		<22.80	
DCS880-A0x-4000-10 ②	4000	2850	4275	2800	4200	2750	5500		<23.50	
DCS880-A0x-5200-10P1 ②	4900	3515	5272	3420	5130	3230	6460		<36.80	H8P ⑦
DCS880-A0x-6600-10P1 ②	6200	4655	6982	4465	6697	4370	8740		<45.60	
DCS880-A0x-8000-10P1 ②	7600	5415	8122	5320	7980	5225	10450		<46.80	
1190 V										
On request										
DCS880-A0x-2600-12 ②	2600	1900	2850	1830	2745	1700	3400		<21.20	H8 ⑦
DCS880-A0x-3300-12 ②	3300	2390	3585	2310	3465	2310	4620		<22.80	
DCS880-A0x-4000-12 ②	3800 A at 7% uk						4000 A at 14% uk		<24.50	

Table 1: DCS880-A types

\* Ratings are valid for IP 21; for IP 42 and IP 54 current derating see page 34.

### Voltage class:

(example: DCS880-A0x-0025-04y-D)

04 ⇒ 400 V    05 ⇒ 500/525 V

06 ⇒ 600 V    07 ⇒ 690 V

08 ⇒ 800 V    10 ⇒ 990 V

12 ⇒ 1190 V

x=1 ⇒ 2-Q converter

x=2 ⇒ 4-Q converter

P ⇒ hard parallel

(two conv. mod. in parallel)

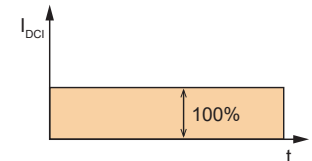
DCS880-A enclosed converters are suitable for three-phase supply voltages from:

**230 ... 990 (1200) V<sub>AC</sub>,**

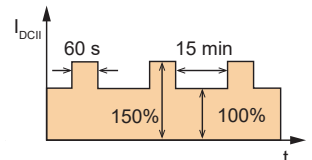
**50 or 60 Hz**

Select the DCS880-A type from Table 1, according to the nominal supply voltage and the rated DC current.

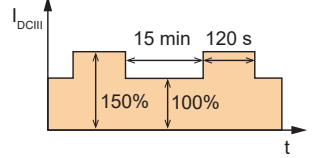
DC I \*  $I_{DCI}$  continuous ( $I_{dN}$ )



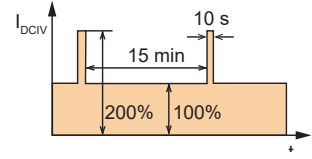
DC II  $I_{DCII}$  for 15 min and  $1.5 * I_{DCII}$  for 60 s



DC III  $I_{DCIII}$  for 15 min and  $1.5 * I_{DCIII}$  for 120 s



DC IV  $I_{DCIV}$  for 15 min and  $2 * I_{DCIV}$  for 10 s



① = Air circuit breaker on request

② = Air circuit breaker not available

③ = Reduced current due to standard air circuit breaker.

Larger air circuit breakers are available on request.

④ with air exit IP21 ⇒ plus 100 A (+C130 see page 37)

⑤ FEX-425 internal field exciter as option; three-phase or single phase, separate supply max. 500 V<sub>AC</sub>.

⑥ Requires 3-phase aux. fan supply, 3 x 400 V or 3 x 525 V, 50 Hz or 3 x 460 V, 60 Hz.

⑦ Requires 3-phase aux. fan supply, 3 x 400 V, 50 Hz or 3 x 460 V, 60 Hz.



## Dimensions DCS880 converter cabinet (SACE Emax 2.2 design)

	Single drive e. g. DCS880-A0x-0820-05X1					Group drive e. g. DCS880-A0x-0820-05X2				
	Height ①	Depth	Width ②	Width ③	Weight [kg]	Height ①	Depth	Width ②	Width ③	Weight ⑦
DC-Converter, Size H1	-Frame size-					-Frame size-				
DCS880-A0x-0090-04/05	2120	600	600	-	230	2120	600	600	-	200+z
DCS880-A0x-0100-04/05	2120	600	600	-	230	2120	600	600	-	200+z
DC-Converter, Size H2										
DCS880-A0x-0270-04/05	2120	600	600	-	250	2120	600	600	-	220+z
DCS880-A0x-0300-04/05	2120	600	600	-	250	2120	600	600	-	220+z
DC-Converter, Size H3										
DCS880-A0x-0290-06	2120	600	600	-	250	2120	600	600	-	220+z
DCS880-A0x-0320-06	2120	600	600	-	250	2120	600	600	-	220+z
DCS880-A0x-0315-04/05	2120	600	600	-	300	2120	600	600	-	270+z
DCS880-A0x-0350-04/05	2120	600	600	-	300	2120	600	600	-	270+z
DCS880-A0x-0405-04/05	2120	600	800	-	310	2120	600	800	-	280+z
DCS880-A0x-0450-04/05	2120	600	800	-	310	2120	600	800	-	280+z
DCS880-A0x-0470-04/05	2120	600	800	-	310	2120	600	800	-	280+z
DCS880-A0x-0520-04/05	2120	600	800	-	310	2120	600	800	-	280+z
DC-Converter, Size H4										
DCS880-A0x-0590-06	2120	600	800	-	360	2120	600	800	-	330+z
DCS880-A0x-0650-06	2120	600	800	-	360	2120	600	800	-	330+z
DCS880-A0x-0610-04/05	2120	600	800	-	360	2120	600	800	-	330+z
DCS880-A0x-0680-04/05	2120	600	800	-	360	2120	600	800	-	330+z
DCS880-A0x-0740-04/05	2120	600	800	-	360	2120	600	800	-	330+z
DCS880-A0x-0820-04/05	2120	600	800	-	360	2120	600	800	-	330+z
DCS880-A0x-0900-04/05	2120	600	800	-	360	2120	600	800	-	330+z
DCS880-A0x-1000-04/05	2120	600	800	-	360	2120	600	800	-	330+z
DC-Converter, Size H6										
DCS880-A0x-0900-06/07	2120	600	1400	-	620	2120	600	1400	-	590+z
DCS880-A0x-1200-04/05	2120	600	1400	-	640	2120	600	1400	-	610+z
DCS880-A0x-1500-04/05/06/07	2120	600	1400	-	720	2120	600	1400	-	690+z
DCS880-A0x-2000-04/05/06/07 ⑤	2120	600	1400	-	740	2120	600	1400	-	710+z
DC-Converter, Size H7 (with circuit breaker)										
DCS880-A0x-1900-08 ⑦	2120	600	2400	2000	850	on request				
DCS880-A0x-2050-05/06/07 ⑦	2120	600	2400	2000	1100					
DCS880-A0x-2500-04/05/06/07 ⑦	2120	600	2400	2000	1100					
DCS880-A0x-2500-08 ⑦	2120	600	2400	2000	850					
DCS880-A0x-3000-04/05/06/07 ⑦	2120	600	2400	2000	1250					
DCS880-A0x-3000-08 ⑦	2120	600	2400	2000	950	not available				
DC-Converter, Size H8 (without circuit breaker)										
DCS880-A0x-2050-10 ④	2120	600	-	1800	790					
DCS880-A0x-2600-10/12 ④	2120	600	-	1800	850					
DCS880-A0x-3300-04/05/06/07/08/10/12 ④	2120	600	-	1800	950					
DCS880-A0x-4000-04/05/06/07/08/10/12 ④	2120	600	-	2400 ⑧	1170					
DCS880-A0x-4800-06/07/08 ④	2120	600	-	2400 ⑧	1200					
DCS880-A0x-5200-04/05 ④	2120	600	-	2400 ⑧	1200					
DC-Converter, Size H8P										
DCS880-A0x-5200-10P1	2120	600	-	3000	1430					
DCS880-A0x-6600-04/05/06/07/08/10P1	2120	600	-	3000	1630					
DCS880-A0x-8000-04/05/06/07/08/10P1	2120	600	-	4200 ⑧	2070					
DCS880-A0x-9600-06/07/08P1	2120	600	-	4200 ⑧	2140					
DCS880-A0x-9999-04/05P1	2120	600	-	4200 ⑧	2140					
Empty cabinets										
DCS880-A50-0000-001y	2120	600	1000			2120	600	1000		
DCS880-A50-0000-002y	2120	600	200			2120	600	200		
DCS880-A50-0000-004y	2120	600	400			2120	600	400		
DCS880-A50-0000-006y	2120	600	600			2120	600	600		
DCS880-A50-0000-008y	2120	600	800			2120	600	800		
Incoming Supply Sections, 690 V										
DCS880-A50-1000-07z2						2120	600	600	600	280 ⑨
DCS880-A50-2000-07z2						2120	600	600	600	280 ⑨
DCS880-A50-3000-07z2 for IEC			not available			2120	600	800	800	441 ⑨
DCS880-A50-3000-07z2 for UL						2120	600	1000	800	554 ⑨
DCS880-A50-4000-07z2 for IEC			not available			2120	600	800	800	441 ⑨
DCS880-A50-4000-07z2 for UL						2120	600	1000	1000	750 ⑨

Table 2: Dimensions of the DCS880-A series.

### Explanations to the table:

x=1 ⇒ 2-Q converter

x=2 ⇒ 4-Q converter

y=1 ⇒ single drive

y=2 ⇒ group drive

z=0 ⇒ incoming, no breaker, no switch

z=S ⇒ incoming with isolation switch

z=A ⇒ incoming with circuit breaker

z=H ⇒ incoming, no breaker, no switch, no options

P ⇒ hard parallel (two conv. mod. in parallel)

### Voltage class:

see left side

① Height is including detachable hood (+ 120 mm), IP54, 300 mm additional / total height 2300 mm.

② With circuit breaker or contactor.

③ Without circuit breaker or contactor.

④ DCS880-A with AC supply voltage 3 x 990 V ... 1190 V or current ≥ 3300 A are generally without circuit breaker.

⑤ At 600 V (6) and 690 V (7) only available as 2-Q converter.

⑥ z: Weight for busbars: 1000 A / 2000 A = 35 kg/m; 3000 A = 70 kg/m.

⑦ The air circuit breaker stands out of the line-up's front. Thus 78 mm have to be added to the total depth of the line-up.

⑧ Listed width for cable connection reduced width for busbar connection on request.

⑨ All weights are related to incoming cabinets with breaker DCS880-A50-\_\_\_\_-07A2.

### Notes:

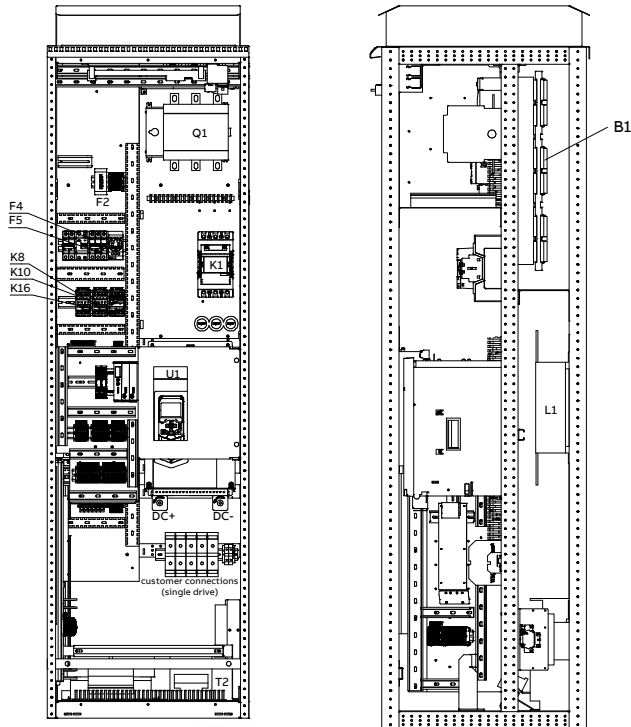
All dimensions are in mm.

Please add for each end panel 15 mm and for a door (without buttons) 20 mm.

Max length of a shipping split is 3.40 m. If the line-up width is longer than 3.40 m busbar joining cabinets are required.

## Overview Enclosed converter DCS880-A

### Overview Enclosed converter DCS880-A0x-0090 ... 0350 (H1/H2/H3-350)



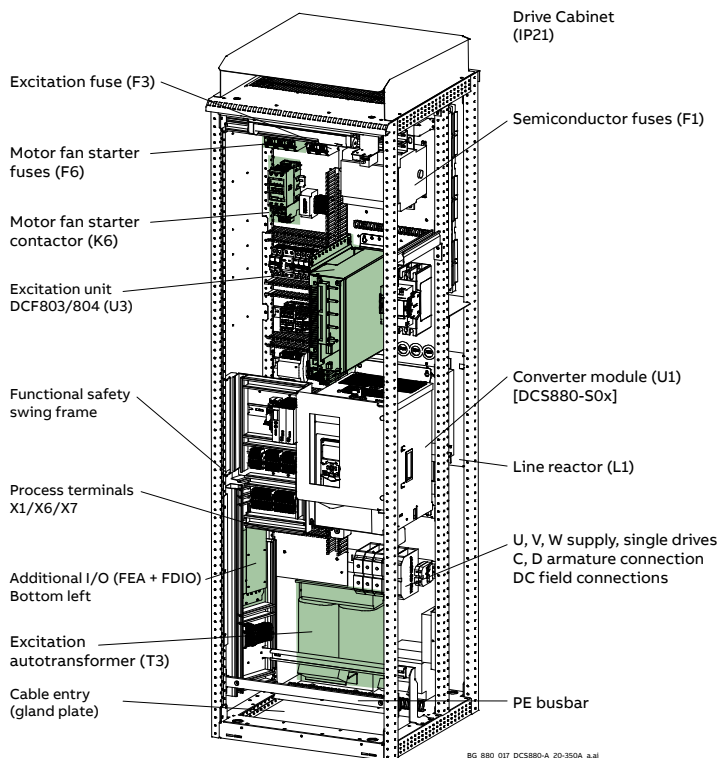
DCS880-A0x-0020 ... 0350 (H1/H2/H3-350)  
single drive connection      standard group drive

#### Component list (standard)

Degree of protection **IP 21**  
 Armature converter module **U1**  
 Isolation switch with semiconductor fuses **Q1**  
 Main contactor **K1**  
 Line reactor **L1**  
 Internal excitation OnBoard 6 - 15 A **A22**  
 Process terminals **X1/X6/X7**  
 Aux. supply voltage transformer **T2**  
 Aux. supply voltage fuses **F2**  
 Electrical disconnect relay **K16\***  
 Power supply 24 V<sub>DC</sub> / 5 A **G1**  
 Horizontal busbars for group drives **B1\*\***

**Note 1:** OnBoard field exciter keeps main contactor ON during field heating

**Note 2:** \* Wiring see section Basic circuit diagrams.



DCS880-A0x-0020 ... 0350 single drive with selected options (shaded) (H1/H2/H3-350)

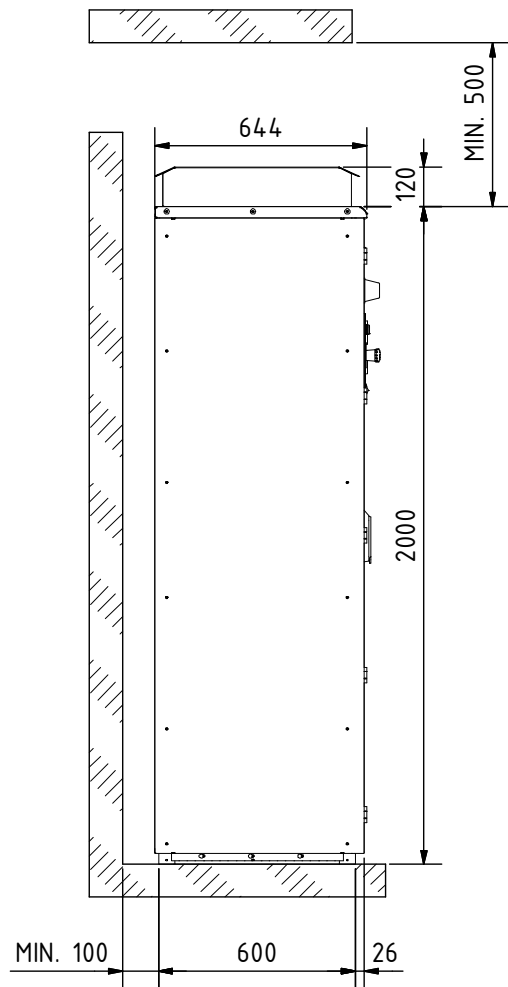
#### Component list (options)

Excitation unit DCF803/804 **U3 (+S711 ... S719)**  
 Excitation contactor **K3**  
 Excitation line reactor **L3**  
 Excitation fuse **F3**  
 Excitation autotransformer **T3 (+S615 ... S624)**  
 Motor fan starter **(+M600 ... M653)**  
 Motor fan starter contactor **K6**  
 Motor fan starter thermal overload **F60**  
 Motor fan starter fuses **F6**  
 115 V / 230 V (24 V) extra 3 x DI + 2 x RO **(+L512)**  
 1 x FDIO+ FEA extension+ FDCO included  
 PT100 interface on FAIO dual channel **(+L529)**  
 Use free slot of FEA extension **(+L512)**

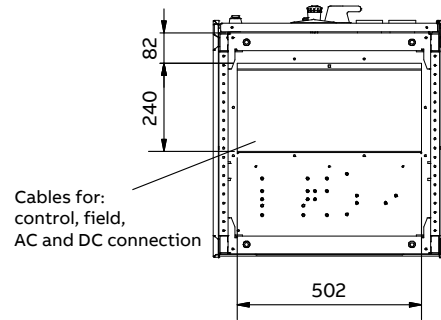
**Note 3:** Not all options are shown.

For more options see section mechanical options and electrical options!

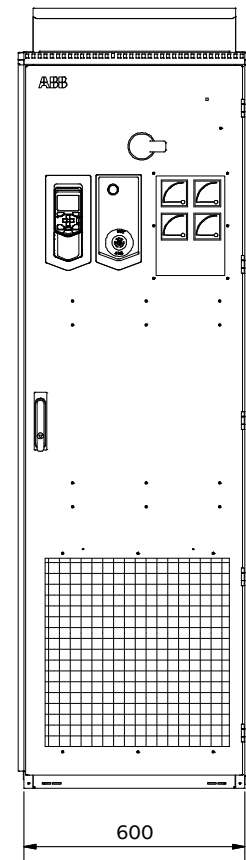




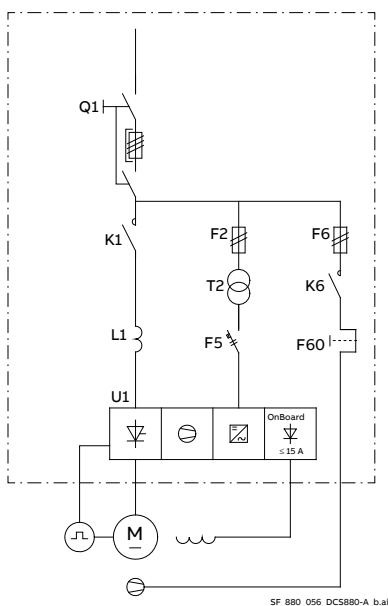
DCS880-A0x-0020 ... 0350 dimensions group and single drive (H1/H2/H3-350)



Cables for:  
control, field,  
AC and DC connection



MG\_880\_011\_DCS880-A\_H1\_a.ai



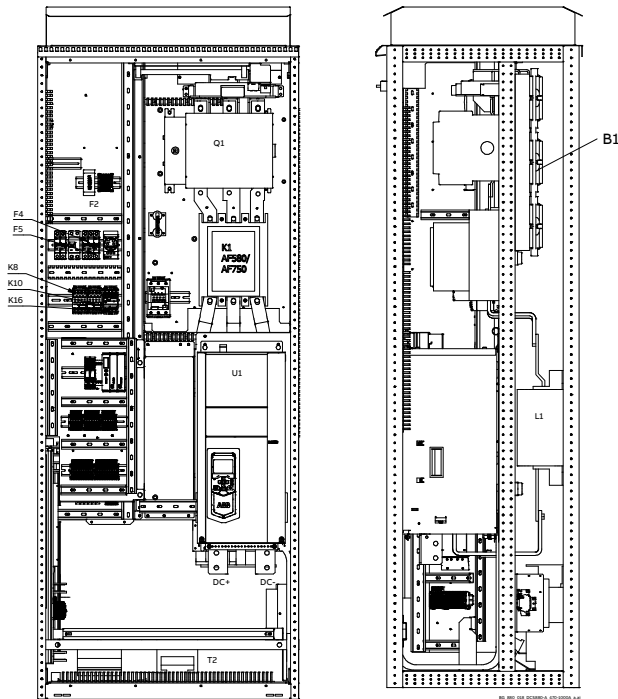
SF\_880\_056\_DCS880-A\_b.ai

DCS880-A0x-0020 ... 0350 single line diagram group and single drive (H1/H2/H3-350)

**Note 4:** For more details (e.g. losses and weight) see tables on page 10 and page 11.

**Note 5:** \*\* Most enclosed converters are available as group and single drives. Group drive require the option horizontal busbars.

## Overview Enclosed converter DCS880-A0x-0405 ... 1000 (H3/H4)



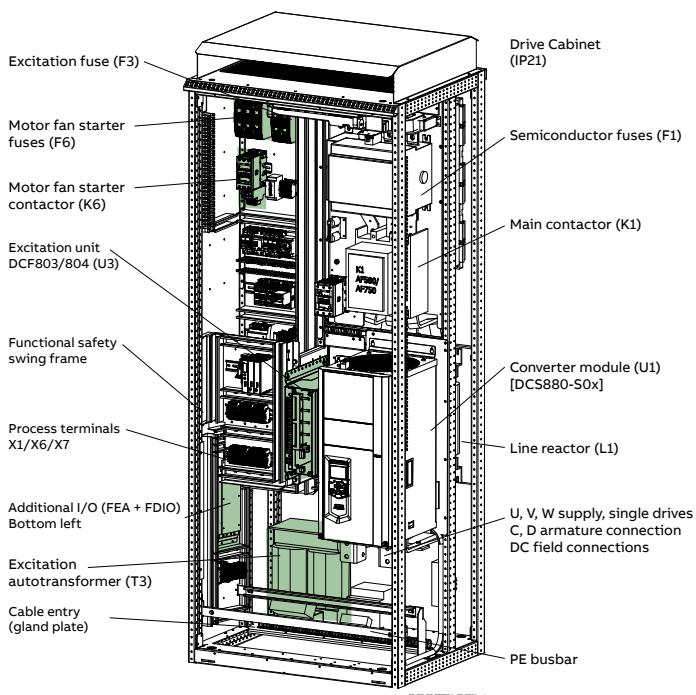
### Component list (standard)

Degree of protection **IP 21**  
 Armature converter module **U1**  
 Isolation switch with semiconductor fuses **Q1**  
 Main contactor **K1**  
 Line reactor **L1**  
 Internal excitation OnBoard 20 - 25 A **A22**  
 Process terminals **X1/X6/X7**  
 Aux. supply voltage transformer **T2**  
 Aux. supply voltage fuses **F2**  
 Electrical disconnect relay **K16\***  
 Power supply 24 V<sub>DC</sub> / 5 A **G1**  
 Horizontal busbars for group drives **B1\*\***

**Note 1:** OnBoard field exciter keeps main contactor ON during field heating

**Note 2:** \* Wiring see section Basic circuit diagrams.

DCS880-A0x-0470 ... 1000 standard group drive (H3/H4)



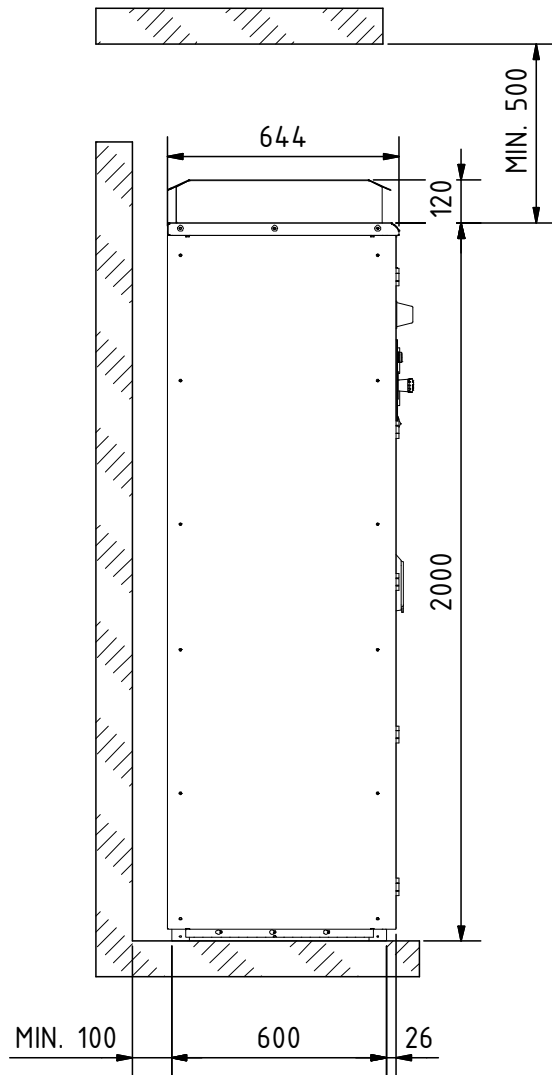
DCS880-A0x-0470 ... 1000 group drive with selected options (shaded) (H3/H4)

### Component list (options)

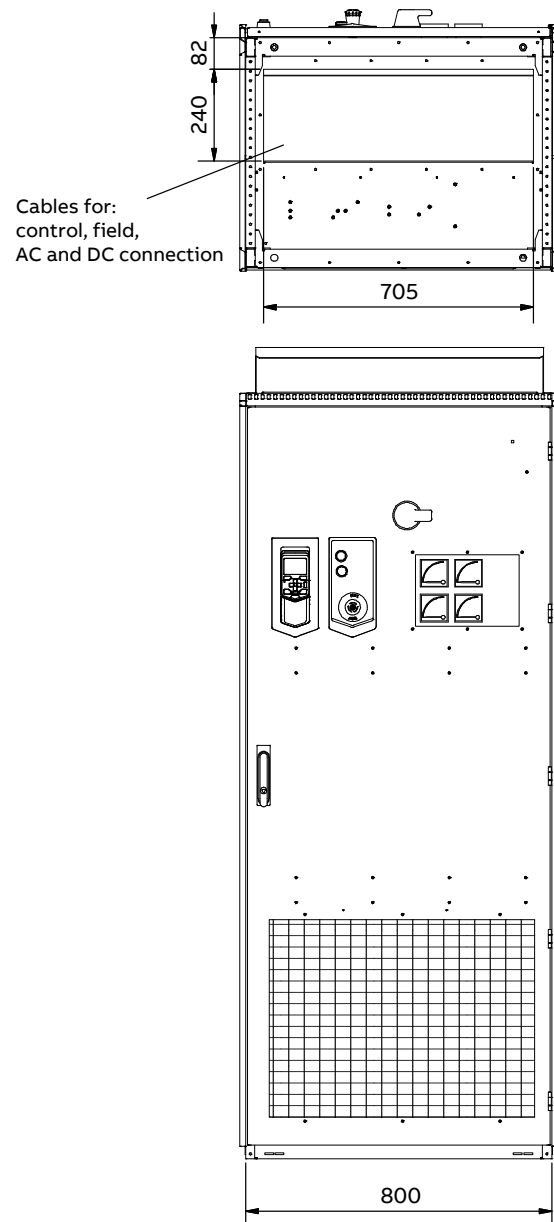
Excitation unit DCF803/804 **U3 (+S711 ... S719)**  
 Excitation contactor **K3**  
 Excitation line reactor **L3**  
 Excitation fuse **F3**  
 Excitation autotransformer **T3 (+S615 ... S624)**  
 Motor fan starter **(+M600 ... M653)**  
 Motor fan starter contactor **K6**  
 Motor fan starter thermal overload **F60**  
 Motor fan starter fuses **F6**  
 115 V / 230 V (24 V) extra 3 x DI + 2 x RO **(+L512)**  
 1 x FDIO+ FEA extension+ FDCO included  
 PT100 interface on FAIO dual channel **(+L529)**  
 Use free slot of FEA extension **(+L512)**

**Note 3:** Not all options are shown.

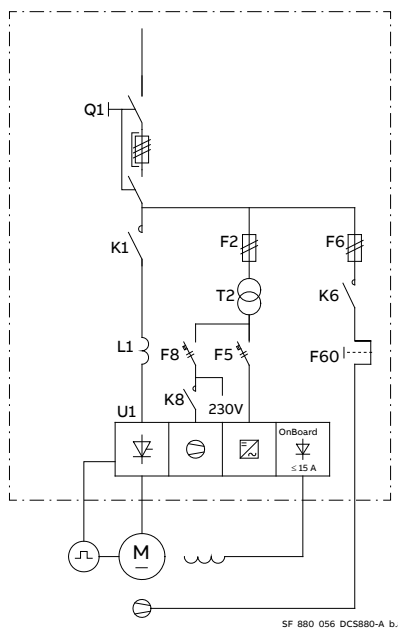
For more options see section mechanical options and electrical options!



DCS880-A0x-0470 ... 1000 dimensions group and single drive (H3/H4)



MG\_880\_010\_DCS880-A\_H4\_a.ai



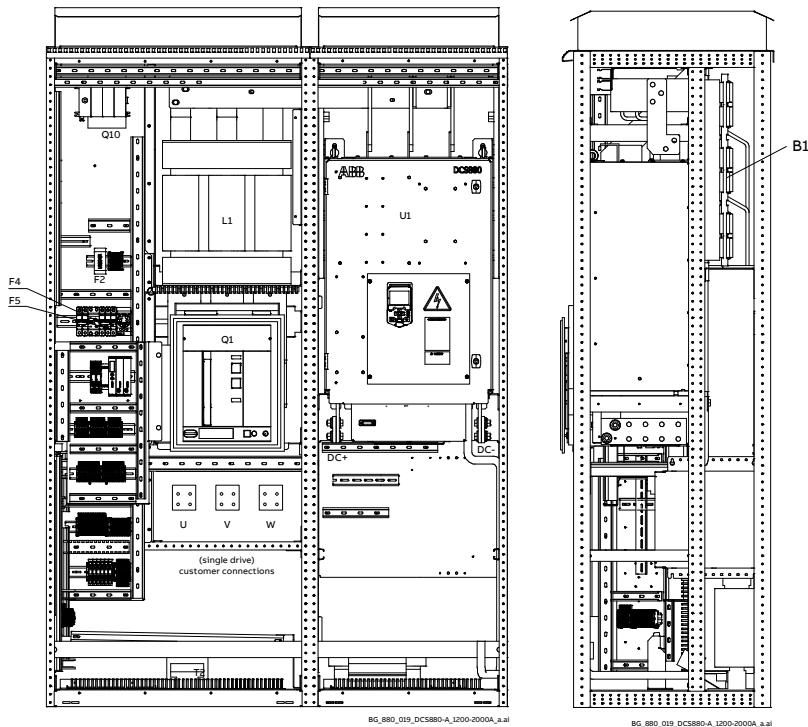
SF\_880\_056\_DCS880-A\_b.ai

DCS880-A0x-0470 ... 1000 single line diagram group and single drive (H3/H4)

**Note 4:** For more details (e.g. losses and weight) see tables on page 10 and page 11.

**Note 5:** \*\* Most enclosed converters are available as group and single drives. Group drive require the option horizontal busbars.

## Overview Enclosed converter DCS880-A0x-0900 ... 2000 (H6)



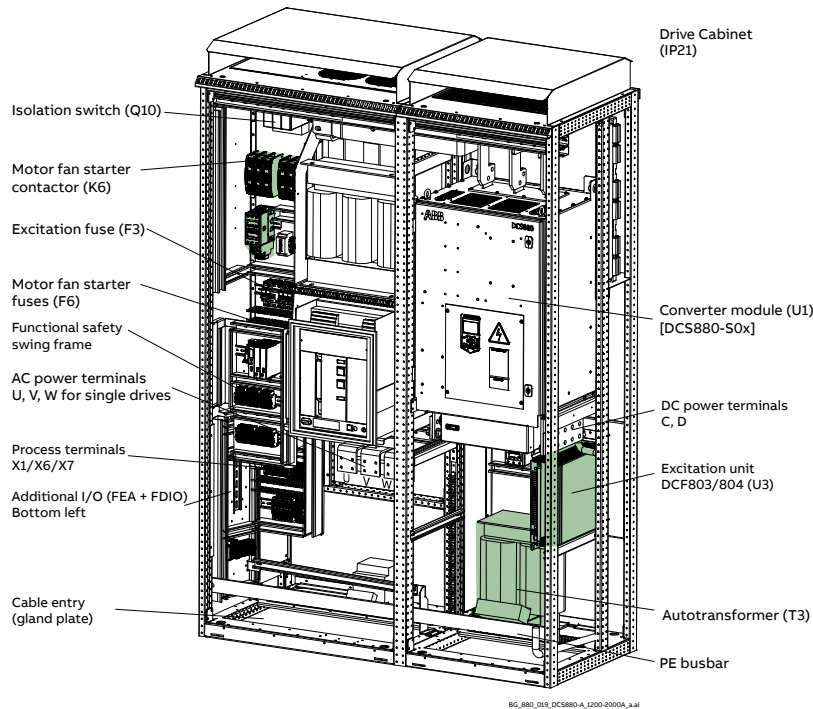
DCS880-A0x-0900 ... 2000 (H6)  
Single drive connection      standard group drive

### Component list (standard)

Degree of protection **IP 21**  
 Armature converter module **U1**  
 Circuit breaker **Q1**  
 Isolation switch with fuses for aux. supply voltage **Q10**  
 Line reactor **L1**  
 Process terminals **X1/X6/X7**  
 Aux. supply voltage transformer **T2**  
 Aux. supply voltage fuses **F2**  
 Converter fan fuse **F8\***  
 Converter fan relay **K8\***  
 Auxiliary circuit fuse **F5\***  
 Electrical disconnect relay **K16\***  
 Power supply 24 V<sub>DC</sub> / 5 A **G1**  
 Horizontal busbars for group drives **B1\*\***

**Note 1:** This standard list does not include any options or the excitation! Please choose the excitation from the options list.

**Note 2:** \* Wiring see section Basic circuit diagrams.

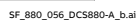
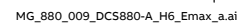
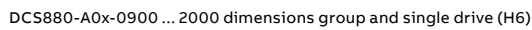


DCS880-A0x-0900 ... 2000 group drive with selected options (shaded) (H6)

### Component list (options)

FEX-425 unit **U3 (+S164)**  
 or  
 Excitation unit DCF803/804 **U3 (+S711 ... S719)**  
 Excitation contactor **K3**  
 Excitation line reactor **L3**  
 Excitation fuse **F3**  
 Excitation autotransformer **T3 (+S615 ... S624)**  
 Motor fan starter **(+M600 ... M653)**  
 Motor fan starter contactor **K6**  
 Motor fan starter thermal overload **F60**  
 Motor fan starter fuses **F6**  
 115 V / 230 V (24 V) extra 3 x DI + 2 x RO **(+L512)**  
 1 x FDIO+ FEA extension+ FDCO included  
 PT100 interface on FAIO dual channel **(+L529)**  
 Use free slot of FEA extension **(+L512)**

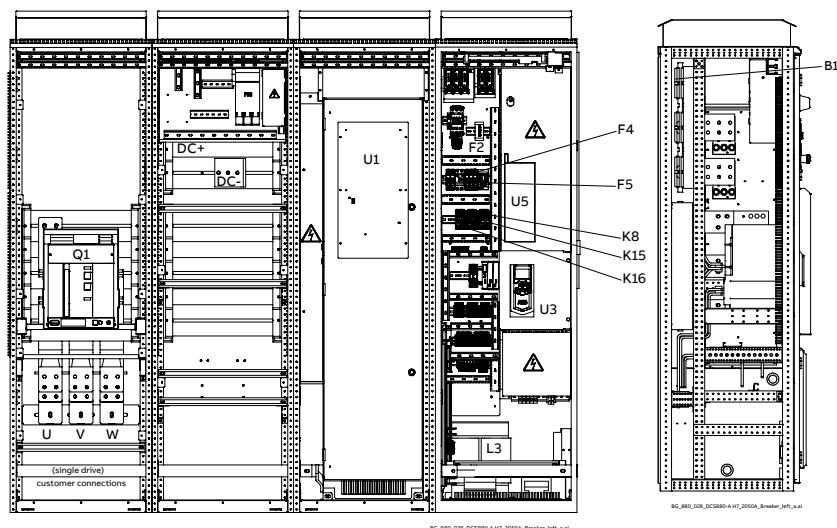
**Note 3:** Not all options are shown.  
 For more options see section mechanical options and electrical options!



DCS880-A0x-0900 ... 2000 single line diagram group and single drive (H6)

**Note 6:** For easy cable connection an additional incoming cabinet can be used (see section Incoming DCS880-A50-x000-07z2).

## Overview Enclosed converter DCS880-A0x-1900 ... 3000 (H7)



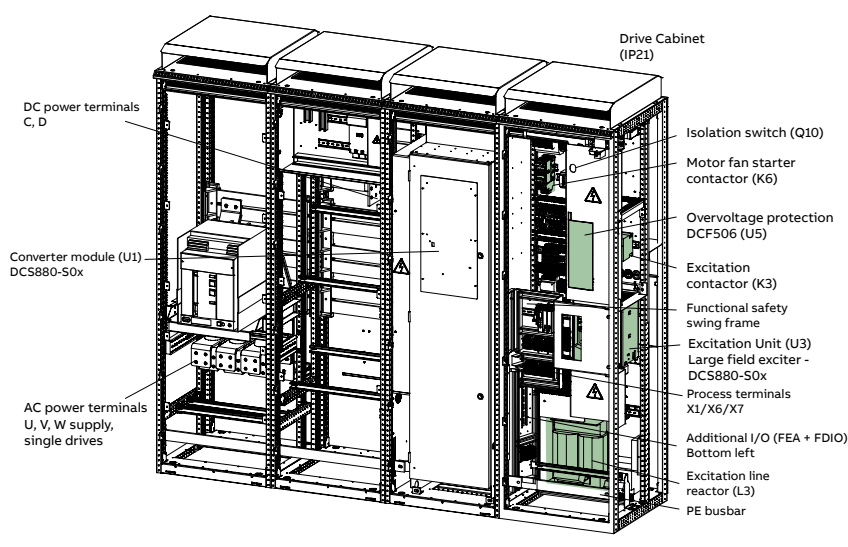
DCS880-A0x-1900 ... 3000 standard single drive (left hand connection) (H7)

### Component list (standard)

Degree of protection **IP 21**  
 Armature converter module **U1**  
 Circuit breaker **Q1**  
 Isolation switch with fuses for aux. supply voltage **Q10**  
 Auxiliary relay **K10**  
 Process terminals **X1/X6/X7**  
 Aux. supply voltage transformer **T2**  
 Aux. supply voltage fuses **F2**  
 Auxiliary circuit fuse **F5\***  
 Converter fan fuse **F8\***  
 Converter fan relay **K8\***  
 E-Stop relay **K15\***  
 Electrical disconnect relay **K16\***  
 Horizontal busbars for group drives **B1\*\***

**Note 1:** This standard list does not include any options or the excitation! Please choose the excitation from the options list.

**Note 2:** \* Wiring see section Basic circuit diagrams.



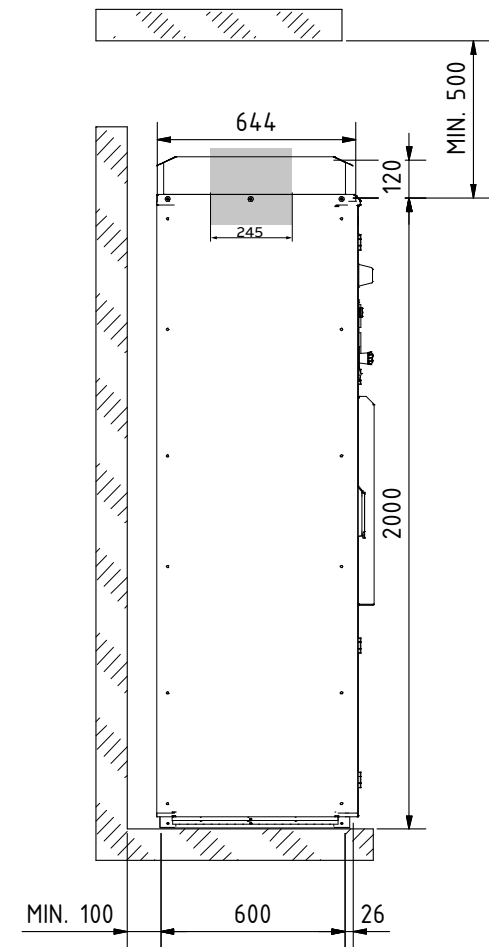
DCS880-A0x-1900 ... 3000 standard single drive (left hand connection) (H7)

### Component list (options)

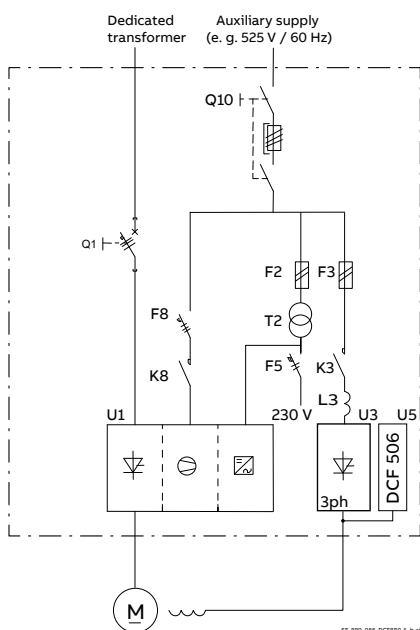
Excitation unit DCF803/804 **U3 (+S711 ... S719)**  
 or  
 DCS880-S01/S02; 25 ... 350 **U3 (+S721 ... S741)**  
 DCF506 - Overvoltage protection **U5**  
 Excitation contactor **K3**  
 Excitation line reactor **L3**  
 Excitation fuse **F3**  
 Excitation autotransformer **T3 (+S615 ... +S624)**  
 Converter fan transf. **T8\*\* (+S610 ... +S612)**  
 Motor fan starter **(+M600 ... M653)**  
 Motor fan starter contactor **K6**  
 Motor fan starter thermal overload **F60**  
 Motor fan starter fuses **F6**  
 Insulation monitor **A90 (+Q954)**  
 Galvanic isolated voltage measurement **(+S798)**  
 Isolated DC transducer **A92**  
 Isolated transformer **T90**

**Note 3:** Not all options are shown.

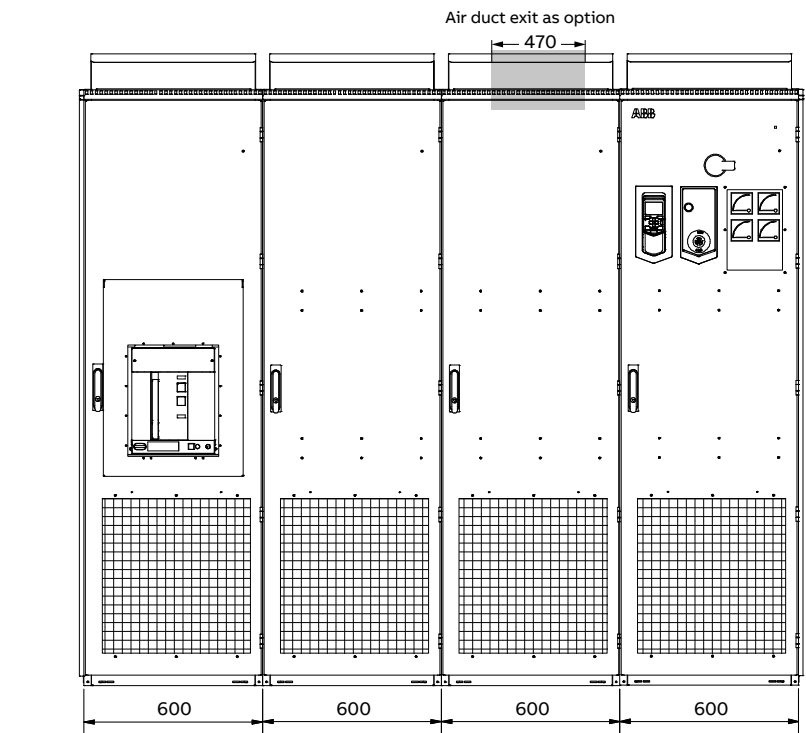
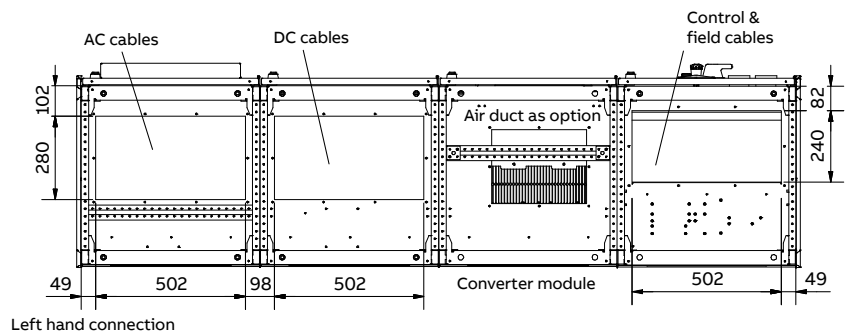
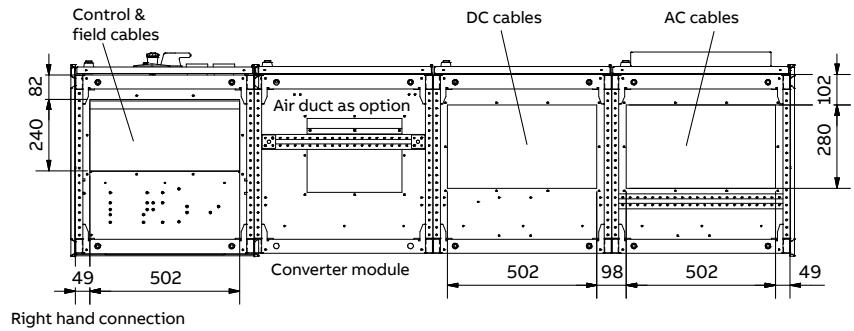
For more options see section mechanical options and electrical options!



DCS880-A0x-1900 ... 3000 dimensions single drive (left hand connection) (H7)



Single line diagram DCS880-A0x-1900 ... 3000 with breaker, dedicated transformer and with excitation - 3 phase large exciter (H7) example 525 V / 50 Hz



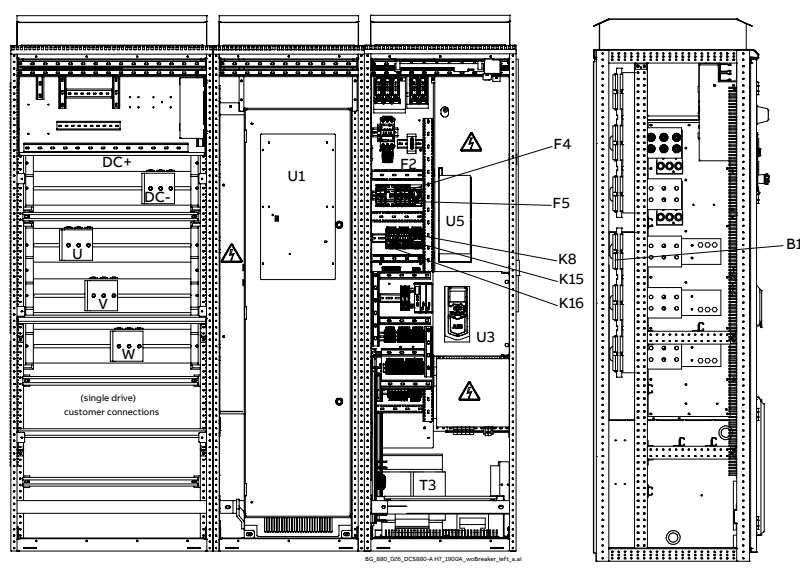
Left hand connection

MG\_880\_017\_H7\_2050A\_Breaker\_left\_a.ai

**Note 4:** Drive without line choke L1. Designed to be connected to dedicated transformers.

**Note 5:** \*\* Most enclosed converters are available as group and single drives. Group drive require the option horizontal busbars.

## Overview Enclosed converter DCS880-A0x-1900 ... 3000 (H7, without breaker +0S775)



DCS880-A0x-1900 ... 3000 standard single drive (left hand connection) (H7 +0S775)

### Component list (standard)

Degree of protection **IP 21**

Armature converter module **U1**

Without circuit breaker **Q1 (+0S775)**

Isolation switch with fuses for aux. -supply voltage **Q10**

Auxiliary relay **K10**

Process terminals **X1/X6/X7**

Aux. supply voltage transformer ( $\leq 690$  V) **T2**

Aux. supply voltage fuses **F2**

Auxiliary circuit fuse **F5\***

Converter fan fuse **F8\***

Converter fan relay **K8\***

E-Stop relay **K15\***

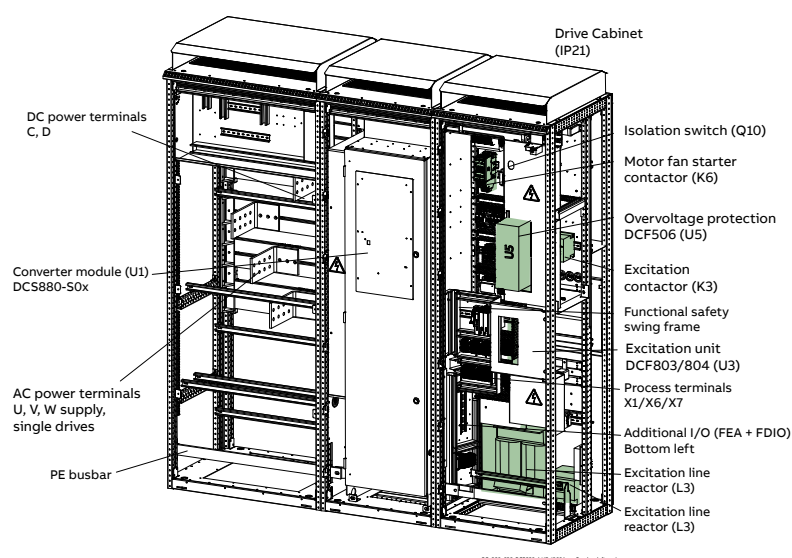
Electrical disconnect relay **K16\***

Horizontal busbars for group drives **B1\*\***

**Note 1:** This standard list does not include any options or the excitation!

Please choose the excitation from the options list.

**Note 2:** \* Wiring see section Basic circuit diagrams.



DCS880-A0x-1900 ... 3000 standard single drive (left hand connection) (H7 +0S775)

### Component list (options)

Excitation unit DCF803/804 **U3 (+S711 ... S719)**

or

DCS880-S01/S02; 25 ... 350 **U3 (+S721 ... S741)**

DCF506 - Overvoltage protection **U5**

Excitation contactor **K3**

Excitation line reactor **L3**

Excitation fuse **F3**

Excitation autotransformer **T3 (+S615 ... +S624)**

Converter fan transf. **T8\*\* (+S610 ... +S612)**

Motor fan starter **(+M600 ... M653)**

Motor fan starter contactor **K6**

Motor fan starter thermal overload **F60**

Motor fan starter fuses **F6**

Insulation monitor **A90 (+Q954)**

Galvanic isolated voltage measurement **(+S798)**

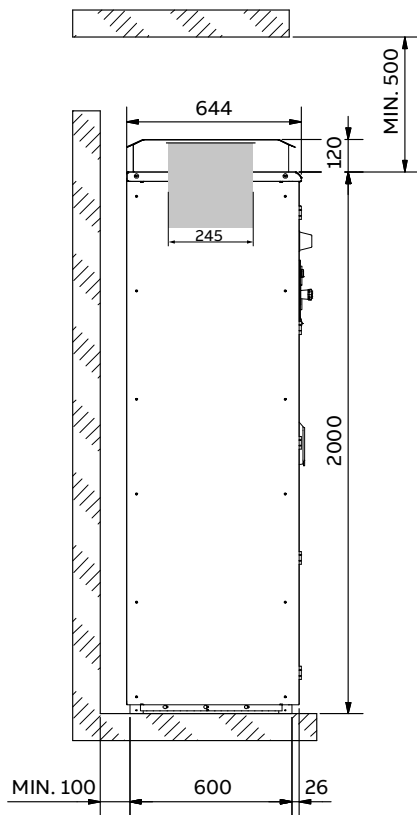
Isolated DC transducer **A92**

Isolated transformer **T90**

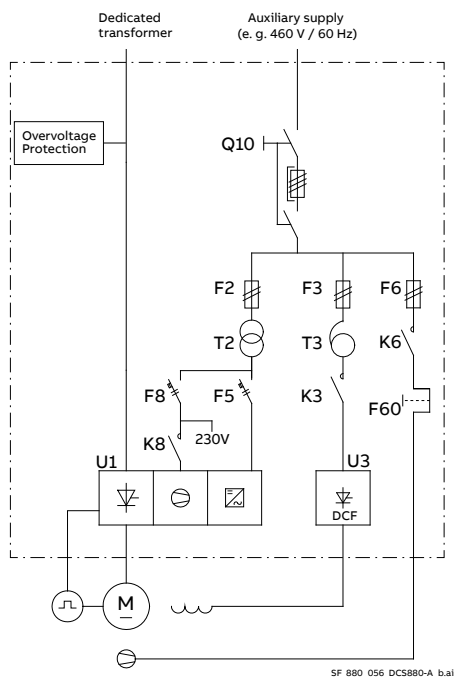
**Note 3:** Not all options are shown.

For more options see section mechanical options and electrical options!

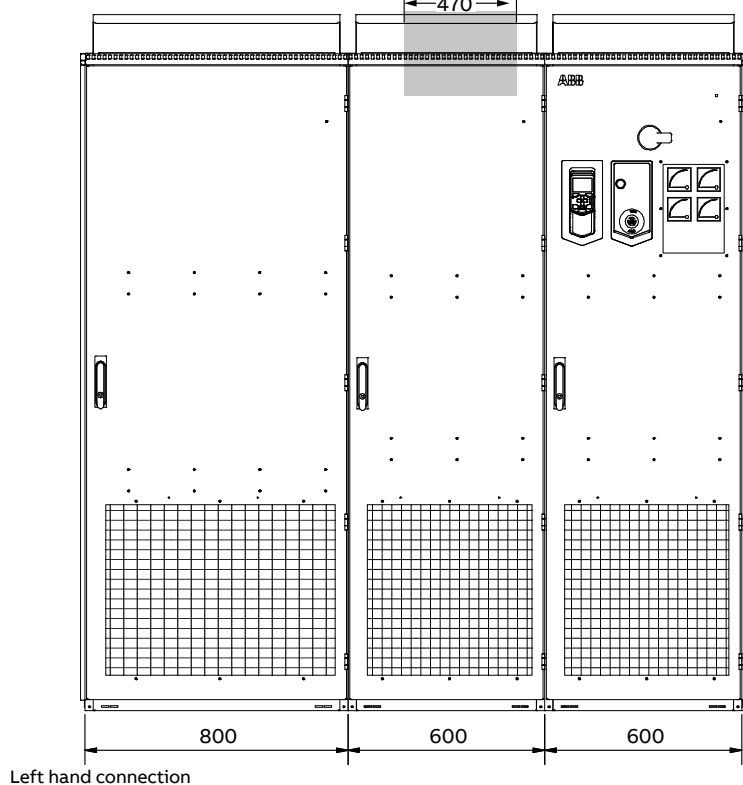
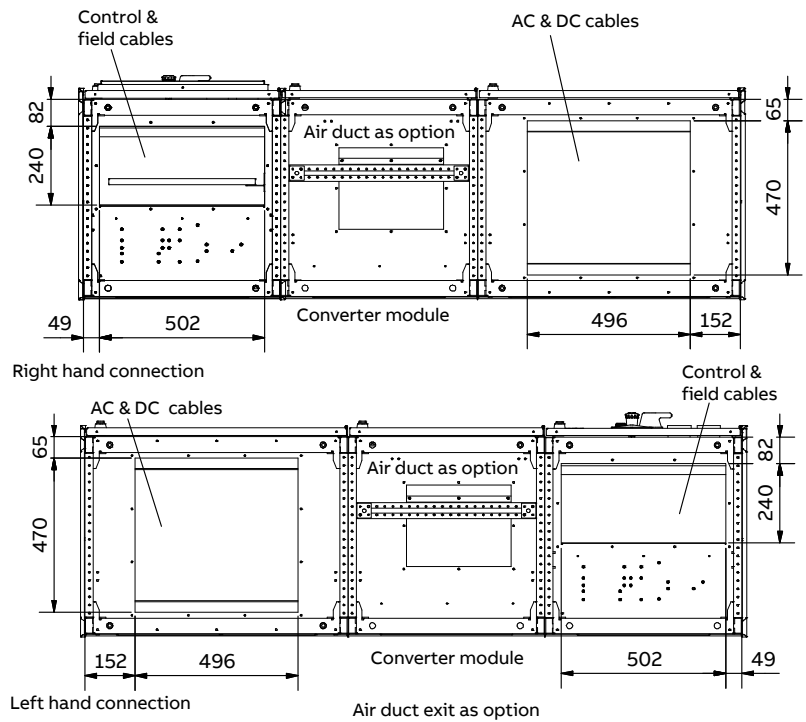




DCS880-A0x-1900 ... 3000 dimensions single drive  
(left hand connection) (H7 +0S775)



Single line diagram DCS880-A0x-1900 ... 3000 **without breaker**;  
dedicated transformer and **without excitation** (H7, +0S775) example aux. supply  
with 460 V / 60 Hz

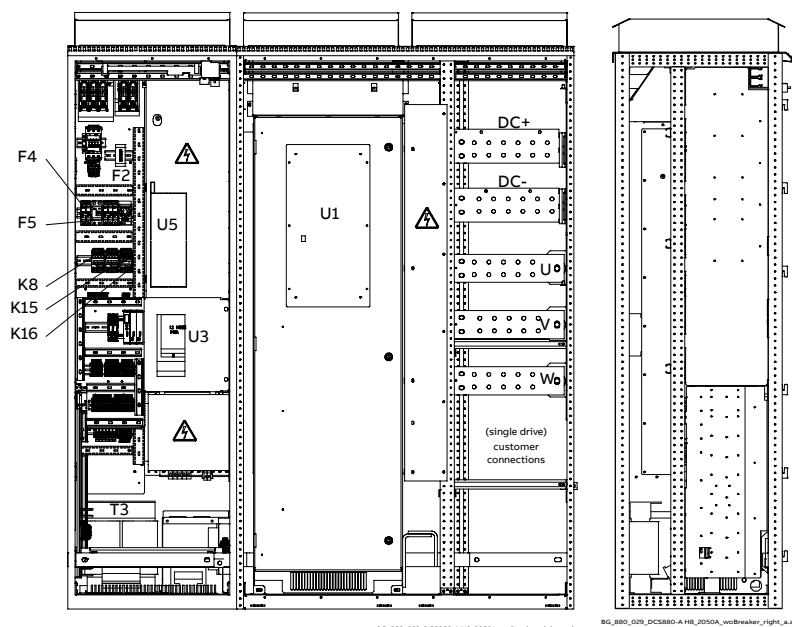


MG\_880\_014\_H7\_1900A\_woBreaker\_left\_a.ai

**Note 4:** Drive without line choke L1. Designed to be connected to dedicated transformers.

**Note 5:** \*\* Most enclosed converters are available as group and single drives. Group drive require the option horizontal busbars.

## Overview Enclosed converter DCS880-A0x-2050 ... 3300 (H8)



DCS880-A0x-2050 ... 3300 standard single drive (left hand connection) (H8)

### Component list (standard)

Degree of protection **IP 21**

Armature converter module **U1**

Isolation switch with fuses for aux.-supply voltage **Q10**

Auxiliary relay **K10**

Process terminals **X1/X6/X7**

Aux. supply voltage transformer **T2**

Aux. supply voltage fuses **F2**

Auxiliary circuit fuse **F5\***

Converter fan fuse **F8\***

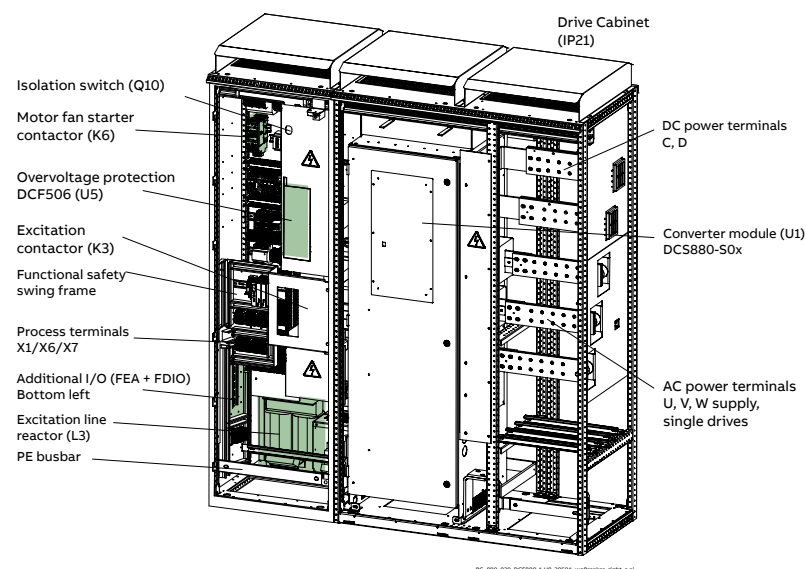
Converter fan relay **K8\***

E-Stop relay **K15\***

Electrical disconnect relay **K16\***

**Note 1:** This standard list does not include any options or the excitation! Please choose the excitation from the options list.

**Note 2:** \* Wiring see section Basic circuit diagrams.



DCS880-A0x-2050 ... 3300 standard single drive (right hand connection) (H8)

### Component list (options)

Excitation unit DCF803/804 **U3**

(+S711 ... S719)

or

DCS880-S01/S02; 25 ... 350 A **U3** (+S721 ... S741)

DCF506 - Overvoltage protection **U5**

Excitation contactor **K3**

Excitation line reactor **L3**

Excitation fuse **F3**

Excitation autotransformer **T3** (+S615 ... +S624)

Converter fan transf. **T8\*** (+S610 ... +S612)

Air circuit breaker **Q1** (+S773)

Motor fan starter (+M600 ... M653)

Motor fan starter contactor **K6**

Motor fan starter thermal overload **F60**

Motor fan starter fuses **F6**

Insulation monitor **A90** (+Q954)

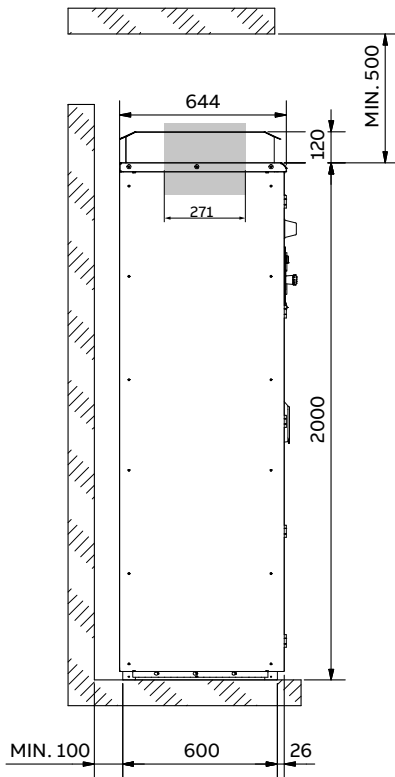
Galvanic isolated voltage measurement (+S798)

Isolated DC transducer **A92**

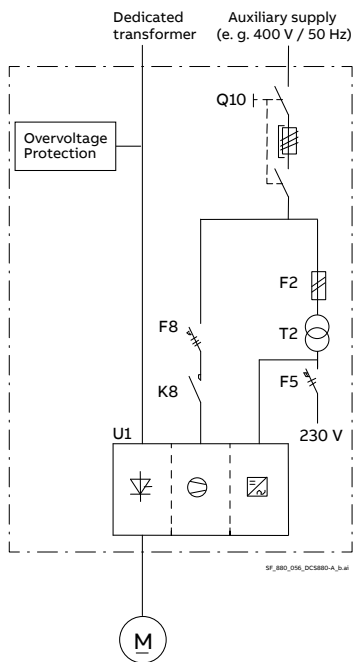
Isolated transformer **T90**

**Note 3:** Not all options are shown.

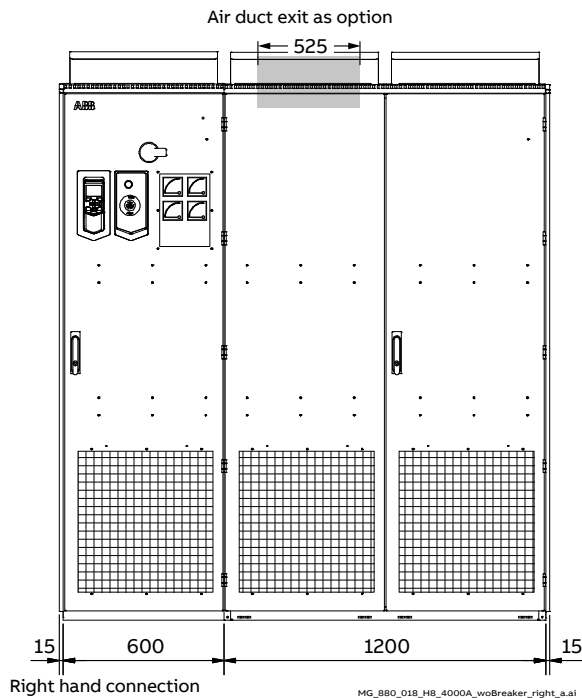
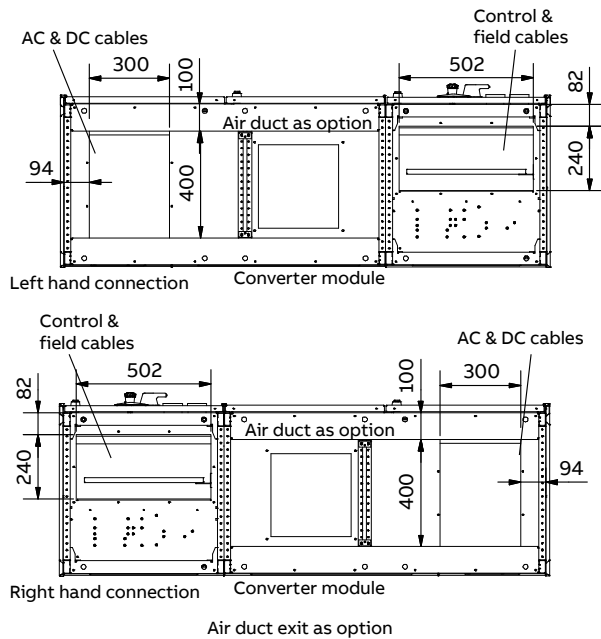
For more options see section mechanical options and electrical options!



DCS880-A0x-2050 ... 3300 dimensions single drive (left hand connection) (H8)

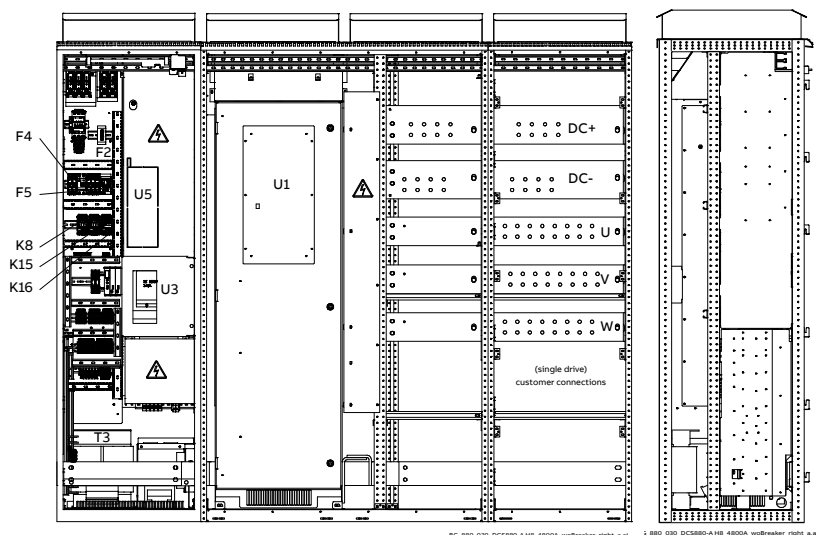


Single line diagram DCS880-A0x-2050 ... 3300 without breaker and without excitation (H8) example auxiliary supply with 400 V / 50 Hz



**Note 4:** Drive without line choke L1. Designed to be connected to dedicated transformers.

## Overview Enclosed converter DCS880-A0x-4000 ... 5200 (H8)



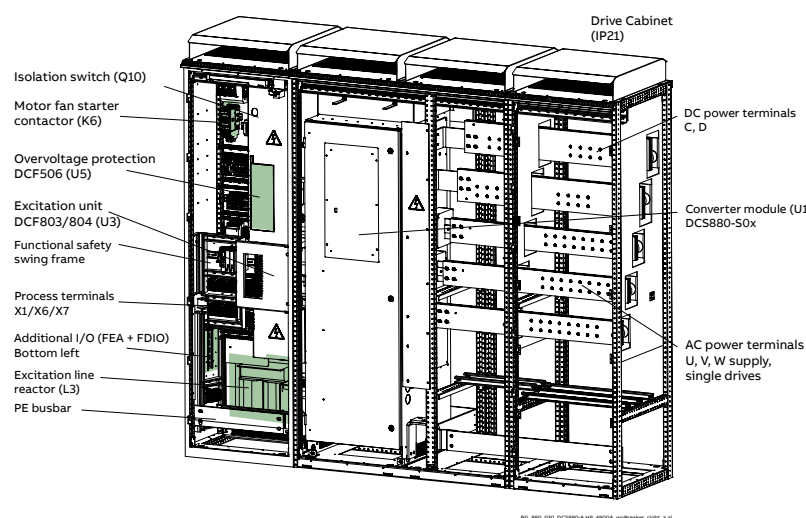
DCS880-A0x-4000 ... 5200 standard single drive (right hand connection) (H8)

### Component list (standard)

Degree of protection **IP 21**  
 Armature converter module **U1**  
 Isolation switch with fuses for aux.- supply voltage **Q10**  
 Auxiliary relay **K10**  
 Process terminals **X1/X6/X7**  
 Aux. supply voltage transformer **T2**  
 Aux. supply voltage fuses **F2**  
 Auxiliary circuit fuse **F5\***  
 Converter fan fuse **F8\***  
 Converter fan relay **K8\***  
 E-Stop relay **K15\***  
 Electrical disconnect relay **K16\***

**Note 1:** This standard list does not include any options or the excitation! Please choose the excitation from the options list.

**Note 2:** \* Wiring see section Basic circuit diagrams



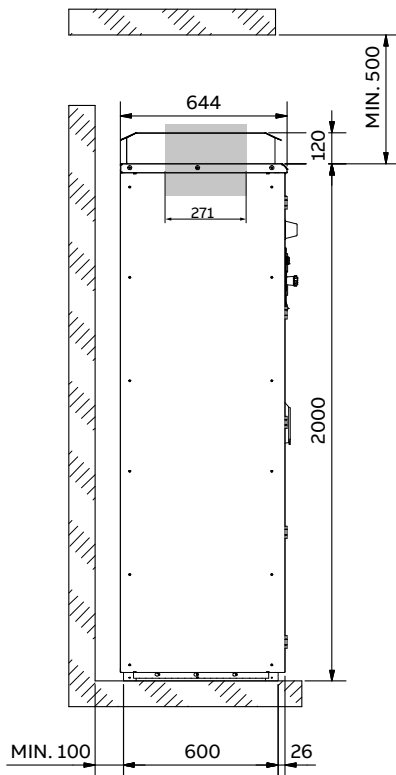
DCS880-A0x-4000 ... 5200 standard single drive (right hand connection) (H8)

### Component list (options)

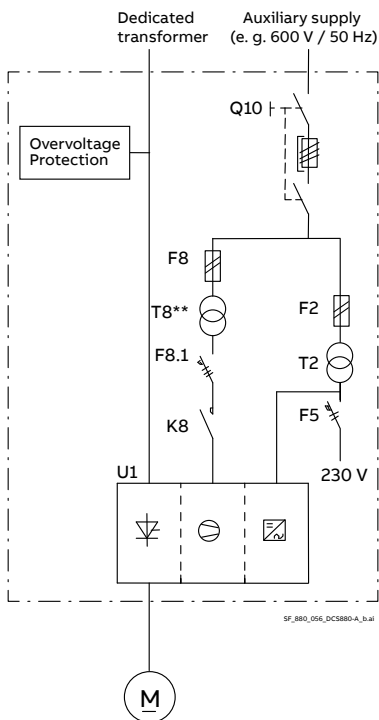
Excitation unit DCF803/804 **U3 (+S711 ... S719)**  
 or  
 DCS880-S01/S02; 25 ... 350 A **U3 (+S721 ... S741)**  
 DCF506 - Overvoltage protection **U5**  
 Excitation contactor **K3**  
 Excitation line reactor **L3**  
 Excitation fuse **F3**  
 Excitation autotransformer **T3 (+S615 ... +S624)**  
 Converter fan transf. **T8\*\* (+S610 ... +S612)**  
 Air circuit breaker **Q1 (+S773)**  
 Motor fan starter **(+M600 ... M653)**  
 Motor fan starter contactor **K6**  
 Motor fan starter thermal overload **F60**  
 Motor fan starter fuses **F6**  
 Insulation monitor **A90 (+Q954)**  
 Galvanic isolated voltage measurement **(+S798)**  
 Isolated DC transducer **A92**  
 Isolated transformer **T90**

**Note 3:** Not all options are shown.

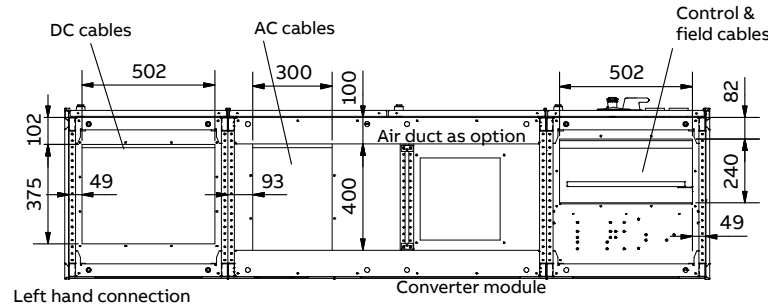
For more options see section mechanical options and electrical options!



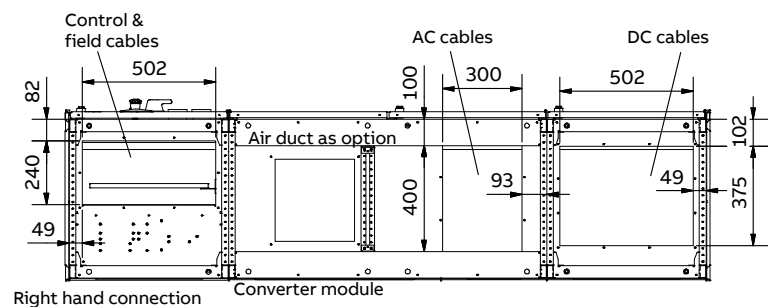
DCS880-A0x-4000 ... 5200 dimensions  
single drive (left hand connection) (H8)



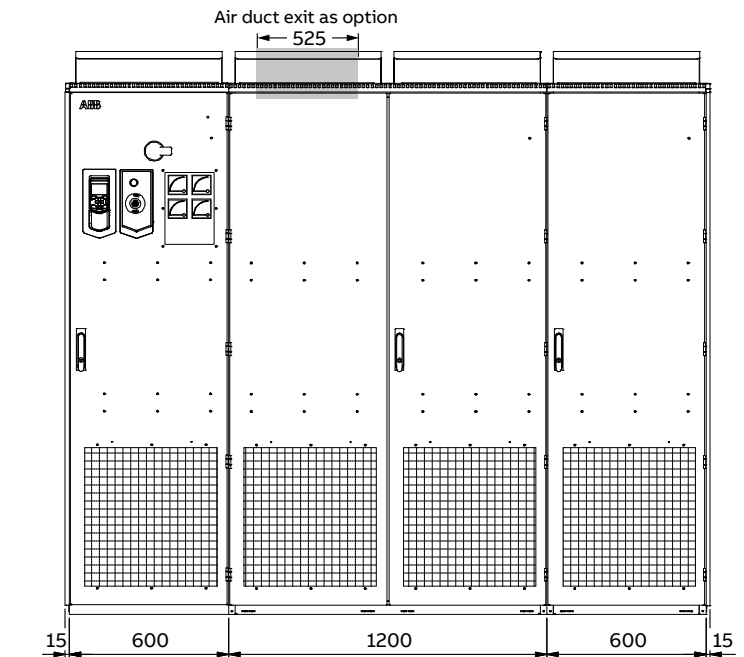
Single line diagram DCS880-A0x-4000 ... 5200  
without breaker and without excitation (H8)  
example auxiliary supply with 600 V / 50 Hz



Left hand connection



Right hand connection



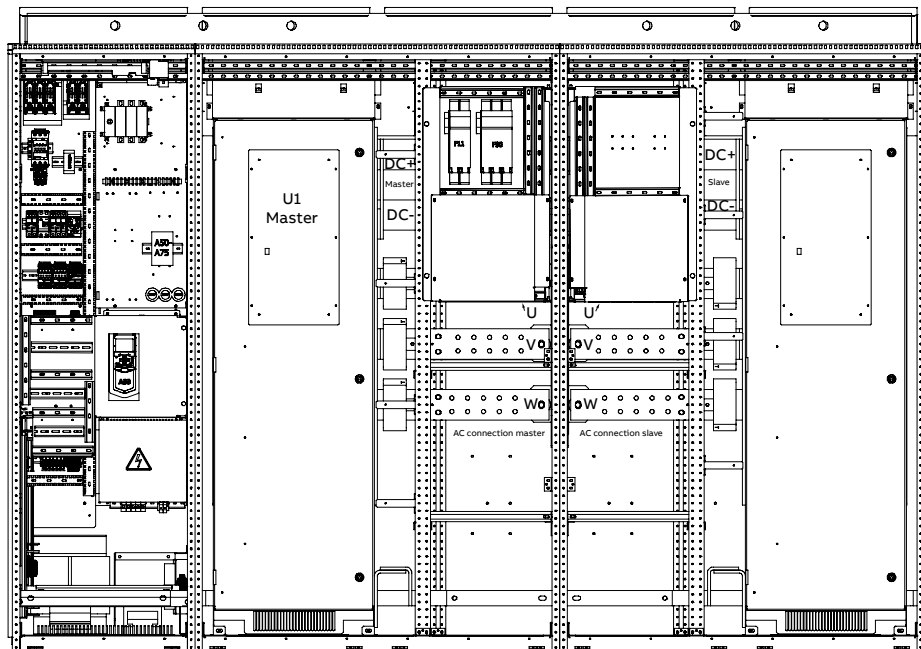
Right hand connection

MG\_880\_019\_HB\_4800A\_woBreaker\_right\_a.ai

**Note 4:** Drive without line choke L1. Designed to be connected to dedicated transformers

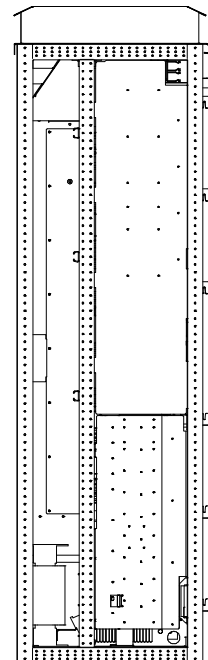
**Note 5:** \*\* Due to converter fan ratings a converter fan transformer (T8) for this single line diagram example (600V/50Hz) is required.

## Overview Enclosed converter DCS880-A0x-5200 ... 6600 (H8P)



DCS880-A0x-5200 ... 6600 master drive left side and slave drive right side (H8P)

BG\_880\_034\_DCS880-A H8P\_6600\_left\_a.ai



BG\_880\_030\_DCS880-A HB\_4800A\_woBreaker\_right\_a.ai

### Component list (standard)

Degree of protection **IP 21**  
 Armature converter module **U1**  
 Isolation switch with fuses for aux.- supply voltage **Q10**  
 Auxiliary relay **K10**  
 Process terminals **X1/X6/X7**  
 Aux. supply voltage transformer **T2**  
 Aux. supply voltage fuses **F2**  
 Auxiliary circuit fuse **F5\***  
 Converter fan fuse **F8\***  
 Converter fan relay **K8\***  
 E-Stop relay **K15\***  
 Electrical disconnect relay **K16\***

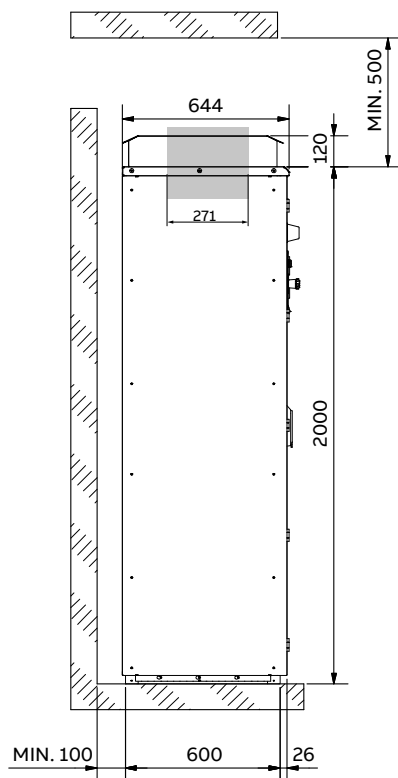
**Note 1:** This standard list does not include any options or the excitation! Please choose the excitation from the options list.

**Note 2:** \* Wiring see section Basic circuit diagrams

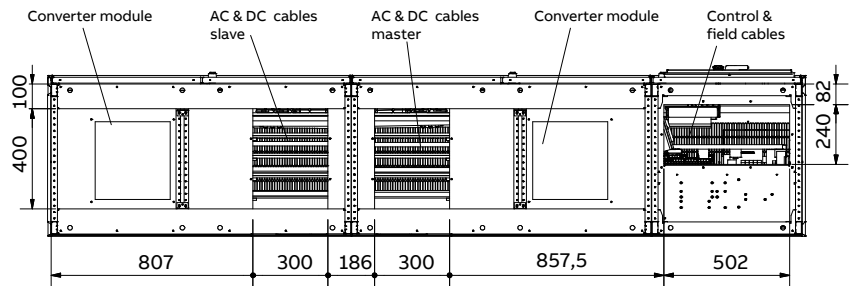
### Component list (options)

Excitation unit DCF803/804 **U3 (+S711 ... S719)**  
 or  
 DCS880-S01/S02; 25 ... 350 A **U3 (+S721 ... S741)**  
 DCF506 - Overvoltage protection **U5**  
 Excitation contactor **K3**  
 Excitation line reactor **L3**  
 Excitation fuse **F3**  
 Excitation autotransformer **T3**  
**(+S615 ... +S624)**  
 Converter fan transf. **T8\*\* (+S610 ... +S612)**  
 Air circuit breaker **Q1 (+S773)**  
 Motor fan starter **(+M600 ... M653)**  
 Motor fan starter contactor **K6**  
 Motor fan starter thermal overload **F60**  
 Motor fan starter fuses **F6**  
 Insulation monitor **A90 (+Q954)**  
 Galvanic isolated voltage measurement **(+S798)**  
 Isolated DC transducer **A92**  
 Isolated transformer **T90**

**Note 3:** Not all options are shown.  
 For more options see section mechanical options and electrical options!

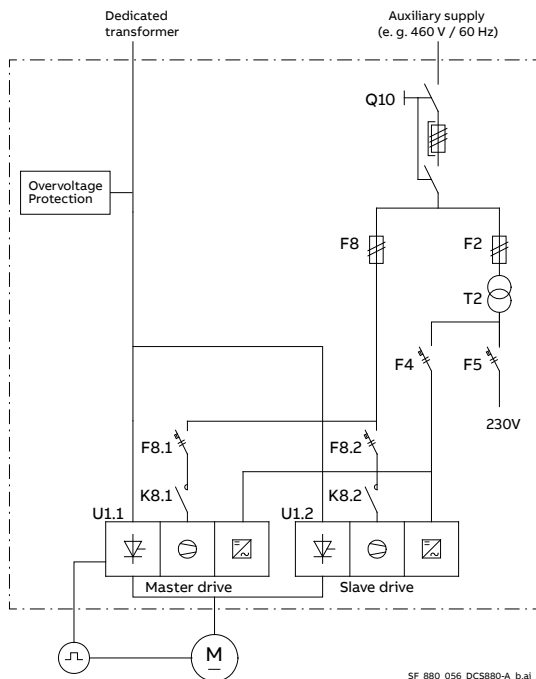


DCS880-A0x-4000 ... 5200 dimensions  
single drive (left hand connection) (H8)



Master drive right side

MG\_880\_026\_HardP\_6600\_a.ai



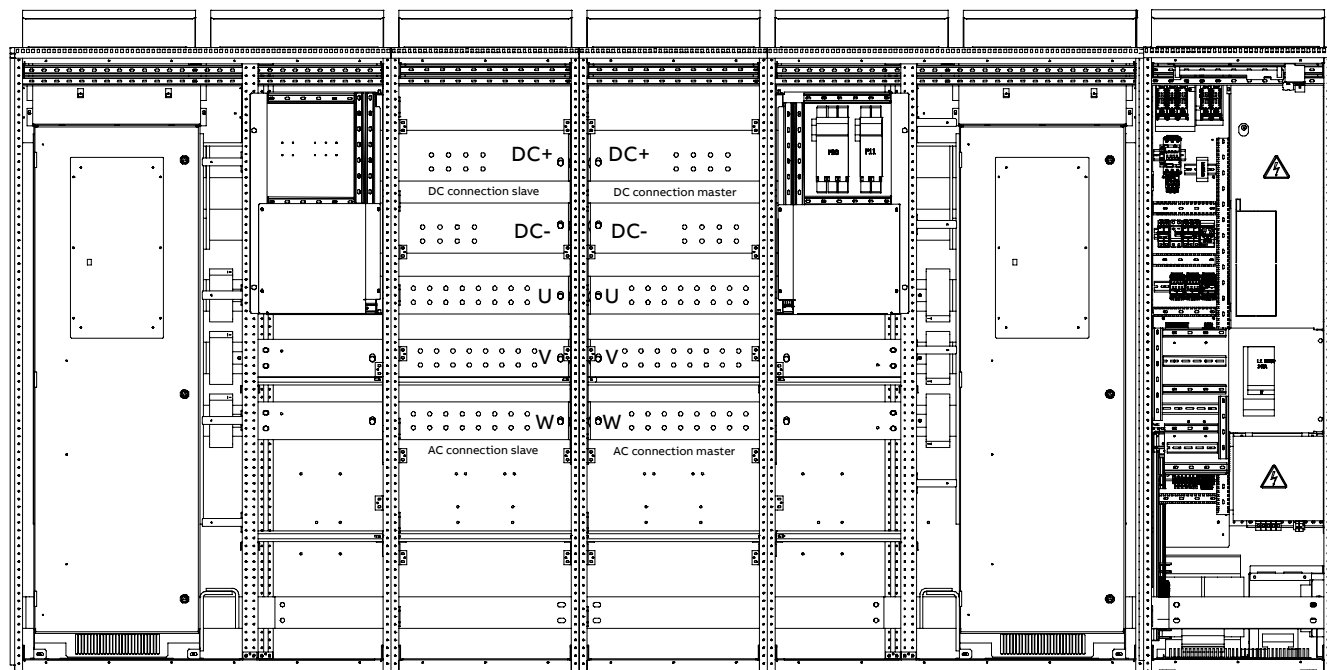
SF\_880\_056\_DCS880-A\_b.ai

Single line diagram DCS880-A0x-4000 ... 5200  
**without breaker and without excitation** (H8)  
example auxiliary supply with 460 V/60 Hz and drives  
mains connected to CCP at the transformer

**Note 4:** Drive without line choke L1. Designed to be connected to dedicated transformers

**Note 5:** \*\* Due to converter fan ratings a converter fan transformer (T8) for different auxiliary supply is required (400 V, 50 Hz or 460 V, 60 Hz).

## Overview Enclosed converter DCS880-A0x-8000 ... 9999 (H8P)



DCS880-A0x-8000 ... 9999 master drive right side and slave drive left side (H8P)

BG\_880\_035\_DCS880-A H8P\_9999\_right\_a.ai

### Component list (standard)

Degree of protection **IP 21**  
 Armature converter module **U1**  
 Isolation switch with fuses for aux.- supply voltage **Q10**  
 Auxiliary relay **K10**  
 Process terminals **X1/X6/X7**  
 Aux. supply voltage transformer **T2**  
 Aux. supply voltage fuses **F2**  
 Auxiliary circuit fuse **F5\***  
 Converter fan fuse **F8\***  
 Converter fan relay **K8\***  
 E-Stop relay **K15\***  
 Electrical disconnect relay **K16\***

**Note 1:** This standard list does not include any options or the excitation! Please choose the excitation from the options list.

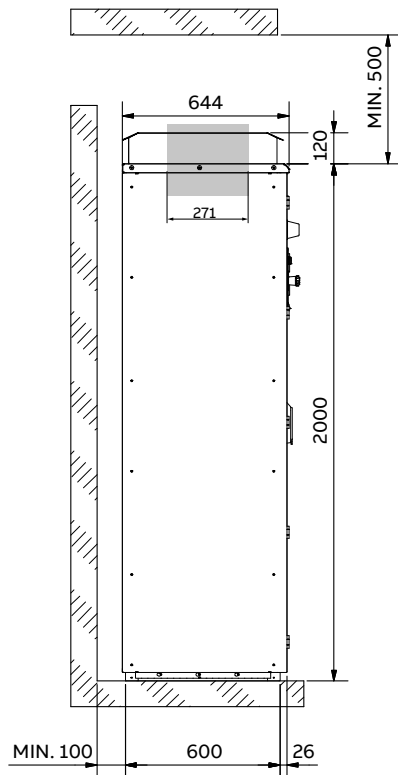
**Note 2:** \* Wiring see section Basic circuit diagrams

### Component list (options)

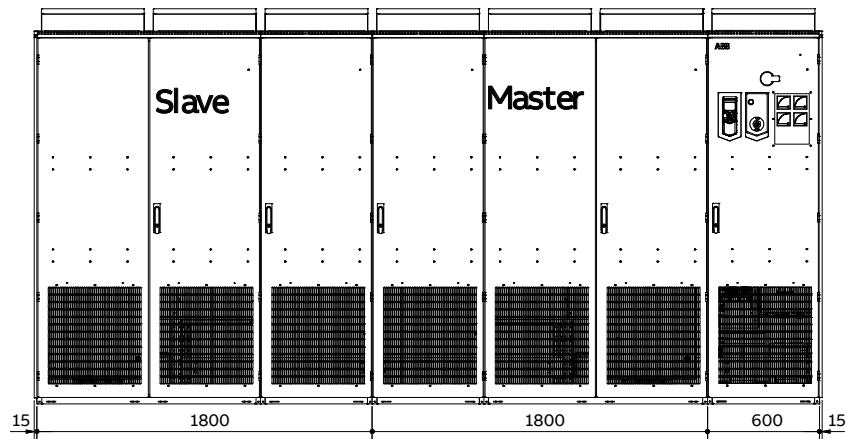
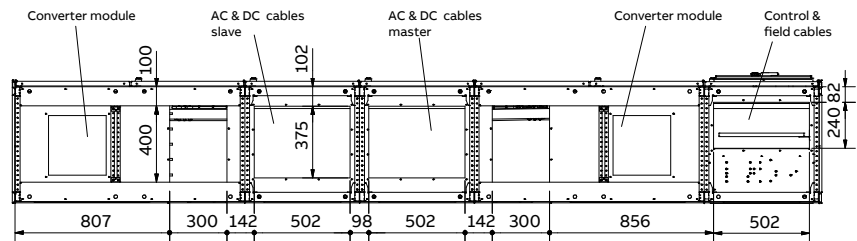
Excitation unit DCF803/804 **U3 (+S711 ... S719)**  
 or  
 DCS880-S01/S02; 25 ... 350 A **U3 (+S721 ... S741)**  
 DCF506 - Overvoltage protection **U5**  
 Excitation contactor **K3**  
 Excitation line reactor **L3**  
 Excitation fuse **F3**  
 Excitation autotransformer **T3**  
**(+S615 ... +S624)**  
 Converter fan transf. **T8\*\* (+S610 ... +S612)**  
 Air circuit breaker **Q1 (+S773)**  
 Motor fan starter **(+M600 ... M653)**  
 Motor fan starter contactor **K6**  
 Motor fan starter thermal overload **F60**  
 Motor fan starter fuses **F6**  
 Insulation monitor **A90 (+Q954)**  
 Galvanic isolated voltage measurement **(+S798)**  
 Isolated DC transducer **A92**  
 Isolated transformer **T90**

**Note 3:** Not all options are shown.  
 For more options see section mechanical options and electrical options!



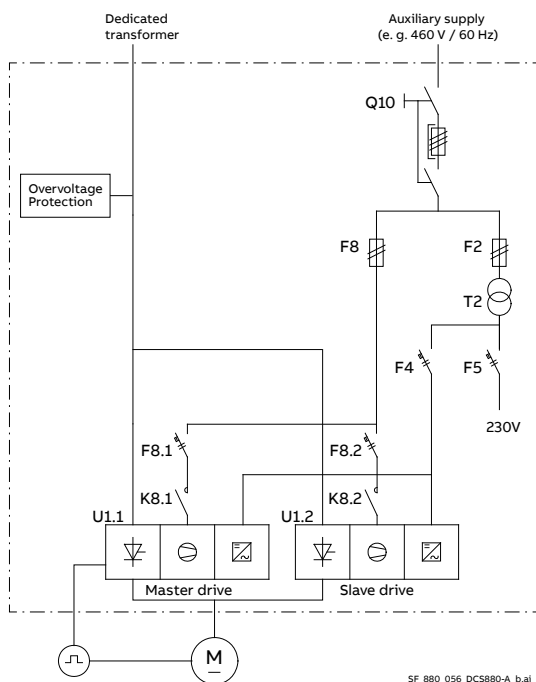


DCS880-A0x-4000 ... 5200 dimensions  
single drive (left hand connection) (H8)



Master drive right side

MG\_880\_027\_HandP\_9999\_a.ai



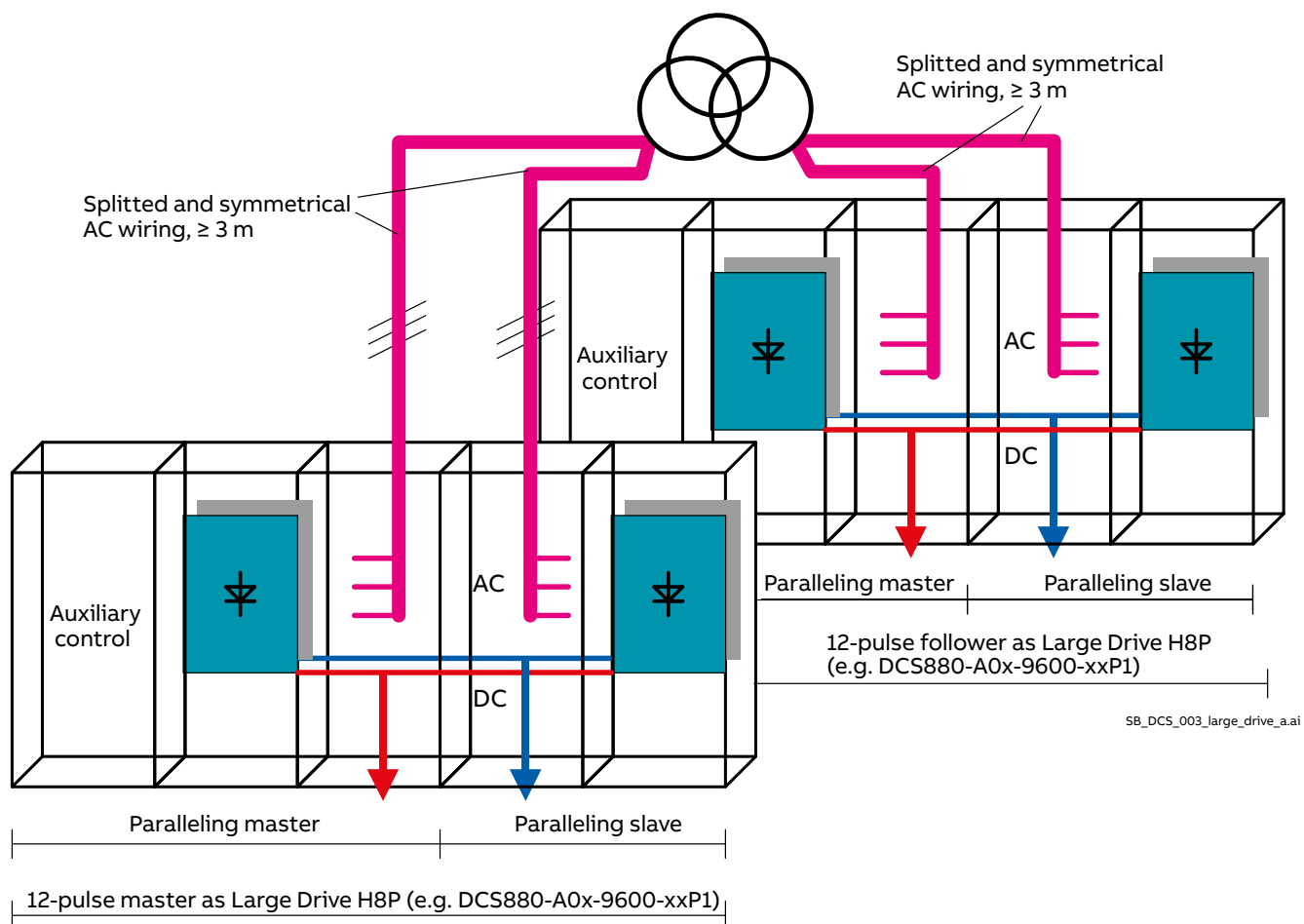
SF\_880\_056\_DCS880-A\_b.ai

Single line diagram DCS880-A0x-4000 ... 5200  
**without breaker and without excitation** (H8)  
example auxiliary supply with 460 V/60 Hz and drives  
mains connected to CCP at the transformer

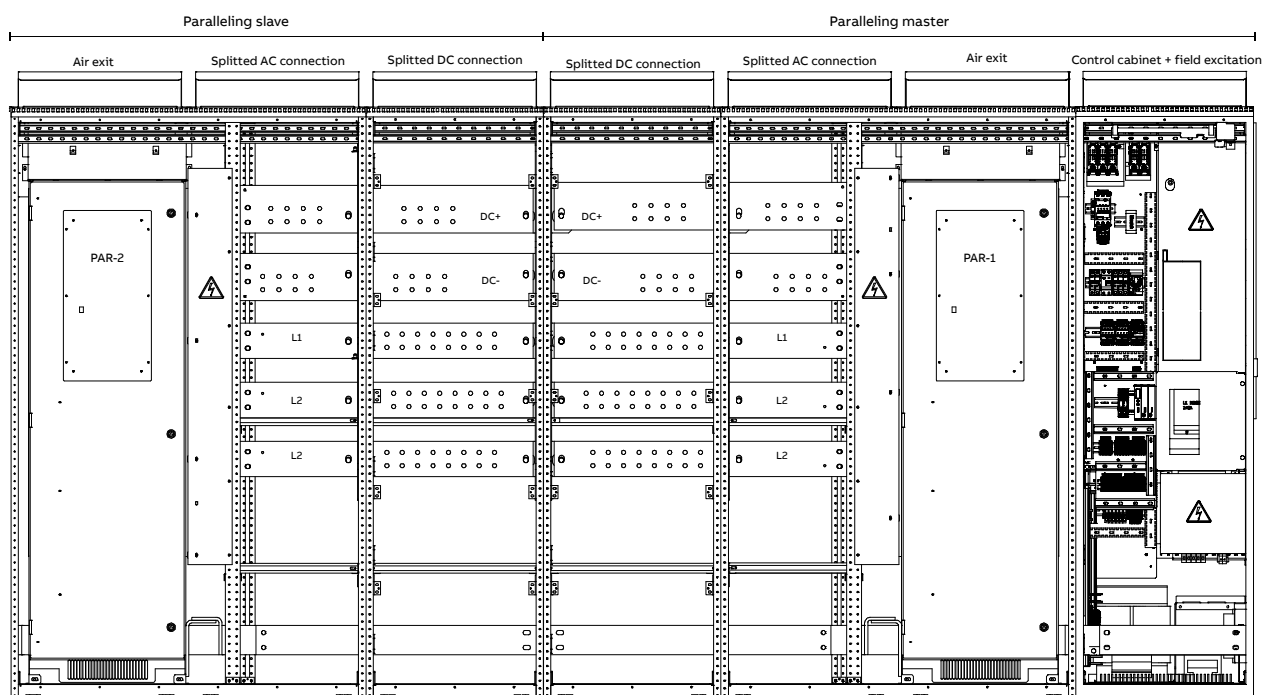
**Note 4:** Drive without line choke L1. Designed to be connected to dedicated transformers

**Note 5:** \*\* Due to converter fan ratings a converter fan transformer (T8) for different auxiliary supply is required (400 V, 50 Hz or 460 V, 60 Hz).

## Overview Enclosed converter Series H8P in 12-pulse configurations



Configuration of 12-pulse parallel (12-pulse master and follower) in combination with hard parallel (paralleling master and slave)



Layout of DCS880-A0x-9600-xxP1 + three-phase field exciter (as option)

BA DCS 003 H8 parallel a.ai

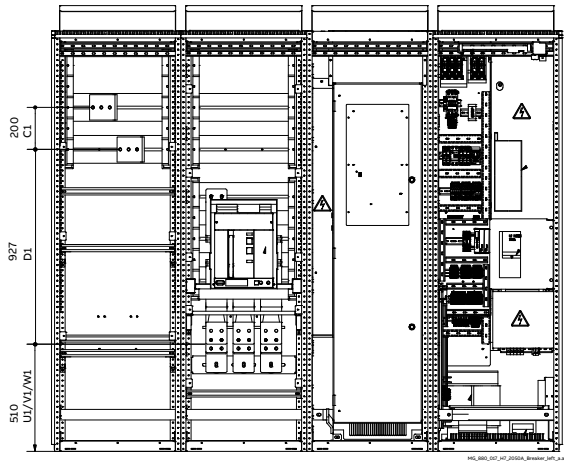
## Air circuit breaker options H7/H8

### Air circuit breaker options for H7

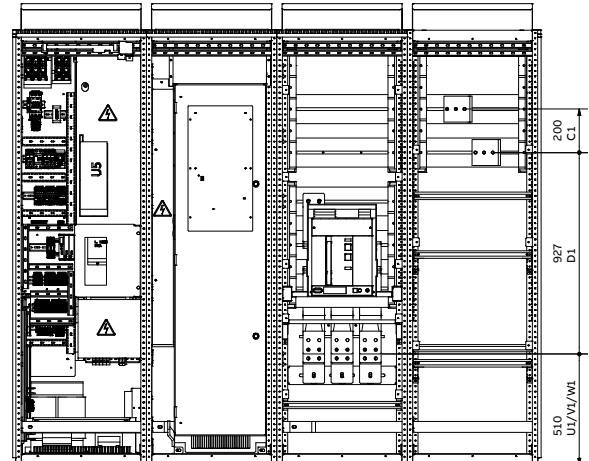
H7 standard design is with air circuit breaker (SACE Emax 2.2)

The standard design provides the circuit breaker on the connection side (left/right). The circuit breaker can be placed directly next to the converter module (**+S870**).

H7 drives are also available without air circuit breaker (**+0S775**).



DCS880-A0x-1900 ... 3000 standard single drive (left hand connection + circuit breaker next to module) (H7 +S870)



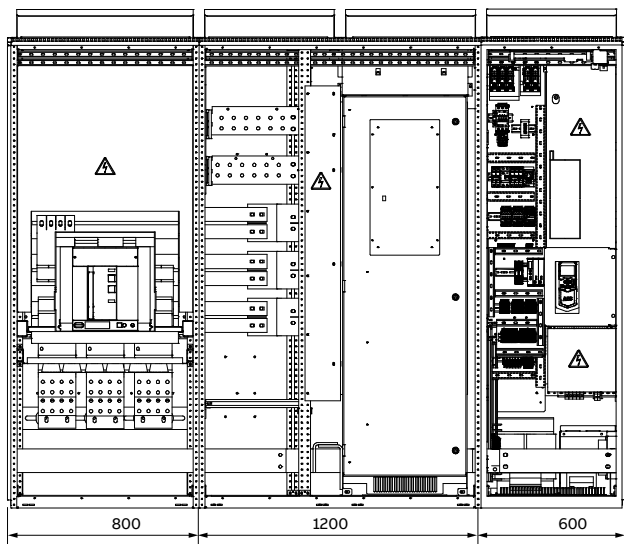
DCS880-A0x-1900 ... 3000 standard single drive (right hand connection + circuit breaker next to module) (H7 +S870)

### Air circuit breaker options for H8

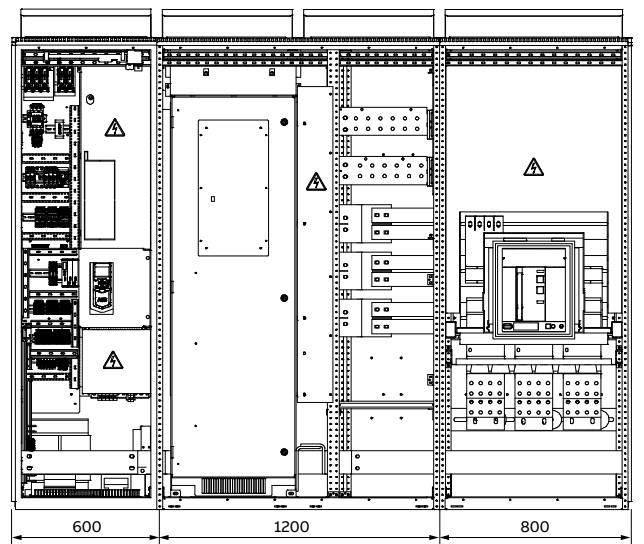
H8 standard design of the converter is **without** air circuit breaker. H8 and H8P converters are switched typically on medium voltage side of dedicated transformer.

Air circuit breaker size E4.2 (SACE Emax 4.2) is optional for drives size H8 from 3300 A and 4800 A with 400 ... 800 V<sub>AC</sub> for IEC standard (**+S773**). The Air circuit breaker option requires:

- H8 3300 A - additional 800 mm cabinet (total length 2600 mm)
- H8 4000 A/4800 A - extended 200 mm cabinet (total length 2600 mm)



DCS880-A0x-3300 standard single drive (left hand connection + circuit breaker SACE Emax 4.2) (H8 +S773)



DCS880-A0x-3300 standard single drive (right hand connection + circuit breaker SACE Emax 4.2) (H8 +S773)

Air circuit breaker size E6.2 (SACE Emax 6.2) is optional for drives size H8 up to 5200 A and 400 ... 800 V<sub>AC</sub> for IEC standard via plus code +S774.

### Air circuit breaker options for H8P

Air circuit breaker for hard parallel drives size H8P are not available.

## DCS880-A General options

### CE mark

Requires options of EMC regulation

- EMC procedure according to part list check for converters 25 A up to 5200 A.

The DCS880-A converters and their options do not require an EMC-modified cabinet.

Note: see also Technical Guide [3ADW000163](#)

### CTO or ETO

**CTO:** Configured-to-Order

Several standard options are available to offer a drive cabinet which meets the most frequent technical requirements and performance expectations.

The standard option for each DCS880-A enclosed converter can be selected via plus codes which are listed in the plus code list on page 52.

For DCS880-A cabinets configured via the standard plus code options no explicit technical clarification phase is foreseen and therefore, no engineering consulting is included.

**ETO:** Engineered-to-Order

For projects or enclosed converters with customized design adaptations the additional option code **+P902** - customized options basic fee (ETO - Engineered-to-order) is available.

This plus code is required for any enclosed converter with

- special non-listed items / non-standard options
- group drive line-ups
- mechanical design modifications

and on each project which requires additional consulting.

Included into the customized options basic fee are 2 additional revisions of the circuit diagrams and a dedicated technical clarification phase with a project manager to specifically meet all customer requirements.

Also, milestones will be defined and communicated to track all important project phases.

The following table shows the differences between CTO (Configured to order) and ETO (Engineered to order **+P902**) support:

	Configured-to-Order	Engineered-to-Order
Project Manager involved	No	Yes
Number of revisions for circuit diagrams	Only the initial version = "generated" version	2 additional revisions
Technical clarification phase	Clarification phase is not foreseen. Design freeze 5 days after submission of the circuit diagrams.	Clarification phase is foreseen. Design period minimum three weeks. Design period: Design freeze date - date drawings submission
Milestones	Only delivery date is communicated	Project milestones are defined and communicated
Customized design adaptations	Not foreseen	In case non-listed items are ordered consulting is included
Leadtime	Standard	Standard + 3 weeks

**Built according to UL 61800-5-1 / CSA 22.2 No. 274-17**

For the plus code option “Built according to UL” (**+C129**) not all components in the cabinet provide UL certificates. Cables [AWG] are available in black and orange.

The table shows the components which are available in

UL/UR design and will be replaced by selection of the plus code **+C129**.

For cabinets H1 ... H7 **+C129** is available up to 600 V<sub>AC</sub> and for H8 cabinets (without ACB)

the plus code **+C129** is available up to 990/1000 V<sub>AC</sub>.

Name	Device	UL/CSA	IEC
U1	Converter	• ①	•
K1	Contacttor	• ②	•
Q1	Air circuit breaker	• ③	•
F2/F3/F6	Motor fan-/exciter-/aux. fuses	• ②	•
L1	Line reactor	• ④	•
T2	Isolation transformer aux. supply		•
T3	Autotransformer exciter T3.01 ... T3.16		•
T8/T8.7	Autotransformer fan supply U1 (size H7/H8)		•
U5	Overvoltage protection	•	•
T90	Galvanic isolation measurement		•
A90	Bender isolation monitor ISO685	•	•

① max. converter supply voltage for UL is 1000 V

② max. supply voltage for UL is 600 V

③ max. supply voltage for UL is 690 V

④ only UR (UL Recognized)

**Note:** H6 ... H7, 690 V<sub>AC</sub> cabinets with **+C129** are only available on request, ACB E4.2 is required.

**Cable markings**

- Class A2 plus standard cable marking.

This cable marking complies with standard EN 60204 for CE marking.

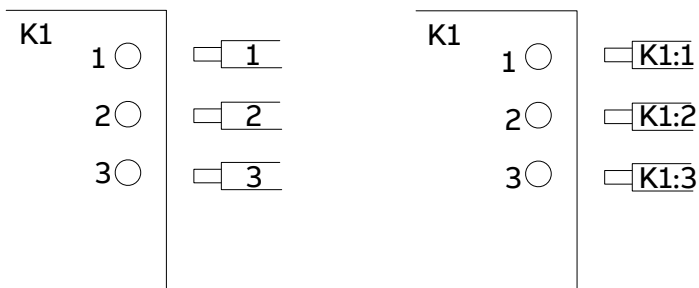
Conductors between

- converter module and
  - apparatus (e.g. contactor, switch)
- are marked with terminal numbers

The marking is done for long conductors and short non-obvious conductors.

- Class B1 option (**+G341**)

The cable marking B1 provides in addition the information of the apparatus symbol.



Standard EN 60204

Class B1 option (+G341)

## DCS880-A Mechanical options

### Protection class

**IP21** is standard design

Air inlet 8 mm longitudinal slots, air outlet same as air inlet plus an air ventilation hood on the top of the cabinet (2120 mm total height).

### Air inlet filters **IP42** option (+B054)

Air input IP42, air output with insect screens to clean the incoming air in dirty environment. Additional water preventing louvers are build in the cabinet door. Only in combination with the option gland plate and bottom plate. Air inlet filters reduce the rated current of the enclosed converters.

### Protection class **IP54** option (+B055)

IP54 option is available for converter size H1 ... H4 and H6.

Air entry is equipped with grids, filters and water protective louvers.

Air exit is equipped with extra de-ventilation.

Size H1 ... H4 = 1 x ventilation; 850 m<sup>3</sup>/h

Size H6 = 2 x ventilation; 5000 m<sup>3</sup>/h




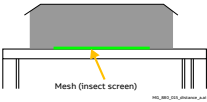



The extra de-ventilation requires 180 mm additional height, thus the total height of converter is 2300 mm.

For further information see [DCS880-A installation manual](#)

For higher protection classes than IP21 a current derating needs to be considered:

### Protection class current derating

Size	Protection class		
	IP21	IP42	IP54
H2/H3	-	5 %	3 %
H4	-	7 %	3 %
H6	-	5 %	3 %

Protection class	Door	Roof	Frame	Note
IP21	Air inlet - 8 mm longitudinal slots 	Air outlet - 8 mm longitudinal slots and air ventilation hood from front to rear (120 mm additional cabinet height) 		100 mm distance between the wall and the converter cabinet is required (200 mm back to back).
IP42	Air inlet with IP42 mesh (insect screen) and water preventing louvers 	Air outlet - 8 mm longitudinal slots an IP42 mesh (insect screen) and a short air ventilation hood (120 mm additional cabinet height) ① 		Back to back, wall alignment or wall mounting is possible.  Wall alignment 100 mm distance, back to back direct possible.
IP54	Air inlet with IP54 S folded filter and water preventing louvers 	Roof cooling fan box - with water preventing louvers and fan box filter 	Protection class seals for frame connections, bottom-, roof- and side- plates 	100 mm distance between the wall and the converter cabinet is required (200 mm back to back).

① For H7 and H8 enclosed converter (only for the converter cabinet) the air outlet is build without IP42 mesh. Instead the converter cabinet air outlet on the top is build with IP22 air outlet duct and the ventilation hood.

### Customer connection

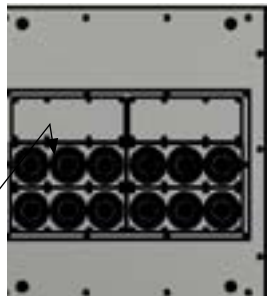
The standard for customer connection is from bottom with cables.

The standard design is with an open frame on the bottom side of the cabinet.

A bottom plate (without cable holes) can be ordered with **(+S780)**. The cable holes must be drilled by the customer.

Gland plate and bottom plate are available via **(+S781)**.

Cable glands for control-, field- and AC cables located in the bottom plate.



Option +S781: Gland Plates

Example cable glands for DC or AC connection from top

### Control cable connection

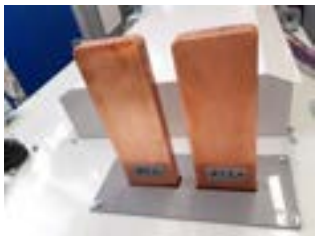
Bottom connection is standard and is included in converter basic design. Top connection on request.

**Connections from top** for DC and AC cables or busbars are available according to the table and can be selected via plus codes:

DC Drive size	Cable connection		Busbar connection	
	AC*	DC	AC*	DC
H1 ... H4	+H351	+H353+H362	-	-
H6	+H351+S800	+H353+H362	-	-
H7	+H351	+H353	+H355	+H356
H8	+H351	+H353	+H355	+H356

**Note:** \* AC connection from top is only available for single drives

**Busbar from top** for AC **(+H355)** and DC **(+H356)** connection is available for H7 and H8.

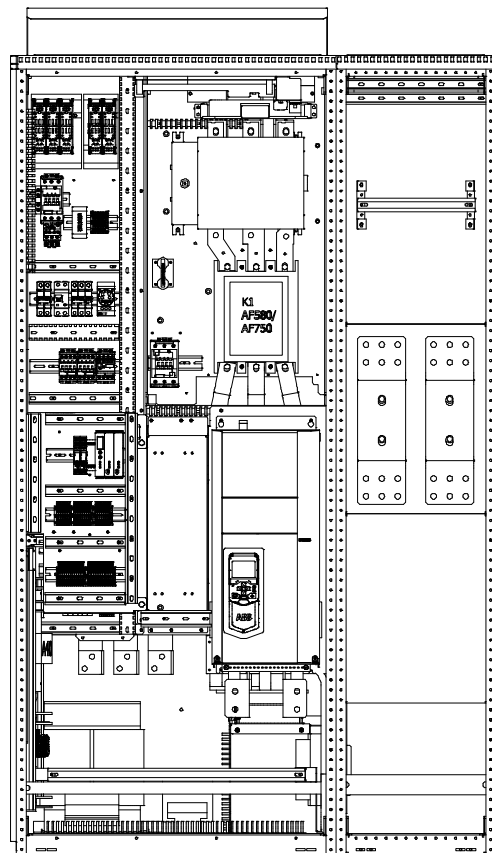


Example busbars for DC from top

For busbar connection from top a top plate (according to the picture) will be installed. Busbars from top are just available with a protection class derating to IP20.

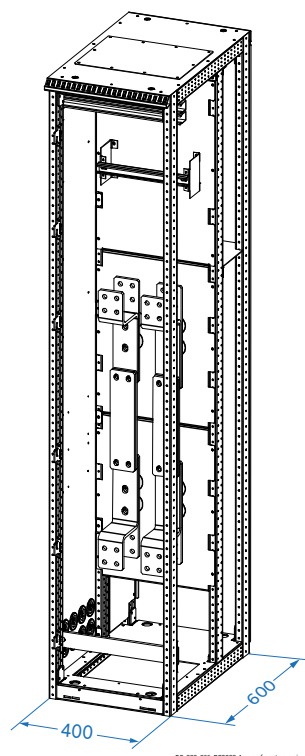
**DC connection from top** with cables can be selected with plus code **(+H353)**. For H1 ... H6 design with DC connection from top an additional cabinet (400 mm), to handle the cables inside of the cabinet, is needed **(+H362)**.

The cabinets with cable connection from top will be equipped with cable gland plates (IP21).



Example H4 with AC cable connection from top (+H351) and DC cable connection (+H351) + additional 400 mm cabinet (+H362) with meggering solution on request

**Meggering solution** for H1 ... H6 drives is available for the DC cable connection from top on request only.

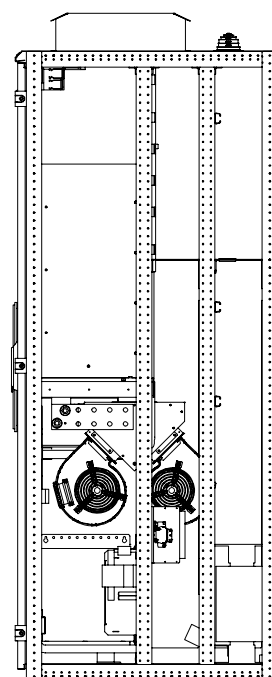
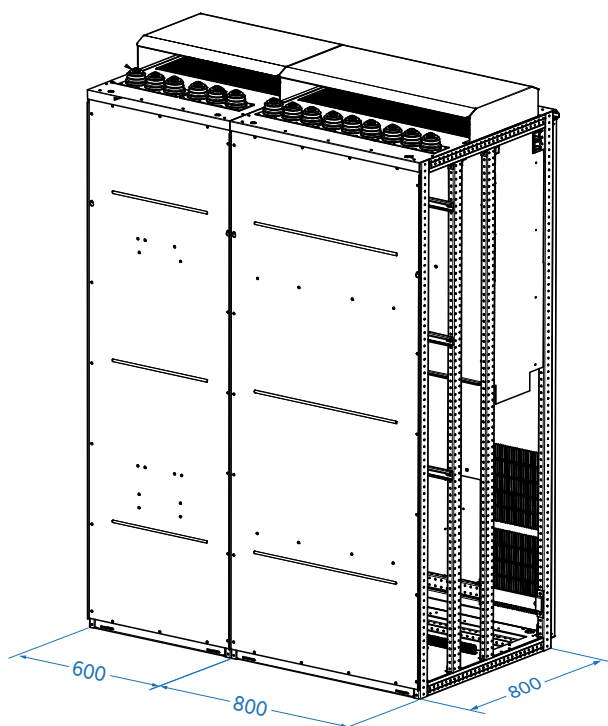


Example: 400 mm additional cabinet for DC cable connection from top with meggering busbars

**AC connection from top** with cables can be added to a cabinet with plus code **(+H351)**.

AC connection from top is only available for single drives.

H6 single drive design with AC cable connection from top needs a cabinet depth of 800 mm **(+S800)**.

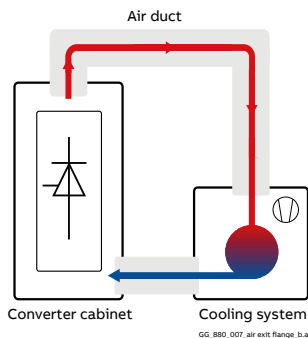


Example H6 with AC cable connection from top and a overall depth of 800mm (+H351 and +S800)



### Air exit flange

Converter size H7, H8, H8P can be equipped with a flange as air exit instead of the hood. The air exit flange option **(+C130)** is used to guide the hot air output of the converter out of the cabinet. A closed loop air cooling system or a heat exchanger can be connected to the air duct. Back pressure in the air duct is not allowed.



Example air duct option on a converter cabinet

### Horizontal AC busbars option for group drives

Horizontal busbars are used to feed the entire line-up from the incoming supply section.

Tin plated copper busbars inside the cabinet are optional.

- without AC busbars => single drive
- copper, 1000 A<sub>AC</sub> **(+S820)**, tin plated **(+S825)**
- copper, 2000 A<sub>AC</sub> **(+S821)**, tin plated **(+S826)**
- copper, 3000 A<sub>AC</sub> **(+S823)**, tin plated **(+S827)**

Current rating should be selected according to the needed power.

Maximum current is 3000 A for horizontal AC-busbars.

4000 A incoming sections should be placed in the middle of a line up, in order to distribute the AC-current to left and right side (horizontal busbars up to 3000 A can stretch to both sides of such incomer).

### Busbars of the converter cabinet

Inside of the converter cabinet equipped with tin plated busbars. Available for converters with a current > 350 A<sub>DC</sub> **(+G312)**.

**Note:** For group drives - tin plated horizontal busbars must be selected separately.

For further information see DCS880-A installation manual ([3ADW000627](#)).

### Door equipment

The control panel of the DCS880 converter module is located in the “control” door of the enclosed cabinet.

A bluetooth control panel can be selected via **(+J429)**.

All cabinet doors are equipped with a triangular key lock

- a safety key lock is an option **(+S705)**.

The control door can be configured with

- Electrical disconnect push button (Black) **(+G332)**
- STO reset button in door **(+Q956)**
- Fault pilot light **(+G392)**

E-Stop push button in door (Red)

- Control from remote e. g. from safety PLC **(+G331)**

- Control from local (safety-relay) **(+S331)**

The buttons and pilot lights are located in a separate device panel.



Example control door configuration

Meters also can be installed into the control door of the enclosed converter cabinets. One armature current- and one voltmeter are installed with **(+S777)**.

It is possible to equip a door with a maximum of 4 meters.

Additional meters (third meter) can be selected with

**(+S776)**. Due to limited standard IOs a fourth meter requires additional engineering **(+P902)**.

### Empty cabinets and joining cabinets

Empty cabinets are always equipped with mounting plates. Customer can install individual own control circuits (dyn. brake control, PLC circuit, safety circuit ...).

Two different designs are available:

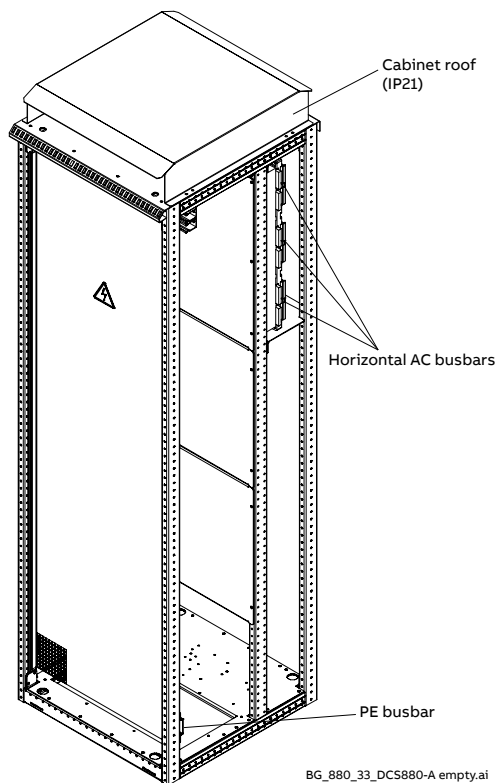
- **Without** horizontal busbars  
e.g. DCS880-A50-0000-0081 = 800 mm width inside 500 mm free depth space in combination with single drives or at the end of group drive line up
- **With** horizontal busbars  
e.g. DCS880-A50-0000-0082 = 800 mm width inside 300 mm free depth space location in the middle or at the end of group drive line up

### Joining cabinets

Maximum length of one transportation segment is 3.40 m. Splitting long group drive line up is made by one or more empty cabinets in combination with a joining cabinet KIT (+S818):

#### DCS880-A50-0000-00x2 +S818

Horizontal busbars located on the rear side of line up. Joining cabinet give access to the horizontal busbar from front and give the option to join horizontal busbars from front.



Empty cabinet as Group Drive (example: 600 mm ...)

### EMC-Filters for drives cabinets

- Located in separate cabinet next to drive cabinet.  
Separate cabinet (on request, +P902 is required).

### Cabinet alignment

A back to back alignment for the cabinet sizes H7, H8 and H8P can be selected for IP42 with plus code (+C160). This will provide a cabinet depth with 1200 mm (2 x 600 mm).

### 12-pulse Configuration parallel, serial, sequential

The converters can be ordered with connection between 12-pulse master and 12-pulse follower.

For the 12-pulse serial emergency short circuit busbars are available.

12-pulse parallel configuration (+S751) available for: 1900 A ... 5200 A, 230 ... 1000 (1190) V<sub>AC</sub> from H7 to H8P.

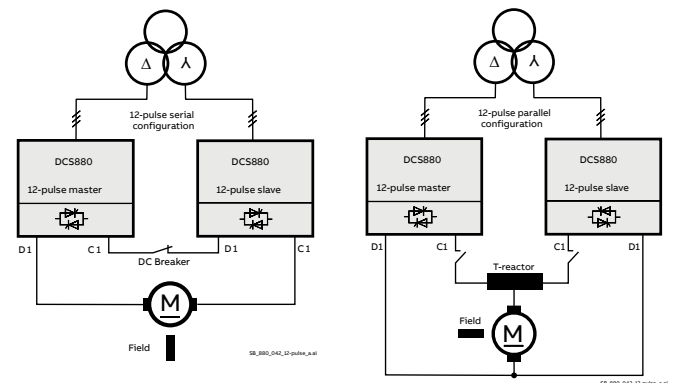
### 12-pulse serial and sequential configuration (+S752)

available for: 2050 A ... 5200 A, 230 ... 600 V<sub>AC</sub> per H7, H8 converter and 350 V<sub>AC</sub> per H6 converter.

Serial sandwich configuration available for:

1900 A ... 3000 A, 230 V<sub>AC</sub> ... 800 V<sub>AC</sub> per H7 converter.

**Note:** see also manual for 12-pulse operation [3ADW000533](#).



Layout of DCS880-A0x-9600-xxP1 + three-phase field exciter (as option)

## DCS880-A Electrical options

### Field exciter options

Each motor requires an exciter circuit.

Converter size H1 ... H4 offer OnBoard exciters which are always included.

Size H1 (400 V / 500 V) - 12 A field current.

Size H2 (400 V / 500 V) - 18 A field current.

Size H3 (400 V / 500 V) - 25 A field current.

Size H4 (400 V / 500 V) - 30 A field current.

Size H1 ... H4 (600 V) require always separate exciters.

Size H1 ... H4 can be ordered without OnBoard field exciter **(+OS163)**.

The bigger drives can be configured according the

- Rated field voltage
- Rated field current
- Single phase excitation circuit
- Three phase excitation circuit
- Supply voltage of excitation circuit.

For single phase excitation circuits autotransformer can be selected to match supply voltage and rated field voltage.

Following excitation devices are available (as separate 1Q exciters). For AC supply voltage see the table below:

- DCF803-0016, 16 A<sub>DC</sub>, single phase or three phase **(+S711)**
- DCF803-0035, 35 A<sub>DC</sub>, single phase or three phase **(+S713)**
- DCF803-0050, 50 A<sub>DC</sub>, single phase **(+S715)**
- DCF803-0060, 60 A<sub>DC</sub>, single phase **(+S716)**

FEX-425-Int 25 A<sub>DC</sub> single phase or three phase, is a special design to be located inside H6 converter module **(+S164)**.

For field reversal (4Q armature bridge) following types are available:

- DCF804-0050-50 A<sub>DC</sub>, single phase **(+S718)**
- DCF804-0060-60 A<sub>DC</sub>, single phase **(+S719)**

### Please note:

Field reversal can only be used for none demanding application, running typically in one direction (propulsion, extrusion, kiln ...).

Unit type	Output current I <sub>cc</sub>	AC field supply voltage	T3 avail.
DCF803-0016	0.3 ... 16 A	110 V -15 % ... 500 V / 1-ph +10 % single-phase	•
		three-phase	
DCF803-0035	0.3 ... 35 A	110 V -15 % ... 500 V / 1-ph +10 % single-phase	•
		three-phase	
DCF803-0050	0.3 ... 50 A	110 V -15 % ... 500 V / 1-ph +10 %	•
DCF804-0050	0.3 ... 50 A	110 V -15 % ... 500 V / 1-ph +10 %	•
DCF803-0060	0.3 ... 60 A	110 V -15 % ... 500 V / 1-ph +10 %	•
DCF804-0060	0.3 ... 60 A	110 V -15 % ... 500 V / 1-ph +10 %	•
FEX-425	0.3 ... 25 A	110 V -15 % ... 500 V / 1-ph +10 % single-phase	•
		three-phase	

### Options for single-phase field exciters

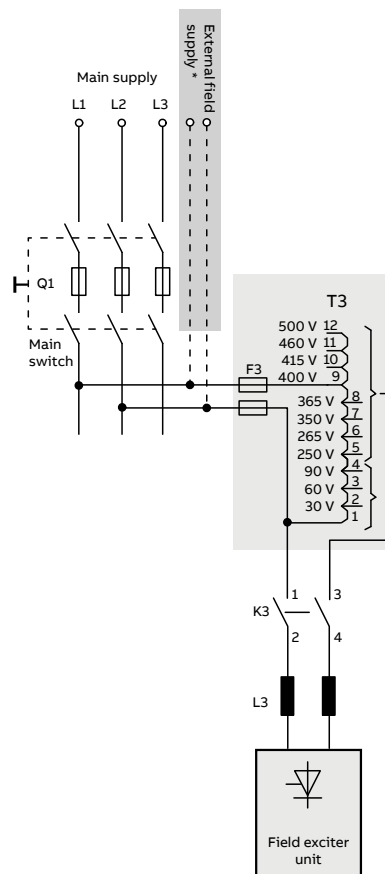
For field supply voltage > 500 V and a field exciter module **DCF80x** or **FEX-425** an autotransformer (**T3**) is needed.

- Autotransformers (T3.xx) ratings are 400 V ... 690 V and are available for single-phase exciters.
- The **maximum** (auto-) transformer input voltage of DCF803-0050/0060 and DCF804-0050/0060 is **690 V**. Higher input voltages or three phase field exciters require an isolation transformer. Therefore **external field supply** is a possible option **(+S650)** to use an existing transformer outside of the cabinet.

**Note:** An autotransformer is recommended for single phase DCF803, if the rated field voltage of the motor is lower than 60 % of the rated field AC supply voltage.

Two different sizes available (7 A ... 57 A):

- Transformer 3.0x; AC input 400 ... 500 V **(+S615 ... +S618)**
  - Transformer 3.1x; AC input 525 ... 690 V **(+S620 ... +S624)**
- The autotransformer is selected according to the customer specification of the AC field supply voltage.



SF\_880\_063\_field supply option\_a.ai

\* External field supply option (+S650)

Example 1 phase field exciter circuit with T3.0x (500V)

### DCSLink communication module

Converter sizes H1 ... H4 can be equipped with a DCSLink board **(+S521)** to control external (none OnBoard) field exciters.

Converter sizes H6 ... H8P are already equipped with a DCSLink board.

### Large field exciter DCS880-S0x... for H7, H8 and H8P

Bigger DCS880 drives size H7, H8 and H8P can be equipped with three phase exciters and independent excitation supply.

A DCS880 converter module as exciter is combined with DCF506 overvoltage protection and controlled via DCSTLink. Converter size H7, H8 and H8P can contain following exciter units inside DCS880-A enclosure (control section):

Single bridge converter for single direction field current Q2:

- DCS880-S01-0090-05X0 for 70 A<sub>DC</sub> field (+S728)
- DCS880-S01-0270-05X0 for 210 A<sub>DC</sub> field (+S729)
- DCS880-S01-0315-05X0 for 250 A<sub>DC</sub> field (+S730)

Double bridge converter for field reversal Q4:

- DCS880-S02-0100-05X0 for 80 A<sub>DC</sub> field (+S739)
- DCS880-S02-0300-05X0 for 240 A<sub>DC</sub> field (+S740)
- DCS880-S02-0350-05X0 for 265 A<sub>DC</sub> field (+S741)

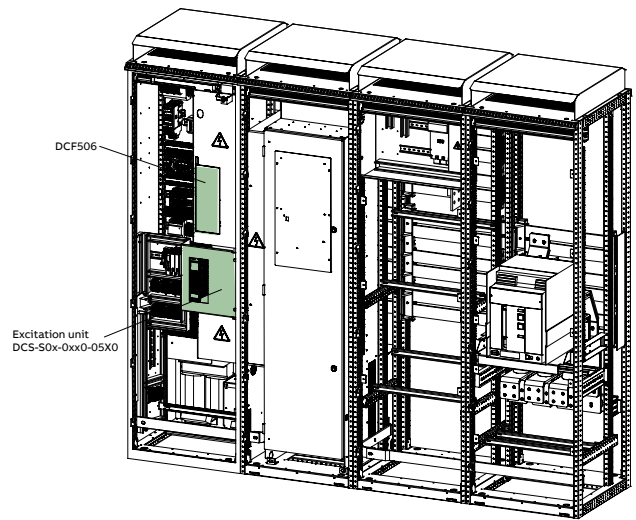
The selectable converter modules as 3 phase field exciter are limited to a supply voltage of 500 V.

For specific field supply voltages, separate input terminals are needed.

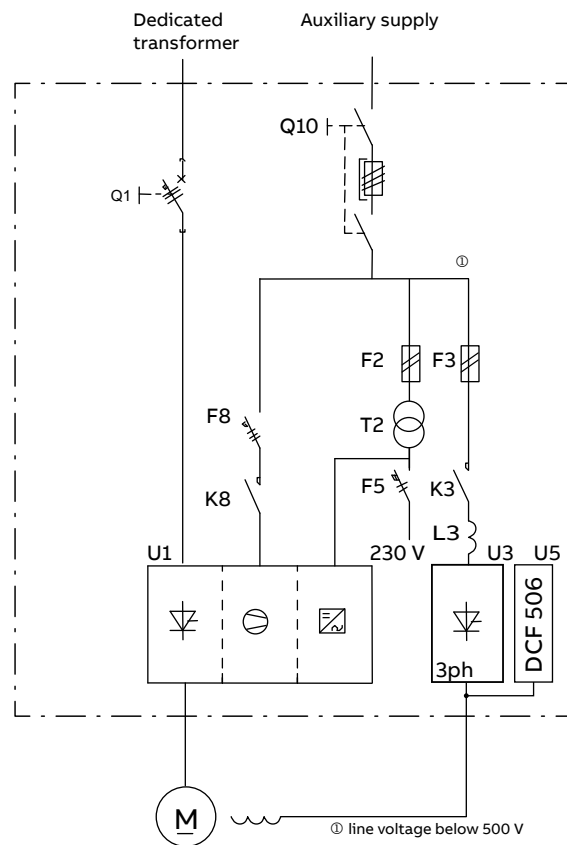
For higher field currents up to 520 A complete DCS880-A enclosed converters are used as field exciters, see +S745 on page 45 .

#### Please note:

Field reversal can only be used for none demanding application, running typically in one direction (propulsion, extrusion, kiln ...).



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SF\_880\_056\_DCS880-A\_b.ai

### Fieldbus interface

The field bus interface hardware is made by F-type adapters which are always located in one slot inside DCS880 control unit.



DCS880 can handle up to two F-type field bus adapters

Example:

- Slot1 (F-adapter number 1) = Profibus for Control
- Slot2 (F-adapter number 2) = Ethernet for Drive Composer connection or Remote monitoring (NETA-21 module).

Fieldbus adapter list and plus code see technical appendix.

The Ethernet network can be built by Ethernet switch

(+K480).

### AC800M ABB PLC connection

The ABB PLC can be connected by optical DDCS protocol.

The FDCO-01 adapter (+L503) is equipped with 2 x 10 Mbd optical channels which also allows to perform a master-follower configuration.

The branching unit NDBU95 (+S782) is the optical splitter and used to create the optical DDCS network for control purpose.

NDBU95 is typically located in separate (empty) cabinet.

### Hardware IO extension

The DCS880 control board is equipped with

- (7 x DI, 24 V) digital input
- 4 x relay output hardware interface.

Most of these IO's are typically used for internal purpose.  
e.g. (Digital input: K1 ack, E-Stop, Off2 command, air cooling feedback ...)

e.g. (relay output: K1 command, K3 command, K6 command ...)

Typically, 2 x DIO, 24 V Hardware interface are free.

If application requires (e.g. On and Start command) additional hardware IO resources, then FIO modules are used. Following IO-extensions can be ordered:

Option	Option code	Connections
FIO-01	+L501	4 x DIO (24 V), 2 x RO
FIO-11	+L500	3 x AI (mA/V), 1 x AO (mA), 2 x DIO
FAIO-01	+L525	2 x AI (mA/V), 2 x AO (mA)
FDIO-01	+L526	3 x DI (24 V, 115 V, 230 V), 2 x RO

The IO module can located on FEA-03 extension adapter and connected via FDCO module inside DCS880.

The option package (+L512) offer 115 V or 230 V (24 V)

- extra 3 x digital input
- 2 x relay output

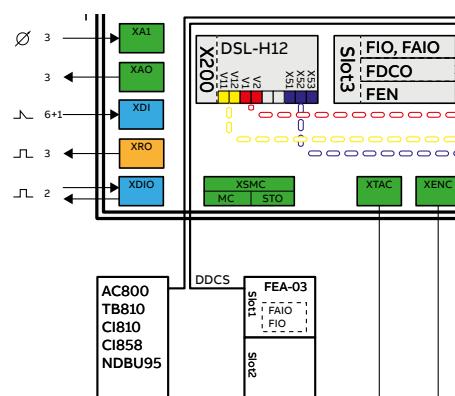
Implemented with 1 x FDIO-01 + FEA-03 extension (installed on the bottom left, inside of the cabinet + FDCO-01) as free customer interface.

In this configuration the FEA-03 offers one free slot, which can be used for

- second FDIO-01 extension module (+L526)
- FEN-01 or FEN-31 encoder speed feedback adapter
- FAIO PT100 temperature measurement function (two channels) (+L529).
- other IO-modules

If one FEA-03 adapter is not enough then a second FEA-03 adapter (+L515) can be selected and connected.

**Note:** The firmware can only handle max 3 of analog / digital extension modules (FDIO-01, FAIO-01, FIO-x1).



### Speed measurement

DCS880 control board is equipped with analog tacho input and (grounded) encoder input for TTL (5 V) and HTL (24 V) encoders. The encoder cable can be extended and routed to a separate terminal block (+L504).

If isolated encoder interface is required (e.g. very long cable ...), then

- FEN-01 (TTL) (+L517)
- FEN-31 (HTL) (+L502)

can be used. They are typically located on FEA-03 extension adapter which is located at the left bottom inside the control cabinet.

If encoder signal also needed for PLC, then splitter OM3-3Ai can be used and one output be conceded to DCS880 OnBoard encoder interface (XENC).

## Electrical accessories

### Anticondensation heater of cabinet

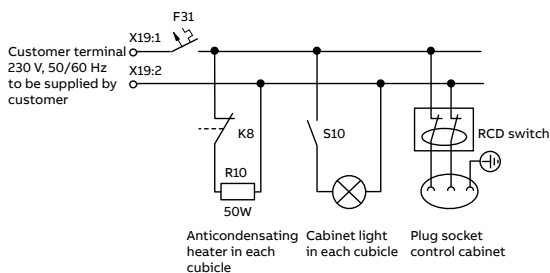
50 W heater per cabinet to prevent condensation. Supplied by 230 V<sub>AC</sub> from customer via terminals (X19) **(+G300)**.

### Lighting of the cabinet

LED lighting, including door contact. Supplied by 230 V<sub>AC</sub> / 115 V<sub>AC</sub> from customer via terminals (X19) **(+G301)**.

### Plug socket

The plug socket is wired to 230 V<sub>AC</sub> customer terminal (X19) and the housing is according to German standard **(+S790)** or **US (+G324)**.



### Aux. transformer (T2)

All converter cabinets are equipped with a transformer **(T2)**. Standard configuration is 230 V<sub>AC</sub> output for IEC - 115 V<sub>AC</sub> output aux. supply voltage can be selected **(+G304)**. The transformer T2 is connected to the main contacts by default and is available for typical voltages ≤ 690 V. For higher or special main supply voltages the transformer needs an external power supply **(+S651)**. A cabinet without transformer T2 can be selected with **(+G307)** - aux. supply 230 V<sub>AC</sub>/115 V<sub>AC</sub> provided directly by customer.

### Interface to external UPS

Separate 230 V<sub>AC</sub> input terminal to supply all necessary components for serial communication (including monitoring network (Drive composer), branching unit NDBU), if the DCS880-A cabinet is switched off. 230 V<sub>AC</sub> UPS performed by customer **(+G429)**.

## DC fuses

For DCS880-A02... (4Q) drives from size H1 ... H4 semiconductor fuses for DC output can be selected to protect the motor **(+F291)**. Due to limited space inside the drive cabinet this option is only available for group drives. For single drives with 2 anti-parallel bridges an additional 400 mm cabinet is required.



Example DC semiconductor fuses for Q4 drives with micro-switch  
Motor fan starter with optional external supply

## Monitoring

### Remote condition monitoring

The drive remote condition monitoring transfers typical operation and drive data to cloud. Cloud function can display drive operation and support optimization. Further information please see: <https://ability.abb.com/>

The gateway to internet is the NETA-21 **(+K484)** hardware. It requires Ethernet connection to the drive / to the drives.

### Temperature monitoring

Two different relays can be included for temperature monitoring of the motor:

- **PT100 relay** ABB CM-TCS.13S (0°C-200°C).

Up to three relays can be configured

**(+L506,+2L506,+3L506)**.

Each relay is equipped with one PT100 channel and operated completely independent of drive function.

- **PTC thermistor relay** ABB CM-MSS.23S **(+L505)**.

### Insulation monitor

Insulation monitor Bender Isometer ISO685 **(A90)** earth fault detection for isolated (IT) networks.

An insulation monitor device can be used to continuously measure the insulation status in an unearthed network. The insulation monitor is installed between mains and protective earth (PE). If the insulation resistance is below adjusted values output relays are activated.

For detection of earth faults in both AC and DC circuits.

The option isolation monitor **(+Q954)** is available for converter sizes **H6, H7, H8** and **H8P** and also for the incoming units **DCS880-A50-0000-00xx**.

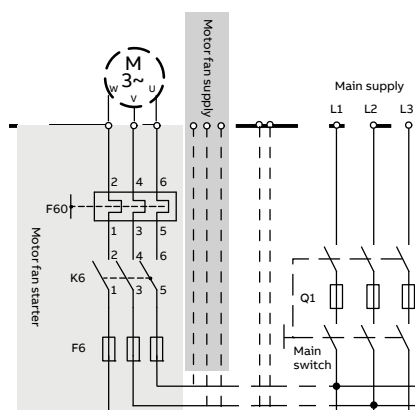


### Motor fan starter

Motor fan starter is an additional control and protection circuit for motor cooling fan.

This option contains

- Fusing (**F6**)
- Contactor and control (**K6**)
- Thermal overload relay (**F60**).



Motor fan starter with optional external supply

The supply can be taken from main input of converter. Very often fan motor voltage does not fit to converter supply voltage. Because fan motors are typically built and manufactured for standard voltages, which is more dedicated to typical auxiliary supplies (400 V, 500 V / 525 V, 50 Hz; 460 V, 60 Hz).

Therefore, the technical appendix requires the input for the auxiliary supply. If needed separate input terminals, for external supply of the fan starter, are added (**+M633**).

Available ratings are **1 ... 24 A**, 400 V, 500 V, 600 V, 690 V (**+M600...+M659**).

For more information see plus code list at technical appendix.

### Converter fan supply and transformer

DCS880 converter fan size H7, H8 and H8P are equipped with three phase fans. The supply voltage is designed for typical auxiliary voltages.

**Size H7:** 400 V, 50 Hz / 525 V, 50 Hz and 460 V, 60 Hz.

**Size H8, H8P:** 400 V, 50 Hz and 460 V, 60 Hz.

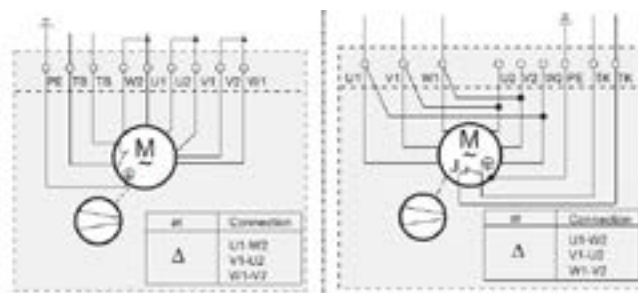
These converter fans can not be supplied from main converter supply, because the dedicated transformer voltage does not fit.

It is strongly recommended to fill in the aux. voltage and frequency in the technical appendix. The converter will be equipped with additional input terminals for aux. supply to feed the three phase fan.

If the voltage does not fit anyway, then a transformer T8 must be selected.

### T8 (auto-) transformer option

- Size H7 input voltage 600 V / 690 V (**+S610**)
- Size H8 input voltage 525 V / 600 V (**+S611**)
- Full engineered isolation transformer (**+S612**)



3 phase converter fan examples H7

3 phase converter fan examples H8

### Galvanic isolated voltage measurement

Local standards sometimes require galvanic isolated voltage measurement, if supply voltage is higher than 690 V.

DCS880-A enclosed converters from size H7 ... H8P measure the actual voltage by means of high ohmic resistors. This measurement is according the IEC standard (2 Mohm for voltages starting at 790 V).

The option galvanic isolation (**+S798**) for converters size H7, H8 and H8P is a complete isolation of AC and DC voltage measurement.

This isolation is performed by a transformer (T90) for the AC voltage and a galvanically isolated transducer (A92) for the DC voltage.

This option could also be required for 12-pulse serial / sequential above  $2 \times 345 V_{AC}$ .

## DCS880-A Crane design

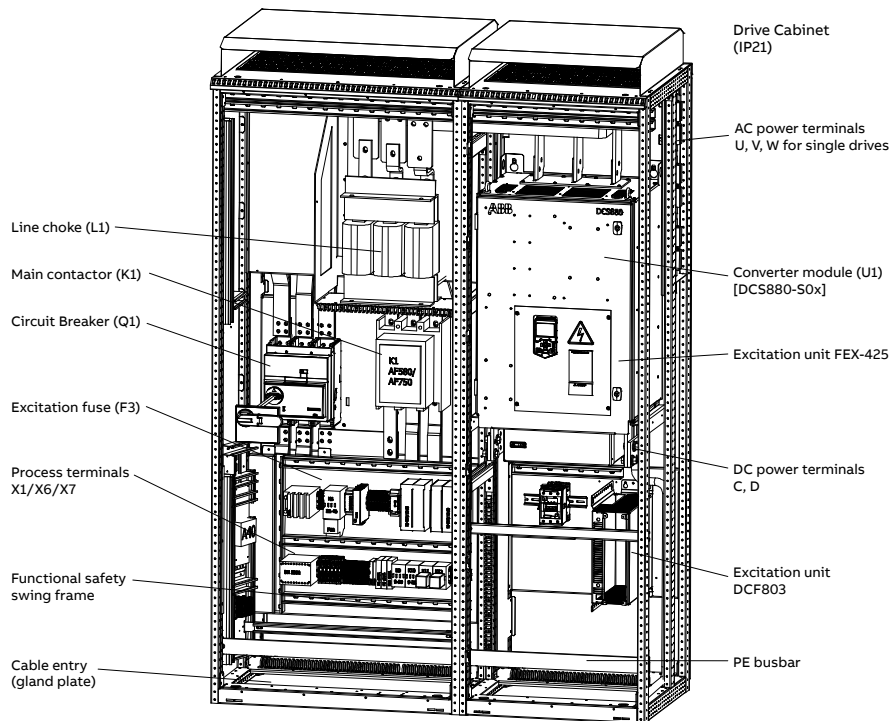
### General

This cabinet solution is intended to supply crane applications with shared motion requirement. In shared motion, there are 2 motors using one DC converter. The crane cabinets are equipped with one DCS880-S02 converter module size H6 with internal FEX-425 field exciter and an additional second field exciter as option. Furthermore instead of a ACB a contactor and a MCCB is installed.

The following H6 modules in crane design are available:

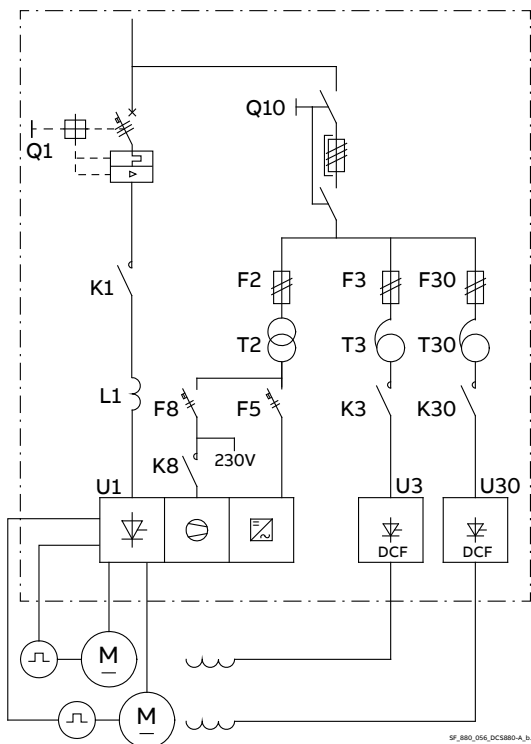
#### DCS880-A02-xxxx-0xC2

400 V	DCS880-A02-1200-05C2 (IEC/UL)
	DCS880-A02-1500-05C2 (IEC/UL)
	DCS880-A02-2000-05C2 (IEC/UL)
525 V	DCS880-A02-0900-06C2 (IEC/UL)
	DCS880-A02-1500-06C2 (IEC/UL)
690 V	DCS880-A02-0900-07C2 (IEC)
	DCS880-A02-1500-07C2 (IEC)



BIG\_880\_046\_DCS880-A\_crane\_x.ai

Please note that standard crane cabinet is in group drive design which requires a incoming unit or +H351 - top entry AC cable connection (800 mm cabinet depth - see also page 36 ).



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DCS880-A0x-0900 ... 2000 single line diagram crane drive (H6)

### Options

The internal field exciter FEX-425 is mandatory and has to be selected via **+S164**. For the second field circuit the following field exciters are available as option:

Unit type	Output current $I_{cc}$	AC field supply voltage	Plus code
DCF803-0016	0.3 ... 16 A	110 V -15 % ... 500 V / 1-ph +10 %	+S711
		single-phase	
		three-phase	+S713
DCF803-0035	0.3 ... 35 A	110 V -15 % ... 500 V / 1-ph +10 %	
		single-phase	+S715
		three-phase	
DCF803-0050	0.3 ... 50 A	110 V -15 % ... 500 V / 1-ph +10 %	

All other options are available as for the standard enclosed converters.

To have all crane functionalities available an additional application program is required. A memory unit with DCC crane software can be ordered via **+S214**.

**Note:** Also see autotransformer options for the supply of the field exciter circuit. All applicable plus codes for the crane design are listed in the technical appendix.

DC connection top is selectable via **+H351** in combination with **+H362** (see page 35).



## DCS880-A +S745 3-phase field exciters in a separate cabinet

### DCS880-A0x-xxxx-04/05X1 +S745

These converters are intended to supply high inductive loads like motor fields or chokes. They are equipped with three phase DCS880-S01 or DCS880-S02 converter modules plus DCF506 over voltage protection. All available 3-phase field exciter cabinets (+S745) are 600 mm in width and 600 mm in depth.

### Options

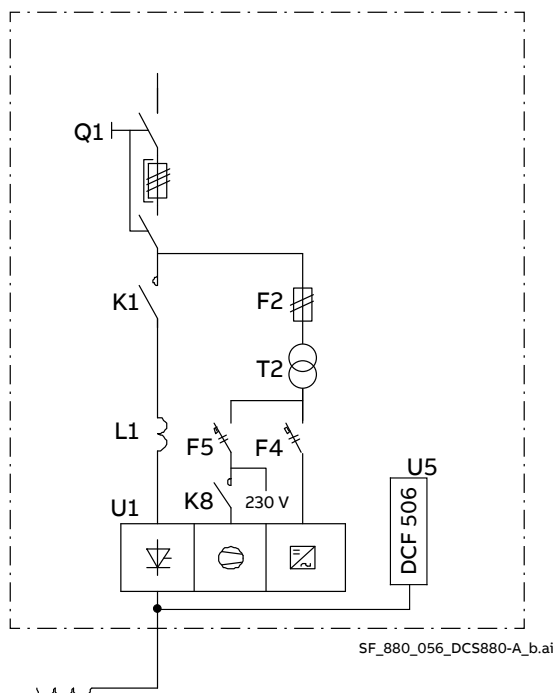
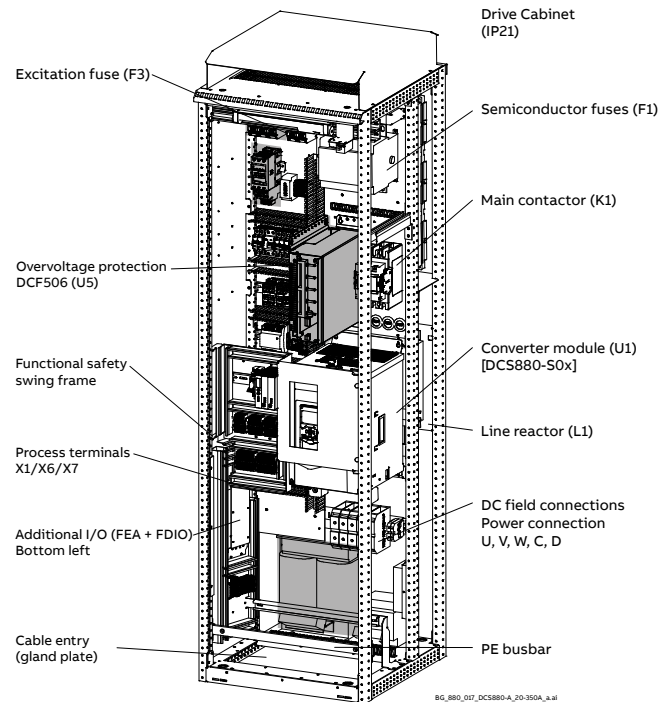
#### Auto- and insulating transformers

An autotransformer is used to have a suitable supply voltage level for a field exciter and to reduce voltage ripple. For each 3-phase field exciter an autotransformer is dimensioned individually.

For dimensioning please contact ABB Motion DC Drives, Germany.

Higher input voltages (> 600 V / 690 V) require an insulating transformer.

All available 3-phase field exciter cabinets (+S745) are 600 mm in width and 600 mm in depth.



Single line diagram of Field exciter DCS880-A0x-xxxx-04/05X1 +S745

### Enclosed 3-phase Field exciters

Unit type	DC I [A]	Power loss [kW]	Size
525 V			
DCS880-A01-0090-04/05X1 +S745	70	0.85	H1
DCS880-A02-0100-04/05X1 +S745	80	0.85	
DCS880-A01-0270-04/05X1 +S745	210	1.40	H2
DCS880-A02-0300-04/05X1 +S745	240	1.40	
DCS880-A01-0315-04/05X1 +S745	250	1.89	H3
DCS880-A02-0350-04/05X1 +S745	265	1.89	
DCS880-A01-0405-04/05X1 +S745	300	2.40	
DCS880-A02-0450-04/05X1 +S745	345	2.40	
DCS880-A01-0610-04/05X1 +S745	520	3.00	H4
DCS880-A02-0680-04/05X1 +S745	520	3.00	

**Note 1:** Limited to 520 A<sub>DC</sub> field current due to the overvoltage protection.

**Note 1:** All values are valid for IP21 cabinte designs, for IP42 and IP54 a current derating needs to be considered.

### Field exciter in a separate cabinet

#### Component list (standard)

Degree of protection IP 21  
 Converter module U1  
 Line reactor L1  
 Transformer T2 only if required  
 Overvolt. protect. DCF506  
 Fuses auxiliary supply F2  
 Auxiliary relays K8, K15, K16  
 Isolation switch Q1  
 Main contactor K1

## DCS880-A50 Incomings

### Incoming Supply Sections for Line-ups DCS880-A50

Group drive are supplied by horizontal busbars.  
The incoming is the common supply connection for the horizontal busbars.

Four different construction types are available.  
The design is visible on diagrams next page.

DCS880-A50-xxxx-07O2	Incoming, no breaker, no switch
DCS880-A50-xxxx-07S2	Incoming with isolation switch
DCS880-A50-xxxx-07A2	Incoming with circuit breaker
DCS880-A50-xxxx-07H2	Incoming pure horizontal busbar connection, no breaker, no switch, no options

The connection to the AC supply can be made by cables or busbars. The cable / busbar entry is at the bottom of the incoming supply section.

Cable connection for 1000 A to 4000 A is standard.  
Busbar connection is on request,  
The cabinets standard protection class is IP 21.

### Basic design

Rated voltage:	400 V, 500 V, 600 V, 690 V
Rated frequency:	50 Hz or 60 Hz
Rated current:	1000 A, 2000 A, 3000 A, 4000 A
Short circuit ratings:	65 kA (1 sec.)

**Note:** AC horizontal busbars for 4000 A are not available.  
The 4000 A incoming sections should be placed in the middle of a line up, in order to distribute the AC-current to left and right side (horizontal busbars up to 3000 A can stretch to both sides of such incomer).

### Top connection for Incomings

All cabinets (-A50-xxxx--07O2/-07S2/-07A2/-07H2) can be equipped with busbars for power supply from the top.  
Cable connections from the top are just available for ...-07H2 cabinets.

### EMC filters

EMC filters are not included in the Incoming.  
If EMC filters are required, then they are located in cabinet next to Incoming - DCS880-A50-xxxx-04/05/06/07E2.

### EMC Filters are available for

- 400 ... 500 V<sub>AC</sub>, 320 ... 600 A<sub>AC</sub>
  - 600 ... 690 V<sub>AC</sub>, 600 ... 2500 A<sub>AC</sub>
- Please select size of filters according to sum of all rated converter currents minus 10 %. The current mentioned above is the nominal current (I<sub>rms</sub>) on the line side.
- Instead of EMC filters a dedicated transformer can be used.

### Insulation monitor

Insulation monitor Bender Isometer ISO685 (A90) earth fault detection for isolated (IT) networks.  
An insulation monitor device can be used to continuously measure the insulation status in an unearthed network. The insulation monitor is installed between mains and protective earth (PE). If the insulation resistance is below adjusted values output relays are activated.  
For detection of earth faults in both AC and DC circuits.  
The option isolation monitor (+Q954) can be mounted inside the cabinet or at the door  
(DCS880-A50-xxxx-07O2, -07S2, -07A2).

**AC voltage measurement (+G334)**

- Meter and a switch  
All three phases are monitored by means of a switch and a meter. Location of the switch and the meter is in the door in the incoming supply section. No transformers are used.
- With voltage transformers  
Voltage transformers are included for AC voltages above 690 V.

**AC current measurement (+G335)**

- 3-phase (meters and current transformers)  
All three phases are monitored by means of current transformers and meters. Location of the meters is in the door of the incoming supply section.

**Arc detecting (+G336)**

- An arc detecting relay is used to supervise the AC bus bars. The type TVOC can handle up to 9 detectors.



Arc detecting

- Detecting elements with fibre optic cable lengths of 2 to 20 m are available. It is possible to supervise several spots in one line-up.  
Location in separate 400 mm empty cabinet for DCS880-A50-xxxx-07S2 and DCS880-A50-xxxx-07A2.



Detecting element

**Earthing switch (+F259)**

available for 1000 A, 2000 A, 3000 A supply

- Switch  
An earthing switch can be used to ground the AC busbars to earth for safety reasons when work must be done in the line-up. Earthing switches are available up to 3000 A and  $SCCR_{max} = 50 \text{ KA}$ .



Earthing switch

- Electrical interlocking  
It is possible to have an electrical interlocking between an earthing switch and a supply side isolating switch or circuit breaker. Therefore the earthing switch needs an interlocking coil.  
Earthing switches are available up to 3000 A and  $SCCR_{max} = 50 \text{ KA}$ .



Interlocking coil

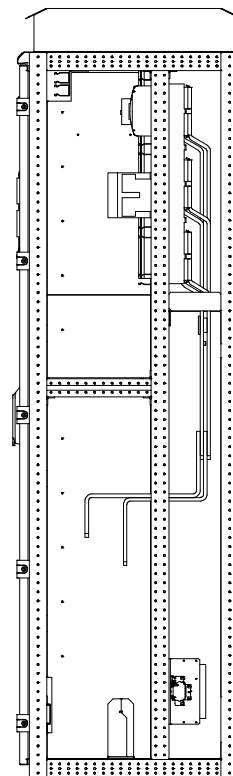
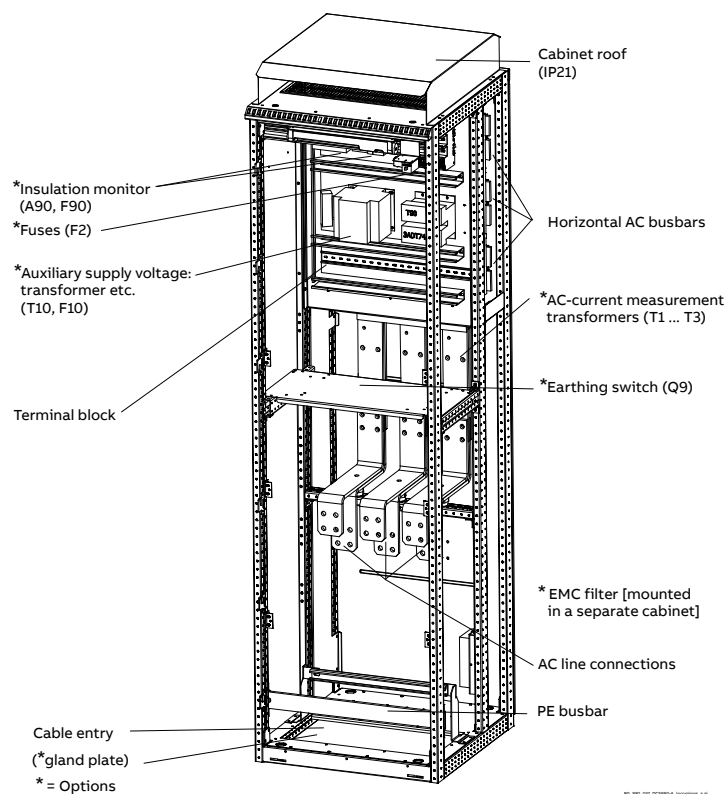
**Branching unit NDBU-95 (+S782)**

The branching unit for DriveWindow and channel 0 optical networks can be located inside the incoming supply DCS880-A50-xxxx-07O2, -07S2, -07A2 (max. 2).

- NDBU-95
- NPSM-01, 24 V<sub>DC</sub> power supply is required

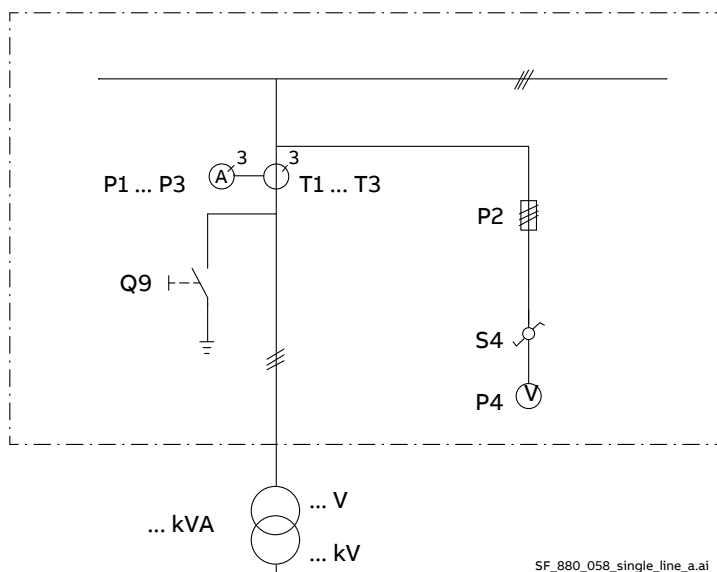
**Note:** The Incoming options are only available for Incoming types **DCS880-A50-xxxx-07O2/-07S2/-07A2**

### Incoming DCS880-A50-xxxx-0702 (without switch)



Incoming DCS880-A50-2000-0702 as an example

### Single line diagram Incoming DCS880-A50-xxxx-0702

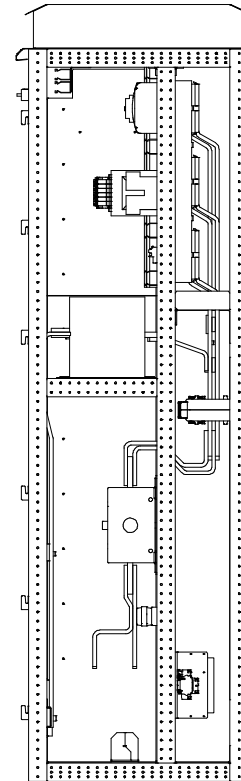
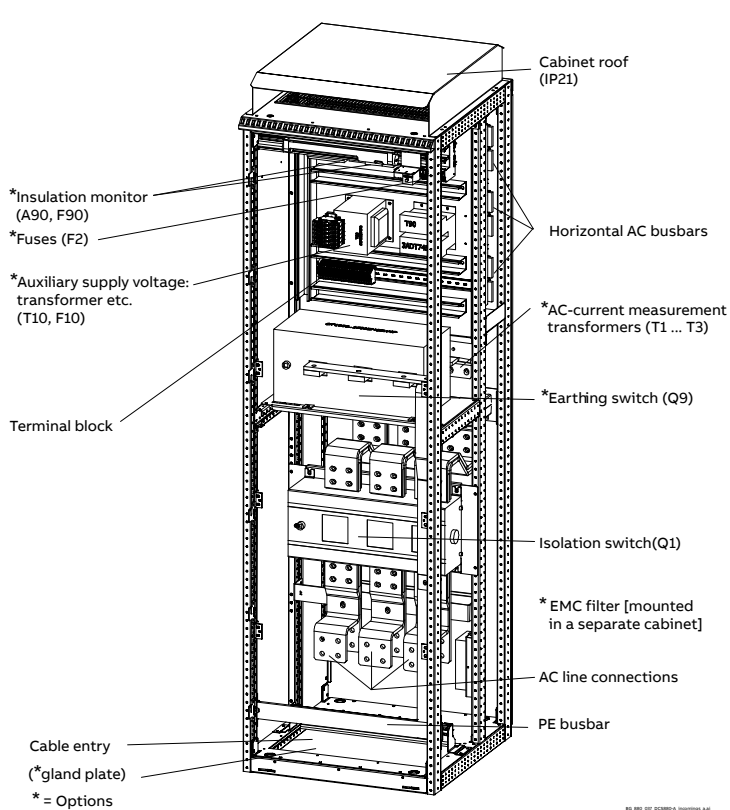


Single line diagram Incoming DCS880-A50-xxxx-0702

**Note 1:** Dimensions see table 2, section Dimensions Converter cabinet

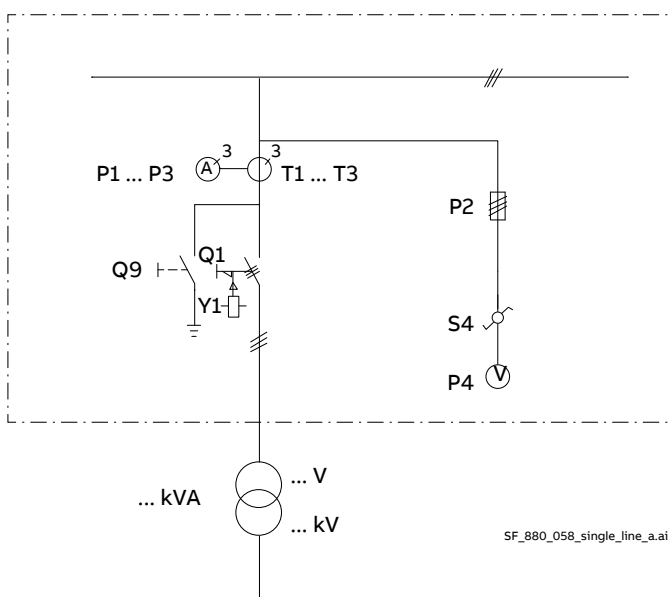
**Note 2:** Available in 1000 A<sub>AC</sub>, 2000 A<sub>AC</sub>, 3000 A<sub>AC</sub> and 4000 A<sub>AC</sub>

### Incoming DCS880-A50-xxxx-07S2 (isolation switch)



Incoming DCS880-A50-2000-07S2 as an example

### Single line diagram Incoming DCS880-A50-xxxx-07S2

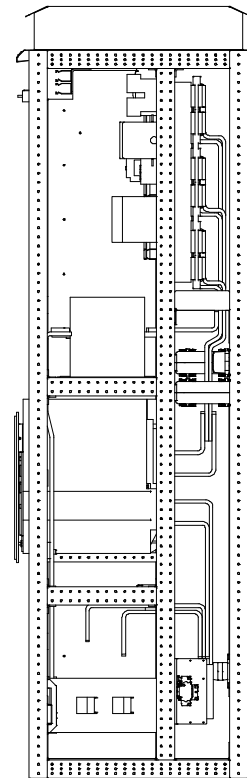
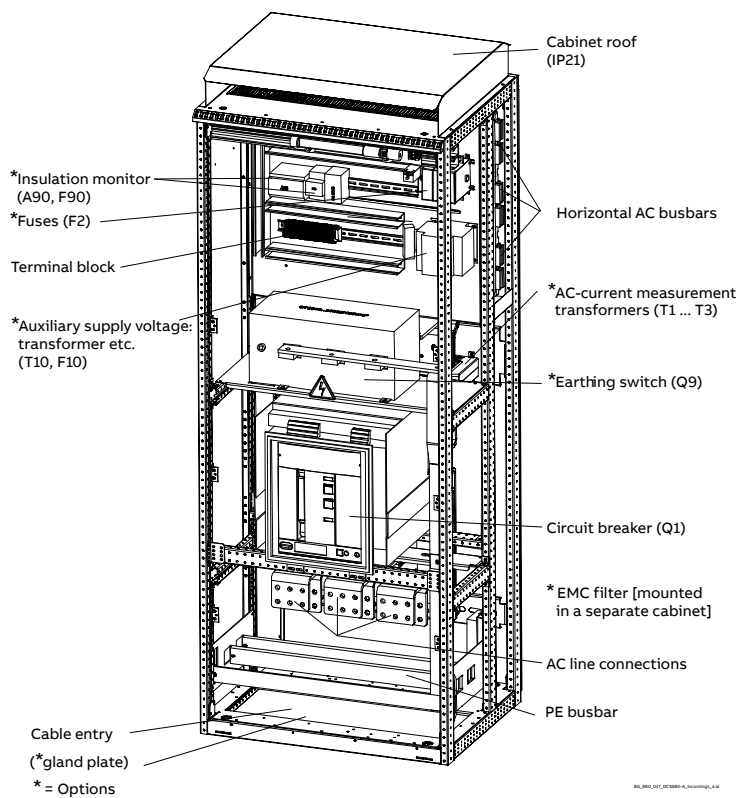


**Note 1:** Dimensions see table 2, section Dimensions Converter cabinet

**Note 2:** Available in 1000 A<sub>AC</sub> and 2000 A<sub>AC</sub>

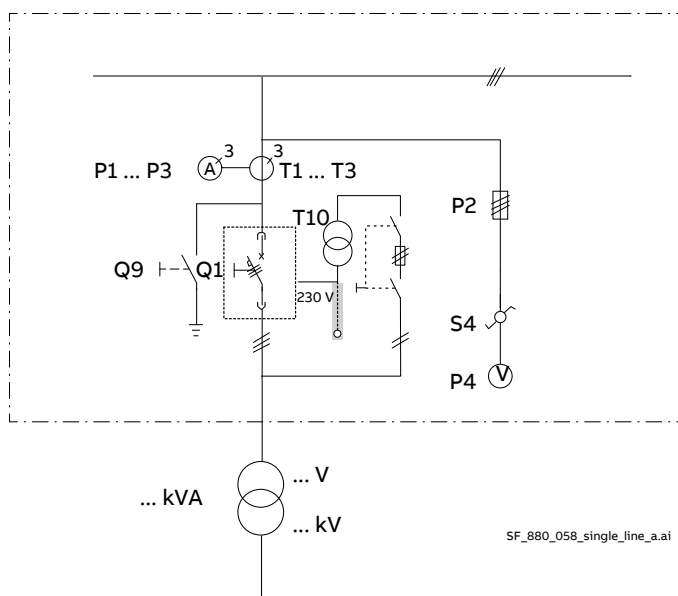
Single line diagram Incoming DCS880-A50-xxxx-07S2

### Incoming DCS880-A50-xxxx-07A2 (circuit breaker)



Incoming DCS880-A50-3000-07A2 as an example

### Single line diagram Incoming DCS880-A50-xxxx-07A2



#### Circuit breaker option (for DCS880-A50-xxxx-07A2)

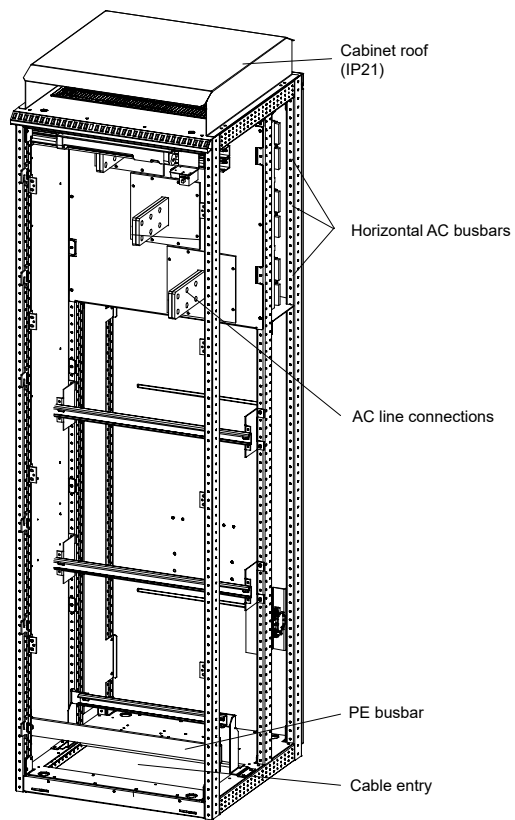
- The circuit breaker is equipped with
- Overcurrent detection
- Undervoltage detection
- Auxiliary contacts (2 NC, 2 NO)

**Note 1:** Dimensions see table 2, section Dimensions Converter cabinet

**Note 2:** Available in 1000 A<sub>AC</sub>, 2000 A<sub>AC</sub>, 3000 A<sub>AC</sub> and 4000 A<sub>AC</sub>

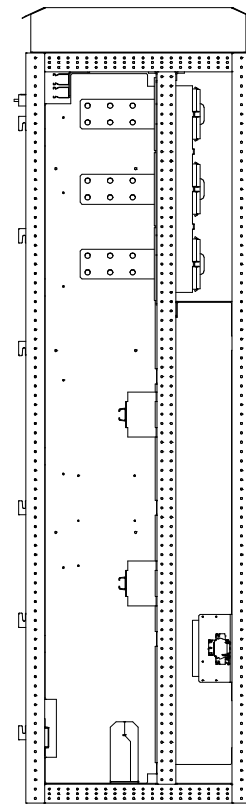
Single line diagram Incoming DCS880-A50-xxxx-07A2

### Incoming DCS880-A50-xxxx-07H2 (without switch and options)



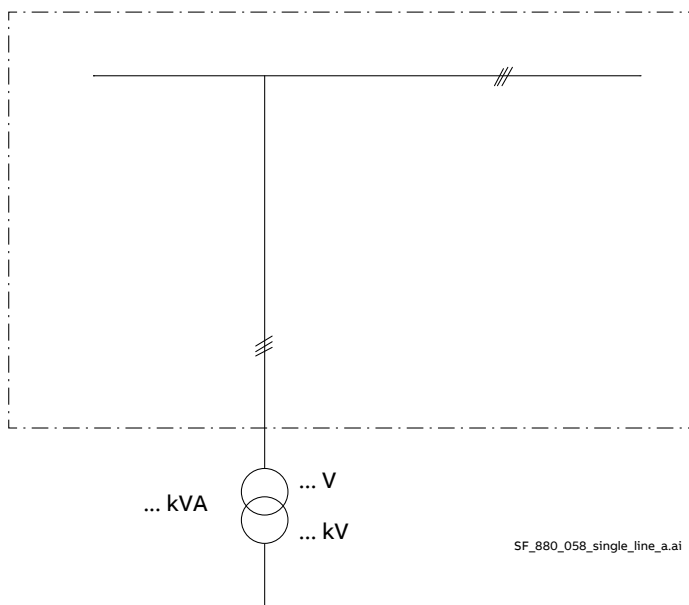
BG\_880\_037\_DCS880-A\_incoming\_a.ai

Incoming DCS880-A50-2000-07H2 as an example



BG\_880\_037\_DCS880-A\_incoming\_a.ai

### Single line diagram Incoming DCS880-A50-xxxx-07H2



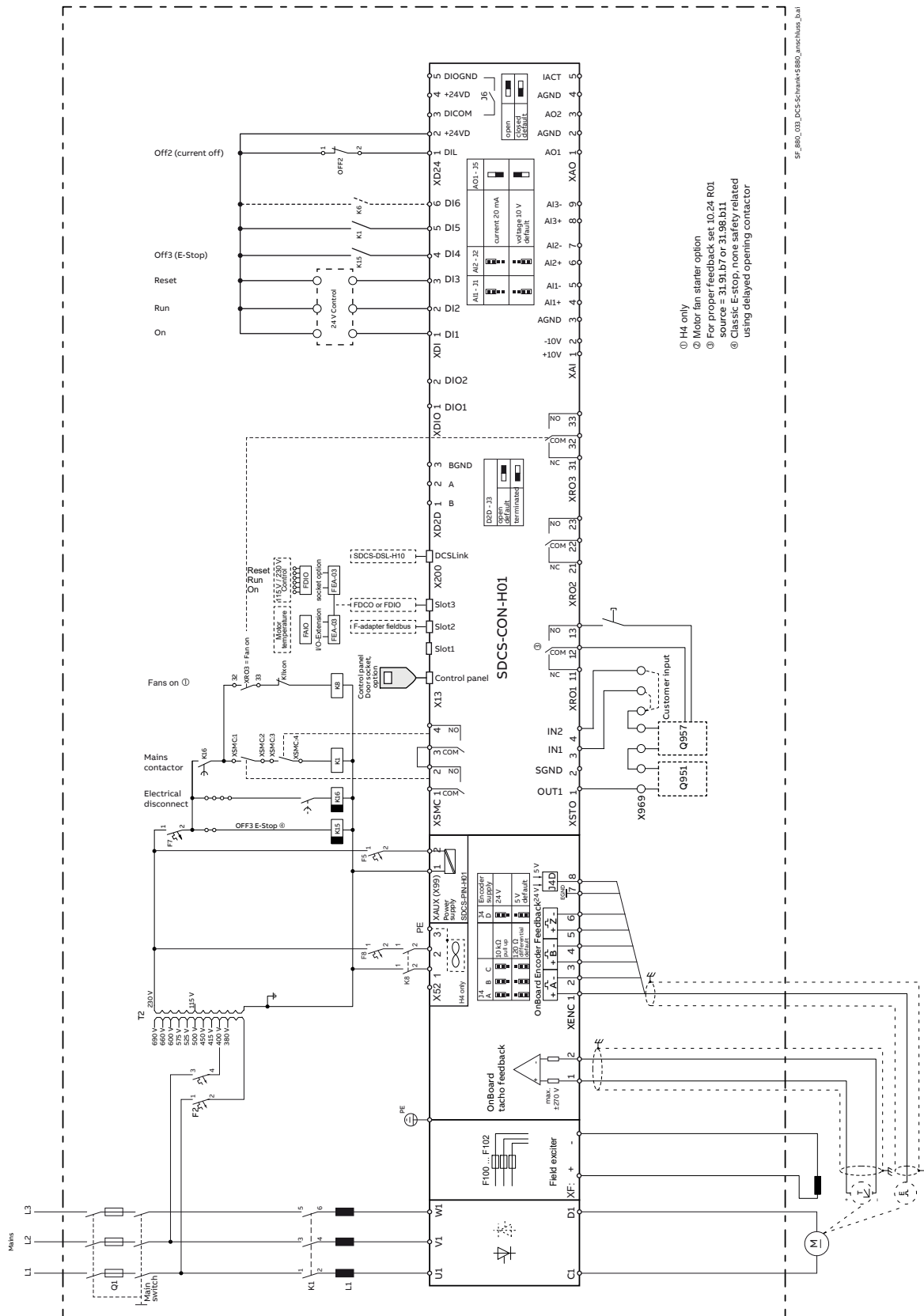
SF\_880\_058\_single\_line\_a.ai

**Note 1:** Dimensions see table 2, section Dimensions Converter cabinet

**Note 2:** Available in 1000 A<sub>AC</sub>, 2000 A<sub>AC</sub> and 3000 A<sub>AC</sub>

Single line diagram Incoming DCS880-A50-xxxx-07H2

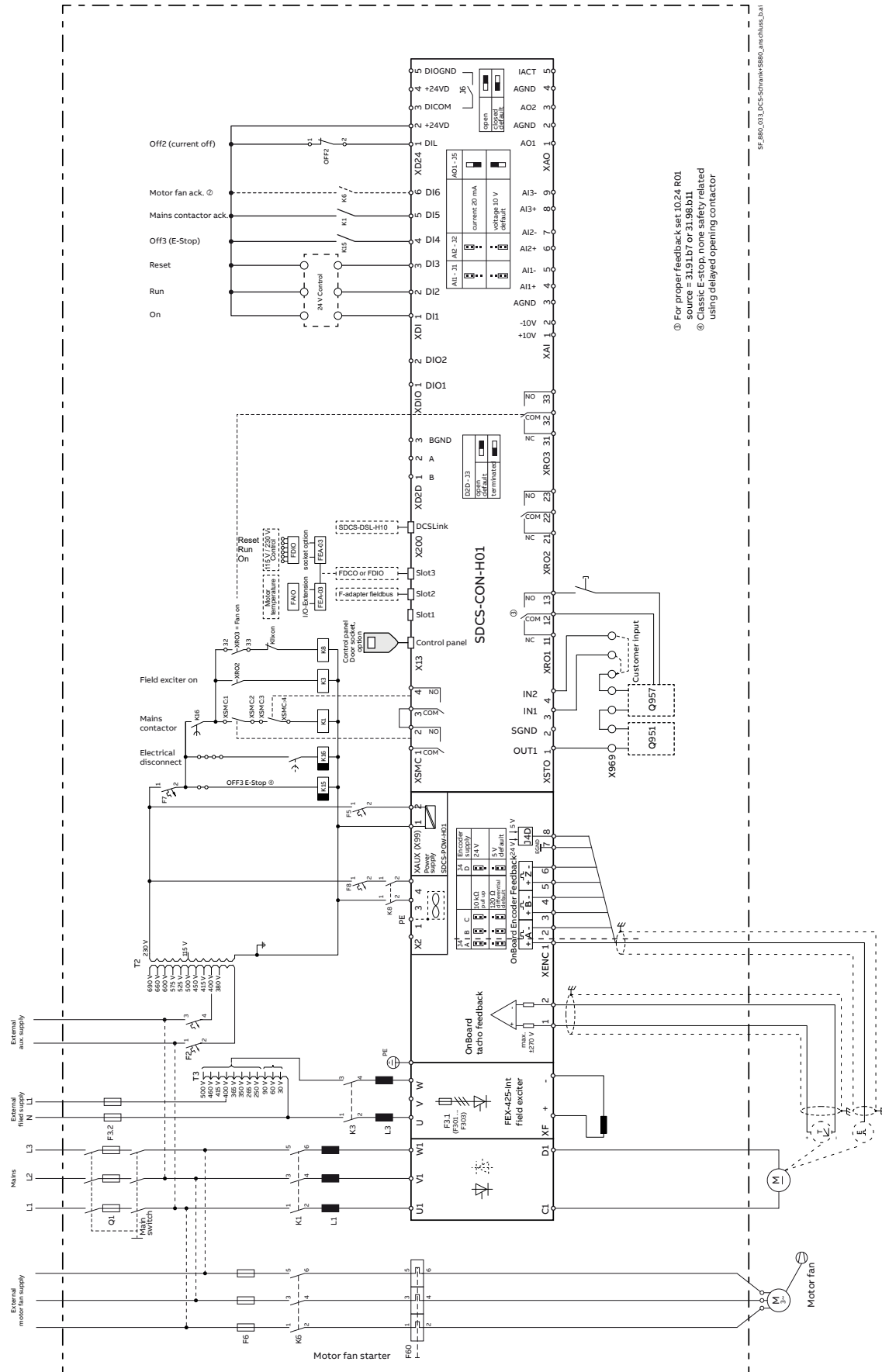
## DCS880-A Basic circuit diagram



SF\_2801\_003\_Schmann-5880\_amschmas\_b.ai



# DCS880-A External supply options circuit diagram



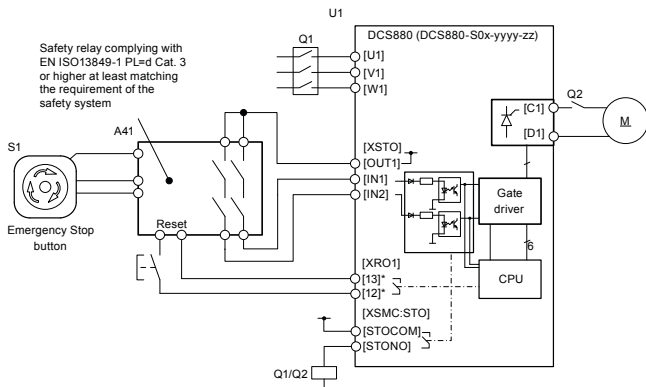
## Safety functions offering

### Integrated safety simplifies configuration



Integrated safety reduces the need for external safety components. Thus, simplifying configuration and reducing installation space. DCS880 converters offer safe torque off (STO) built in as a standard. STO is used to prevent unexpected startup (POUS) and in stopping-related functions, e.g. E-Stop, enabling safe machine operation and maintenance. With safe torque off activated, the drive will not provide current and thus no torque at the shaft.

The functional safety of the drive is designed in accordance with EN/UL/IEC 61800-5-2 and complies with the requirements of the European Union Machinery Directive 2006/42/EC

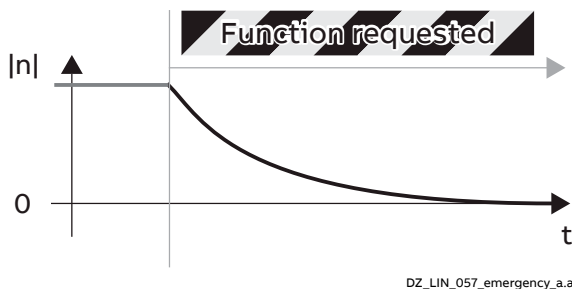


\*Relay output terminals (e.g., [XRO1] [13] - [12], 10.24: STO Reset Indication (31.91b7)  
SF\_880\_018\_Emergency STOP\_e.ai

### Scalable safety according to your requirements

The safety functionality can be scaled from basic wired E-Stop and POUS functionality, to a complete safety system with PROFIsafe and a safety PLC (such as the AC500-S). The more elaborate safety functions such as safely limited speed (SLS) or Safe direction (SDI) are available using the FSO-21 option module.

### Emergency Stop (E-Stop) cat. 0 (option)



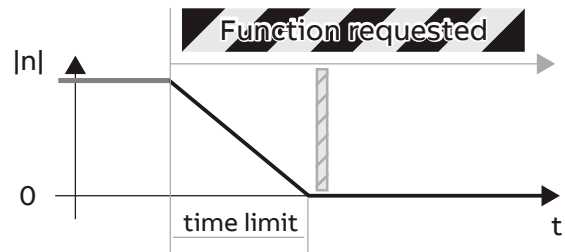
DZ\_LIN\_057\_emergency\_a.ai

Emergency stop, cat. 0 schematic

Cat.0 means stopping by immediate removal of torque to the machine actuators (i.e. coast stop).

For this, the STO function of the drive is used. This function corresponds to an uncontrolled stop in accordance with stop category 0 of EN 60204-1.

### Emergency Stop (E-Stop) cat. 1 (option)



DZ\_LIN\_057\_emergency\_a.ai

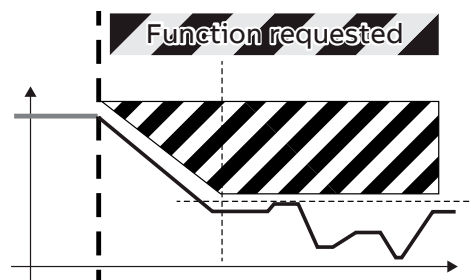
Emergency stop, cat. 1 schematic

Cat. 1 means a controlled stop (ramp down the speed) with power available to the machine actuators to achieve the stop and then removal of torque when the stop is achieved (STO). This can be realized with SS1-t (time controlled) function or SS1 function.

### Prevention of unexpected start-up (POUS)

The Prevention of unexpected start-up function prevents the drive from generating torque. The POUS function activates the STO function of the drive. By using this function, short-time operations can be performed without switching off and disconnecting the drive. Examples are loading or unloading, cleaning and maintenance work on the non-electrical parts of the machinery.

### Safely limited speed (SLS)



DZ\_LIN\_057\_emergency\_a.ai

Safely limited speed, schematic

The safely-limited speed (SLS) function ensures that the specified speed limit is not exceeded. The SLS safety function can automatically decelerate to a speed below the defined speed limit when it is activated. Both time and ramp monitoring can be used during the deceleration. The SLS function is suitable to ensure that the machine does not exceed a predefined speed e.g. during maintenance or cleaning operations.

## Functional safety modules

### FSPS-21 PROFIsafe safety module

The FSPS-21 PROFIsafe safety option module enables a safe ethernet connection between drive and safety PLC using PROFIsafe over PROFINET IO.



FSPS-21

With the FSPS-21 module, the following safety functions are supported (with a safety level up to SIL3 / PL e):

- Safe torque off (STO), i.e. coast stop
- Safe Stop 1 (SS1-t), i.e. ramp stop
- POUS (Prevention of unexpected start-up)

### FSO-21 safety module

The FSO-21 module provides various safety functions with a safety level up to SIL 3 / PL e.

The safe speed estimate functionality is not available for DCS880. Therefore, an FSE-31 module must be used together with a safe encoder to provide safe speed, direction and position information to the module.

### Available safety functions

The following safety functions are supported (with a safety level up to SIL3 / PL e (Cat. 3)):

- STO, with or without SBC (Safe brake control)
- STO with speed limit activated SBC
- SS1 (Safe stop 1)
- POUS (Prevention of unexpected start-up)
- SSE (Safe stop emergency)
- SLS (Safely limited speed)
- varSLS (Variable SLS) <sup>1)</sup>
- SMS (Safe maximum speed)
- SSM (Safe speed monitor)
- SDI (Safe direction)

1) Requires PROFIsafe connection

FSO-21 safety functions can be activated using wired inputs or a PROFIsafe connection. In the latter case, an additional PROFINET IO fieldbus module (e.g. FPNO-21) is needed to connect the drive to the safety PLC.



FSO-21, FSE-31

### Integrated safety simplifies configuration

#### Easy configuration

Configuring the safety functions module is easy thanks to the graphical user interface of the Drive Composer pro PC tool.

### TÜV-certified safety design tool

The FSDT-01 functional design safety design tool can be used to design complete safety circuits.

It helps to increase the safety of users in the vicinity of machines. You can perform functional safety modeling, design, calculation and verification for machine functional safety.



### Ordering information:

Option	Ordering code
FSPS-21	+Q986
FSO-21	+Q972 <sup>2)</sup>
FSE-31 (HTL only)	+L521 <sup>2)</sup>
FPNO-21 (PROFINet)	+K492
PROFIsafe using FSO-21 <sup>3)</sup>	+Q982 <sup>2)</sup>

<sup>2)</sup> For availability please check with your local ABB.

<sup>3)</sup> For PROFIsafe with FSO-21 (+Q982) also FSE-31 (+L521) and PROFINet fieldbus adapter option FENA-21 (+K475) or FPNO-21 (+K492) is required.

## Cabinet based safety functions – Configurations

The basic E-Stop-options according to cat. 0 (STO) and cat. 1 (SS1-t) and the POUS safety function can also be realized using safety relays and wired connections. The following pages show typical configurations as examples and illustrate, where the safety relays and the X25 safety bus terminals are located and help to identify the required plus codes and their total number.

Figure	Incoming	Drive	Drive	Drive	POUS	One option applicable	Group drives
						+Q951 +Q952 +Q953 +Q954 +S925 +S926 +S927	
Single drive, each drive one E-Stop each drive one POUS	1	E-Stop POUS	E-Stop POUS	E-Stop POUS	n	n n n n	
Group drive, one E-Stop for all each drive one POUS	2	E-Stop POUS	X25 POUS	X25 POUS	n	x x x x	n
Group drive, one E-Stop for all, one POUS for all	3	E-Stop POUS	X25 X25	X25 X25	x	x x x x	n
Two line-ups, one E-Stop for all, one POUS for all	4	Line-up 1 Transmitter Line-up 2 Receiver	E-Stop POUS	X25 X25	X25 X25	x x x x	n
				X25 X25	X25 X25	*	x
				X25 X25	X25 X25	*	n

n: needed n times, n = number of drives.

x: needed once

\* Not needed, logic for feature in line-up 1

Figure 1

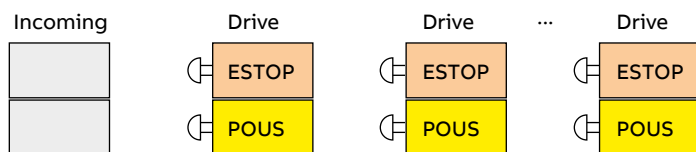


Figure 2

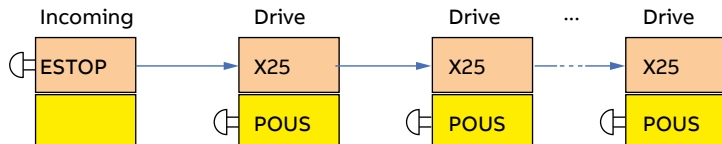


Figure 3

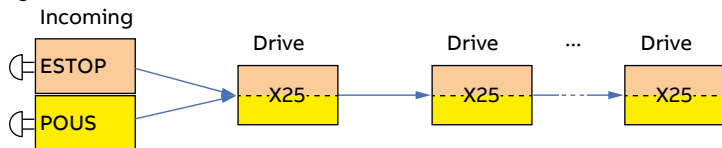
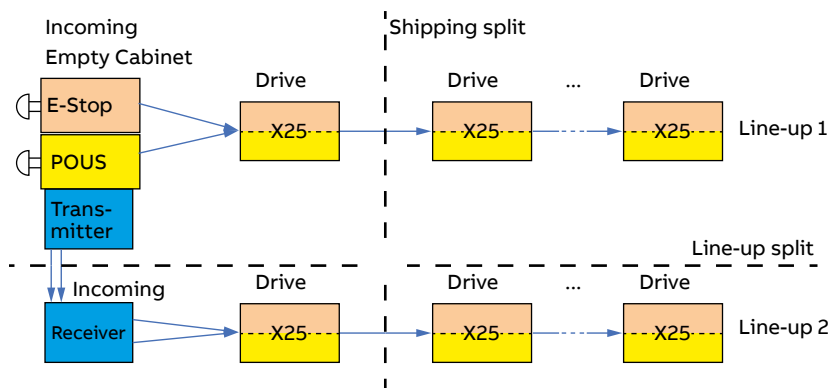


Figure 4



Number of drives:

With  
POUS

Without  
POUS

Group drive options

(One figure selectable)

x option +S925







x option +S925

x option +S925,  
1 x option +S926,  
1 x option +S927.

## Cabinet based safety functions – Available plus codes

The following list helps choosing the correct plus codes for a (group) drive according to the configurations on the previous page. The desired E-Stop and / or POUS options must be chosen once for each single drive (figure 1) or each group drive (figure 2 ... 4). With a configuration according to figure 2, the POUS option must be chosen for each drive as well.

Options +Q957 (POUS), +S925, +S926 and +S927 are defined by the configuration on the previous page.

Classic Electrical Stop non safety related using delayed opening contactor			
+Q951 1 x	<b>Emergency Stop cat. 0 with opening the Main contactor</b> according EN 60204-1 The mains contactor is opened off after STO ist achieved.		
 x	Response time:	520 ms or less (from input to the safety relay until safe torque off)	
	Safety integrity level (SIL):	3	
	Performance level (PL):	e	
	Category:	3	
+Q952 1 x	<b>Emergency Stop cat. 1 with opening the Main contactor</b> according EN 60204-1 The mains contactor is opened off after STO ist achieved.		
 x	Configurable ramp time:	0 to 999s	
	Response time:	30 ms or less from input to the safety relay to trigger the 0 to 999 s (as set by safety timer relay) for ramp stop; 540 ms + Emergency stop deceleration ramp time or less (from input to the safety relay until safe torque off)	
	Safety integrity level (SIL):	3	
	Performance level (PL):	e	
	Category:	3	
+Q963 1 x	<b>Emergency Stop cat. 0 without opening the Main contactor</b> according EN 60204-1 The mains contactor is not opened off after STO ist achieved.		
 x	Response time:	520 ms or less (from input to the safety relay until safe torque off)	
	Safety integrity level (SIL):	3	
	Performance level (PL):	e	
	Category:	3	
+Q964 1 x	<b>Emergency Stop cat. 1 without opening the Main contactor</b> according EN 60204-1 The mains contactor is not opened off after STO ist achieved.		
 x	Configurable ramp time:	0 to 999s	
	Response time:	30 ms or less from input to the safety relay to trigger the 0 to 999 s (as set by safety timer relay) for ramped stop; 520 ms + Emergency stop deceleration ramp time or less (from input to the safety relay until safe torque off)	
	Safety integrity level (SIL):	3	
	Performance level (PL):	e	
	Category:	3	
+Q957 1 x	<b>Prevention of unexpected start-up</b> according EN ISO 14118 The mains contactor is not opened off after STO ist achieved.		
 x	Response time:	520 ms or less (from input to the safety relay until safe torque off)	
	Safety integrity level (SIL):	3	
	Performance level (PL):	e	
	Category:	3	
 x +S925	<b>Terminal X25 for safety options in group drive incl. engineering fee</b> used as an interface to the drive for common SS1-t, STO, MC open command and feedback loops.		
1 x +S926	<b>Safety transmitter - group drive</b> Transmitting interface to up to 2 other line-ups with same E-Stop / POUS group		
	Safety integrity level (SIL): 3	3	
	Performance level (PL):	e	
1 x +S927	<b>Safety receiver - group drive</b> Receiving interface with same E-Stop / POUS group; provides information for next terminal X25.		
	Additional response time:	+S926 and +S927 increase the response time of the group safety functions (SS1-t, STO and MC open command) in the receiving line-up by 40 ms in total.	
	Safety integrity level (SIL):	3	
	Performance level (PL):	e	
	Category:	3	

## Disclaimer for customer-specific functional safety circuits

DCS880-A enclosed converters offer a wide variety of functional safety (FS) circuits (+Q951, +Q952, +Q963, +Q964, +Q957) and combinations of these.

These options have been thoroughly developed and tested. They are built according to the machine directive (CE marking) and have been approved by 3rd party FS authority (TÜV Süd). Any modification of the circuit will void the FS approval. If nevertheless a customer decides to use different FS circuits or functions which are NOT according to the standard configurations, we will implement that under following pre-conditions:

- Customer-specific FS circuits are not approved and will not be tested during the factory development process.
- Customer-specific FS circuits are not part of the routine test of the DCS880 drive system. The customer needs to ensure proper testing after the delivery of the enclosed converters on site.
- FS of the DCS880-A enclosed converter and the drive system/machine is in customer's responsibility.
- The customer will prepare a component list of the customer-specific FS circuit.
- The customer will prepare circuit diagrams of the customer-specific FS circuit.
- The customer will prepare a routine test specification for the customer-specific FS circuit.
- The customer specific circuit diagrams must be implemented into the project. The customer has to approve the DCS880-A enclosed converters circuit diagrams and their implementation. Any delay of approval will delay the delivery date.
- The use of the customer-specific FS circuit is at customer's own risk. Full responsibility and legal liability for the FS circuit is up to the customer. The factory declines any responsibility.
- The factory delivers only standard manuals with standard test instructions (acceptance test) and the FS calculation of the standard circuit. The customer must adapt these documents to comply with the FS standards. Any changes to the FS circuits on site must be documented in the machine logbook.
- Actual costs will be charged (material, labor and engineering). A minimum fee as per price list applies.

I herewith declare, that I have read and understood above conditions and agree with them. I also acknowledge that the use of the customer-specific FS circuit is at customer's own risk. Full responsibility and legal liability for the FS circuit is up to the customer.

### Please fill in:

Company name and legal address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name, position: \_\_\_\_\_

Date, place: \_\_\_\_\_

Signature: \_\_\_\_\_

## Type code

Type code:

DCS880 - A02 - 0025 - 04 X 2 + XXXX

### Product series

DCS880 = DC converter

### Product type

A0 = Standard single cabinet

A5 = Incoming or Empty cabinet ②

A8 = Hydrogen cabinet

### Bridge type

0 = no bridge

1 = Single bridge (1-Q/2-Q)

2 = anti-parallel bridges (4-Q)

### Module type

Rated DC current (IP00)

### Incoming rated AC current

0, 1000, 2000, 3000, 4000 A<sub>AC</sub> ②

### Rated AC voltage

04 = 100 ... 415 V<sub>AC</sub>

05 = 100 ... 525 V<sub>AC</sub>

06 = 270 ... 600 V<sub>AC</sub>

07 = 315 ... 690 V<sub>AC</sub>

08 = 360 ... 800 V<sub>AC</sub>

10 = 450 ... 990 V<sub>AC</sub>

12 = 540 ... 1190 V<sub>AC</sub>

### Power connection

X = Standard (H1 ... H6)

R = Right side (H7/H8/H8T)

L = Left side (H7/H8/ H8T)

P = Hard-parallel H8

C = Crane design (H6)

O = Pure cable connection

A = Air circuit breaker

S = Isolation switch

H = Horizontal busbar terminal

E = EMC filter

1 = 1000 mm width

2 = 200 mm width

4 = 400 mm width

6 = 600 mm width

8 = 800 mm width

Drive / Converter ①

Drive / Converter ①

Drive / Converter ①

Drive / Converter ①

Drive ①

Incoming ②

Incoming ②

Incoming ②

Incoming ②

Incoming ②

Empty cabinet ②

Empty cabinet ②

Empty cabinet ②

Empty cabinet ②

Empty cabinet ②

### Busbar System

1 = Single drive / converter, no horizontal busbars

2 = Group drive / converter, horizontal busbar supply

### Option

Universal Plus code table of DC Drives see 3ADT060018

① Single and group drive / converter  
② Incoming or Empty cabinet



## Plus codes

Option	Description
05163	No OnBoard field exciter
05775	W/o ACB for D6/H7 (2050 A ... 3000 A) 500 V ... 690 V
B054	IP42 (air inlet filter)
B055	IP54
C129	Built according to UL/CSA standard
C130	Air outlet duct connection
C160	Back to back cabinet alignment
F259	Earthing switch - only for incoming units
F291	Fuses in DC output
G300	Anticondensation heater
G301	Cabinet lighting
G304	Transformer T2 and Hardware I/O set to 115 V <sub>AC</sub>
G307	Terminals for 230 V aux. supply
G312	Tin plated busbars (inside the module for >350 A <sub>DC</sub> and ≤1000 A <sub>DC</sub> )
G324	Plug socket (USA standard); interface to external UPS
G331	E-Stop push button in door (Red)
G332	Electrical disconnect push button on door (Black)
G334	1 x AC volt meter with phase selector switch (DCS880-A50)
G335	3 x current meter incl. current transformer (DCS880-A50)
G336	Arc monitoring, TVOC
G341	Cable markings, class B1
G392	Fault pilot light (red)
G429	Interface to external UPS
H351	AC top connection for cabinets - cable connection
H353	DC top connection for cabinets - cable connection
H355	AC top connection for cabinets - busbar connection
H356	DC top connection for cabinets - busbar connection
H362	DC top connection for cables - 400 mm additional connection cabinet
J429	Control bluetooth panel ACS-AP-W, instead of ACS-AP-I
K451	FDNA-01, DeviceNet fieldbus adapter
K454	FPBA-01, Profibus DP-Vx fieldbus adapter
K457	FCAN-01, CANopen fieldbus adapter
K458	FSCA-01, Modbus RTU fieldbus adapter
K469	FECA-01, EtherCAT fieldbus adapter
K470	FEPL-02, Ethernet POWERLINK fieldbus adapter
K475	FENA-21, Two-port adapter - Ethernet/IP, Modbus TCP, Profinet IO
K480	Ethernet switch - 8 ports
K484	NETA-21, requires Ethernet interface for the drive
K490	FEIP-21, Two-port Ethernet/IP fieldbus adapter
K491	FMBT-21, Two-port Modbus/TCP fieldbus adapter
K492	FPNO-21, Two-port Profinet IO fieldbus adapter
L500	FIO-11, Analog I/O extension adapter (3 x AI / 1 x AO / 2 x DIO)
L501	FIO-01, Digital I/O extension adapter (4 x DIO / 2 x RO)
L502	FEN-31, HTL encoder interface
L503	FDCO-01, DDCS communication 10/10 MBd
L504	OnBoard encoder terminal block
L505	PTC thermistor relay
L506	1 x PT100 relay
2L506	2 x PT100 relay
3L506	3 x PT100 relay
L512	1 x FDIO + FEA-03 extension (bottom left) + FDCO
L515	FEA-03, F-extension adapter for 2 additional slots
L516	FEN-21, Resolver interface
L517	FEN-01, TTL encoder interface
L525	FAIO-01, Analog I/O extension adapter (2 x AI / 2 x AO)
L526	FDIO-01, Digital I/O extension adapter (3 x DI 24 V <sub>DC</sub> or 230 V <sub>AC</sub> / 2 x RO)
L529	PT100 interface on FAIO dual channel
M600	1 ... 1.6 A Starter for motor fan
M601	1.6 ... 2.5 A Starter for motor fan
M604	7.6 ... 10.0 A Starter for motor fan
M633	Supply terminals for motor fan starter
M638	2.3 ... 3.1 A Starter for motor fan
M639	3.1 ... 4.2 A Starter for motor fan
M640	4.2 ... 5.7 A Starter for motor fan
M641	5.7 ... 7.6 A Starter for motor fan
M650	10 ... 13.0 A Starter for motor fan
M651	13.0 ... 16.0 A Starter for motor fan
M652	16.0 ... 20.0 A Starter for motor fan
M653	20.0 ... 24.0 A Starter for motor fan
M659	Starter unknown (400 V ... 690 V)
P902	Customized options basic fee
P904	Extended warranty 24/30
P909	Extended warranty 30/42
P912	Seaworthy packaging

Option	Description
Q951	Emergency stop cat. 0 with opening the main contactor
Q952	Emergency stop cat. 1 with opening the main contactor
Q954	Insulation monitor inside for IT net (isolated mains)
Q956	STO reset button in door
Q957	Prevention of unexpected start-up according EN ISO 14118
Q963	Emergency stop cat. 0 without opening the mains contactor
Q964	Emergency stop cat. 1 without opening the mains contactor
Q986	FSPS-21, Two-port Profisafe fieldbus adapter
S164	FEX-425-INT no transformer
S175	SDCS-CMA-02, Current measurement
S186	SCDC-SUB-4, Voltage measurement adaptation board
S521	SDCS-DSL-H10 (1 x DSL)
S523	SDCS-DSL-H14 (1 x DSL / 4 x optical powerlink)
S551	Memory unit incl. IEC prog. licence (DCS880)
S604	1 x DC/DC transducer 4/20 mA / 0-10 V
2S604	2 x DC/DC transducer 4/20 mA / 0-10 V
S610...	T8 fan auto transformer option
S612	
S615...	Auto transformer T3.0 x 400 ... 500 V <sub>AC</sub>
S618	
S620...	Auto transformer T3.1 x 525 ... 690 V <sub>AC</sub>
S624	
S650	External field supply - supply terminals for customer
S651	External aux. supply - supply terminals for customer
S705	Door key lock, safety key
S711	DCF803-0016 exciter 1Q-16 A
S713	DCF803-0035 exciter 1Q-35 A
S715	DCF803-0050 exciter 1Q-50 A
S716	DCF803-0060 exciter 1Q-60 A
S718	DCF804-0050 exciter 4Q-50 A
S719	DCF804-0060 exciter 4Q-60 A
S721	Mounting fee for 1-ph autotransformer
S728	DCS880-S01-0090-05X0 for 84 A <sub>DC</sub> field
S729	DCS880-S01-0270-05X0 for 160 A <sub>DC</sub> field
S730	DCS880-S01-0315-05X0 for 285 A <sub>DC</sub> field
S739	DCS880-S02-0100-05X0 for 90 A <sub>DC</sub> field
S740	DCS880-S02-0300-05X0 for 180 A <sub>DC</sub> field
S741	DCS880-S02-0350-05X0 for 300 A <sub>DC</sub> field
S745	As Idc stand-alone field exciter (90 ... 520 A)
S751	Cabinet configuration for DCS880-A parallel, H7 ... H8P
S752	Cabinet configuration for DCS880-A serial/sequent. H7 ... H8P
S755	"Emergency short circuit busbar for DCS880-A, 12-pulse serial/sequent. H8"
S773	ACB E4.2 for H8 3300 ... 4800 A
S774	ACB E6.2 for H8 5200 A
S776	3rd additional meter
S777	Armature current- and volt-meter
S779	DCS880 Control panel door mounted
S780	Bottom plate
S781	Gland plate and bottom plate
S782	NDBU95 branching unit
S783	ND17 line choke positioning below breaker - 2200 A <sub>DC</sub> (size H7)
S785	Second single phase field exciter
S790	Plug socket (german standard)
S798	Galvanic isolation for voltage measurement
S799	Crane: contactor plus T <sub>max</sub>
S800	Cabinet depth 800 mm
S818	Joining cabinet KIT - Connection for horizontal busbars
S820...	Horizontal AC busbars, 1000 A <sub>AC</sub> ... 3000 A <sub>AC</sub> , copper
S823	
S825...	Horizontal AC busbars, 1000 A <sub>AC</sub> ... 3000 A <sub>AC</sub> , tin plated
S827	
S870	ACB Emax next to module (size H7)
S925	Terminal X25 for safety options in group drive incl. Engineering fee
S926	Safety transmitter - group drive
S927	Safety receiver - group drive
S958	Emergency stop control circuit
S990	Recommended spare part list
S991	Mechanical drawings as layout (2D AUTOCAD - DWG format)
S992	Visual inspection in the factory - FAT
S993	Function test for 12-pulse configurations
S994	Circuit diagrams - EPLAN format

An extended List of all plus codes with explanation is available in DCS880, DCT880 and DCS800 [plus code list](#).



## Appendix

<b>Project name</b>	_____	<b>Drive name</b>	_____
Converter type DCS880-A0	_____		
U1 - Mains circuit supply voltage	_____ V	U <sub>AUX</sub> - Auxiliary supply voltage	_____ V
U2 - Motor voltage	_____ V <sub>DC</sub>	I2 - Motor current	_____ A <sub>DC</sub>
U3 - Field exciter supply voltage	_____ V <sub>DC</sub>	I3 - Field current	_____ A <sub>DC</sub>
U6 - Motor fan supply voltage	_____ V <sub>DC</sub>	U8 - Module fan supply voltage	_____ V

Single drive ☐ Group drive ☐ IEC ☐ UL 61800-5-1 ☐ CSA 22.2 No.274-17 ☐

Description	Plus code	H1	H4	H6	H7	H8	H8P	Inc.	E.C.	Crane
<b>Protection class</b>										
IP42 (air inlet filter)	B054	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IP54 - Roof with forced-ventilation	B055	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>		<input type="checkbox"/>
<b>Application miscellaneous</b>										
Fuses in DC output for 4Q drives (e.g. P&P standard)	F291	<input type="checkbox"/>								
<b>Accessories &amp; electrical options</b>										
As stand-alone field exciter DCS880-A cabinet with OVP DCF506 + incl DCSLink board	S745	<input type="checkbox"/>								
Anticondensation heater to be supplied by customer with 230 V	G300	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cabinet lighting Rittal fluorescent; to be supplied by customer with 230 V	G301	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interface to external UPS Wired to terminals; 230 V input (orange cable acc IEC)	G429	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
Ethernet switch with 8 ports spider 8TX	K480	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NDBU95 branching unit DDCS network	S782	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plug socket (german standard) separate 230 V customer supply	S790	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Plug socket (USA standard); interface to external UPS separate 115 V customer supply	G324	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
Aux. supply voltage (T2) adapted to 115 V	G304	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External supply terminals for aux. supply	S651	<input type="checkbox"/>	<input type="checkbox"/>							<input type="checkbox"/>
<b>Mechanical</b>										
Tin-plated busbars (inside the module for >350 A <sub>DC</sub> )	G312	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bottom plate without holes; holes drilled by customer	S780	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gland plate and bottom plate required for IP41/42	S781	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Back to back cabinet alignment (IP 42 required)	C160				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Top Entry AC (CABLE)	H351	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		(□)		<input type="checkbox"/>
Top Exit DC (CABLE)	H353				<input type="checkbox"/>	<input type="checkbox"/>				
Top Entry AC (Busbars)	H355				<input type="checkbox"/>	<input type="checkbox"/>		(□)		
Top Exit DC (Busbars)	H356				<input type="checkbox"/>	<input type="checkbox"/>				
Top Exit DC (CABLE) + additional 400 mm connection - (DC) cabinet	H353	<input type="checkbox"/>	<input type="checkbox"/>							<input type="checkbox"/>
	+H362									
Top Entry AC (CABLE) + Cabinet depth 800 mm	H351		<input type="checkbox"/>							
	+S800									
Cabinet depth 800 mm	S800	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
Joining cabinet kit	S818								<input type="checkbox"/>	
<b>Field exciter and accessories</b>										
H1 ... H4 OnBoard exciter included			■							
External supply terminals for field exciter	S650	<input type="checkbox"/>	<input type="checkbox"/>							<input type="checkbox"/>
Fex-425 intern 1 ... 25 A Internal for size H6 three or single phase	S164		<input type="checkbox"/>							<input type="checkbox"/>
DCF803-0016 exciter 1Q ... 16 A for size H1 ... H8 three or single phase	S711	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
DCF803-0035 exciter 1Q ... 35 A for size H1 ... H8 three or single phase	S713	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
DCF803-0050 exciter 1Q ... 50 A for size H1 ... H8 single phase	S715	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
DCF803-0060 exciter 1Q ... 60 A for size H1 ... H8 single phase	S716	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
DCF804-0050 exciter 4Q ... 50 A Field reversal for size H6 ... H8 single phase	S718	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
DCF804-0060 exciter 4Q ... 60 A Field reversal for size H6 ... H8 single phase	S719	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Autotransformer single phase T3.0x AC input 400 V ... 500 V	S615	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
	... S618									
Autotransformer single phase T3.1x AC input 525 V ... 690 V	S620	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
	... S624									
<b>H7, H8 DCS880 large exciter</b>										
DCS880-S01-0090 for 84 A <sub>DC</sub> 2Q, 500 V no transformer	S728				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
DCS880-S01-0270 for 160 A <sub>DC</sub> 2Q, 500 V no transformer	S729				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
DCS880-S01-0315 for 285 A <sub>DC</sub> 2Q, 500 V no transformer	S730				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
DCS880-S02-0100 for 90 A <sub>DC</sub> 4Q, 500 V no transformer	S739				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
DCS880-S02-0300 for 180 A <sub>DC</sub> 4Q, 500 V no transformer	S740				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
DCS880-S02-0350 for 300 A <sub>DC</sub> 4Q, 500 V no transformer	S741				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
<b>Fieldbus adapter / interface (max 2)</b>										
FCAN-01 CANopen fieldbus adapter (built in)	K457	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FDNA-01 DeviceNet fieldbus adapter (built in)	K451	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FECA-01 EtherCAT fieldbus adapter (built in)	K469	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FENA-21 Two-port Ethernet adapter: Ethernet/IP; Modbus TCP; PROFINET IO; (built in)	K475	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>

Description	Plus code	H1 ...	H4	H6	H7	H8	H8P	Inc.	E.C.	Crane
Two-Port EtherNet/IP Adapter	K490	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FMBT-21 Two-Port Modbus/TCP Adapter	K491	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FPNO-21 Two-Port PROFINET IO Adapter	K492	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FEPL-02 Ethernet POWERLINK fieldbus adapter (built in)	K470	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FPBA-01 PROFIBUS DP-Vx fieldbus adapter (built in)	K454	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FSCA-01 Modbus RTU fieldbus adapter (built in)	K458	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
<b>Functional safety modules</b>										
FSPS-21 PROFISAFE adapter (built in)	Q986	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
<b>I/O Option</b>										
FIO-01 Digital I/O extension: 4 x DIO; 2 x RO (built in)	L501	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FIO-11 Analog I/O extension: 3 x AI; 1 x AO; 2 x DIO (built in)	L500	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FAIO-01 Analog I/O extension 2: 2 x AI; 2 x AO (built in)	L525	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FDIO-01 Digital I/O extension 2: 3 x DI 24 V <sub>DC</sub> or 110 V/ 230 V <sub>AC</sub> + 2 x RO	L526	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FEN-01 TTL Encoder Interface TTL Encoder Interface	L517	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FEN-21 Resolver Interface Resolver Interface	L516	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FEN-31 HTL Encoder Interface HTL Encoder Interface	L502	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
OnBoard encoder terminal block Cable extension to XENC bottom left	L504	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
115 V; 230 V (24 V) extra 3 x digital input 1 x FDIO + FEA extension (bottom left) + FDCO	L512	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FEA-03 F-extension adapter, 2 x slot	L515	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
FDCO-01, DDCS communication 10/10 MBd Optical DDCS communication 10/10 MBd	L503	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
PT100 interface on FAIO dual channel Use free slot of L512 bottom left	L529	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
SDCS-DSL-H10 (1 x DSL) Peer-to-Peer interface for DCSLink; (already included in H5 ... H8)	S521	<input type="checkbox"/>								
DC/DC transducer 4 ... 20 mA / 0 ... 10 V	S604	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
<b>Memory unit</b>										
Memory unit incl. IEC prog. licence (DCS880) "Programming licence pre-loaded (built in) not in combination with other application software"	S551	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
DCC crane software	S214									<input type="checkbox"/>
<b>Door accessories</b>										
Door key lock, safety key Price per door, not complete converter	S705	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Additional third meter on cabinet door	S706	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Armature current and voltmeter Installed on (control) cabinet door	S776	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
1 x AC voltmeter with phase selector switch Incoming option	S777	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
3 x current meter incl current transformer Incoming option	G392	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Fault pilot light (red) e.g. E-Stop, tripped, ...	S779	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Red E-stop button in door (E-stop control from remote)	G331	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Electrical disconnect push button on door (Black) Push button black latching, turn to release	G332	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Red E-stop button in door (E-Stop control from local)	S331	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
STO reset button in door - Automatic restart is not allowed	Q956	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
<b>Monitoring</b>										
NETA-21 Ethernet interface on drive required	K484	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PT100 relay ABB CM-TCS.13S, 1 x channel (0 ... 200°)	L506	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
PTC thermistor relay ABB CM-MSS.23S, 1 x channel										
Insulation monitor inside for IT net (isolated mains) Bender ISO-685, incl. detection and alarm circuit	Q954		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
<b>POUS single + group drive</b>										
Prevention of unexpected start-up according EN 60204-1 STO including indication lamp in door	Q957	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Single drive functional safety</b>										
Emergency Stop cat. 0 with opening the Main contactor STO (coast stop)	Q951	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Emergency Stop cat. 1 with opening the Main contactor SS1-t (ramp stop+STO)	Q952	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Emergency Stop cat. 0 without opening the Main contactor STO (coast stop)	Q963	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Emergency Stop cat. 1 without opening the Main contactor SS1-t (ramp stop+STO)	Q964	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Emergency stop control circuit According customer specification, no approval	S958	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
<b>Group drive &amp; master-follower functional safety options</b>										
Terminal X25 for Safety Options in Group drive incl. engineering fee interface for common SS1-t and STO command+ feedback loop	S925	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
<b>Starter for motor fan (max one)</b>										
External supply terminals for motor fan starter	M633	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
1 ... 1.6 A Starter (IEC) 1 pc for one motor fan; 400 V ... 690 V	M600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
1.6 ... 2.5 A Starter 1 pc for one motor fan; 400 V ... 690 V	M601	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
2.3 ... 3.1 A Starter 1 pc for one motor fan; 400 V ... 690 V	M638	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
3.1 ... 4.2 A Starter 1 pc for one motor fan; 400 V ... 690 V	M639	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
4.2 ... 5.7 A Starter 1 pc for one motor fan; 400 V ... 690 V	M640	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
5.7 ... 7.6 A Starter 1 pc for one motor fan; 400 V ... 690 V	M641	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
7.6 ... 10.0 A Starter 1 pc for one motor fan; 400 V ... 690 V	M604	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>

Description	Plus code	H1 ...	H4	H6	H7	H8	H8P	Inc.	E.C.	Crane
10 ... 13.0 A Starter 1 pc for one motor fan; 400 V ... 690 V	M650	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
13.0 ... 16.0 A Starter 1 pc for one motor fan; 400 V ... 690 V	M651	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
16.0 ... 20.0 A Starter 1 pc for one motor fan; 400 V ... 690 V	M652	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
20.0 ... 24.0 A Starter 1 pc for one motor fan; 400 V ... 690 V	M653	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
<b>Group drive options</b>										
Horizontal AC busbars, 1000 A <sub>AC</sub> , Copper Group drives connection with Incomer	S820	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horizontal AC busbars, 2000 A <sub>AC</sub> , Copper Group drives connection with Incomer	S821	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horizontal AC busbars, 3000 A <sub>AC</sub> , Copper Group drives connection with Incomer	S823	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horizontal AC busbars, 1000 A <sub>AC</sub> , tin plated Group drives connection with Incomer	S825	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horizontal AC busbars, 2000 A <sub>AC</sub> , tin plated Group drives connection with Incomer	S826	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horizontal AC busbars, 3000 A <sub>AC</sub> , tin plated Group drives connection with Incomer	S827	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>POUS single + group drive, Incoming + empty cabinet DCS880 A05 ...</b>										
Prevention of unexpected start-up according EN 60204-1 STO including indication lamp in door	Q957	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Engineered</b>										
Customized options basic fee (ETO - Engineered to order)	P902	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Documentation Options

Description	Plus code	available
Bill of materials - PDF Format		■
Layout Drawings - mechanical dimensions - PDF Format		■
Circuit Diagrams - PDF Format		■
Partlist of electrical components as EXCEL file	S990	<input type="checkbox"/>
Mechanical Drawings as layout - 2D AUTOCAD - DWG Format	S991	<input type="checkbox"/>
Circuit Diagrams - EPLAN Format	S994	<input type="checkbox"/>

- standard
- ☐ available option
- ☐ option partly available

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