

SIEMENS

SIMOREG DC-MASTER Converter Commutation Protector (SIMOREG CCP)

Operating Instructions



Unit software version:

When these operating instructions went to print, SIMOREG CCP units were being supplied from the factory with software release 1.2.

When using a SIMOREG DC-MASTER as basic converter unit:

The SIMOREG DC-MASTER must have software release 2.2 or higher.

The software release of the SIMOREG DC-MASTER can be read-out at parameters r060 and r065, the software release of the associated SIMOREG CCP can be read-out at parameter n560.

When using a SINAMICS DCM as basic converter unit:

The SINAMICS DCM must have software release 1201400 or higher.

The software release of the SINAMICS DCM can be read-out at parameter r50060[6], the software release of the associated SIMOREG CCP can be read-out at parameter r51560[0].

The latest software release for the SIMOREG CCP is available on the Internet page

<http://support.automation.siemens.com/WW/view/de/19847387/133100>

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1 Notes

Legal notes

Warning concept

This manual contains information that you should observe to ensure your own personal safety as well as to avoid material damage. The notes referring to your personal safety are highlighted in the manual by a triangular safety alert symbol; notices referring to property damage only have no safety alert symbol. Depending on the hazard level, warnings are displayed in descending order as follows.

DANGER

Indicates that death or serious injury **will** result if the appropriate precautionary measures are not taken.

WARNING

Indicates that death or serious injury **can** result if the appropriate precautionary measures are not taken.

CAUTION

with a triangular safety alert symbol indicates that minor personal injury can result if the appropriate precautionary measures are not taken.

CAUTION

without a triangular safety alert symbol indicates that property damage may result if the appropriate precautionary measures are not taken.

NOTICE

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

In the event of a number of levels of danger occurring simultaneously, the warning corresponding to the highest level of danger is always used. A warning with a triangular safety alert symbol indicating possible injury to personnel may also include a warning relating to property damage.

Qualified personnel

The product/system that belongs to this documentation may be operated only by **personnel qualified** for the associated task while observing the appropriate documentation for the associated task, in particular, the safety and warning notes provided in the documentation. Because of their training and experience, qualified personnel can recognize any risks involved with handling these products/systems and avoid any possible dangers.

Correct usage of Siemens products

Note the following:

WARNING

Siemens products are only permitted to be used for the applications listed in the catalog and in the associated technical documentation. If third-party products and components are used, they must be recommended or approved by Siemens. These products can only function correctly and safely if they are transported, stored, set up, mounted, installed, commissioned, operated and maintained correctly. The permissible ambient conditions must be adhered to. Notes in the relevant documentation must be observed.

Trademarks

All names appearing with the registered trademark sign ® are registered trademarks of Siemens AG. Other product names used in this documentation may be trademarks which, if used by third parties, could infringe the rights of their owners.

Disclaimer of liability

We have checked that the contents of this publication correspond to the hardware and software described here. However, since deviations cannot be entirely precluded, we cannot guarantee full conformance. The information given in this publication is reviewed at regular intervals and any corrections that might be necessary are made in the subsequent editions.

1.1 Warning notes

Note

In the interests of clarity, these operating instructions do not contain full details of all information for all product types and cannot take into account every possible aspect of installation, operation, or maintenance.

If you require further information, or problems arise, which these operating instructions do not cover in enough detail, please contact your local Siemens office.

Furthermore, the contents of these operating instructions shall not become a part of or modify any prior or existing agreement, commitment, or legal relationship. The Purchase Agreement contains the complete and exclusive obligations of Siemens, including the warranty provisions. Any statements contained in these operating instructions neither expand nor restrict the scope of these contractual warranty conditions.



WARNING

This unit is at a hazardous voltage level and contains dangerous rotating machine parts (fans). Failure to comply with these operating instructions can lead to death, serious physical injury and material damage.

Only qualified personnel who are familiar with all the safety instructions provided in these operating instructions, as well as the assembly, operating, and maintenance instructions, should carry out work on this unit.



WARNING

Only safety extra-low voltages (DVC A) that comply with EN 60204-1 may be connected to all of the connections and terminals between 0 and 48 V.

 DANGER

When this unit is operated, it is inevitable that certain components will be subject to dangerous voltage levels. Touching these components may lead to serious physical injury or even death. The following precautions should be taken in order to reduce the risk to life and limb.

1. Only qualified personnel who are familiar with this unit and the information supplied with it should work on the unit involving installation, operation, troubleshooting and fault rectification, or repair.
2. The unit must be installed in compliance with the relevant safety regulations (e.g. EN, DIN, VDE) as well as all of the other relevant national or local regulations. Grounding, conductor dimensioning, and the appropriate short-circuit protection measures must be carried out correctly in order to ensure operational safety.
3. The unit must be operated with all covers supplied.
4. Before carrying out visual inspections and maintenance work, ensure that the unit is disconnected from the supply voltage and locked-out. Before they are shut down, both the converter unit and the motor are at dangerous voltage levels. These hazardous voltages may be present even when the converter unit line contactor is open.
5. If measurements need to be taken while the power supply is switched on, under absolutely no circumstances touch the electrical connection points. Remove all jewelry from wrists and fingers. Make sure that the measuring and test equipment is in good condition and is safe to operate.
6. When working on a unit that is switched on and on an insulated surface, make sure that no grounding has been put in place.
7. Follow these operating instructions precisely and observe all notes concerning hazards, warnings, or areas where caution is required.
8. This list is not exhaustive and as such cannot outline all the measures required in order to operate the unit safely. Should you require further information or encounter specific problems which have not been handled in enough detail for the purposes of the buyer, please contact your local Siemens office.

CAUTION

Operating the unit in the immediate vicinity (< 1.5 m) of mobile telephones with a transmitter power of > 1 W may lead to incorrect operation of the unit.

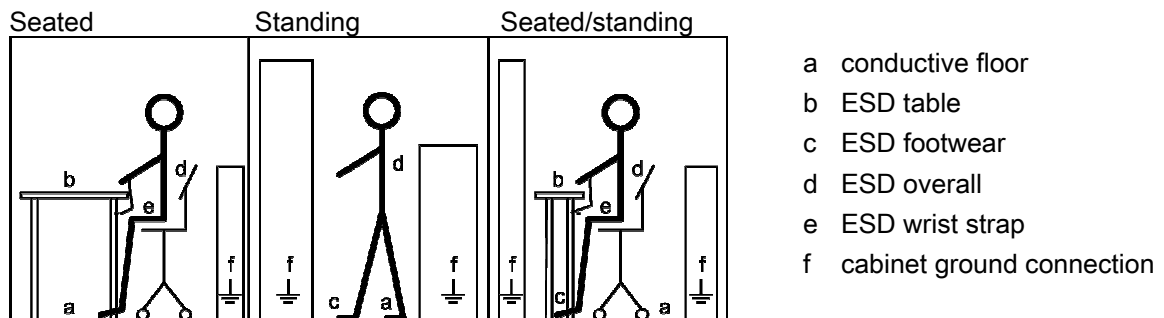
1.2 Electrostatic sensitive devices (ESD)

CAUTION

The electronic boards contain electrostatic sensitive devices. These components can be easily destroyed if not handled correctly. Observe the following notes if you nevertheless have to work with electronic modules:

- You should only touch electronic modules if absolutely necessary.
- If you do have to touch modules, your body must be electrically discharged first.
- Modules must not be brought into contact with highly insulating materials, e.g. plastic foils, insulated tabletops, or clothing made from synthetic fibers.
- Modules may be set down only on conducting work surfaces.
- Modules and components should only be stored and transported in conductive packaging (such as metalized plastic boxes or metal containers).
- If the packaging material is not conductive, the modules must be wrapped with a conductive packaging material, such as conductive foam rubber or household aluminum foil, prior to placing them in the packaging.

The necessary ESD protective measures are illustrated once again in the following diagram:



2 Type spectrum, ordering information

2.1 Units - order numbers

Unit	Rated current	Rated voltage	Current range that can be covered	Order No. (MLFB)
SIMOREG CCP 600 A / 460 V	600 A	460 V	to 600 A	6RA7085-6FC00-0
SIMOREG CCP 1200 A / 460 V	1200 A	460 V	to 1200 A	6RA7091-6FC00-0
SIMOREG CCP 1000 A / 690 V	1000 A	690 V	to 1000 A	6RA7090-6KC00-0
SIMOREG CCP 2000 A / 460 V	2000 A	460 V	to 2000 A	6RA7095-6FC00-0
SIMOREG CCP 2000 A / 690 V	2000 A	690 V	to 2000 A	6RA7095-6KC00-0

2.2 Ordering information for options and accessories

Ordering options with order codes

6RA70... - 6...C00 - 0 - Z
 ... + ...
 ...

Order No. of the SIMOREG CCP with identifier Z

Order codes (additional) and/or

where necessary, plain text

Options:

Option	Order codes	Order No. (MLFB)
Printed operating instructions for Converter Commutation Protector SIMOREG CCP in German/English	D74	6RX1700-0DD74

Accessories:

Item	Order No. (MLFB)
Operating instructions for SIMOREG DC-MASTER and SIMOREG CCP and DriveMonitor in all of the available languages on CD-ROM	6RX1700-0AD64
Operating instructions for SINAMICS DCM and SIMOREG CCP in all of the available languages on DVD	6RX1800-0AD64
Operating instructions for SINAMICS DCM DC Converters in German English French Italian Russian Spanish	6RX1800-0AD00 6RX1800-0AD76 6RX1800-0AD77 6RX1800-0AD72 6RX1800-0AD56 6RX1800-0AD78
List Manual for SINAMICS DCM in German English French Italian Russian Spanish	6RX1800-0ED00 6RX1800-0ED76 6RX1800-0ED77 6RX1800-0ED72 6RX1800-0ED56 6RX1800-0ED78

Item	Order No. (MLFB)
Patch cable UTP CAT5 acc. to ANSI/EIA/TIA 568 Parallel cable for SIMOREG DC-MASTER 6RA70 / SINAMICS DCM and SIMOREG CCP approx. 5 m Connecting cable, pulse turn-off interface to the parallel SIMOREG CCP connection and Connecting cable, summed firing pulse interface to the SIMOREG DC-MASTER (CUD2) and Connecting cable "fast pulse cancellation interface" to SINAMICS DCM	6RY1707-0AA08
Fast pulse inhibit interface module (Firing Unit Trigger Board)	6RY1803-0CP00

2.3 Selecting a suitable SIMOREG CCP

The rated unit data (taking into account the relevant limit values) of the SIMOREG DC-MASTER or SINAMICS DCM and SIMOREG CCP components form the basis for the selection table.

2.3.1 Selection table for 4Q basic units

SIMOREG DC-MASTER		Converter Commutation Protector SIMOREG CCP 6RA70...				
Order No.	Rated DC voltage / DC current	..85-6FC00-0 460 V / to 600 A	..91-6FC00-0 460 V / to 1200 A	..90-6KC00-0 690 V / to 1000 A	..95-6FC00-0 460 V / to 2000 A	..95-6KC00-0 690 V / to 2000 A
6RA7013-6DV62-0	420 V / 15 A					
6RA7018-6DV62-0	420 V / 30 A					
6RA7025-6DV62-0	420 V / 60 A					
6RA7028-6DV62-0	420 V / 90 A					
6RA7031-6DV62-0	420 V / 125 A					
6RA7075-6DV62-0	420 V / 210 A					
6RA7078-6DV62-0	420 V / 280 A	x				
6RA7081-6DV62-0	420 V / 400 A	x				
6RA7085-6DV62-0	420 V / 600 A	x	x			
6RA7087-6DV62-0	420 V / 850 A		x			
6RA7091-6DV62-0	420 V / 1200 A		x		x	
6RA7093-4DV62-0	420 V / 1600 A				x	
6RA7095-4DV62-0	420 V / 2000 A				x	
6RA7098-4DV62-0	420 V / 3000 A					
6RA7018-6FV62-0	480 V / 30 A					
6RA7025-6FV62-0	480 V / 60 A					
6RA7028-6FV62-0	480 V / 90 A					
6RA7031-6FV62-0	480 V / 125 A					
6RA7075-6FV62-0	480 V / 210 A					
6RA7078-6FV62-0	480 V / 280 A	x				
6RA7082-6FV62-0	480 V / 450 A	x				
6RA7085-6FV62-0	480 V / 600 A	x	x			
6RA7087-6FV62-0	480 V / 850 A		x			
6RA7091-6FV62-0	480 V / 1200 A		x			
6RA7025-6GV62-0	600 V / 60 A					
6RA7031-6GV62-0	600 V / 125 A					
6RA7075-6GV62-0	600 V / 210 A					
6RA7081-6GV62-0	600 V / 400 A			x		
6RA7085-6GV62-0	600 V / 600 A			x		
6RA7087-6GV62-0	600 V / 850 A			x		
6RA7090-6GV62-0	600 V / 1100 A					x
6RA7093-4GV62-0	600 V / 1600 A					x
6RA7095-4GV62-0	600 V / 2000 A					x
6RA7096-4GV62-0	600 V / 2200 A					
6RA7097-4GV62-0	600 V / 2800 A					
6RA7086-6KV62-0	725 V / 760 A			x		
6RA7090-6KV62-0	725 V / 1000 A			x		x
6RA7093-4KV62-0	725 V / 1500 A					x
6RA7095-4KV62-0	725 V / 2000 A					x
6RA7097-4KV62-0	725 V / 2600 A					
6RA7088-6LV62-0	875 V / 950 A					
6RA7093-4LV62-0	875 V / 1500 A					
6RA7095-4LV62-0	875 V / 1900 A					
6RA7096-4MV62-0	1000 V / 2200 A					

x

= suitable

= not suitable (see note)

SINAMICS DCM		Converter Commutation Protector SIMOREG CCP 6RA70...				
Order No.	Rated DC voltage/DC current	..85-6FC00-0 460 V / to 600 A	..91-6FC00-0 460 V / to 1200 A	..90-6KC00-0 690 V / to 1000 A	..95-6FC00-0 460 V / to 2000 A	..95-6KC00-0 690 V / to 2000 A
6RA8013-6DV62-0AA0	420 V / 15 A					
6RA8018-6DV62-0AA0	420 V / 30 A					
6RA8025-6DV62-0AA0	420 V / 60 A					
6RA8028-6DV62-0AA0	420 V / 90 A					
6RA8031-6DV62-0AA0	420 V / 125 A					
6RA8075-6DV62-0AA0	420 V / 210 A					
6RA8078-6DV62-0AA0	420 V / 280 A	x				
6RA8081-6DV62-0AA0	420 V / 400 A	x				
6RA8085-6DV62-0AA0	420 V / 600 A	x	x			
6RA8087-6DV62-0AA0	420 V / 850 A		x			
6RA8091-6DV62-0AA0	420 V / 1200 A		x		x	
6RA8093-4DV62-0AA0	420 V / 1600 A				x	
6RA8095-4DV62-0AA0	420 V / 2000 A				x	
6RA8098-4DV62-0AA0	420 V / 3000 A					
6RA8013-6FV62-0AA0	500 V / 15 A					
6RA8018-6FV62-0AA0	500 V / 30 A					
6RA8025-6FV62-0AA0	500 V / 60 A					
6RA8028-6FV62-0AA0	500 V / 90 A					
6RA8031-6FV62-0AA0	500 V / 125 A					
6RA8075-6FV62-0AA0	500 V / 210 A					
6RA8078-6FV62-0AA0	500 V / 280 A	x				
6RA8082-6FV62-0AA0	500 V / 450 A	x				
6RA8085-6FV62-0AA0	500 V / 600 A	x	x			
6RA8087-6FV62-0AA0	500 V / 850 A		x			
6RA8091-6FV62-0AA0	500 V / 1200 A		x			
6RA8025-6GV62-0AA0	600 V / 60 A					
6RA8031-6GV62-0AA0	600 V / 125 A					
6RA8075-6GV62-0AA0	600 V / 210 A					
6RA8081-6GV62-0AA0	600 V / 400 A			x		
6RA8085-6GV62-0AA0	600 V / 600 A			x		
6RA8087-6GV62-0AA0	600 V / 850 A			x		
6RA8090-6GV62-0AA0	600 V / 1100 A					x
6RA8093-4GV62-0AA0	600 V / 1600 A					x
6RA8095-4GV62-0AA0	600 V / 2000 A					x
6RA8096-4GV62-0AA0	600 V / 2200 A					
6RA8097-4GV62-0AA0	600 V / 2800 A					
6RA8086-6KV62-0AA0	725 V / 760 A			x		
6RA8090-6KV62-0AA0	725 V / 1000 A			x		x
6RA8093-4KV62-0AA0	725 V / 1500 A					x
6RA8095-4KV62-0AA0	725 V / 2000 A					x
6RA8097-4KV62-0AA0	725 V / 2600 A					
6RA8088-6LV62-0AA0	875 V / 950 A					
6RA8093-4LV62-0AA0	875 V / 1500 A					
6RA8095-4LV62-0AA0	875 V / 1900 A					
6RA8096-4MV62-0AA0	1000 V / 2200 A					

x

= suitable

= not suitable (see note)

Note

For system configurations, with reduced rate values (e.g. DC rating, US rating, voltage derating), under certain circumstances, suitable combinations of units can be found that are not listed in the table.

2.3.2 Selection table for 2Q basic units

SIMOREG DC-MASTER		Converter Commutation Protector SIMOREG CCP 6RA70...				
Order No.	Rated DC voltage / DC current	..85-6FC00-0 460 V / to 600 A	..91-6FC00-0 460 V / to 1200 A	..90-6KC00-0 690 V / to 1000 A	..95-6FC00-0 460 V / to 2000 A	..95-6KC00-0 690 V / to 2000 A
6RA7018-6DS22-0	485 V / 30 A					
6RA7025-6DS22-0	485 V / 60 A					
6RA7028-6DS22-0	485 V / 90 A					
6RA7031-6DS22-0	485 V / 125 A					
6RA7075-6DS22-0	485 V / 210 A					
6RA7078-6DS22-0	485 V / 280 A	x				
6RA7081-6DS22-0	485 V / 400 A	x				
6RA7085-6DS22-0	485 V / 600 A	x	x			
6RA7087-6DS22-0	485 V / 850 A		x			
6RA7091-6DS22-0	485 V / 1200 A		x		x	
6RA7093-4DS22-0	485 V / 1600 A				x	
6RA7095-4DS22-0	485 V / 2000 A				x	
6RA7098-4DS22-0	485 V / 3000 A					
6RA7018-6FS22-0	550 V / 30 A					
6RA7025-6FS22-0	550 V / 60 A					
6RA7028-6FS22-0	550 V / 90 A					
6RA7031-6FS22-0	550 V / 125 A					
6RA7075-6FS22-0	550 V / 210 A					
6RA7078-6FS22-0	550 V / 280 A	x				
6RA7082-6FS22-0	550 V / 450 A	x				
6RA7085-6FS22-0	550 V / 600 A	x	x			
6RA7087-6FS22-0	550 V / 850 A		x			
6RA7091-6FS22-0	550 V / 1200 A		x			
6RA7025-6GS22-0	690 V / 60 A					
6RA7031-6GS22-0	690 V / 125 A					
6RA7075-6GS22-0	690 V / 210 A					
6RA7081-6GS22-0	690 V / 400 A			x		
6RA7085-6GS22-0	690 V / 600 A			x		
6RA7087-6GS22-0	690 V / 850 A			x		
6RA7090-6GS22-0	690 V / 1100 A					x
6RA7093-4GS22-0	690 V / 1600 A					x
6RA7095-4GS22-0	690 V / 2000 A					x
6RA7095-4GS22-5	690 V / 2000 A					x
6RA7096-4GS22-0	690 V / 2200 A					
6RA7096-4GS22-5	690 V / 2200 A					
6RA7097-4GS22-0	690 V / 2800 A					
6RA7086-6KS22-0	830 V / 720 A			x		
6RA7088-6KS22-0	830 V / 950 A			x		x
6RA7093-4KS22-0	830 V / 1500 A					x
6RA7095-4KS22-0	830 V / 2000 A					x
6RA7095-4KS22-5	830 V / 2000 A					x
6RA7097-4KS22-0	830 V / 2600 A					
6RA7088-6LS22-0	1000 V / 900 A					
6RA7093-4LS22-0	1000 V / 1500 A					
6RA7095-4LS22-0	1000 V / 1900 A					
6RA7095-4LS22-5	1000 V / 1900 A					
6RA7096-4MS22-0	1140 V / 2200 A					

x

= suitable

= not suitable (see note)

SINAMICS DCM		Converter Commutation Protector SIMOREG CCP 6RA70...				
Order No.	Rated DC voltage / DC current	..85-6FC00-0 460 V / to 600 A	..91-6FC00-0 460 V / to 1200 A	..90-6KC00-0 690 V / to 1000 A	..95-6FC00-0 460 V / to 2000 A	..95-6KC00-0 690 V / to 2000 A
6RA8025-6DS22-0AA0	485 V / 60 A					
6RA8028-6DS22-0AA0	485 V / 90 A					
6RA8031-6DS22-0AA0	485 V / 125 A					
6RA8075-6DS22-0AA0	485 V / 210 A					
6RA8078-6DS22-0AA0	485 V / 280 A	x				
6RA8081-6DS22-0AA0	485 V / 400 A	x				
6RA8085-6DS22-0AA0	485 V / 600 A	x	x			
6RA8087-6DS22-0AA0	485 V / 850 A		x			
6RA8091-6DS22-0AA0	485 V / 1200 A		x		x	
6RA8093-4DS22-0AA0	485 V / 1600 A				x	
6RA8095-4DS22-0AA0	485 V / 2000 A				x	
6RA8098-4DS22-0AA0	485 V / 3000 A					
6RA8025-6FS22-0AA0	575 V / 60 A					
6RA8028-6FS22-0AA0	575 V / 90 A					
6RA8031-6FS22-0AA0	575 V / 125 A					
6RA8075-6FS22-0AA0	575 V / 210 A					
6RA8078-6FS22-0AA0	575 V / 280 A	x				
6RA8082-6FS22-0AA0	575 V / 450 A	x				
6RA8085-6FS22-0AA0	575 V / 600 A	x	x			
6RA8087-6FS22-0AA0	575 V / 850 A		x			
6RA8091-6FS22-0AA0	575 V / 1200 A		x			
6RA8025-6GS22-0AA0	690 V / 60 A					
6RA8031-6GS22-0AA0	690 V / 125 A					
6RA8075-6GS22-0AA0	690 V / 210 A					
6RA8081-6GS22-0AA0	690 V / 400 A			x		
6RA8085-6GS22-0AA0	690 V / 600 A			x		
6RA8087-6GS22-0AA0	690 V / 800 A			x		
6RA8090-6GS22-0AA0	690 V / 1100 A					x
6RA8093-4GS22-0AA0	690 V / 1600 A					x
6RA8095-4GS22-0AA0	690 V / 2000 A					x
6RA8096-4GS22-0AA0	690 V / 2200 A					
6RA8097-4GS22-0AA0	690 V / 2800 A					
6RA8086-6KS22-0AA0	830 V / 720 A			x		
6RA8090-6KS22-0AA0	830 V / 1000 A			x		x
6RA8093-4KS22-0AA0	830 V / 1500 A					x
6RA8095-4KS22-0AA0	830 V / 2000 A					x
6RA8097-4KS22-0AA0	830 V / 2600 A					
6RA8088-6LS22-0AA0	1000 V / 950 A					
6RA8093-4LS22-0AA0	1000 V / 1500 A					
6RA8095-4LS22-0AA0	1000 V / 1900 A					
6RA8096-4MS22-0AA0	1140 V / 2200 A					

x

= suitable

= not suitable (see note)

Note

For system configurations, with reduced rate values (e.g. DC rating, US rating, voltage derating), under certain circumstances, suitable combinations of units can be found that are not listed in the table.

2.4 Rating plate, packaging label

SIMOREG DC-MASTER	
Converter Commutation Protector	
SIEMENS	
	
Bestellnr./Order No	1P 6RA70 . . - 6 - 0
	
Fabrik-Nr./Serial No	S Q6
Nennstrom/Rated Current	 A
Nennspannung/Rated Voltage	... V
Netzfrequenz/Frequency	50 / 60 Hz
Erz.-Stand/Prod State	A1
Kühlung/Cooling	S
	
MADE IN EU (AUSTRIA)	

... Barcode for MLFB

... For options, the MLFB is followed by a **-Z**

... Identifier for options (order-specific)

... Bar code, serial number (order-specific)

Rating plate

SIMOREG DC-MASTER	SIEMENS
Converter Commutation Protector	
6RA70 . . - 6 - 0	
	
1P 6RA70 . . - 6 - 0	QTY 1
	
S Q6	
	SW VERSION (Version) 1.0
Q	E-STATUS (Version) A1
MADE IN EU (AUSTRIA)	

... For options, after the MLFB is a **-Z**, followed by its identifier (order-specific)

Packaging label

3 Description, Technical Data

3.1 Description

Application

The SIMOREG DC-MASTER Converter Commutation Protector (SIMOREG CCP) is used to protect the semiconductor fuses of a line-commutated converter when operating in the inverter mode. When an inverter commutation fault occurs, a high current flows in the regenerative feedback direction via the line supply or a cross-current in the converter. SIMOREG CCP limits the current to a non-hazardous value so that the thyristors and the associated super-fast fuses are protected. This therefore eliminates the complex replacement of fuses that takes a considerable amount of time. Although it cannot prevent inverter commutation faults, it can provide protection against its effects.

Compatibility

The SIMOREG CCP is compatible to line-commutated SIMOREG DC-MASTER converters (from software release 2.2) and SINAMICS DCM (from software release 1.2). It can be used for converters connected in parallel.

Note

It is not possible to use the SIMOREG CCP for converters connected in series.

Mode of operation

The line supply voltage, line current and the armature voltage are continually sensed in the basic converter unit. These quantities are used to identify as to whether a commutation fault (inverter commutation fault) has occurred.

If this is the case, then the following occurs:

1. The firing pulses are immediately disabled in the SIMOREG DC-MASTER or SINAMICS DCM.
2. The basic converter unit sends a turn-off command to the SIMOREG CCP (via the serial interface)
3. SIMOREG CCP turns-off the thyristors by connecting the pre-charged quenching capacitors anti-parallel to all thyristors. As a consequence, the current commutates from the converter into SIMOREG CCP. The quenching capacitors are initially discharged by the current that has been commutated and then they are charged. The armature current starts to decrease as soon as the voltage of the quenching capacitors has reached the value of the motor EMF. However, the armature voltage continues to increase. As soon as it has reached the limit value, resistors are switched-in, which absorb the energy fed back from the motor during the remaining time of the current reduction phase.
4. A fault message is output in the basic converter unit (Fault F030 or F60030).
5. The SIMOREG CCP re-charges the quenching capacitors with the reverse polarity so that a new turn-off operation is possible.

Note

After the line supply voltage has been connected and after a quenching operation, wait and recovery times must be maintained, refer to the Technical data.

3.2 Technical data

Order No.	6RA70...	..85-6FC00-0	..91-6FC00-0	..90-6KC00-0	..95-6FC00-0	..95-6KC00-0
Rated voltage	460 V (+15% / -20%)	460 V (+15% / -20%)	690 V (+10% / -20%)	460 V (+15% / -20%)	690 V (+10% / -20%)	
Rated current	600 A	1200 A	1000 A	2000 A	2000 A	
current range that can be covered	to 600 A	to 1200 A	to 1000 A	to 2000 A	to 2000 A	
Rated supply voltage Electronics power supply	2 AC 380 V (-20 %) to 460 V (+15 %); $I_n=1$ A or 1 AC 190 V (-20 %) to 230 V (+15 %); $I_n=2$ A					
Rated frequency	45 to 65 Hz					
Power loss	100 W					
Ambient temperature	Operation: 0 to 55 °C storage, transport: -25 to +70 °C					
Installation altitude above sea level	≤ 2000 m without derating > 2000 m with voltage derating *)					
Environmental class	3K3 acc. to DIN IEC 60 721-3-3					
Pollution degree	2 acc. to EN50178 **)					
Degree of protection	IP00 acc. to DIN EN 60529					
Dimensions (W x H x D)	780 x 406 x 500 mm, dimension drawing, see Chapter 5.1					
Weight (approx.)	35 kg	35 kg	45 kg	55 kg	75 kg	
*) Voltage derating as a function of installation altitude: When supplying the electronics with voltages of 460 VAC phase to phase (maximum 300 VAC with respect to ground) operation is permitted up to 4500 m. A maximum of 400 VAC phase to phase (maximum 230 V AC with respect to ground) is permitted up to 5000 m. At higher altitudes or a higher voltage, there is no longer "safe electrical separation" - but only basic insulation. **) Definition, pollution degree 2: Normally, only non-conductive pollution occurs. However, occasionally conductive pollution can be expected for a short period of time if the electronic equipment is not operational.						

Wait time, recovery time:

Each time that the line supply voltage is connected (e.g. via a line contactor):

The quenching capacitors in the unit are charged.

The wait time until the SIMOREG CCP is ready, is **approx. 3 s**

After one quenching operation:

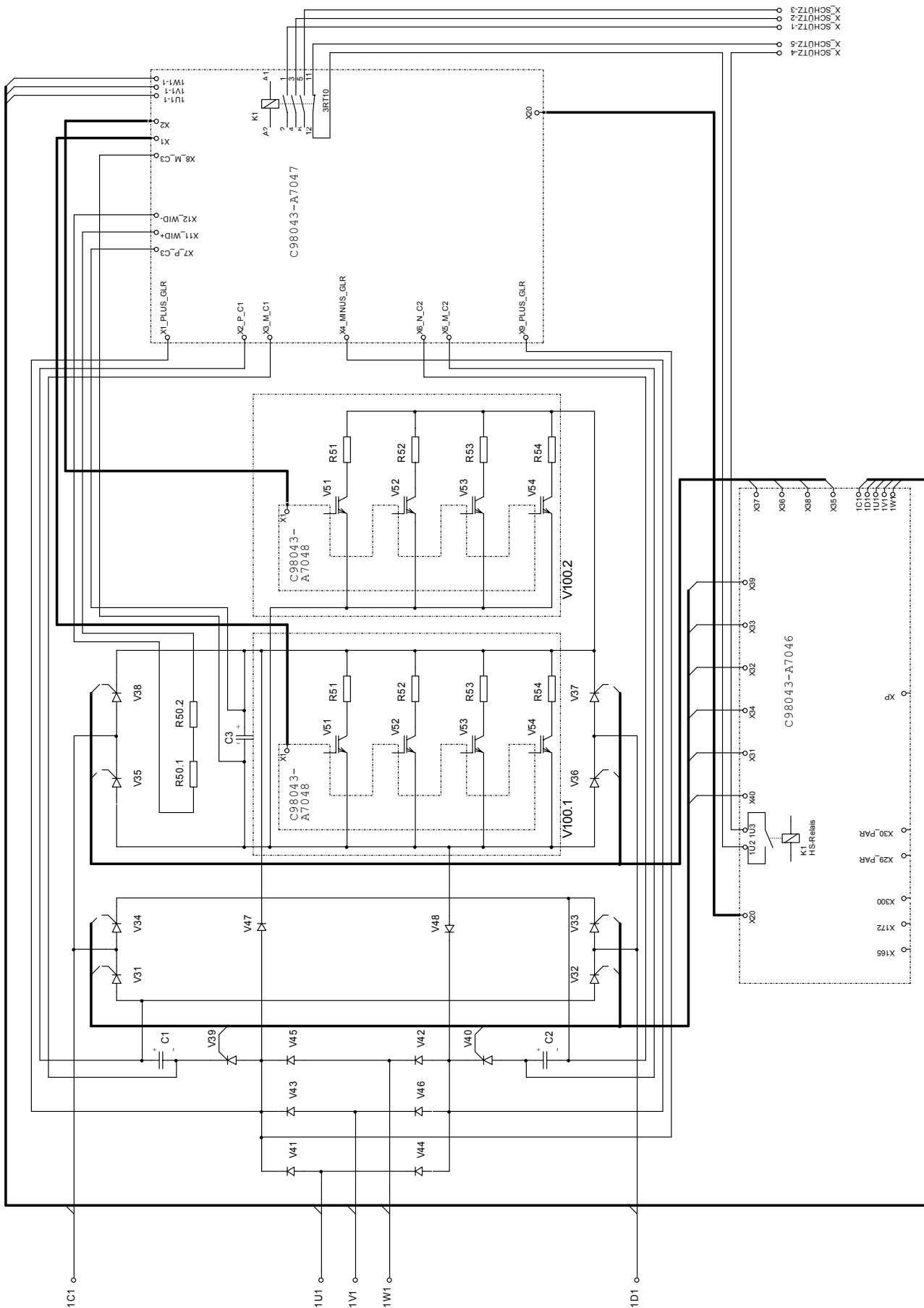
The time until the SIMOREG CCP is ready again depends on the operations during the quenching process and immediately afterwards.

The quenching capacitors in the SIMOREG CCP are again recharged to the required value, duration **approx. 10 s**.

The chopper resistors, which convert the energy into heat when the armature current is reduced, require a cooling time.

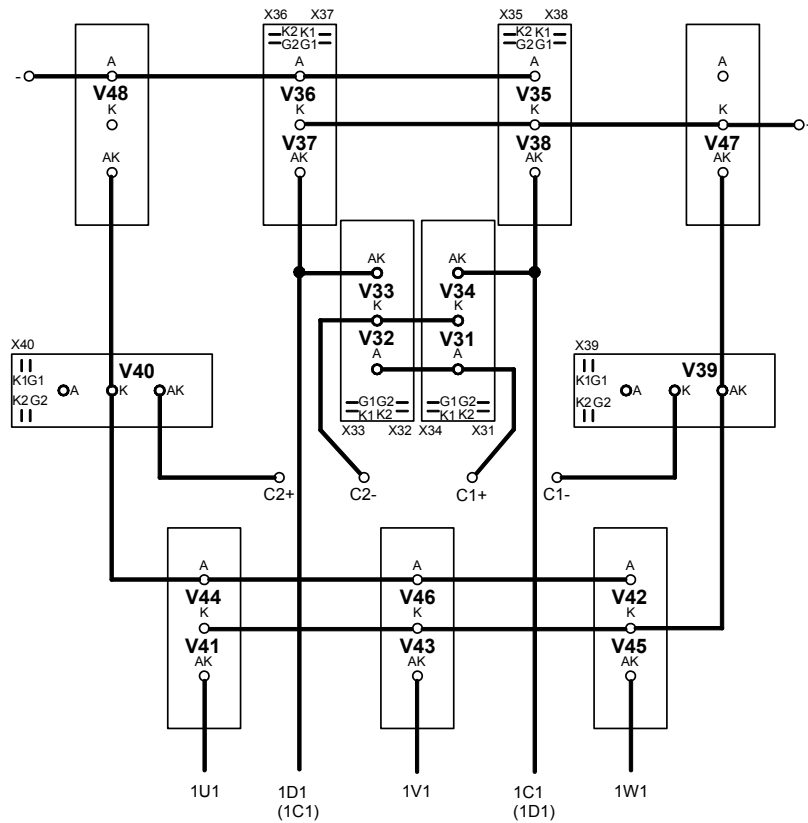
This is calculated using a software algorithm, and depending on the energy that is dissipated during the quenching operation, is up to **approx. 20 min**.

3.3 Block diagram

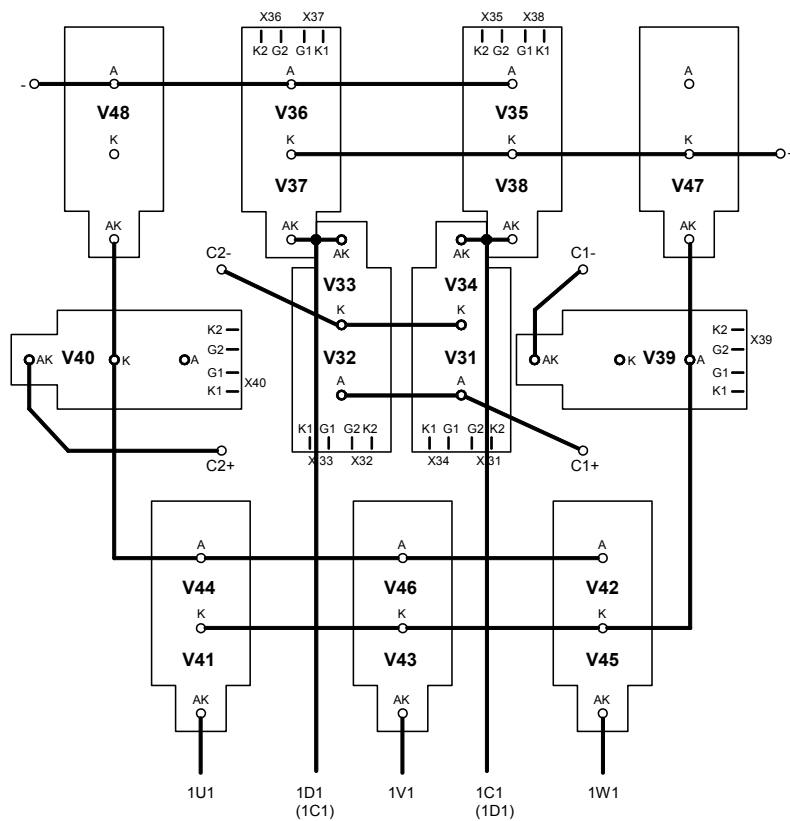


Arrangement of the thyristor and diode modules

Units 6RA70...85-6FC00-0 / ...91-6FC00-0 / ...90-6KC00-0 (all 1000 A)



Units 6RA70...95-6FC00-0 / ...95-6KC00-0 (all 2000 A)



4 Transport, Unpacking

The units are packaged in the manufacturer's factory in accordance with the order specification. A product packaging label is attached to the cardboard box.

Avoid heavy vibration and severe shocks during transportation, e.g. when placing down.

Follow the instructions on the packaging concerning transportation, storage, and proper handling.

The unit can be installed once it has been unpacked, and you have checked that the delivery is complete and the unit is intact and has not been damaged.

The packaging materials consist of a cardboard box and corrugated cardboard, and can be disposed of in accordance with local regulations for cardboard packaging materials.

If you identify any damage that has occurred in transit, please inform your shipping agent immediately.

5 Installation



CAUTION

Failure to lift the unit properly can lead to physical injury or material damage.

The unit should only be lifted with suitable equipment (work gloves should be used) and by appropriately qualified personnel.

In order to prevent the enclosure from becoming deformed, no horizontal forces may be exerted on the lifting eyes.

The user is responsible for installing the converter, the motor, the transformer as well as all of the other devices and units according to the relevant safety regulations (e.g. EN, DIN, VDE) as well as all of the other relevant national or local regulations regarding dimensioning conductors and protection, grounding, disconnectors, overcurrent protection etc.

The unit must be installed in compliance with the relevant safety regulations (e.g. EN, DIN, VDE) as well as all of the other relevant national or local regulations. Grounding, conductor dimensioning, and the relevant short-circuit protection measures must be carried out correctly in order to ensure operational safety.

Cabinet installation of SIMOREG units in conformance with UL 508 C

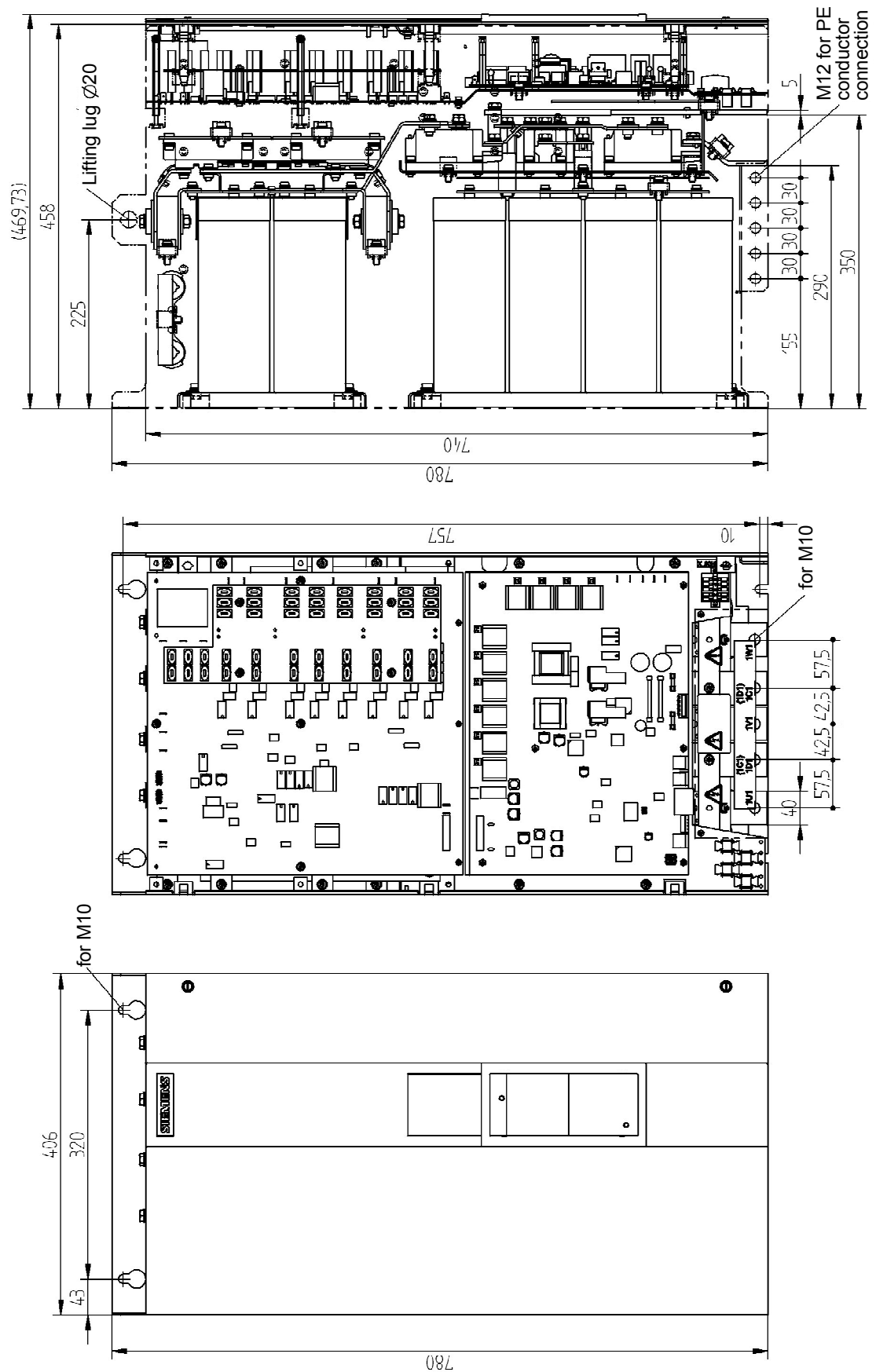
If this unit is to be installed in a cabinet, the cabinet must be sufficiently ventilated and of "Type 1" in accordance with standard UL 508 C.

To install the unit, the cabinet must have minimum dimensions of 2200 mm x 600 mm x 600 mm (H x W x D).

600 A / 1000 A / 1200 A - units:



2000 A - units:



5.2 SINAMICS DCM - Installing the Firing Unit Trigger Board

When using the SIMOREG CCP with SINAMICS DCM connected in parallel, each SINAMICS DCM must be equipped with a supplementary module "fast pulse cancellation interface" (Firing Unit Trigger Board) (Order No.: 6RY1803-0CP00). See chapter 6.3.2.

CAUTION

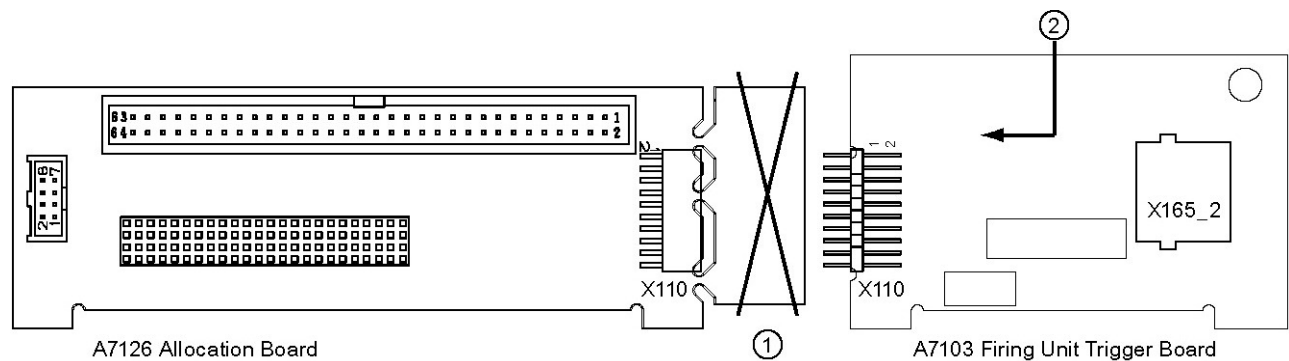
Please observe the information provided on "Electrostatic sensitive devices (ESD)" in Chapter 1.
--



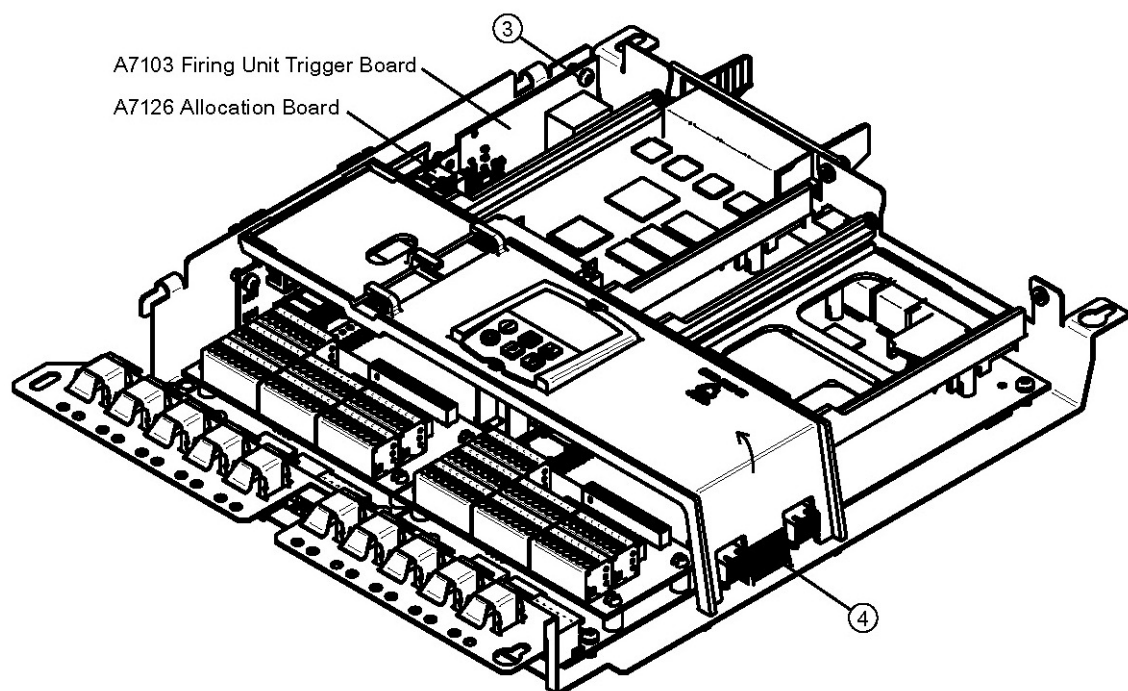
WARNING

Always carry out the work with the SINAMICS DCM in a no-voltage condition!
--

- Remove the front cover of the SINAMICS DCM
- ① Break-off the extension of the module A7126 Allocation Board
- ② Using the guide slots in the holder for the electronic modules, position the Firing Unit Trigger Board A7103 and by shifting the plug connection (X110), establish a connection to the Allocation Board A7126



- ③ Fasten the Firing Unit Trigger Board A7103 using the screw provided, tightening torque 1 Nm
- ④ The BOP holder can be released at the side and swung upwards to route the connecting cable



- After connecting the cable (see Chapter 6.3.3) relocate the front cover of the SINAMICS DCM and fasten using all of the screws

6 Connecting

WARNING

The units are operated at high voltage levels.

All connection work must be carried out in the no-voltage condition!

Only qualified personnel who are familiar with all the safety instructions in these operating instructions, as well as the assembly, installation, operating, and maintenance instructions, - should carry out work on these units.

Non-observance of these warnings can result in death, serious personal injury, or substantial property damage.

Connecting the unit incorrectly can lead to it being damaged or destroyed.

The units may be connected to a line supply with a residual current operated circuit breaker if a universal current sensitive device is being used, which in the case of a ground fault, can also detect a DC component in the fault current. It is recommended to use a residual current operated circuit breaker with a response current ≥ 300 mA, which means that it is not suitable for protecting personnel. If you have additional questions, please contact Technical Support.

Even when the motor is stationary, power terminals and control terminals can still be at a certain voltage.

Even after being disconnected from the power supply, the snubber capacitors in the converter unit can still be at a dangerous voltage level. For this reason, the unit should not be opened until an adequate period of time has elapsed.

When handling the unit while it is open, remember that live parts are exposed. The unit must only be operated with the front covers provided by the factory in place.

The user is responsible for ensuring that the SIMOREG CCP, the motor, converter unit and other devices are installed and connected in accordance with the recognized technical rules in the country of installation and applicable regional regulations. Special attention should be paid to cable dimensioning, fuses, grounding, shutdown, disconnection, and overcurrent protection.

The units described here control rotating mechanical equipment (drives). Failure to follow these operating instructions may result in death, serious physical injury, or extensive material damage.

Perfect, safe and reliable operation of the units is conditional upon them having been professionally transported, stored, mounted, and installed, and having been carefully operated and maintained.

Also observe all of the safety instructions in the converter unit operating instructions.

Note

Please observe the installation instructions for EMC-compliant design of drives in Chapter 6.1 of the operating instructions of the basic SIMOREG DC-MASTER or SINAMICS DCM unit.

6.1 Cable lengths

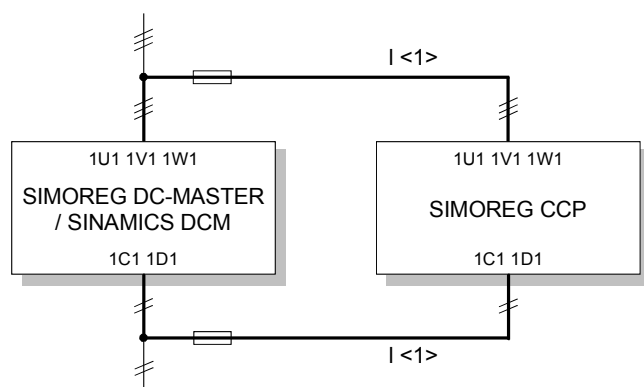
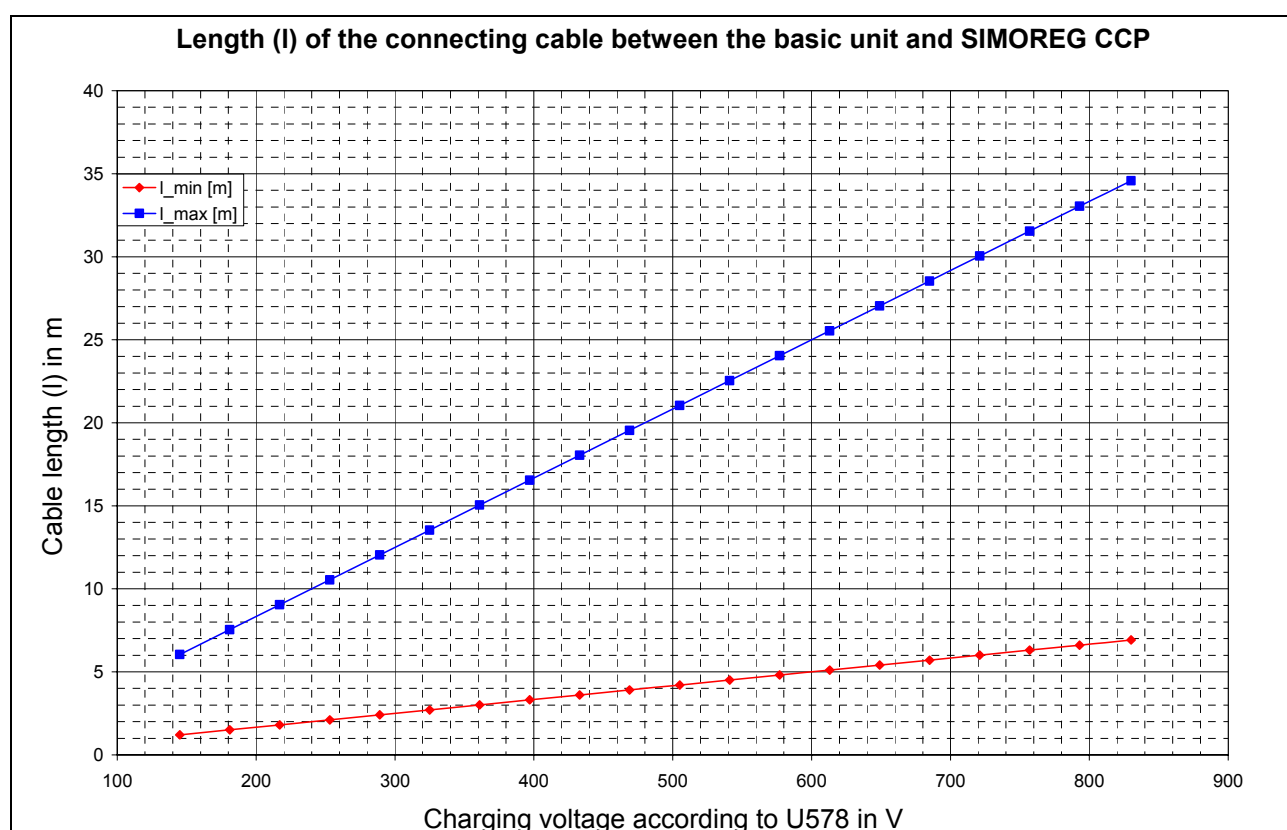
Lengths of the connecting cables between connections 1U1, 1V1, 1W1, 1C1, 1D1 of the basic converter unit and the SIMOREG CCP

The connecting cables between the basic converter unit and the SIMOREG CCP also serve as commutation inductance for quenching operations and must therefore have a defined length.

The cable length is valid for each cable for 1U1, 1V1, 1W1, 1C1, 1D1 and can be taken from the following diagram. The actual cable length used must lie between $I_{\min}$ and $I_{\max}$ (also refer to the example below).

Note

The correct values for parameters U578 or p51578 must be available before determining the cable length.



$\langle 1 \rangle$ = cable length

Cable length to connect the AC connections I_{UVW}

Cable length to connect the DC connections I_{CD}

The following basic rule applies

The sum of the lengths, formed from l_{UVW} and l_{CD} must have twice the value of I ($2 \cdot I$) according to the diagram above ($2 \cdot I = l_{UVW} + l_{CD}$). You can e.g. keep the line-side connecting cables as short as possible or as required (e.g. using busbars) and use motor-side connecting cables with the required length.

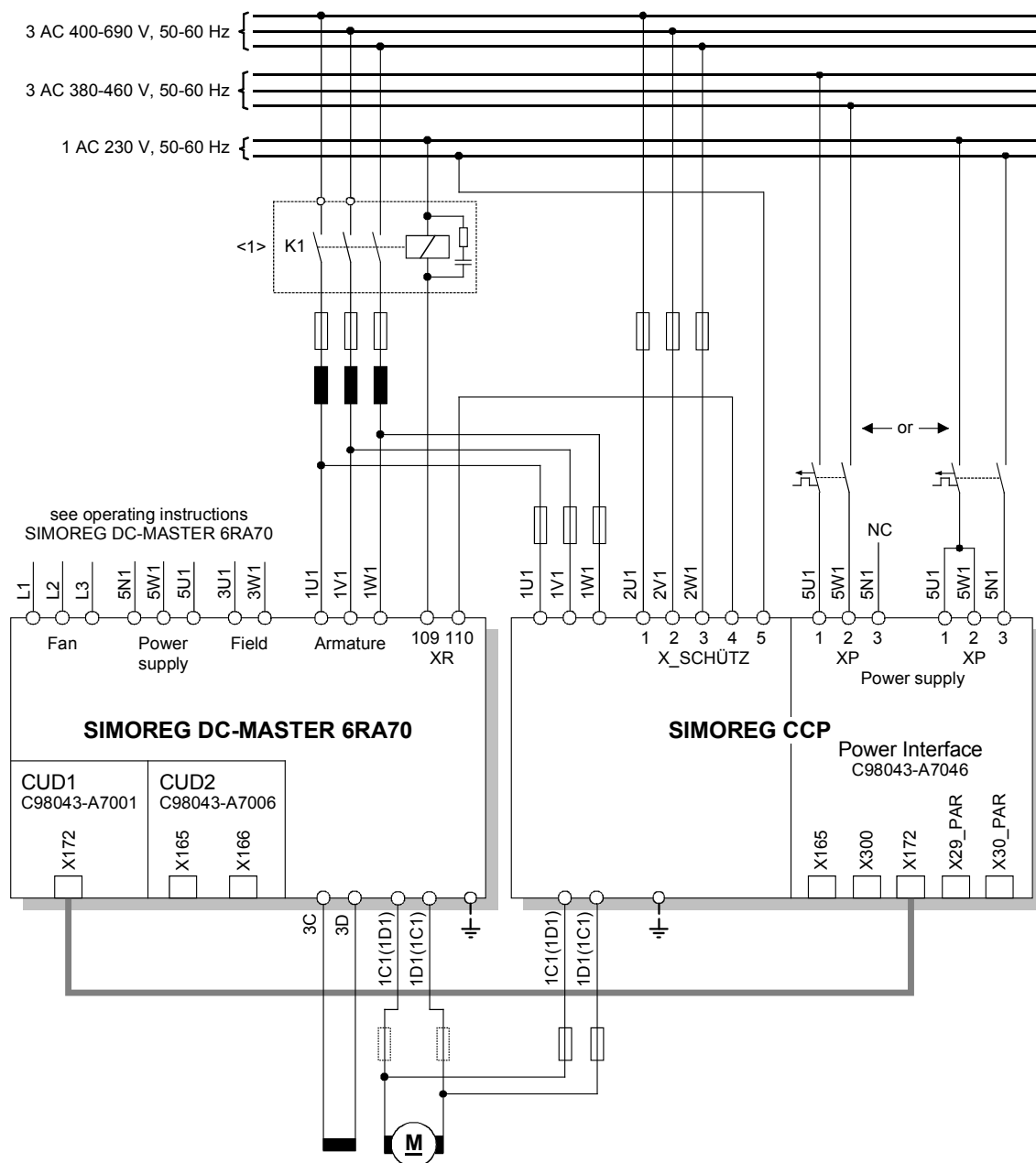
Example

The minimum required cable length $l_{\min}$ is 3 m.

- Use 3m lengths each for 1U1, 1V1, 1W1, 1C1, 1D1.
- Or: e.g. use 1m lengths each for 1U1, 1V1, 1W1 and 5 m lengths each for 1C1, 1D1

6.2 Recommended connection

6.2.1 Connecting a SIMOREG DC-MASTER



<1>

CAUTION

Operation without a main contactor/circuit breaker is not permissible.

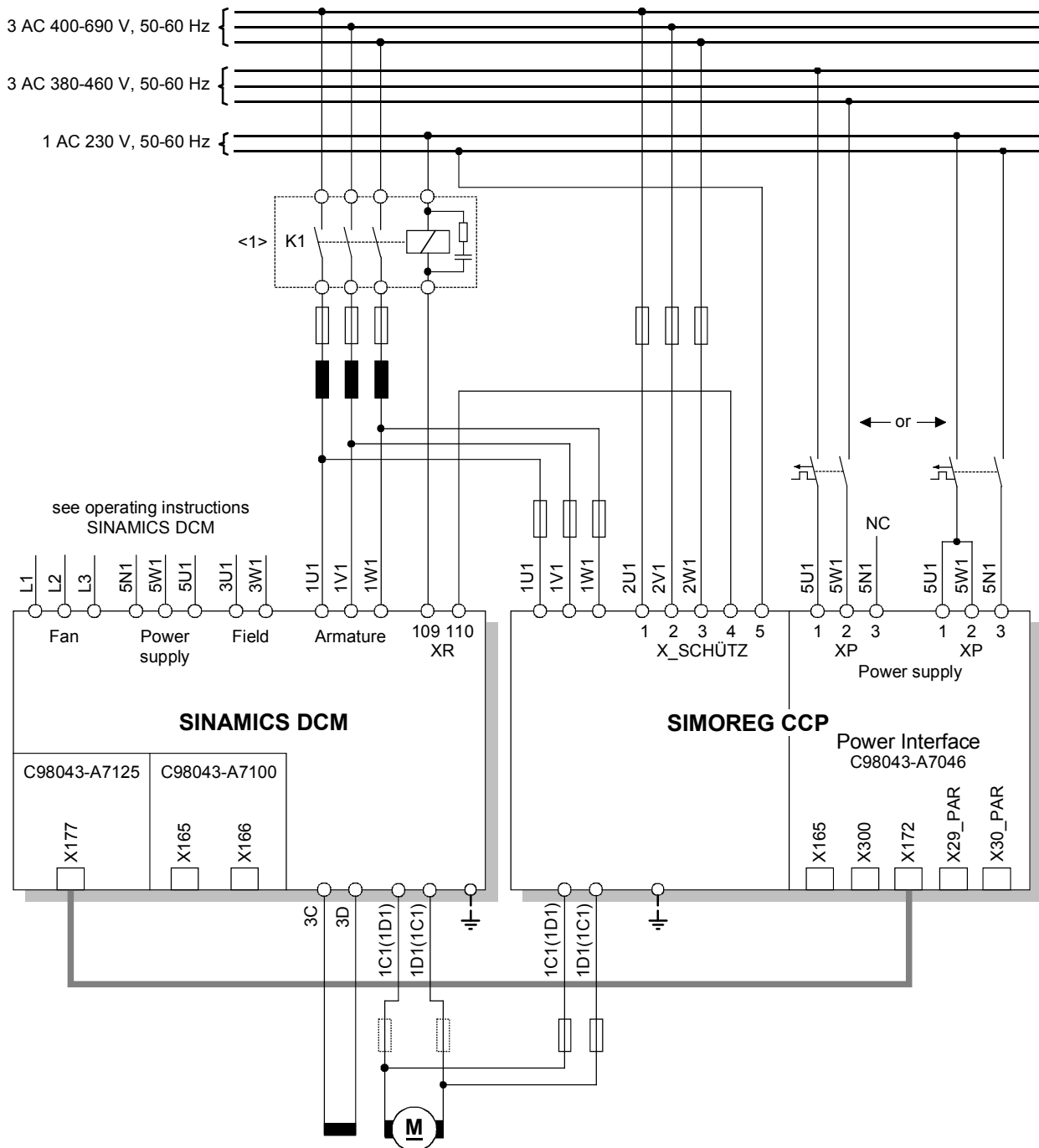
The control voltage for the main contactor (or the circuit breaker) must always be routed via terminal XR (connections 109 and 110) of the SIMOREG unit and via terminal X_SCHÜTZ (connections 4 and 5) of the SIMOREG CCP.

For a parallel connection (see Chapter 6.3.1) all SIMOREG units must be incorporated in this interlock circuit.

In applications with SIMOREG CCP, in the case of a fault, the basic converter unit or the SIMOREG CCP must be able to safely and reliably disconnect the arrangement from the line supply.

In addition, it must be carefully observed that the total of the delay times of all of the switching elements in the control circuit must not exceed the time set at parameter P089.

6.2.2 Connecting a SINAMICS DCM



<1>

CAUTION

Operation without a main contactor/circuit breaker is not permissible.

The control voltage for the main contactor (or the circuit breaker) must always be routed via terminal XR1 (connections 109 and 110) of the SINAMICS DCM and via terminal X_SCHÜTZ (connections 4 and 5) of the SIMOREG CCP.

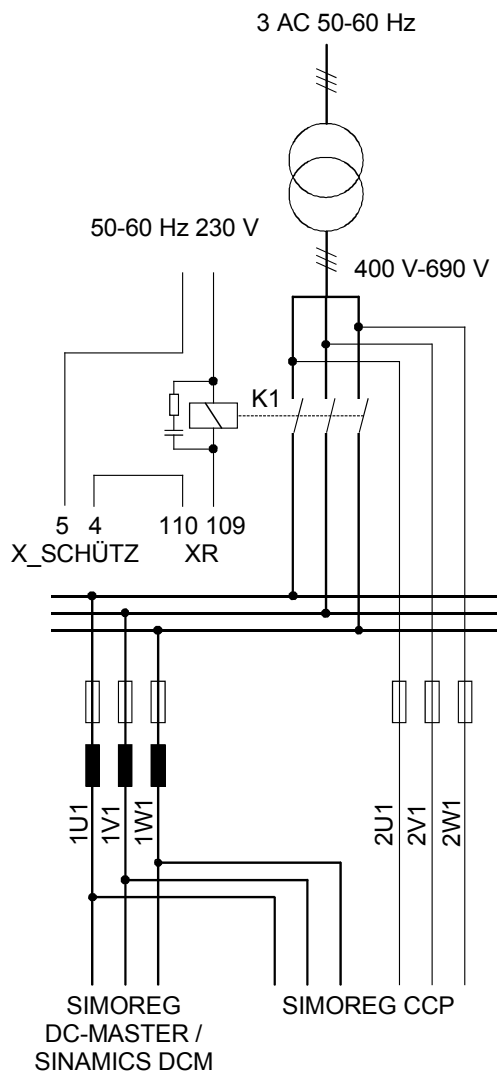
For a parallel connection (see Chapter 6.3.2) all SINAMICS DCM units must be incorporated in this interlock circuit.

In applications with SIMOREG CCP, in the case of a fault, the basic converter unit or the SIMOREG CCP must be able to safely and reliably disconnect the arrangement from the line supply.

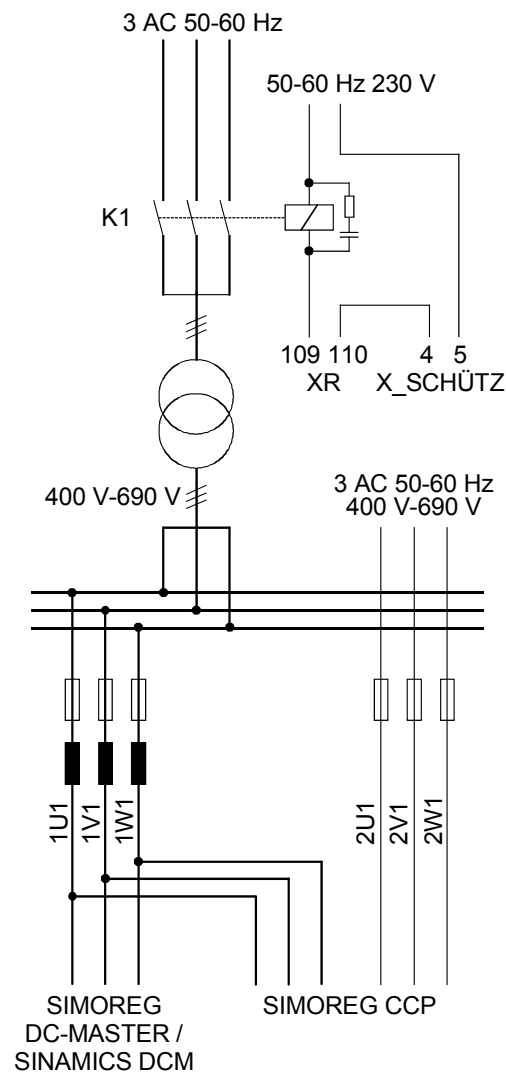
In addition, it must be carefully observed that the total of the delay times of all of the switching elements in the control circuit must not exceed the time set at parameter P50089.

6.2.3 Versions to interconnect the main contactor (circuit breaker) K1

after the supply transformer



before the supply transformer



6.2.4 Recommended connection when using a Siemens 3WL circuit breaker

If circuit breakers from other manufacturers are used, then the recommended connection described here applies accordingly.

It should be noted that the circuit breaker is equipped with a ready to close signal contact (S20, order option Z=C22) and undervoltage release (F3 short-time delayed or F4 with the shortest possible delay time, the version is defined using the 15th position of the MLFB of the circuit breaker).

Also refer to the operating instructions for the 3WL circuit breaker, Order No.: 3ZX1812-0WL00-0AN0 Chapter 8.4 Auxiliary release/ electrical close inhibit
(<http://support.automation.siemens.com/WW/view/en/8912465>)

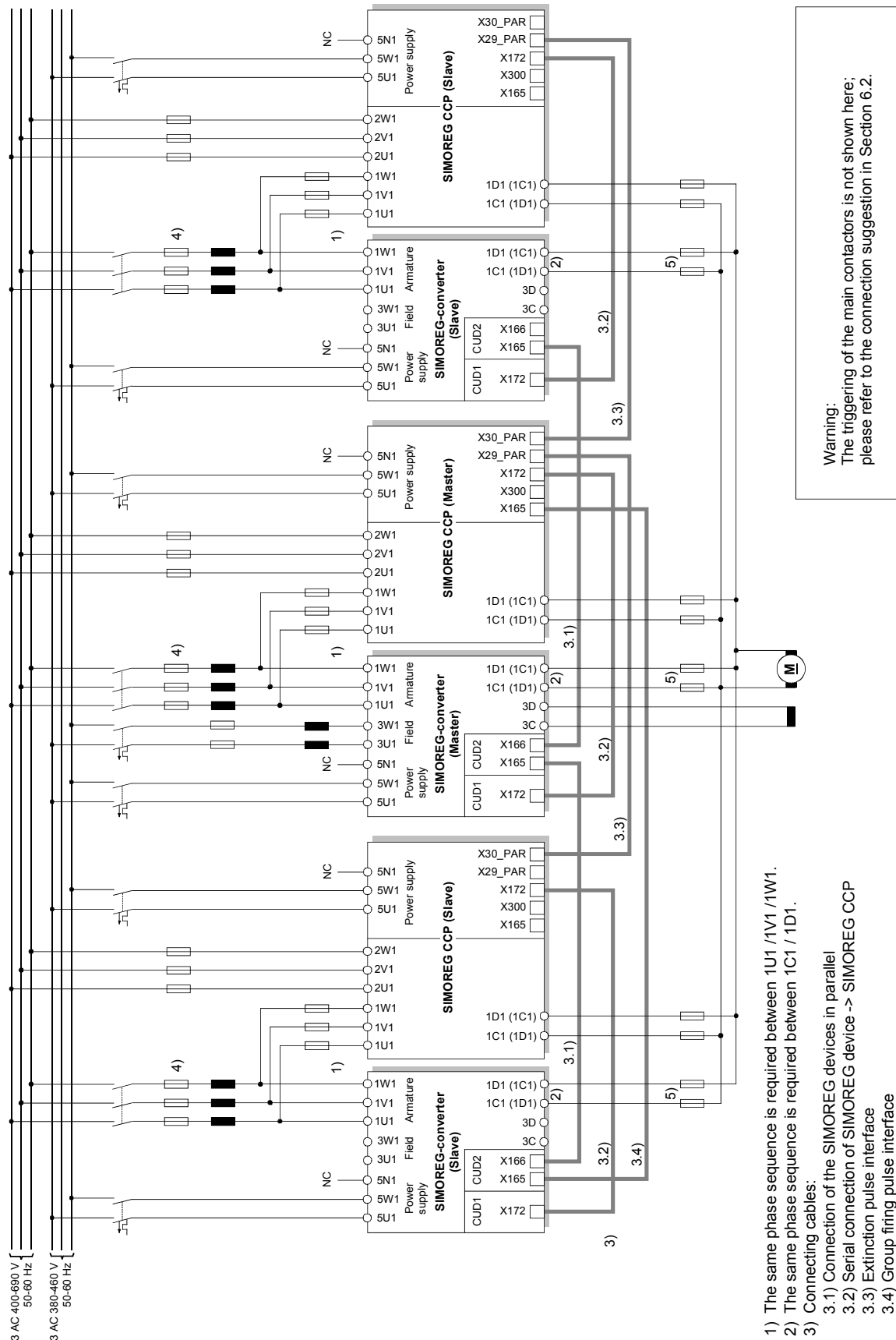
The diagram illustrates a motor control circuit for a 3-phase 400V system. The main circuit components include a main switch (S11), a motor (M1), a thermal relay (Y1), and a circuit breaker (F4). The control circuit is connected to a 24V DC supply (P24) and a fault inverter (Fault inv.). The control unit is a SIEMENS Circuit breaker 3WL control unit, which is connected to a SIMOREG DC-MASTER (B0107) and a SINAMICS DCM (r2139.03). The diagram shows the connection of various components and the control voltage supply.

[illegible]

6.3 Connecting units in parallel

6.3.1 Parallel connection of SIMOREG DC-MASTER units

A SIMOREG CCP is directly connected in parallel to each of the converter units connected in parallel (SIMOREG DC-MASTER).



6.3.2 Parallel connection of SINAMICS DCM units

The following topologies are possible when connecting SINAMICS DCM in parallel:

- **12-pulse parallel connection:**
Each of the two SINAMICS DCM should be equipped with one SIMOREG CCP.
Interconnection and parameterization is just the same as for a single SINAMICS DCM.
- **6-pulse parallel connection:**
Each of the SINAMICS DCM used should be equipped with one SIMOREG CCP.
Parameterization is just the same as for a single SINAMICS DCM.

Note

For **series connections** it is not permissible to use a SIMOREG CCP.

A SIMOREG CCP is directly connected in parallel to each of the converter units connected in parallel (SINAMICS DCM).

Each SINAMICS DCM must be equipped with a supplementary module "fast pulse cancellation interface" (Firing Unit Trigger Board) - available as accessory - also refer to Chapter 5.2 (Installation) and 6.3.3 (connection).

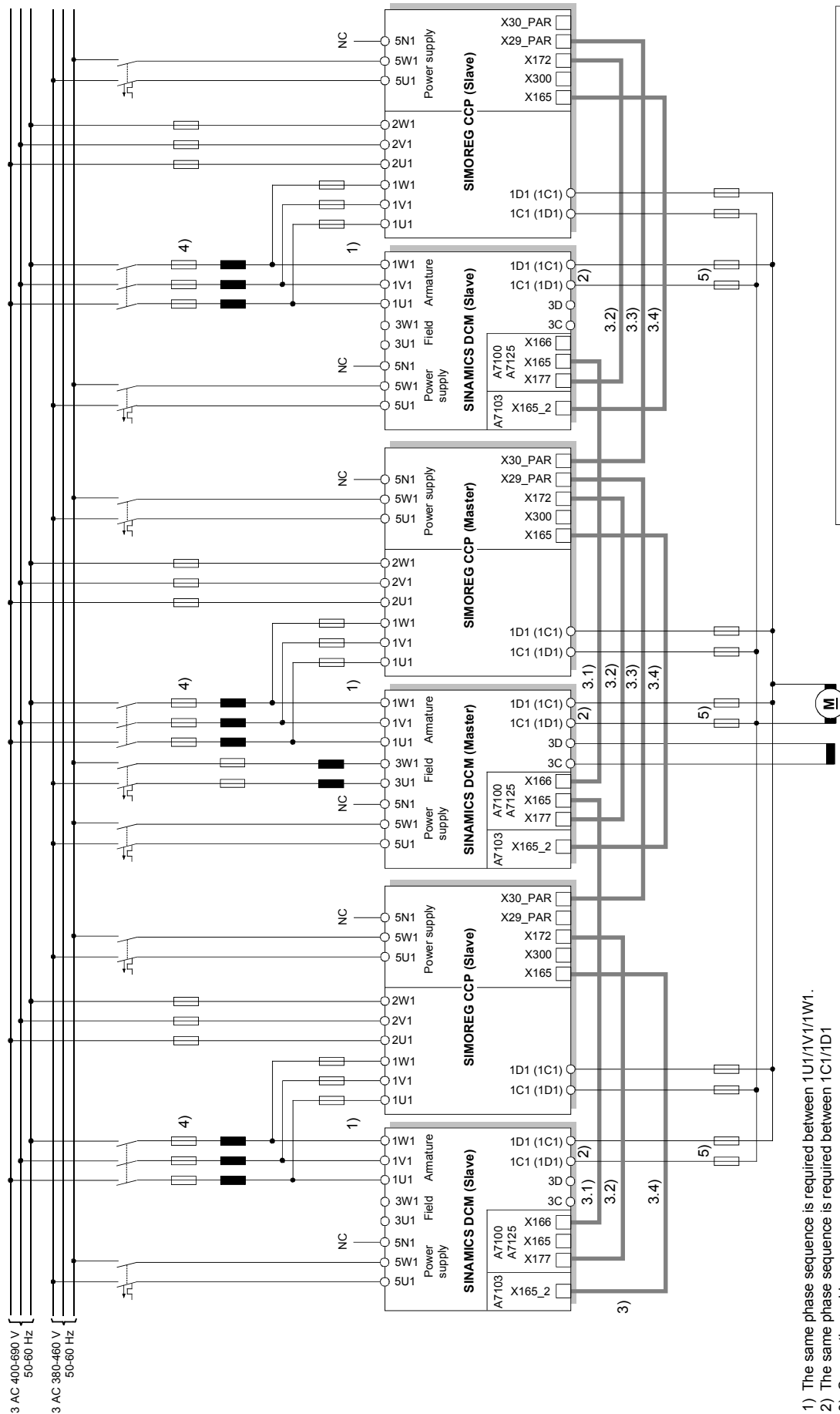
Ordering data, refer to chapter 2.2 (ordering data for options and accessories)

The interconnection must be made according to the following diagram.

Mode of operation:

- The inverter commutation fault monitoring is continuously active in the SINAMICS DCM.
- If an inverter commutation fault is identified in a SINAMICS DCM then a turn-off command is issued to the associated SIMOREG CCP.
The turn-off command is transferred via the serial connection 3.2.
- The turn-off command is transferred from this SIMOREG CCP to the additional SIMOREG CCP. All SIMOREG CCP units simultaneously execute the turn-off operation.
The turn-off command is transferred via the turn-off pulse interface 3.3, with which all SIMOREG CCPs are connected with one another.
- At the same time, the firing pulses are immediately disabled in all SINAMICS DCM units from the assigned SIMOREG CCP. This therefore ensures that the SINAMICS DCM, which have (still) not identified an inverter commutation fault, do not prevent the turn-off operation.
The firing pulses are disabled via the fast pulse cancellation interface 3.4.

CAUTION
The parallel interface (X165, X166) at the SINAMICS DCM is not compatible to the parallel interface (X165) at the SIMOREG DC-MASTER CCP. It is not permissible that both connectors are connected.



1) The same phase sequence is required between 1U1/1V1/1W1.

2) The same phase sequence is required between 1C1/1D1

3) Connecting cable:

3.1) Parallel connection of SINAMICS DCM units

3.2) Serial connection between the SINAMICS DCM unit - SIMOREG CCP

3.3) Turn-off pulse interface

3.4) Fast pulse cancellation interface

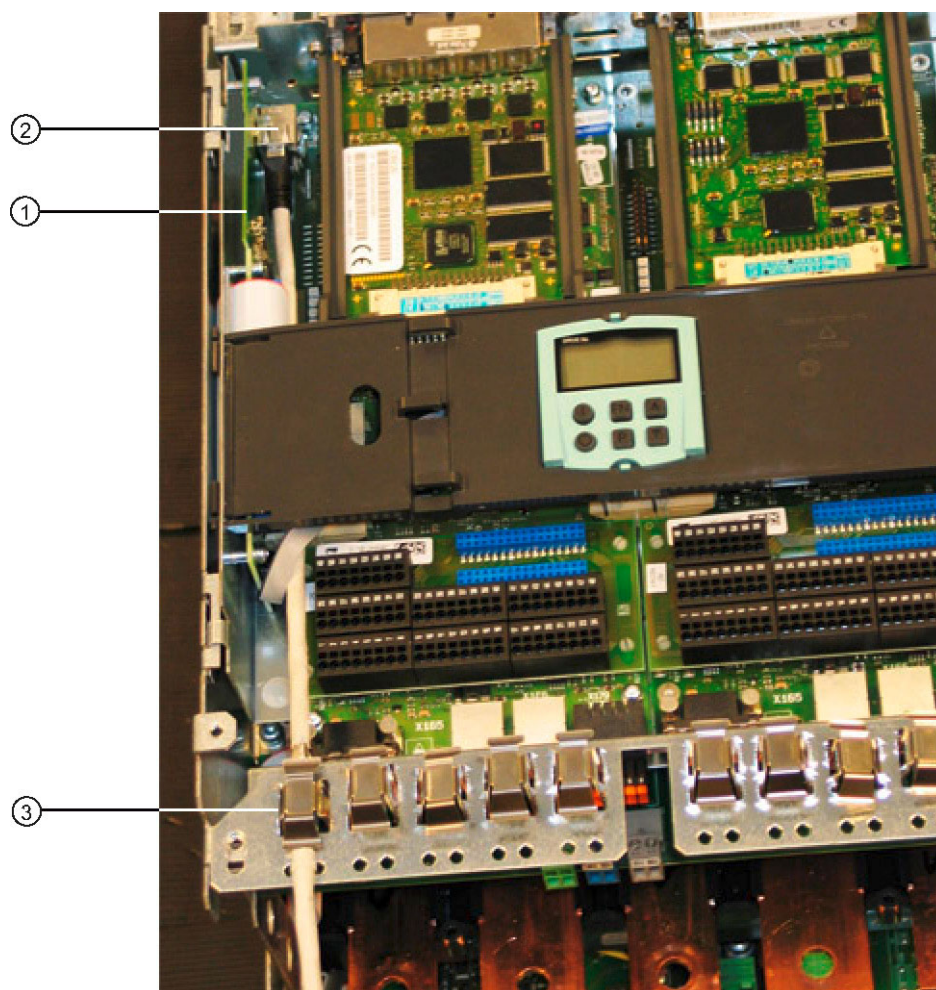
4) These fuses may only be used with units up to 850 A

5) Only for units up to 850 A

for additional connections and settings for the SINAMICS DCM units, refer to the operating instructions of the SINAMICS DCM

6.3.3 Connecting the Firing Unit Trigger Board

Routing of the connecting cable "fast pulse cancellation interface" to the SINAMICS DCM with shield support:



- ① Firing Unit Trigger Board
- ② Connector X165_2
- ③ Shield support

6.4 Fuses

Fuses in the armature circuit and in the motor circuit

Recommended Siemens semiconductor fuses (depending on the SIMOREG CCP used):

Unit Order No. (MLFB)	Rated current	Rated voltage	Fuses 1U1, 1V1, 1W1	Fuses 1C1, 1D1
6RA7085-6FC00-0	600 A	460 V	3NE3335 (560 A / 1000 V)	3NE7431-0C (350 A / 2000 V)
6RA7091-6FC00-0	1200 A	460 V	3NE3335 (560 A / 1000 V)	3NE7431-0C (350 A / 2000 V)
6RA7090-6KC00-0	1000 A	690 V	3NE3335 (560 A / 1000 V)	3NE7431-0C (350 A / 2000 V)
6RA7095-6FC00-0	2000 A	460 V	3NE3338-8 (800 A / 800 V)	3NE7648-1C (525 A / 2000 V)
6RA7095-6KC00-0	2000 A	690 V	3NE3338-8 (800 A / 800 V)	3NE7648-1C (525 A / 2000 V)

Note

It is no longer recommended to use the fuse types as listed in previous editions of the SIMOREG CCP operating instructions.

Fuses for pre-charging

10 A line protection e.g. type Diazed 5SD604

Fuses F1 and F2 in the Power Interface

Only UL-listed or UL-recognized fuses may be used in UL-listed units.

Wickmann 198 1 A / 250 V 5 x 20 mm time-lag

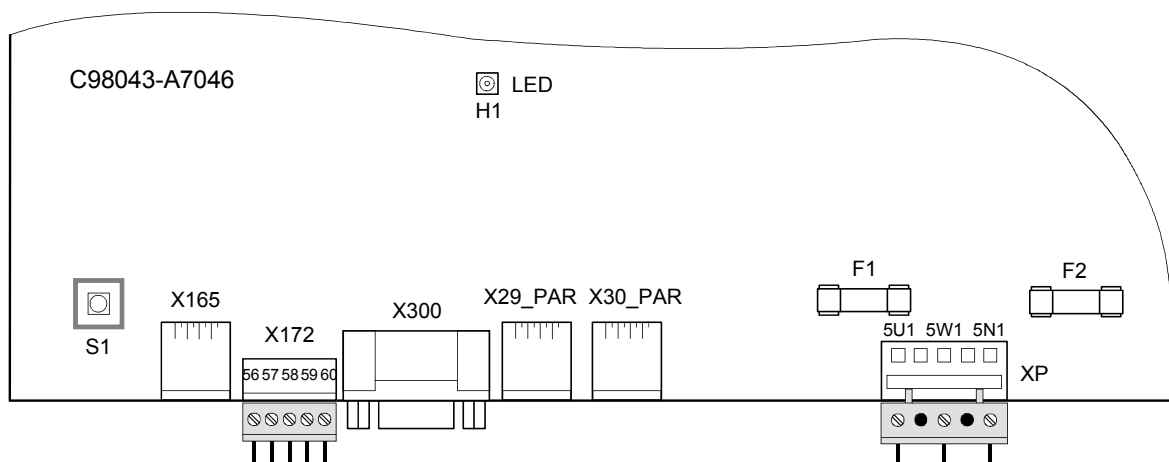
Wickmann 343 1 A / 250 V 6.3 x 32 mm time-lag

Schurter FSD 1 A / 250 V 5 x 20 mm time-lag order designation 0034.3987

Schurter FST 1 A / 250 V 5 x 20 mm time-lag order designation 0034.3117

6.5 Arrangement of the terminals, connectors and fuses

Module C98043-A7046 Power Interface SIMOREG CCP



6.6 Terminal assignment, connectors

WARNING

If the unit is incorrectly connected, this can result in damage or destruction.
The power cable or busbars must be mechanically fixed outside the unit.

Power unit

Terminal type:

600 A / 1000 A / 1200 A units Through hole for M10 (Cu - busbar 3x25)

2000 A units Through hole for M10 (Cu - busbar 5x40)

The units are designed for a permanent line supply connection in accordance with DIN VDE 0160, Section 6.5.2.1.

Protective conductor connection: Minimum cross-section 10 mm². (Connection option, see Chapter 5.1)

The connection cross-sections should be determined according to the applicable regulations - e.g. DIN VDE 100 Part 523, DIN VDE 0276 Part 1000.

The connection lengths should be determined according to the diagram in Chapter 6 – Connecting.

Function	Terminal	Connection values/Comments
Armature power input	1U1 1V1 1W1	} see Technical data, Chapter 3.2
Protective conductor PE		
Armature circuit-motor connection	1C1 (1D1) 1D1 (1C1)	

Pre-charging, main contactor / circuit breaker

Terminal strip WAGO 264-105

Conductor cross section max. 2.5 mm²

AWG max. 12

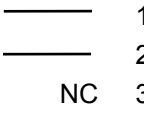
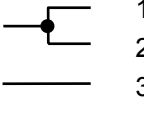
Stripped length 8 - 9 mm

Function	Connection	Terminal X_SCHÜTZ	Connection values/Comments
Power connection, pre-charging	1 2 3	2U1 2V1 2W1	Cable cross-section 1.5 mm ² Fuse protection 10 A (see Chapter 6.4) Connection values the same as for the power unit SIMOREG CCP (see above)
Control circuit for main contactor / circuit breaker	4 5		Wiring, main contactor/circuit breaker (see the recommended connection in Chapter 6.2)

Electronics power supply

Terminal type: plug-in terminal, type 49
maximum conductor cross-section 1.5 mm² finely stranded

Module C98043-A7046 Power Interface SIMOREG CCP

Function	Connection	Terminal XP	Connection values/Comments
Infeed 400 V	 1 2 NC 3	5U1 5W1 5N1	2 AC 380 V (–20 %) to 460 V (+15 %); I _n =1 A internal fuse protection with F1, F2 on the C98043-A7046 module (see Chapter 6.4) external fuse protection max. 6A, Characteristic C recommended
or			
Infeed 230 V	 1 2 3	5U1 5W1 5N1	1 AC 190 V(–20 %) to 230 V (+15 %); I _n =2 A internal fuse protection with F1, F2 on the C98043-A7046 module (see Chapter 6.4) external fuse protection max. 6 A, Characteristic C recommended

Note

For line supply voltages outside the tolerance range specified in Chapter 3.2, the electronic supply voltage must be adapted using transformers in order to comply with the value specified in Chapter 3.2. An isolation transformer is mandatory for rated line supply voltages exceeding 460 V.

The rated supply voltage for the armature circuit should be set in parameter P078 (Index 001) or p50078[1].

Serial interface RS 485

Module C98043-A7046 Power Interface SIMOREG CCP

Function	Terminal X172	Connection values/Comments
TX+	56	RS485, 4-wire send cable, positive differential output
TX-	57	RS485, 4-wire send cable, negative differential output
RX+	58	RS485, 4-wire receive cable, positive differential input
RX-	59	RS485, 4-wire receive cable, negative differential input
M	60	Ground

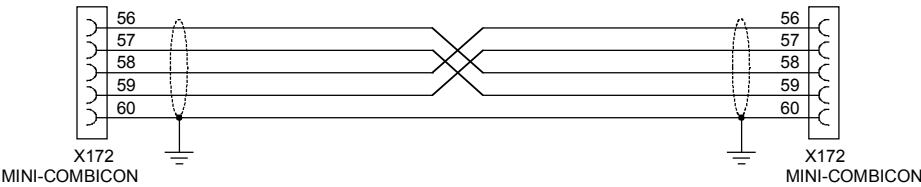
max. cable length 600 m

The following points must be noted: DIN 19245 Part 1

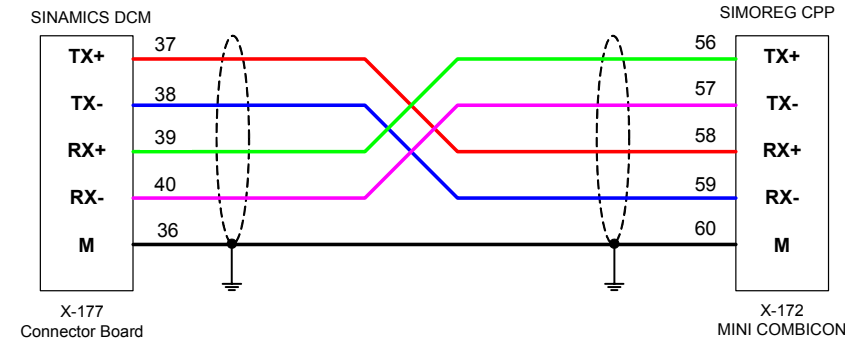
It is especially important that the voltage difference between the data reference potential M of all connections does not exceed -7 V/+12 V. Equipotential bonding must be implemented if this cannot be guaranteed.

Activating the serial interface by setting the protocol at parameter P790 or p50790.

Connecting to a SIMOREG DC-MASTER:



Connecting to a SINAMICS DCM:



Programming interface for the software update X300

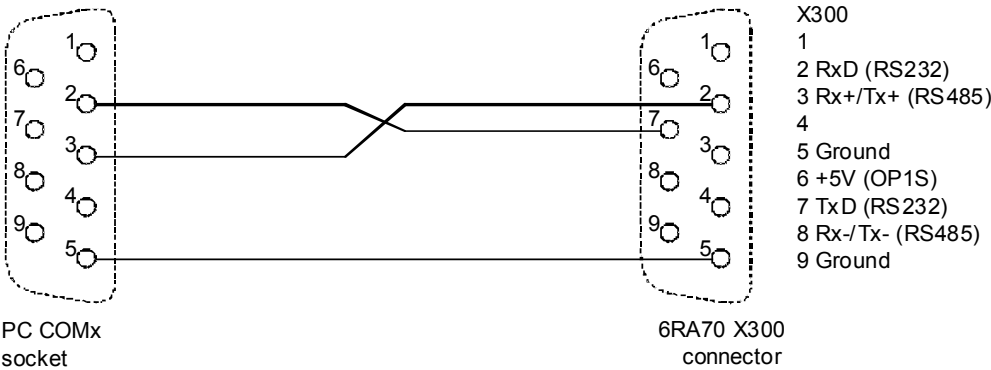
Serial interface RS232

9-pin SUBMIN D socket

Module C98043-A7046 Power Interface SIMOREG CCP

Connector pin X300	Function
2	Receive cable, RS232 standard (V.24)
5	Ground
7	Send cable, RS232 standard (V.24)

Cable:



Use a shielded connecting cable. Ground the shield at both ends.

Additional connectors

Module C98043-A7046 Power Interface SIMOREG CCP

Connector	Function
X165	"Output pulse inhibit": Used when connecting several SINAMICS DCM in parallel
X29_PAR	Pulse turnoff interface to the parallel connection of SIMOREG CCPs
X30_PAR	The two connectors are connected in parallel.

7 Commissioning

CAUTION

The operator must be electrostatically discharged before coming into contact with modules in order to protect electronic components against high voltages caused by electrostatic charge. The easiest way to do this is to touch a conductive, grounded object immediately beforehand (for example, the bare metal part of a control cabinet).

It is not permissible that modules come into contact with highly insulating materials (e.g. plastic foils, insulating desktops, articles of clothing manufactured out of man-made fibers).

Modules may be set down only on conducting work surfaces.



WARNING

The unit is at a hazardous voltage. Failure to comply with these operating instructions can lead to death, serious physical injury, and material damage.

The units may be connected to a line supply with a residual current operated circuit breaker if a universal current sensitive device is being used, which in the case of a ground fault, can also detect a DC component in the fault current. It is recommended to use a residual current operated circuit breaker with a response current ≥ 300 mA, which means that it is not suitable for protecting personnel. If you have additional questions, please contact Technical Support.

Only qualified personnel who are familiar with all of the safety instructions in this description, as well as the assembly, installation, operating, and maintenance instructions, should carry out work on these units.

The successful and safe operation of this equipment is dependent on proper transportation, storage, installation, and assembly, as well as on careful operation and maintenance.

The unit is at dangerous voltage levels even when the converter unit line contactor is open. Before commencing any maintenance or service work, disconnect all power sources of the converter infeed and lock them out so that they cannot be accidentally reconnected.

These instructions are not exhaustive and, as such, cannot outline all the measures required in order to operate the unit safely. Where necessary, additional information or instructions may be required for special applications. If you encounter specific problems that have not been handled in enough detail for the purposes of the buyer, then please contact your local Siemens office.

The use of non-approved parts for carrying out repair work on the unit or handling of the unit by inadequately qualified personnel will result in dangerous conditions with the risk of death, serious physical injury, or extensive damage to equipment. All safety measures listed in these operating instructions, as well as all warning signs attached to the unit, must be followed.

Observe all the warning information outlined in Chapter 1 of these operating instructions.

7.1 Operation via the basic unit (SIMOREG DC-MASTER or SINAMICS DCM)

The basic converter unit has setting and monitoring parameters for commissioning, operation, monitoring and diagnostics of the SIMOREG CCP. The state of the SIMOREG CCP is signaled via connectors and the triggering of the SIMOREG CCP or erroneous states are signaled using fault and alarm messages.

Data is exchanged between the basic converter unit and SIMOREG CCP via the serial interface.

7.1.1 SIMOREG DC-MASTER parameters

(see below for a detailed description)

P790 *)	Protocol selection for the basic converter interface G-SST2
r799 *)	Diagnostics information for G-SST2
r812 *)	Receive data at G-SST2
n560	Software version of the SIMOREG CCP
n569	Serial number of the SIMOREG CCP
n570	MLFB (Order No.) of the SIMOREG CCP
n571	Rated supply voltage of the SIMOREG CCP
n572	Rated current of the SIMOREG CCP
n574	State of the SIMOREG CCP
n575	Display of the I _{2t} value of the voltage limiting choppers 1 of the SIMOREG CCP
n576	Display of the I _{2t} value of the voltage limiting choppers 2 of the SIMOREG CCP
U577	Voltage setpoint for the upper response threshold of the SIMOREG CCP chopper
U578	Voltage setpoint for the pre-charging of the SIMOREG CCP quenching capacitors
U580	Control word for commutation monitoring
U581	Diagnostics memory for the commutation monitoring
U582	Response of the commutation monitoring
U583	Test command for the SIMOREG CCP

*) For a description of these parameters, see the operating instructions SIMOREG DC-MASTER Chapter 11

Detailed description of parameters

The specified software release refers to the software release of the SIMOREG DC-MASTER

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS) Type	See/ change (Access / state)
n560 (2560)	Software version of the SIMOREG CCP [from SW 2.1 and higher] i001: Version release of the SIMOREG CCP software i002: Version release of the SIMOREG CCP software, boot sector	0.0 to 9.9 0,1	Ind: 2 Type: O2	P052 = 3
n569 (2569)	Serial number of the SIMOREG CCP [from SW 2.1 and higher] i001: 1. and 2nd position of the serial number i002: 3. and 4th position of the serial number i003: 5. and 6th position of the serial number i004: 7. and 8th position of the serial number i005: 9. and 10th position of the serial number i006: 11. and 12th position of the serial number i007: 13. and 14th position of the serial number i008 to i015: 0 i016: Checksum of the serial number The ASCII-Code of the serial number can be read from this parameter.		Ind: 16 Type: L2	P052 = 3
n570 (2570)	MLFB (Order No.) of the SIMOREG CCP [from SW 2.1 and higher] Here, the coding of the corresponding MLFB is displayed.	250 to 254 1	Ind: None Type: O2	P052 = 3
n571 (2571)	Rated supply voltage of the SIMOREG CCP [from SW 2.1 and higher] Rated supply voltage of the SIMOREG CCP stamped on the rating plate	10 to 830 [V] 1V	Ind: None Type: O2	P052 = 3

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS) Type	See/ change (Access / state)
n572 (2572)	Rated current of the SIMOREG CCP [from SW 2.1 and higher] Rated current of the SIMOREG CCP stamped on the rating plate	0.0 to 6553.5 [A] 0.1A	Ind: None Type: O2	P052 = 3
n574 (2574)	State of the SIMOREG CCP [from SW 2.2 and higher] Display at the operator panel (PMU): 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 Segment lit or bit = 1: significance specified below applies Segment dark or bit = 0: significance specified below <u>does not</u> apply Segment or bit 0 Voltage at U, V, W is OK 1 Voltage at C – D greater than +100 V 2 Voltage at C – D less than -100 V 3 The quenching capacitors have reached the setpoint voltage 4 Turn-off operation running 5 Connection between parallel SIMOREG CCP OK 6 - 7 - 8 Parallel interface connected at CCP 9 I2t value of voltage limiting chopper 1 is too high 10 I2t value of voltage limiting chopper 2 is too high 11 Contents of the memory of the technical data of the SIMOREG CCP (MLFB, rated values, serial number) valid 12 Pre-charging of the chopper capacitors completed 13 - 14 - 15 - Note: This parameter has the same bit assignment as connector K0574.		Ind: None Type: V2	P052 = 3
n575 (2575)	Display of the I2t value of the voltage limitingchoppers 1 of the SIMOREG CCP [from SW 2.1]	0 to 100 [%] 1 %	Ind: None Type: O2	P052 = 3
n576 (2576)	Display of the I2t value of the voltage limitingchoppers 2 of the SIMOREG CCP [from SW 2.1]	0 to 100 [%] 1 %	Ind: None Type: O2	P052 = 3

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS) Type	See/ change (Access / state)																																																																																																																														
U577 (2577)	Voltage setpoint for the upper response threshold of the SIMOREG CCP chopper [from SW 2.2 and higher] The set voltage value defines the upper response threshold of the voltage limiter implemented in the SIMOREG CCP. Within the scope of the turn-off operation of the CCP, this limits the counter-voltage that occurs - which is also necessary - when the armature current is reduced to a value that is not dangerous for the basic unit and the associated SIMOREG CCP. The required setting value depends on the blocking voltage strength of the power semiconductors used in the basic converter (SIMOREG DC-MASTER) and in the SIMOREG CCP and is therefore dependent on the Unit MLFB. The following table should be used to correctly set this parameter. As a result of the unit MLFB for the basic converter and SIMOREG CCP, two setting values are obtained from which the lower of the two should be set at U577. Example: Basic converter MLFB: 6RA7085-6DV62-0 (r070=9) ⇒ U577=1300 V SIMOREG CCP MLFB: 6RA7085-6FC00-0 (n570=250) ⇒ U577=1100 V therefore the following setting is obtained: <u>U577=1100 V</u> Table to determine the setting value for U577:	850 to 1600 [V] 1 V	Ind: None FS=1600 Type: O2	P052 = 3 P051 = 40 online																																																																																																																														
<table><tr><th>MLFB SIMOREG DC-MASTER</th><th>MLFB characteristic number (r070)</th><th>Setting value for U577 [V]</th></tr><tr><td>6RA7013-6DV62-0</td><td>1</td><td>1300</td></tr><tr><td>6RA7018-6DV62-0</td><td>2</td><td>1300</td></tr><tr><td>6RA7025-6DV62-0</td><td>3</td><td>1300</td></tr><tr><td>6RA7028-6DV62-0</td><td>4</td><td>1300</td></tr><tr><td>6RA7031-6DV62-0</td><td>5</td><td>1300</td></tr><tr><td>6RA7075-6DV62-0</td><td>6</td><td>1300</td></tr><tr><td>6RA7078-6DV62-0</td><td>7</td><td>1300</td></tr><tr><td>6RA7081-6DV62-0</td><td>8</td><td>1300</td></tr><tr><td>6RA7085-6DV62-0</td><td>9</td><td>1300</td></tr><tr><td>6RA7087-6DV62-0</td><td>10</td><td>1300</td></tr><tr><td>6RA7091-6DV62-0</td><td>11</td><td>1300</td></tr><tr><td>6RA7093-4DV62-0</td><td>12</td><td>1500</td></tr><tr><td>6RA7095-4DV62-0</td><td>13</td><td>1500</td></tr><tr><td>6RA7025-6GV62-0</td><td>14</td><td>1700</td></tr><tr><td>6RA7031-6GV62-0</td><td>15</td><td>1700</td></tr><tr><td>6RA7075-6GV62-0</td><td>16</td><td>1700</td></tr><tr><td>6RA7081-6GV62-0</td><td>17</td><td>1700</td></tr><tr><td>6RA7085-6GV62-0</td><td>18</td><td>1700</td></tr><tr><td>6RA7087-6GV62-0</td><td>19</td><td>1700</td></tr><tr><td>6RA7090-6GV62-0</td><td>20</td><td>1700</td></tr><tr><td>6RA7093-4GV62-0</td><td>21</td><td>1700</td></tr><tr><td>6RA7095-4GV62-0</td><td>22</td><td>1700</td></tr><tr><td>6RA7086-6KV62-0</td><td>23</td><td>2100</td></tr><tr><td>6RA7090-6KV62-0</td><td>24</td><td>2100</td></tr><tr><td>6RA7093-4KV62-0</td><td>25</td><td>2100</td></tr><tr><td>6RA7095-4KV62-0</td><td>26</td><td>2100</td></tr><tr><td>6RA7088-6LV62-0</td><td>27</td><td>2500</td></tr><tr><td>6RA7093-4LV62-0</td><td>28</td><td>2500</td></tr><tr><td>6RA7095-4LV62-0</td><td>29</td><td>2500</td></tr><tr><td>6RA7018-6DS22-0</td><td>30</td><td>1300</td></tr><tr><td>6RA7025-6DS22-0</td><td>31</td><td>1300</td></tr><tr><td>6RA7028-6DS22-0</td><td>32</td><td>1300</td></tr><tr><td>6RA7031-6DS22-0</td><td>33</td><td>1300</td></tr><tr><td>6RA7075-6DS22-0</td><td>34</td><td>1300</td></tr><tr><td>6RA7078-6DS22-0</td><td>35</td><td>1300</td></tr><tr><td>6RA7081-6DS22-0</td><td>36</td><td>1300</td></tr><tr><td>6RA7085-6DS22-0</td><td>37</td><td>1300</td></tr><tr><td>6RA7087-6DS22-0</td><td>38</td><td>1300</td></tr><tr><td>6RA7091-6DS22-0</td><td>39</td><td>1300</td></tr><tr><td>6RA7093-4DS22-0</td><td>40</td><td>1500</td></tr><tr><td>6RA7095-4DS22-0</td><td>41</td><td>1500</td></tr></table>		MLFB SIMOREG DC-MASTER	MLFB characteristic number (r070)	Setting value for U577 [V]	6RA7013-6DV62-0	1	1300	6RA7018-6DV62-0	2	1300	6RA7025-6DV62-0	3	1300	6RA7028-6DV62-0	4	1300	6RA7031-6DV62-0	5	1300	6RA7075-6DV62-0	6	1300	6RA7078-6DV62-0	7	1300	6RA7081-6DV62-0	8	1300	6RA7085-6DV62-0	9	1300	6RA7087-6DV62-0	10	1300	6RA7091-6DV62-0	11	1300	6RA7093-4DV62-0	12	1500	6RA7095-4DV62-0	13	1500	6RA7025-6GV62-0	14	1700	6RA7031-6GV62-0	15	1700	6RA7075-6GV62-0	16	1700	6RA7081-6GV62-0	17	1700	6RA7085-6GV62-0	18	1700	6RA7087-6GV62-0	19	1700	6RA7090-6GV62-0	20	1700	6RA7093-4GV62-0	21	1700	6RA7095-4GV62-0	22	1700	6RA7086-6KV62-0	23	2100	6RA7090-6KV62-0	24	2100	6RA7093-4KV62-0	25	2100	6RA7095-4KV62-0	26	2100	6RA7088-6LV62-0	27	2500	6RA7093-4LV62-0	28	2500	6RA7095-4LV62-0	29	2500	6RA7018-6DS22-0	30	1300	6RA7025-6DS22-0	31	1300	6RA7028-6DS22-0	32	1300	6RA7031-6DS22-0	33	1300	6RA7075-6DS22-0	34	1300	6RA7078-6DS22-0	35	1300	6RA7081-6DS22-0	36	1300	6RA7085-6DS22-0	37	1300	6RA7087-6DS22-0	38	1300	6RA7091-6DS22-0	39	1300	6RA7093-4DS22-0	40	1500	6RA7095-4DS22-0	41	1500			
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PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS) Type	See/ change (Access / state)
	6RA7025-6GS22-0 42 1700 6RA7031-6GS22-0 43 1700 6RA7075-6GS22-0 44 1700 6RA7081-6GS22-0 45 1700 6RA7085-6GS22-0 46 1700 6RA7087-6GS22-0 47 1700 6RA7090-6GS22-0 48 1700 6RA7093-4GS22-0 49 1700 6RA7095-4GS22-0 50 1700 6RA7086-6KS22-0 51 2100 6RA7088-6KS22-0 52 2100 6RA7093-4KS22-0 53 2100 6RA7095-4KS22-0 54 2100 6RA7088-6LS22-0 55 2500 6RA7093-4LS22-0 56 2500 6RA7095-4LS22-0 57 2500 6RA7096-4GV62-0 58 1700 6RA7096-4GS22-0 59 1700 6RA7000-0MV62-0 60 2900 6RA7095-4GS22-5 96 1700 6RA7095-4KS22-5 97 2100 6RA7095-4LS22-5 98 2500 6RA7096-4GS22-5 99 1700 6RA7018-6FV62-0 101 1500 6RA7025-6FV62-0 102 1500 6RA7028-6FV62-0 103 1500 6RA7031-6FV62-0 104 1500 6RA7075-6FV62-0 105 1500 6RA7078-6FV62-0 106 1500 6RA7082-6FV62-0 107 1500 6RA7085-6FV62-0 108 1500 6RA7087-6FV62-0 109 1500 6RA7091-6FV62-0 110 1500 6RA7018-6FS22-0 111 1500 6RA7025-6FS22-0 112 1500 6RA7028-6FS22-0 113 1500 6RA7031-6FS22-0 114 1500 6RA7075-6FS22-0 115 1500 6RA7078-6FS22-0 116 1500 6RA7082-6FS22-0 117 1500 6RA7085-6FS22-0 118 1500 6RA7087-6FS22-0 119 1500 6RA7091-6FS22-0 120 1500 6RA7098-4DV62-0 121 1500 6RA7097-4GV62-0 122 1700 6RA7097-4KV62-0 123 2100 6RA7096-4MV62-0 124 2100 6RA7098-4DS22-0 125 1500 6RA7097-4GS22-0 126 1700 6RA7097-4KS22-0 127 2100 6RA7096-4MS22-0 128 2900 6RA7095-4MV62-0 129 2900			
	MLFB SIMOREG CCP	MLFB characteristic number (n570)	Setting value for U577 [V]	
	6RA7085-6FC00-0 250 1100 6RA7091-6FC00-0 251 1100 6RA7095-6FC00-0 252 1100 6RA7090-6KC00-0 253 1600 6RA7095-6KC00-0 254 1600			
	Note: The setting value for U577 according to the table above defines the maximum permissible value of the voltage limit for the particular unit.			

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS) Type	See/ change (Access / state)																								
U578 (2578)	Voltage setpoint for the pre-charging of the SIMOREG CCP quenching capacitors [from SW 2.2] To successfully turn off the thyristors, the set voltage value defines the minimum charge voltage required for the quenching capacitors in the SIMOREG CCP. This value is used as setpoint for the two-level controller, which precharges the quenching capacitors from the line supply. The maximum pre-charging voltage that can be reached is limited by the - average rectified value of the line supply voltage that is connected (minimum value according to the lower tolerance limit as defined by P351). The value to be set at the parameter U578 should be determined as follows using the characteristic diagrams provided in the Appendix of these operating instructions. To start, the number of the associated characteristic diagram is selected from the following table for the SIMOREG CCP being used (MLFB according to parameter n570 or according to the rating plate) and for the rated armature voltage of the motor according to parameter P101. <table><tr><th>MLFB SIMOREG CCP</th><th>MLFB characteristic number (n570)</th><th>P101 [V]</th><th>No. of the associated characteristic diagram</th></tr><tr><td>6RA7085-6FC00-0</td><td>250</td><td>420 470</td><td>1, 1A 2, 2A</td></tr><tr><td>6RA7091-6FC00-0</td><td>251</td><td>420 470</td><td>3, 3A 4, 4A</td></tr><tr><td>6RA7095-6FC00-0</td><td>252</td><td>420 470</td><td>5, 5A 6, 6A</td></tr><tr><td>6RA7090-6KC00-0</td><td>253</td><td>520 600 720</td><td>7.0, 7.0A 7, 7A 8, 8A</td></tr><tr><td>6RA7095-6KC00-0</td><td>254</td><td>520 600 720</td><td>9.0, 9.0A 9, 9A 10, 10A</td></tr></table> Then, for the specified values of P111 and r072i002, a search is made for the associated voltage value in the characteristic diagram. Below is an example for determining U578 for n570 = 6RA7091-6FC00-0 (characteristic number = 251) P101 = 470 V P111 = 0.23 mH r072i002 = 890.0 A According to n570 and r071 characteristic diagram 4 (4A) should be used. As abscissa value, as an approximation, instead of P111 = 0.23 mH the next lower grid value of 0.22 mH is used. For r072i002 = 890.0 A, a linear interpolation is made in the associated current range 800 A to 900 A. The next higher ordinate grid value for 380 V is used here as an approximation. As a consequence, U578 = 380 V should be set. If the armature circuit inductance according to P111 exceeds the value range shown in the characteristic diagram, then the value should be determined for the maximum value of P111 that is shown. Depending on the values of P111 and r072i002, the voltage value being searched for can lie outside the upper or lower limit shown in the characteristic diagram. The upper limit shown in the characteristic diagram is valid for a value of P351 = -20 % of P078i001 (according to the factory setting). The following upper limit applies for a value of P351 that deviates from the factory setting: $Upper\ limit = \frac{1.35 * P078.001 * \left(1 + \frac{P351}{100 \%}\right)}{1.073}$	MLFB SIMOREG CCP	MLFB characteristic number (n570)	P101 [V]	No. of the associated characteristic diagram	6RA7085-6FC00-0	250	420 470	1, 1A 2, 2A	6RA7091-6FC00-0	251	420 470	3, 3A 4, 4A	6RA7095-6FC00-0	252	420 470	5, 5A 6, 6A	6RA7090-6KC00-0	253	520 600 720	7.0, 7.0A 7, 7A 8, 8A	6RA7095-6KC00-0	254	520 600 720	9.0, 9.0A 9, 9A 10, 10A	145 to 830 [V] 1 V	Ind: None FS=145 Type: O2	P052 = 3 P051 = 40 online
MLFB SIMOREG CCP	MLFB characteristic number (n570)	P101 [V]	No. of the associated characteristic diagram																									
6RA7085-6FC00-0	250	420 470	1, 1A 2, 2A																									
6RA7091-6FC00-0	251	420 470	3, 3A 4, 4A																									
6RA7095-6FC00-0	252	420 470	5, 5A 6, 6A																									
6RA7090-6KC00-0	253	520 600 720	7.0, 7.0A 7, 7A 8, 8A																									
6RA7095-6KC00-0	254	520 600 720	9.0, 9.0A 9, 9A 10, 10A																									

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS) Type	See/ change (Access / state)
	The following situations can occur: <u>Determined voltage value $\leq 145\text{ V}$</u> (lower limit in the characteristic diagram): U578 = 145 V should be set. The successful turn-off operation by the SIMOREG CCP is assured in all situations, however, the voltage load (or torque increase) of the motor that can briefly occur for a turn-off operation is higher than necessary. <u>Determined voltage value lies between the lower limit (145 V) and the upper limit:</u> The voltage value determined should be set at U578. The successful turn-off operation by the SIMOREG CCP is assured in all situations. <u>Determined voltage value $>$ upper limit:</u> Operation involving the basic converter - SIMOREG CCP combination is not permissible. The successful turn-off operation by the SIMOREG CCP is not assured. This problem may be able to be resolved by contacting the manufacturer. <u>Note:</u> When communications are established between the basic converter and SIMOREG CCP (P790=6), then the setpoint according to U578 in the SIMOREG CCP is set using its operating firmware. If the selected setpoint cannot be reached due to the fact that the actual line supply voltage is too low, for operating states < 4.0, the basic converter outputs Alarm A032 - followed by Fault F032 (fault value 3) - to signal that the required charge voltage has not been achieved. If, after commissioning, one of the relevant system parameters changes, then the correct setting of U578 should be checked and, if required, it should be appropriately set again.			
U580 (2580)	Control word for commutation monitoring [from SW 2.1 and higher] Converter commutation is permanently monitored. Fault message F030 is output when a commutation fault is detected and the SIMOREG CCP (if being used) initiates that the thyristors are turned off. Detecting a commutation fault is based on 3 criteria. Using this parameter, these can be individually activated/deactivated for test purposes. 0: None of the 3 decision-making criteria is evaluated 1: Decision-making criterion 1 (adequate voltage-time integral for the commutation) is evaluated 2: Decision-making criterion 2 (curvature of the current cusp) is evaluated 4: Decision-making criterion 3 (magnitude of the current actual value) is evaluated Setting note: Each decision-making criterion is coded using a number. If several decision-making criteria are to be evaluated, then the sum of the corresponding numbers should be set. If $U806 \geq 2$ (this means that the basic converter is a slave connected in parallel), then decision-making criterion 1, is not evaluated independent of the setting of U580.	0 to 7 1	Ind: None FS=7 Type: O2	P052 = 3 P051 = 40 online
U581 (2581)	Diagnostics memory for the commutation monitoring [from SW 2.1 and higher] This memory is updated each time that fault message F030 is output. It includes more detailed information about the cause of the commutation fault, which can be evaluated by Siemens experts.	0 to 65536 1	Ind: 68 Type: O2	P052 = 3

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS) Type	See/ change (Access / state)
U582 (2582)	Response of the commutation monitoring [from SW 2.1 and higher] This parameter can be used to define the response of the commutation - monitoring. 1 After a commutation fault or an overcurrent condition has been detected, this results in an immediate pulse cancellation and Alarm message A030 is output. The pulses are enabled again after approx. 20 ms and alarm message A030 disappears. 2 After a commutation fault or an overcurrent condition has been detected, this results in an immediate pulse cancellation and fault message F030 is output. <u>Notice:</u> The setting U582=1 is not permissible for a selected SIMOREG CCP (P790=6)!	1 to 2 1	Ind: None FS=2 Type: O2	P052 = 3 P051 = 40 online
U583 (2583)	Test command for the SIMOREG CCP [from SW 2.2 and higher] This parameter can be used to issue a turn-off command to the SIMOREG CCP for test purposes. 0 No turn-off command is issued 1 A turn-off command is issued in MI 2 A turn-off command is issued in MII After issuing a single turn-off command to the SIMOREG CCP, this parameter automatically sets itself back to the value 0! <u>Note:</u> If the test command is issued while operational (i.e. in operating states I and II), then the basic converter defines the torque direction required to select the correct test command. In the operating state, torque direction 0 (--) the test command is issued in torque direction I.	0 to 2 1	Ind: None FS = 0 Type: O2	P052 = 3 P051 = 40 online

7.1.2 SINAMICS DCM parameters

(see below for a detailed description)

r50047[0..31]	Faults, supplementary information
r50071	Rated unit supply voltage for armature
p50790	P2P interface operating mode
p50795	P2P/CCP bus termination
p50797	P2P interface telegram monitoring time
r50799[0..8]	P2P/CCP diagnostics
r51560[0..1]	CCP software version
r51569[0...15]	CCP serial number
r51570	CCP order number
r51571	CCP rated supply voltage
r51572	CCP rated current
r51574.0...12	CO/BO: CCP state
r51575	CO: CCP I2t value voltage limiting chopper 1
r51576	CO: CCP I2t value voltage limiting chopper 2
p51577	CCP chopper voltage setpoint, upper response threshold
p51578	CCP quenching capacitor pre-charging voltage setpoint
r51579.0...7	CO/BO: CCP command
p51580	Commutation monitoring, control word
p51583	CCP test turn-off command

Detailed description of parameters

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS)	Access level
r50047 [0...31]	Faults, additional information/fault addit. info Description: Display of additional information on faults that have occurred with numbers from 60000 and higher. [0] = fault value [1] = additional information on the last fault that occurred (refer to the corresponding fault) ... [30] = additional information on the last fault that occurred (refer to the corresponding fault) [31] = fault number	- 1 1	Ind: 32 -	1
r50071	Rated unit supply voltage armature / Unit Va_rated Description: Displays the unit rated supply voltage for the armature according to the rating plate of the unit.	- [Vrms] -	Ind: None -	1
p50790	P2P interface operating mode / P2P operating mode Description: Sets the operating mode for the peer-to-peer interface (P2P interface). Value: 0: No function 5: Peer-to-peer communication 6: Communication with SIMOREG CCP Note: Correct communication is optically displayed using an LED on the Power Interface module C98043-A7046: LED flashes slowly (<1 Hz): Communication with SINAMICS DCM OK LED flashes quickly (~3 Hz): Communication error with SIMOREG CCP	0 to 6 1 1	Ind: None FS = 0	2
p50795	P2P/CCP bus termination / P2P/CCP bus term. Description: Sets the bus termination for the peer-to-peer interface and the interface to the SIMOREG CCP. Value: 0: off 1: on Note: CCP: Converter Commutation Protector P2P: Peer-to-peer interface	0 to 1 1 1	Ind: None FS = 0	2

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS)	Access level
p50797	P2P interface telegram monitoring time / P2P t_tel_monit Description: Sets the telegram monitoring time for the peer-to-peer interface (P2P interface). The set time is only effective in the "peer-to-peer interface" operating mode (p50790 = 5). p50797 = 0: Monitoring is disabled. p50797 > 0: Monitoring is enabled. Within the set time, after a valid telegram has been received, the next valid telegram must be received. Otherwise, Fault F60012 is output. Dependency: See also: F60012 Note: Telegram monitoring is activated in the following cases: - From the reception of the first error-free telegram. - After the electronics power supply has been switched-on. - From the reception of the first error-free telegram after the telegram monitoring responds (when the telegram monitoring time expires - timeout). The telegram monitoring time (p50797) is dependent on the selected baud rate (p50793). For safe, reliable operation, the following minimum setting values are recommended: - 300 Baud → p50797 = 0.520 s (recommended minimum value) - 600 Baud → p50797 = 0.260 s (recommended minimum value) - 1200 Baud → p50797 = 0.140 s (recommended minimum value) - 2400 Baud → p50797 = 0.080 s (recommended minimum value) - 4800 Baud → p50797 = 0.040 s (recommended minimum value) If, for the peer-to-peer communication partner, the "automatic restart" function (p50086 > 0) is selected, then only the parameterization p50797 > p50086 (of the communication partner) makes sense.	0 to 65 [s] 0.01 s	Ind: None FS = 0	2
r50799 [0...8]	P2P/CCP diagnostics / P2P/CCP diag Description: Displays the diagnostics information for the peer-to-peer interface and the interface to the SIMOREG CCP. Index: [0] = number of error-free telegrams [1] = number telegrams with error [2] = number of byte frame errors [3] = number of overrun errors [4] = number of parity errors [5] = number of STX errors [6] = number of block check errors [7] = number of break errors [8] = number of timeout errors Note: The error frequency is detected using free-running counters and when 65535 is reached, the particular counter is reset to 0. For communication with SIMOREG CCP (p50790 = 6) the diagnostics information in indices 5, 6 and 8 has no significance. Possible error causes for STX errors: - The start pause before STX was not maintained. - STX error, i.e. not equal to 02. Possible error cause for timeout errors: - The telegram monitoring interval has expired (p50797).	0 to 65534 1 1	Ind: 9 -	1
r51560 [0...1]	CCP software version / CCP SW version Description: Displays the software version for the Converter Communication Protector (CCP). Index: [0] = version release of the CCP software [1] = version release of the software of the CCP boot sector	- - -	Ind: 2 -	3

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS)	Access level			
r51569 [0...15]	CCP serial number / CCP serial No. Description: Displays the serial number of the Converter Commutation Protector (CCP). Note: The individual characters of the number are displayed in the ASCII code in the indices. An ASCII table (excerpt) can be found in the Appendix of the List Manual for example.	0 to 255 1 1	Ind: 16 -	3			
r51570	CCP order number / CCP Order No. Description: Displays the order number (MLFB) of the connected Converter Commutation Protector (CCP). Value: 0: No CCP connected 250: 6RA7085-6FC00-0 251: 6RA7091-6FC00-0 252: 6RA7095-6FC00-0 253: 6RA7090-6KC00-0 254: 6RA7095-6KC00-0	0 to 254 1 1	Ind: None -	3			
r51571	CCP rated supply voltage / CCP V_{rated} Description: Displays the rated supply voltage according to the rating plate of the Converter Communication Protector (CCP).	- [V] -	Ind: None -	3			
r51572	CCP rated current / CCP I_{rated} Description: Displays the rated current according to the rating plate of the Converter Communication Protector (CCP).	- [A] -	Ind: None -	3			
r51574. 0...12	CO/BO: CCP state/ CCP state Description: Displays the connector output for the state of the Converter Communication Protector (CCP).		- 1 1	Ind: None -	3		
	Bit array	Signal name				1 signal	0 signal
	Bit 00	Voltage at U, V, W ok.				Yes	No
	Bit 01	Voltage at C - D higher than +100 V				Yes	No
	Bit 02	Voltage at C - D less than -100 V				Yes	No
	Bit 03	Quenching capacitors have reached their setpoint voltage				Yes	No
	Bit 04	Turn-off operation running				Yes	No
	Bit 05	Connection between parallel CCP ok.				Yes	No
	Bit 08	Connector X165_2 (at the DCM) is connected with X165 (at the CCP)				Yes	No
	Bit 09	I2t value voltage limiting chopper 1 too high				Yes	No
	Bit 10	I2t value voltage limiting chopper 2 too high				Yes	No
	Bit 11	Memory for technical data for the CCP ok.				Yes	No
	Bit 12	Chopper capacitors pre-charging completed				Yes	No
r51575	CO: CCP I2t value voltage limiting chopper 1 / CCP I2t chopper 1 Description: Displays the I2t value for voltage limiting chopper 1 for the Converter Commutation Protector (CCP).	- [%] -	Ind: None -	3			
r51576	CO: CCP I2t value voltage limiting chopper 2 / CCP I2t chopper 2 Description: Displays the I2t value for voltage limiting chopper 2 for the Converter Commutation Protector (CCP).	- [%] -	Ind: None -	3			

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS)	Access level																																																																																												
p51577	CCP chopper voltage setpoint, upper response threshold / CCP V_set thresh up Description: Sets the upper response threshold of the voltage limiter implemented in the CCP. Within the scope of the turn-off operation of the CCP, this limits the counter-voltage - which is also necessary - that occurs when the armature current is reduced to a value that is not dangerous for the basic converter unit and the associated CCP. Note: CCP: Converter Commutation Protector The parameter is automatically set for the "Optimization run for CCP" (p50051 = 30). The following table should be used to correctly set this parameter. As a result of the unit MLFB for the basic converter unit and SIMOREG CCP, two setting values are obtained from which the lower of the two should be set at p51577. Example: Basic converter unit MLFB: 6RA8085-6DV62-0 □ p51577=1300 V SIMOREG CCP MLFB: 6RA7085-6FC00-0 □ p51577=1100 V therefore the following setting is obtained: p51577=1100 V Table to determine the setting value for p51577: <table><tr><th>MLFB SINAMICS DCM</th><th>Setting value for p51577 [V]</th></tr><tr><td>6RA8013-6DV62-0AA0</td><td>1300</td></tr><tr><td>6RA8018-6DV62-0AA0</td><td>1300</td></tr><tr><td>6RA8025-6DV62-0AA0</td><td>1300</td></tr><tr><td>6RA8028-6DV62-0AA0</td><td>1300</td></tr><tr><td>6RA8031-6DV62-0AA0</td><td>1300</td></tr><tr><td>6RA8075-6DV62-0AA0</td><td>1300</td></tr><tr><td>6RA8078-6DV62-0AA0</td><td>1300</td></tr><tr><td>6RA8081-6DV62-0AA0</td><td>1300</td></tr><tr><td>6RA8085-6DV62-0AA0</td><td>1300</td></tr><tr><td>6RA8087-6DV62-0AA0</td><td>1300</td></tr><tr><td>6RA8091-6DV62-0AA0</td><td>1300</td></tr><tr><td>6RA8093-4DV62-0AA0</td><td>1500</td></tr><tr><td>6RA8095-4DV62-0AA0</td><td>1500</td></tr><tr><td>6RA8098-4DV62-0AA0</td><td>1500</td></tr><tr><td>6RA8013-6FV62-0AA0</td><td>1500</td></tr><tr><td>6RA8018-6FV62-0AA0</td><td>1500</td></tr><tr><td>6RA8025-6FV62-0AA0</td><td>1500</td></tr><tr><td>6RA8028-6FV62-0AA0</td><td>1500</td></tr><tr><td>6RA8031-6FV62-0AA0</td><td>1500</td></tr><tr><td>6RA8075-6FV62-0AA0</td><td>1500</td></tr><tr><td>6RA8078-6FV62-0AA0</td><td>1500</td></tr><tr><td>6RA8082-6FV62-0AA0</td><td>1500</td></tr><tr><td>6RA8085-6FV62-0AA0</td><td>1500</td></tr><tr><td>6RA8087-6FV62-0AA0</td><td>1500</td></tr><tr><td>6RA8091-6FV62-0AA0</td><td>1500</td></tr><tr><td>6RA8025-6GV62-0AA0</td><td>1700</td></tr><tr><td>6RA8031-6GV62-0AA0</td><td>1700</td></tr><tr><td>6RA8075-6GV62-0AA0</td><td>1700</td></tr><tr><td>6RA8081-6GV62-0AA0</td><td>1700</td></tr><tr><td>6RA8085-6GV62-0AA0</td><td>1700</td></tr><tr><td>6RA8087-6GV62-0AA0</td><td>1700</td></tr><tr><td>6RA8090-6GV62-0AA0</td><td>1700</td></tr><tr><td>6RA8093-4GV62-0AA0</td><td>1700</td></tr><tr><td>6RA8095-4GV62-0AA0</td><td>1700</td></tr><tr><td>6RA8096-4GV62-0AA0</td><td>1700</td></tr><tr><td>6RA8097-4GV62-0AA0</td><td>1700</td></tr><tr><td>6RA8086-6KV62-0AA0</td><td>2100</td></tr><tr><td>6RA8090-6KV62-0AA0</td><td>2100</td></tr><tr><td>6RA8093-4KV62-0AA0</td><td>2100</td></tr><tr><td>6RA8095-4KV62-0AA0</td><td>2100</td></tr><tr><td>6RA8097-4KV62-0AA0</td><td>2100</td></tr><tr><td>6RA8088-6LV62-0AA0</td><td>2500</td></tr><tr><td>6RA8093-4LV62-0AA0</td><td>2500</td></tr><tr><td>6RA8095-4LV62-0AA0</td><td>2500</td></tr><tr><td>6RA8096-4MV62-0AA0</td><td>2900</td></tr></table>	MLFB SINAMICS DCM	Setting value for p51577 [V]	6RA8013-6DV62-0AA0	1300	6RA8018-6DV62-0AA0	1300	6RA8025-6DV62-0AA0	1300	6RA8028-6DV62-0AA0	1300	6RA8031-6DV62-0AA0	1300	6RA8075-6DV62-0AA0	1300	6RA8078-6DV62-0AA0	1300	6RA8081-6DV62-0AA0	1300	6RA8085-6DV62-0AA0	1300	6RA8087-6DV62-0AA0	1300	6RA8091-6DV62-0AA0	1300	6RA8093-4DV62-0AA0	1500	6RA8095-4DV62-0AA0	1500	6RA8098-4DV62-0AA0	1500	6RA8013-6FV62-0AA0	1500	6RA8018-6FV62-0AA0	1500	6RA8025-6FV62-0AA0	1500	6RA8028-6FV62-0AA0	1500	6RA8031-6FV62-0AA0	1500	6RA8075-6FV62-0AA0	1500	6RA8078-6FV62-0AA0	1500	6RA8082-6FV62-0AA0	1500	6RA8085-6FV62-0AA0	1500	6RA8087-6FV62-0AA0	1500	6RA8091-6FV62-0AA0	1500	6RA8025-6GV62-0AA0	1700	6RA8031-6GV62-0AA0	1700	6RA8075-6GV62-0AA0	1700	6RA8081-6GV62-0AA0	1700	6RA8085-6GV62-0AA0	1700	6RA8087-6GV62-0AA0	1700	6RA8090-6GV62-0AA0	1700	6RA8093-4GV62-0AA0	1700	6RA8095-4GV62-0AA0	1700	6RA8096-4GV62-0AA0	1700	6RA8097-4GV62-0AA0	1700	6RA8086-6KV62-0AA0	2100	6RA8090-6KV62-0AA0	2100	6RA8093-4KV62-0AA0	2100	6RA8095-4KV62-0AA0	2100	6RA8097-4KV62-0AA0	2100	6RA8088-6LV62-0AA0	2500	6RA8093-4LV62-0AA0	2500	6RA8095-4LV62-0AA0	2500	6RA8096-4MV62-0AA0	2900	850 to 2900 [V] 1 V	Ind: None FS=1600	3
MLFB SINAMICS DCM	Setting value for p51577 [V]																																																																																															
6RA8013-6DV62-0AA0	1300																																																																																															
6RA8018-6DV62-0AA0	1300																																																																																															
6RA8025-6DV62-0AA0	1300																																																																																															
6RA8028-6DV62-0AA0	1300																																																																																															
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6RA8095-4LV62-0AA0	2500																																																																																															
6RA8096-4MV62-0AA0	2900																																																																																															

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS)	Access level
	6RA8025-6DS22-0AA0 1300 6RA8028-6DS22-0AA0 1300 6RA8031-6DS22-0AA0 1300 6RA8075-6DS22-0AA0 1300 6RA8078-6DS22-0AA0 1300 6RA8081-6DS22-0AA0 1300 6RA8085-6DS22-0AA0 1300 6RA8087-6DS22-0AA0 1300 6RA8091-6DS22-0AA0 1300 6RA8093-4DS22-0AA0 1500 6RA8095-4DS22-0AA0 1500 6RA8098-4DS22-0AA0 1500 6RA8025-6FS22-0AA0 1500 6RA8028-6FS22-0AA0 1500 6RA8031-6FS22-0AA0 1500 6RA8075-6FS22-0AA0 1500 6RA8078-6FS22-0AA0 1500 6RA8082-6FS22-0AA0 1500 6RA8085-6FS22-0AA0 1500 6RA8087-6FS22-0AA0 1500 6RA8091-6FS22-0AA0 1500 6RA8025-6GS22-0AA0 1700 6RA8031-6GS22-0AA0 1700 6RA8075-6GS22-0AA0 1700 6RA8081-6GS22-0AA0 1700 6RA8085-6GS22-0AA0 1700 6RA8087-6GS22-0AA0 1700 6RA8090-6GS22-0AA0 1700 6RA8093-4GS22-0AA0 1700 6RA8095-4GS22-0AA0 1700 6RA8096-4GS22-0AA0 1700 6RA8097-4GS22-0AA0 1700 6RA8086-6KS22-0AA0 2100 6RA8090-6KS22-0AA0 2100 6RA8093-4KS22-0AA0 2100 6RA8095-4KS22-0AA0 2100 6RA8097-4KS22-0AA0 2100 6RA8088-6LS22-0AA0 2500 6RA8093-4LS22-0AA0 2500 6RA8095-4LS22-0AA0 2500 6RA8096-4MS22-0AA0 2900 MLFB SIMOREG CCP Setting value for p51577 [V] 6RA7085-6FC00-0 1100 6RA7091-6FC00-0 1100 6RA7095-6FC00-0 1100 6RA7090-6KC00-0 1600 6RA7095-6KC00-0 1600 <u>Note:</u> The setting value for p51577, according to the table above, defines the maximum permissible value of the voltage limit for the particular unit.			
p51578	CCP quenching capacitor pre-charging voltage setpoint / C pre-charging V_{set} Description: Setting of the minimum required charge voltage of the quenching capacitors in the CCP for successful thyristor turn-off. This value is used as setpoint for the two-level controller, which precharges the quenching capacitors from the line supply. The maximum pre-charging voltage that can be reached is limited by the rectified average value of the line supply voltage that is connected. Note: CCP: Converter Commutation Protector The parameter is automatically set for the "Optimization run for CCP" (p50051 = 30). The correct setting for this parameter can be taken from the following reference: SIMOREG CCP operating instructions	145 to 830 [V] 1V	Ind: None FS=145	3

PNU	Description			Value range [dimension] Graduation	No. of indices Factory setting (FS)	Access level
	MLFB SIMOREG CCP	p50101 [V]	No. of the associated characteristic diagram			
	6RA7085-6FC00-0	420 470	1, 1A 2, 2A			
	6RA7091-6FC00-0	420 470	3, 3A 4, 4A			
	6RA7095-6FC00-0	420 470	5, 5A 6, 6A			
	6RA7090-6KC00-0	520 600 720	7.0, 7.0A 7, 7A 8, 8A			
	6RA7095-6KC00-0	520 600 720	9.0, 9.0A 9, 9A 10, 10A			
	Then, for the specified values of p50111 and r50072[1], a search is made for the associated voltage value in the characteristic diagram. Below is an example for determining p51578 for p51570 = 6RA7091-6FC00-0 p50101 = 470 V p50111 = 0.23 mH r50072[1] = 890.0 A According to p51570 and r50071, characteristic diagram 4 (4A) should be used. As abscissa value, the next lower grid value of 0.22 mH is used as an approximation, instead of P50111 = 0.23 mH. For r50072[1] = 890.0 A, a linear interpolation is made in the associated current range 800 A to 900 A. The next higher ordinate grid value for 380 V is used here as an approximation. As a consequence, p51578 = 380 V should be set. If the armature circuit inductance according to p50111 exceeds the value range shown in the characteristic diagram, then the value should be determined for the maximum value of p50111 that is shown. Depending on the values of p50111 and r50072[1], the voltage value being searched for can lie outside the upper or lower limit shown in the characteristic diagram. The upper limit shown in the characteristic diagram is valid for a value of p50351 = -20 % of p50078[0] (according to the factory setting). The following upper limit applies for a value of p50351 that deviates from the factory setting: $\text{Upper limit} = \frac{1.35 * p50078[0] * \left(1 + \frac{p50351}{100 \%}\right)}{1.073}$					

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS)	Access level																																				
	The following situations can occur: <u>Determined voltage value < 145 V</u> (lower limit in the characteristic diagram): p51578 = 145 V should be set. The successful turn-off operation by the SIMOREG CCP is assured in all situations, however, the voltage load (or torque increase) of the motor that can briefly occur for a turn-off operation is higher than necessary. <u>Determined voltage value lies between the lower limit (145 V) and the upper limit:</u> The voltage value determined should be set at p51578. The successful turn-off operation by the SIMOREG CCP is assured in all situations. <u>Determined voltage value > upper limit:</u> Operation involving the basic converter unit - SIMOREG CCP combination is not permissible. The successful turn-off operation by the SIMOREG CCP is not assured. This problem may be able to be resolved by contacting the manufacturer. <u>Note:</u> When communications are established between the basic converter unit and SIMOREG CCP (p50790=6), then the setpoint according to p51578 in the SIMOREG CCP is set using its operating firmware. If the selected setpoint cannot be reached due to the fact that the actual line supply voltage is too low, for operating states < 4.0, the basic converter outputs Alarm A60321 - followed by Fault F60320 (fault value 3) - to signal that the required charge voltage has not been achieved. If one of the relevant system parameters changes after commissioning, then the correct setting of p51578 should be checked, and if required, it should be appropriately set again.																																							
r51579. 0...7	CO/BO: CCP command/ CCP command Description: Display and connector output for the commands from the SINAMICS DCM to the SIMOREG CCP. <table><tr><th>Bit array</th><th>Signal name</th><th>1 signal</th><th>0 signal</th></tr><tr><td>Bit 00</td><td>Fire turn-off thyristors</td><td>Yes</td><td>No</td></tr><tr><td>Bit 01</td><td>Line supply voltage (armature) in the tolerance range</td><td>Yes</td><td>No</td></tr><tr><td>Bit 02</td><td>CCP connected to the parallel switching master</td><td>Yes</td><td>No</td></tr><tr><td>Bit 03</td><td>Main contactor CLOSE</td><td>Yes</td><td>No</td></tr><tr><td>Bit 04</td><td>Torque direction I active</td><td>Yes</td><td>No</td></tr><tr><td>Bit 05</td><td>Torque direction II active</td><td>Yes</td><td>No</td></tr><tr><td>Bit 06</td><td>Reserved (always 1)</td><td>Yes</td><td>No</td></tr><tr><td>Bit 07</td><td>Reserved (always 1)</td><td>Yes</td><td>No</td></tr></table> Note: CCP: Converter Commutation Protector	Bit array	Signal name	1 signal	0 signal	Bit 00	Fire turn-off thyristors	Yes	No	Bit 01	Line supply voltage (armature) in the tolerance range	Yes	No	Bit 02	CCP connected to the parallel switching master	Yes	No	Bit 03	Main contactor CLOSE	Yes	No	Bit 04	Torque direction I active	Yes	No	Bit 05	Torque direction II active	Yes	No	Bit 06	Reserved (always 1)	Yes	No	Bit 07	Reserved (always 1)	Yes	No	0 to 255 1 1	Ind: None -	3
Bit array	Signal name	1 signal	0 signal																																					
Bit 00	Fire turn-off thyristors	Yes	No																																					
Bit 01	Line supply voltage (armature) in the tolerance range	Yes	No																																					
Bit 02	CCP connected to the parallel switching master	Yes	No																																					
Bit 03	Main contactor CLOSE	Yes	No																																					
Bit 04	Torque direction I active	Yes	No																																					
Bit 05	Torque direction II active	Yes	No																																					
Bit 06	Reserved (always 1)	Yes	No																																					
Bit 07	Reserved (always 1)	Yes	No																																					
p51580	Commutation monitoring control word / commut_monit STW Description: Setting of the criterion to detect a commutation fault for the commutation monitoring. <table><tr><th>Bit array</th><th>Signal name</th><th>1 signal</th><th>0 signal</th></tr><tr><td>Bit 00</td><td>Use criterion 1 (message from the thyristor blocking voltage)</td><td>Yes</td><td>No</td></tr><tr><td>Bit 01</td><td>Use criterion 2 (curvature of the current cusp)</td><td>Yes</td><td>No</td></tr><tr><td>Bit 02</td><td>Use criterion 3 (magnitude of the current actual value)</td><td>Yes</td><td>No</td></tr></table> Note: Converter commutation is permanently monitored. When a commutation fault is detected, Fault F60030 is output and thyristor turn-off is initiated by the CCP (if being used). The detection of a commutation fault is based on 3 decision-making criteria. Using this parameter, these can be individually set for test purposes. If several decision-making criteria are to be evaluated, then the sum of the corresponding numbers should be set.	Bit array	Signal name	1 signal	0 signal	Bit 00	Use criterion 1 (message from the thyristor blocking voltage)	Yes	No	Bit 01	Use criterion 2 (curvature of the current cusp)	Yes	No	Bit 02	Use criterion 3 (magnitude of the current actual value)	Yes	No	0 to 7 1 1	Ind: None FS = 7	3																				
Bit array	Signal name	1 signal	0 signal																																					
Bit 00	Use criterion 1 (message from the thyristor blocking voltage)	Yes	No																																					
Bit 01	Use criterion 2 (curvature of the current cusp)	Yes	No																																					
Bit 02	Use criterion 3 (magnitude of the current actual value)	Yes	No																																					

PNU	Description	Value range [dimension] Graduation	No. of indices Factory setting (FS)	Access level
p51583	CCP test turn-off command / CCP turn-off command Description: Setting to issue a turn-off command to the Converter Commutation Protector (CCP) for test purposes. Value: 0: No turn-off command 1: Issue in torque direction I 2: Issue in torque direction II Notice: After a turn-off command has been issued to the CCP, this parameter automatically sets itself back to the value 0. Note: If the test command is issued during operation (i.e. in the operating state o0.1 or o0.2), then the turn-off operation of the SIMOREG CCP acts on the thyristor bridge that is presently enabled. This is independent of issuing the turn-off command in torque direction I or II.	0 to 2 1 1	Ind: None FS = 0	3

7.1.3 SIMOREG DC-MASTER connectors

States of the SIMOREG CCP				
K0574	State of the SIMOREG CCP Significance of the individual bits: See under parameter n574	1 $\triangle$ 1		
K0575	I2t value of voltage limiting chopper 1 of the SIMOREG CCP	16384 $\triangle$ 100%		
K0576	I2t value of voltage limiting chopper 2 of the SIMOREG CCP	16384 $\triangle$ 100%		
K0577	Low byte: Command to the SIMOREG CCP Bit0 = Fire turn-off thyristors Bit1 = Line supply voltage (armature) is in the tolerance range Bit2 = This SIMOREG CCP is connected to the parallel switching master Bit3 = Main contactor CLOSE Bit4 = Torque direction 1 active Bit5 = Torque direction 2 active Bit6 = always 1 Bit 7 = always 1 High byte: Diagnostics information about the monitoring of the blocking voltage-time integral The monitoring of the blocking voltage-time integral results in the SIMOREG CCP being triggered (and A030 or F030 with fault value 1), if bit 8 OR bit 9 = 1 AND ALL additional bits = 1 (i.e. the condition is fulfilled) Bit 8 = Torque direction I AND EMF $\leq$ +5% (i.e. regenerative feedback) Bit9 = Torque direction II AND EMF $\geq$ -5% (i.e. regenerative feedback) Bit 10 = delay angle $> 90^\circ$ (i.e. regenerative feedback) Bit 11 = no return pulse jump Bit12 = Armature current flows (The I = 0 signal has been present for a maximum of 0.6 ms) Bit13 = The blocking voltage-time integral is too low (< 50% of the theoretical value) Bit14 = Decision-making criteria 1 is evaluated (see U580) Bit15 = "No parallel operation" or "Parallel switching master" (U800 = 0 OR U800 = 1 OR [U800 = 2 AND U806 $>$ 10]) Note: Bits 8 and 9 are always updated. For all other a bits, the following applies: The bits after the first bit with the value zero are invalid!	1 $\triangle$ 1		

7.1.4 SIMOREG DC-MASTER faults

F030	Commutation fault or an overcurrent condition has occurred - or a test command was issued via U583 (active in all operating states)	
	Possible error causes	
	- Line voltage dip during regenerative operation - Current control loop not optimized	
	Fault value: r047 indices 002 to 016:	
	1	The blocking voltage-time integral for the commutating thyristor pair was too small
	2	The current cusp breaks upwards
	3	The amplitude of the current cusp was higher than 250% of the actual rated unit current according to r072i002
	for i001= 1 to 3 and 5, i002 to i006 are valid for i001= 4, i002 to i015 are invalid	
	i002 delay angle (K0100) for a fault situation	
	i003 EMF actual value (K0287) for a fault situation	
	i004 Gating unit diagnostics (K0989) for a fault situation	
	i005 Field current actual value (K0265) for a fault situation	
	i006 Pulse number (K0105) for a fault situation	

7.1.5 SINAMICS DCM faults

F60300	Commutation fault or an overcurrent condition has occurred - or a test command was issued via p51583 (active in all operating states) Possible error causes - Line voltage dip during regenerative operation - Current control loop not optimized Fault value: r50047[0..8]: <table border="1"> <tr> <td data-bbox="212 427 821 1877"> 1: Commutation was unsuccessful because the commutating thyristor did not assume a blocking voltage (only when parameter p50166 is activated). 2: The current cusp breaks upwards 3: The amplitude of the current cusp was greater than 290 % of the actual rated unit current acc. to r50072[1]. 4: A SINAMICS DCM connected in parallel has detected a commutation fault or an overcurrent condition. 5: Test command was entered via p51583. </td><td data-bbox="821 427 1436 1877"> Criterion 1: r50047[0] = decision-making criterion (=1) r50047[1] = fired thyristor pairs r50047[2] = thyristor state (=r53146) r50047[3] = actual delay angle r50047[4] = actual EMF as a % Criterion 2: r50047[0] = decision-making criterion (=2) Criterion 2.1: r50047[1] = sub-criterion (=1) r50047[2] = delta Ia sampling values when initiating r50047[3] = last Ia sampling value r50047[4] = actual Ia sampling value r50047[5] = actual delay angle r50047[6] = currently valid counter status Criterion 2.2: r50047[1] = sub-criterion (=2) r50047[2] = delta Ia sampling values when initiating r50047[3] = delta minimum r50047[4] = actual Ia sampling value r50047[5] = first delta Ia r50047[6] = actual delay angle r50047[7] = currently valid counter status Criterion 3: r50047[0] = decision-making criterion (=3) r50047[1] = delta counter status when initiating r50047[2] = last CD voltage r50047[3] = actual CD voltage r50047[4] = delta Va r50047[5] = actual delay angle r50047[6] = actual firing instant r50047[7] = actual EMF r50047[8] = actual Ia sampling value Triggering a CCP in a parallel connection: r50047[0] = fault value (=4) Test command: r50047[0] = decision-making criterion (=5) r50047[1] = actual CD voltage r50047[2] = actual delay angle r50047[3] = actual firing instant r50047[4] = actual EMF r50047[5] = actual Ia sampling value r50047[6] = torque direction when triggering </td></tr> </table>	1: Commutation was unsuccessful because the commutating thyristor did not assume a blocking voltage (only when parameter p50166 is activated). 2: The current cusp breaks upwards 3: The amplitude of the current cusp was greater than 290 % of the actual rated unit current acc. to r50072[1]. 4: A SINAMICS DCM connected in parallel has detected a commutation fault or an overcurrent condition. 5: Test command was entered via p51583.	Criterion 1: r50047[0] = decision-making criterion (=1) r50047[1] = fired thyristor pairs r50047[2] = thyristor state (=r53146) r50047[3] = actual delay angle r50047[4] = actual EMF as a % Criterion 2: r50047[0] = decision-making criterion (=2) Criterion 2.1: r50047[1] = sub-criterion (=1) r50047[2] = delta Ia sampling values when initiating r50047[3] = last Ia sampling value r50047[4] = actual Ia sampling value r50047[5] = actual delay angle r50047[6] = currently valid counter status Criterion 2.2: r50047[1] = sub-criterion (=2) r50047[2] = delta Ia sampling values when initiating r50047[3] = delta minimum r50047[4] = actual Ia sampling value r50047[5] = first delta Ia r50047[6] = actual delay angle r50047[7] = currently valid counter status Criterion 3: r50047[0] = decision-making criterion (=3) r50047[1] = delta counter status when initiating r50047[2] = last CD voltage r50047[3] = actual CD voltage r50047[4] = delta Va r50047[5] = actual delay angle r50047[6] = actual firing instant r50047[7] = actual EMF r50047[8] = actual Ia sampling value Triggering a CCP in a parallel connection: r50047[0] = fault value (=4) Test command: r50047[0] = decision-making criterion (=5) r50047[1] = actual CD voltage r50047[2] = actual delay angle r50047[3] = actual firing instant r50047[4] = actual EMF r50047[5] = actual Ia sampling value r50047[6] = torque direction when triggering
1: Commutation was unsuccessful because the commutating thyristor did not assume a blocking voltage (only when parameter p50166 is activated). 2: The current cusp breaks upwards 3: The amplitude of the current cusp was greater than 290 % of the actual rated unit current acc. to r50072[1]. 4: A SINAMICS DCM connected in parallel has detected a commutation fault or an overcurrent condition. 5: Test command was entered via p51583.	Criterion 1: r50047[0] = decision-making criterion (=1) r50047[1] = fired thyristor pairs r50047[2] = thyristor state (=r53146) r50047[3] = actual delay angle r50047[4] = actual EMF as a % Criterion 2: r50047[0] = decision-making criterion (=2) Criterion 2.1: r50047[1] = sub-criterion (=1) r50047[2] = delta Ia sampling values when initiating r50047[3] = last Ia sampling value r50047[4] = actual Ia sampling value r50047[5] = actual delay angle r50047[6] = currently valid counter status Criterion 2.2: r50047[1] = sub-criterion (=2) r50047[2] = delta Ia sampling values when initiating r50047[3] = delta minimum r50047[4] = actual Ia sampling value r50047[5] = first delta Ia r50047[6] = actual delay angle r50047[7] = currently valid counter status Criterion 3: r50047[0] = decision-making criterion (=3) r50047[1] = delta counter status when initiating r50047[2] = last CD voltage r50047[3] = actual CD voltage r50047[4] = delta Va r50047[5] = actual delay angle r50047[6] = actual firing instant r50047[7] = actual EMF r50047[8] = actual Ia sampling value Triggering a CCP in a parallel connection: r50047[0] = fault value (=4) Test command: r50047[0] = decision-making criterion (=5) r50047[1] = actual CD voltage r50047[2] = actual delay angle r50047[3] = actual firing instant r50047[4] = actual EMF r50047[5] = actual Ia sampling value r50047[6] = torque direction when triggering		

F60320	SIMOREG CCP not ready
Possible error causes	
• Missing connection or interrupted cable at X177 • For a parallel connection, missing connection or interrupted cable at X165/X166 (parallel interface, master) • For a parallel connection, missing connection or interrupted cable at X29_PAR or X30_PAR (turn-off pulse interface) • Hardware defect in the charge circuit of the quenching capacitors • Ruptured fuse in the armature circuit, either line side or motor side • Ruptured fuse in the pre-charging circuit for the chopper capacitors • presently in the cooling-down phase necessary for the chopper resistors • MLFB data of the SIMOREG CCP (r51570,r51571,r51572) invalid or not available	
Fault value:	
r50047[0..2]:	
1 Voltage not available at the connections U, V, W of the SIMOREG CCP. Trigger time: 5 s.	r50047[0] = fault value r50047[1] = CCP state (extended status word + r51574) r50047[2] = armature voltage
2 Voltage at C-D at the SIMOREG CCP does not match the voltage C-D at the SINAMICS DCM. Trigger time: 15 s.	
3 The quenching capacitors of the SIMOREG CCP have not reached the setpoint voltage. Trigger time: 15 s for 460 V, 7 s for 690 V.	
4 The parallel interface cable is not connected at the SIMOREG CCP, which is assigned the parallel switching master. Trigger time: 15 s.	
5 No connection between the SINAMICS DCM and SIMOREG CCP via the serial interface. (The dynamic values are not updated) Trigger time: 15 s	
6 No connection between parallel SIMOREG CCP units. Trigger time: 15 s	
7 Contents of the memory of the technical data of the SIMOREG CCP (MLFB, rated values, serial number) invalid. Trigger time: immediately	
11 The I2t value (r51575) of the voltage limiting chopper 1 is too high (> 100 %). Trigger time: immediately	
12 The I2t value (r51576) of the voltage limiting chopper 2 is too high (> 50 %). Trigger time: immediately	
20 The pre-charging of the chopper capacitors was not able to be completed within the time set in p50089 - or the condition according to fault value 5 is fulfilled. Trigger time: 20 ms.	

F60050	Optimization run interrupted by an internal cause. Possible error causes • Missing connection or interrupted cable at X177 • For a parallel connection, missing connection or interrupted cable at X165/X166 (parallel interface, master) • For a parallel connection, missing connection or interrupted cable at X29_PAR or X30_PAR (turn-off pulse interface) • Hardware defect in the charge circuit of the quenching capacitors • Ruptured fuse in the armature circuit, either line side or motor side • Ruptured fuse in the pre-charging circuit for the chopper capacitors • presently in the cooling-down phase necessary for the chopper resistors • MLFB data of the SIMOREG CCP (r51570, r51571, r51572) invalid or not available Fault value: r50047[0..4]	
701 702 703 704 705 706 707 708	Parameter p50790 P2P-interface, operating mode not set to communicate with SIMOREG CCP No communication to the CCP p51570 incorrect order number (MLFB) of the CCP Incorrect supply voltage SINAMICS DCM chopper threshold = 0 Armature circuit inductance = 0 $V_{max} >$ as maximum value that can be set for p51578 Calculated chopper energy too high	Note regarding fault value = 701: r50047[1]: Parameter value p50790 Note regarding fault value = 704: r50047[1]: Parameter value p50078[0] r50047[2]: Parameter value p51571 r50047[3]: Line supply voltage tolerance SINAMICS DCM r50047[4]: Line supply voltage tolerance SIMOREG CCP Note regarding fault value = 707: r50047[1]: Calculated V_{max} r50047[2]: Parameter p51578 maximum possible value Note regarding fault value = 708: r50047[1]: Calculated chopper energy r50047[2]: maximum possible chopper energy for SIMOREG CCP

7.1.6 SIMOREG DC-MASTER alarms

A030	Commutation fault or overcurrent condition has occurred (active for operating states – –, I, II) Possible causes • Line voltage dip during regenerative operation • Current control loop not optimized
A032	SIMOREG CCP not ready (active for operating states < o4.0) Possible causes • Voltage not available at the connections U, V, W of the SIMOREG CCP • Voltage at C-D at the SIMOREG CCP does not match the voltage C-D at the SIMOREG DC-MASTER • The quenching capacitors of the SIMOREG CCP have not reached the setpoint voltage • The parallel interface cable is not connected at the SIMOREG CCP, which is assigned the parallel switching master • No connection between the SIMOREG DC-MASTER and SIMOREG CCP via the serial interface G-SST2 • No connection between parallel SIMOREG CCP units • Contents of the memory of the technical data of the SIMOREG CCP (MLFB, rated values, serial number) invalid • The I2t value of the voltage limiting chopper 1 in the SIMOREG CCP is too high (> 100 %). • The I2t value of the voltage limiting chopper 2 in the SIMOREG CCP is too high (> 50 %).

7.1.7 SINAMICS DCM alarms

A60321	SIMOREG CCP not ready Possible causes: 1. Voltage not available at the connections U, V, W of the SIMOREG CCP. Trigger time: 1 s 2. Voltage at C-D at the SIMOREG CCP does not match the voltage C-D at the SINAMICS DCM. Trigger time: 1 s 3. The quenching capacitors of the SIMOREG CCP have not reached the setpoint voltage. Trigger time: 1 s 4. The parallel interface cable is not connected at the SIMOREG CCP which is assigned to the parallel switching master . Trigger time: 1 s 5. No connection between the SINAMICS DCM and SIMOREG CCP via the serial interface. (The dynamic values are not updated) Trigger time: 1 s 6. No connection between parallel SIMOREG CCP units. Trigger time: 1 s 7. Contents of the memory of the technical data of the SIMOREG CCP (MLFB, rated values, serial number) invalid. Trigger time: immediately 11. The I2t value (r51575) of the voltage limiting chopper 1 is too high (> 100 %). Trigger time: immediately 12. The I2t value (r51576) of the voltage limiting chopper 2 is too high (> 50 %). Trigger time: immediately 20. The pre-charging of the chopper capacitors was not able to be completed within the time set in p50089 - or the condition according to fault value 5 is fulfilled. Trigger time: 20 ms after fault value 5 occurs
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7.2 Commissioning steps

7.2.1 SIMOREG DC-MASTER commissioning steps

Note

The parameter values to be set when commissioning the SIMOREG CCP must be graphically determined using the characteristic diagram (Appendix).

Alternatively, an existing commissioning script for the DriveMonitor can be used (script file `ccp.ssc` and database file `simoreg-ccp-mlfb.xml`).

If the basic converter unit has a software release from V 3.1 and higher, SIMOREG CCP can be commissioned by selecting P051=30 (automatic setting of the parameters for SIMOREG CCP). This optimization run must be performed after commissioning step 4. In this case, commissioning steps 3, 5 and 6 are not performed. If Fault F050 occurs during the optimization run (optimization run cannot be performed) the fault description of the particular fault value (r047.001) provides information about possible causes.

1. Connect SIMOREG CCP according to the recommended connection in Chapter 6.
2. Set P790=6 (communication with the CCP).
Correct communication is optically displayed using an LED on the Power Interface module C98043-A7046:

LED flashes slowly (<1 Hz)	Communication with SIMOREG CCP OK,
LED flashes quickly (approx. 3 Hz)	no communication with the SIMOREG CCP
3. Determining the setting value for parameter U577 (factory setting = 1600)
Required parameter values:
 r070...MLFB (characteristic number) of the SIMOREG DC-MASTER
 n570...MLFB (characteristic number) of the SIMOREG CCP

 ⇒ Determining the setting value according to the parameter description for U577
4. Commission the basic converter unit according to the operating instructions SIMOREG DC-MASTER, Chapter 7.
The commissioning must be correctly completed. This also means that the optimization runs according to commissioning step 8 must be performed.
The optimization run for the pre-control and current controller for the armature and field (P051=25) is absolutely mandatory, as the armature inductance is determined in this run and the value of P111 is required for the subsequent SIMOREG CCP commissioning.

Notice:

P351 must not be parameterized more negative than the factory setting. Otherwise, when the line contactor is closed (or the circuit breaker) then a charging current surge occurs in the chopper capacitors. This can destroy the CCP power semiconductors.

Comment:

The chopper capacitors are charged via an internal pre-charging circuit. When reaching the undervoltage threshold defined by P351, the line contactor (or circuit breaker) is closed, which means that the pre-charging circuit is bypassed.

Note:

If Fault F030 occurs when commissioning the basic converter unit (especially during the optimization runs), then the commutation monitoring should be deactivated for the commissioning (U580=0). After commissioning has been successfully completed, the commutation monitoring must be reactivated (U580=7).

Notice:

If an existing drive system was retrofitted with a SIMOREG CCP, then the optimization run for the pre-control and current controller for the armature and field (P051=25) is absolutely necessary. The value of P111 determined in this optimization run is required to commission the SIMOREG CCP. Parameter P111 can be modified through manual optimization. This is the reason that before performing the optimization run with P051=25, the actual value of

P111 should be noted and only set again after the SIMOREG CCP commissioning has been completed.

5. Determining the maximum energy in the armature circuit for the turn-off operation

Parameter value required:

n570	MLFB (Order No.) of the SIMOREG CCP
r072i002	Actual rated unit DC current, armature [A]
P101	Rated motor armature voltage [V] ^{1.)}
P111	Armature circuit inductance [mH]

as well as a characteristic diagram according to the following table:

MLFB SIMOREG CCP	MLFB characteristic number	P101 [V] ^{1.)}	No. of the associated characteristic diagram ^{2.)}
6RA7085-6FC00-0	250	420	11
		470	12
6RA7091-6FC00-0	251	420	11
		470	12
6RA7095-6FC00-0	252	420	13
6RA7090-6KC00-0	253	520	14.0
		600	14
		720	15
6RA7095-6KC00-0	254	520	16.0
		600	16
		720	17

1.) Rated DC voltage according to the motor rating plate (the values are typical rated data for Siemens DC motors from the product catalog DA12)

2.) The characteristic diagrams are provided in the appendix to these operating instructions

If the graphically determined value lies below the limit line W_{max} , then the energy reduction in the armature circuit is assured using the SIMOREG CCP.

6. Determining the setting value for parameter U578 (factory setting = 145)

Required parameter values:

n570	MLFB (Order No.) of the SIMOREG CCP
r071	Rated unit supply voltage (armature) [V]
r072i002	Actual rated unit DC current, armature [A]
P078i001	Actual rated converter input voltage, armature [V]
P101	Rated motor armature voltage [V]
P111	Armature circuit inductance [mH]
P351	Threshold for the undervoltage shutdown [%].

⇒ Determining the setting value according to the parameter description for U578

The SIMOREG CCP is now ready to run.

7.2.2 SINAMICS DCM commissioning steps

Note

If the basic converter unit has a software release from V 1.2 and higher, the SIMOREG CCP can be commissioned by selecting p50051=30 (automatic setting of the parameters for SIMOREG CCP). This optimization run must be performed after commissioning step 4. In this case, commissioning steps 3, 5 and 6 are not performed. If Fault F60050 occurs during the optimization run (optimization run interrupted internally) the fault description of the particular fault value (r50047) provides information about possible causes.

1. Connect SIMOREG CCP according to the recommended connection in Chapter 6.
2. Set p50790=6 (communication with the CCP).
Correct communication is optically displayed using an LED on the Power Interface module C98043-A7046:

LED flashes slowly (<1 Hz)	Communication with SIMOREG CCP OK,
LED flashes quickly (approx. 3 Hz)	no communication with the SIMOREG CCP
3. Determining the setting value for parameter p51577 (factory setting = 1600)
Required parameter values:
 r50070...MLFB (characteristic number) of the SINAMICS DCM
 r51570...MLFB (characteristic number) of the SIMOREG CCP

 ⇒ Determining the setting value according to the parameter description for p51577
4. Commission the basic converter unit according to the operating instructions SINAMICS DCM, Chapter 7.
The commissioning must be correctly completed. This also means that the optimization runs according to commissioning step 8 must be performed.
The optimization run for the pre-control and current controller for the armature and field (p50051=25) is absolutely mandatory, as the armature inductance is determined in this run and the value of p50111 is required for the subsequent SIMOREG CCP commissioning.

Notice:

p50351 must not be parameterized more negative than the factory setting. Otherwise, when the line contactor is closed (or the circuit breaker) then a charging current surge occurs in the chopper capacitors. This can destroy the CCP power semiconductors.

Comment:

The chopper capacitors are charged via an internal pre-charging circuit. When reaching the undervoltage threshold defined by p50351, the line contactor (or circuit breaker) is closed, which means that the pre-charging circuit is bypassed.

Note:

If Fault F60300 occurs when commissioning the basic unit (especially during the optimization runs), then the commutation monitoring must be deactivated for the commissioning (p51580=0). After commissioning has been successfully completed, the commutation monitoring must be reactivated (p51580=7).

Notice:

If an existing drive system was retrofitted with a SIMOREG CCP, then the optimization run for the pre-control and current controller for the armature (p50051=25) and field (p50051=24) is absolutely necessary. The value of p50111 determined in this optimization run is required to commission the SIMOREG CCP. Parameter p50111 can be modified through manual optimization. This is the reason that before performing the optimization run, the actual value of p50111 should be noted and only set again after the SIMOREG CCP commissioning has been completed.

5. Determining the maximum energy in the armature circuit for the turn-off operation

Parameter value required:

p51570	MLFB (Order No.) of the SIMOREG CCP
r50072[1]	actual rated unit DC current, armature [A]
r50101	rated motor armature voltage [V] ^{1.)}
p50111	Armature circuit inductance [mH]

as well as a characteristic diagram according to the following table:

MLFB SIMOREG CCP	MLFB characteristic c number	p50101 [V] ^{1.)}	No. of the associated characteristic diagram ^{2.)}
6RA7085-6FC00-0	250	420	11
		470	12
6RA7091-6FC00-0	251	420	11
		470	12
6RA7095-6FC00-0	252	420	13
6RA7090-6KC00-0	253	520	14.0
		600	14
		720	15
6RA7095-6KC00-0	254	520	16.0
		600	16
		720	17

1.) Rated DC voltage according to the motor rating plate (the values are typical rated data for Siemens DC motors from the product catalog DA12)

2.) The characteristic diagrams are provided in the appendix to these operating instructions

If the graphically determined value lies below the limit line $W_{\max}$, then the energy reduction in the armature circuit is assured using the SIMOREG CCP.

6. Determining the setting value for parameter p51578 (factory setting = 145)

Required parameter values:

p51570	MLFB (Order No.) of the SIMOREG CCP
r50071	Rated unit supply voltage (armature) [V]
r50072[1]	actual rated unit DC current, armature [A]
r50078[0]	actual rated converter input voltage, armature [V]
r50101	rated motor armature voltage [V]
p50111	armature circuit inductance [mH]
p50351	Threshold for the undervoltage shutdown [%].

⇒ Determining the setting value according to the parameter description for p51578

The SIMOREG CCP is now ready to run.

8 Maintenance

WARNING

When electrical equipment is operated, some of the components will be at hazardous voltage levels.

Failure to handle/operate the equipment properly can result in death or severe bodily injury as well as substantial property damage.

When performing maintenance on this unit, you should therefore observe all information provided in this chapter as well as any notices attached to the product itself.

- Only qualified personnel who are familiar with all the safety instructions in this description, as well as the installation, operating, and maintenance instructions, should carry out maintenance work on this unit.
- Before carrying out visual inspections and maintenance work, it must be ensured that the unit is disconnected from the AC power supply, locked out so that the power supply cannot be reconnected, and grounded. Before they are shut down, both the converter unit and the motor are at dangerous voltage levels. A hazardous voltage is present even if the converter unit contactor is open.
- Even after being disconnected from the power supply, the snubber capacitors in the basic converter unit can still be at a hazardous voltage. For this reason, the unit should not be opened until an adequate period of time has elapsed.
- Before commencing any work, ensure that the unit is in a no-voltage condition (see Chapter 1)

Only spare parts approved by the manufacturer may be used.

The converter unit must be well protected against pollution in order to prevent voltage flashovers and, therefore, destruction. Dust and foreign bodies, which are drawn in by the cooling-air flow in particular, must be thoroughly removed at specific intervals; this depends on the rate of accumulation of dirt, but should be carried out at least every 12 months. The unit should be cleaned using dry compressed air, max. 1 bar, or using a vacuum cleaner.

8.1 Software update of the SIMOREG CCP

- 1 Switch-off the electronics power supply of the SIMOREG CCP
- 2 Connect one COM port of the PC to connector X300 at the SIMOREG CCP.
- 3 Switch-on the electronics power supply AND while doing this press button S1 on the Power Interface module C98043-A7046
⇒ the SIMOREG CCP goes into the programming mode (the yellow monitoring LED on the SIMOREG CCP remains dark)
- 4 At the PC, start the load program `LOAD_CCP.exe` and using the "Open file" button, select the required data file (`7046Axxx.hex`). Pressing the "Open" button starts the load operation (this takes about 10 s).
- 5 After the software has been successfully updated, the SIMOREG CCP automatically goes into the normal operating state (the yellow monitoring LED at the SIMOREG CCP flashes slowly if communication with the basic unit has been established).
- 6 Check the new software release at 560 or r51560[0].
- 7

END

Order number of the cable: 6SX7005-0AB00 (also see Chapter 6.5)

Note:

From this instant onwards, a timer runs in the SIMOREG CCP for approximately 2 minutes. If, during this time, the update is not started from the PC, then the SIMOREG CCP returns to the normal operating state. To restart the software - update, the sequence from step 1 should be repeated.

Note:

In the properties dialog of a link to `LOAD_CCP.exe` a parameter of form COMx can be transferred - whereby 1 or 2 should be used for x (default: COM1)

Note:

If the electronics power supply is switched-off during the software update, then you must repeat the operation starting from Step 4.

8.2 Replacing components

8.2.1 Replacing modules



WARNING

Modules must only be replaced by qualified personnel.

Modules must not be inserted or withdrawn under voltage.

Non-observance of the warnings can result in death, severe personal injury or significant property damage.

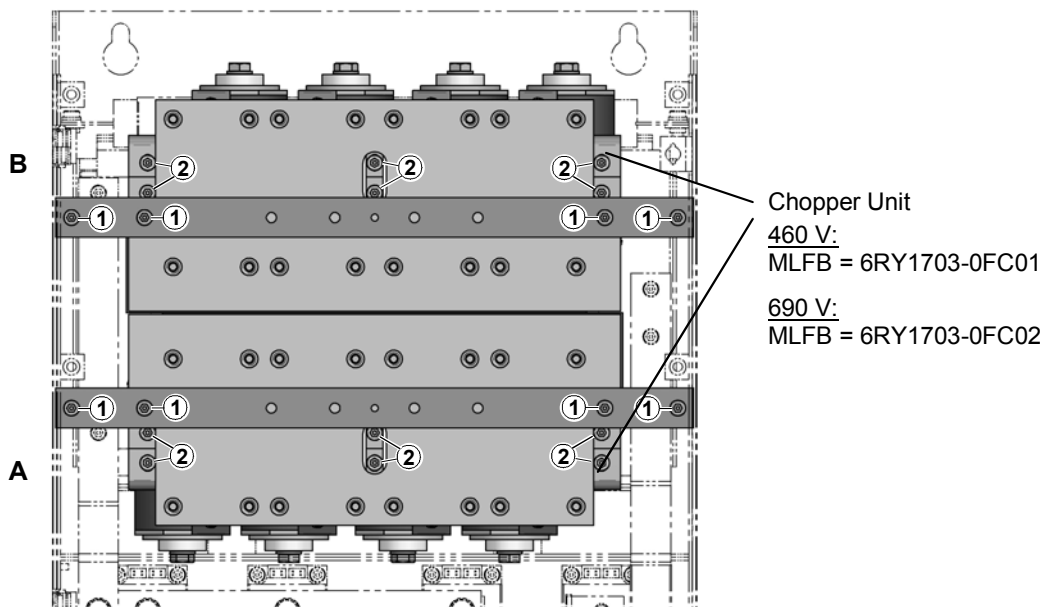


CAUTION

The modules contain electrostatically sensitive devices. Discharge yourself before touching any electronic modules. The easiest way to do this is to touch a conductive, grounded object immediately beforehand (for example, bare metal parts of control cabinet or the protective ground contact of a socket outlet).

Replacing the chopper unit

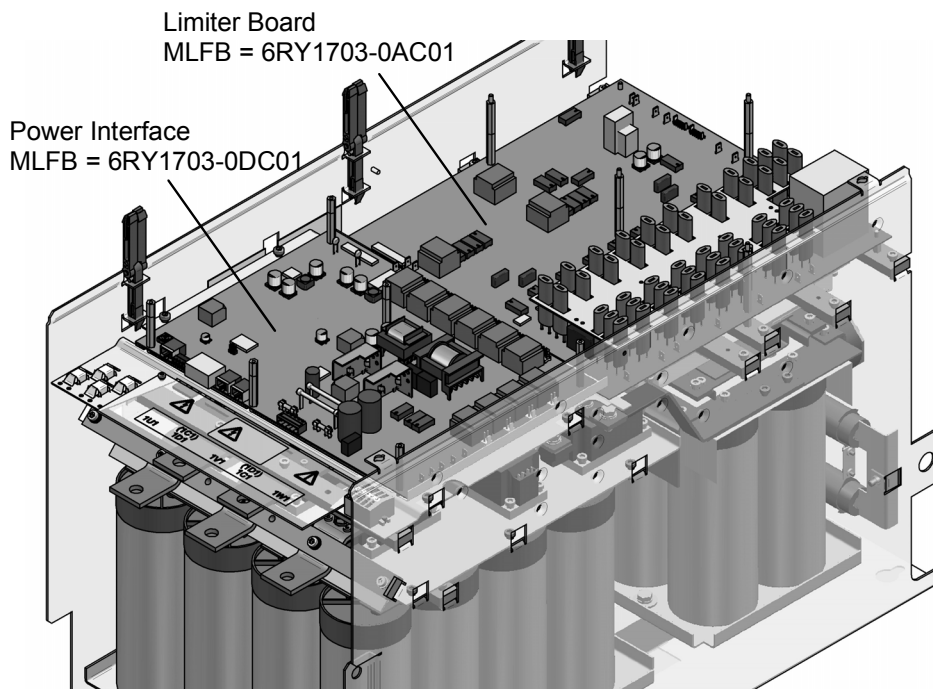
- Remove the Limiter Board C98043-A7047
- Release screw (1)
- Release screw (2)
- Replace the module(s)



Note

For units 6RA7085-6FC00-0, 6RA7091-6FC00-0 and 6RA7090-6KC00-0, there is only one chopper unit (Item A)

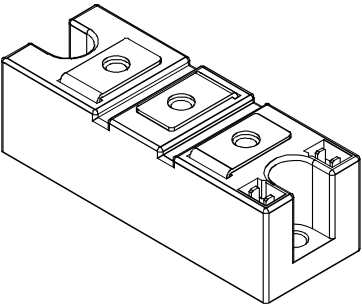
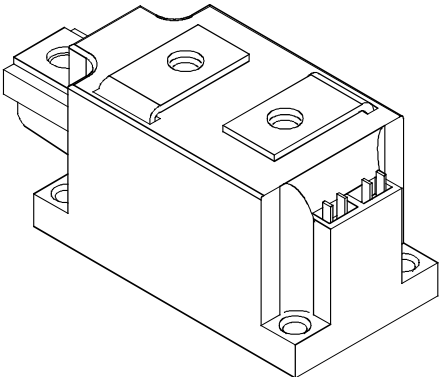
Replacing printed circuit boards



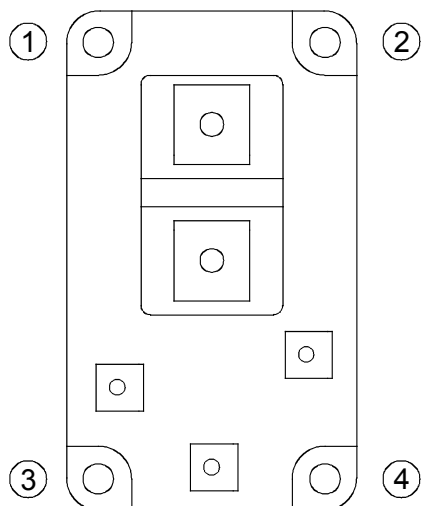
8.2.2 Replacing diode, thyristor and IGBT modules

The modules are fixed using self-tapping screws. To mount modules, it is absolutely necessary to use screws with metric thread with the same length as the original screws and locking elements (washer and spring washer). When screwing modules to busbars and other assemblies, screws with metric thread with the same length as the original screws and locking elements (washer and spring washer) must also be used.

Module design

 Tightening torque, module: 3,5 Nm Tightening torque of the power connections: 5 Nm	 Tightening torque, module: 6 Nm Tightening torque of the power connections: 12 Nm
---	---

IGBT type SKM 500 GA 174 DS



Tightening torque, IGBT: 5 Nm
Tightening torque of the busbars: 5 Nm

NOTICE

All 4 IGBT modules must always be replaced.

It is only permissible to use the original IGBT types.

The sequence when bolting the IGBT modules can be seen in the adjacent diagram and this must be maintained under all circumstances.

9 Service, Technical Support

Note

We would be grateful if you could specify the following unit data when you have any queries:

- Unit order number and serial number
- Software version
- Hardware version of the C98043-A7046 module (Power Interface)
(screen printed on the component side)

You can find information on our services and regional contact partners under:

http://www.siemens.de/automation/csi_de/service

Technical support

Our technical support service can provide you with technical assistance for products, systems, and solutions.

<http://www.siemens.de/automation/support-request> (German)

<http://www.siemens.com/automation/support-request> (English)

Central hotlines for technical support for SIMOREG CCP / SIMOREG DC-MASTER / SINAMICS DCM:

Time zone Europe and Africa	Tel: +49 (0)911 895 7222 Fax: +49 (0)911 895 7223 mailto:support.automation@siemens.com	8:00 to 17:00 CET
Time zone, Americas	24-hour hotline: +1 800 333 7421	8:00 to 17:00 Eastern Standard Time
	Tel.: +1 423 262 2960 Fax: +1 423 262 2200 mailto:support.america.automation@siemens.com	
Time zone Asia / Australia	Tel: +86 1064 757575 Fax: +86 1064 747474 mailto:support.asia.automation@siemens.com	7:30 to 17:30 Local time, Beijing

Repairs

If you wish to have a part/unit repaired, then please contact your regional contact partner for repairs.

Service calls

Qualified personnel can perform repair work on your units and offer services that ensure their availability. This work can be carried out with charges that are scaled according to the amount of time and work involved, or at a flat rate as part of a contract. Services whose charges depend on the amount of time and work involved are performed within the normal working hours for the region and with an appropriate response time. You can request service calls through your regional contact partner.

10 Spare parts

Equipment identifiers	Designation	Dimensions LxWxH (mm)	Weight (kg)	Order No. (MLFB)	used in 6RA70..
C98043-A7046	Power-Interface SIMOREG CCP printed circuit board	360x260x42	0,8	6RY1703-0DC01	..85-6FC00-0 ..91-6FC00-0 ..90-6KC00-0 ..95-6FC00-0 ..95-6KC00-0
C98043-A7047	Limiter Board SIMOREG CCP	375x360x68	1	6RY1703-0AC01	..85-6FC00-0 ..91-6FC00-0 ..90-6KC00-0 ..95-6FC00-0 ..95-6KC00-0
V100.1	Chopper unit 460 V	310x110x210	3	6RY1703-0FC01	..85-6FC00-0 ..91-6FC00-0
V100.1, V100.2	Chopper unit 460 V	310x110x210	3	6RY1703-0FC01	..95-6FC00-0
V100.1	Chopper unit 690 V	310x110x210	3	6RY1703-0FC02	..90-6KC00-0
V100.1, V100.2	Chopper unit 690 V	310x110x210	3	6RY1703-0FC02	..95-6KC00-0
V41+V44, V42+V45, V43+V46, V47, V48	Diode module SKKD162/18	94x30x34	0,165	6RY1700-0BA06	..85-6FC00-0 ..91-6FC00-0
V41+V44, V42+V45, V43+V46, V47, V48	Diode module SKKD162/22	94x30x34	0,165	6RY1700-0BA07	..90-6KC00-0
V41+V44, V42+V45, V43+V46, V47, V48	Diode module DD261N22	115x52x50	0,8	6RY1700-0BA08	..95-6FC00-0 ..95-6KC00-0
V31+34, V32+33, V35+38, V36+37, V39, V40	Thyristor module SKKT162/18	94x30x34	0,165	6SY7010-0AA73	..85-6FC00-0 ..91-6FC00-0
V31+34, V32+33, V35+38, V36+37, V39, V40	Thyristor module MCC161-22io1	94x30x34	0,125	6SY7010-0AA74	..90-6KC00-0
V31+34, V32+33, V35+38, V36+37, V39, V40	Thyristor module MCC224-22io1	115x52x50	0,75	6SY7010-0AA75	..95-6KC00-0
V31+34, V32+33, V35+38, V36+37, V39, V40	Thyristor module MCC312-18io1	115x52x50	0,75	6SY7010-0AA22	..95-6FC00-0
F1, F2	Fuses on the Power- Interface printed circuit board	20x5	0,002	6RY1702-0BA00	..85-6FC00-0 ..91-6FC00-0 ..90-6KC00-0 ..95-6FC00-0 ..95-6KC00-0

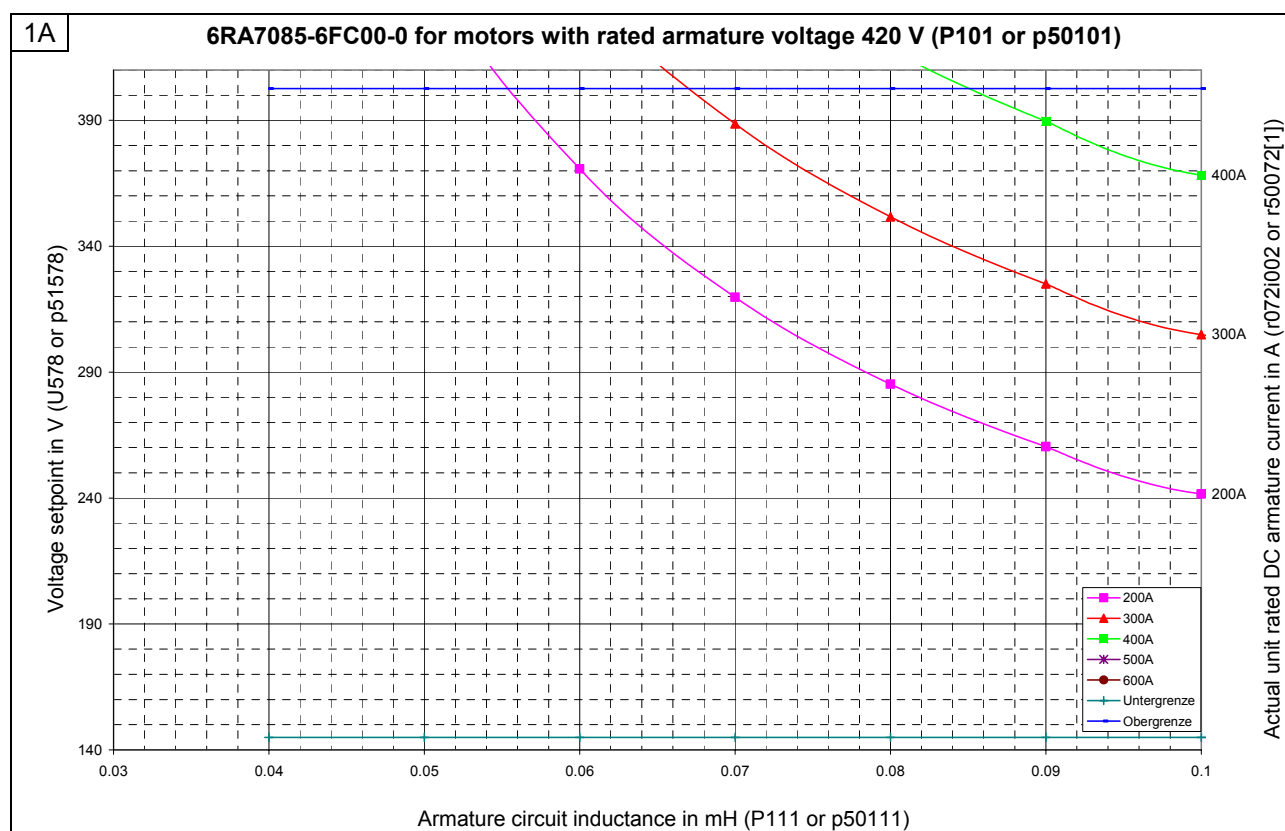
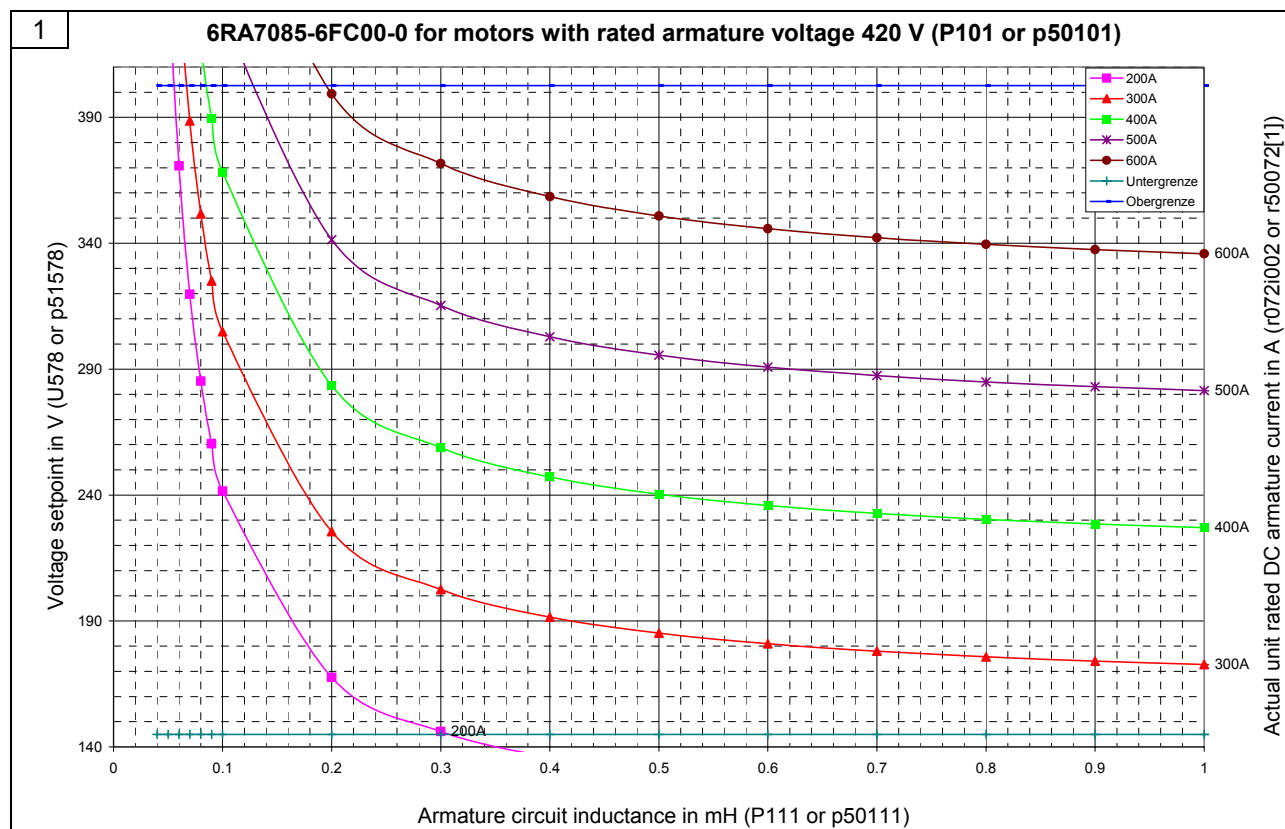
11 Appendix

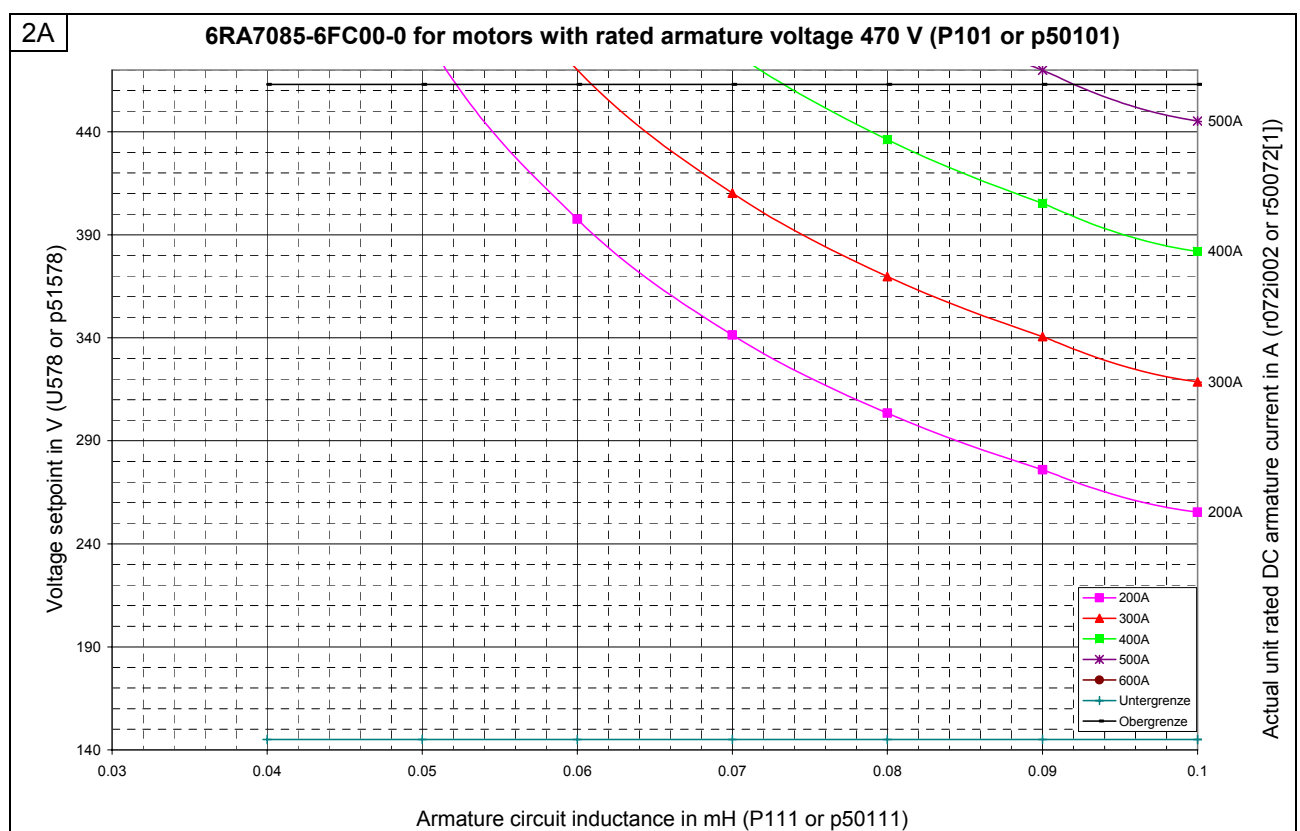
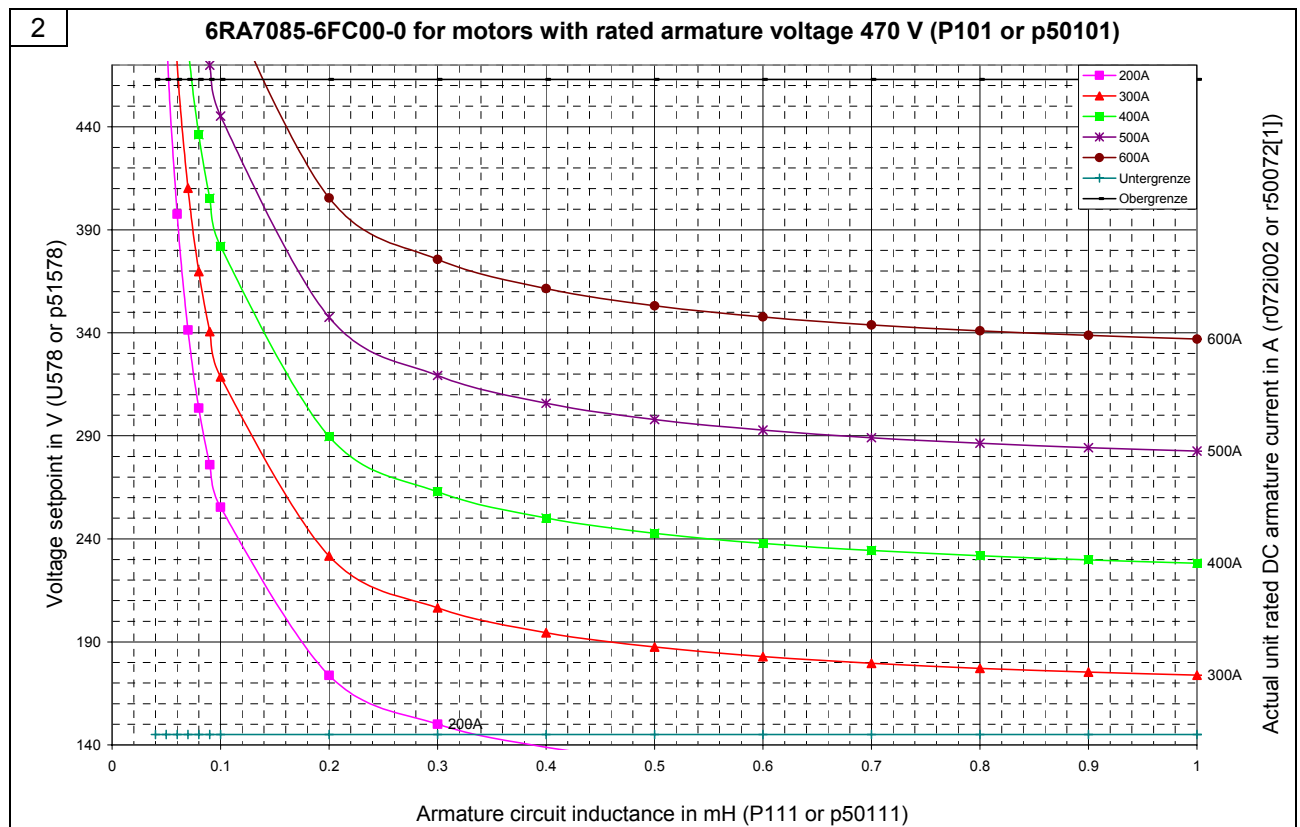
11.1 Characteristic diagrams

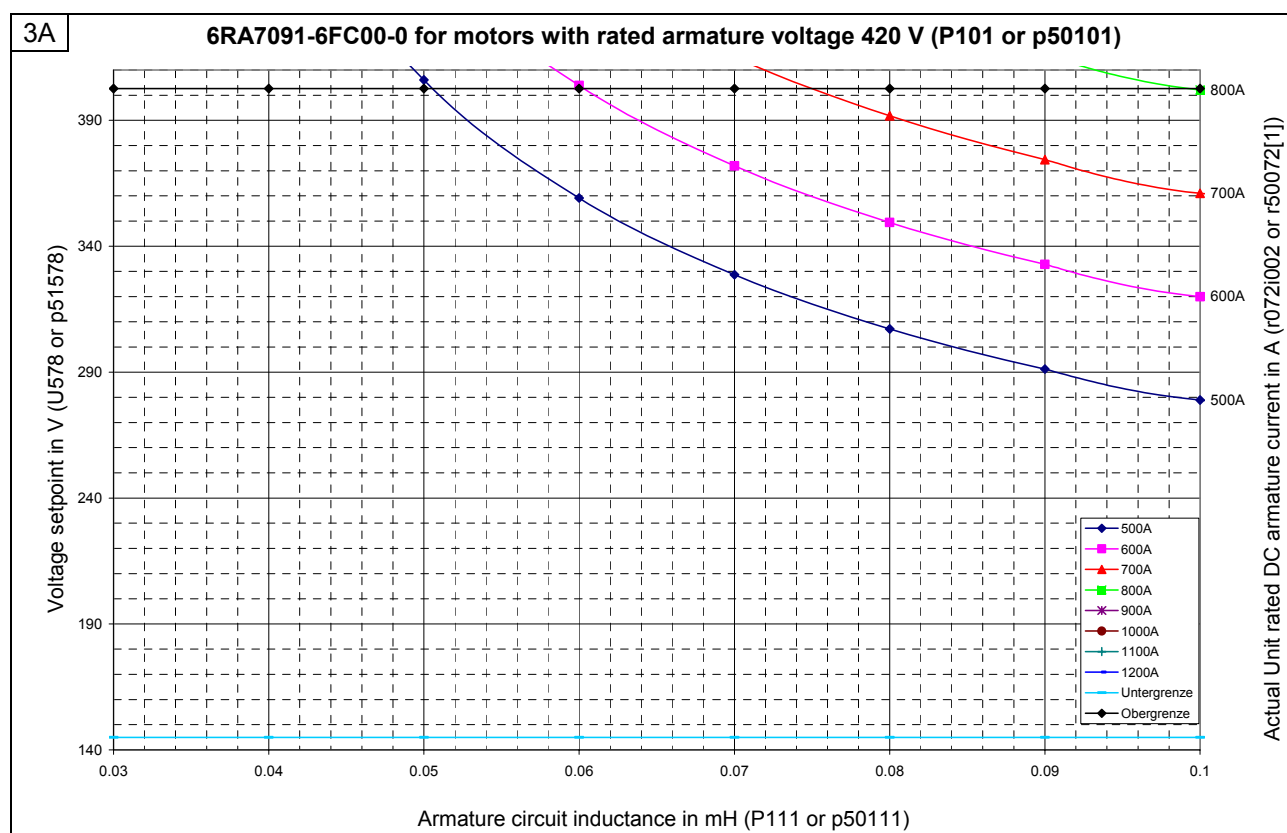
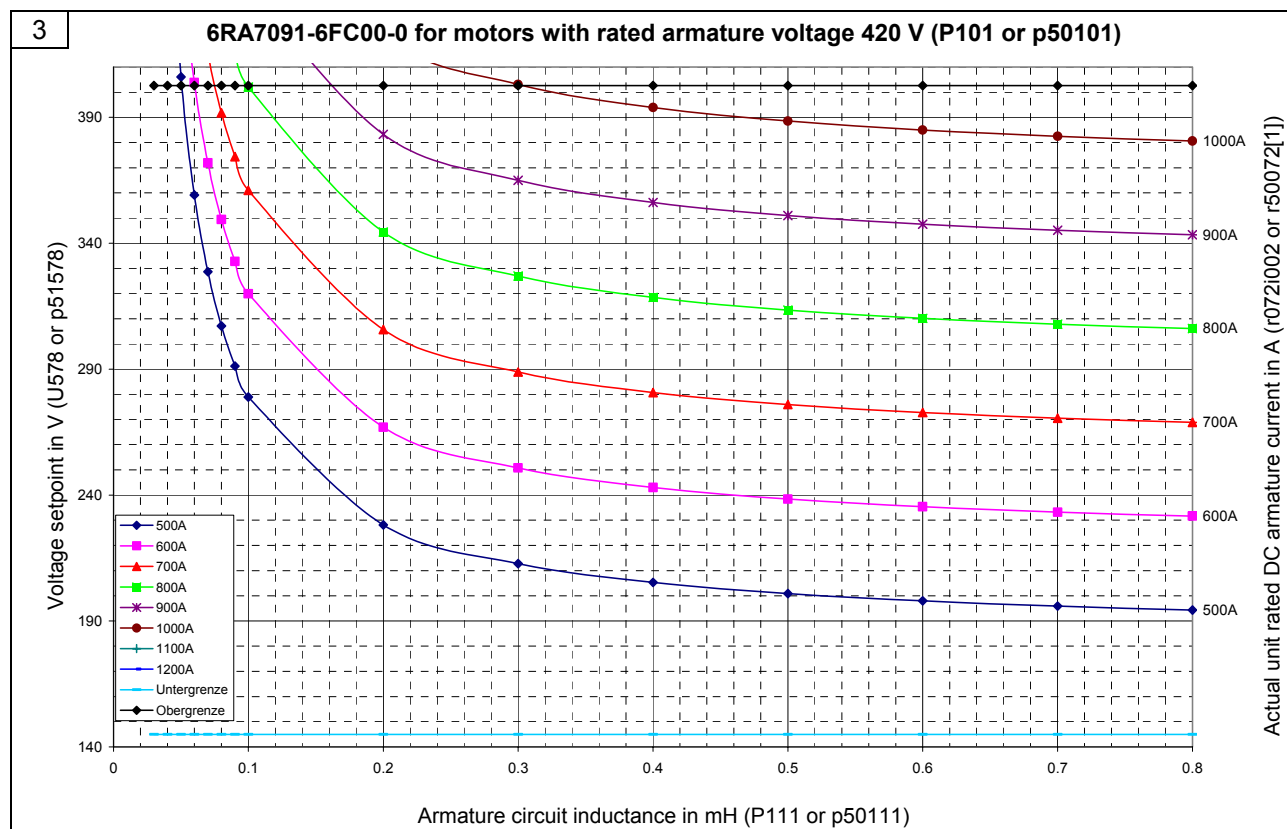
Characteristic diagrams to define the voltage setpoint for the pre-charging of the SIMOREG CCP quenching capacitors (parameter U578 for SIMOREG DC-MASTER or p51578 for SINAMICS DCM) using the armature circuit inductance (P111 for SIMOREG DC-MASTER or p50111 for SINAMICS DCM) and the actual unit rated DC armature current (r072i002 for SIMOREG DC-MASTER or r50072[1] for SINAMICS DCM)

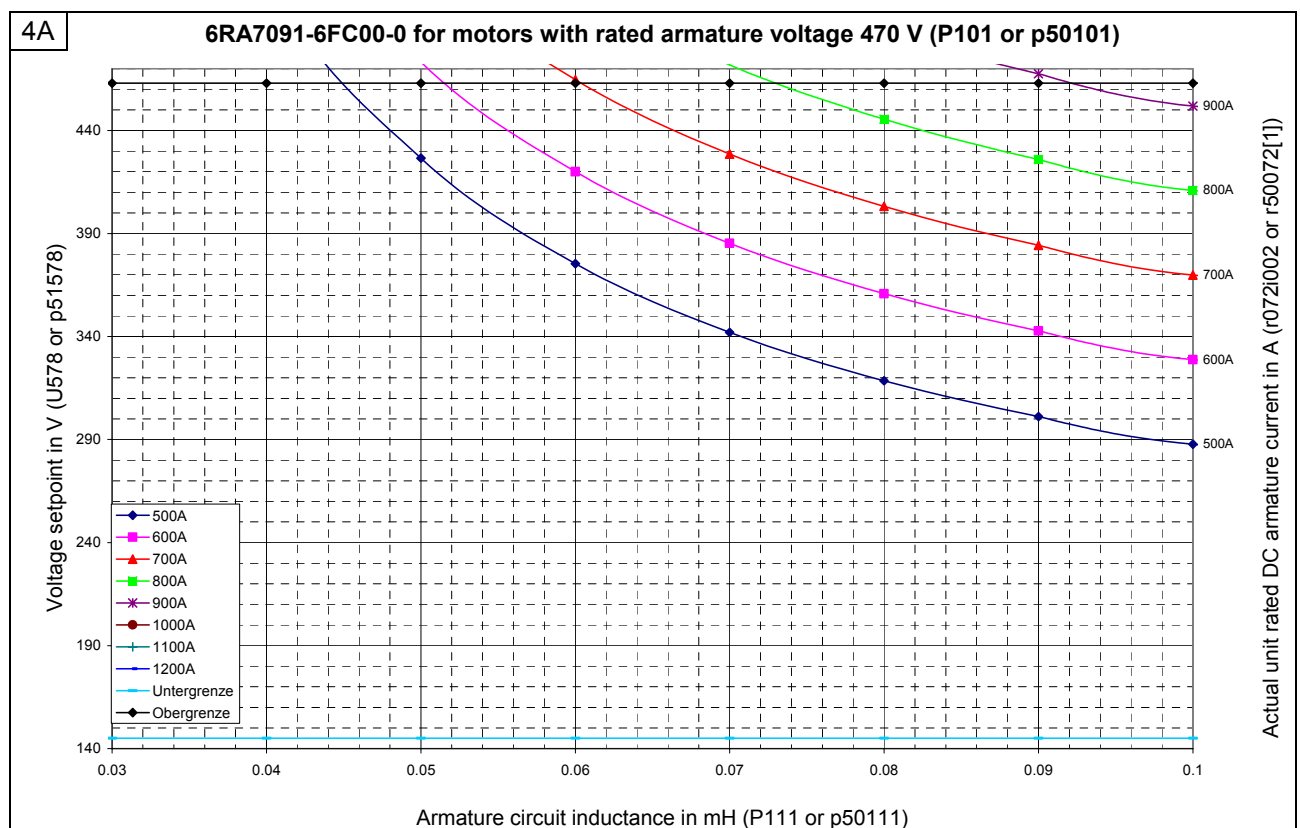
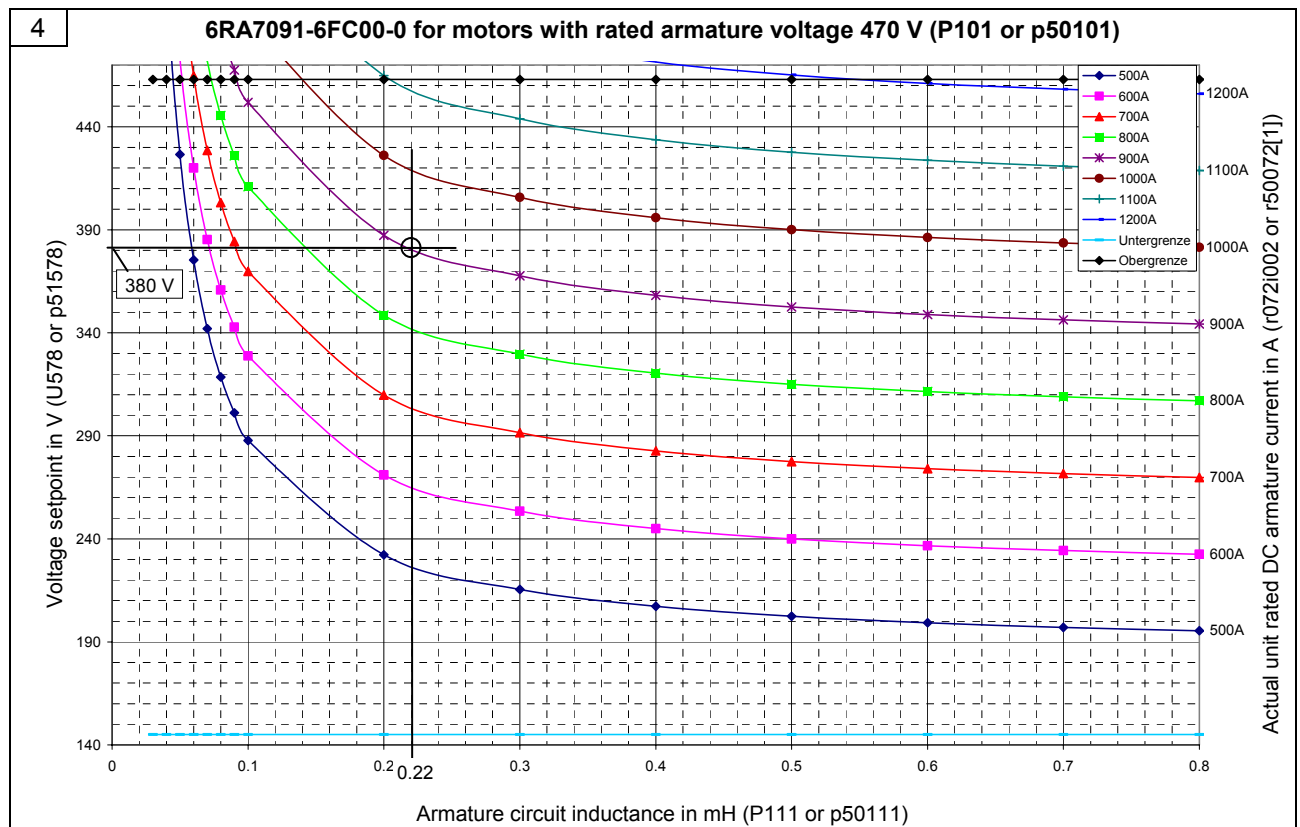
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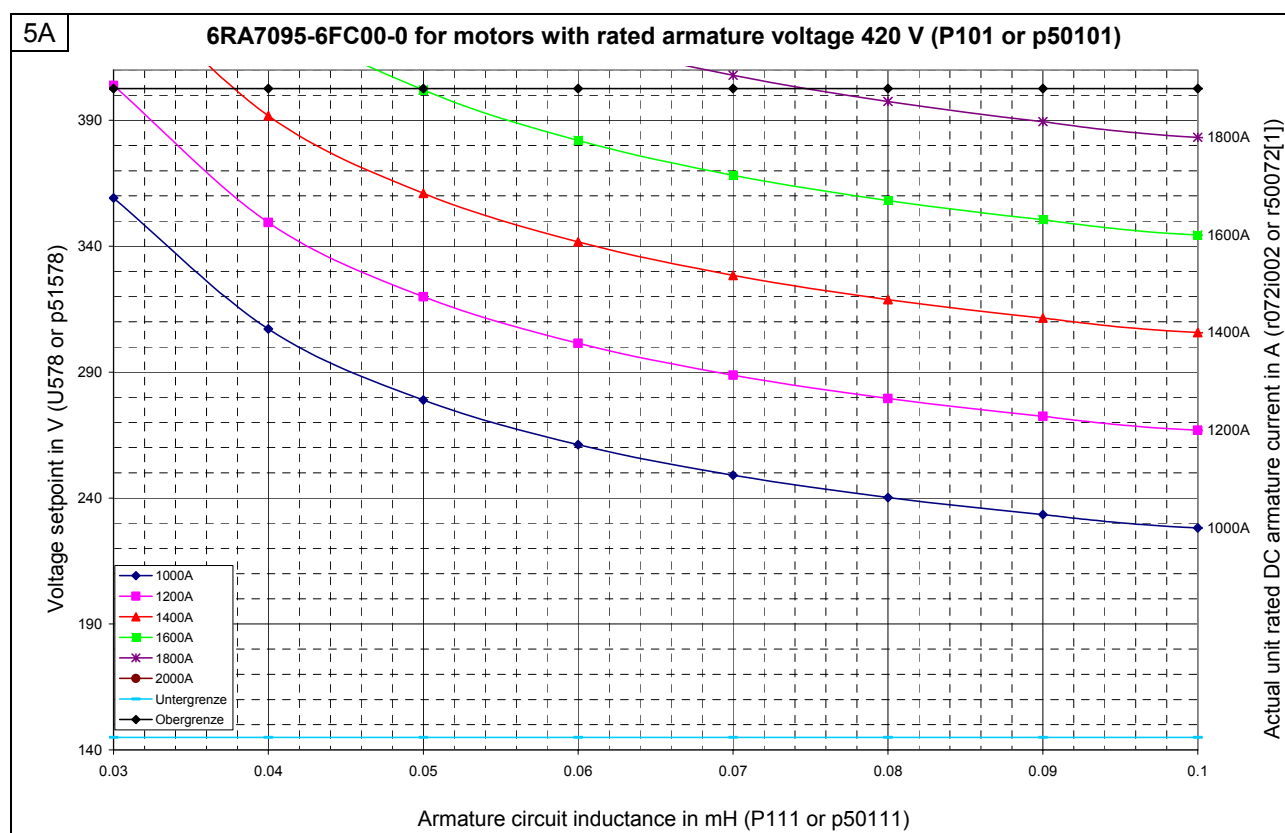
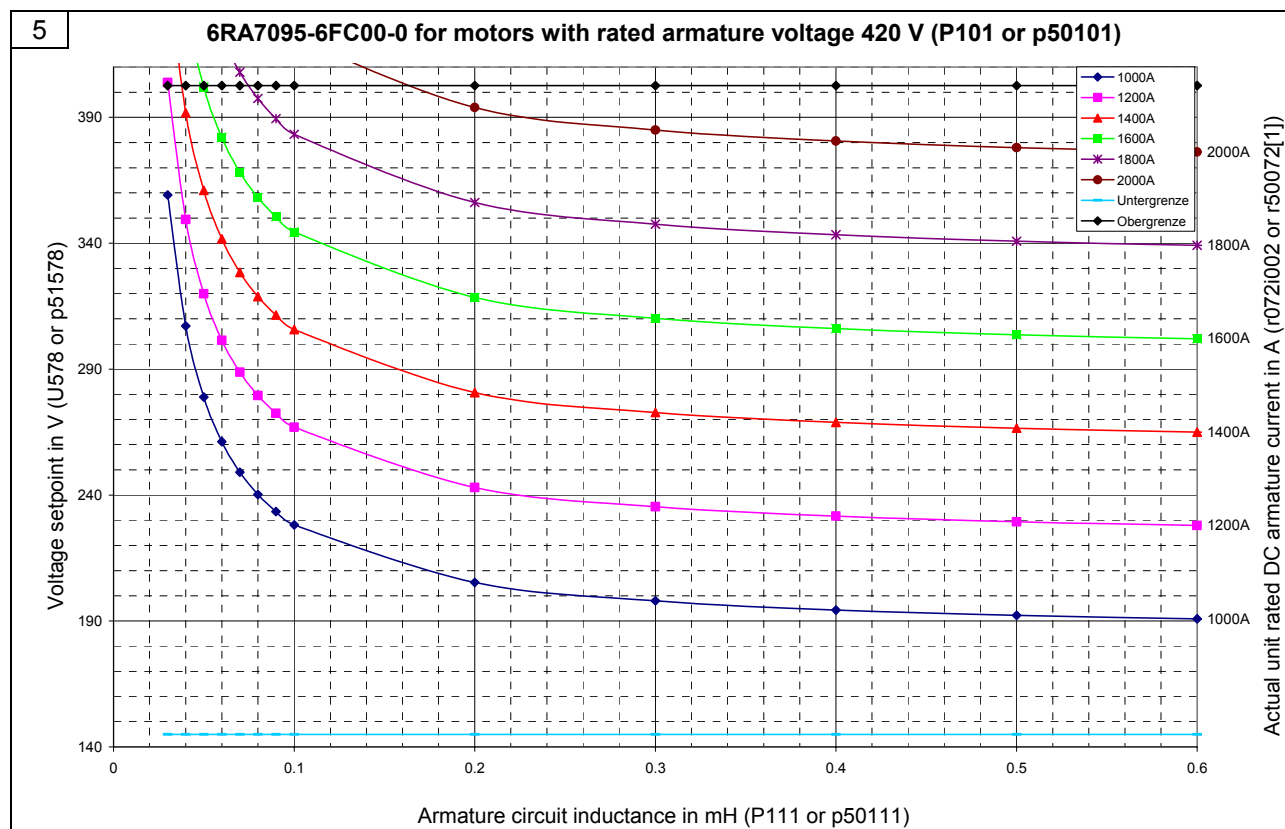
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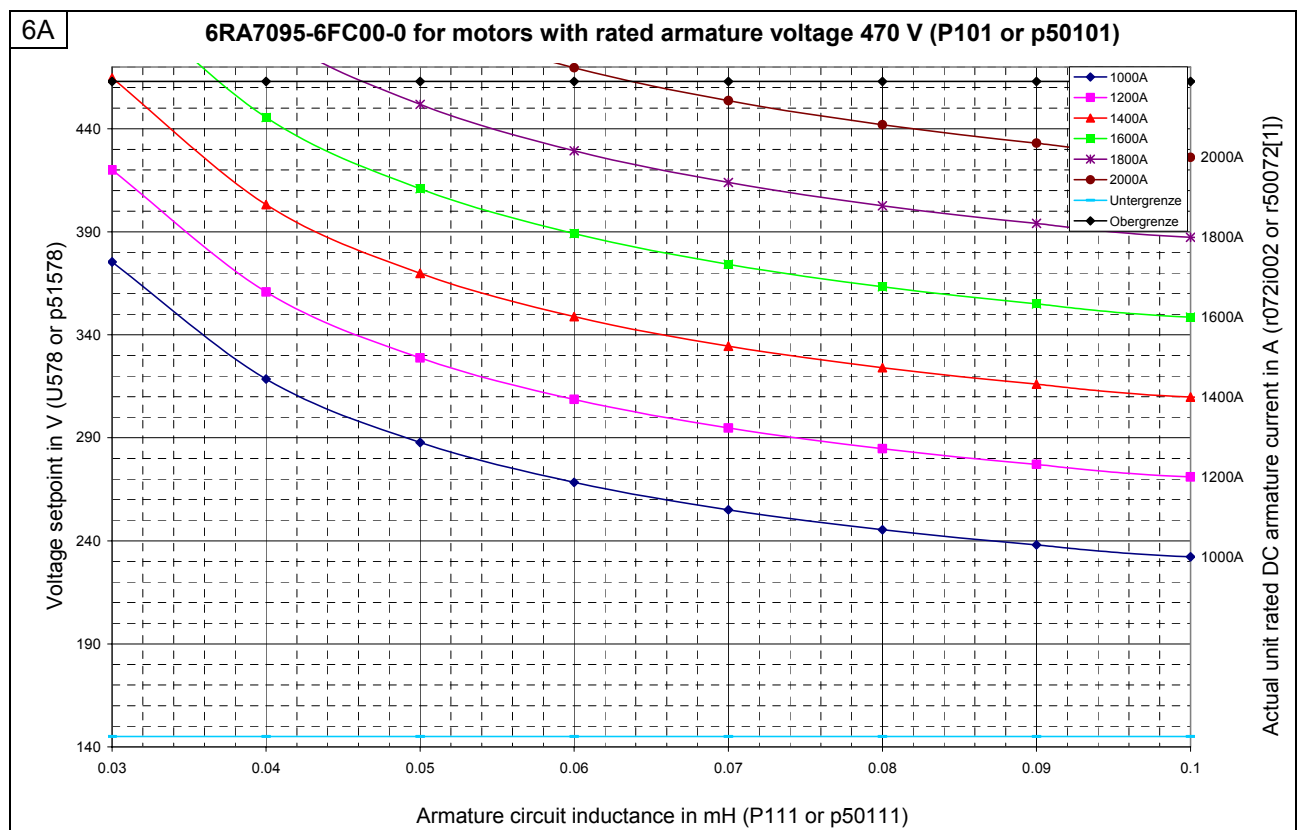
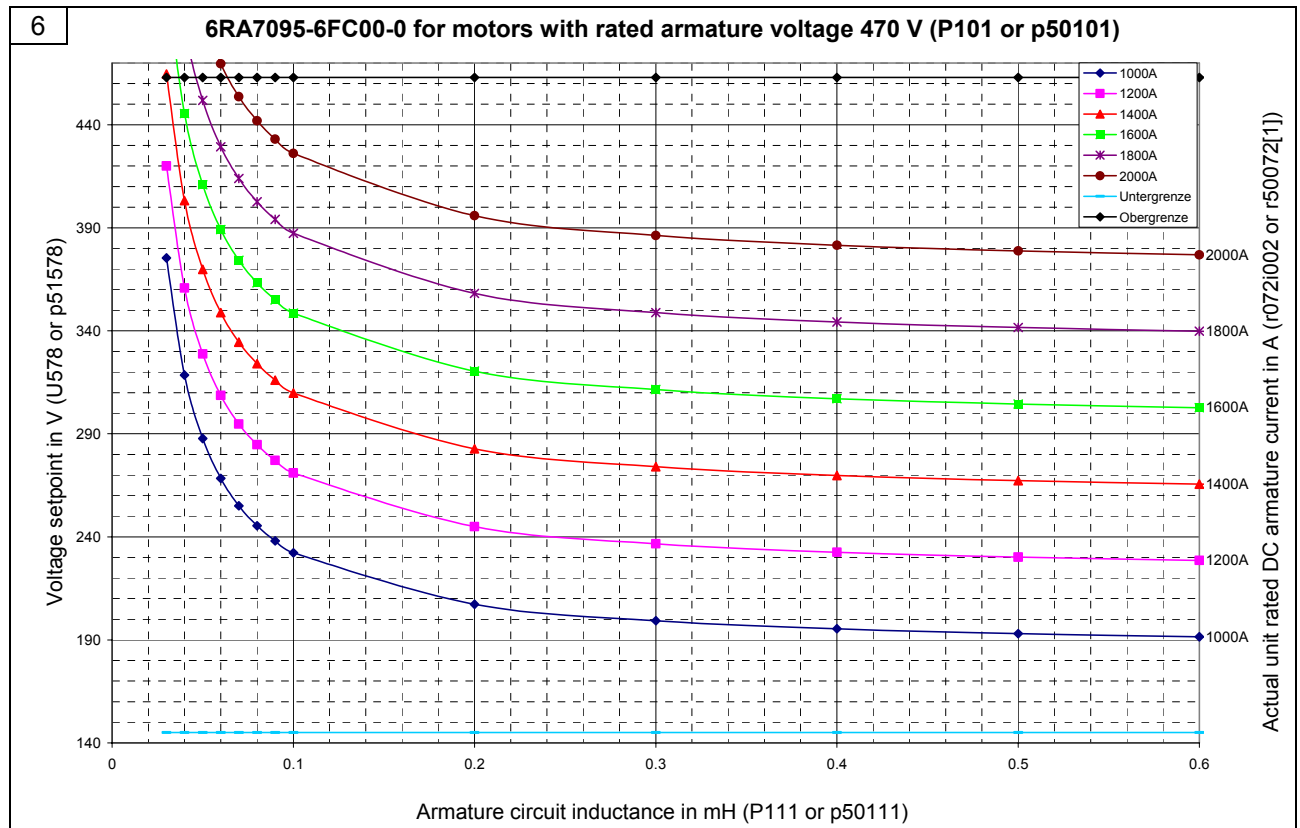


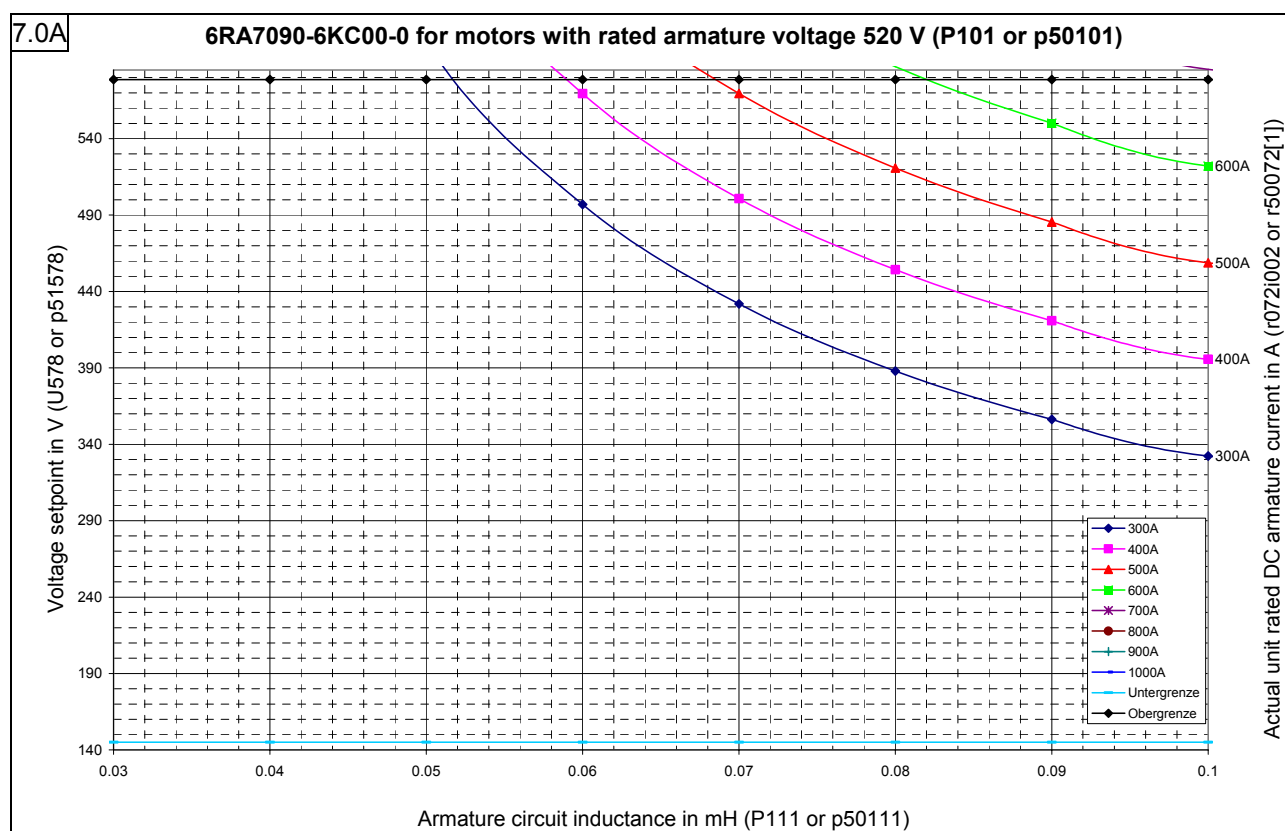
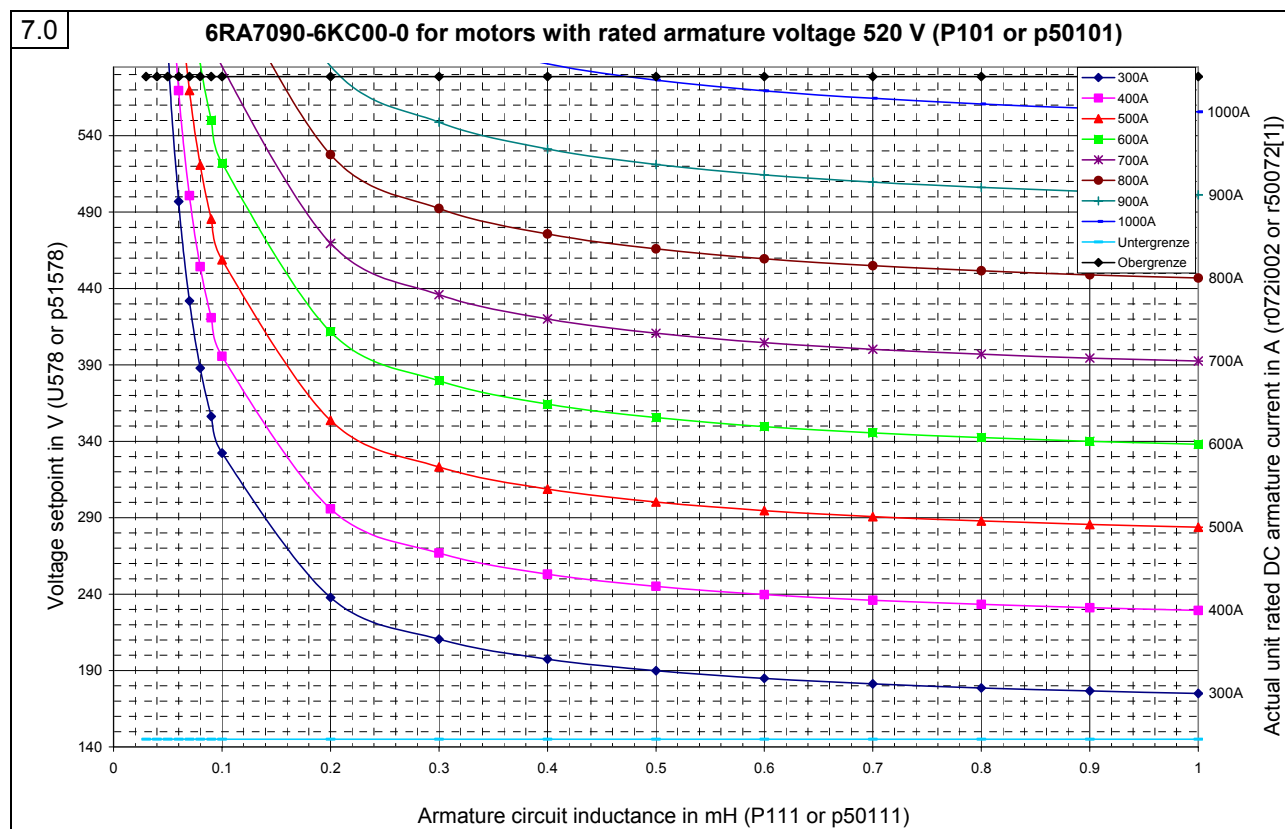


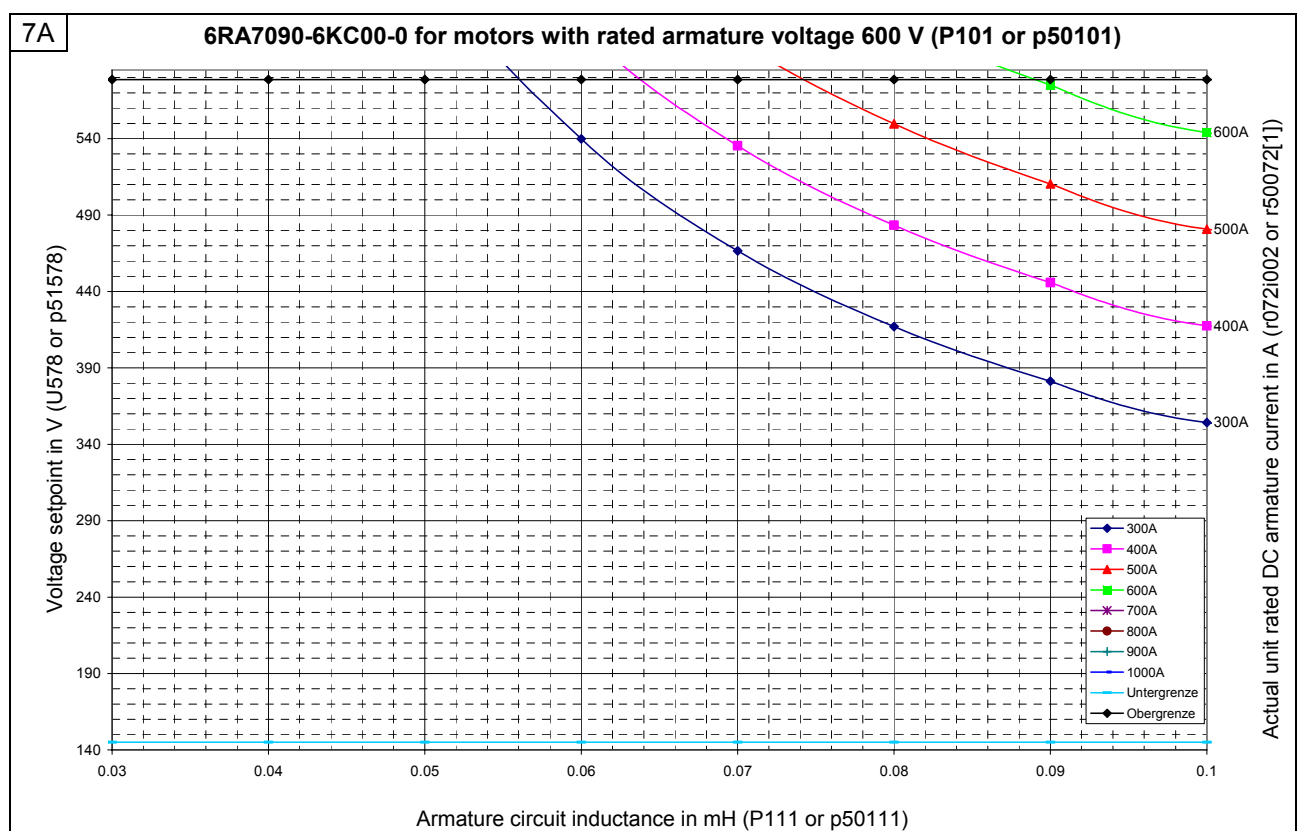
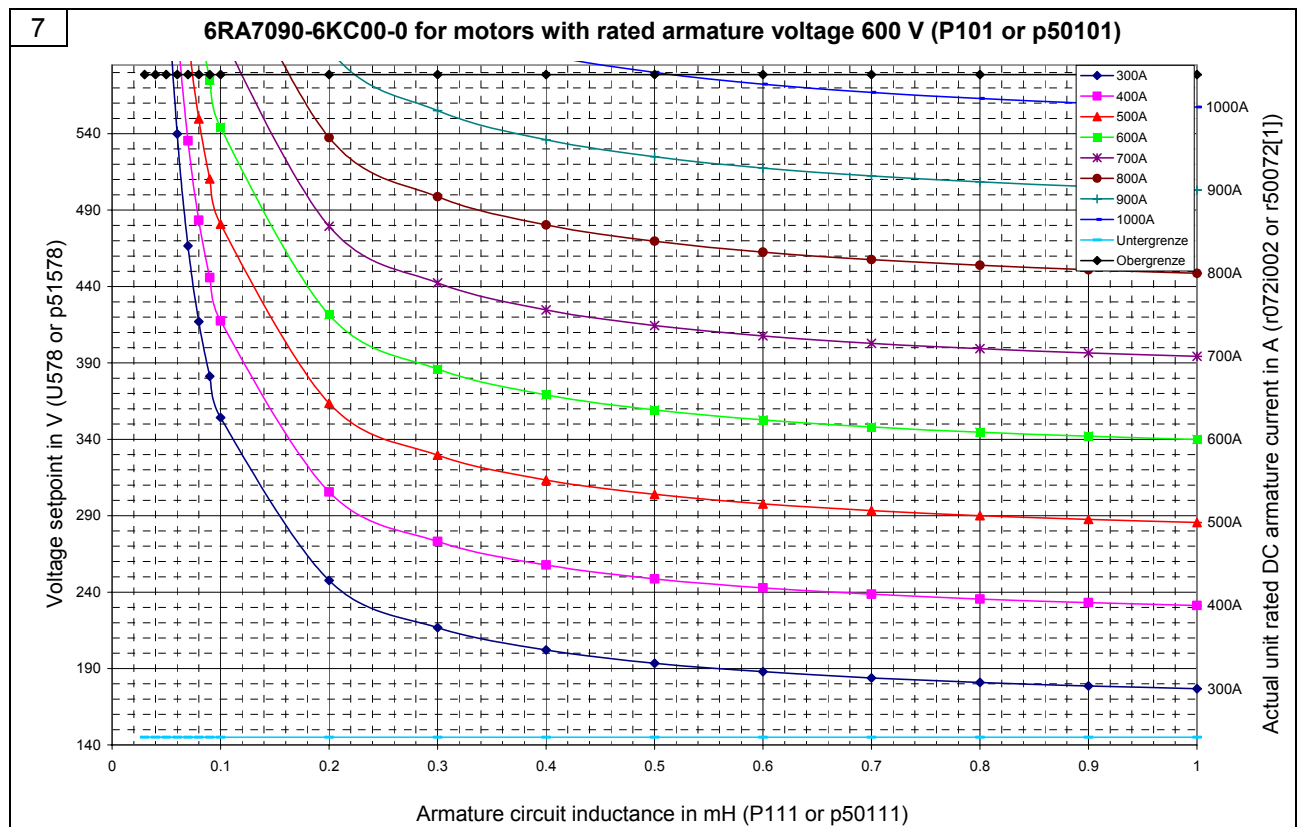


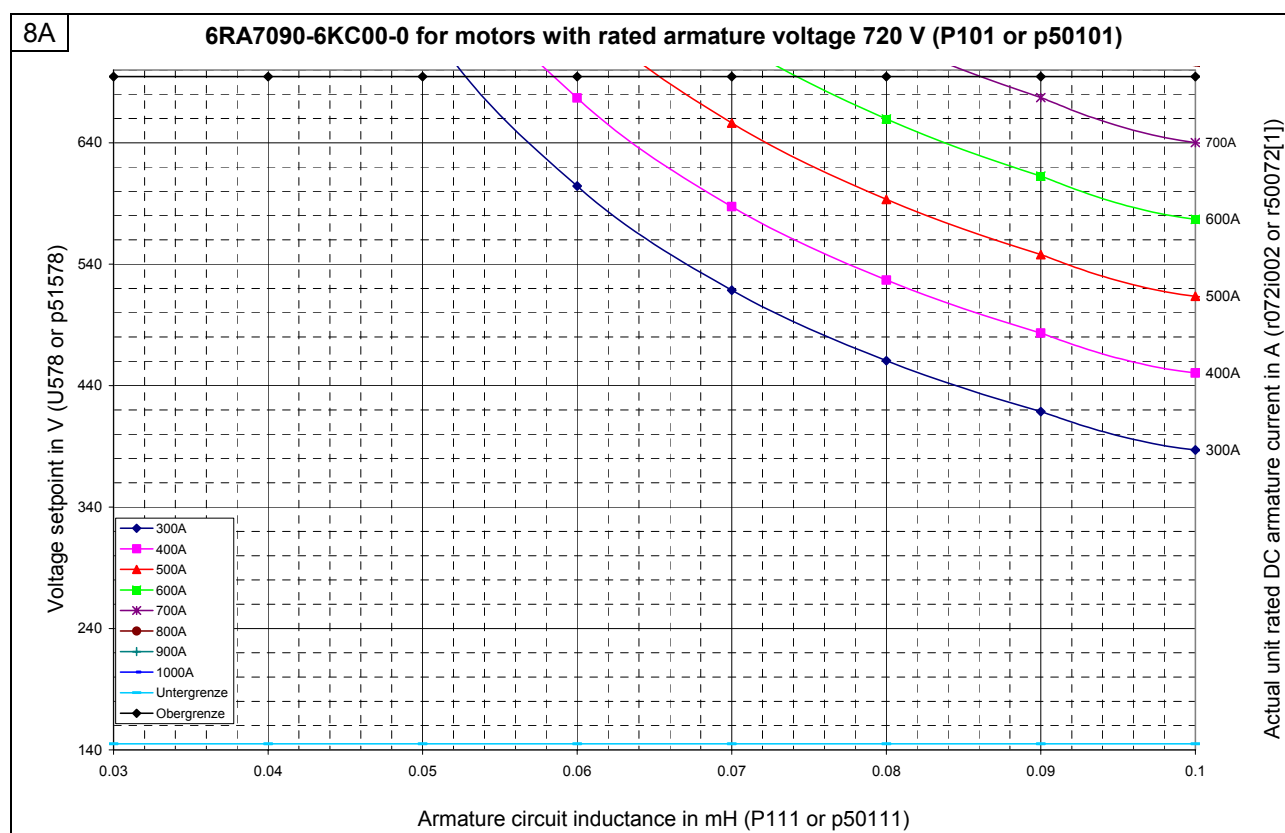
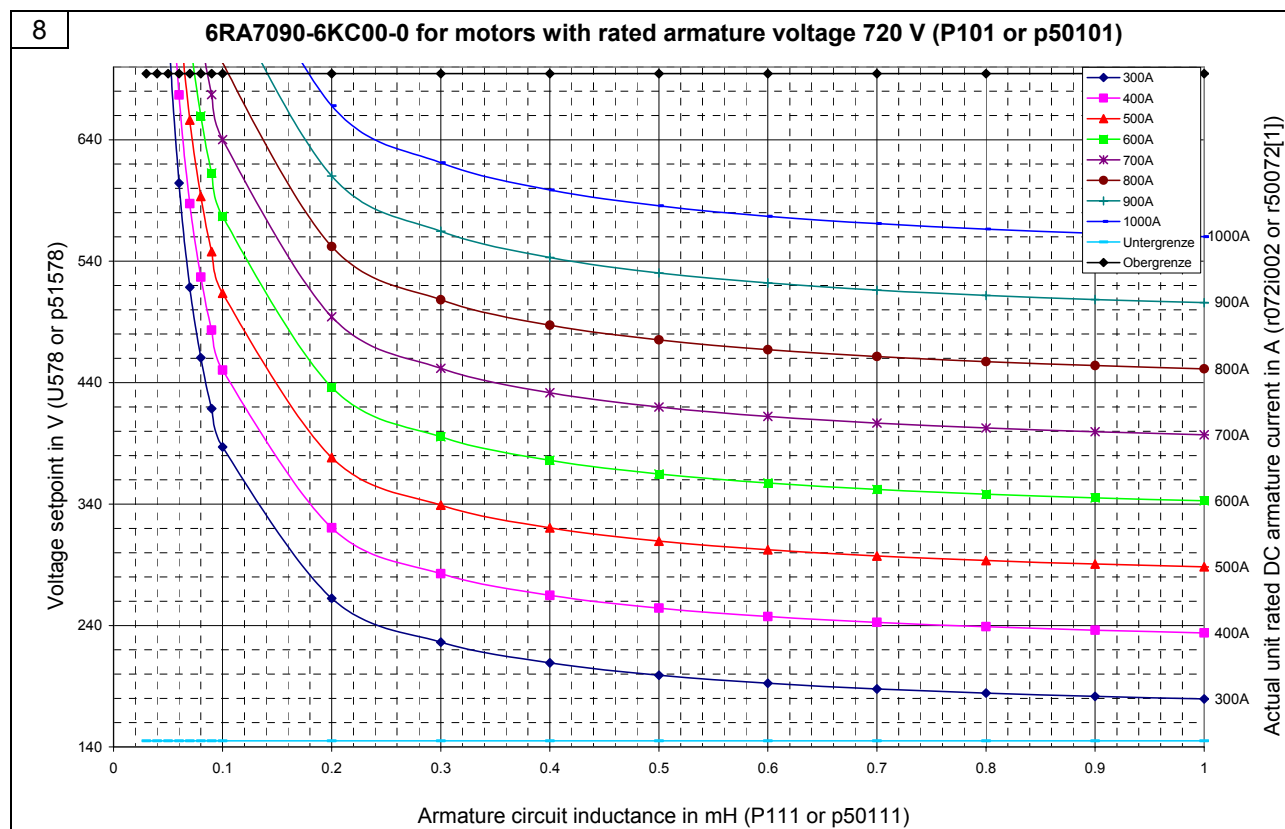


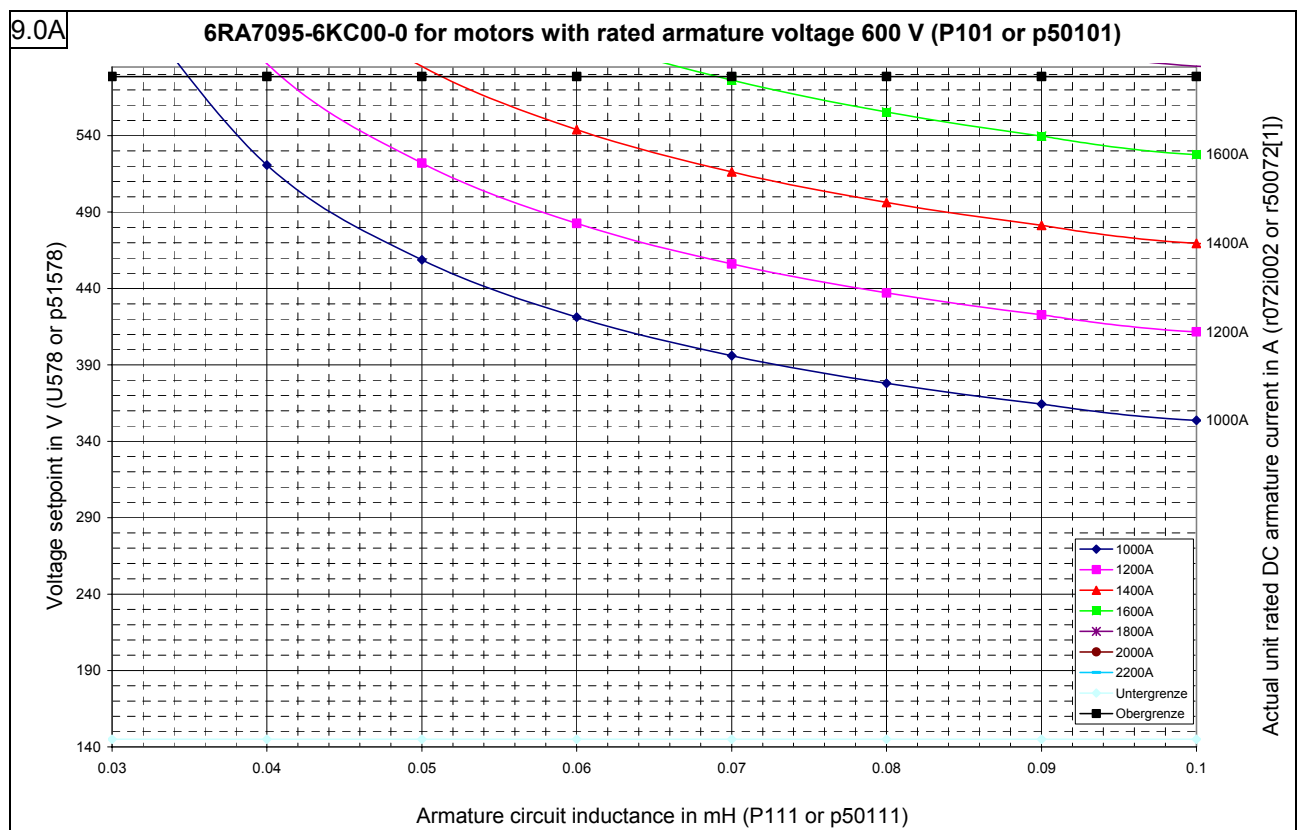
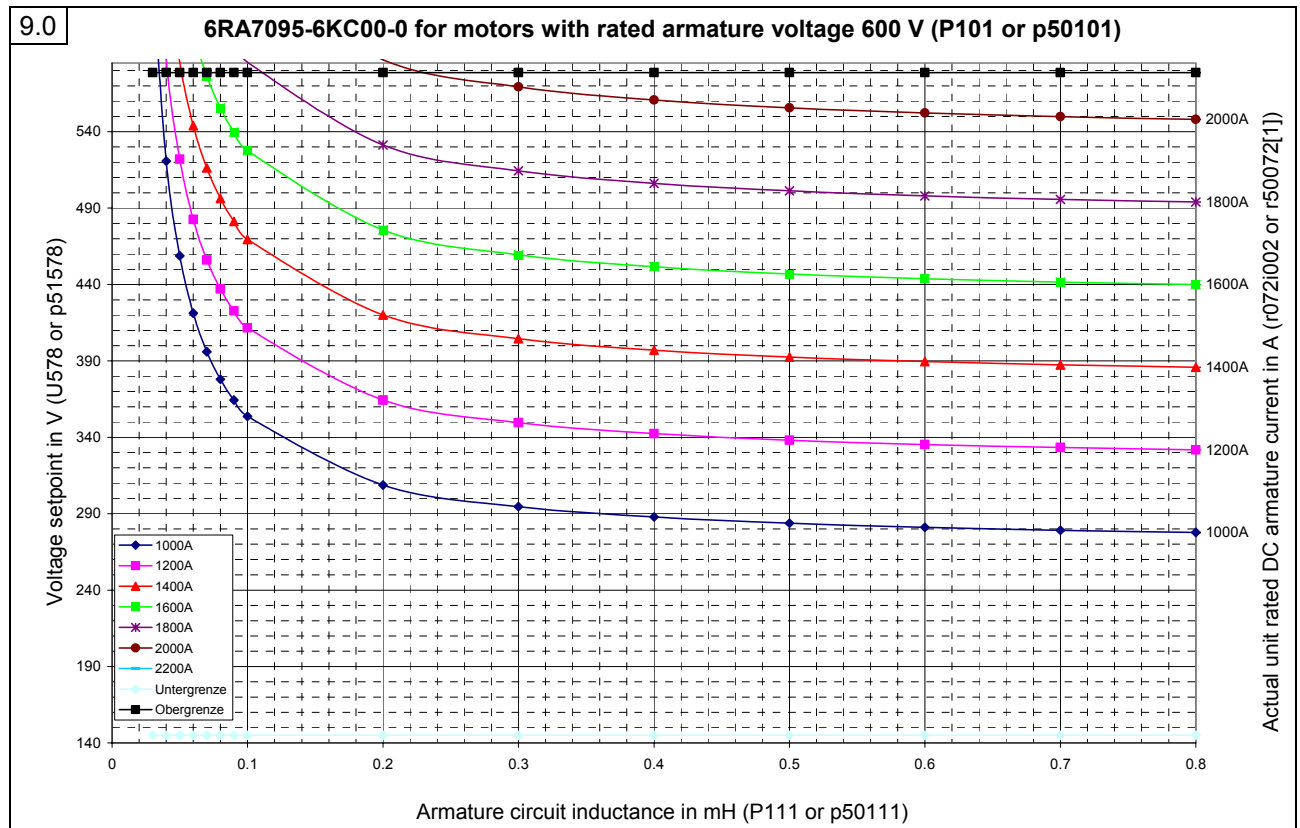


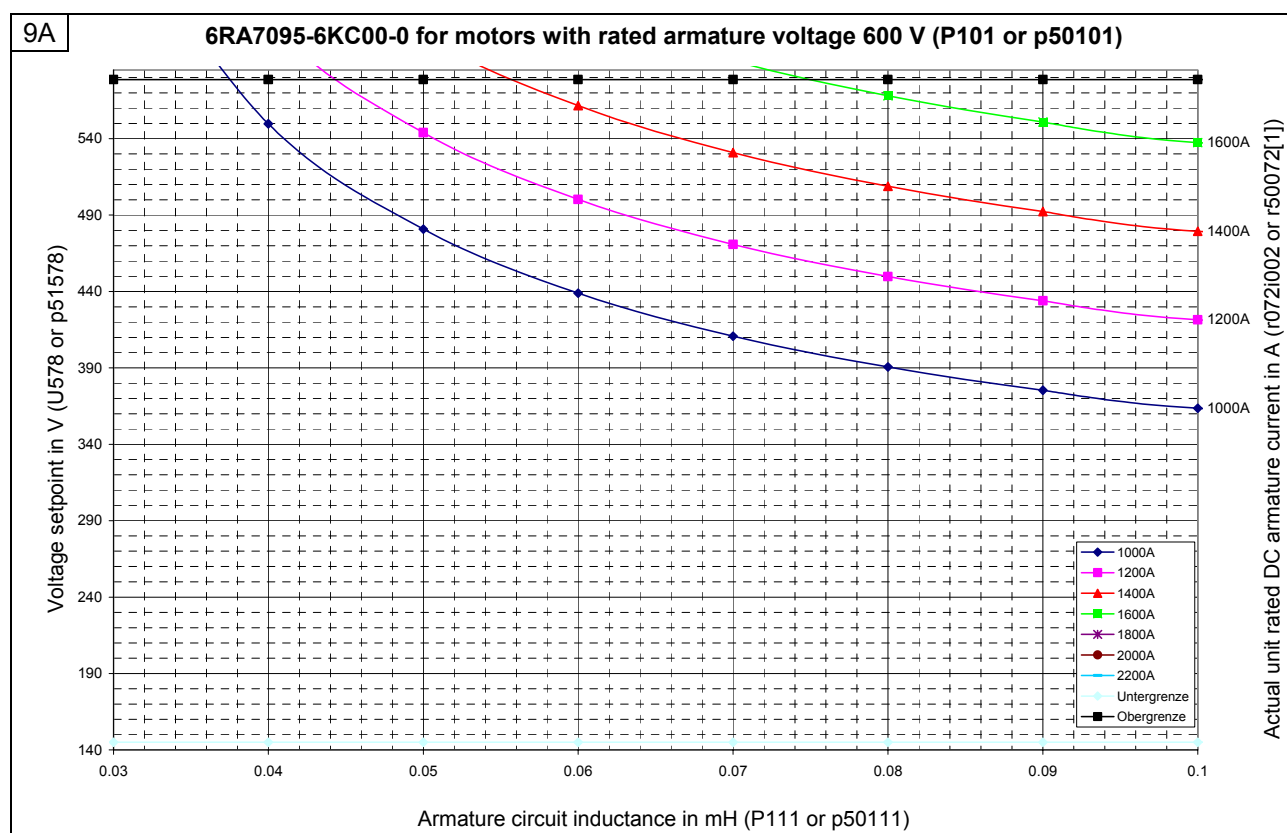
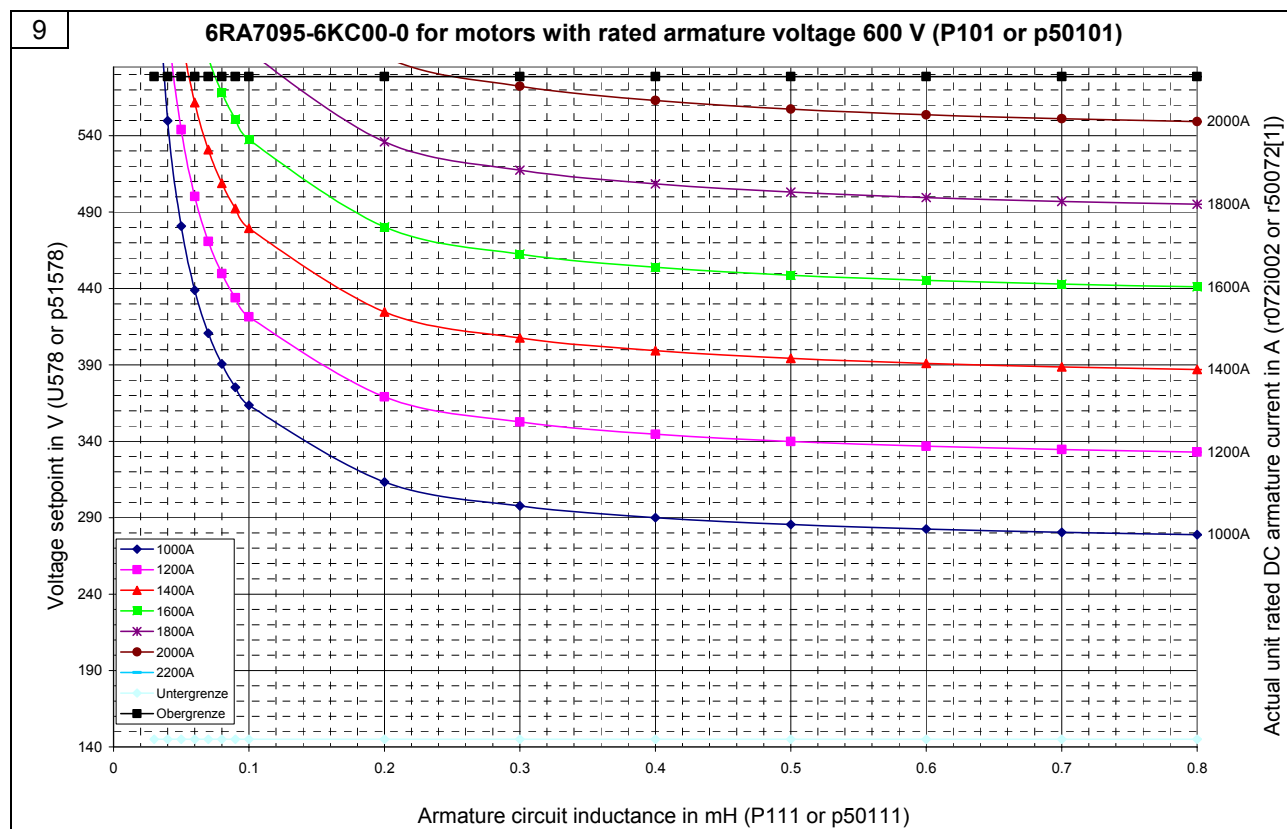


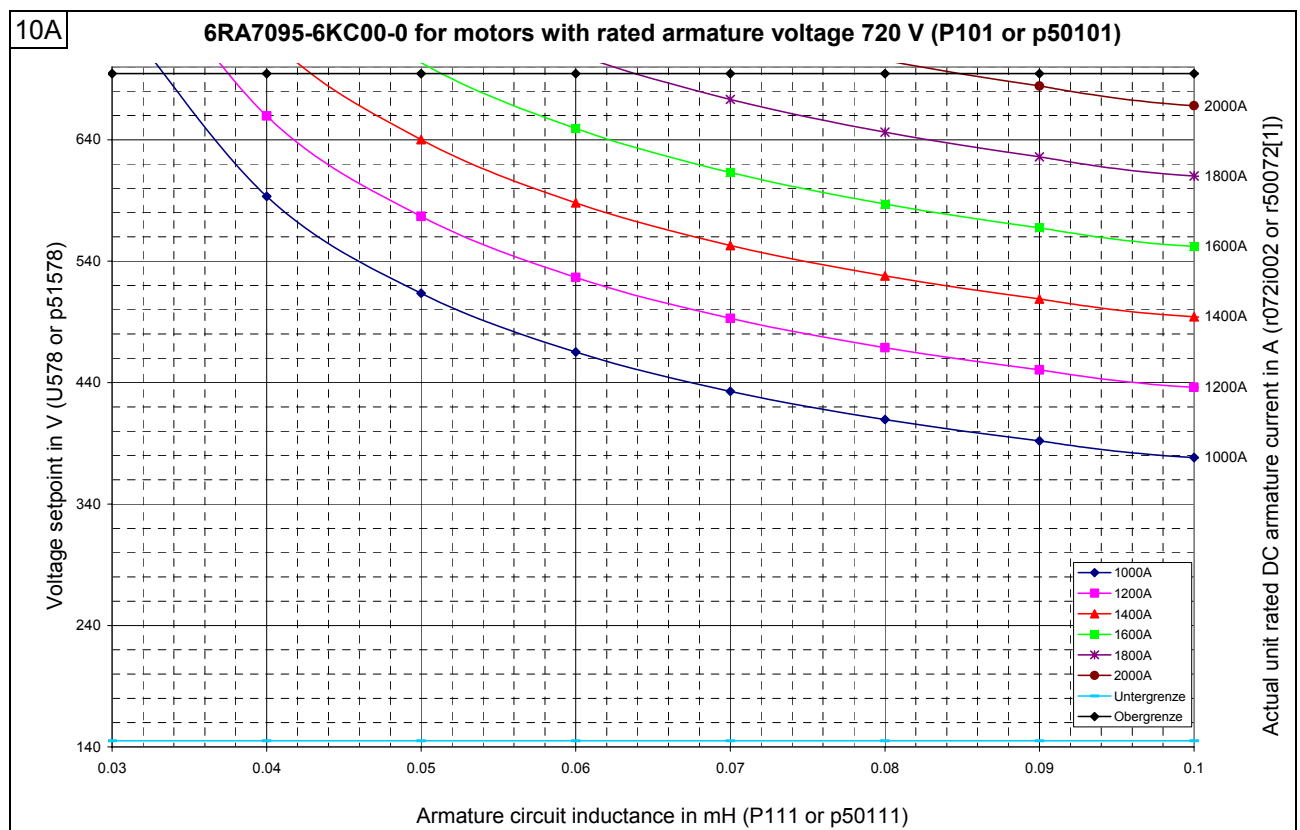
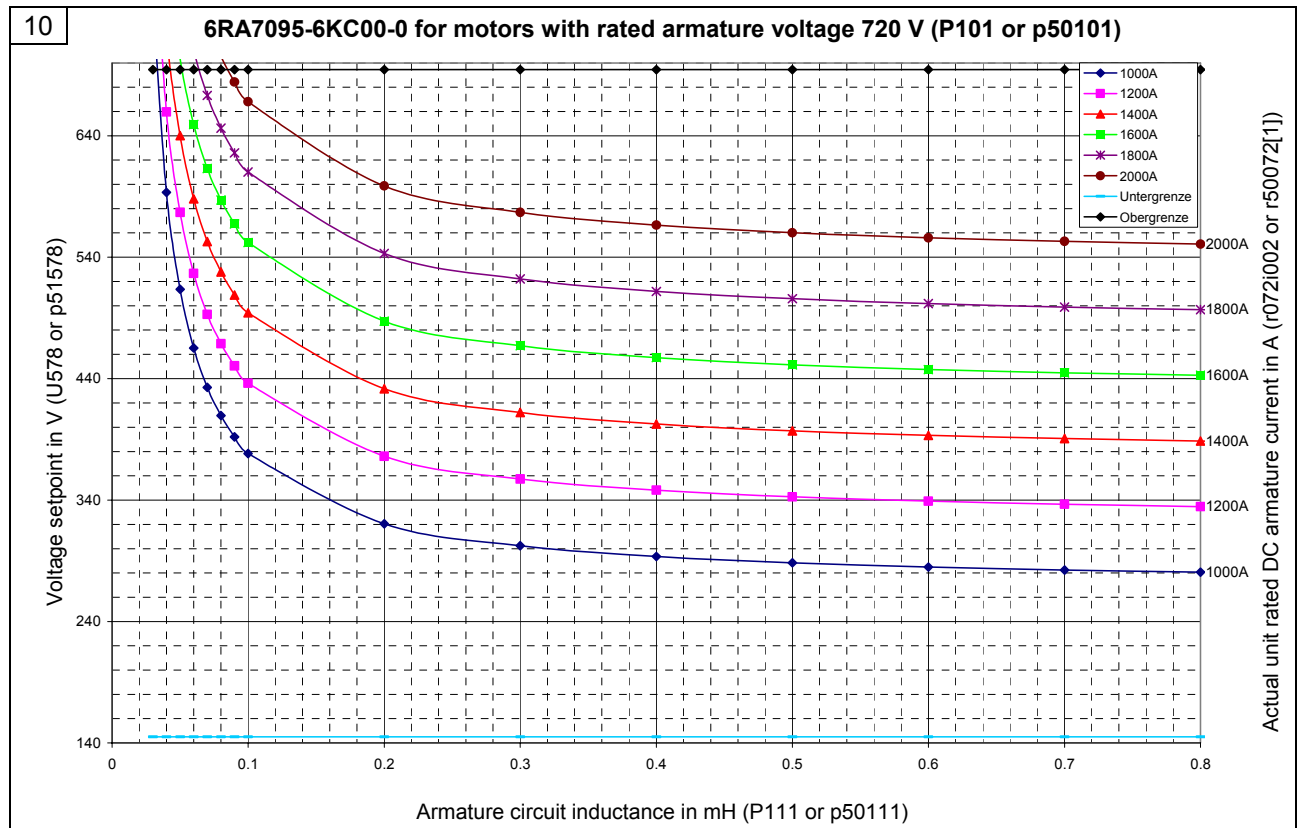




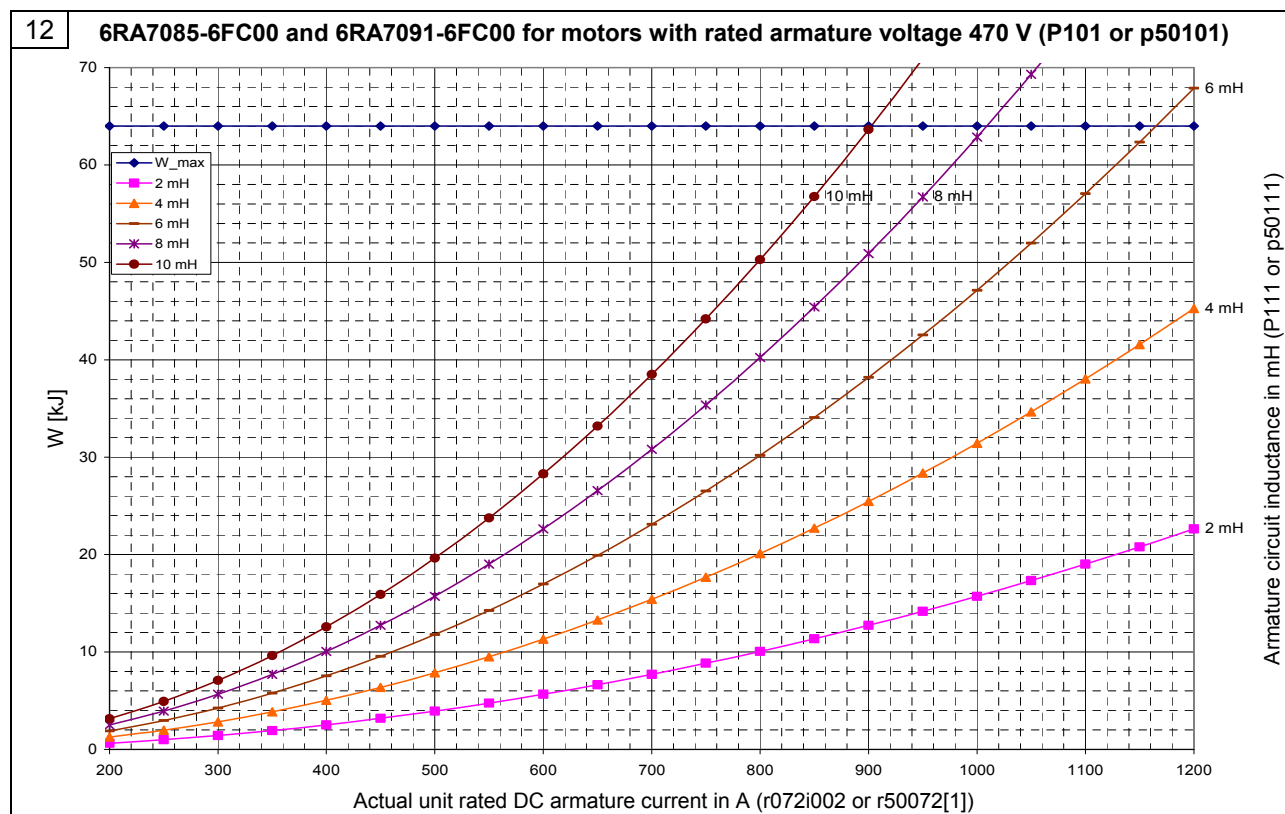
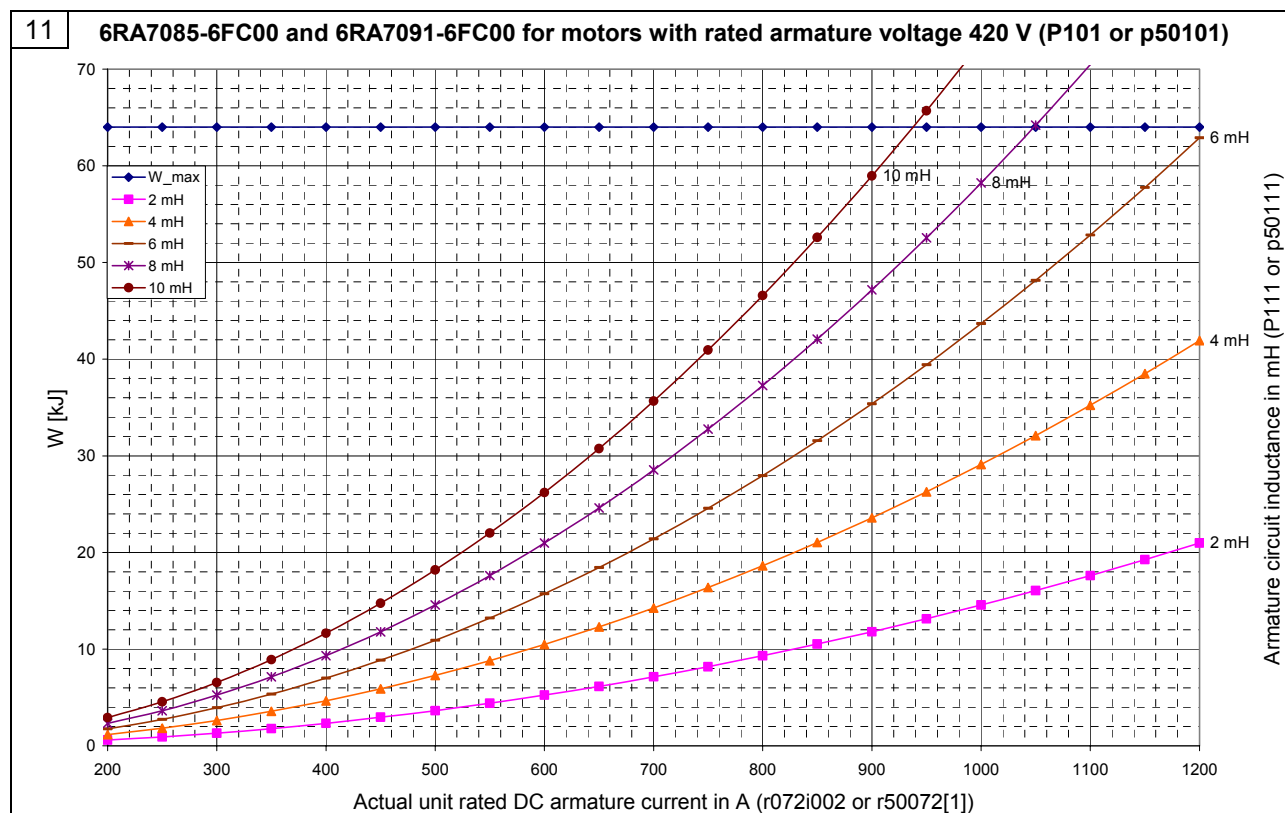


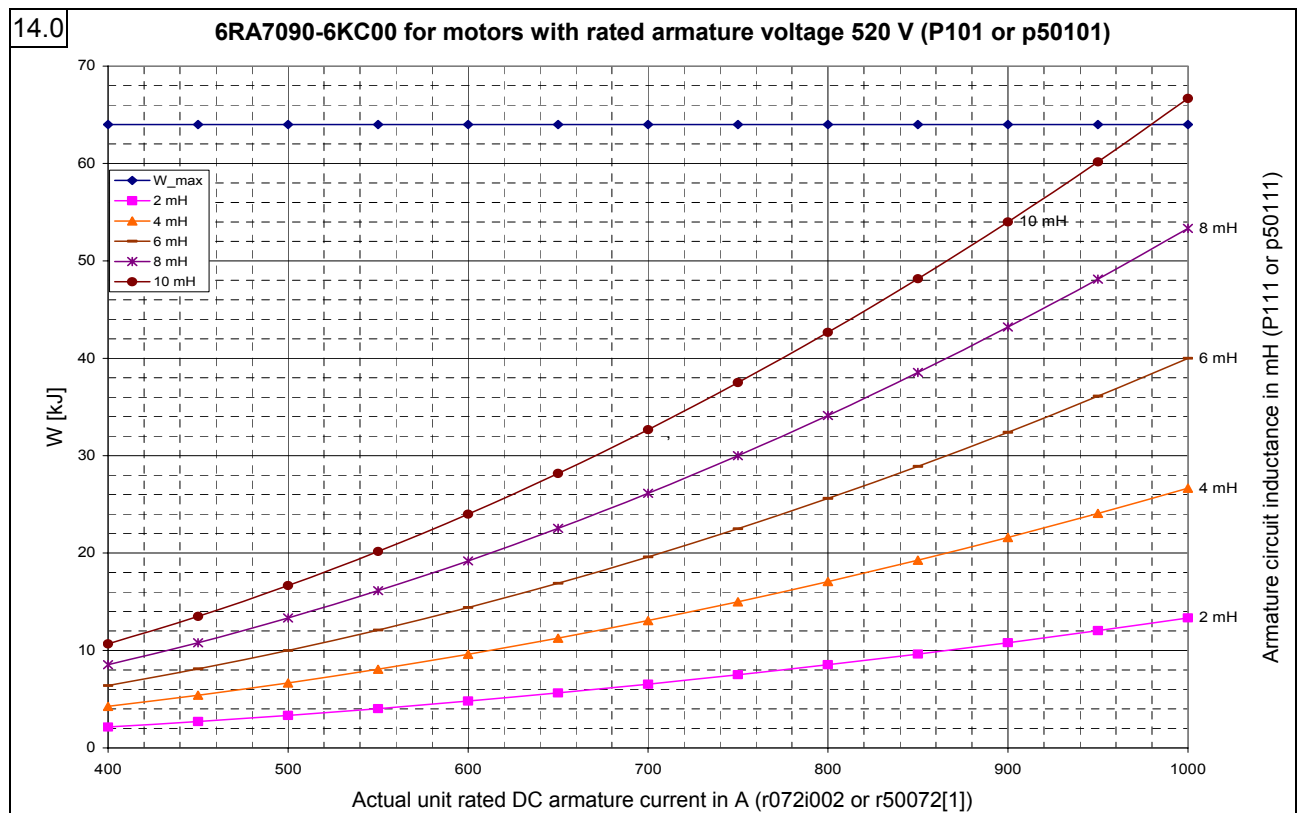
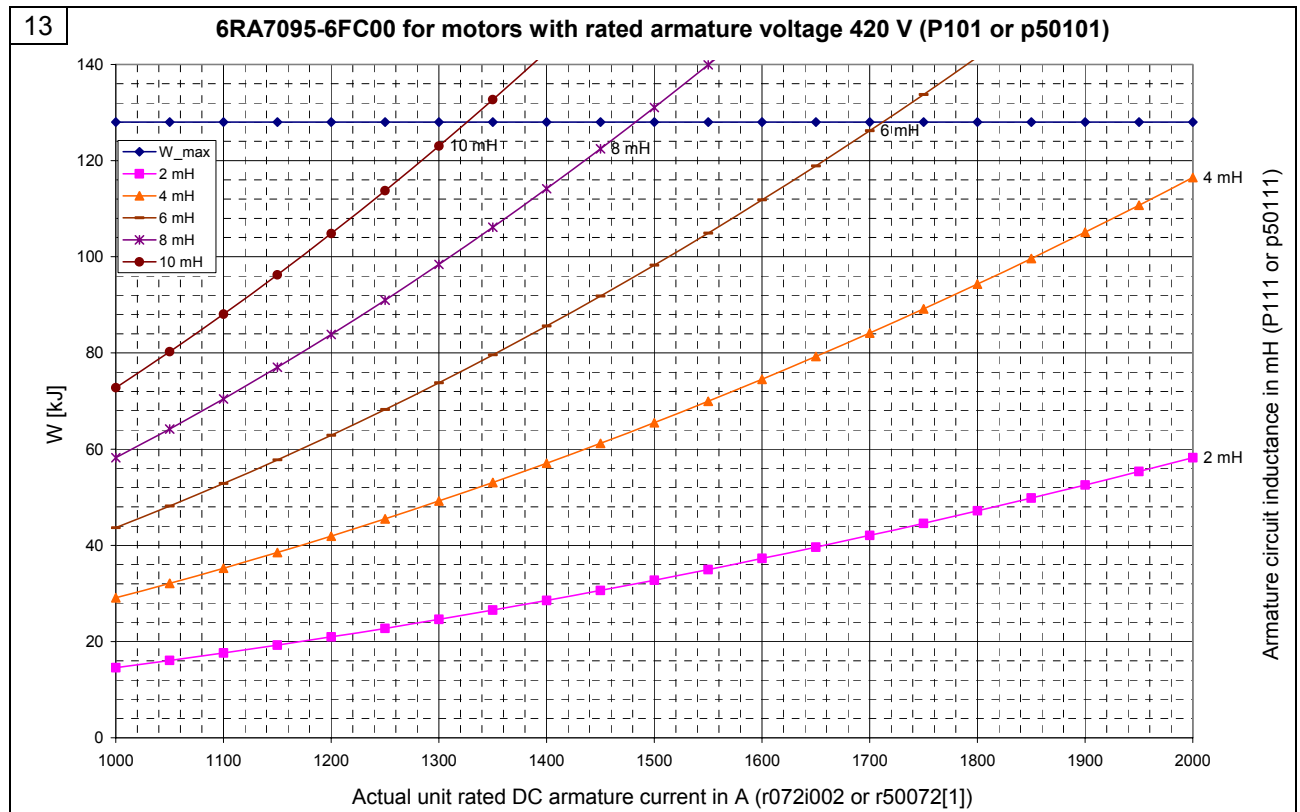


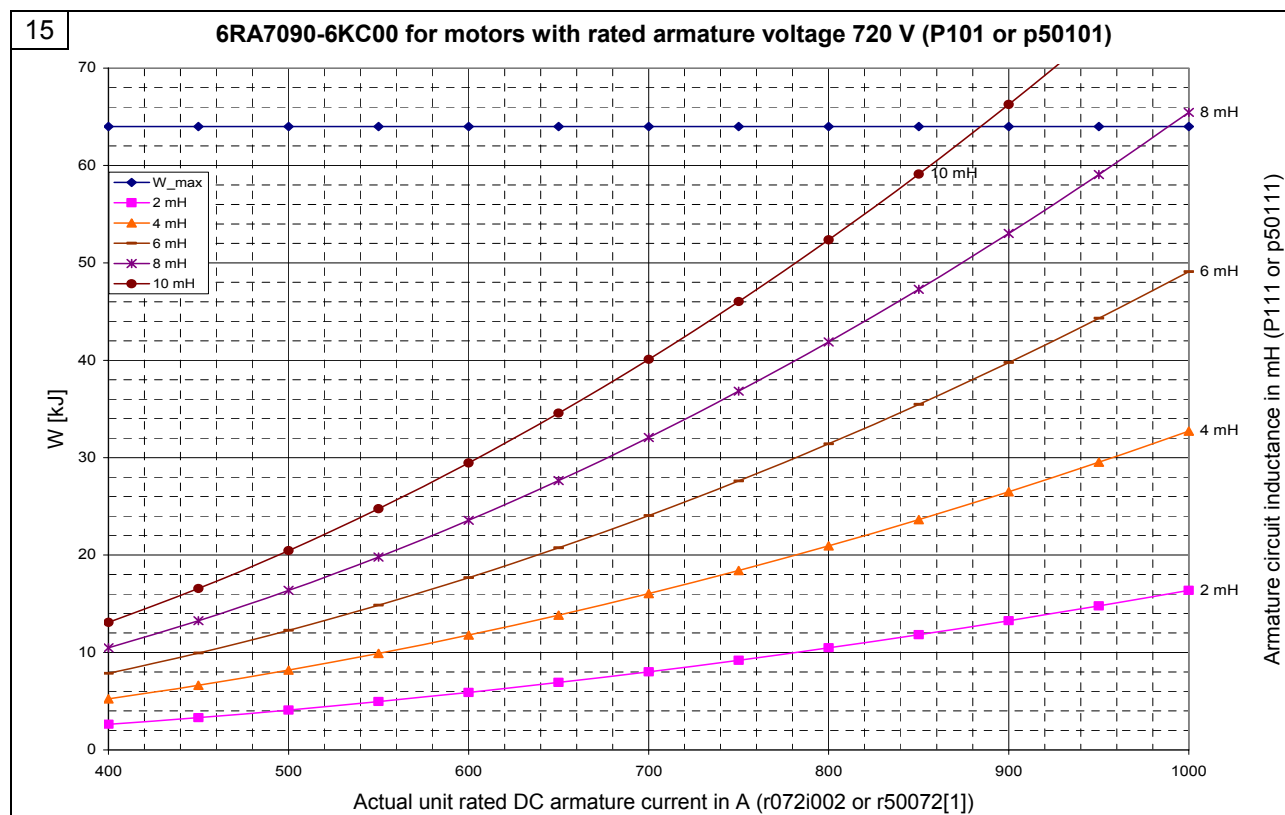
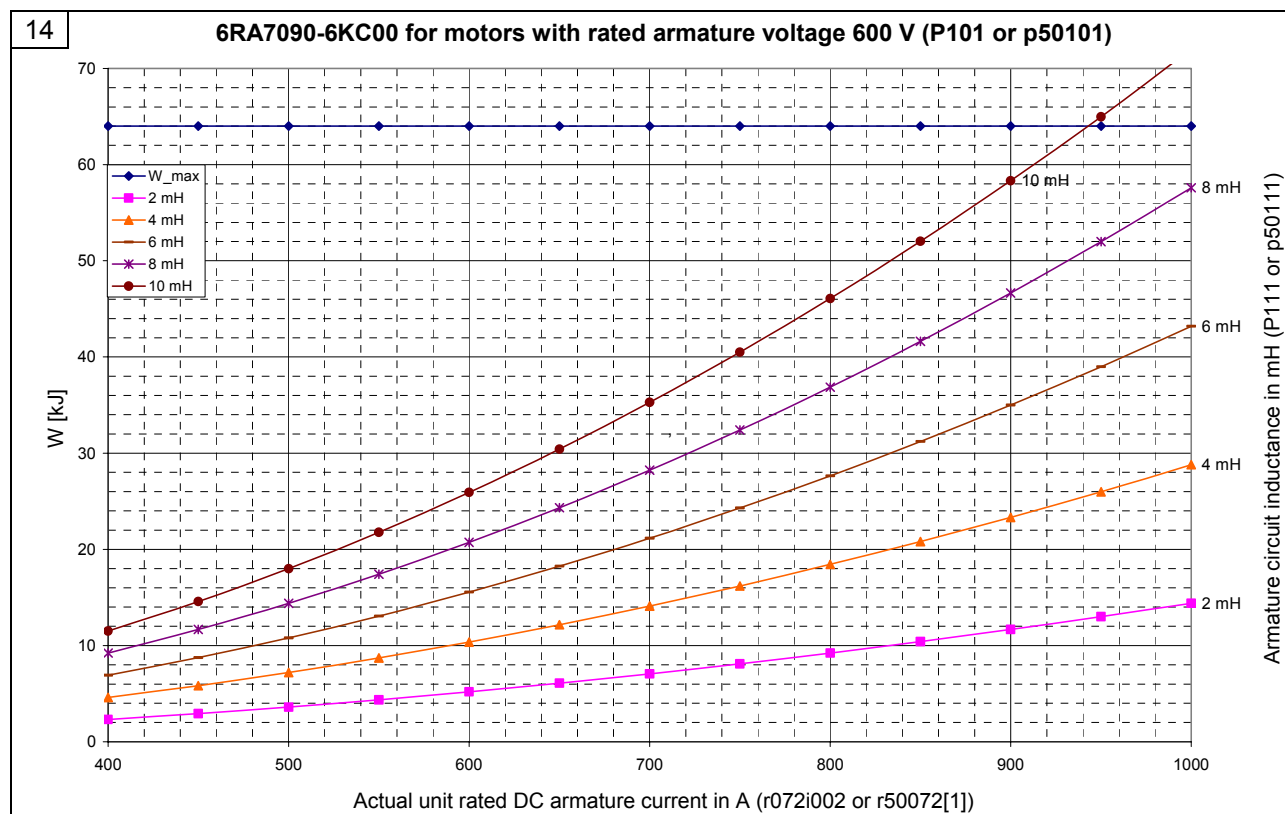


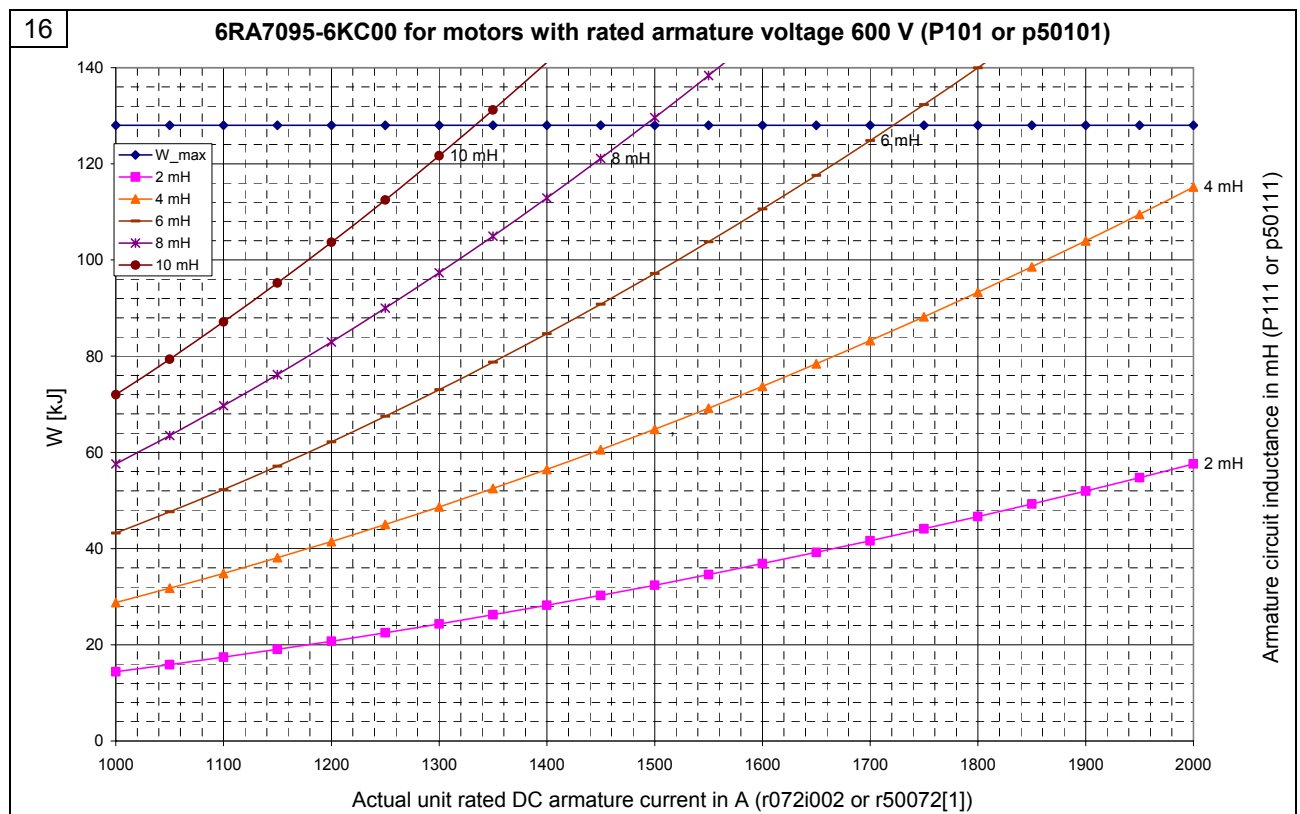
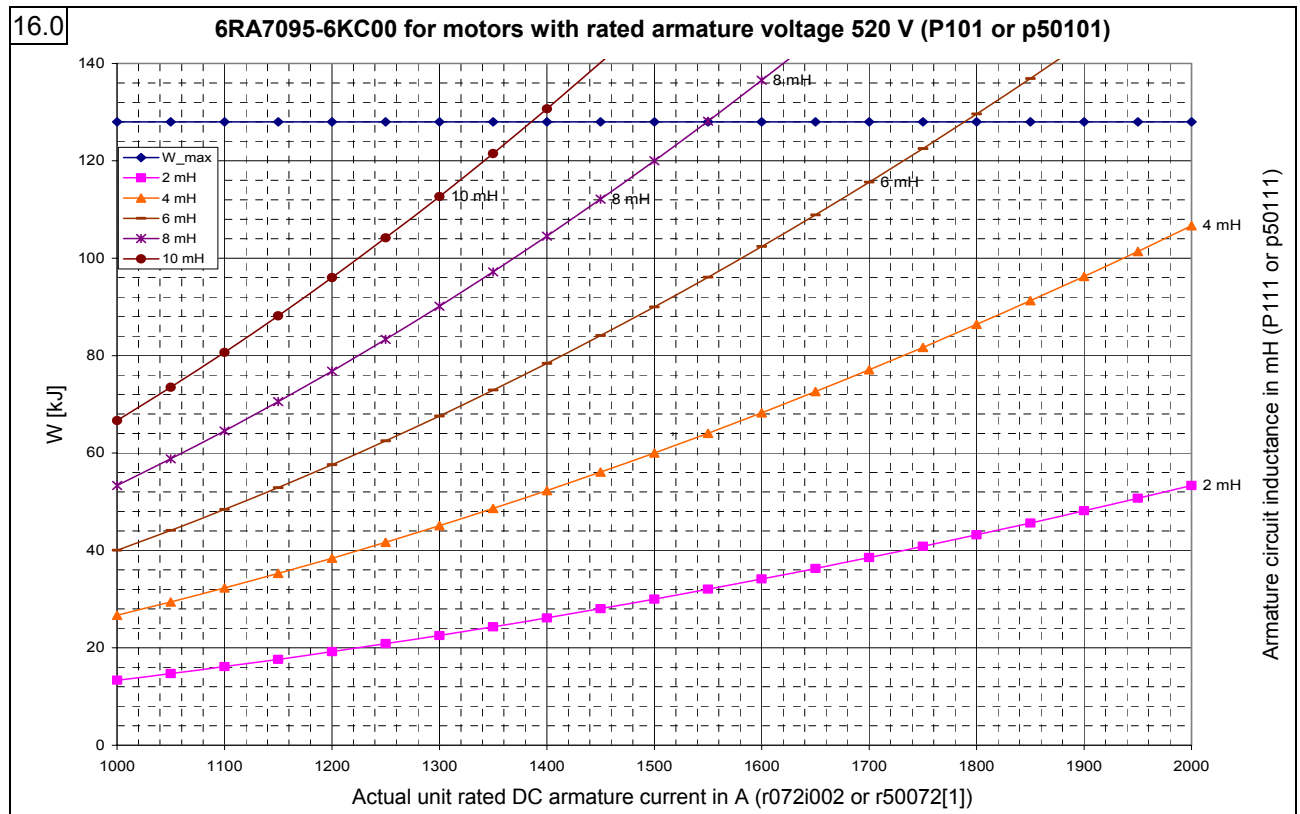


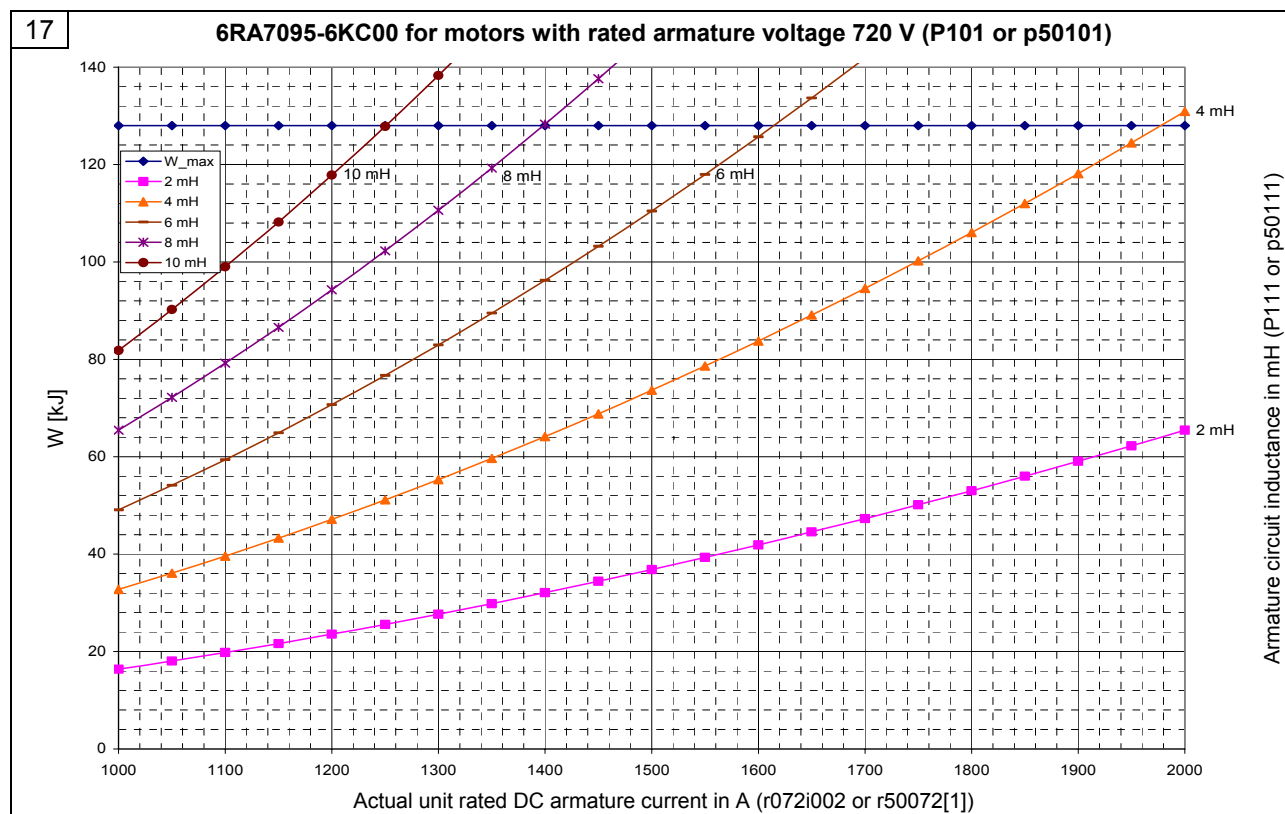
Characteristic diagrams to determine the maximum energy in the armature circuit using the armature circuit inductance (P111 or p50111) and the actual rated unit armature DC current (r072i002 or r50072[1])











11.2 Relevant standards

EN 50178		Electronic equipment for use in power installations
EN 60068	Part 2 A93	Electrical engineering; basic environmental testing techniques; checks
EN 61800	Part 1	Adjustable speed electrical power drive systems: General requirements. Definition for the dimensioning of low-voltage DC drive systems
EN 60146	Part 1	Semiconductor converters: General requirements and special requirements for line-commutated converters
EN 60204		Machinery Directive
EN 60529	Part 4-2 A12.01	Degrees of protection; protection against contact, foreign objects, and water for electrical equipment (EN 60529: 1991)
EN 60721		Electrical engineering; certification of environmental conditions:
EN 61140		Protection against electric shock
	Part1 A08.03	Classification of electrical and electronic equipment
EN 61800	Part 3	EMC product standard for adjustable speed drives
DIN VDE 0110	Part 1 and 2 A01.89	Insulation coordination for electrical equipment in low-voltage systems
SN36350		Environmentally friendly product design
UL 508 C		Power Conversion Equipment
ISO 14001:2004		Environmental management

11.3 Certification

The products listed in this document are manufactured and sold according to DIN ISO 9001. The SIMOREG CCP complies with all of the requirements of UL 508, however has not been certified.

11.4 Abbreviations, terminology

CE	Communauté Européenne
cULus	for ready-to-connect products, tested by UL in accordance with the UL and CSA standards
UL	Underwriters Laboratories
CCP	Converter Commutation Protector
IGBT	insulated gate bipolar transistor

11.5 Environmental compatibility

Environmental aspects during development

The use of highly-integrated components has enabled the number of parts to be kept to a minimum, with energy being used as efficiently as possible during production as a result.

Particular emphasis has been placed on ensuring that the metal and plastic parts have a low volume and low weight, and that the number of different types is kept to a minimum.

Front parts:	PC + ABS ABS	Cycoloy Novodur	GE-Plastics Bayer
Plastic parts in the unit:	PC PA 6.6 SE1-GFN1	Lexan 141-R Noryl	
Insulation materials:	PC (FR) fl	Makrolon or Lexan	
Rating plate:	Polyester film		

Pollutant-free materials have been used for all significant parts. No flame retardants containing halogen or insulation materials containing silicon have been used.

Environmental compatibility was a key criterion in selecting supplier parts.

Environmental aspects during production

The majority of supplier parts are transported in reusable packaging. The packaging material itself can be reused, it mainly comprises cardboard.

With the exception of the enclosure, no surface coatings have been used.

The production processes do not produce any emissions.

Environmental aspects for disposal

The unit features screw-in and snap-in connections that can be easily released in order to separate it into different mechanical components for recycling purposes.

The printed circuit boards may be used in recycling processes involving energy recovery. The proportion of components containing hazardous substances is low.

12.2010

Bisher sind folgende Ausgaben erschienen:
The following versions have appeared so far:

Ausgabe Version	interne Sachnummer Internal Part No.
01	C98130-A7046-A1-01-7419
02	C98130-A7046-A1-02-7419
03	C98130-A7046-A1-03-7419
04	C98130-A7046-A1-04-7419