SIEMENS

SINAMICS DCM

Base Drive panel instructions — version 3.0

High-performance drives

usa.siemens.com/sinamics-dcm

2 Introduction

2.1 Base Drive panel description

SINAMICS DCM Base Drive panels are complete drive assemblies ready to be installed into an enclosure. Base Drive Panels are fully digital, compact units which supply the armature and field of variable-speed DC motors with rated armature currents from 15 Amps to 1200 Amps. The motor field circuit can be supplied with DC currents of up to 40 Amps (current levels depend on the armature rated current). Each Base Drive panel includes the following components and factory installed converter options.

- 3-phase Armature Converter
- 1-phase Field Converter
- Main Contactor or DC Output Contactor (Frame Size Dependent)
- Protective Semiconductor Fuses (Frame Size Dependent since may be internal to converter)
- Control Power Transformer
- Power and Control Terminals
- Advanced CUD – G00 Option
- PROFINET, EtherNet/IP Communication CBE20 – G20 Option
- Micro Memory Card – S01 Option
- Single phase fan (230V AC) – L21 Option, 450A – 1200A Base Drives

Providing the Advanced CUD, provides several customer advantages.

- DRIVE-CLiQ connectivity allows for the connection of Terminal Modules (TM15, TM31, TM150) plus the SMC30 Encoder Module. This gives the customers flexibility for future expansion of additional Input/Outputs by simply adding DRIVE-CLiQ modules rather than adding another Advanced CUD board to add additional Inputs/Outputs.
- Option Slot allows the CBE20 to be installed in the Advanced CUD. The CBE20 allows the drive to utilize ProfiNet or Ethernet-IP communications. The CBE20 can alternatively be used to provide high speed peer to peer communications with the drives.

2.2 General information

SINAMICS DCM converters are characterized by their compact, space-saving construction. Their compact design makes them particularly easy to service and maintain since individual components are readily accessible.

All SINAMICS DCM units are equipped with a BOP20 “Basic operator panel” mounted in the converter cover. The BOP20 has a backlit two-line display area and 6 keys. It may be used to acknowledge faults, set parameters and read diagnostic information.

The AOP30 optional advance operator panel can be mounted externally, e.g., in the cubicle door. When mounted remotely, the AOP30 can be connected to the converter with cables up to 50 meters (164 feet) in length. Cables up to 200 meters (600 feet) in length can be used if a separate 24V DC power supply is available. The AOP30 connects to the SINAMICS DCM through connector X178 using the RS485 interface. The AOP30 can be installed as an economic alternative to conventional door mounted metering devices (i.e., voltmeters, ammeters, and speed indicator).

The AOP30 features a liquid crystal display (240 × 64 pixels) with backlighting for plain-text display and a bar-type display for process variables. English, German, French, Spanish, Italian and Chinese can be selected as the display languages.

The converter can also be parameterized on a standard PC with appropriate software connected to the serial interface on the basic unit. This PC interface is used during start-up, for maintenance during shutdown and for diagnosis in operation.

On 2-quadrant converters, a fully controlled three-phase bridge supplies the armature. On 4-quadrant converters, two fully controlled three-phase bridges are connected in an inverse-parallel connection to allow both positive and negative armature current. For the field converter, a single-phase, half-controlled 2-pulse bridge supplies the motor shunt field.

The armature and field converters can operate with AC line frequencies from 45–65 Hz. If required for a specific application, the frequency of the armature and field AC supplies can be different. The power section cooling system is monitored by means of temperature sensors.

The power section for the armature and field converters is constructed of isolated thyristor modules for converters rated from 15A–1200A at 480V AC line voltage. The heat sink in this case is electrically isolated and at ground potential. The housing and terminal covers on power connections provide protection against accidental contact for operators working in the vicinity. All connecting terminals are accessible from the top.

All open and closed-loop drive control and communication functions are performed by powerful microprocessors. Drive control functions are implemented in the software as program modules that can be “wired up” and changed by parameters.

2.3 Rated DC current

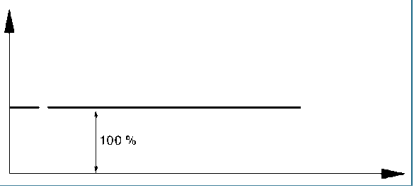
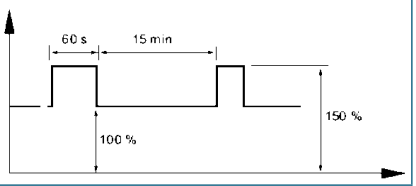
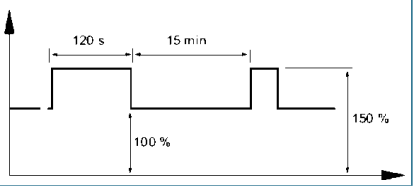
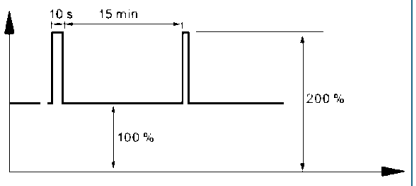
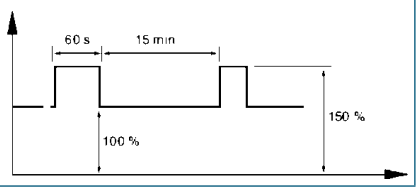
- The rating plate of the SINAMICS DCM Base drive panel has the rated Armature current listed of the output rating for IEC DC I constant duty rating.
- The Base Drive Panels are designed using the DC I rating which means that fuses, contactors and terminal blocks are sized for the full continuous DC I current.
- The DC I rating is the maximum current the power module can supply continuously with no overload. Because an overload is not possible, the DC I rated current is higher than the continuous DC II rating.
- The microprocessor calculates the current I2t value of the power section cyclically to ensure that the thyristors are not damaged in overload operation.
- The DC II rated current allows operation by an overload of 150% for 60 seconds in a 40° C ambient. The overload can be applied no sooner than every 15 minute intervals.

Overload capability

The rated DC current specified on the unit rating plate (maximum permissible continuous DC current) may be exceeded in operation. The extent to which this value is exceeded and how long this lasts are subject to certain limits. The absolute upper limit for the value of the overload currents is 1.8x the rated DC current. The maximum overload duration depends on the time characteristic of the overload current, as well as on the load history of the unit, and also depends on the specific unit. Each overload must be preceded by an under load (load phase with load current < rated DC current). Once the maximum permissible overload duration has elapsed, the load current must return to at least an absolute value ≤ the rated DC current. The SINAMICS DCM Base drive may be operated with five different overload settings configured in the drive parameters.

DC I through DC IV rated at 40˚C

- **DC I —** Continuous Duty without no overloads possible
- **DC II —** Continuous rating with 150% overload for 60 seconds with a 15 minute cool down below base load current setting
- **DC III —** Continuous rating with 150% overload for 120 seconds with a 15 minute cool down below base load current setting
- **DC IV —** Continuous rating with 200% overload for 10 seconds with a 15 minute cool down below base load current setting
- **US Rated —** Continuous rating with 150% overload for 60 seconds with a 15 minute cool down below base load current setting — ambient temp at 45˚C

Load class (parameter)	Load for the converter	Load cycle
DC I	$I_{DC\ I}$ continous (I_{dN})	
DC II	$I_{DC\ II}$ for 15 min. and 1.5 x $I_{DC\ II}$ for 60 s	
DC III	$I_{DC\ III}$ for 15 min. and 1.5 x $I_{DC\ III}$ for 120 s	
DC IV	$I_{DC\ IV}$ for 15 min. and 2 x $I_{DC\ IV}$ for 10 s	
U.S. rating	I_{US} for 15 min and 1.5 x I_{US} for 60 s Note: with this setting, for all unit types, an ambient and / or cooling medium temperature of 45˚C is permissible.	

2.4 Expandable functionality using SINAMICS components

One of the many features of the SINAMICS DCM Base Drive is its ability to expand its functionality modularly through the use of coupling supplementary modules from the SINAMICS drives family to the DRIVE-CLiQ interface. Modules include digital, analog I/O, external encoder and communications options. As a result, the flexibility, when engineering the plant or system is increased, costs are optimized at the same time. A complete list of the option modules can be found in the SINAMICS DCM catalog available from your local Siemens sales office.

The SINAMICS DCM Base Drive contains one advanced CUD (left) microprocessor board with the CBE20 installed, and one additional bay for another advanced or standard CUD (right).

In order to optimally fulfill the requirements relating to interfaces and computational performance for technology functions, a standard or advanced CUD or a combination can be selected. It is also possible to use two CUDs to increase the performance for technological open-loop and closed-loop control tasks. This allows optimum adaptation to the wide range of requirements relating to drive technology and complementary markets — both technically and economically.

Printed circuit boards

Description	Where used US rating 480V	Part number	Recommended spare
Advanced CUD (C98043-A7100-L4)	All Ratings	6RY18030AA050AA1	1
Memory card (C98130-A7100-B1)	All Ratings	6RX18000AS01	1
Connector board (C98043-A7125-L1)	All Ratings	6RY18030GA00	1
Allocation board* (C98043-A7126-L1)	All Ratings	6RY18030GA01	1
Power Interface board (2Q Only) (C98043-A7105-L1)	All 2Q Ratings	6RY18030DA01	1
Power Interface board (4Q Only) (C98043-A7105-L4)	All 4Q Ratings	6RY18030DA02	1
Basic Operator Panel BOP20 (A5E00111019)	All Ratings	6SL30550AA004BA0	1
Field Supply/Power Section +RC (4Q Only) (C98043-A7111-L1)	15 Amp	6RY18030CA01	1
Field Supply/Power Section +RC (4Q Only) (C98043-A7111-L2)	30 Amp	6RY18030CA02	1
Field Supply board (2Q and 4Q) (C98043-A7120-L6)	60 to 125 Amp	6RY18030CA03	1
Field Supply board (2Q and 4Q) (C98043-A7115-L12)	210 to 850 Amp	6RY18030CA04	1
Field Supply board (2Q and 4Q) (C98043-A7116-L1)	1200 Amp	6RY18030CA05	1
Snubber board (RC) (C98 043-A7007-L4)	60 to 280 Amp	6RY18030FA05	1
Snubber board (RC) (C98043-A7011-L6)	450 and 600 Amp	6RY17030FA10	1
Snubber boards (RC) (C98043-A7011-L1)	850 Amp and 1200 Amp	6RY17030FA06	2
Fuse for Power Supply, 1 amp F1, F2 Mounted on Power Interface board	All Ratings	6RY17020BA00	2
Heat Sink Temperature Sensor (C98 043-A7010-L2)	All Ratings	6RY18060AB00	1

*When ordering please indicate the units order No. (MLFB) and Serial Number.