

## SIMOREG DC-MASTER

Operating Instructions

6RA70 Series

Microprocessor-Based Converters from 6kW to 2500kW  
for Variable-Speed DC Drives



These Operating Instructions are available in the following languages:

Language	German	French	Spanish	Italian
Order No.	6RX1700-0AD00	6RX1700-0AD77	6RX1700-0AD78	6RX1700-0AD72

## Converter software version:

As these Operating Instructions went to print, SIMOREG DC-MASTER converters were being delivered from the factory with software version **3.1** installed.

These Operating Instructions also apply to other software versions.

Earlier software versions: Some parameters described in this document might not be stored in the software (i.e. the corresponding functionality is not available on the converter) or some parameters will have a restricted setting range. If this is the case, however, appropriate reference to this status will be made in the Parameter List.

Later software versions: Additional parameters might be available on the SIMOREG DC-MASTER (i.e. extra functions might be available which are not described in these Operating Instructions) or some parameters might have an extended setting range. In this case, leave the relevant parameters at their factory setting, or do not set any parameter values which are not described in these Instructions !

The software version of the SIMOREG DC-MASTER can be read in parameters r060 and r065.

The latest software version is available at the following Internet site:

<http://www4.ad.siemens.de/view/cs/en/8479576>

## CAUTION

Before updating your software, find out the product state of your SIMOREG device. You will find this on the rating plate (field on the bottom left-hand side "Prod. State").

Prod. State = A1,A2 (devices with the CUD1 electronics board, version C98043-A7001-L1-xx):  
It is only permissible to load software versions 1.xx and 2.xx.

Prod. State = A3 (devices with the CUD1 electronics board, version C98043-A7001-L2-xx):  
It is only permissible to load software versions 3.xx.

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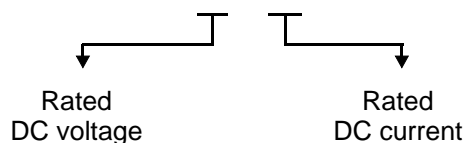
We have checked that the contents of this publication agree with the hardware and software described herein. Nonetheless, differences might exist and therefore we cannot guarantee that they are completely identical. The information given in this publication is reviewed at regular intervals and any corrections that might be necessary are made in the subsequent printings. Suggestions for improvement are welcome at all times.

SIMOREG ® is a registered trademark of Siemens

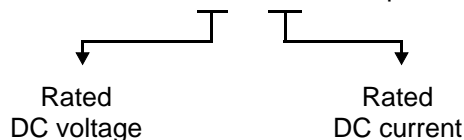
## 2 Type spectrum



Converter order no.	Type designation
6RA7018 - 6DS22 - 0	D485 / 30 Mre - GeE6S22
6RA7025 - 6DS22 - 0	D485 / 60 Mre - GeE6S22
6RA7028 - 6DS22 - 0	D485 / 90 Mre - GeE6S22
6RA7031 - 6DS22 - 0	D485 / 125 Mre - GeE6S22
6RA7075 - 6DS22 - 0	D485 / 210 Mre - GeEF6S22
6RA7078 - 6DS22 - 0	D485 / 280 Mre - GeEF6S22
6RA7081 - 6DS22 - 0	D485 / 400 Mre - GeEF6S22
6RA7085 - 6DS22 - 0	D485 / 600 Mre - GeEF6S22
6RA7087 - 6DS22 - 0	D485 / 850 Mre - GeEF6S22
6RA7091 - 6DS22 - 0	D485 / 1200 Mre - GeEF6S22
6RA7093 - 4DS22 - 0	D485 / 1600 Mre - GeEF4S22
6RA7095 - 4DS22 - 0	D485 / 2000 Mre - GeEF4S22
6RA7098 - 4DS22 - 0	D485 / 3000 Mre - GeEF4S22
6RA7018 - 6FS22 - 0	D550 / 30 Mre - GeE6S22
6RA7025 - 6FS22 - 0	D550 / 60 Mre - GeE6S22
6RA7028 - 6FS22 - 0	D550 / 90 Mre - GeE6S22
6RA7031 - 6FS22 - 0	D550 / 125 Mre - GeE6S22
6RA7075 - 6FS22 - 0	D550 / 210 Mre - GeEF6S22
6RA7078 - 6FS22 - 0	D550 / 280 Mre - GeEF6S22
6RA7082 - 6FS22 - 0	D550 / 450 Mre - GeEF6S22
6RA7085 - 6FS22 - 0	D550 / 600 Mre - GeEF6S22
6RA7087 - 6FS22 - 0	D550 / 850 Mre - GeEF6S22
6RA7091 - 6FS22 - 0	D550 / 1200 Mre - GeEF6S22
6RA7025 - 6GS22 - 0	D690 / 60 Mre - GeE6S22
6RA7031 - 6GS22 - 0	D690 / 125 Mre - GeE6S22
6RA7075 - 6GS22 - 0	D690 / 210 Mre - GeEF6S22
6RA7081 - 6GS22 - 0	D690 / 400 Mre - GeEF6S22
6RA7085 - 6GS22 - 0	D690 / 600 Mre - GeEF6S22
6RA7087 - 6GS22 - 0	D690 / 800 Mre - GeEF6S22
6RA7090 - 6GS22 - 0	D690 / 1000 Mre - GeEF6S22
6RA7093 - 4GS22 - 0	D690 / 1600 Mre - GeEF4S22
6RA7095 - 4GS22 - 0	D690 / 2000 Mre - GeEF4S22
6RA7096 - 4GS22 - 0	D690 / 2200 Mre - GeEF4S22
6RA7097 - 4GS22 - 0	D690 / 2800 Mre - GeEF4S22
6RA7086 - 6KS22 - 0	D830 / 720 Mre - GeEF6S22
6RA7088 - 6KS22 - 0	D830 / 950 Mre - GeEF6S22
6RA7093 - 4KS22 - 0	D830 / 1500 Mre - GeEF4S22
6RA7095 - 4KS22 - 0	D830 / 2000 Mre - GeEF4S22
6RA7097 - 4KS22 - 0	D830 / 2600 Mre - GeEF4S22
6RA7088 - 6LS22 - 0	D1000 / 900 Mre - GeEF6S22
6RA7093 - 4LS22 - 0	D1000 / 1500 Mre - GeEF4S22
6RA7095 - 4LS22 - 0	D1000 / 1900 Mre - GeEF4S22
6RA7096 - 4MS22 - 0	D1140 / 2200 Mre - GeEF4S22



Converter order no.	Type designation
6RA7013 - 6DV62 - 0	D420 / 15 Mreq - GeG6V62
6RA7018 - 6DV62 - 0	D420 / 30 Mreq - GeG6V62
6RA7025 - 6DV62 - 0	D420 / 60 Mreq - GeG6V62
6RA7028 - 6DV62 - 0	D420 / 90 Mreq - GeG6V62
6RA7031 - 6DV62 - 0	D420 / 125 Mreq - GeG6V62
6RA7075 - 6DV62 - 0	D420 / 210 Mreq - GeGF6V62
6RA7078 - 6DV62 - 0	D420 / 280 Mreq - GeGF6V62
6RA7081 - 6DV62 - 0	D420 / 400 Mreq - GeGF6V62
6RA7085 - 6DV62 - 0	D420 / 600 Mreq - GeGF6V62
6RA7087 - 6DV62 - 0	D420 / 850 Mreq - GeGF6V62
6RA7091 - 6DV62 - 0	D420 / 1200 Mreq - GeGF6V62
6RA7093 - 4DV62 - 0	D420 / 1600 Mreq - GeGF4V62
6RA7095 - 4DV62 - 0	D420 / 2000 Mreq - GeGF4V62
6RA7098 - 4DV62 - 0	D420 / 3000 Mreq - GeGF4V62
6RA7018 - 6FV62 - 0	D480 / 30 Mreq - GeG6V62
6RA7025 - 6FV62 - 0	D480 / 60 Mreq - GeG6V62
6RA7028 - 6FV62 - 0	D480 / 90 Mreq - GeG6V62
6RA7031 - 6FV62 - 0	D480 / 125 Mreq - GeG6V62
6RA7075 - 6FV62 - 0	D480 / 210 Mreq - GeGF6V62
6RA7078 - 6FV62 - 0	D480 / 280 Mreq - GeGF6V62
6RA7082 - 6FV62 - 0	D480 / 450 Mreq - GeGF6V62
6RA7085 - 6FV62 - 0	D480 / 600 Mreq - GeGF6V62
6RA7087 - 6FV62 - 0	D480 / 850 Mreq - GeGF6V62
6RA7091 - 6FV62 - 0	D480 / 1200 Mreq - GeGF6V62
6RA7025 - 6GV62 - 0	D600 / 60 Mreq - GeG6V62
6RA7031 - 6GV62 - 0	D600 / 125 Mreq - GeG6V62
6RA7075 - 6GV62 - 0	D600 / 210 Mreq - GeGF6V62
6RA7081 - 6GV62 - 0	D600 / 400 Mreq - GeGF6V62
6RA7085 - 6GV62 - 0	D600 / 600 Mreq - GeGF6V62
6RA7087 - 6GV62 - 0	D600 / 850 Mreq - GeGF6V62
6RA7090 - 6GV62 - 0	D600 / 1100 Mreq - GeGF6V62
6RA7093 - 4GV62 - 0	D600 / 1600 Mreq - GeGF4V62
6RA7095 - 4GV62 - 0	D600 / 2000 Mreq - GeGF4V62
6RA7096 - 4GV62 - 0	D600 / 2200 Mreq - GeGF4V62
6RA7097 - 4GV62 - 0	D600 / 2800 Mreq - GeGF4V62
6RA7086 - 6KV62 - 0	D725 / 760 Mreq - GeGF6V62
6RA7090 - 6KV62 - 0	D725 / 1000 Mreq - GeGF6V62
6RA7093 - 4KV62 - 0	D725 / 1500 Mreq - GeGF4V62
6RA7095 - 4KV62 - 0	D725 / 2000 Mreq - GeGF4V62
6RA7097 - 4KV62 - 0	D725 / 2600 Mreq - GeGF4V62
6RA7088 - 6LV62 - 0	D875 / 950 Mreq - GeGF6V62
6RA7093 - 4LV62 - 0	D875 / 1500 Mreq - GeGF4V62
6RA7095 - 4LV62 - 0	D875 / 1900 Mreq - GeGF4V62
6RA7096 - 4MV62 - 0	D1000 / 2200 Mreq - GeGF4V62



## 2.1 Converter order number code



**Code letters defined acc. to general MLFB guidelines:**

**Converter model:**

- 23: SIMOREG Comp. 4th Gen.
- 24: SIMOREG Comp. 4th Gen. Digital
- 70: SIMOREG DC-MASTER

**Rated DC currents and cooling:**

Natural cooling: Separate cooling  
 Ambient temp. Ambient temp.  
 +45°C +35°C / +40°C on 6RA70

00:	50
01: ≥3.6.....<4.1	51
02: ≥4.1.....<4.65	52
03: ≥4.65.....<5.25	53
04: ≥5.25.....<6.0	54
05: ≥6.0.....<6.8	55
06: ≥6.8.....<7.75	56
07: ≥7.75.....<8.8	57
08: ≥8.8.....<10.0	58
09:	59
10: ≥10.0.....<11.5	60: ≥31.5.....<36.0
11: ≥11.5.....<13.0	61: ≥36.0.....<41.0
12: ≥13.0.....<14.5	62: ≥41.0.....<46.5
13: ≥14.5.....<16.5	63: ≥46.5.....<52.5
14: ≥16.5.....<19.0	64: ≥52.5.....<60.0
15: ≥19.0.....<21.5	65: ≥60.0.....<68.0
16: ≥21.5.....<24.5	66: ≥68.0.....<77.5
17: ≥24.5.....<28.0	67: ≥77.5.....<88.0
18: ≥28.0.....<31.5	68: ≥88.0.....<100
19:	69:
20: ≥31.5.....<36.0	70: ≥100.....<115
21: ≥36.0.....<41.0	71: ≥115.....<130
22: ≥41.0.....<46.5	72: ≥130.....<145
23: ≥46.5.....<52.5	73: ≥145.....<165
24: ≥52.5.....<60.0	74: ≥165.....<190
25: ≥60.0.....<68.0	75: ≥190.....<215
26: ≥68.0.....<77.5	76: ≥215.....<245
27: ≥77.5.....<88.0	77: ≥245.....<280
28: ≥88.0.....<100	78: ≥280.....<315
29:	79:
30: ≥100.....<115	80: ≥315.....<360
31: ≥115.....<130	81: ≥360.....<410
32: ≥130.....<145	82: ≥410.....<465
33: ≥145.....<165	83: ≥465.....<525
34: ≥165.....<190	84: ≥525.....<600
35: ≥190.....<215	85: ≥600.....<680
36: ≥215.....<245	86: ≥680.....<775
37: ≥245.....<280	87: ≥775.....<880
38: ≥280.....<315	88: ≥880.....<1000
39:	89:
40:	90: ≥1000.....<1150
41:	91: ≥1150.....<1300
42:	92: ≥1300.....<1450
43:	93: ≥1450.....<1650
44:	94: ≥1650.....<1900
45:	95: ≥1900.....<2150
	96: ≥2150.....<2400
	97: ≥2400.....<2850
	98: ≥2850.....<3250

**Options:**  
 Z: With option

**Innovation**

**Closed-loop control:**

- 1: Uncontrolled field
- 2: Controlled field

**Closed-loop control:**

- 1: 1Q analog
- 2: 1Q digital
- 7: 4Q analog
- 6: 4Q digital

**Converter connection:**

- A:
- B:
- C:
- D: B2HZ (1Q)
- .
- K: (B2) A (B2) C (4Q)
- .
- S: B6C (1Q)
- T:
- U:
- V: (B6) A (B6) C (4Q)





**Rated supply voltage:**

- A:
- B: 230V
- C:
- D: 400V
- E:
- F: 440V
- G: 500V - 575V
- H: 660V
- K: 690V - 750V
- L: 830V
- M: 950V


**Thyristor construction and fuse assembly:**

- 0: Control units without power section
- 1: USA Power
- 2: USA Base
- 3: Disk thyristors, produced in China
- 4: Disk thyristors with fuse assembly
- 5: Thyristor modules, produced in China
- 6: Thyristor modules
- 7:
- 8: ANL
- 9:







## 2.2 Rating plate


<h1>SIMOREG DC-MASTER</h1>	
<b>SIEMENS</b>	<b>DC - CONVERTER</b>
	1)
Order No. / Type <b>1P 6RA70 . . . - . . . . . - 0</b>	2)
	3)
	4)
Serial No. <b>s Q6 . . . . .</b>	
<b>ARMATURE</b>	
Input                              3AC . . . V                      . . . A    50/60Hz	
Suitable for use on a circuit capable of delivering not more than . . . kA rms symmetrical amperes , . . . V maximum.	
Output (DC-Rating)              DC . . . V                      . . . A	
Output (US-Rating)              DC . . . V                      . . . A	
<b>FIELD SUPPLY</b>	
Input                              2AC . . . V                      . . . A    50/60Hz	
Output                              DC . . . V                      . . . A	
Prod. State    5)	
Cooling	 EN 60146
<b>Made in Austria</b>	

- 1) Bar code for order number (MLFB)
- 2) A -Z is affixed after the MLFB for options
- 3) Code for options (order-specific)
- 4) Bar code, serial number (order-specific)
- 5) Product version
- 6) Space for other symbol

e.g.: 

## 2.3 Packaging label

<b>DC - CONVERTER</b>	<b>SIEMENS</b>
Stromrichter	D . . . / . . . M . . . -GeE . . . 2
Static Converter	
Variateur	
<b>6RA70 . . . - . . . . . - 0</b>	
	1)  EN 60146
1P 6RA70 . . . - . . . . . - 0	2)
	
s Q6 . . . . .	QTY 1
	SW - STAND      E - STAND
Q . . . . .	(Version)          (Version)
	- - -                  - - -
<b>Made in Austria</b>	

- 1) Space for other symbol  
e.g.: 
- 2) A -Z is affixed to the MLFB for options, followed by the code for the relevant option (order-specific)





Options	Codes	Order No.
attachment to DIN EN 50022 rail <sup>4)</sup>		
SCI2 Serial Communication Interface 2 (terminal expansion with FO link to SCB1) for attachment to DIN EN 50022 rail <sup>4)</sup>		6SE7090-0XX84-3EF0
T100 module incl. hardware operating instructions without software module) <sup>3)</sup>		6SE7090-0XX87-0BB0
Hardware operating instructions for T100		6SE7080-0CX87-0BB0
MS100 "Universal Drive" software module for T100 (EPROM) without manual		6SE7098-0XX84-0BB0
Manual for MS100 "Universal Drive" software module		
German		6SE7080-0CX84-0BB1
English		6SE7087-6CX84-0BB1
French		6SE7087-7CX84-0BB1
Spanish		6SE7087-8CX84-0BB1
Italian		6SE7087-2CX84-0BB1
T300 technology board with 2 connecting leads, SC58 and SC60, terminal block SE300 and hardware operating instructions <sup>3)</sup>		6SE7090-0XX84-0AH0
T400 technology board (incl. short description) <sup>3)</sup>		6DD1606-0AD0
T400 hardware and configuring manual		6DD1903-0EA0
Operating instructions for SIMOREG DC-MASTER		
Operating instructions in German	D00	6RX1700-0AD00
Operating instructions in Italian	D72	6RX1700-0AD72
Operating instructions in English	D76	6RX1700-0AD76
Operating instructions in French	D77	6RX1700-0AD77
Operating instructions in Spanish	D78	6RX1700-0AD78
Operating instructions and DriveMonitor in all the above languages available on CD-ROM		6RX1700-0AD64

1) These boards can be ordered under two different numbers, i.e.

- under the order number of the board without accessories (such as connectors and Short Guide)
- as a retrofit kit: Board with connectors and Short Guide

Board	Order number of board (w/o accessories)	Order number of retrofit kit
ADB	6SE7090-0XX84-0KA0	6SE7010-0KA00
SBP	6SE7090-0XX84-0FA0	6SE7010-0FA00
EB1	6SE7090-0XX84-0KB0	6SE7010-0KB00
EB2	6SE7090-0XX84-0KC0	6SE7010-0KC00
SLB	6SE7090-0XX84-0FJ0	6SE7010-0FJ00
CBP2	6SE7090-0XX84-0FF5	6SE7010-0FF05
CBC	6SE7090-0XX84-0FG0	6SE7010-0FG00
CBD	6SE7090-0XX84-0FK0	6SE7010-0FK00

The retrofit kit must be ordered to install boards in the SIMOREG converter so that the correct connectors for system cabling and the Short Guide are also available.

The LBA local bus adapter and ADB adapter board must be ordered as additional components for installing supplementary boards in the SIMOREG converter. These adapters are available under separate order numbers.

- 2) A pulse encoder evaluation circuit is a standard component of the basic SIMOREG converter. The SBP need therefore be ordered only in configurations requiring evaluation of a second pulse encoder.
- 3) An LBA local bus adapter is required to install this board in a SIMOREG converter. The adapter is available under a separate order number.
- 4) Supplied packed separately, including 10 m fiber-optic cable.
- 5) The last figure in the order code identifies the module location or slot of the electronic box (see Section 5.3.2):

- 1 . . . Board location 2
- 2 . . . Board location 3
- 4 . . . Slot D
- 5 . . . Slot E
- 6 . . . Slot F
- 7 . . . Slot G

## 2.5 Reference to new products

### **SIMOREG DC-MASTER Converter Commutation Protector (SIMOREG CCP)**

The SIMOREG DC-MASTER Converter Commutation Protector (SIMOREG CCP) can be supplied as an option for the converters in the SIMOREG DC-MASTER 6RA70 series.

Field of application:

The SIMOREG DC-MASTER Converter Commutation Protector (SIMOREG CCP) is for protecting the semiconductor fuses of a line-commutated power converter in inverter mode. If the inverter stalls, a large current is created in the regenerating direction via the power system or a crossover current is created in the power converter. The SIMOREG CCP limits this current to a harmless level so that thyristors and the associated super-fast fuses are protected. As a result, time-consuming and expensive replacement of the fuses is no longer necessary. Stalling of the inverter cannot be prevented but its effects can.

Compatibility:

Because the sensor technology and the recognition of a commutation failure can only be made in the SIMOREG basic unit the SIMOREG CCP is only compatible to line-commutated converters of the SIMOREG DC-MASTER 6RA70 series (and later).

Use with converters connected in parallel is possible.

The SIMOREG CCP is operated via the SIMOREG unit (parameterization, fault messages). Version 2.2 or a later software version must be installed in the SIMOREG unit.

For more information and help selecting the most suitable unit for your application, please contact your local SIEMENS Sales Office.