Motor Data

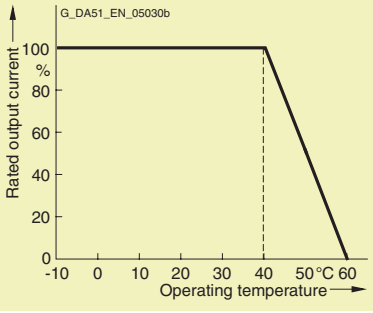
Rated output	Speed		Torque		Frame size	
kW	2-pole rpm	4-pole rpm	2-pole Nm	4-pole Nm	2-pole	4-pole
380 V to 480 V 3 AC						
0.37	2740	1370	1.3	2.6	71 M	71 M
0.55	2800	1395	1.9	3.8	71 M	80 M
0.75	2855	1395	2.5	5.1	80 M	80 M
1.1	2845	1415	3.7	7.4	80 M	90 S
1.5	2860	1420	5.0	10	90 S	90 L
2.2	2880	1420	7.3	15	90 L	100 L
3.0	2890	1420	9.9	20	100 L	100 L

Derating Data

Pulse frequency

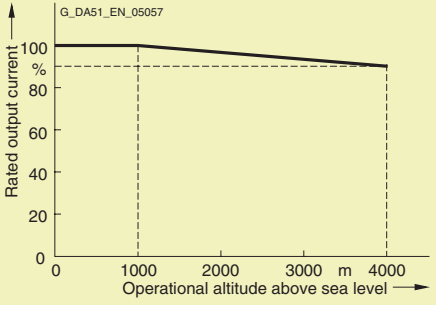
Rated output (for 400 V 3 AC)	Rated output current in A for a pulse frequency of						
kW	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.37	1.2	1.2	1.2	1.2	1.2	1.2	1.2
0.55	1.6	1.6	1.6	1.6	1.6	1.6	1.2
0.75	2.1	2.1	2.1	2.1	1.8	1.8	1.2
1.1	3.0	3.0	2.7	2.7	1.8	1.8	1.2
1.5	4.0	4.0	2.7	2.7	1.8	1.8	1.2
2.2	5.9	5.9	5.1	5.1	3.5	3.5	2.3
3.0	7.7	7.7	5.1	5.1	3.5	3.5	2.3

Operating temperature

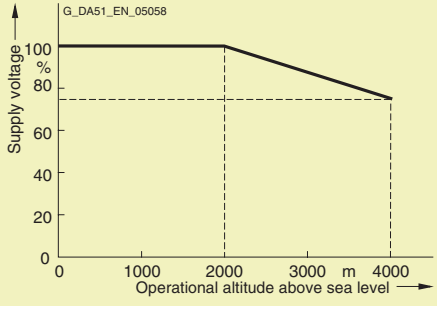


Operational altitude

Permissible output current
in % of the rated output current



Permissible mains voltage
in % of the max. possible mains voltage



CE Marking

The MICROMASTER 411 inverters and the COMBIMASTER 411 distributed drive solution comply with the requirements of the low-voltage directive 73/23/EEC and – with correct installation and selection – with the requirements of the EMC directive 89/336/EEC. A certificate can be provided on request.

The inverters comply with the following standards listed in the EU gazette:

Low-voltage Directive

- **EN 60 204**

Safety of machinery, electrical equipment of machines

- **EN 50 178**

Electronic equipment in electrical power installations.

Machinery Directive

The inverters are suitable for installation in machines. Compliance with the machine directive 89/39/EEC requires a separate certificate of conformity. This must be furnished by the plant constructor or the installer of the machine.

EMC Directive

- **EN 61 800-3**

Variable-speed electric drives
Part 3: EMC product standard including special test procedure.

The modified EMC product standard EN 61 800-3/A11 for electrical drive systems is valid since 01.01.2002. The following comments apply to the series 6SE6 frequency inverters from Siemens:

- The EMC product standard EN 61 800-3/A11 does not apply directly to a frequency inverter but to a PDS (Power Drive System) which comprises the complete circuitry, motor and cables in addition to the inverter.
- A frequency inverter must therefore only be considered as a component which, on its own, is not subject to the EMC product standard EN 61 800-3/A11. However, the inverter's Instruction Manual specifies the conditions on how the product standard can be complied with if the frequency inverter is integrated into a PDS. The EMC directive in the EU is complied with for a PDS by observance of the product standard EN 61 800-3/A11 for PDS. The frequency inverters on their own do not generally require indentification according to the EMC directive.
- The frequency inverters as components on their own are only classified as "Limited availablility" for persons and users with the necessary EMC knowledge. They are not envisaged for unlimited sale or as "General availablility" for users.
  At this point it is necessary to exactly differentiate between the frequency inverter and the PDS. A PDS can certainly be envisaged by the vendor for general availability, and the standard must be applied accordingly. On the other hand, the components used in the PDS may possibly not be for "General availability".
- Since 01.01.2002, the EMC product standard EN 61 800-3/A11 also defines, for the first time, limits for conducted interference and radiated interference for the so-called "Second environment" (= industrial power supply systems which do not supply households). Although these limits lie below those of filter Class A according to EN 55 011, a PDS with an unfiltered frequency inverter of series 6SE6 nevertheless does not comply with these values, and therefore does not meet the standard EN 61 800-3/A11.
- Using internal filters and the installation instructions included in the documentation, the PDS designed using the frequency inverters complies with the product standard EN 61 800-3/A11:
  - Unlimited sale with filters of Class B to EN 55 011 in the first environment (living accommodation and industrial areas)
  - Limited sale and installation by EMC experts with filters of Class A to EN 55 011 in the first environment plus warning information
  - With filters of Class A to EN 55 011 in the second environment (industrial areas), where these filters even significantly exceed the requirements of EN 61 800-3/A11.
- A differentiation must be made between the product standards for electrical drive systems (PDS) of the range of standards EN 61 800-3/A11 (of which Part 3/A11 covers EMC topics) and the product standards for the devices/systems/machines etc. No changes will probably result in the practical use of frequency inverters. Since frequency inverters are always part of a PDS, and these are part of a machine the machine vendor must observe various standards depending on the type and environment, e.g. EN 61 000-3-2 for power supply harmonics and EN 55 011 for radio interferences. The product standard for PDS on its own is therefore either insufficient or irrelevant.

With respect to the compliance of limits for power supply harmonics, the EMC product standard EN 61 800-3/A11 for PDS refers to compliance with the EN 61 000-3-2 and EN 61 000-3-12 standards.

Electromagnetic Compatibility

The MICROMASTER 411/COMBIMASTER 411 will, when correctly installed and put to their intended use, satisfy the requirements of the EEC directive 89/336/EEC concerning electromagnetic compatibility.
If the guidelines on installation to reduce the effects of electromagnetic interference are followed, the devices are suitable for installation in machines. According to the machinery directive, these machines must be separately certified.

The table below lists the measured results for emissions of and immunity to interference for MICROMASTER 411/ COMBIMASTER 411.

The inverters were installed according to the guidelines detailed within the Operating Instructions for the MICROMASTER 411/ COMBIMASTER 411.

EMC-phenomenon Standard/test		**Relevant criterion**	**Limit value**
Emitted interference EN 61 800-3	Conducted via mains cable	150 kHz to 30 MHz	Unfiltered – not tested Internal filter Class B
	Emitted by the drive	30 MHz to 1 GHz	All devices – Class A
ESD immunity EN 61 000-4-2 ESD through air discharge ESD through contact discharge		 Test level 3 Test level 3	 8 kV 6 kV
Electrical fields immunity EN 61 000-4-3 Electrical field applied to unit		Test level 3 26 MHz to1 GHz	10 V/m
Burst interference immunity EN 61 000-4-4 Applied to all cable terminations		Test level 4	4 kV
Surge immunity EN 61 000-4-5 Applied to mains cables		Test level 3	2 kV
Immunity to RFI emissions, conducted EN 61 000-4-6 Applied to mains, motor and control cables		Test level 4 0.15 MHz to 80 MHz 80 % AM (1 kHz)	10 V