Catalog DA 51.2 • 2002

micromaster

MICROMASTER 410/420/430/440
Inverters
0.12 kW to 250 kW

SIEMENS

Catalogs of the Business Unit "Standard Drives"

MICROMASTER 410/420/430/440 Inverters **DA 51.2**

Order No.:
German: E86060-K5151-A121-A3
English: E86060-K5151-A121-A3-7600

COMBIMASTER 411/MICROMASTER 411 DA 51.3
(in preparation)

Order No.:
German: E86060-K5151-A131-A1
English: E86060-K5151-A131-A1-7600

MICROMASTER, MICROMASTER Vector
MIDIMASTER Vector, COMBIMASTER DA 64

You can download the catalog in the Internet under the following address:
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Wechsel- und Drehstromsteller
SIVOLT A/V DA 68
(available only in German)

Order No.:
German: E20002-K4068-A101-A1

Semiconductor-Protection Fuses SITOR DA 94.1

Order No.:
German: E20002-K4094-A111-A3
English: E20002-K4094-A111-A2-7600

Low-Voltage Motors M 11

Order No.:
German: E86060-K1711-A101-A1
English: E86060-K1711-A101-A1-7600

Getriebemotoren 2KG1 M 15
(available only in German)

Order No.:
German: E86060-K1715-A101-A2

Automation & Drives CA 01

Order No.:
German: E86060-D4001-A100-B7
English: E86060-D4001-A110-B7-7600

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MICROMASTER 410/420/430/440 Inverters

0.12 kW to 250 kW

Catalog DA 51.2 · 2002

Supersedes: Catalog DA 51.2 · 2001

Overview 0

MICROMASTER 410
0.12 kW to 0.75 kW 1

MICROMASTER 420
0.12 kW to 11 kW 2

MICROMASTER 430
7.5 kW to 90 kW 3

MICROMASTER 440
0.12 kW to 250 kW 4

Appendix A

The products and systems referred to in this catalog are marketed with a DQS certified management system.
The DQS certificate is recognized in all IQ Net countries.

Management system

DQS certified according to
DIN EN ISO 9001 Reg. No. 357-05
DIN EN ISO 14001 Reg. No. 81342-01

BSI certified according to
BS EN ISO 9001 Reg. No. FM 25845

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Guidelines

	MICROMASTER 410	MICROMASTER 420
Main areas of application	*"The low-priced"* for variable speeds with three-phase motors on single-phase networks, e.g. with pumps, fans, billboards, cabinets, gate drives and automatic machines	*"The universal"* for three-phase networks and optional fieldbus interfacing, e.g. for conveyor belts, material transport, pumps, fans and machine tools
Power ranges	0.12 kW to 0.75 kW	0.12 kW to 11 kW
Voltage ranges	100 V to 120 V 1 AC 200 V to 240 V 1 AC	200 V to 240 V 1 AC 200 V to 240 V 3 AC 380 V to 480 V 3 AC
Control	• *V/f* characteristic • Multipoint characteristic (programmable *V/f* characteristic) • FCC (flux current control)	• *V/f* characteristic • Multipoint characteristic (programmable *V/f* characteristic) • FCC (flux current control)
Process control	–	Internal PI controller
Inputs	3 digital inputs 1 analog Input	3 digital inputs 1 analog input
Outputs	1 relay output	1 analog output 1 relay output
Interfacing to automation system	The PLC partner for LOGO! and SIMATIC S7-200	The ideal partner for your automation tasks, whether with SIMATIC S7-200, SIMATIC S7-300/400 (TIA) or SIMOTION
Additional features	• Natural ventilation (no fan unit) • Position of connections as with conventional switching elements (e.g. contactors)	• BICO technology
	Section 1	Section 2

MICROMASTER 430	MICROMASTER 440
"The specialist for pumps and fans" with optimized OP (manual/automatic switchover), matched software functionality and optimized power efficiency	***"The all-purpose"*** with advanced vector control (with and without encoder feedback) for versatile applications in sectors such as conveying systems, textiles, elevators, hoisting gear and machine construction
7.5 kW to 90 kW	0.12 kW to 250 kW
380 V to 480 V 3 AC	200 V to 240 V 1 AC 200 V to 240 V 3 AC 380 V to 480 V 3 AC 500 V to 600 V 3 AC
• *V/f* characteristic • Multipoint characteristic (programmable *V/f* characteristic) • FCC (flux current control)	• *V/f* characteristic • Multipoint characteristic (programmable *V/f* characteristic) • FCC (flux current control) • Vector control
Internal PID controller	Internal PID controller (autotuning)
6 digital inputs 2 analog inputs 1 PTC/KTY input	6 digital inputs 2 analog inputs 1 PTC/KTY input
2 analog outputs 3 relay outputs	2 analog outputs 3 relay outputs
The ideal partner for your automation tasks, whether with SIMATIC S7-200, SIMATIC S7-300/400 (TIA) or SIMOTION	The ideal partner for your automation tasks, whether with SIMATIC S7-200, SIMATIC S7-300/400 (TIA) or SIMOTION
• Low-energy mode • Load torque monitoring (detects running dry of pumps) • Motor staging	• 3 selectable drive data sets • Integrated brake chopper (up to 75 kW) • Torque control
Section 3	Section 4

Overview

Options

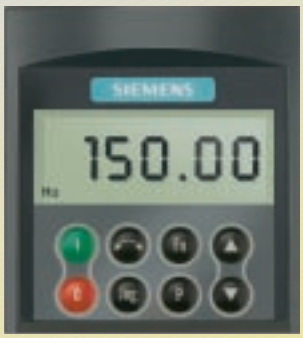
Various options are available for the MICROMASTER:

- Filters
- Chokes
- Operator panels
- PROFIBUS module
- DeviceNet module
- Pulse encoder evaluation module
- Gland plates
- Mounting kits, etc.

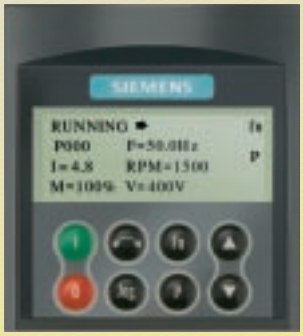
Assignment of operator panels and modules to the converter ranges

Accessories	Order No.	MICROMASTER 410	420	430	440
Operator panels					
OP	6SE6400-0SP00-0AA0	●			
BOP	6SE6400-0BP00-0AA0		●		●
AOP	6SE6400-0AP00-0AA0		●		●
	6SE6400-0AP00-0AA1		●		●
BOP-2	6SE6400-0BE00-0AA0			●	
Modules					
PROFIBUS	6SE6400-1PB00-0AA0		●	●	●
DeviceNet	6SE6400-1DN00-0AA0		●	●	●
Pulse encoder evaluation	6SE6400-0EN00-0AA0				●

● Possible combination



BOP/OP



AOP

BOP-2

Operator panels

PROFIBUS

DeviceNet

Pulse encoder evaluation

Modules

Inverter
MICROMASTER 410

1/2 Description
1/4 Circuit Diagrams
1/6 Technical Data
1/7 Selection and Ordering Data
1/8 Options
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1

Description

Frame size AA

Frame size AB

Applications

The MICROMASTER 410 inverter is suitable for a variety of variable-speed drive applications.

It is especially suitable for use with pumps and fans, as a drive in various sectors, e.g. food, textile and packaging industries, as well as for conveyor systems, factory gate and garage door drives, and as a universal drive for moving billboards.

It is the ideal low-cost frequency inverter solution for the bottom performance range of the MICROMASTER family.

The inverter is especially characterized by its customer-oriented performance and ease of use.

Versions for connection to 230-V and 115-V single-phase networks enable it to be used all over the world.

Design

The MICROMASTER 410 has a compact design.

Heat sinks provide natural cooling for the inverter. A fan unit is not used.

The position of the connections has been selected as for conventional contactors.

The operator panel available as an option can be easily fitted without requiring any tools.

Main Characteristics

- Simple selection from minimum range of types (only few options)
- Compact design
- Natural cooling with heat sinks (no fan unit)
- Simple connection similar to conventional switching elements (e.g. contactors)
- Version with internal EMC filter Class B
- Fast, simple commissioning with input of only a few parameters (fast commissioning mode)
- Integral RS-485 communications interface
- Three programmable digital inputs, non-floating (the analog input can be used as a 4th digital input)
- One analog input (0 V to 10 V)
- One programmable relay output (30 V DC/5 A resistive; 250 V AC/2 A inductive)
- Low-noise motor operation resulting from high pulse frequency
- Integral protection for motor and inverter.

Options (Overview)

- Line commutating chokes
- Adapter for standardized mounting on DIN rails
- OP operator panel for parameterizing an inverter
- PC connection set
- PC commissioning tool.

International Standards

- The MICROMASTER 410 inverter complies with the requirements of the EU low-voltage guideline; filtered versions also comply with the EU EMC guideline
- The MICROMASTER 410 inverter has the CE marking
- UL and cUL listed
- c-tick

Note:

See Appendix for standards.

Mechanical Features

- Compact design
- Heat dissipation through self-ventilation (convection)
- Operating temperature -10 °C to +50 °C
- Easy cable connection, mains and motor connections are separated for optimum electromagnetic compatibility and clear connection
- Detachable, optional operator panels
- Screwless control terminals
- Side mounting possible, thus also usable with low cabinet depth.

Performance Features

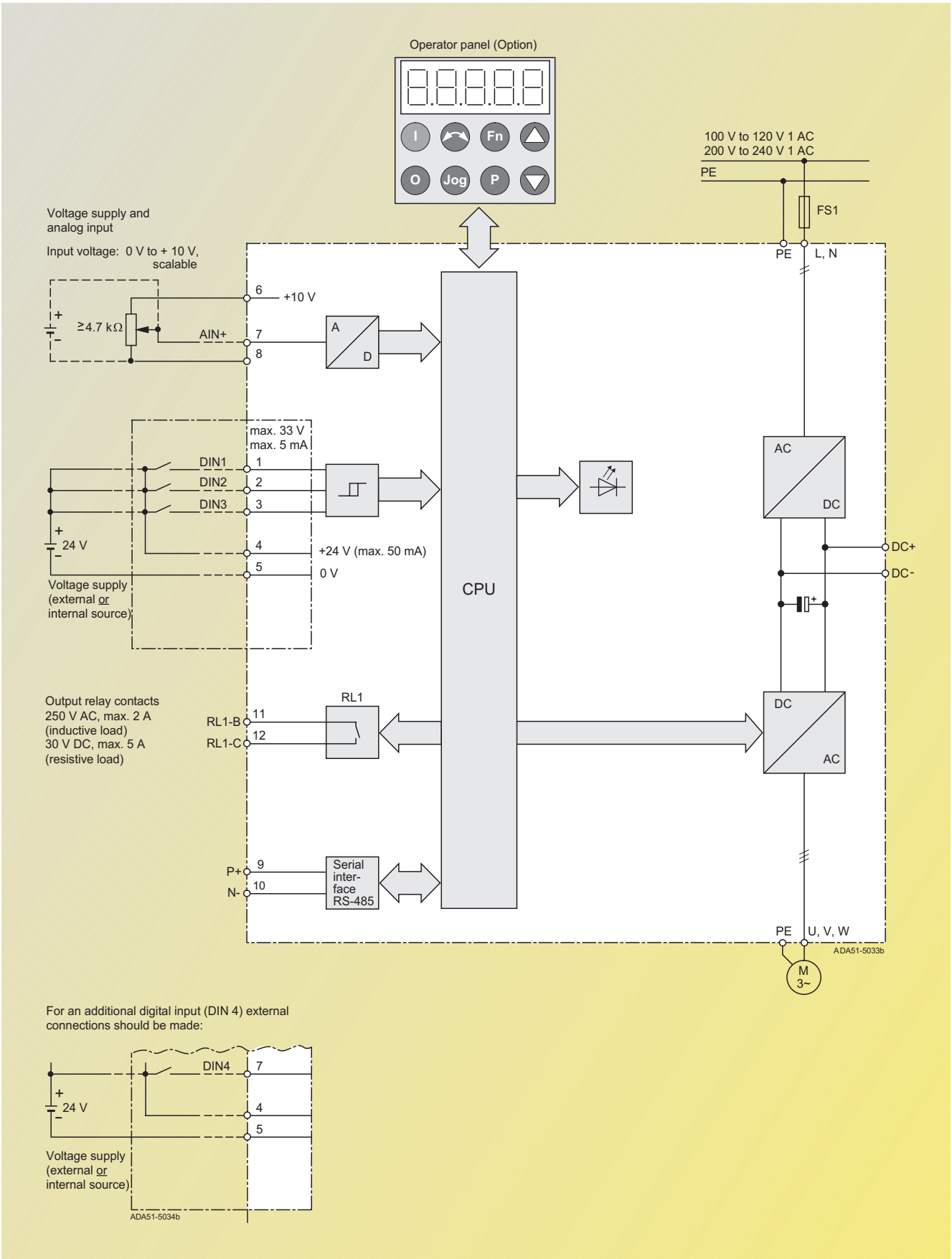
- Latest IGBT technology
- Digital microprocessor control
- Linear *V/f* characteristic, with programmable voltage boosting
- Quadratic *V/f* characteristic
- Multipoint characteristic (programmable *V/f* characteristic)
- Flying restart
- Automatic restart facility following power failure or fault
- Programmable acceleration (0 s to 650 s) with ramp smoothing
- Fast current limit (FCL) for trip free operation
- Fast, repeatable digital input response time
- Fine speed adjustment using a high resolution 10-bit analog input
- One skip frequency
- Removable "Y" capacitor for use on IT mains supplies
- Serial RS-485 interface with USS protocol
- LED for status information
- Versions with internal EMC filter Class B.

Protection Features

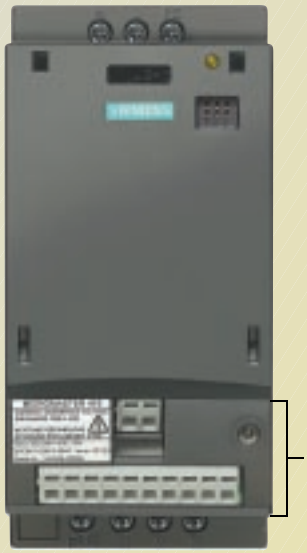
- Overload current 1.5 x rated output current (i.e. 150 % overload capability) for 60 s, then 0.85 x rated output current for 240 s, cycle time 300 s
- Overvoltage/undervoltage protection
- Inverter overtemperature protection
- Earth fault protection
- Short circuit protection
- I^2t motor thermal protection
- Stall prevention.

Circuit Diagrams

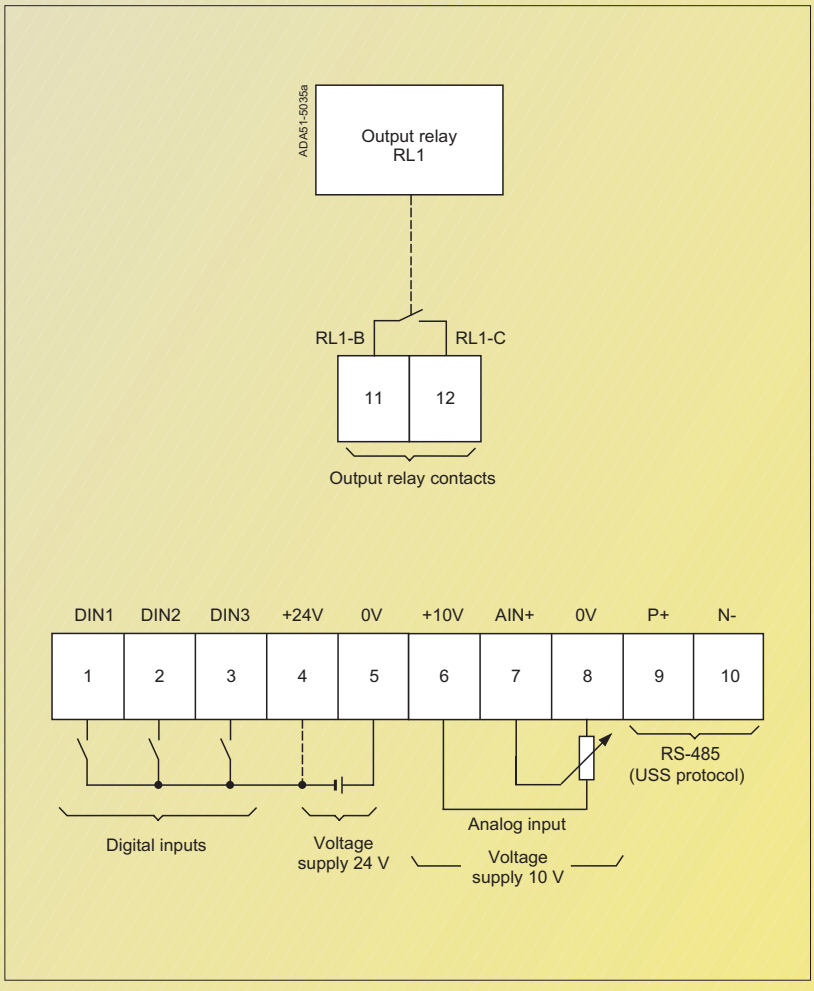
General Circuit Diagram



Terminal Connection Diagram



View A



Technical Data

MICROMASTER 410 inverter

Input voltage and power ranges	200 V to 240 V 1 AC ± 10 % 100 V to 120 V 1 AC ± 10 %	0.12 to 0.75 kW 0.12 to 0.55 kW	
Input frequency	47 to 63 Hz		
Output frequency	0 Hz to 650 Hz		
Power factor	≥ 0.95		
Inverter efficiency	96 % to 97 %		
Overload capability	Overload current 1.5 x rated output current (i.e. 150 % overload capability) for 60 s; then 0.85 x rated output current for 240 s, cycle time 300 s		
Inrush current	less than rated input current		
Control method	linear *V/f*; quadratic *V/f*; multipoint characteristic (programmable *V/f*)		
PWM frequency	8 kHz (standard) 2 kHz to 16 kHz (in 2 kHz steps)		
Fixed frequencies	3, programmable		
Skip frequency bands	1, programmable		
Setpoint resolution	10 bit analog 0.01 Hz serial		
Digital inputs	3 programmable digital inputs, non-floating; PNP, SIMATIC-compatible		
Analog inputs	1, for setpoint (0 V to 10 V, scaleable or for use as 4th digital input)		
Relay outputs	1, configurable 30 V DC/5 A (resistive), 250 V AC/2 A (inductive)		
Serial interfaces	RS-485, for operation with USS protocol		
Motor cable length	max. 30 m (shielded) max. 50 m (unshielded)		
Electromagnetic compatibility	Inverter available with internal EMC filter to EN 61 800-3 (defined limits to EN 55 011, Class B)		
Braking	DC Braking, Compound Braking		
Protection level	IP 20		
Temperature range	–10 °C to +50 °C		
Storage temperature	–40 °C to +70 °C		
Humidity	95 % (non-condensing)		
Operational altitudes	up to 1000 m above sea level without derating		
Protection features for	• under-voltage • over-voltage • overload • earth faults • short circuits • stall prevention • I^2t motor thermal protection • motor over-temperature		
Conformity with standards	UL, cUL, CE, c-tick		
CE marking	Conformity with EC low voltage directive 73/23/EC filtered versions also with electromagnetic compatibility directive 89/336/EC		
Dimensions and weights (without options)	Frame size (FS) AA AB	H x W x D (mm) 150 x 69 x 118 150 x 69 x 138	Weight, approx. (kg) 0.8 1.0

Derating Data

Pulse frequency

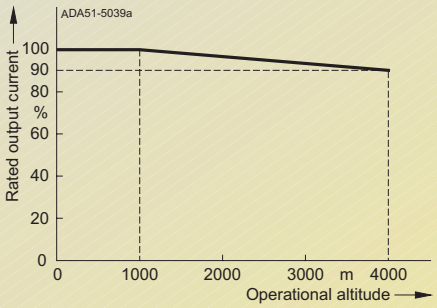
Rated output	**Rated output current in A** for a pulse frequency of						
kW	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.12	0.9	0.9	0.9	0.8	0.7	0.6	0.5
0.25	1.7	1.7	1.7	1.5	1.3	1.1	0.9
0.37	2.3	2.3	2.3	2.0	1.7	1.5	1.3
0.55	3.2	3.2	3.2	2.9	2.6	2.3	2.0
0.55, 115 V (at 50 °C)	3.0	3.0	2.7	2.5	2.2	2.0	1.7
0.55, 115 V (at 40 °C)	3.2	3.2	3.2	2.9	2.6	2.3	2.0
0.75 (at 50 °C)	3.9	3.9	3.6	3.2	2.9	2.6	2.3
0.75 (at 40 °C)	4.2	4.2	4.2	3.8	3.4	3.0	2.7

The current data apply to an ambient temperature of 50 °C unless specified otherwise.

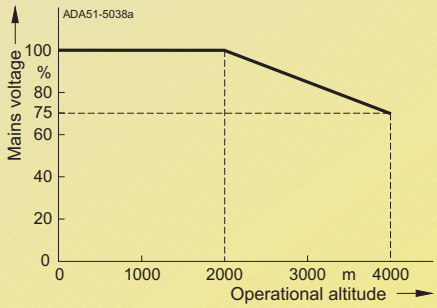
Derating Data (continued)

Installation height above sea level

Permissible output current
in % of the rated output current



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



MICROMASTER 410 Inverter

Rated output		Rated input current [1]	Rated output current	Frame size	Order No.	
kW	hp	A	A	(FS)	**MICROMASTER 410 without filter**	**MICROMASTER 410 with internal filter Class B**
Mains operating voltage 100 V to 120 V 1 AC, output voltage 200 V to 240 V 3 AC						
0.12	0.16	4.6	0.9	AA	**6SE6410-2UA11-2AA0**	–
0.25	0.33	7.5	1.7	AA	**6SE6410-2UA12-5AA0**	–
0.37	0.50	10.1	2.3	AA	**6SE6410-2UA13-7AA0**	–
0.55	0.75	13.4	2.7 (3.2 at 40 °C)	AB	**6SE6410-2UA15-5BA0**	–
Mains operating voltage 200 V to 240 V 1 AC, output voltage 200 V to 240 V 3 AC						
0.12	0.16	1.5	0.9	AA	**6SE6410-2UB11-2AA0**	**6SE6410-2BB11-2AA0**
0.25	0.33	3.0	1.7	AA	**6SE6410-2UB12-5AA0**	**6SE6410-2BB12-5AA0**
0.37	0.50	4.4	2.3	AA	**6SE6410-2UB13-7AA0**	**6SE6410-2BB13-7AA0**
0.55	0.75	5.8	3.2	AB	**6SE6410-2UB15-5BA0**	**6SE6410-2BB15-5BA0**
0.75	1.0	7.8	3.6 (4.2 at 40 °C)	AB	**6SE6410-2UB17-5BA0**	**6SE6410-2BB17-5BA0**

The current data apply to an ambient temperature of 50 °C unless specified otherwise.

See Appendix for note on ordering.

All MICROMASTER 410 inverters are supplied without an operator panel (OP). An OP or other options have to be ordered additionally (see page 1/9).

Motors for MICROMASTER 410

Catalog M 11 contains selection and ordering data for motors which are particularly suitable for operation with the MICROMASTER 410 inverters (see Appendix for overview).

1) The values apply to rated mains voltages of 115 V or 230 V.

Options

Variant Dependent Options

EMC filter, Class B

Variants with **internal** EMC filter Class B are available for inverters with a mains operating voltage of 230 V 1 AC.

- The requirements are fulfilled using shielded cables with a max. length of 5 m, or 10 m with a low-capacitance motor cable (core/core < 75 pF/m, core/shield < 150 pF/m).
  The limits comply with EN 55 011 Class B.

An inverter with internal filter can be used with a 30-mA residual current operated circuit-breaker, and is only suitable for hardwired installation.

A non-filtered inverter together with the optional filter "Filter Class B with low leakage currents" has a leakage current ≤ 3.5 mA (shielded motor cable up to 5 m).

Line commutating choke

Line commutating chokes are used to smooth voltage peaks or to bridge commutating dips.

In addition, line commutating chokes reduce the effects of harmonics on the inverter and the power supply.

If the ratio of inverter rated power to netwerk short-circuit power is less than 1 %, a line commutating choke must be used in order to reduce the current peaks.

The line commutating chokes are designed as footprint chokes and are fitted between the inverter and the mounting plate.

In line with the EN 61 000-3-2 regulations "Limits for harmonic currents with device input current ≤ 16 A per phase", there are special aspects for drives with 250 W to 550 W and 230-V single-phase supplies which can be used in non-industrial applications (1st environment).

For devices with 250 W and 370 W it is necessary either to fit the recommended input chokes or to apply to the power utility company for authorization to connect the devices to the public power supply.
No limits are currently defined in the EN 61 000-3-2 standard for professionally used devices with a connected load > 1 kW. This means that the inverters with an output power ≥ 0.75 kW comply with the EN 61 000-3-2 standard.

Variant Independent Options

Operator Panel (OP)

With the OP, individual parameter settings can be made.

Values and units are shown on a 5-digit display.

An OP can be used for several inverters. It is directly plugged into the inverter.

Inverter with Operator Panel (OP)

Connection set for PC to inverter

For controlling and commissioning an inverter directly from a PC if the appropriate software has been installed (e.g. STARTER).

The connection set includes an RS-485/RS-232 interface converter with a 9-pin Sub-D connector.

Commissioning tools

- STARTER
  Starter is graphic start-up software for guided commissioning for MICROMASTER 410/420/430/440 frequency inverters under Windows NT/2000. Parameter lists can be read out, altered, stored, entered and printed.
- DriveMonitor
  DriveMonitor is start-up software for list-oriented programming of frequency inverters under Windows 95/98/NT/2000.

Ordering Data for Variant Dependent Options

The options listed here (filters, chokes, fuses and circuit breakers) are inverter specific.

The inverter and the associated options have the same voltage ratings.

All variant dependent options and the operator panel are certified to UL, except fuses. The fuses of type 3NA3 are recommended for Europe.

Use in America requires UL-listed fuses such as e.g. the Class NON range from Bussmann.

Mains operating voltage	Rated output kW	Inverter **without** filter	Order No. of the options **Filter Class B with low leakage currents**	**Line commutating choke**	**Fuse** (see Catalog NS K)	**Circuit-breaker** (see Catalog NS K)
100 V to 120 V 1 AC	0.12	6SE6410-2UA11-2AA0	–	**6SE6400-3CC01-0AB0**	**3NA3803**	**3RV1021-1GA10**
	0.25	6SE6410-2UA12-5AA0	–			**3RV1021-1JA10**
	0.37	6SE6410-2UA13-7AA0 *)	–	**6SE6400-3CC02-6BB0**	**3NA3805**	**3RV1021-1KA10**
	0.55	6SE6410-2UA15-5BA0 *)	–		**3NA3807**	**3RV1021-4AA10**
200 V to 240 V 1 AC	0.12	6SE6410-2UB11-2AA0	**6SE6400-2FL01-0AB0**	**6SE6400-3CC00-4AB0**	**3NA3803**	**3RV1021-1BA10**
	0.25	6SE6410-2UB12-5AA0				**3RV1021-1EA10**
	0.37	6SE6410-2UB13-7AA0		**6SE6400-3CC01-0AB0**		**3RV1021-1FA10**
	0.55	6SE6410-2UB15-5BA0				**3RV1021-1HA10**
	0.75	6SE6410-2UB17-5BA0			**3NA3805**	**3RV1021-1JA10**
		Inverter **with** internal filter Class B				
200 V to 240 V 1 AC	0.12	6SE6410-2BB11-2AA0	–	**6SE6400-3CC00-4AB0**	**3NA3803**	**3RV1021-1BA10**
	0.25	6SE6410-2BB12-5AA0	–			**3RV1021-1EA10**
	0.37	6SE6410-2BB13-7AA0	–	**6SE6400-3CC01-0AB0**		**3RV1021-1FA10**
	0.55	6SE6410-2BB15-5BA0	–			**3RV1021-1HA10**
	0.75	6SE6410-2BB17-5BA0	–		**3NA3805**	**3RV1021-1JA10**

*) With these inverters, the choke cannot be mounted in the substructure; it must be mounted upright.

Ordering Data for Variant Independent Options

The options listed here are suitable for all MICROMASTER 410 Inverters.

Options	Order No.
Operator Panel (OP)	**6SE6400-0SP00-0AA0**
Connection set for PC to inverter	**6SE6400-0PL00-0AA0**
Adapter for mounting on DIN rail	**6SE6400-0DR00-0AA0**
Start-up tools STARTER and DriveMonitor, as well as multilanguage documentation on CD-ROM	**6SE6400-5EA00-1AG0**

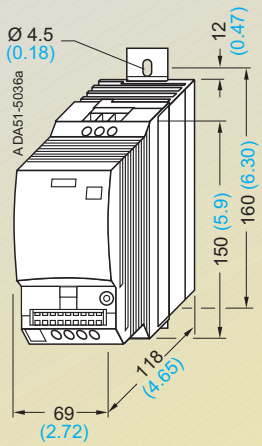
Documentation

Type of documentation	Language	Order No.
Operating instructions [1] (paper version)	German	**6SE6400-5EA00-0AP0**
	English	**6SE6400-5EA00-0BP0**
	French	**6SE6400-5EA00-0DP0**
	Italian	**6SE6400-5EA00-0CP0**
	Spanish	**6SE6400-5EA00-0EP0**
Parameter list [1] (paper version)	German	**6SE6400-5EB00-0AP0**
	English	**6SE6400-5EB00-0BP0**
	French	**6SE6400-5EB00-0DP0**
	Italian	**6SE6400-5EB00-0CP0**
	Spanish	**6SE6400-5EB00-0EP0**
Getting Started Guide [1] (paper version), included with every inverter	Multilanguage	–

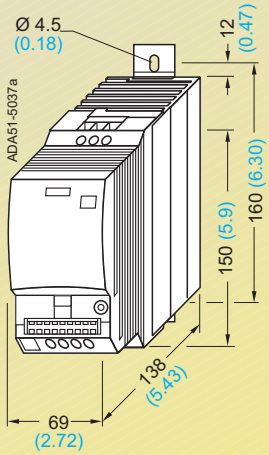
1) Available on Internet at http://www.siemens.com/micromaster.

Dimension Drawings

MICROMASTER 410 Inverter



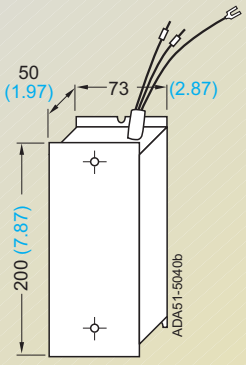
Inverter frame size AA
6SE6410-2 . . 11-2AA0
6SE6410-2 . . 12-5AA0
6SE6410-2 . . 13-7AA0



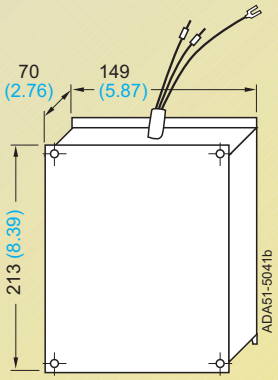
Inverter frame size AB
6SE6410-2 . . 15-5BA0
6SE6410-2 . . 17-5BA0

All dimensions in mm (values in brackets are in inches)

Line commutating chokes



Footprint chokes
6SE6400-3CC00-4AB0
6SE6400-3CC01-0AB0



Chokes for upright mounting
6SE6400-3CC02-6BB0

All dimensions in mm (values in brackets are in inches)

Inverter
MICROMASTER 420

2/2 Description
2/4 Circuit Diagrams
2/6 Technical Data
2/8 Selection and Ordering Data
2/9 Options
2/16 Dimension Drawings

2

Description

Applications

The MICROMASTER 420 inverter is suitable for a variety of variable-speed drive applications. It is especially suitable for applications for pumps, fans and conveyor systems.

It is especially characterized by its customer-oriented performance and ease of use. Its large supply-voltage range enables it to be used all over the world.

Design

The MICROMASTER 420 has a modular design. The operator panels and communications modules can be easily exchanged without requiring any tools.

Main Characteristics

- Simple commissioning
- Modular construction allows maximum configuration flexibility
- Three fully programmable isolated digital inputs
- One scalable analog input (0 V to 10 V) can also be used as a 4th digital input
- One programmable analog output (0 mA to 20 mA)
- One fully programmable relay output (30 V DC/5 A, resistive 250 V AC/2 A, inductive)
- Silent motor operation is selectable when using high switching frequencies, adjustable (observe derating if necessary)
- Complete inverter and motor protection.

Options (Overview)

- EMC filters Class A/B
- Line commutating chokes
- Output chokes
- Gland plates
- BOP basic operator panel for parameterizing an inverter
- AOP advanced operator panel with plain-text and multilingual display
- Communications modules
  - PROFIBUS
  - DeviceNet
- PC connection kits
- Assembly kits for mounting the operator panels in the control cabinet doors
- PC commissioning tools, running under Windows 95/98 and NT/2000.

International Standards

- The MICROMASTER 420 inverter complies with the requirements of the EU low-voltage guideline; filtered versions also comply with the EU EMC guideline
- The MICROMASTER 420 inverter has the CE marking
- Ⓤ and cⓊ listed
- c-tick

Note:

See Appendix for standards.

Mechanical Features

- Modular design
- Operating temperature: –10 °C to +50 °C
- Compact housing as a result of high power density
- Easy cable connection, mains and motor connections are separated for optimum electromagnetic compatibility
- Detachable operator panels
- Screwless control terminals.

Performance Features

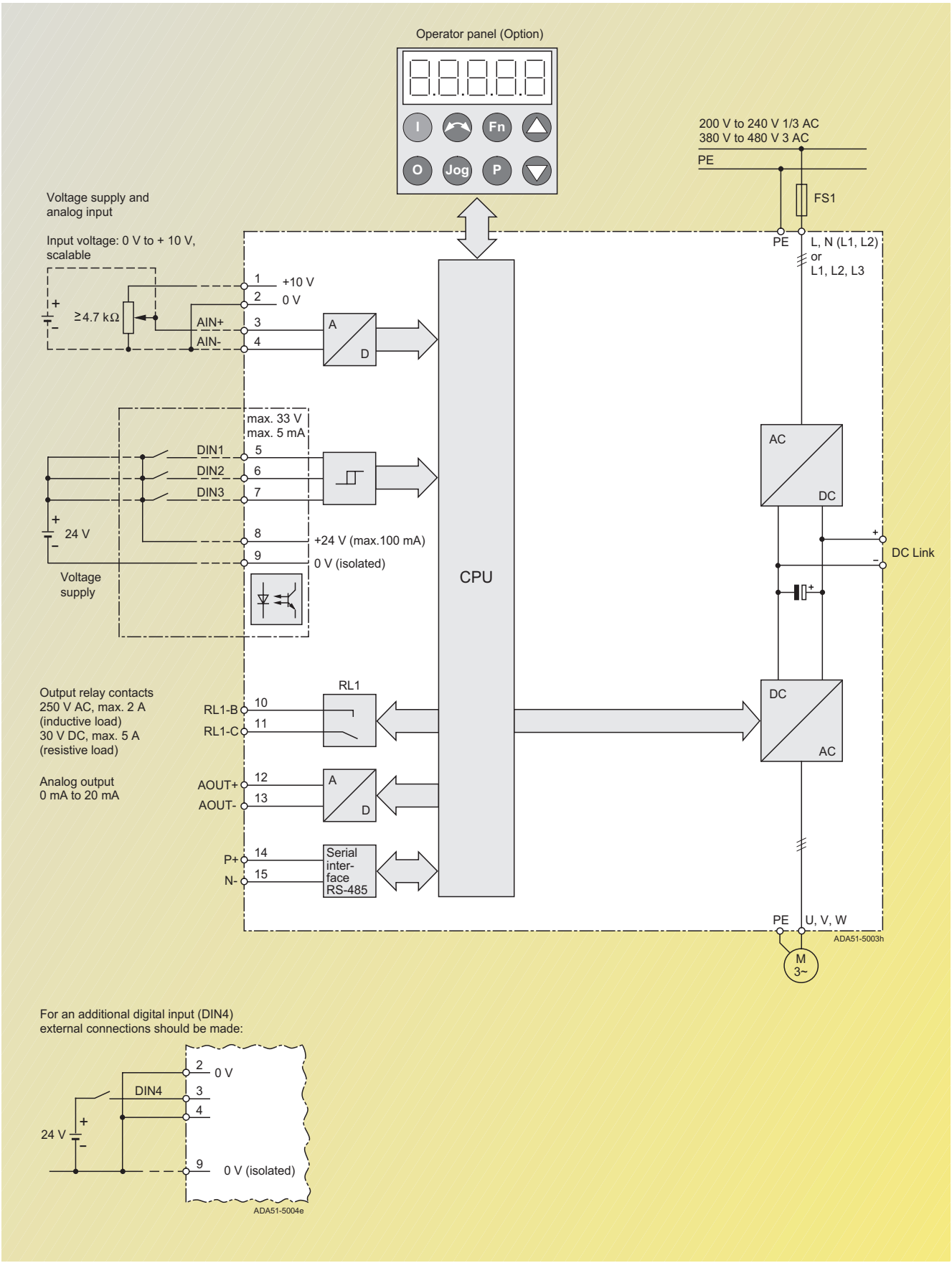
- Latest IGBT technology
- Digital microprocessor control
- Flux current control (FCC) for improved dynamic response and optimized motor control
- Linear *V/f* characteristic
- Quadratic *V/f* characteristic
- Multipoint characteristic (programmable *V/f* characteristic)
- Flying restart
- Slip compensation
- Automatic restart facility following power failure or fault
- PI feedback for simple process control.
- Programmable acceleration/deceleration, 0 s to 650 s
- Ramp smoothing
- Fast current limit (FCL) for trip free operation
- Fast, repeatable digital input response time
- Fine speed adjustment using a high resolution 10 bit analog input
- Compound braking for rapid controlled braking
- Four skip frequencies
- Removable “Y” capacitor for use on IT mains supplies (with non-grounded mains supplies, the “Y” capacitor must be removed, and an output choke installed).

Protection Features

- Overload current 1.5 x rated output current (i.e. 150 % overload capability) for 60 s, cycle time 300 s
- Overvoltage/undervoltage protection
- Inverter overtemperature protection
- Motor protection using PTC via digital input (possible with supplementary circuit)
- Earth fault protection
- Short circuit protection
- I^2t motor thermal protection
- Locked motor protection
- Stall prevention
- Parameter interlock.

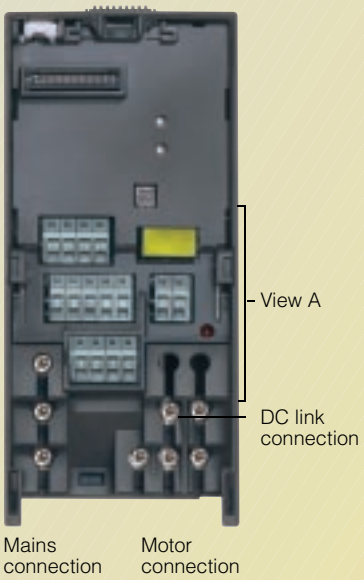
Circuit Diagram

General Circuit Diagram

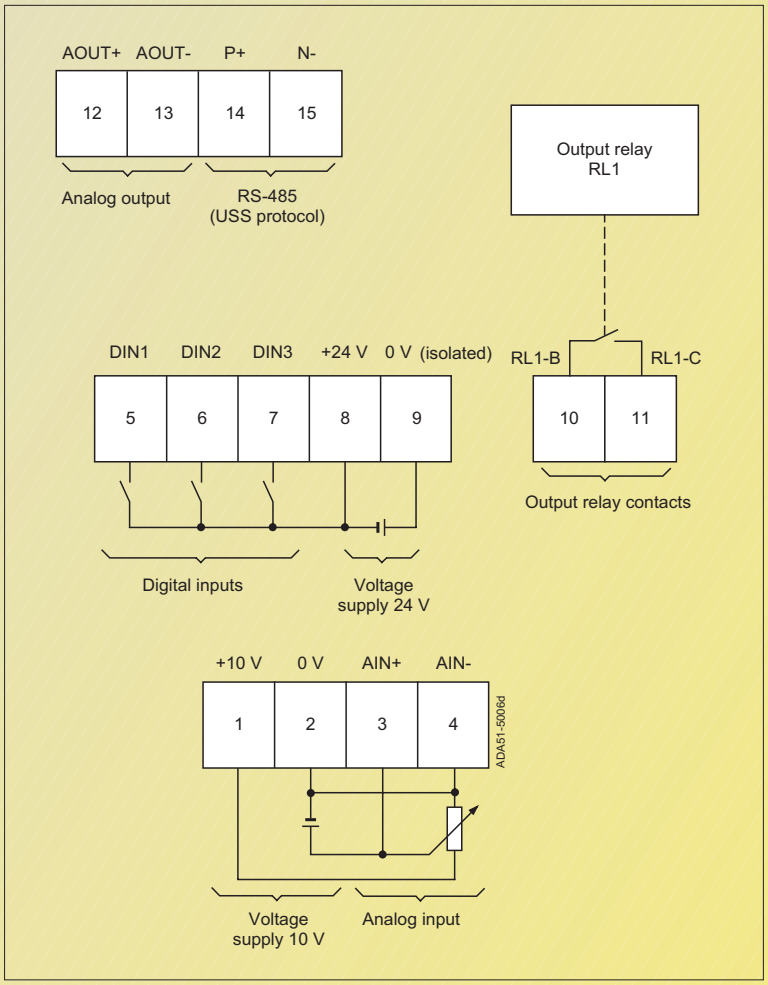


Terminal Connection Diagram

Example frame size A



View A



Technical Data

MICROMASTER 420 inverter

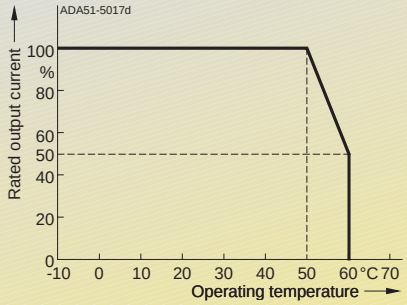
Input voltage and power ranges	200 V to 240 V 1 AC ± 10% 200 V to 240 V 3 AC ± 10% 380 V to 480 V 3 AC ± 10%	0.12 kW to 3 kW 0.12 kW to 5.5 kW 0.37 kW to 11 kW	
Input frequency	47 Hz to 63 Hz		
Output frequency	0 Hz to 650 Hz		
Power factor	≥ 0.95		
Inverter efficiency	96% to 97%		
Overload capability	Overload current 1.5 x rated output current (i.e. 150 % overload capability) for 60 s, cycle time 300 s		
Inrush current	less than rated input current		
Control method	linear *V/f*; quadratic *V/f*; multipoint characteristic (programmable *V/f*); flux current control (FCC)		
PWM frequency	16 kHz (standard with 230 V 1/3 AC) 4 kHz (standard with 400 V 3 AC) 2 kHz to 16 kHz (in 2 kHz steps)		
Fixed frequencies	7, programmable		
Skip frequency bands	4, programmable		
Setpoint resolution	0.01 Hz digital 0.01 Hz serial 10 bit analog		
Digital inputs	3 fully programmable isolated digital inputs; switchable PNP/NPN		
Analog input	1 for setpoint or PI controller (0 to 10 V, scalable or for use as 4th digital input)		
Relay output	1, configurable 30 V DC/5 A (resistive), 250 V AC/2 A (inductive)		
Analog output	1, configurable (0 mA to 20 mA)		
Serial interfaces	RS-485, optional RS-232		
Motor cable length without output choke with output choke	 max. 50 m (shielded) max. 100 m (unshielded) max. 200 m (shielded) max. 300 m (unshielded)		
Electromagnetic compatibility	Inverter available with internal EMC filter Class A; available as options are EMC filters to EN 55 011, Class A or Class B		
Braking	DC Braking, Compound Braking		
Protection level	IP 20		
Temperature range	–10 °C to +50 °C		
Storage temperature	–40 °C to +70 °C		
Humidity	95% (non-condensing)		
Operational altitudes	up to 1000 m above sea level without derating		
Protection features for	• under-voltage • over-voltage • overload • earth faults • short circuits • stall prevention • locked motor • motor over-temperature • inverter over-temperature • parameter PIN protection		
Conformity with standards	ⓤL, cⓤL, CE, c-tick		
CE marking	Conformity with EC low voltage directive 73/23/EC; filtered versions also with electromagnetic compatibility directive 89/336/EC		
Dimensions and weights (without options)	Frame size (FS) A B C	H x W x D (mm) 173 x 73 x 149 202 x 149 x 172 245 x 185 x 195	Weight, approx. (kg) 1.0 3.3 5.0

Derating Data

Pulse frequency

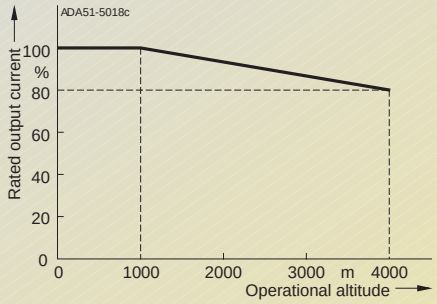
Rated output (for 400 V 3 AC)	**Rated output current in A** for a pulse frequency of						
kW	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
0.37	1.2	1.2	1.2	1.2	1.2	1.2	1.1
0.55	1.6	1.6	1.6	1.6	1.6	1.6	1.1
0.75	2.1	2.1	2.1	2.1	1.6	1.6	1.1
1.1	3.0	3.0	2.7	2.7	1.6	1.6	1.1
1.5	4.0	4.0	2.7	2.7	1.6	1.6	1.1
2.2	5.9	5.9	5.1	5.1	3.6	3.6	2.6
3.0	7.7	7.7	5.1	5.1	3.6	3.6	2.6
4.0	10.2	10.2	6.7	6.7	4.8	4.8	3.6
5.5	13.2	13.2	13.2	13.2	9.6	9.6	7.5
7.5	18.4	18.4	13.2	13.2	9.6	9.6	7.5
11	26.0	26.0	17.9	17.9	13.5	13.5	10.4

Operating temperature

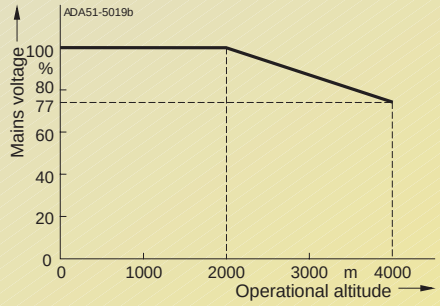


Installation height above sea level

Permissible output current
in % of the rated output current



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



Selection and Ordering Data

MICROMASTER 420 Inverter

Rated output		Rated input current [1]	Rated output current	Frame size	Order No.	
					MICROMASTER 420 without filter	**MICROMASTER 420 with Class A filter [2]**
kW	hp	A	A	(FS)		
Mains operating voltage 200 V to 240 V 1 AC						
0.12	0.16	1.4	0.9	A	**6SE6420-2UC11-2AA0**	**6SE6420-2AB11-2AA0**
0.25	0.33	2.7	1.7	A	**6SE6420-2UC12-5AA0**	**6SE6420-2AB12-5AA0**
0.37	0.50	3.7	2.3	A	**6SE6420-2UC13-7AA0**	**6SE6420-2AB13-7AA0**
0.55	0.75	5.0	3.0	A	**6SE6420-2UC15-5AA0**	**6SE6420-2AB15-5AA0**
0.75	1.0	6.6	3.9	A	**6SE6420-2UC17-5AA0**	**6SE6420-2AB17-5AA0**
1.1	1.5	9.6	5.5	B	**6SE6420-2UC21-1BA0**	**6SE6420-2AB21-1BA0**
1.5	2.0	13.0	7.4	B	**6SE6420-2UC21-5BA0**	**6SE6420-2AB21-5BA0**
2.2	3.0	17.6	10.4	B	**6SE6420-2UC22-2BA0**	**6SE6420-2AB22-2BA0**
3.0	4.0	23.7	13.6	C	**6SE6420-2UC23-0CA0**	**6SE6420-2AB23-0CA0**
Mains operating voltage 200 V to 240 V 3 AC						
0.12	0.16	0.6	0.9	A	**6SE6420-2UC11-2AA0**	–
0.25	0.33	1.1	1.7	A	**6SE6420-2UC12-5AA0**	–
0.37	0.50	1.6	2.3	A	**6SE6420-2UC13-7AA0**	–
0.55	0.75	2.1	3.0	A	**6SE6420-2UC15-5AA0**	–
0.75	1.0	2.9	3.9	A	**6SE6420-2UC17-5AA0**	–
1.1	1.5	4.1	5.5	B	**6SE6420-2UC21-1BA0**	–
1.5	2.0	5.6	7.4	B	**6SE6420-2UC21-5BA0**	–
2.2	3.0	7.6	10.4	B	**6SE6420-2UC22-2BA0**	–
3.0	4.0	10.5	13.6	C	**6SE6420-2UC23-0CA0**	**6SE6420-2AC23-0CA0**
4.0	5.0	13.1	17.5	C	**6SE6420-2UC24-0CA0**	**6SE6420-2AC24-0CA0**
5.5	7.5	17.5	22.0	C	**6SE6420-2UC25-5CA0**	**6SE6420-2AC25-5CA0**
Mains operating voltage 380 V to 480 V 3 AC						
0.37	0.50	1.1	1.2	A	**6SE6420-2UD13-7AA0**	–
0.55	0.75	1.4	1.6	A	**6SE6420-2UD15-5AA0**	–
0.75	1.0	1.9	2.1	A	**6SE6420-2UD17-5AA0**	–
1.1	1.5	2.8	3.0	A	**6SE6420-2UD21-1AA0**	–
1.5	2.0	3.9	4.0	A	**6SE6420-2UD21-5AA0**	–
2.2	3.0	5.0	5.9	B	**6SE6420-2UD22-2BA0**	**6SE6420-2AD22-2BA0**
3.0	4.0	6.7	7.7	B	**6SE6420-2UD23-0BA0**	**6SE6420-2AD23-0BA0**
4.0	5.0	8.5	10.2	B	**6SE6420-2UD24-0BA0**	**6SE6420-2AD24-0BA0**
5.5	7.5	11.6	13.2	C	**6SE6420-2UD25-5CA0**	**6SE6420-2AD25-5CA0**
7.5	10.0	15.4	19.0	C	**6SE6420-2UD27-5CA0**	**6SE6420-2AD27-5CA0**
11	15.0	22.5	26.0	C	**6SE6420-2UD31-1CA0**	**6SE6420-2AD31-1CA0**

See Appendix for note on ordering.

All MICROMASTER 420 are supplied with a Status Display Panel SDP. A Basic Operator Panel BOP, Advanced Operator Panel AOP or other options have to be ordered additionally (see pages 2/11 to 2/15).

Motors for MICROMASTER 420

Catalog M 11 contains selection and ordering data for motors which are particularly suitable for operation with the MICROMASTER 420 inverters (see Appendix for overview).

1) The values apply to rated mains voltages of 240 V or 400 V.

2) Use of MICROMASTER inverters with internal filter is not permissible on non-grounded (IT) mains supplies.

Variant Dependent Options

EMC filter, Class A

Filter for inverters without an internal filter, for

– 200 V to 240 V 3 AC, frame sizes A and B
– 380 V to 480 V 3 AC, frame size A.

All other inverters can be supplied with an internal Class A filter.

The requirements are fulfilled using shielded cables with a max. length of 25 m.

EMC filter, Class B

Filter for inverters without an internal filter, for

– 200 V to 240 V 3 AC, frame sizes A and B
– 380 V to 480 V 3 AC, frame size A.

With this filter, the inverter complies with the emission standard EN 55 011, Class B.

The requirements are fulfilled using shielded cables with a max. length of 25 m.

Additional EMC filter, Class B

Obtainable for inverters with an internal Class A EMC filter A.

With this filter, the inverter complies with the emission standard EN 55 011, Class B.

The requirements are fulfilled using shielded cables with a max. length of 25 m.

Class B filter with low leakage currents

EMC filter for 200 V to 240 V 1 AC inverters, frame sizes A and B, without an internal (Class A) EMC filter.

With this filter, the inverter complies with the emission standard EN 55 011, Class B. The leakage currents are reduced to < 3.5 mA.

The requirements are fulfilled using shielded cables with a max. length of 5 m.

Leakage currents:

The leakage currents of the inverters with/without filter (internal/external) may exceed 30 mA. Typical values in practice are between 10 mA and 50 mA. The exact values depend on the design, environment and cable lengths. Interference-free operation with residual current operated devices with a trigger value of 30 mA cannot be guaranteed. However, operation with residual current operated devices with a trigger value of 300 mA is possible. Please refer to the Instruction Manual for details.

Line commutating choke

Line commutating chokes are used to smooth voltage peaks or to bridge commutating dips. In addition, line commutating chokes reduce the effects of harmonics on the inverter and the power supply. If the line impedance is < 1%, a line commutating choke must be used in order to reduce the current peaks.

In line with the EN 61 000-3-2 regulations “Limits for harmonic currents with device input current ≤ 16 A per phase”, there are special aspects for drives with 250 W to 550 W and 230-V single-phase supplies which can be used in non-industrial applications (1st environment).

For devices with 250 W and 370 W it is necessary either to fit the recommended input chokes or to apply to the power utility company for authorization to connect the devices to the public power supply.
No limits are currently defined in the EN 61 000-3-2 standard for professionally used devices with a connected load > 1 kW. This means that the inverters with an output power ≥ 0.75 kW comply with the EN 61 000-3-2 standard.

Output choke

Output chokes can be supplied for reducing the capacitive currents and d*V*/d*t* in the case of motor cables > 50 m (shielded) or > 100 m (unshielded).

Gland plate

The gland plate enables shielded connection of the power and control cables, ensuring optimum EMC performance. This ensures compliance with the NEMA 1 directive.

Options

Variant Independent Options

Basic Operator Panel (BOP)

With the BOP, individual parameter settings can be made. Values and units are shown on a 5-digit display.

Basic Operator Panel (BOP)

A BOP can be used for several inverters. It can be directly mounted on the inverter or in a control-cabinet door using a mounting kit.

Advanced Operator Panel (AOP)

The AOP enables parameter sets to be read out of the inverter or to be written into the inverter (upload/download). Different parameter sets can be stored in the AOP. It has a plain-text display with the possibility of switching between several languages.

Advanced Operator Panel (AOP)

Up to 30 inverters can be controlled from an AOP via USS protocol. It can be directly plugged into the inverter or built into the control-cabinet door using a mounting kit.

PROFIBUS module

For a complete PROFIBUS connection with up to 12 Mbaud. Remote control of the inverter is possible with the PROFIBUS module. Remote control and operation at the inverter can be combined using an operator panel – plugged onto the PROFIBUS module. The latter can be supplied by an external 24 V DC power supply and is thus also active when the inverter is disconnected from the mains.

Connection by means of a 9-pin SUB-D connector (available as an accessory).

DeviceNet module

For networking the inverters to the DeviceNet fieldbus system widely used on the American market. A max. transmission rate of 500 kbaud is possible. Remote control of the module is possible via the DeviceNet module. Remote control and operation on the inverter can be combined using an operator panel connected to the DeviceNet module.

The connection to the DeviceNet bus system is made using a 5-pin connector with terminal strip.

Connection set for PC to inverter

For controlling an inverter directly from a PC if the appropriate software has been installed (e.g. STARTER) in the PC. Isolated RS-232 adapter board for reliable point-to-point connection to a PC. Includes a Sub-D connector and an RS-232 standard cable (3 m).

Connection set for PC to AOP

For connecting a PC to an AOP. Offline programming of inverters and archiving of parameter sets possible. Includes a desktop attachment kit for an AOP, an RS-232 standard cable (3 m) with Sub-D connectors and a universal power supply unit.

Operator panel door mounting kit for single inverter control

For mounting an operator panel in a control cabinet door. Degree of protection is IP 56. Contains a cable adapter board with screwless terminals for use with the user's own cables.

AOP door mounting kit for multiple inverter control (USS)

For mounting an AOP in a control cabinet door. Degree of protection IP 56. The AOP can communicate with several inverters by means of the RS-485 USS protocol. The 4-pin connecting cable from the AOP to the RS-485 terminals of the inverter and to the 24 V user terminal strip is not included.

Commissioning tools

- STARTER
  Starter is start-up software for guided commissioning for MICROMASTER 410/420/430/440 frequency inverters under Windows NT/2000. Parameter lists can be read out, altered, stored, entered and printed.
- DriveMonitor
  DriveMonitor is start-up software for list-oriented programming of frequency inverters under Windows 95/98/NT/2000.

Both programs are included on the Docu CD which is provided with every inverter.

Ordering Data for Variant Dependent Options

The options listed here (filters, chokes, gland plates, fuses and circuit breakers) are inverter specific.

The inverter and the associated options have the same voltage ratings.

All options are certified to ⓤL, except fuses. The fuses of type 3NA3 are recommended for Europe.

Use in America requires ⓤL-listed fuses such as e.g. the Class NON range from Bussmann.

Mains operating voltage	Rated output	Inverter **without** filter	Order No. of the options		
	kW		**EMC filter Class A**	**EMC filter Class B**	**Supplementary EMC filter Class B**
200 V to 240 V 1 AC	0.12	6SE6420-2UC11-2AA0	–	–	–
	0.25	6SE6420-2UC12-5AA0	–	–	–
	0.37	6SE6420-2UC13-7AA0	–	–	–
	0.55	6SE6420-2UC15-5AA0	–	–	–
	0.75	6SE6420-2UC17-5AA0	–	–	–
	1.1	6SE6420-2UC21-1BA0	–	–	–
	1.5	6SE6420-2UC21-5BA0	–	–	–
	2.2	6SE6420-2UC22-2BA0	–	–	–
	3.0	6SE6420-2UC23-0CA0	–	–	–
200 V to 240 V 3 AC	0.12	6SE6420-2UC11-2AA0	**6SE6400-2FA00-6AD0**	**6SE6400-2FB00-6AD0**	–
	0.25	6SE6420-2UC12-5AA0			–
	0.37	6SE6420-2UC13-7AA0			–
	0.55	6SE6420-2UC15-5AA0			–
	0.75	6SE6420-2UC17-5AA0			–
	1.1	6SE6420-2UC21-1BA0	**6SE6400-2FA01-4BC0**	**6SE6400-2FB01-4BC0**	–
	1.5	6SE6420-2UC21-5BA0			–
	2.2	6SE6420-2UC22-2BA0			–
	3.0	6SE6420-2UC23-0CA0	–	–	–
	4.0	6SE6420-2UC24-0CA0	–	–	–
	5.5	6SE6420-2UC25-5CA0	–	–	–
380 V to 480 V 3 AC	0.37	6SE6420-2UD13-7AA0	**6SE6400-2FA00-6AD0**	**6SE6400-2FB00-6AD0**	–
	0.55	6SE6420-2UD15-5AA0			–
	0.75	6SE6420-2UD17-5AA0			–
	1.1	6SE6420-2UD21-1AA0			–
	1.5	6SE6420-2UD21-5AA0			–
	2.2	6SE6420-2UD22-2BA0	–	–	–
	3.0	6SE6420-2UD23-0BA0	–	–	–
	4.0	6SE6420-2UD24-0BA0	–	–	–
	5.5	6SE6420-2UD25-5CA0	–	–	–
	7.5	6SE6420-2UD27-5CA0	–	–	–
	11	6SE6420-2UD31-1CA0	–	–	–
		Inverter **with** internal filter Class A			
200 V to 240 V 1 AC	0.12	6SE6420-2AB11-2AA0	–	–	**6SE6400-2FS01-0AB0**
	0.25	6SE6420-2AB12-5AA0	–	–	
	0.37	6SE6420-2AB13-7AA0	–	–	
	0.55	6SE6420-2AB15-5AA0	–	–	
	0.75	6SE6420-2AB17-5AA0	–	–	
	1.1	6SE6420-2AB21-1BA0	–	–	**6SE6400-2FS02-6BB0**
	1.5	6SE6420-2AB21-5BA0	–	–	
	2.2	6SE6420-2AB22-2BA0	–	–	
	3.0	6SE6420-2AB23-0CA0	–	–	**6SE6400-2FS03-5CB0**
200 V to 240 V 3 AC	3.0	6SE6420-2AC23-0CA0	–	–	**6SE6400-2FS03-8CD0**
	4.0	6SE6420-2AC24-0CA0	–	–	
	5.5	6SE6420-2AC25-5CA0	–	–	
380 V to 480 V 3 AC	2.2	6SE6420-2AD22-2BA0	–	–	**6SE6400-2FS01-6BD0**
	3.0	6SE6420-2AD23-0BA0	–	–	
	4.0	6SE6420-2AD24-0BA0	–	–	
	5.5	6SE6420-2AD25-5CA0	–	–	**6SE6400-2FS03-8CD0**
	7.5	6SE6420-2AD27-5CA0	–	–	
	11	6SE6420-2AD31-1CA0	–	–	

Options

Ordering Data for Variant Dependent Options (continued)

Mains operating voltage	Rated output	Inverter **without** filter	Order No. of the options		
	kW		**Low leakage Class B**	**Line commutating choke**	**Output choke**
200 V to 240 V 1 AC	0.12	6SE6420-2UC11-2AA0	**6SE6400-2FL01-0AB0**	**6SE6400-3CC00-4AB0**	**6SE6400-3TC00-4AD0**
	0.25	6SE6420-2UC12-5AA0			
	0.37	6SE6420-2UC13-7AA0		**6SE6400-3CC01-0AB0**	
	0.55	6SE6420-2UC15-5AA0			
	0.75	6SE6420-2UC17-5AA0			
	1.1	6SE6420-2UC21-1BA0	**6SE6400-2FL02-6BB0**	**6SE6400-3CC02-6BB0**	**6SE6400-3TC01-0BD0**
	1.5	6SE6420-2UC21-5BA0			
	2.2	6SE6420-2UC22-2BA0			
	3.0	6SE6420-2UC23-0CA0	–	**6SE6400-3CC03-5CB0**	**6SE6400-3TC03-2CD0**
200 V to 240 V 3 AC	0.12	6SE6420-2UC11-2AA0	–	**6SE6400-3CC00-3AC0**	**6SE6400-3TC00-4AD0**
	0.25	6SE6420-2UC12-5AA0	–		
	0.37	6SE6420-2UC13-7AA0	–	**6SE6400-3CC00-5AC0**	
	0.55	6SE6420-2UC15-5AA0	–		
	0.75	6SE6420-2UC17-5AA0	–		
	1.1	6SE6420-2UC21-1BA0	–	**6SE6400-3CC00-8BC0**	**6SE6400-3TC01-0BD0**
	1.5	6SE6420-2UC21-5BA0	–	**6SE6400-3CC01-4BD0**	
	2.2	6SE6420-2UC22-2BA0	–		
	3.0	6SE6420-2UC23-0CA0	–	**6SE6400-3CC01-7CC0**	**6SE6400-3TC03-2CD0**
	4.0	6SE6420-2UC24-0CA0	–	**6SE6400-3CC03-5CD0**	
	5.5	6SE6420-2UC25-5CA0	–		
380 V to 480 V 3 AC	0.37	6SE6420-2UD13-7AA0	–	**6SE6400-3CC00-2AD0**	**6SE6400-3TC00-4AD0**
	0.55	6SE6420-2UD15-5AA0	–		
	0.75	6SE6420-2UD17-5AA0	–	**6SE6400-3CC00-4AD0**	
	1.1	6SE6420-2UD21-1AA0	–		
	1.5	6SE6420-2UD21-5AA0	–	**6SE6400-3CC00-6AD0**	
	2.2	6SE6420-2UD22-2BA0	–	**6SE6400-3CC01-0BD0**	**6SE6400-3TC01-0BD0**
	3.0	6SE6420-2UD23-0BA0	–		
	4.0	6SE6420-2UD24-0BA0	–	**6SE6400-3CC01-4BD0**	
	5.5	6SE6420-2UD25-5CA0	–	**6SE6400-3CC02-2CD0**	**6SE6400-3TC03-2CD0**
	7.5	6SE6420-2UD27-5CA0	–		
	11	6SE6420-2UD31-1CA0	–	**6SE6400-3CC03-5CD0**	
		Inverter **with** internal filter Class A			
200 V to 240 V 1 AC	0.12	6SE6420-2AB11-2AA0	–	**6SE6400-3CC00-4AB0**	**6SE6400-3TC00-4AD0**
	0.25	6SE6420-2AB12-5AA0	–		
	0.37	6SE6420-2AB13-7AA0	–	**6SE6400-3CC01-0AB0**	
	0.55	6SE6420-2AB15-5AA0	–		
	0.75	6SE6420-2AB17-5AA0	–		
	1.1	6SE6420-2AB21-1BA0	–	**6SE6400-3CC02-6BB0**	**6SE6400-3TC01-0BD0**
	1.5	6SE6420-2AB21-5BA0	–		
	2.2	6SE6420-2AB22-2BA0	–		
	3.0	6SE6420-2AB23-0CA0	–	**6SE6400-3CC03-5CB0**	**6SE6400-3TC03-2CD0**
200 V to 240 V 3 AC	3.0	6SE6420-2AC23-0CA0	–	**6SE6400-3CC01-7CC0**	**6SE6400-3TC03-2CD0**
	4.0	6SE6420-2AC24-0CA0	–	**6SE6400-3CC03-5CD0**	
	5.5	6SE6420-2AC25-5CA0	–		
380 V to 480 V 3 AC	2.2	6SE6420-2AD22-2BA0	–	**6SE6400-3CC01-0BD0**	**6SE6400-3TC01-0BD0**
	3.0	6SE6420-2AD23-0BA0	–		
	4.0	6SE6420-2AD24-0BA0	–	**6SE6400-3CC01-4BD0**	
	5.5	6SE6420-2AD25-5CA0	–	**6SE6400-3CC02-2CD0**	**6SE6400-3TC03-2CD0**
	7.5	6SE6420-2AD27-5CA0	–		
	11	6SE6420-2AD31-1CA0	–	**6SE6400-3CC03-5CD0**	

Ordering Data for Variant Dependent Options (continued)

Mains operating voltage	Rated output	Inverter **without** filter	Order No. of the options		
	kW		**Gland plate**	**Fuse** (see Catalog NS K)	**Circuit breaker** (see Catalog NS K)
200 V to 240 V 1 AC	0.12	6SE6420-2UC11-2AA0	**6SE6400-0GP00-0AA0**	**3NA3803**	**3RV1021-1CA10**
	0.25	6SE6420-2UC12-5AA0			**3RV1021-1FA10**
	0.37	6SE6420-2UC13-7AA0			**3RV1021-1HA10**
	0.55	6SE6420-2UC15-5AA0			**3RV1021-1JA10**
	0.75	6SE6420-2UC17-5AA0		**3NA3805**	**3RV1021-1KA10**
	1.1	6SE6420-2UC21-1BA0	**6SE6400-0GP00-0BA0**	**3NA3807**	**3RV1021-4BA10**
	1.5	6SE6420-2UC21-5BA0			**3RV1021-4DA10**
	2.2	6SE6420-2UC22-2BA0		**3NA3810**	**3RV1031-4EA10**
	3.0	6SE6420-2UC23-0CA0	**6SE6400-0GP00-0CA0**	**3NA3812**	**3RV1031-4GA10**
200 V to 240 V 3 AC	0.12	6SE6420-2UC11-2AA0	**6SE6400-0GP00-0AA0**	**3NA3803**	**3RV1021-0JA10**
	0.25	6SE6420-2UC12-5AA0			**3RV1021-1CA10**
	0.37	6SE6420-2UC13-7AA0			**3RV1021-1DA10**
	0.55	6SE6420-2UC15-5AA0			**3RV1021-1FA10**
	0.75	6SE6420-2UC17-5AA0			**3RV1021-1GA10**
	1.1	6SE6420-2UC21-1BA0	**6SE6400-0GP00-0BA0**	**3NA3805**	**3RV1021-1HA10**
	1.5	6SE6420-2UC21-5BA0			**3RV1021-1JA10**
	2.2	6SE6420-2UC22-2BA0		**3NA3807**	**3RV1021-4AA10**
	3.0	6SE6420-2UC23-0CA0	**6SE6400-0GP00-0CA0**	**3NA3810**	**3RV1021-4BA10**
	4.0	6SE6420-2UC24-0CA0		**3NA3812**	**3RV1021-4DA10**
	5.5	6SE6420-2UC25-5CA0		**3NA3814**	**3RV1031-4FA10**
380 V to 480 V 3 AC	0.37	6SE6420-2UD13-7AA0	**6SE6400-0GP00-0AA0**	**3NA3803**	**3RV1021-1CA10**
	0.55	6SE6420-2UD15-5AA0			**3RV1021-1DA10**
	0.75	6SE6420-2UD17-5AA0			**3RV1021-1EA10**
	1.1	6SE6420-2UD21-1AA0			**3RV1021-1GA10**
	1.5	6SE6420-2UD21-5AA0			**3RV1021-1HA10**
	2.2	6SE6420-2UD22-2BA0	**6SE6400-0GP00-0BA0**	**3NA3805**	**3RV1021-1JA10**
	3.0	6SE6420-2UD23-0BA0			**3RV1021-1KA10**
	4.0	6SE6420-2UD24-0BA0		**3NA3807**	**3RV1021-4AA10**
	5.5	6SE6420-2UD25-5CA0	**6SE6400-0GP00-0CA0**		**3RV1021-4CA10**
	7.5	6SE6420-2UD27-5CA0		**3NA3810**	**3RV1031-4EA10**
	11	6SE6420-2UD31-1CA0		**3NA3814**	**3RV1031-4FA10**
		Inverter **with** internal filter Class A			
200 V to 240 V 1 AC	0.12	6SE6420-2AB11-2AA0	**6SE6400-0GP00-0AA0**	**3NA3803**	**3RV1021-1CA10**
	0.25	6SE6420-2AB12-5AA0			**3RV1021-1FA10**
	0.37	6SE6420-2AB13-7AA0			**3RV1021-1HA10**
	0.55	6SE6420-2AB15-5AA0			**3RV1021-1JA10**
	0.75	6SE6420-2AB17-5AA0		**3NA3805**	**3RV1021-1KA10**
	1.1	6SE6420-2AB21-1BA0	**6SE6400-0GP00-0BA0**	**3NA3807**	**3RV1021-4BA10**
	1.5	6SE6420-2AB21-5BA0			**3RV1021-4DA10**
	2.2	6SE6420-2AB22-2BA0		**3NA3810**	**3RV1031-4EA10**
	3.0	6SE6420-2AB23-0CA0	**6SE6400-0GP00-0CA0**	**3NA3812**	**3RV1031-4GA10**
200 V to 240 V 3 AC	3.0	6SE6420-2AC23-0CA0	**6SE6400-0GP00-0CA0**	**3NA3810**	**3RV1021-4BA10**
	4.0	6SE6420-2AC24-0CA0		**3NA3812**	**3RV1021-4DA10**
	5.5	6SE6420-2AC25-5CA0		**3NA3814**	**3RV1031-4FA10**
380 V to 480 V 3 AC	2.2	6SE6420-2AD22-2BA0	**6SE6400-0GP00-0BA0**	**3NA3805**	**3RV1021-1JA10**
	3.0	6SE6420-2AD23-0BA0			**3RV1021-1KA10**
	4.0	6SE6420-2AD24-0BA0		**3NA3807**	**3RV1021-4AA10**
	5.5	6SE6420-2AD25-5CA0	**6SE6400-0GP00-0CA0**		**3RV1021-4CA10**
	7.5	6SE6420-2AD27-5CA0		**3NA3810**	**3RV1031-4EA10**
	11	6SE6420-2AD31-1CA0		**3NA3814**	**3RV1031-4FA10**

Options

Ordering Data for Variant Independent Options

The options listed here are suitable for all MICROMASTER 420 Inverters.

Options	Order No.
Basic Operator Panel (BOP)	**6SE6400-0BP00-0AA0**
Advanced Operator Panel (AOP)	**6SE6400-0AP00-0AA0** **6SE6400-0AP00-0AA1** (available from mid 2002)
PROFIBUS module	**6SE6400-1PB00-0AA0**
DeviceNet module	**6SE6400-1DN00-0AA0**
RS485/PROFIBUS bus connector	**6GK1500-0FC00**
Connection set for PC to inverter	**6SE6400-1PC00-0AA0**
Connection set for PC to AOP	**6SE6400-0PA00-0AA0**
Inverter-door mounting kit for single inverter control	**6SE6400-0PM00-0AA0**
AOP-door mounting kit for multiple inverter control (USS)	**6SE6400-0MD00-0AA0**

Technical data of the communications modules

		PROFIBUS module 6SE6400-1PB00-0AA0	**DeviceNet module** 6SE6400-1DN00-0AA0
Size (height x width x depth)		161 mm x 73 mm x 46 mm	
Degree of protection		IP 20	
Degree of pollution		2 to IEC 60 664-1 (DIN VDE 0110/T1), no condensation permitted during operation	
Mechanical strength • Stationary • Transport	 Deflection Acceleration Deflection Acceleration	to DIN IEC 60 068-2-6 (if module installed correctly) 0.15 mm in the frequency range of 10 Hz to 58 Hz 19.6 m/s^2 in the frequency range of 58 Hz to 500 Hz 3.5 mm in the frequency range of 5 Hz to 9 Hz 9.8 m/s^2 in the frequency range of 9 Hz to 500 Hz	
Climatic category (during operation)		3K3 to DIN IEC 60 721-3-3	
Cooling method		Natural air cooling	
Permissible ambient or cooling agent temperature • in operation • during storage and transport		 –10 °C to +50 °C (14 °F to 122 °F) –25 °C to +70 °C (–13 °F to 158 °F)	
Relative humidity (permissible humidity rating) • in operation • during storage and transport		 ≤ 85% (non-condensing) ≤ 95%	
Electromagnetic compatibility	Emission Interference radiation	to EN 55 011 (1991) Class A to IEC 60 801-3 and EN 61 000-4-3	
Supply voltage		6.5 V ± 5%, max. 300 mA, internal from inverter or 24 V ± 10%, max. 350 mA, external	6.5 V ± 5%, max. 300 mA internal from inverter and 24 V, max. 60 mA from DeviceNet bus
Output voltage		5 V ± 10%, max. 100 mA, galvanically isolated supply • for terminating the serial interface bus or • for supplying the OLP (Optical Link Plug)	–
Data transmission rate		max. 12 Mbaud	125, 250 and 500 kbaud

Documentation

Type of documentation	Language	Order No.
Docu-Pack, supplied with each inverter, containing CD-ROM [1]) and Getting-Started Guide [2]) (paper version)	Multilanguage	**6SE6400-5AB00-1AP0**
Operating instructions [2]) (paper version)	German	**6SE6400-5AA00-0AP0**
	English	**6SE6400-5AA00-0BP0**
	French	**6SE6400-5AA00-0DP0**
	Italian	**6SE6400-5AA00-0CP0**
	Spanish	**6SE6400-5AA00-0EP0**
Parameter list [2]) (paper version)	German	**6SE6400-5BA00-0AP0**
	English	**6SE6400-5BA00-0BP0**

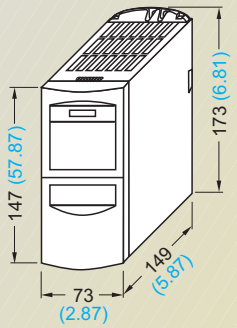
1) The CD-ROM contains operating instructions, parameter list, commissioning tools STARTER and DriveMonitor, multilanguage.

2) Available on Internet at http://www.siemens.com/micromaster

Dimension Drawings

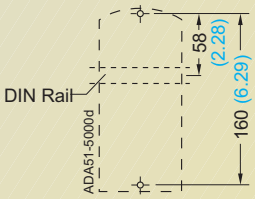
MICROMASTER 420 Inverter

Frame size	200 V to 240 V 1/3 AC	380 V to 480 V 3 AC
A	0.12 kW to 0.75 kW	0.37 kW to 1.5 kW
B	1.1 kW to 2.2 kW	2.2 kW to 4 kW
C	3 kW to 5.5 kW	5.5 kW to 11 kW



Inverter frame size **A**

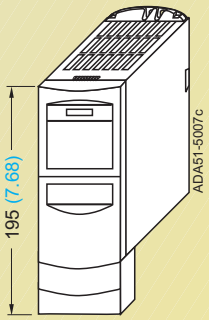
Drill and fixing pattern



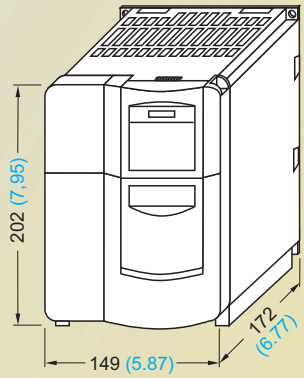
Fixing with
2 bolts M4, 2 nuts M4,
2 washers M4
or snap on to the DIN rail

Tightening torque with
washers fitted: 2.5 Nm

Ventilation clearance required
at top and bottom: 100 mm

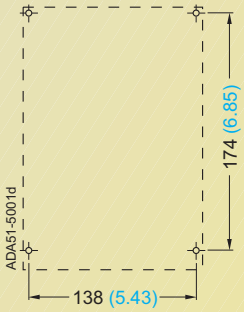


Inverter frame size **A**
with **gland plate**



Inverter frame size **B**

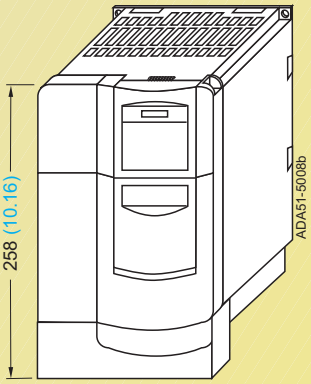
Drill pattern



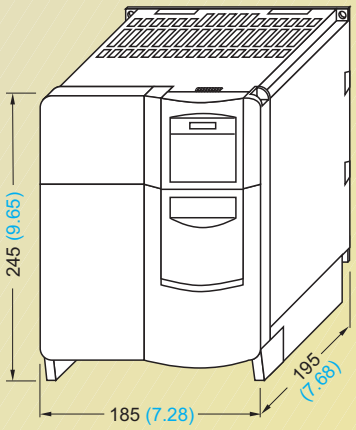
Fixing with
4 bolts M4, 4 nuts M4,
4 washers M4

Tightening torque with
washers fitted: 2.5 Nm

Ventilation clearance required
at top and bottom: 100 mm

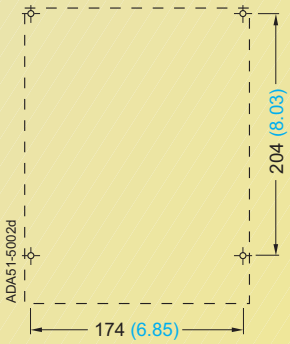


Inverter frame size **B**
with **gland plate**



Inverter frame size **C**

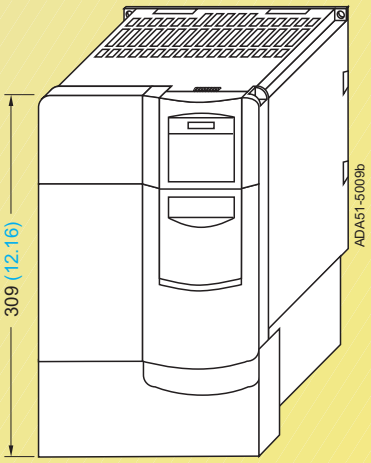
Drill pattern



Fixing with
4 bolts M5, 4 nuts M5,
4 washers M5

Tightening torque with
washers fitted: 3.0 Nm

Ventilation clearance required
at top and bottom: 100 mm

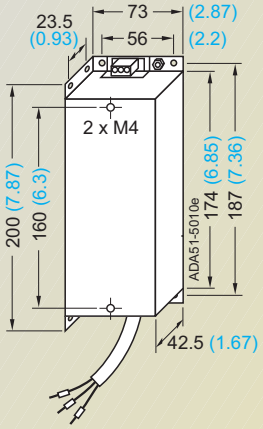


Inverter frame size **C**
with **gland plate**

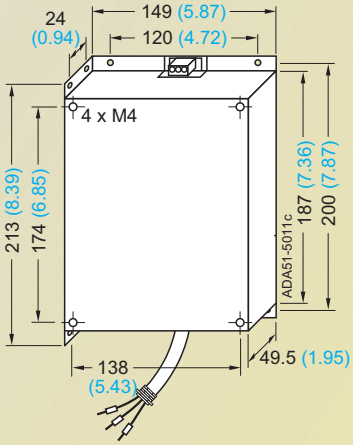
With the communications module, the mounting depth increases by 23 mm (0.91 inches).

All dimensions are in mm (values in brackets are in inches)

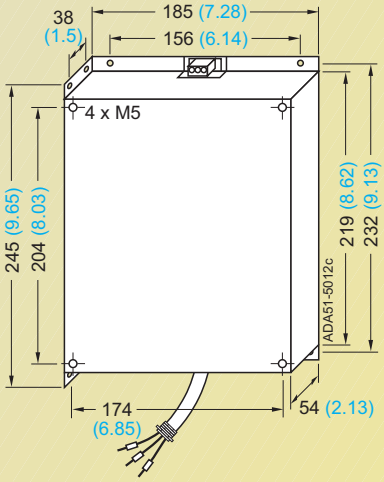
Filters and Chokes



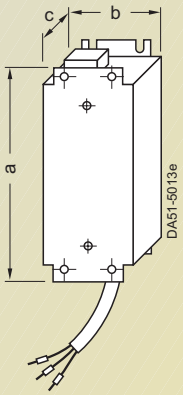
Filter for frame size **A**



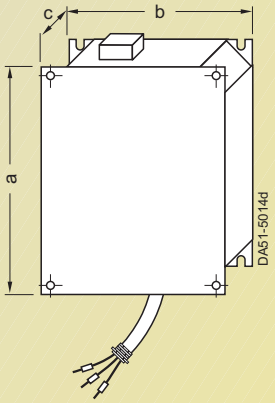
for frame size **B**



for frame size **C**

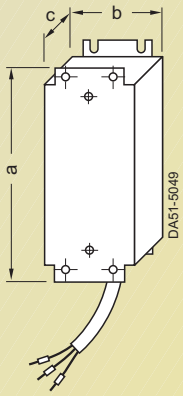


Line commutating choke
for frame size **A**

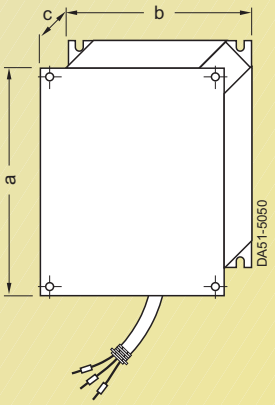


for frame sizes **B** and **C**

Line commutating choke for	Dim. a	b	c	Weight (max.) kg
frame size **A**	200 (7.87)	75.5 (2.97)	50 (1.97)	0.8
frame size **B**	213 (8.39)	150 (5.91)	50 (1.97)	1.3
frame size **C**	245 (9.65)	185 (7.28)	50 (1.97)	2.3



Output choke for frame size **A**



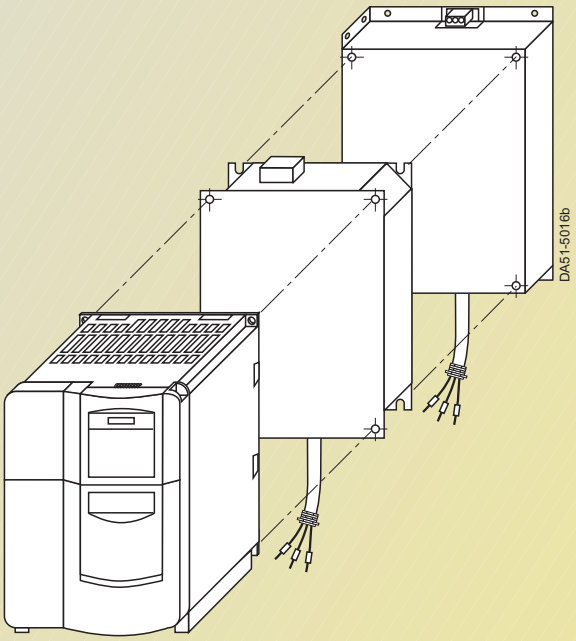
for frame sizes **B** and **C**

Output choke for	Dim. a	b	c	Weight (max.) kg
frame size **A**	200 (7.87)	75.5 (2.97)	50 (1.97)	0.8
frame size **B**	213 (8.39)	150 (5.91)	70 (2.76)	3.4
frame size **C**	245 (9.65)	185 (7.28)	80 (3.15)	5.6

All dimensions are in mm (values in brackets are in inches)

Dimension Drawings

Assembly of inverter and options



Example:
Assembly of inverter, choke and filter

If additional accessories are required, they must be mounted at the side.

Inverter
MICROMASTER 430

3/2 Description

3/4 Circuit Diagrams

3/6 Technical Data

3/8 Selection and Ordering Data

3/9 Options

3/14 Dimension Drawings

Description

3

Applications

The MICROMASTER 430 inverter is suitable for a variety of variable-speed drive applications. Its flexibility provides for a wide spectrum of applications. It is especially suitable for use with industrial pumps and fans. The inverter is especially characterized by its customer-oriented performance and ease of use. It has more inputs and outputs than the MICROMASTER 420, an optimized operator panel with manual/automatic switchover, and adapted software functionality.

Design

The MICROMASTER 430 inverter has a modular design.

The operator panels and communications modules can be easily exchanged.

Main Characteristics

- Simple commissioning
- Modular construction allows maximum configuration flexibility
- Six programmable isolated digital inputs
- Two scalable analog inputs (0 V to 10 V, 0 mA to 20 mA) can also be used as a 7th/8th digital input
- Two programmable analog outputs (0 mA to 20 mA)
- Three fully programmable relay outputs (30 V DC/5 A, resistive 250 V AC/2 A, inductive)
- Silent motor operation is selectable when using high switching frequencies (observe derating if necessary)
- Complete inverter and motor protection
- Control of up to three additional drives on the basis of PID control (motor staging)
- Operation of drive directly on mains (with external bypass circuit)
- Energy saving mode
- Detects running-dry of pumps (belt failure detection).

Options (Overview)

- Line commutating chokes
- Output chokes
- Gland plates
- BOP basic operator panel 2 (BOP-2) for parameterizing an inverter
- Communications modules
  - PROFIBUS
  - DeviceNet
- PC connection kits
- Assembly kits for mounting the operator panels in the control cabinet doors
- PC commissioning tools, running under Windows 95/98 and NT/2000.

International Standards

- The MICROMASTER 430 inverter complies with the requirements of the EU low-voltage guideline; filtered versions also comply with the EU EMC guideline
- The MICROMASTER 430 inverter has the CE marking
- Ⓤ and cⓊ listed
- c-tick

Note:

See Appendix for standards.

Mechanical Features

- Modular design
- Operating temperature: –10 °C to +40 °C
- Compact housing as a result of high power density
- Easy cable connection, mains and motor connections are separated for optimum electromagnetic compatibility
- Detachable operator panels
- Screwless control terminals on detachable I/O board.

Performance Features

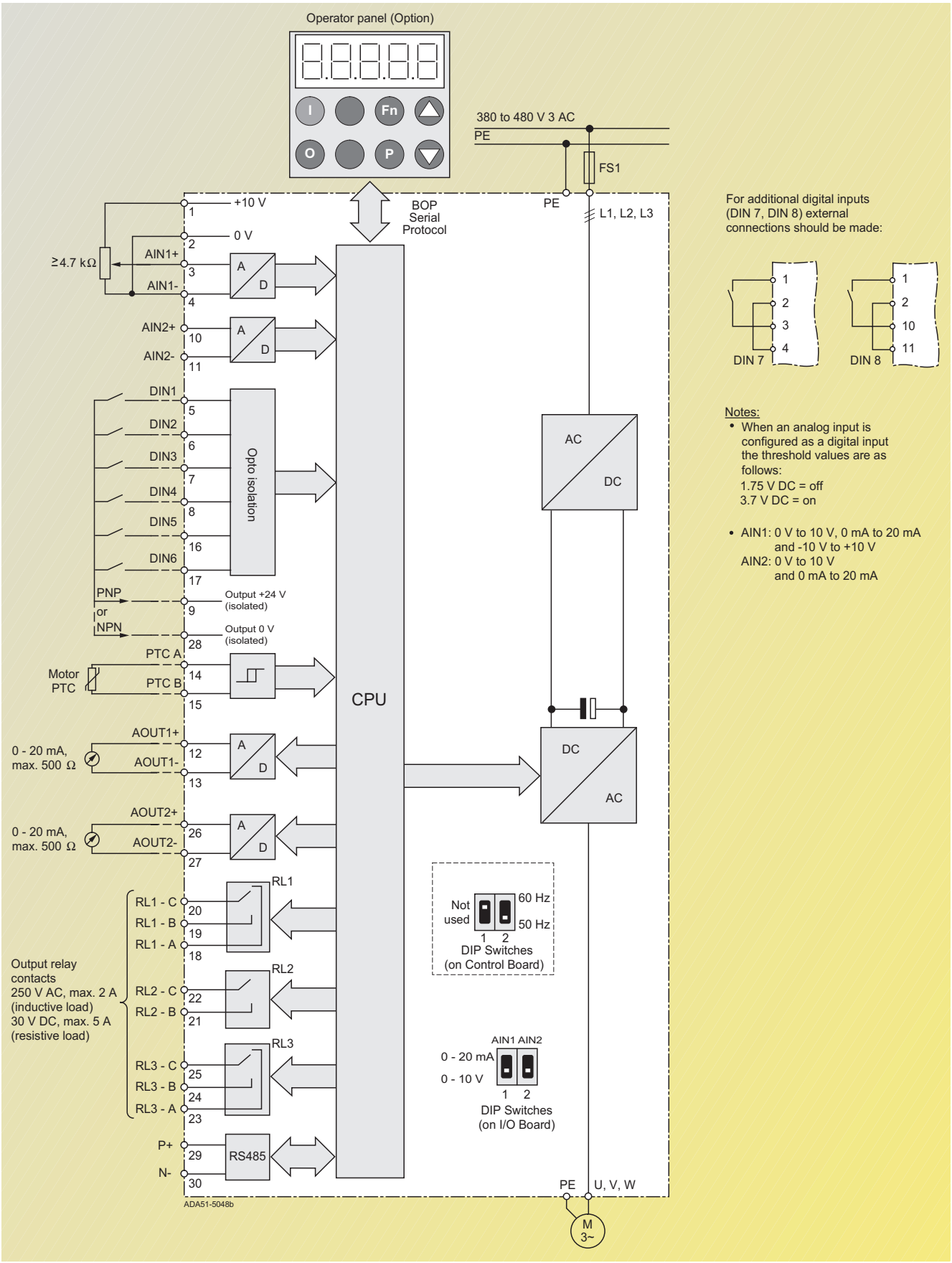
- Latest IGBT technology
- Digital microprocessor control
- Flux current control (FCC) for improved dynamic response and optimized motor control
- Linear *V/f* characteristic
- Quadratic *V/f* characteristic
- Multipoint characteristic (programmable *V/f* characteristic)
- Flying restart
- Slip compensation
- Automatic restart facility following power failure or fault
- Energy saving mode (stopping e.g. of a pump at low speeds)
- Motor staging (connection and disconnection of additional motors, use of inverter as control drive in a pump cascade)
- Manual/automatic mode
- Load torque detection (detects running-dry of pumps)
- High-grade PID controller for simple process control
- Programmable acceleration/deceleration, 0 s to 650 s
- Ramp smoothing
- Fast current limit (FCL) for trip free operation
- Fast, repeatable digital input response time
- Fine speed adjustment using two high resolution 10-bit analog inputs
- Compound braking for rapid controlled braking
- Four skip frequencies
- Removable “Y” capacitor for use on IT mains supplies (with non-grounded mains supplies, the “Y” capacitor must be removed, and an output choke installed).

Protection Features

- Overload capability
  - **VT mode**
    Overload current 1.4 x rated output current (i.e. 140 % overload capability) for 3 s and 1.1 x rated output current (i.e. 110 % overload capability) for 60 s, cycle time 300 s
- Overvoltage/undervoltage protection
- Inverter overtemperature protection
- Special direct connection for PTC or KTY to protect the motor
- Earth fault protection
- Short circuit protection
- I^2t motor thermal protection
- Locked motor protection
- Stall prevention
- Parameter interlock.

Circuit Diagrams

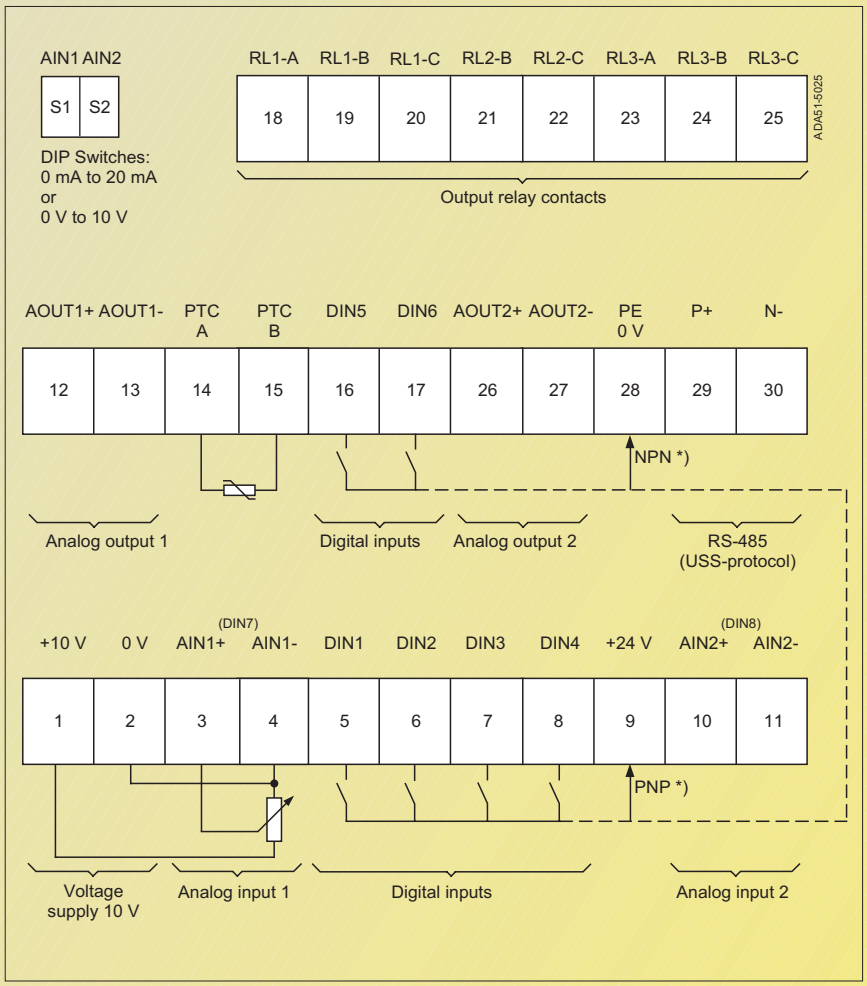
General Circuit Diagram



Terminal Connection Diagram

Example frame size C

View A



*) PNP or NPN possible

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Technical Data

MICROMASTER 430 Inverter

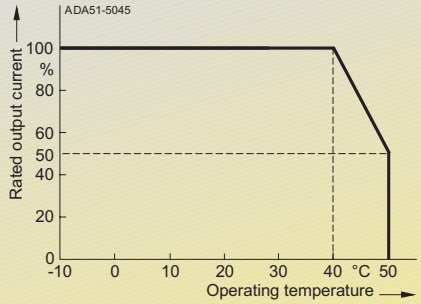
Input voltage and power ranges	380 V to 480 V 3 AC ± 10%	7.5 kW to 90 kW (variable torque)	
Input frequency	47 Hz to 63 Hz		
Output frequency	0 Hz to 650 Hz		
Power factor	≥ 0.95		
Inverter efficiency	96 % to 97 %		
Overload capability	Overload current 1.4 x rated output current (i.e. 140 % overload capability) for 3 s and 1.1 x rated output current (i.e. 110 % overload capability) for 60 s, cycle time 300 s		
Inrush current	less than rated input current		
Control method	linear *V/f*; quadratic *V/f*; multipoint characteristic (programmable *V/f*); flux current control (FCC), energy saving mode		
PWM frequency	4 kHz (standard) 2 kHz to 16 kHz (in 2 kHz steps)		
Fixed frequencies	15, programmable		
Skip frequency bands	4, programmable		
Setpoint resolution	0.01 Hz digital 0.01 Hz serial 10 bit analog		
Digital inputs	6 fully programmable isolated digital inputs; switchable PNP/NPN		
Analog inputs	2 programmable analog inputs • 0 V to 10 V, 0 mA to 20 mA and –10 V to +10 V (AIN1) • 0 V to 10 V and 0 mA to 20 mA (AIN2) • both can be used as 7th/8th digital input		
Relay outputs	3, configurable, 30 V DC/5 A (resistive), 250 V AC/2 A (inductive)		
Analog outputs	2, programmable (0/4 mA to 20 mA)		
Serial interfaces	RS-485, Option RS-232		
Motor cable length without output choke with output choke	 max. 50 m (shielded) max. 100 m (unshielded) max. 200 m (shielded) max. 300 m (unshielded)		
Electromagnetic compatibility	Optional EMC filters to EN 55 011, Class B (for frame size C), Inverter with internal filter Class A available		
Braking	DC Braking, Compound Braking		
Protection level	IP 20		
Temperature range	–10 °C to +40 °C		
Storage temperature	–40 °C to +70 °C		
Relative humidity	95% (non-condensing)		
Installation height	up to 1000 m above sea level without derating		
Protection features for	• under-voltage • over-voltage • overload • earth faults • short circuits • stall prevention • locked motor • motor over-temperature • inverter over-temperature • parameter PIN protection		
Conformity with standards	®, c®, CE, c-tick		
CE marking	Conformity with EC low voltage directive 73/23/EC filtered versions also with electromagnetic compatibility directive 89/336/EC		
Dimensions and weights (without options)	Frame size (FS) C D E F without filter F with filter	H x W x D, max. (mm) 245 x 185 x 195 520 x 275 x 245 650 x 275 x 245 850 x 350 x 320 1150 x 350 x 320	Weight, approx. (kg) 5.7 17 22 56 75

Derating Data

Pulse frequency

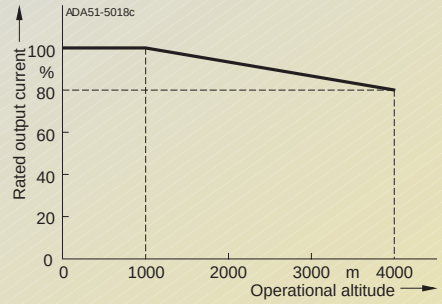
Rated output (for 400 V 3 AC)	**Rated output current in A** for a pulse frequency of						
kW	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
7.5	19.0	17.1	15.2	13.3	11.4	9.5	7.6
11.0	26.0	24.7	23.4	20.8	18.2	15.6	13.0
15.0	32.0	28.8	25.6	22.4	19.2	16.0	12.8
18.5	38.0	36.1	34.2	30.4	26.6	22.8	19.0
22	45.0	40.5	36.0	31.5	27.0	22.5	18.0
30	62.0	55.8	49.6	43.4	37.2	31.0	24.8
37	75.0	71.3	67.5	60.0	52.5	45.0	37.5
45	90.0	81.0	72.0	63.0	54.0	45.0	36.0
55	110.0	93.5	77.0	63.3	49.5	41.3	33.0
75	145.0	123.3	101.5	83.4	65.3	54.4	43.5
90	178.0	138.0	97.9	84.6	71.2	62.3	53.4

Operating temperature

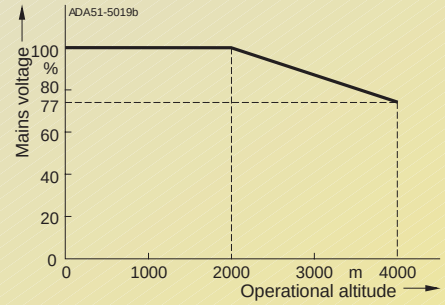


Installation height above sea level

Permissible output current
in % of the rated output current



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



Selection and Ordering Data

MICROMASTER 430 Inverter

Rated output		Rated input current [1]	Rated output current	Frame size	Ordering No.	
					MICROMASTER 430 without filter	**MICROMASTER 430 with internal filter Class A [2]**
kW	hp	A	A	(FS)		
Mains operating voltage 380 V to 480 V 3 AC						
7.5	10	16.0	19	C	**6SE6430-2UD27-5CA0**	**6SE6430-2AD27-5CA0**
11.0	15	22.5	26	C	**6SE6430-2UD31-1CA0**	**6SE6430-2AD31-1CA0**
15.0	20	30.5	32	C	**6SE6430-2UD31-5CA0**	**6SE6430-2AD31-5CA0**
18.5	25	37.2	38	D	**6SE6430-2UD31-8DA0**	**6SE6430-2AD31-8DA0**
22	30	43.3	45	D	**6SE6430-2UD32-2DA0**	**6SE6430-2AD32-2DA0**
30	40	59.3	62	D	**6SE6430-2UD33-0DA0**	**6SE6430-2AD33-0DA0**
37	50	71.7	75	E	**6SE6430-2UD33-7EA0**	**6SE6430-2AD33-7EA0**
45	60	86.6	90	E	**6SE6430-2UD34-5EA0**	**6SE6430-2AD34-5EA0**
55	75	103.6	110	F	**6SE6430-2UD35-5FA0**	**6SE6430-2AD35-5FA0**
75	100	138.5	145	F	**6SE6430-2UD37-5FA0**	**6SE6430-2AD37-5FA0**
90	120	168.5	178	F	**6SE6430-2UD38-8FA0**	**6SE6430-2AD38-8FA0**

See Appendix for note on ordering.

All MICROMASTER 430 inverters are supplied with a Status Display Panel SDP. A BOP-2 or other options have to be ordered additionally (see pages 3/11 to 3/13).

Motors for MICROMASTER 430

Catalog M 11 contains selection and ordering data for motors which are particularly suitable for operation with the MICROMASTER 430 inverters (see Appendix for overview).

1) Additional conditions: input current at nominal working point, applies to short-circuit voltage of mains supply $V_k \geq 1$ % referred to rated inverter power and rated mains voltage of 400 V.

2) Use of MICROMASTER inverters with internal filter is not permissible on non-grounded mains supplies.

Variant Dependent Options

EMC filter, Class A

All other inverters can be supplied with an internal filter Class A.

The requirements are fulfilled using shielded cables with a max. length of 25 m.

Additional EMC filter, Class B

Obtainable for inverters with an internal EMC filter Class A, frame size C.

With this filter, the inverter complies with the emission standard EN 55 011, Class B.

The requirements are fulfilled using shielded cables with a max. length of 25 m.

Leakage currents:

The leakage currents of the inverters with/without filter (internal/external) may exceed 30 mA. Typical values in practice are between 10 mA and 50 mA. The exact values depend on the design, environment and cable lengths. Interference-free operation with residual current operated devices with a trigger value of 30 mA cannot be guaranteed. However, operation with residual current operated devices with a trigger value of 300 mA is possible. Please refer to the Instruction Manual for details.

Line commutating choke

Line commutating chokes are used to smooth voltage peaks or to bridge commutating dips. In addition, line commutating chokes reduce the effects of harmonics on the inverter and the power supply. If the line impedance is < 1%, a line commutating choke must be used in order to reduce the current peaks.

No limits are currently defined in the EN 61 000-3-2 standard for professionally used devices with a connected load > 1 kW. This means that the inverters with an output power ≥ 0.75 kW comply with the EN 61 000-3-2 standard.

Output choke

Output chokes can be supplied for reducing the capacitive currents and d*V*/d*t* in the case of motor cables > 50 m (shielded) or > 100 m (unshielded).

Gland plate

Gland plates are available for inverters with frame size C. In frame sizes D, E and F, the gland plates are integrated.

The gland plate enables shielded connection of the power and control cables, ensuring optimum EMC performance. This action ensures compliance with the NEMA 1 directive.

Variant Independent Options

Basic Operator Panel 2 (BOP-2)

With the BOP-2, individual parameter settings can be made. Values and units are shown on a 5-digit display.

Basic Operator Panel (BOP-2)

A BOP-2 can be used for several inverters. It can be directly mounted on the inverter or in a control-cabinet door using a mounting kit.

PROFIBUS module

For a complete PROFIBUS connection with up to 12 Mbaud. Remote control of the inverter is possible with the PROFIBUS module. Remote control and operation at the inverter can be combined using an operator panel – plugged onto the PROFIBUS module. The latter can be supplied by an external 24 V DC power supply and is thus also active when the inverter is disconnected from the mains.

Connection by means of a 9-pin SUB-D connector (available as an accessory).

DeviceNet module

For networking the inverters to the DeviceNet fieldbus system widely used on the American market. A max. transmission rate of 500 kbaud is possible. Remote control of the module is possible via the DeviceNet module.

Remote control and operation on the inverter can be combined using an operator panel connected to the DeviceNet module.

The connection to the DeviceNet bus system is made using a 5-pin connector with terminal strip.

Connection set for PC to inverter

For controlling an inverter directly from a PC if the appropriate software has been installed (e.g. STARTER) in the PC. Isolated RS-232 adapter board for reliable point-to-point connection to a PC. Includes a Sub-D connector and an RS-232 standard cable (3 m).

Operator panel door mounting kit for single inverter control

For mounting an operator panel in a control cabinet door. Degree of protection is IP 56. Contains a cable adapter board with screwless terminals for use with the user's own cables.

Commissioning tools

- STARTER
  Starter is start-up software for guided commissioning for MICROMASTER 410/420/430/440 frequency inverters under Windows NT/2000. Parameter lists can be read out, altered, stored, entered and printed.
- DriveMonitor
  DriveMonitor is start-up software for list-oriented programming of frequency inverters under Windows 95/98/NT/2000.

Both programs are included on the Docu CD which is provided with every inverter.

Options

Ordering Data for Variant Dependent Options

The options listed here (filters, chokes, gland plates, fuses and circuit breakers) are inverter specific.

The inverter and the associated options have the same voltage ratings.

All options are certified to UL, except fuses. The fuses 3NE1 comply with UL (corresponds to cUL).

Mains operating voltage	Rated output	Inverter **without** filter	Order No. of the options		
	kW		**Line commutating choke**	**Output choke**	**Gland plates**
380 V to 480 V 3 AC	7.5	6SE6430-2UD27-5CA0	**6SE6400-3CC02-2CD0**	**6SE6400-3TC03-2CD0**	**6SE6400-0GP00-0CA0**
	11.0	6SE6430-2UD31-1CA0			
	15.0	6SE6430-2UD31-5CA0	**6SE6400-3CC03-5CD0**		
	18.5	6SE6430-2UD31-8DA0	**6SE6400-3CC04-4DD0**	**6SE6400-3TC05-4DD0**	Integrated as standard
	22	6SE6430-2UD32-2DA0		**6SE6400-3TC03-8DD0**	
	30	6SE6430-2UD33-0DA0	**6SE6400-3CC05-2DD0**	**6SE6400-3TC05-4DD0**	
	37	6SE6430-2UD33-7EA0	**6SE6400-3CC08-3ED0**	**6SE6400-3TC08-0ED0**	
	45	6SE6430-2UD34-5EA0		**6SE6400-3TC07-5ED0**	
	55	6SE6430-2UD35-5FA0	**6SE6400-3CC11-2FD0**	**6SE6400-3TC14-5FD0**	
	75	6SE6430-2UD37-5FA0		**6SE6400-3TC15-4FD0**	
	90	6SE6430-2UD38-8FA0	**6SE6400-3CC11-7FD0**	**6SE6400-3TC14-5FD0**	

Mains operating voltage	Rated output	Inverter **without** filter	Order No. of the options		
			Fuse (see Catalog NS K)		**Circuit breaker** (see Catalog NS K)
	kW		**3NA3**	**3NE1 (cUL)**	
380 V to 480 V 3 AC	7.5	6SE6430-2UD27-5CA0	**3NA3007**	●	**3RV1031-4EA10**
	11.0	6SE6430-2UD31-1CA0	**3NA3012**		**3RV1031-4FA10**
	15.0	6SE6430-2UD31-5CA0	**3NA3014**		**3RV1031-4HA10**
	18.5	6SE6430-2UD31-8DA0	**3NA3020**	**3NE1817-0**	**3RV1042-4KA10**
	22	6SE6430-2UD32-2DA0	**3NA3022**	**3NE1818-0**	
	30	6SE6430-2UD33-0DA0	**3NA3024**	**3NE1820-0**	**3RV1042-4MA10**
	37	6SE6430-2UD33-7EA0	**3NA3030**	**3NE1021-0**	**3VL1712-.DD33-....**
	45	6SE6430-2UD34-5EA0	**3NA3032**	**3NE1022-0**	**3VL1716-.DD33-....**
	55	6SE6430-2UD35-5FA0	**3NA3036**	**3NE1224-0**	**3VL3720-.DC36-....**
	75	6SE6430-2UD37-5FA0		**3NE1225-0**	**3VL3725-.DC36-....**
	90	6SE6430-2UD38-8FA0	**3NA3140**		**3VL4731-.DC36-....**

● Use in America requires UL-listed fuses such as e.g. the Class NON range from Bussmann.

Ordering Data for Variant Dependent Options (continued)

Mains operating voltage	Rated output kW	Inverter **with** internal filter Class A	Order No. of the options **Line commutating choke**	**Output choke**
380 V to 480 V 3 AC	7.5	6SE6430-2AD27-5CA0	**6SE6400-3CC02-2CD0**	**6SE6400-3TC03-2CD0**
	11.0	6SE6430-2AD31-1CA0		
	15.0	6SE6430-2AD31-5CA0	**6SE6400-3CC03-5CD0**	
	18.5	6SE6430-2AD31-8DA0	**6SE6400-3CC04-4DD0**	**6SE6400-3TC05-4DD0**
	22	6SE6430-2AD32-2DA0		**6SE6400-3TC03-8DD0**
	30	6SE6430-2AD33-0DA0	**6SE6400-3CC05-2DD0**	**6SE6400-3TC05-4DD0**
	37	6SE6430-2AD33-7EA0	**6SE6400-3CC08-3ED0**	**6SE6400-3TC08-0ED0**
	45	6SE6430-2AD34-5EA0		**6SE6400-3TC07-5ED0**
	55	6SE6430-2AD35-5FA0	**6SE6400-3CC11-2FD0**	**6SE6400-3TC14-5FD0**
	75	6SE6430-2AD37-5FA0		**6SE6400-3TC15-4FD0**
	90	6SE6430-2AD38-8FA0	**6SE6400-3CC11-7FD0**	**6SE6400-3TC14-5FD0**

Mains operating voltage	Rated output kW	Inverter **with** internal filter Class A	Order No. of the options **Supplementary EMC filter, Class B**	**Gland plate**
380 V to 480 V 3 AC	7.5	6SE6430-2AD27-5CA0	**6SE6400-2FS03-8CD0**	**6SE6400-0GP00-0CA0**
	11.0	6SE6430-2AD31-1CA0		
	15.0	6SE6430-2AD31-5CA0		
	18.5	6SE6430-2AD31-8DA0	–	Integrated as standard
	22	6SE6430-2AD32-2DA0	–	
	30	6SE6430-2AD33-0DA0	–	
	37	6SE6430-2AD33-7EA0	–	
	45	6SE6430-2AD34-5EA0	–	
	55	6SE6430-2AD35-5FA0	–	
	75	6SE6430-2AD37-5FA0	–	
	90	6SE6430-2AD38-8FA0	–	

Mains operating voltage	Rated output kW	Inverter **with** internal filter Class A	Order No. of the options **Fuse** (see Catalog NS K) **3NA3**	**3NE1 (UL)**	**Circuit breaker** (see Catalog NS K)
380 V to 480 V 3 AC	7.5	6SE6430-2AD27-5CA0	**3NA3007**	●	**3RV1031-4EA10**
	11.0	6SE6430-2AD31-1CA0	**3NA3012**		**3RV1031-4FA10**
	15.0	6SE6430-2AD31-5CA0	**3NA3014**		**3RV1031-4HA10**
	18.5	6SE6430-2AD31-8DA0	**3NA3020**	**3NE1817-0**	**3RV1042-4KA10**
	22	6SE6430-2AD32-2DA0	**3NA3022**	**3NE1818-0**	
	30	6SE6430-2AD33-0DA0	**3NA3024**	**3NE1820-0**	**3RV1042-4MA10**
	37	6SE6430-2AD33-7EA0	**3NA3030**	**3NE1021-0**	**3VL1712-.DD33-....**
	45	6SE6430-2AD34-5EA0	**3NA3032**	**3NE1022-0**	**3VL1716-.DD33-....**
	55	6SE6430-2AD35-5FA0	**3NA3036**	**3NE1224-0**	**3VL3720-.DC36-....**
	75	6SE6430-2AD37-5FA0		**3NE1225-0**	**3VL3725-.DC36-....**
	90	6SE6430-2AD38-8FA0	**3NA3140**		**3VL4731-.DC36-....**

● Use in America requires UL-listed fuses such as e.g. the Class NON range from Bussmann.

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Options

Ordering Data for Variant Independent Options

The options listed here are suitable for all MICROMASTER 430.

Option	Order No.
Basic Operator Panel 2 (BOP-2)	**6SE6400-0BE00-0AA0**
PROFIBUS module	**6SE6400-1PB00-0AA0**
DeviceNet module	**6SE6400-1DN00-0AA0**
RS485/PROFIBUS bus connector	**6GK1500-0FC00**
Connection set for PC to inverter	**6SE6400-1PC00-0AA0**
Operator panel door mounting kit for single inverter	**6SE6400-0PM00-0AA0**

Technical data of the communications modules

		PROFIBUS module 6SE6400-1PB00-0AA0	**DeviceNet module** 6SE6400-1DN00-0AA0
Size (height x width x depth)		161 mm x 73 mm x 46 mm	
Degree of protection		IP 20	
Degree of pollution		2 to IEC 60664-1 (DIN VDE 0110/T1), no condensation permitted during operation	
Mechanical strength • Stationary • Transport	 Deflection Acceleration Deflection Acceleration	to DIN IEC 60068-2-6 (if module installed correctly) 0.15 mm in the frequency range of 10 Hz to 58 Hz 19.6 m/s^2 in the frequency range of 58 Hz to 500 Hz 3.5 mm in the frequency range of 5 Hz to 9 Hz 9.8 m/s^2 in the frequency range of 9 Hz to 500 Hz	
Climatic category (during operation)		3K3 to DIN IEC 60721-3-3	
Cooling method		Natural air cooling	
Permissible ambient or cooling agent temperature • in operation • during storage and transport		 –10 °C to +50 °C (14 °F to 122 °F) –25 °C to +70 °C (–13 °F to 158 °F)	
Relative humidity (permissible humidity rating) • in operation • during storage and transport		 ≤ 85% (non-condensing) ≤ 95%	
Electromagnetic compatibility	Emission Interference radiation	to EN 55011 (1991) Class A to IEC 60801-3 and EN 61000-4-3	
Supply voltage		6.5 V ± 5%, max. 300 mA, internal from inverter or 24 V ± 10%, max. 350 mA, external	6.5 V ± 5%, max. 300 mA internal from inverter and 24 V, max. 60 mA from DeviceNet bus
Output voltage		5 V ± 10%, max. 100 mA, galvanically isolated supply • for terminating the serial interface bus or • for supplying the OLP (Optical Link Plug)	–
Data transmission rate		max. 12 Mbaud	125, 250 and 500 kbaud

Documentation (available from 05/2002)

Type of documentation	Language	Order No.
Docu-Pack, supplied with each inverter, containing CD-ROM [1]) and Getting Started Guide [2]) (paper version)	Multilanguage	**6SE6400-5AE00-1AP0**
Operating instructions [2]) (paper version)	German	**6SE6400-5AE00-0AP0**
	English	**6SE6400-5AE00-0BP0**
	French	**6SE6400-5AE00-0DP0**
	Italian	**6SE6400-5AE00-0CP0**
	Spanish	**6SE6400-5AE00-0EP0**
Parameter list [2]) (paper version)	German	**6SE6400-5AF00-0AP0**
	English	**6SE6400-5AF00-0BP0**
	French	**6SE6400-5AF00-0DP0**
	Italian	**6SE6400-5AF00-0CP0**
	Spanish	**6SE6400-5AF00-0EP0**

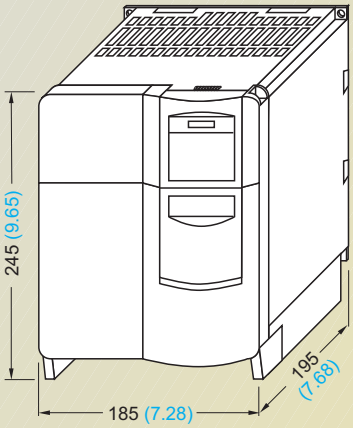
1) The CD-ROM contains operating instructions, parameter list, commissioning tools STARTER and DriveMonitor, multilanguage.

2) Available on Internet at http://www.siemens.com/micromaster

Dimension Drawings

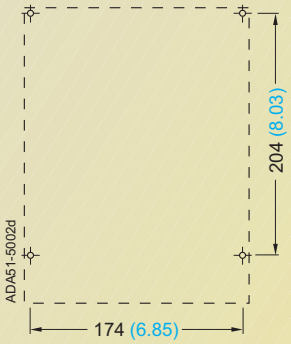
MICROMASTER 430 Inverter

Frame size	380 V to 480 V 3 AC
C	7.5 kW to 15 kW
D	18.5 kW to 30 kW
E	37 kW to 45 kW
F	55 kW to 90 kW



Inverter frame size **C**

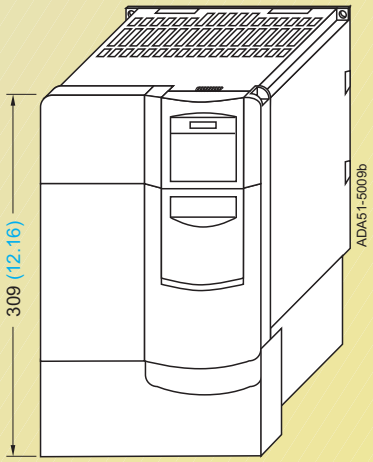
Drill pattern



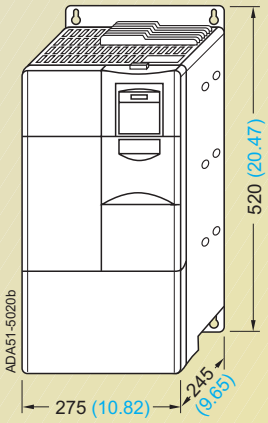
Fixing with
4 bolts M5
4 nuts M5
4 washers M5

Tightening torque with washers fitted: 3.0 Nm

Ventilation clearance required at top and bottom: 100 mm

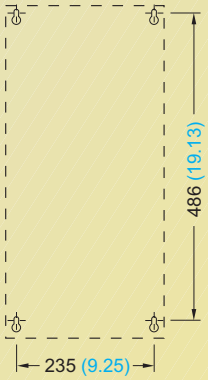


Inverter frame size **C** with **gland plates**



Inverter frame size **D**

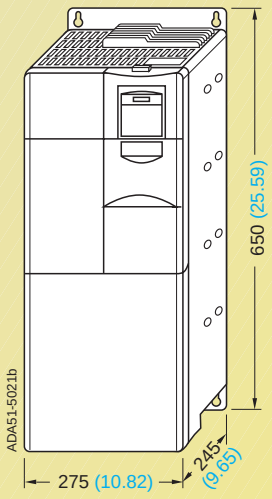
Drill pattern



Fixing with
4 bolts M8
4 nuts M8
4 washers M8

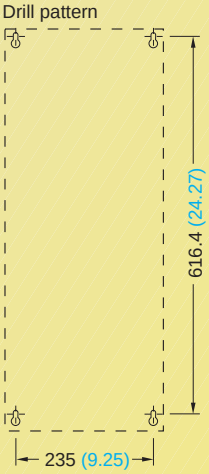
Tightening torque with washers fitted: 3.0 Nm

Ventilation clearance required at top and bottom: 300 mm



Inverter frame size **E**

Drill pattern



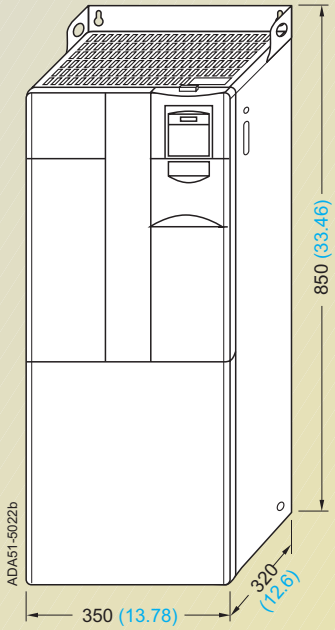
Fixing with
4 bolts M8
4 nuts M8
4 washers M8

Tightening torque with washers fitted: 3.0 Nm

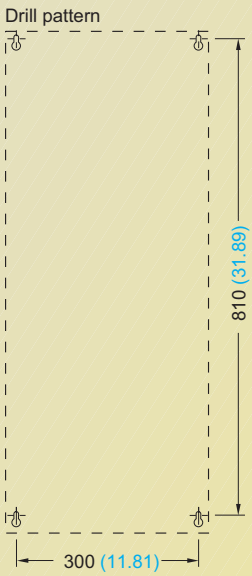
Ventilation clearance required at top and bottom: 300 mm

With the communications module the mounting depth increases with frame size C by 23 mm (0.91 inches).

All dimensions are in mm (values in brackets are in inches)



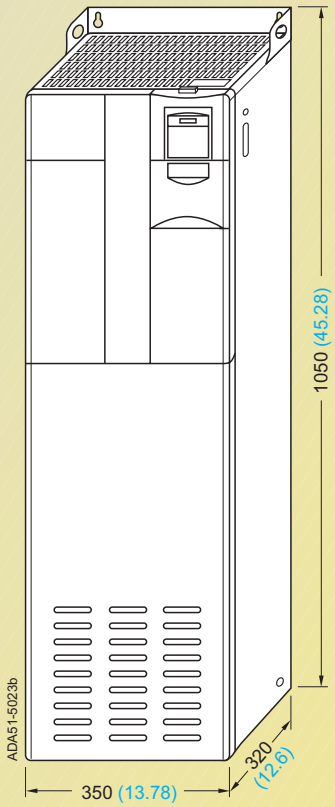
Inverter frame size **F** without filter



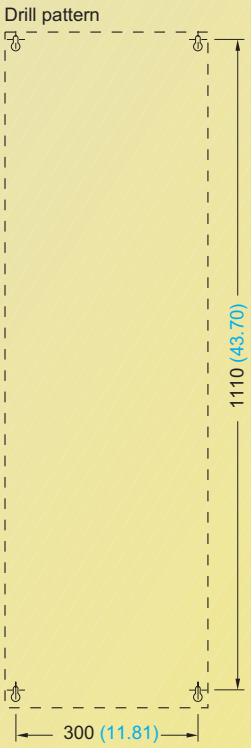
Fixing with
4 bolts M8
4 nuts M8
4 washers M8

Tightening torque with washers fitted: 3.0 Nm

Ventilation clearance required at top and bottom: 350 mm



Inverter frame size **F** with filter



Fixing with
4 bolts M8
4 nuts M8
4 washers M8

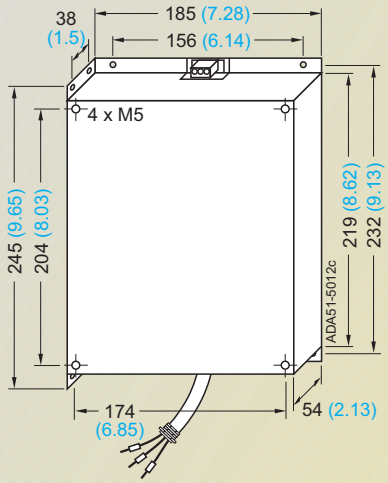
Tightening torque with washers fitted: 3.0 Nm

Ventilation clearance required at top and bottom: 350 mm

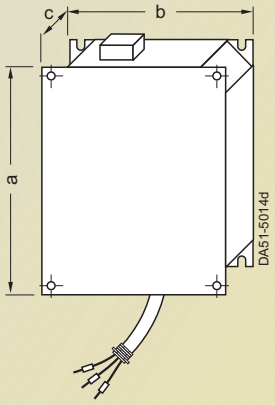
All dimensions are in mm (values in brackets are in inches)

Dimension Drawings

Filters and Chokes

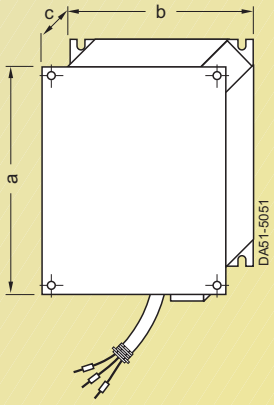


Filter for frame size **C**



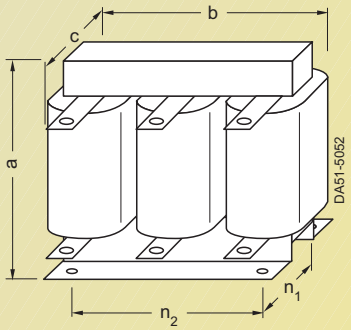
Line commutating choke for	Dim.			Weight (max.)
	a	b	c	kg
frame size **C**	245 (9.65)	185 (7.28)	50 (1.97)	2.3

Line commutating choke for frame size **C**



Line commutating choke for	Dim.			Weight (max.)
	a	b	c	kg
frame size **D**	520 (20.47)	275 (10.83)	85 (3.35)	9.5
frame size **E**	650 (25.59)	275 (10.83)	95 (3.74)	17.0

Line commutating choke for frame sizes **D** and **E**

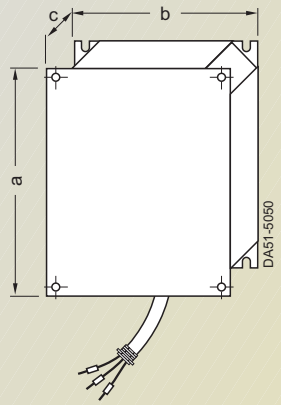


Line commutating choke Type 6SE6400-	for inverter frame size	Dim. a	b	c	n_1	n_2	Weight (max.) kg
3CC11-....	**F**	210 (8.27)	240 (9.45)	141 (5.55)	109 (4.29)	190 (7.48)	25.0

Line commutating choke for inverter frame size **F**

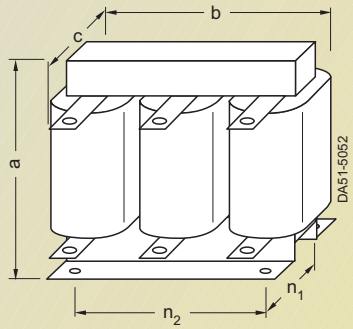
All dimensions are in mm (values in brackets are in inches)

Output chokes



Output choke for frame size **C**

Output choke for	Dim.			Weight (max.)
	a	b	c	kg
frame size **C**	245 (9.65)	185 (7.28)	80 (3.15)	5.6



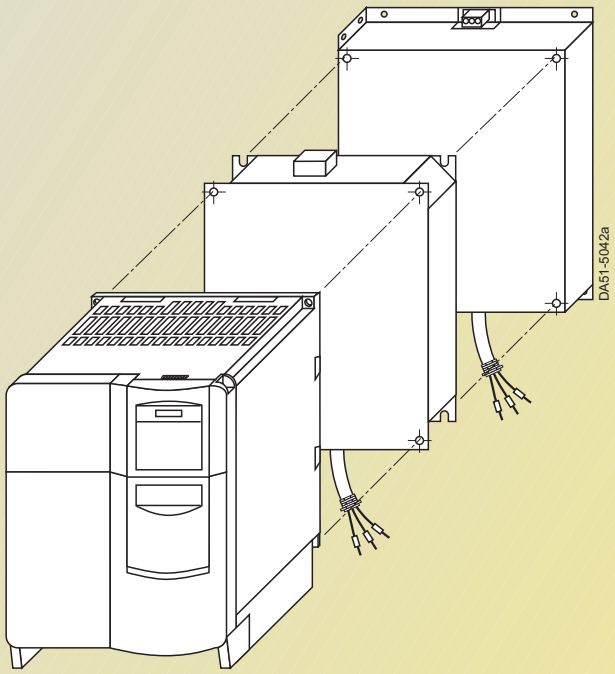
Output choke
for inverter frame sizes **D**, **E** and **F**

Output choke Type 6SE6400-	for inverter frame size (FS)	Dim. a	b	c	n_1 (to DIN 41308)	n_2	Weight (max.) kg
3TC03-8DD0	**D**	210 (8.27)	225 (8.86)	179 (7.05)	76 (2.99)	176 (6.93)	16.1
3TC05-4DD0	**D**	210 (8.27)	225 (8.86)	150 (5.91)	76 (2.99)	176 (6.93)	10.7
3TC07-5ED0	**E**	248 (9.76)	270 (10.63)	209 (8.23)	88 (3.46)	200 (7.87)	24.9
3TC08-0ED0	**E**	210 (8.27)	225 (8.86)	150 (5.91)	76 (2.99)	176 (6.93)	10.4
3TC14-5FD0	**F**	321 (12.64)	350 (13.78)	288 (11.34)	120 (4.72)	264 (10.39)	51.5
3TC15-4FD0	**F**	210 (8.27)	225 (8.86)	150 (5.91)	76 (2.99)	176 (6.93)	11.2

All dimensions are in mm (values in brackets are in inches)

Dimension Drawings

Assembly of inverter and options



Example:
Assembly of inverter, choke and filter

If additional accessories are required, they must be mounted at the side.

Inverter
MICROMASTER 440

4/2 Description
4/4 Circuit Diagrams
4/6 Technical Data
4/9 Selection and Ordering Data
4/12 Options
4/21 Dimension Drawings

4

Description

Applications

The MICROMASTER 440 inverter is suitable for a variety of variable-speed drive applications. Its flexibility provides for a wide spectrum of applications. These also include positioning operations for cranes and hoisting gear, high-bay warehouses, production machines for food, beverages and tobacco, packaging machines etc.; i.e. applications which require the frequency inverter to have a higher functionality and dynamic response than usual.

The inverter is especially characterized by its customer-oriented performance and ease of use. Its large supply-voltage range enables it to be used all over the world.

Design

The MICROMASTER 440 has a modular design. The operator panels and the modules can be easily exchanged.

International Standards

- The MICROMASTER 440 inverter complies with the requirements of the EU low-voltage guideline; filtered versions also comply with the EU EMC guideline
- The MICROMASTER 440 inverter has the CE marking
- UL and cUL listed
- c-tick

Note:

- See Appendix for standards.

Main Characteristics

- Simple commissioning
- Modular construction allows maximum configuration flexibility
- Six programmable isolated digital inputs
- Two scalable analog inputs (0 V to 10 V, 0 mA to 20 mA) can also be used as a 7th/8th digital input
- Two programmable analog outputs (0 mA to 20 mA)
- Three fully programmable relay outputs (30 V DC/5 A, resistive 250 V AC/2 A, inductive)
- Silent motor operation is selectable when using high switching frequencies (observe derating if necessary)
- Complete inverter and motor protection.

Options (Overview)

- EMC filters Class A/B
- Line commutating chokes
- Output chokes
- Gland plates
- BOP basic operator panel for parameterizing an inverter
- AOP advanced operator panel with plain-text and multilingual display
- Communications module
  – PROFIBUS
  – DeviceNet
- Pulse encoder evaluation module
- PC connection kits
- Assembly kits for mounting the operator panels in the control cabinet doors
- PC commissioning tools, running under Windows 95/98 and NT/2000.

Mechanical Features

- Modular design
- Operating temperature
  0.12 kW to 75 kW:
  –10 °C to +50 °C
  90 kW to 200 kW:
  0 °C to +40 °C
- Compact housing as a result of high power density
- Easy cable connection, mains and motor connections are separated for optimum electromagnetic compatibility
- Detachable operator panels
- Screwless control terminals on detachable I/O board.

Performance Features

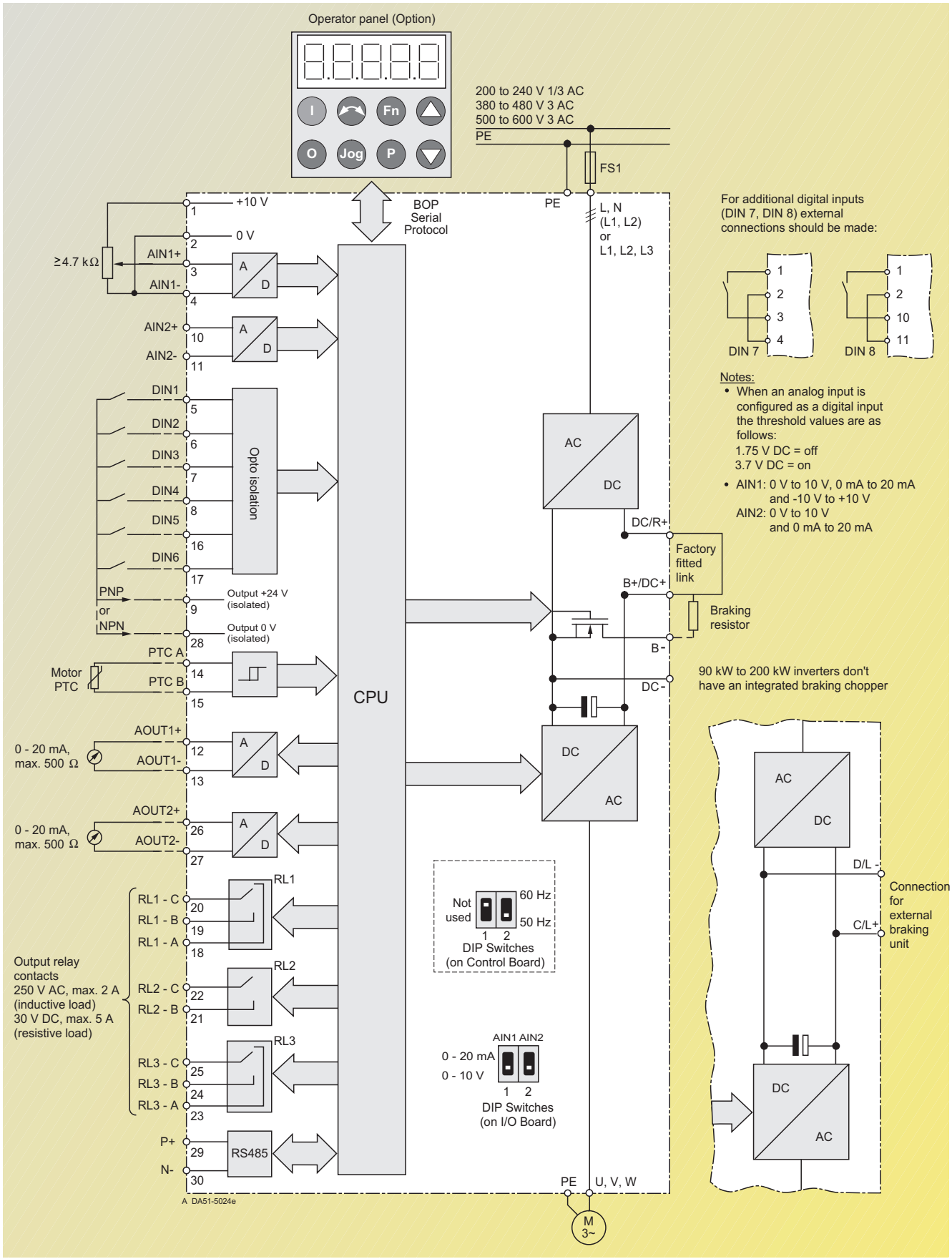
- Latest IGBT technology
- Digital microprocessor control
- High-quality Vector Control system
- Flux current control (FCC) for improved dynamic response and optimized motor control
- Linear *V/f* characteristic
- Quadratic *V/f* characteristic
- Multipoint characteristic (programmable *V/f* characteristic)
- Torque control
- Flying restart
- Slip compensation
- Automatic restart facility following power failure or fault
- User-definable function blocks for logic and arithmetic operations
- Kinetic buffering
- Positioning deceleration ramp
- High-grade PID controller (auto-tuning) for simple process control
- Programmable acceleration/deceleration, 0 s to 650 s
- Ramp smoothing
- Fast current limit (FCL) for trip free operation
- Fast, repeatable digital input response time
- Fine speed adjustment using two high resolution 10-bit analog inputs
- Compound braking for rapid controlled braking
- Integral brake chopper (only for 0.12 kW to 75 kW inverters)
- Four skip frequencies
- Removable “Y” capacitor for use on IT mains supplies (with non-grounded mains supplies, the “Y” capacitor must be removed, and an output choke installed).

Protection Features

- Overload capability
  - **CT mode**
    0.12 kW to 75 kW:
    Overload current
    1.5 x rated output current (i.e. 150 % overload capability) for 60 s, cycle time 300 s, and 2 x rated output current (i.e. 200 % overload capability) for 3 s, cycle time 300 s
    90 kW to 200 kW:
    Overload current
    1.36 x rated output current (i.e. 136 % overload capability) for 57 s, cycle time 300 s, and 1.6 x rated output current (i.e. 160 % overload capability) for 3 s, cycle time 300 s
  - **VT mode**
    5.5 kW to 90 kW:
    Overload current
    1.4 x rated input current (i.e. 140 % overload capability) for 3 s, and 1.1 x rated input current (i.e. 110 % overload capability) for 60 s, cycle time 300 s
    110 kW to 250 kW:
    Overload current
    1.5 x rated input current (i.e. 150 % overload capability) for 1 s, and 1.1 x rated input current (i.e. 110 % overload capability) for 59 s, cycle time 300 s
- Overvoltage/undervoltage protection
- Inverter overtemperature protection
- Special direct connection for PTC or KTY to protect the motor
- Earth fault protection
- Short circuit protection
- I^2t motor thermal protection
- Locked motor protection
- Stall prevention
- Parameter interlock.

Circuit Diagrams

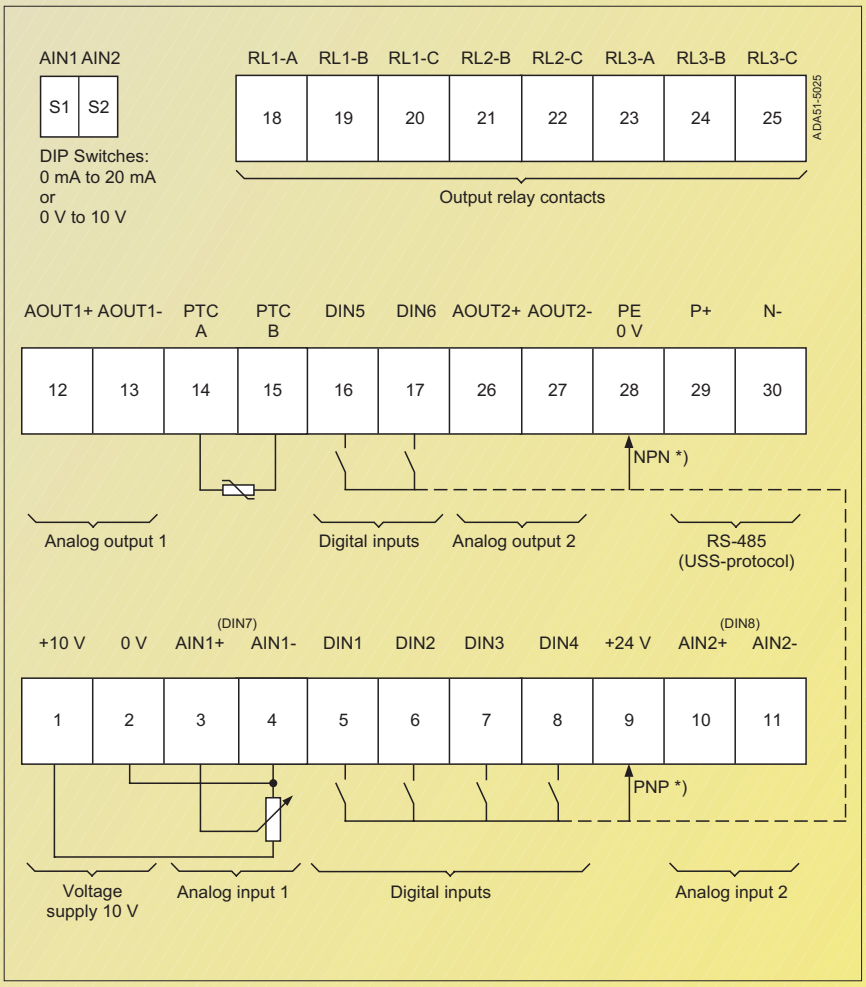
General Circuit Diagram



Terminal Connection Diagram

Example frame size FX

View A



*) PNP or NPN possible

Technical Data

MICROMASTER 440 Inverter

Input voltage and power ranges			**CT** (constant torque)	**VT** (variable torque)
		200 V to 240 V 1 AC ± 10 %	0.12 kW to 3 kW	–
		200 V to 240 V 3 AC ± 10 %	0.12 kW to 45 kW	5.5 kW to 45 kW
		380 V to 480 V 3 AC ± 10 %	0.37 kW to 200 kW	7.5 kW to 250 kW
		500 V to 600 V 3 AC ± 10 %	0.75 kW to 75 kW	1.5 kW to 90 kW
Input frequency		47 Hz to 63 Hz		
Output frequency		0 Hz to 650 Hz (in *V/f* mode)		
Power factor		≥ 0.95		
Inverter efficiency		96 % to 97 %		
Overload capability				
– CT operation	0.12 kW to 75 kW	Overload current 1.5 x rated output current (i.e. 150 % overload capability) for 60 s, cycle time 300 s, and 2 x rated output current (i.e. 200 % overload capability) for 3 s, cycle time 300 s		
	90 kW to 200 kW	Overload current 1.36 x rated output current (i.e. 136 % overload capability) for 57 s, cycle time 300 s, and 1.6 x rated output current (i.e. 160 % overload capability) for 3 s, cycle time 300 s		
– VT operation	5.5 kW to 90 kW	Overload current 1.4 x rated input current (i.e. 140 % overload capability) for 3 s and 1.1 x rated input current (i.e. 110 % overload capability) for 60 s, cycle time 300 s		
	110 kW to 250 kW	Overload current 1.5 x rated input current (i.e. 150 % overload capability) for 1 s and 1.1 x rated input current (i.e. 110 % overload capability) for 59 s, cycle time 300 s		
Inrush current		less than rated input current		
Control method		Vector control, torque control, linear *V/f*; quadratic *V/f* characteristic; multipoint characteristic (programmable *V/f* characteristic); flux current control (FCC)		
PWM frequency	0.12 kW to 75 kW	4 kHz (standard); 16 kHz (standard with 230 V inverters 0.12 kW to 5.5 kW) 2 kHz to 16 kHz (in 2 kHz steps)		
	90 kW to 200 kW	2 kHz (standard with VT mode); 4 kHz (standard with CT mode) 2 kHz to 8 kHz (in 2 kHz steps)		
Fixed frequencies		15, programmable		
Skip frequency bands		4, programmable		
Setpoint resolution		0.01 Hz digital 0.01 Hz serial 10 bit analog		
Digital inputs		6 fully programmable isolated digital inputs; switchable PNP/NPN		
Analog inputs		2 programmable analog inputs • 0 V to 10 V, 0 mA to 20 mA and –10 V to +10 V (AIN1) • 0 V to 10 V and 0 mA to 20 mA (AIN2) • both can be used as 7th/8th digital input		
Relay outputs		3, programmable, 30 V DC/5 A (resistive), 250 V AC/2 A (inductive)		
Analog inputs		2, programmable (0/4 mA to 20 mA)		
Serial interfaces		RS-485, optional RS-232		
Motor cable length				
0.12 – 75 kW	without output choke	max. 50 m (shielded), max. 100 m (unshielded)		
	with output choke	max. 200 m (shielded), max. 300 m (unshielded)		
90 – 250 kW	without output choke	max. 100 m (shielded), max. 150 m (unshielded)		
	with output choke	in preparation		
Electromagnetic compatibility	0.12 kW to 75 kW	Optional EMC filters to EN 55 011, Class A or Class B (for frame sizes A, B, C), Inverter with internal filter Class A available (frame sizes A, B, C, D, E, F)		
Braking		Resistance braking with DC braking, compound braking, integral brake chopper (integral brake chopper only with 0.12 kW to 75 kW inverters)		
Protection level		IP 20		
Temperature range (without derating)	0.12 kW to 75 kW	–10 °C to +50 °C (CT) –10 °C to +40 °C (VT)		
	90 kW to 200 kW	0 °C to +40 °C		
Storage temperature		–40 °C to +70 °C		
Humidity		95% (non-condensing)		
Operational altitudes	0.12 kW to 75 kW	up to 1000 m above sea level without derating		
	90 kW to 200 kW	up to 2000 m above sea level without derating		
Protection features for		under-voltage, over-voltage, overload, earth faults, short circuits, stall prevention, locked motor, motor over-temperature, inverter over-temperature, parameter PIN protection		
Conformity with standards		ul, cul, CE, c-tick		
CE marking		Conformity with EC low voltage directive 73/23/EC filtered versions also with electromagnetic compatibility directive 89/336/EC		
Dimensions and weights (without options)		Frame size (FS)	H x W x D, max. (mm)	Weight, approx. (kg)
		A	173 x 73 x 149	1.3
		B	202 x 149 x 172	3.4
		C	245 x 185 x 195	5.7
		D	520 x 275 x 245	17
		E	650 x 275 x 245	22
		F without filter	850 x 350 x 320	56
		F with filter	1150 x 350 x 320	75
		FX	1555 x 330 x 360	110
		GX	1875 x 330 x 560	190

Derating Data

Pulse frequency

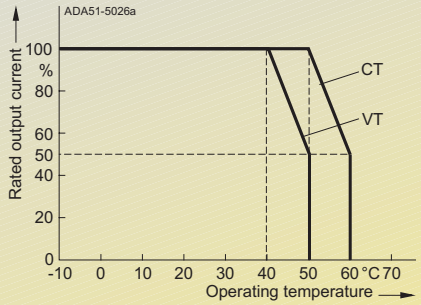
Rated output	Rated output current in A for a pulse frequency of						
kW	4 kHz	6 kHz	8 kHz	10 kHz	12 kHz	14 kHz	16 kHz
Mains operating voltage 200 V 1/3 AC							
0.12 to 5.5	Values correspond to the 4-kHz standard values. No derating, since 16 kHz standard.						
7.5	28.0	26.6	25.2	22.4	19.6	16.8	14.0
11	42.0	37.8	33.6	29.4	25.2	21.0	16.8
15	54.0	48.6	43.2	37.8	32.4	27.0	21.6
18.5	68.0	64.6	61.2	54.4	47.6	40.8	34.0
22	80.0	72.0	64.0	56.0	48.0	40.0	32.0
30	104.0	91.0	78.0	70.2	62.4	57.2	52.0
37	130.0	113.8	97.5	87.8	78.0	71.5	65.0
45	154.0	134.8	115.5	104.0	92.4	84.7	77.0
Mains operating voltage 400 V 3 AC							
0.37	1.3	1.3	1.3	1.3	1.3	1.2	1.0
0.55	1.7	1.7	1.7	1.6	1.5	1.4	1.2
0.75	2.2	2.2	2.2	2.0	1.8	1.5	1.3
1.1	3.1	2.9	2.8	2.5	2.2	1.9	1.6
1.5	4.1	3.7	3.3	2.9	2.5	2.1	1.6
2.2	5.9	5.6	5.3	4.7	4.1	3.5	3.0
3.0	7.7	6.9	6.2	5.4	4.6	3.9	3.1
4.0	10.2	9.2	8.2	7.1	6.1	5.1	4.1
5.5	13.2	11.9	10.6	9.2	7.9	6.6	5.3
7.5	19.0	18.1	17.1	15.2	13.3	11.4	9.5
11.0	26.0	23.4	20.8	18.2	15.6	13.0	10.4
15.0	32.0	30.4	28.8	25.6	22.4	19.2	16.0
18.5	38.0	34.2	30.4	26.6	22.8	19.0	15.2
22	45.0	40.5	36.0	31.5	27.0	22.5	18.0
30	62.0	58.9	55.8	49.6	43.4	37.2	31.0
37	75.0	67.5	60.0	52.5	45.0	37.5	30.0
45	90.0	76.5	63.0	51.8	40.5	33.8	27.0
55	110.0	93.5	77.0	63.3	49.5	41.3	33.0
75	145.0	112.4	79.8	68.9	58.0	50.8	43.5
90	178.0	131.5	101.1	–	–	–	–
110	205.0	151.4	116.5	–	–	–	–
132	250.0	184.7	142.1	–	–	–	–
160	302.0	223.1	171.6	–	–	–	–
200	370.0	273.3	210.2	–	–	–	–
Mains operating voltage 500 V 3 AC							
0.75	1.4	1.2	1.0	0.8	0.7	0.6	0.6
1.5	2.7	2.2	1.6	1.4	1.1	0.9	0.8
2.2	3.9	2.9	2.0	1.6	1.2	1.0	0.8
4.0	6.1	4.6	3.1	2.4	1.8	1.5	1.2
5.5	9.0	6.8	4.5	3.6	2.7	2.3	1.8
7.5	11.0	8.8	6.6	5.5	4.4	3.9	3.3
11.0	17.0	12.8	8.5	6.8	5.1	4.3	3.4
15.0	22.0	17.6	13.2	11.0	8.8	7.7	6.6
18.5	27.0	20.3	13.5	10.8	8.1	6.8	5.4
22	32.0	24.0	16.0	12.8	9.6	8.0	6.4
30	41.0	32.8	24.6	20.5	16.4	14.4	12.3
37	52.0	39.0	26.0	20.8	15.6	13.0	10.4
45	62.0	52.7	43.4	40.3	37.2	32.6	27.9
55	77.0	67.4	57.8	52.0	46.2	42.4	38.5
75	99.0	84.2	69.3	64.4	59.4	52.0	44.6

Technical Data

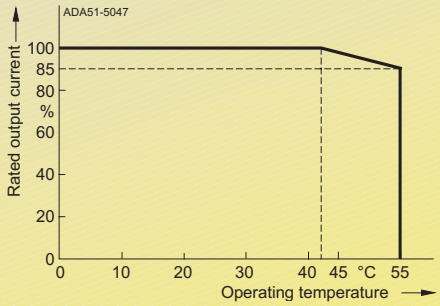
Derating Data (continued)

Operating temperature

Inverter 0.12 kW to 0.75 kW



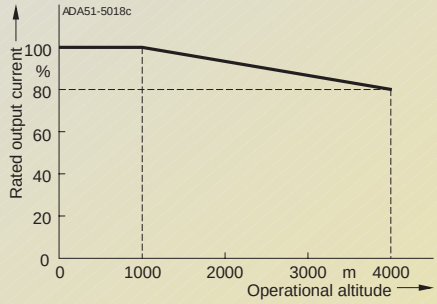
Inverter 90 kW to 200 kW



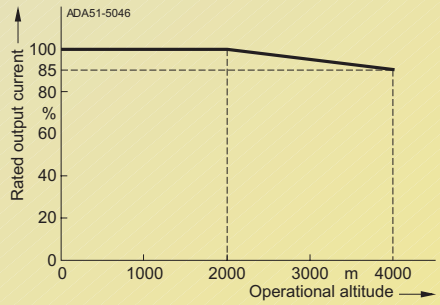
Installation height above sea level

Permissible output current
in % of the rated output current

Inverter 0.12 kW to 75 kW

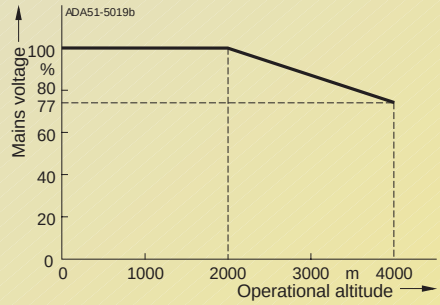


Inverter 90 kW to 200 kW

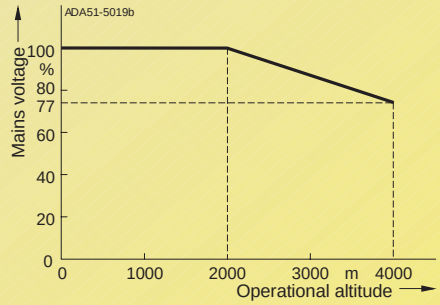


Permissible mains voltage
in % of the max. possible mains voltage

Inverter 0.12 kW to 75 kW



Inverter 90 kW to 200 kW



4

MICROMASTER 440 Inverter without filter

CT (constant torque)				VT (variable torque)				MICROMASTER 440 without filter		
Rated output		Rated input current [1]	Rated output current	Rated output		Rated input current [1]	Rated output current	Frame size	weight approx.	Order No.
kW	hp	A	A	kW	hp	A	A	(FS)	kg	
Mains operating voltage 200 V to 240 V 1 AC										
0.12	0.16	1.4	0.9	–	–	–	–	A	1.3	**6SE6440-2UC11-2AA1**
0.25	0.33	2.7	1.7	–	–	–	–	A	1.3	**6SE6440-2UC12-5AA1**
0.37	0.50	3.7	2.3	–	–	–	–	A	1.3	**6SE6440-2UC13-7AA1**
0.55	0.75	5.0	3.0	–	–	–	–	A	1.3	**6SE6440-2UC15-5AA1**
0.75	1.0	6.6	3.9	–	–	–	–	A	1.3	**6SE6440-2UC17-5AA1**
1.1	1.5	9.6	5.5	–	–	–	–	B	3.3	**6SE6440-2UC21-1BA1**
1.5	2	13.0	7.4	–	–	–	–	B	3.3	**6SE6440-2UC21-5BA1**
2.2	3	17.6	10.4	–	–	–	–	B	3.3	**6SE6440-2UC22-2BA1**
3.0	4	23.7	13.6	–	–	–	–	C	5.5	**6SE6440-2UC23-0CA1**
Mains operating voltage 200 V to 240 V 3 AC										
0.12	0.16	0.6	0.9	–	–	–	–	A	1.3	**6SE6440-2UC11-2AA1**
0.25	0.33	1.1	1.7	–	–	–	–	A	1.3	**6SE6440-2UC12-5AA1**
0.37	0.50	1.6	2.3	–	–	–	–	A	1.3	**6SE6440-2UC13-7AA1**
0.55	0.75	2.1	3.0	–	–	–	–	A	1.3	**6SE6440-2UC15-5AA1**
0.75	1.0	2.9	3.9	–	–	–	–	A	1.3	**6SE6440-2UC17-5AA1**
1.1	1.5	4.1	5.5	–	–	–	–	B	3.3	**6SE6440-2UC21-1BA1**
1.5	2.0	5.6	7.4	–	–	–	–	B	3.3	**6SE6440-2UC21-5BA1**
2.2	3.0	7.6	10.4	–	–	–	–	B	3.3	**6SE6440-2UC22-2BA1**
3.0	4.0	10.5	13.6	–	–	–	–	C	5.5	**6SE6440-2UC23-0CA1**
4.0	5.0	13.1	17.5	**5.5**	7.5	17.6	22	C	5.5	**6SE6440-2UC24-0CA1**
5.5	7.5	17.5	22	**7.5**	10	26.5	28	C	5.5	**6SE6440-2UC25-5CA1**
7.5	10	25.3	28	**11.0**	15	38.4	42	D	17	**6SE6440-2UC27-5DA1**
11.0	15	37.0	42	**15.0**	20	50.3	54	D	16	**6SE6440-2UC31-1DA1**
15.0	20	48.8	54	**18.5**	25	61.5	68	D	16	**6SE6440-2UC31-5DA1**
18.5	25	61.0	68	**22**	30	70.8	80	E	20	**6SE6440-2UC31-8EA1**
22	30	69.4	80	**30**	40	96.2	104	E	20	**6SE6440-2UC32-2EA1**
30	40	94.1	104	**37**	50	114.1	130	F	55	**6SE6440-2UC33-0FA1**
37	50	110.6	130	**45**	60	134.9	154	F	55	**6SE6440-2UC33-7FA1**
45	60	134.9	154	–	–	–	–	F	55	**6SE6440-2UC34-5FA1**
Mains operating voltage 380 V to 480 V 3 AC										
0.37	0.50	1.1	1.3	–	–	–	–	A	1.3	**6SE6440-2UD13-7AA1**
0.55	0.75	1.4	1.7	–	–	–	–	A	1.3	**6SE6440-2UD15-5AA1**
0.75	1.0	1.9	2.2	–	–	–	–	A	1.3	**6SE6440-2UD17-5AA1**
1.1	1.5	2.8	3.1	–	–	–	–	A	1.3	**6SE6440-2UD21-1AA1**
1.5	2.0	3.9	4.1	–	–	–	–	A	1.3	**6SE6440-2UD21-5AA1**
2.2	3.0	5.0	5.9	–	–	–	–	B	3.3	**6SE6440-2UD22-2BA1**
3.0	4.0	6.7	7.7	–	–	–	–	B	3.3	**6SE6440-2UD23-0BA1**
4.0	5.0	8.5	10.2	–	–	–	–	B	3.3	**6SE6440-2UD24-0BA1**
5.5	7.5	11.6	13.2	**7.5**	10	16.0	19	C	5.5	**6SE6440-2UD25-5CA1**
7.5	10	15.4	19	**11.0**	15	22.5	26	C	5.5	**6SE6440-2UD27-5CA1**
11.0	15	22.5	26	**15.0**	20	30.5	32	C	5.5	**6SE6440-2UD31-1CA1**
15.0	20	30.0	32	**18.5**	25	37.2	38	D	16	**6SE6440-2UD31-5DA1**
18.5	25	36.6	38	**22**	30	43.3	45	D	16	**6SE6440-2UD31-8DA1**
22	30	43.1	45	**30**	40	59.3	62	D	16	**6SE6440-2UD32-2DA1**
30	40	58.7	62	**37**	50	71.7	75	E	20	**6SE6440-2UD33-0EA1**
37	50	71.2	75	**45**	60	86.6	90	E	20	**6SE6440-2UD33-7EA1**
45	60	85.6	90	**55**	75	103.6	110	F	56	**6SE6440-2UD34-5FA1**
55	75	103.6	110	**75**	100	138.5	145	F	56	**6SE6440-2UD35-5FA1**
75	100	138.5	145	**90**	125	168.5	178	F	56	**6SE6440-2UD37-5FA1**
90	125	168.5	178	**110**	150	204.5	205	FX	110	**6SE6440-2UD38-8FA0**
110	150	204.0	205	**132**	200	244.5	250	FX	110	**6SE6440-2UD41-1FA0**
132	200	244.5	250	**160**	250	296.4	302	GX	190	**6SE6440-2UD41-3GA0**
160	250	296.4	302	**200**	300	354.0	370	GX	190	**6SE6440-2UD41-6GA0**
200	300	354.0	370	**250**	350	442.0	477	GX	190	**6SE6440-2UD42-0GA0**

1) Additional conditions: input current at nominal working point, applies to short-circuit voltage of mains supply $V_k \geq 1$ % referred to rated inverter power and rated mains voltage of 240 V or 400 V or 500 V.

Selection and Ordering Data

MICROMASTER 440 Inverter without filter (continued)

CT (constant torque)				VT (variable torque)				MICROMASTER 440 without filter		
Rated output		Rated input current [1]	Rated output current	Rated output		Rated input current [1]	Rated output current	Frame size	weight approx.	Order No.
kW	hp	A	A	kW	hp	A	A	(FS)	kg	
Mains operating voltage 500 V to 600 V 3 AC										
0.75	1.0	2.0	1.4	**1.5**	2.0	3.2	2.7	C	5.5	**6SE6440-2UE17-5CA1**
1.5	2.0	3.2	2.7	**2.2**	3.0	4.4	3.9	C	5.5	**6SE6440-2UE21-5CA1**
2.2	3.0	4.4	3.9	**4.0**	5.0	6.9	6.1	C	5.5	**6SE6440-2UE22-2CA1**
4.0	5.0	6.9	6.1	**5.5**	7.5	9.4	9	C	5.5	**6SE6440-2UE24-0CA1**
5.5	7.5	9.4	9	**7.5**	10	12.6	11	C	5.5	**6SE6440-2UE25-5CA1**
7.5	10	12.3	11	**11.0**	15	18.1	17	C	5.5	**6SE6440-2UE27-5CA1**
11.0	15	18.1	17	**15.0**	20	24.9	22	C	5.5	**6SE6440-2UE31-1CA1**
15.0	20	24.2	22	**18.5**	25	29.8	27	D	16	**6SE6440-2UE31-5DA1**
18.5	25	29.5	27	**22**	30	35.1	32	D	16	**6SE6440-2UE31-8DA1**
22	30	34.7	32	**30**	40	47.5	41	D	16	**6SE6440-2UE32-2DA1**
30	40	47.2	41	**37**	50	57.9	52	E	20	**6SE6440-2UE33-0EA1**
37	50	57.3	52	**45**	60	69.4	62	E	20	**6SE6440-2UE33-7EA1**
45	60	69.0	62	**55**	75	83.6	77	F	56	**6SE6440-2UE34-5FA1**
55	75	82.9	77	**75**	100	113.4	99	F	56	**6SE6440-2UE35-5FA1**
75	100	113.4	99	**90**	120	137.6	125	F	56	**6SE6440-2UE37-5FA1**

See Appendix for note on ordering.

All MICROMASTER 440 inverters are supplied with a Status Display Panel SDP. A Basic Operator Panel BOP, Advanced Operator Panel AOP or other options have to be ordered additionally (see pages 4/14 to 4/20).

Motors for MICROMASTER 440

Catalog M 11 contains selection and ordering data for motors which are particularly suitable for operation with the MICROMASTER 440 inverters (see Appendix for overview).

1) Additional conditions: input current at nominal working point, applies to short-circuit voltage of mains supply $V_k \geq 1$ % referred to rated inverter power and rated mains voltage of 240 V or 400 V or 500 V.

MICROMASTER 440 Inverter with internal filter Class A

CT (constant torque)				VT (variable torque)				MICROMASTER 440 with internal filter Class A [2]		
Rated output		Rated input current [1]	Rated output current	Rated output		Rated input current [1]	Rated output current	Frame size	weight approx.	Order No.
kW	hp	A	A	kW	hp	A	A	(FS)	kg	
Mains operating voltage 200 V to 240 V 1 AC										
0.12	0.16	1.4	0.9	–	–	–	–	A	1.3	**6SE6440-2AB11-2AA1**
0.25	0.33	2.7	1.7	–	–	–	–	A	1.3	**6SE6440-2AB12-5AA1**
0.37	0.50	3.7	2.3	–	–	–	–	A	1.3	**6SE6440-2AB13-7AA1**
0.55	0.75	5.0	3.0	–	–	–	–	A	1.3	**6SE6440-2AB15-5AA1**
0.75	1.0	6.6	3.9	–	–	–	–	A	1.3	**6SE6440-2AB17-5AA1**
1.1	1.5	9.6	5.5	–	–	–	–	B	3.4	**6SE6440-2AB21-1BA1**
1.5	2	13.0	7.4	–	–	–	–	B	3.4	**6SE6440-2AB21-5BA1**
2.2	3	17.6	10.4	–	–	–	–	B	3.4	**6SE6440-2AB22-2BA1**
3.0	4	23.7	13.6	–	–	–	–	C	5.7	**6SE6440-2AB23-0CA1**
Mains operating voltage 200 V to 240 V 3 AC										
3.0	4.0	10.5	13.6	**4.0**	5.0	13.1	17.5	C	5.7	**6SE6440-2AC23-0CA1**
4.0	5.0	13.1	17.5	**5.5**	7.5	17.6	22	C	5.7	**6SE6440-2AC24-0CA1**
5.5	7.5	17.5	22.0	**7.5**	10.0	26.5	28	C	5.7	**6SE6440-2AC25-5CA1**
Mains operating voltage 380 V to 480 V 3 AC										
2.2	3.0	5.0	5.9	–	–	–	–	B	3.4	**6SE6440-2AD22-2BA1**
3.0	4.0	6.7	7.7	–	–	–	–	B	3.4	**6SE6440-2AD23-0BA1**
4.0	5.0	8.5	10.2	–	–	–	–	B	3.4	**6SE6440-2AD24-0BA1**
5.5	7.5	11.6	13.2	**7.5**	10	16.0	19	C	5.7	**6SE6440-2AD25-5CA1**
7.5	10	15.4	18.4	**11.0**	15	22.5	26	C	5.7	**6SE6440-2AD27-5CA1**
11.0	15	22.5	26	**15.0**	20	30.5	32	C	5.7	**6SE6440-2AD31-1CA1**
15.0	20	30.0	32	**18.5**	25	37.2	38	D	17	**6SE6440-2AD31-5DA1**
18.5	25	36.6	38	**22**	30	43.3	45	D	17	**6SE6440-2AD31-8DA1**
22	30	43.1	45	**30**	40	59.3	62	D	17	**6SE6440-2AD32-2DA1**
30	40	58.7	62	**37**	50	71.7	75	E	22	**6SE6440-2AD33-0EA1**
37	50	71.2	75	**45**	60	86.6	90	E	22	**6SE6440-2AD33-7EA1**
45	60	85.6	90	**55**	75	103.6	110	F	75	**6SE6440-2AD34-5FA1**
55	75	103.6	110	**75**	100	138.5	145	F	75	**6SE6440-2AD35-5FA1**
75	100	138.5	145	**90**	125	168.5	178	F	75	**6SE6440-2AD37-5FA1**

See Appendix for note on ordering.

All MICROMASTER 440 inverters are supplied with a Status Display Panel SDP. A Basic Operator Panel BOP, Advanced Operator Panel AOP or other options have to be ordered additionally (see pages 4/14 to 4/20).

Motors for MICROMASTER 440

Catalog M 11 contains selection and ordering data for motors which are particularly suitable for operation with the MICROMASTER 440 inverters (see Appendix for overview).

1) Additional conditions: input current at nominal working point, applies to short-circuit voltage of mains supply $V_k \geq 1$ % referred to rated inverter power and rated mains voltage of 240 V or 400 V.

2) Use of MICROMASTER inverters with internal filter is not permissible on non-grounded mains supplies.

Options

Variant Dependent Options

EMC filter, Class A

Filter for inverters without an internal filter, for

- 200 V to 240 V 3 AC, frame sizes A and B
- 380 V to 480 V 3 AC, frame size A.

All other inverters can be supplied with an internal filter Class A.

The requirements are fulfilled using shielded cables with a max. length of 25 m.

EMC filter, Class B

Filter for inverters without an internal filter, for

- 200 V to 240 V 3 AC, frame sizes A and B
- 380 V to 480 V 3 AC, frame size A.

With this filter, the inverter complies with the emission standard EN 55 011, Class B.

The requirements are fulfilled using shielded cables with a max. length of 25 m.

Additional EMC filter, Class B

Obtainable for inverters with an internal EMC filter Class A, frame sizes A, B, C.

With this filter, the inverter complies with the emission standard EN 55 011, Class B.

The requirements are fulfilled using shielded cables with a max. length of 25 m.

Class B filter with low leakage currents

EMC filter for 200 V to 240 V 1 AC inverters, frame sizes A and B, without an internal EMC filter Class A.

With this filter, the inverter complies with the emission standard EN 55 011, Class B. Leakage currents are reduced to < 3.5 mA.

The requirements are fulfilled using shielded cables with a max. length of 5 m.

Leakage currents:

The leakage currents of the inverters with/without filter (internal/external) may exceed 30 mA. Typical values in practice are between 10 mA and 50 mA. The exact values depend on the design, environment and cable lengths. Interference-free operation with residual current operated devices with a trigger value of 30 mA cannot be guaranteed. However, operation with residual current operated devices with a trigger value of 300 mA is possible. Please refer to the Instruction Manual for details.

Line commutating choke

Line commutating chokes are used to smooth voltage peaks or to bridge commutating dips. In addition, line commutating chokes reduce the effects of harmonics on the inverter and the power supply. If the line impedance is < 1 %, a line commutating choke must be used in order to reduce the current peaks.

In line with the EN 61 000-3-2 regulations “Limits for harmonic currents with device input current ≤ 16 A per phase”, there are special aspects for drives with 250 W to 550 W and 230-V single-phase supplies which can be used in non-industrial applications (1st environment).

For devices with 250 W and 370 W it is necessary either to fit the recommended input chokes or to apply to the power utility company for authorization to connect the devices to the public power supply.
No limits are currently defined in the EN 61 000-3-2 standard for professionally used devices with a connected load > 1 kW. This means that the inverters with an output power ≥ 0.75 kW comply with the EN 61 000-3-2 standard.

Output choke

Output chokes can be supplied for reducing the capacitive currents and d*V*/dt in the case of motor cables > 50 m (shielded) or > 100 m (unshielded).

Gland plate

Gland plates are available for inverters with frame sizes A, B and C. In frame sizes D and above, the gland plates are integrated.

The gland plate enables shielded connection of the power and control cables, ensuring optimum EMC performance. This action ensures compliance with the NEMA 1 directive.

Variant Independent Options

Basic Operator Panel (BOP)

With the BOP, individual parameter settings can be made. Values and units are shown on a 5-digit display.

Basic Operator Panel (BOP)

A BOP can be used for several inverters. It can be directly mounted on the inverter or in a control-cabinet door using a mounting kit.

Advanced Operator Panel (AOP)

The AOP enables MICROMASTER 440 parameter sets to be easily read and modified. In contrast to the BOP, the value and meaning of the parameters can be directly displayed in several languages by fast scrolling of the address.

Advanced Operator Panel (AOP)

The AOP is directly plugged into the inverter, or communicates with the latter via a door mounting kit. Together with the "AOP door mounting kit for multiple inverter control", the AOP permits bus communication with up to 30 inverters at a transmission rate of 38 kbaud (RS485, USS).

For servicing purposes, the AOP furthermore supports the download & upread of complete parameter sets.

The innovative AOP (Order No. 6SE6400-0AP00-0AA1) is required to access all parameters of the MICROMASTER 440.

PROFIBUS module

For a complete PROFIBUS connection with up to 12 Mbaud. Remote control of the inverter is possible with the PROFIBUS module. Remote control and operation at the inverter can be combined using an operator panel – plugged onto the PROFIBUS module. The latter can be supplied by an external 24 V DC power supply and is thus also active when the inverter is disconnected from the mains.

Connection by means of a 9-pin Sub-D connector (available as an accessory).

DeviceNet module

For networking the inverters to the DeviceNet fieldbus system widely used on the American market. A max. transmission rate of 500 kbaud is possible. Remote control of the module is possible via the DeviceNet module. Remote control and operation on the inverter can be combined using an operator panel connected to the DeviceNet module.

The connection to the DeviceNet bus system is made using a 5-pin connector with terminal strip.

Pulse encoder evaluation module

The pulse encoder evaluation module permits direct connection of the most widely encountered digital pulse encoders to the inverter.

They offer the following functions:

- Zero speed at full load torque
- Extremely accurate speed control
- Increased dynamic response of speed and torque control.

This module can be used with HTL and TTL pulse encoders (High-voltage Transistor Logic, 24 V and Transistor-transistor Logic, 5 V).

Connection set for PC to inverter

For controlling an inverter directly from a PC if the appropriate software has been installed (e.g. STARTER) in the PC. Isolated RS-232 adapter board for reliable point-to-point connection to a PC. Includes a Sub-D connector and an RS-232 standard cable (3 m).

Connection set for PC to AOP

For connecting a PC to an AOP. Offline programming of inverters and archiving of parameter sets possible. Includes a desktop attachment kit for an AOP, an RS-232 standard cable (3 m) with Sub-D connectors and a universal power supply unit.

BOP/AOP door mounting kit for single inverter control

For mounting an operator panel in a control cabinet door. Degree of protection is IP 56. Contains a cable adapter board with screwless terminals for use with the user's own cables.

AOP door mounting kit for multiple inverter control (USS)

For mounting an AOP in a control cabinet door. Degree of protection IP 56. The AOP can communicate with several inverters by means of the RS-485 USS protocol. The 4-pin connecting cable from the AOP to the RS-485 terminals of the inverter and to the 24 V user terminal strip is not included.

Commissioning tools

- STARTER
  Starter is graphic start-up software for guided commissioning for MICROMASTER 410/420/430/440 frequency inverters under Windows NT/2000. Parameter lists can be read out, altered, stored, entered and printed.
- DriveMonitor
  DriveMonitor is start-up software for list-oriented programming of frequency inverters under Windows 95/98/NT/2000.

Both programs are included on the Docu CD which is provided with every inverter.

Options

Ordering Data for Variant Dependent Options

The options listed here (filters, chokes, brake resistors, gland plates, fuses and circuit breakers) are inverter specific.

The inverter and the associated options have the same voltage ratings.

All options are certified to UL, except fuses. The fuses 3NE1 comply with UL (corresponds to VDE).

Mains operating voltage	Rated output kW	Inverter **without** filter	Order No. of the options **EMC filter Class A**	**EMC filter Class B**	**Filter Class B with low leakage**
200 V to 240 V 1 AC	0.12	6SE6440-2UC11-2AA1	–	–	**6SE6400-2FL01-0AB0**
	0.25	6SE6440-2UC12-5AA1	–	–	
	0.37	6SE6440-2UC13-7AA1	–	–	
	0.55	6SE6440-2UC15-5AA1	–	–	
	0.75	6SE6440-2UC17-5AA1	–	–	
	1.1	6SE6440-2UC21-1BA1	–	–	**6SE6400-2FL02-6BB0**
	1.5	6SE6440-2UC21-5BA1	–	–	
	2.2	6SE6440-2UC22-2BA1	–	–	
	3.0	6SE6440-2UC23-0CA1	–	–	–
200 V to 240 V 3 AC	0.12	6SE6440-2UC11-2AA1	**6SE6400-2FA00-6AD0**	**6SE6400-2FB00-6AD0**	–
	0.25	6SE6440-2UC12-5AA1			–
	0.37	6SE6440-2UC13-7AA1			–
	0.55	6SE6440-2UC15-5AA1			–
	0.75	6SE6440-2UC17-5AA1			–
	1.1	6SE6440-2UC21-1BA1	**6SE6400-2FA01-4BC0**	**6SE6400-2FB01-4BC0**	–
	1.5	6SE6440-2UC21-5BA1			–
	2.2	6SE6440-2UC22-2BA1			–
	3.0	6SE6440-2UC23-0CA1	–	–	–
	4.0	6SE6440-2UC24-0CA1	–	–	–
	5.5	6SE6440-2UC25-5CA1	–	–	–
	7.5	6SE6440-2UC27-5DA1	–	–	–
	11.0	6SE6440-2UC31-1DA1	–	–	–
	15.0	6SE6440-2UC31-5DA1	–	–	–
	18.5	6SE6440-2UC31-8EA1	–	–	–
	22	6SE6440-2UC32-2EA1	–	–	–
	30	6SE6440-2UC33-0FA1	–	–	–
	37	6SE6440-2UC33-7FA1	–	–	–
	45	6SE6440-2UC34-5FA1	–	–	–
380 V to 480 V 3 AC	0.37	6SE6440-2UD13-7AA1	**6SE6400-2FA00-6AD0**	**6SE6400-2FB00-6AD0**	–
	0.55	6SE6440-2UD15-5AA1			–
	0.75	6SE6440-2UD17-5AA1			–
	1.1	6SE6440-2UD21-1AA1			–
	1.5	6SE6440-2UD21-5AA1			–
	2.2	6SE6440-2UD22-2BA1	–	–	–
	3.0	6SE6440-2UD23-0BA1	–	–	–
	4.0	6SE6440-2UD24-0BA1	–	–	–
	5.5	6SE6440-2UD25-5CA1	–	–	–
	7.5	6SE6440-2UD27-5CA1	–	–	–
	11.0	6SE6440-2UD31-1CA1	–	–	–
	15.0	6SE6440-2UD31-5DA1	–	–	–
	18.5	6SE6440-2UD31-8DA1	–	–	–
	22	6SE6440-2UD32-2DA1	–	–	–
	30	6SE6440-2UD33-0EA1	–	–	–
	37	6SE6440-2UD33-7EA1	–	–	–
	45	6SE6440-2UD34-5FA1	–	–	–
	55	6SE6440-2UD35-5FA1	–	–	–
	75	6SE6440-2UD37-5FA1	–	–	–
	90	6SE6440-2UD38-8FA0	On request	–	–
	110	6SE6440-2UD41-1FA0		–	–
	132	6SE6440-2UD41-3GA0		–	–
	160	6SE6440-2UD41-6GA0		–	–
	200	6SE6440-2UD42-0GA0		–	–
500 V to 600 V 3 AC	0.75	6SE6440-2UE17-5CA1	–	–	–
	1.5	6SE6440-2UE21-5CA1	–	–	–
	2.2	6SE6440-2UE22-2CA1	–	–	–
	4.0	6SE6440-2UE24-0CA1	–	–	–
	5.5	6SE6440-2UE25-5CA1	–	–	–
	7.5	6SE6440-2UE27-5CA1	–	–	–
	11.0	6SE6440-2UE31-1CA1	–	–	–
	15.0	6SE6440-2UE31-5DA1	–	–	–
	18.5	6SE6440-2UE31-8DA1	–	–	–
	22	6SE6440-2UE32-2DA1	–	–	–
	30	6SE6440-2UE33-0EA1	–	–	–
	37	6SE6440-2UE33-7EA1	–	–	–
	45	6SE6440-2UE34-5FA1	–	–	–
	55	6SE6440-2UE35-5FA1	–	–	–
	75	6SE6440-2UE37-5FA1	–	–	–

Ordering Data for Variant Dependent Options (continued)

Mains operating voltage	Rated output kW	Inverter **without** filter	Order No. of the options **Line commutating choke**	**Output choke**	**Brake resistor**
200 V to 240 V 1 AC	0.12	6SE6440-2UC11-2AA1	**6SE6400-3CC00-4AB0**	**6SE6400-3TC00-4AD0**	**6SE6400-4BC05-0AA0**
	0.25	6SE6440-2UC12-5AA1			
	0.37	6SE6440-2UC13-7AA1	**6SE6400-3CC01-0AB0**		
	0.55	6SE6440-2UC15-5AA1			
	0.75	6SE6440-2UC17-5AA1			
	1.1	6SE6440-2UC21-1BA1	**6SE6400-3CC02-6BB0**	**6SE6400-3TC01-0BD0**	**6SE6400-4BC11-2BA0**
	1.5	6SE6440-2UC21-5BA1			
	2.2	6SE6440-2UC22-2BA1			
	3.0	6SE6440-2UC23-0CA1	**6SE6400-3CC03-5CB0**	**6SE6400-3TC03-2CD0**	**6SE6400-4BC12-5CA0**
200 V to 240 V 3 AC	0.12	6SE6440-2UC11-2AA1	**6SE6400-3CC00-3AC0**	**6SE6400-3TC00-4AD0**	**6SE6400-4BC05-0AA0**
	0.25	6SE6440-2UC12-5AA1			
	0.37	6SE6440-2UC13-7AA1	**6SE6400-3CC00-5AC0**		
	0.55	6SE6440-2UC15-5AA1			
	0.75	6SE6440-2UC17-5AA1			
	1.1	6SE6440-2UC21-1BA1	**6SE6400-3CC00-8BC0**	**6SE6400-3TC01-0BD0**	**6SE6400-4BC11-2BA0**
	1.5	6SE6440-2UC21-5BA1	**6SE6400-3CC01-4BD0**		
	2.2	6SE6440-2UC22-2BA1			
	3.0	6SE6440-2UC23-0CA1	**6SE6400-3CC01-7CC0**	**6SE6400-3TC03-2CD0**	**6SE6400-4BC12-5CA0**
	4.0	6SE6440-2UC24-0CA1	**6SE6400-3CC03-5CD0**		**6SE6400-4BC13-0CA0**
	5.5	6SE6440-2UC25-5CA1			
	7.5	6SE6440-2UC27-5DA1	**6SE6400-3CC05-2DD0**	**6SE6400-3TC02-8DC0**	**6SE6400-4BC18-0DA0**
	11.0	6SE6440-2UC31-1DA1		**6SE6400-3TC05-4DD0**	
	15.0	6SE6440-2UC31-5DA1			
	18.5	6SE6440-2UC31-8EA1	**6SE6400-3CC08-8EC0**	**6SE6400-3TC08-0ED0**	**6SE6400-4BC21-2EA0**
	22	6SE6440-2UC32-2EA1			
	30	6SE6440-2UC33-0FA1	**6SE6400-3CC11-7FD0**	**6SE6400-3TC15-4FD0**	**6SE6400-4BC22-5FA0**
	37	6SE6440-2UC33-7FA1			
	45	6SE6440-2UC34-5FA1			
380 V to 480 V 3 AC	0.37	6SE6440-2UD13-7AA1	**6SE6400-3CC00-2AD0**	**6SE6400-3TC00-4AD0**	**6SE6400-4BD11-0AA0**
	0.55	6SE6440-2UD15-5AA1			
	0.75	6SE6440-2UD17-5AA1	**6SE6400-3CC00-4AD0**		
	1.1	6SE6440-2UD21-1AA1			
	1.5	6SE6440-2UD21-5AA1	**6SE6400-3CC00-6AD0**		
	2.2	6SE6440-2UD22-2BA1	**6SE6400-3CC01-0BD0**	**6SE6400-3TC01-0BD0**	**6SE6400-4BD12-0BA0**
	3.0	6SE6440-2UD23-0BA1			
	4.0	6SE6440-2UD24-0BA1	**6SE6400-3CC01-4BD0**		
	5.5	6SE6440-2UD25-5CA1	**6SE6400-3CC02-2CD0**	**6SE6400-3TC03-2CD0**	**6SE6400-4BD16-5CA0**
	7.5	6SE6440-2UD27-5CA1			
	11.0	6SE6440-2UD31-1CA1	**6SE6400-3CC03-5CD0**		
	15.0	6SE6440-2UD31-5DA1	**6SE6400-3CC04-4DD0**	**6SE6400-3TC05-4DD0**	**6SE6400-4BD21-2DA0**
	18.5	6SE6440-2UD31-8DA1		**6SE6400-3TC03-8DD0**	
	22	6SE6440-2UD32-2DA1	**6SE6400-3CC05-2DD0**	**6SE6400-3TC05-4DD0**	
	30	6SE6440-2UD33-0EA1	**6SE6400-3CC08-3ED0**	**6SE6400-3TC08-0ED0**	**6SE6400-4BD22-2EA0**
	37	6SE6440-2UD33-7EA1		**6SE6400-3TC07-5ED0**	
	45	6SE6440-2UD34-5FA1	**6SE6400-3CC11-2FD0**	**6SE6400-3TC14-5FD0**	**6SE6400-4BD24-0FA0**
	55	6SE6440-2UD35-5FA1		**6SE6400-3TC15-4FD0**	
	75	6SE6440-2UD37-5FA1	**6SE6400-3CC11-7FD0**	**6SE6400-3TC14-5FD0**	
	90	6SE6440-2UD38-8FA0	**6SL3000-0CE32-3AA0**	in preparation	–
	110	6SE6440-2UD41-1FA0	**6SL3000-0CE32-8AA0**		–
	132	6SE6440-2UD41-3GA0	**6SL3000-0CE33-3AA0**		–
	160	6SE6440-2UD41-6GA0	**6SL3000-0CE35-1AA0**		–
	200	6SE6440-2UD42-0GA0			–
500 V to 600 V 3 AC	0.75	6SE6440-2UE17-5CA1	–	**6SE6400-3TC03-2CD0**	**6SE6400-4BE14-5CA0**
	1.5	6SE6440-2UE21-5CA1	–		
	2.2	6SE6440-2UE22-2CA1	–		
	4.0	6SE6440-2UE24-0CA1	–		
	5.5	6SE6440-2UE25-5CA1	–		
	7.5	6SE6440-2UE27-5CA1	–		**6SE6400-4BE16-5CA0**
	11.0	6SE6440-2UE31-1CA1	–		
	15.0	6SE6440-2UE31-5DA1	**6SE6400-3CC04-4DD0**	**6SE6400-3TC02-2DE0**	**6SE6400-4BE21-3DA0**
	18.5	6SE6440-2UE31-8DA1		**6SE6400-3TC02-7DE0**	
	22	6SE6440-2UE32-2DA1		**6SE6400-3TC03-2DE0**	
	30	6SE6440-2UE33-0EA1	**6SE6400-3CC08-3ED0**	**6SE6400-3TC05-2EE0**	**6SE6400-4BE21-8EA0**
	37	6SE6440-2UE33-7EA1			
	45	6SE6440-2UE34-5FA1	**6SE6400-3CC11-2FD0**	**6SE6400-3TC06-2FE0**	**6SE6400-4BE24-2FA0**
	55	6SE6440-2UE35-5FA1		**6SE6400-3TC08-8FE0**	
	75	6SE6440-2UE37-5FA1			

Options

Ordering Data for Variant Dependent Options (continued)

● Use in America requires ⓊⓁ-listed fuses such as e.g. the Class NON range from Bussmann.

Mains operating voltage	Rated output kW	Inverter **without** filter	Order No. of the options **Gland plate**	**Fuse** (see Catalog NS K) **3NA3**	**3NE1 (ⓊⓁ)**	**Circuit-breakers** (see Catalog NS K)
200 V to 240 V 1 AC	0.12	6SE6440-2UC11-2AA1	**6SE6400-0GP00-0AA0**	**3NA3803**	●	**3RV1021-1DA10**
	0.25	6SE6440-2UC12-5AA1				**3RV1021-1GA10**
	0.37	6SE6440-2UC13-7AA1				**3RV1021-1HA10**
	0.55	6SE6440-2UC15-5AA1		**3NA3805**		**3RV1021-1KA10**
	0.75	6SE6440-2UC17-5AA1				**3RV1021-4AA10**
	1.1	6SE6440-2UC21-1BA1	**6SE6400-0GP00-0BA0**	**3NA3807**		**3RV1021-4BA10**
	1.5	6SE6440-2UC21-5BA1				**3RV1031-4EA10**
	2.2	6SE6440-2UC22-2BA1		**3NA3810**		**3RV1031-4FA10**
	3.0	6SE6440-2UC23-0CA1	**6SE6400-0GP00-0CA0**	**3NA3812**		**3RV1031-4HA10**
200 V to 240 V 3 AC	0.12	6SE6440-2UC11-2AA1	**6SE6400-0GP00-0AA0**	**3NA3803**	●	**3RV1021-1BA10**
	0.25	6SE6440-2UC12-5AA1				**3RV1021-1DA10**
	0.37	6SE6440-2UC13-7AA1				**3RV1021-1FA10**
	0.55	6SE6440-2UC15-5AA1		**3NA3805**		**3RV1021-1GA10**
	0.75	6SE6440-2UC17-5AA1				**3RV1021-1HA10**
	1.1	6SE6440-2UC21-1BA1	**6SE6400-0GP00-0BA0**	**3NA3807**		**3RV1021-1KA10**
	1.5	6SE6440-2UC21-5BA1				**3RV1021-4AA10**
	2.2	6SE6440-2UC22-2BA1		**3NA3810**		**3RV1021-4CA10**
	3.0	6SE6440-2UC23-0CA1	**6SE6400-0GP00-0CA0**			**3RV1031-4EA10**
	4.0	6SE6440-2UC24-0CA1		**3NA3812**		**3RV1031-4FA10**
	5.5	6SE6440-2UC25-5CA1		**3NA3814**		**3RV1031-4HA10**
	7.5	6SE6440-2UC27-5DA1	Integrated as standard	**3NA3820**	**3NE1817-0**	**3RV1042-4JA10**
	11.0	6SE6440-2UC31-1DA1		**3NA3824**	**3NE1820-0**	**3RV1042-4LA10**
	15.0	6SE6440-2UC31-5DA1				**3VL1712-.DD33-....**
	18.5	6SE6440-2UC31-8EA1		**3NA3830**	**3NE1021-0**	
	22	6SE6440-2UC32-2EA1			**3NE1022-0**	**3VL1716-.DD33-....**
	30	6SE6440-2UC33-0FA1		**3NA3836**	**3NE1224-0**	**3VL3720-.DC36-....**
	37	6SE6440-2UC33-7FA1		**3NA3140**	**3NE1225-0**	**3VL3725-.DC36-....**
	45	6SE6440-2UC34-5FA1				**3VL4731-.DC36-....**
380 V to 480 V 3 AC	0.37	6SE6440-2UD13-7AA1	**6SE6400-0GP00-0AA0**	**3NA3003**	●	**3RV1021-1CA10**
	0.55	6SE6440-2UD15-5AA1				**3RV1021-1DA10**
	0.75	6SE6440-2UD17-5AA1				**3RV1021-1FA10**
	1.1	6SE6440-2UD21-1AA1				**3RV1021-1GA10**
	1.5	6SE6440-2UD21-5AA1				**3RV1021-1JA10**
	2.2	6SE6440-2UD22-2BA1	**6SE6400-0GP00-0BA0**	**3NA3005**		**3RV1021-1KA10**
	3.0	6SE6440-2UD23-0BA1				**3RV1021-4AA10**
	4.0	6SE6440-2UD24-0BA1		**3NA3007**		**3RV1021-4BA10**
	5.5	6SE6440-2UD25-5CA1	**6SE6400-0GP00-0CA0**			**3RV1031-4EA10**
	7.5	6SE6440-2UD27-5CA1		**3NA3012**		**3RV1031-4FA10**
	11.0	6SE6440-2UD31-1CA1		**3NA3014**		**3RV1031-4HA10**
	15.0	6SE6440-2UD31-5DA1	Integrated as standard	**3NA3020**	**3NE1817-0**	**3RV1042-4KA10**
	18.5	6SE6440-2UD31-8DA1		**3NA3022**	**3NE1818-0**	
	22	6SE6440-2UD32-2DA1		**3NA3024**	**3NE1820-0**	**3RV1042-4MA10**
	30	6SE6440-2UD33-0EA1		**3NA3030**	**3NE1021-0**	**3VL1712-.DD33-....**
	37	6SE6440-2UD33-7EA1		**3NA3032**	**3NE1022-0**	**3VL1716-.DD33-....**
	45	6SE6440-2UD34-5FA1		**3NA3036**	**3NE1224-0**	**3VL3720-.DC36-....**
	55	6SE6440-2UD35-5FA1			**3NE1225-0**	**3VL3725-.DC36-....**
	75	6SE6440-2UD37-5FA1		**3NA3140**		**3VL4731-.DC36-....**
	90	6SE6440-2UD38-8FA0		–	**3NE1227-0**	On request
	110	6SE6440-2UD41-1FA0		–	**3NE1230-0**	
	132	6SE6440-2UD41-3GA0		–	**3NE1332-0**	
	160	6SE6440-2UD41-6GA0		–	**3NE1333-0**	
	200	6SE6440-2UD42-0GA0		–	**3NE1435-0**	
500 V to 600 V 3 AC	0.75	6SE6440-2UE17-5CA1	**6SE6400-0GP00-0CA0**	**3NA3803-6**	●	**3RV1021-1DA10**
	1.5	6SE6440-2UE21-5CA1				**3RV1021-1GA10**
	2.2	6SE6440-2UE22-2CA1				**3RV1021-1JA10**
	4.0	6SE6440-2UE24-0CA1				**3RV1021-4AA10**
	5.5	6SE6440-2UE25-5CA1		**3NA3805-6**		**3RV1021-4BA10**
	7.5	6SE6440-2UE27-5CA1		**3NA3810-6**		**3RV1021-4DA10**
	11.0	6SE6440-2UE31-1CA1		**3NA3812-6**		**3RV1031-4FA10**
	15.0	6SE6440-2UE31-5DA1	Integrated as standard	**3NA3814-6**	**3NE1803-0**	**3RV1031-4HA10**
	18.5	6SE6440-2UE31-8DA1		**3NA3820-6**	**3NE1817-0**	**3RV1042-4JA10**
	22	6SE6440-2UE32-2DA1		**3NA3822-6**	**3NE1818-0**	**3RV1042-4KA10**
	30	6SE6440-2UE33-0EA1		**3NA3824-6**	**3NE1820-0**	**3RV1042-4MA10**
	37	6SE6440-2UE33-7EA1				**3VL1712-.DD33-....**
	45	6SE6440-2UE34-5FA1		**3NA3132-6**	**3NE1022-0**	**3VL1716-.DD33-....**
	55	6SE6440-2UE35-5FA1				**3VL3720-.DC36-....**
	75	6SE6440-2UE37-5FA1		**3NA3136-6**	**3NE1224-0**	**3VL3725-.DC36-....**

Ordering Data for Variant Dependent Options (continued)

Mains operating voltage	Rated output kW	Inverter **with** internal filter Class A	Order No. of the options **Supplementary EMC filter Class B**	**Line commutating choke**	**Output choke**
200 V to 240 V 1 AC	0.12	6SE6440-2AB11-2AA1	**6SE6400-2FS01-0AB0**	**6SE6400-3CC00-4AB0**	**6SE6400-3TC00-4AD0**
	0.25	6SE6440-2AB12-5AA1			
	0.37	6SE6440-2AB13-7AA1		**6SE6400-3CC01-0AB0**	
	0.55	6SE6440-2AB15-5AA1			
	0.75	6SE6440-2AB17-5AA1			
	1.1	6SE6440-2AB21-1BA1	**6SE6400-2FS02-6BB0**	**6SE6400-3CC02-6BB0**	**6SE6400-3TC01-0BD0**
	1.5	6SE6440-2AB21-5BA1			
	2.2	6SE6440-2AB22-2BA1			
	3.0	6SE6440-2AB23-0CA1	**6SE6400-2FS03-5CB0**	**6SE6400-3CC03-5CB0**	**6SE6400-3TC03-2CD0**
200 V to 240 V 3 AC	3.0	6SE6440-2AC23-0CA1	**6SE6400-2FS03-8CD0**	**6SE6400-3CC01-7CC0**	**6SE6400-3TC03-2CD0**
	4.0	6SE6440-2AC24-0CA1		**6SE6400-3CC03-5CD0**	
	5.5	6SE6440-2AC25-5CA1			
380 V to 480 V 3 AC	2.2	6SE6440-2AD22-2BA1	**6SE6400-2FS01-6BD0**	**6SE6400-3CC01-0BD0**	**6SE6400-3TC01-0BD0**
	3.0	6SE6440-2AD23-0BA1			
	4.0	6SE6440-2AD24-0BA1		**6SE6400-3CC01-4BD0**	
	5.5	6SE6440-2AD25-5CA1	**6SE6400-2FS03-8CD0**	**6SE6400-3CC02-2CD0**	**6SE6400-3TC03-2CD0**
	7.5	6SE6440-2AD27-5CA1			
	11.0	6SE6440-2AD31-1CA1		**6SE6400-3CC03-5CD0**	
	15.0	6SE6440-2AD31-5DA1	–	**6SE6400-3CC04-4DD0**	**6SE6400-3TC05-4DD0**
	18.5	6SE6440-2AD31-8DA1	–		**6SE6400-3TC03-8DD0**
	22	6SE6440-2AD32-2DA1	–	**6SE6400-3CC05-2DD0**	**6SE6400-3TC05-4DD0**
	30	6SE6440-2AD33-0EA1	–	**6SE6400-3CC08-3ED0**	**6SE6400-3TC08-0ED0**
	37	6SE6440-2AD33-7EA1	–		**6SE6400-3TC07-5ED0**
	45	6SE6440-2AD34-5FA1	–	**6SE6400-3CC11-2FD0**	**6SE6400-3TC14-5FD0**
	55	6SE6440-2AD35-5FA1	–		**6SE6400-3TC15-4FD0**
	75	6SE6440-2AD37-5FA1	–	**6SE6400-3CC11-7FD0**	**6SE6400-3TC14-5FD0**

Mains operating voltage	Rated output kW	Inverter **with** internal filter Class A	Order No. of the options **Brake resistor**	**Gland plate**
200 V to 240 V 1 AC	0.12	6SE6440-2AB11-2AA1	**6SE6400-4BC05-0AA0**	**6SE6400-0GP00-0AA0**
	0.25	6SE6440-2AB12-5AA1		
	0.37	6SE6440-2AB13-7AA1		
	0.55	6SE6440-2AB15-5AA1		
	0.75	6SE6440-2AB17-5AA1		
	1.1	6SE6440-2AB21-1BA1	**6SE6400-4BC11-2BA0**	**6SE6400-0GP00-0BA0**
	1.5	6SE6440-2AB21-5BA1		
	2.2	6SE6440-2AB22-2BA1		
	3.0	6SE6440-2AB23-0CA1	**6SE6400-4BC12-5CA0**	**6SE6400-0GP00-0CA0**
200 V to 240 V 3 AC	3.0	6SE6440-2AC23-0CA1	**6SE6400-4BC12-5CA0**	**6SE6400-0GP00-0CA0**
	4.0	6SE6440-2AC24-0CA1	**6SE6400-4BC13-0CA0**	
	5.5	6SE6440-2AC25-5CA1		
380 V to 480 V 3 AC	2.2	6SE6440-2AD22-2BA1	**6SE6400-4BD12-0BA0**	**6SE6400-0GP00-0BA0**
	3.0	6SE6440-2AD23-0BA1		
	4.0	6SE6440-2AD24-0BA1		
	5.5	6SE6440-2AD25-5CA1	**6SE6400-4BD16-5CA0**	**6SE6400-0GP00-0CA0**
	7.5	6SE6440-2AD27-5CA1		
	11.0	6SE6440-2AD31-1CA1		
	15.0	6SE6440-2AD31-5DA1	**6SE6400-4BD21-2DA0**	Integrated as standard
	18.5	6SE6440-2AD31-8DA1		
	22	6SE6440-2AD32-2DA1		
	30	6SE6440-2AD33-0EA1	**6SE6400-4BD22-2EA0**	
	37	6SE6440-2AD33-7EA1		
	45	6SE6440-2AD34-5FA1	**6SE6400-4BD24-0FA0**	
	55	6SE6440-2AD35-5FA1		
	75	6SE6440-2AD37-5FA1		

Options

Ordering Data for Variant Dependent Options (continued)

Mains operating voltage	Rated output kW	Inverter **with** internal filter Class A	Order No. of the options **Fuse** (see Catalog NS K) **3NA3**	**3NE1 (UL)**	**Circuit breaker** (see Catalog NS K)
200 V to 240 V 1 AC	0.12	6SE6440-2AB11-2AA1	**3NA3803**	●	**3RV1021-1DA10**
	0.25	6SE6440-2AB12-5AA1			**3RV1021-1GA10**
	0.37	6SE6440-2AB13-7AA1			**3RV1021-1HA10**
	0.55	6SE6440-2AB15-5AA1	**3NA3805**		**3RV1021-1KA10**
	0.75	6SE6440-2AB17-5AA1			**3RV1021-4AA10**
	1.1	6SE6440-2AB21-1BA1	**3NA3807**		**3RV1021-4BA10**
	1.5	6SE6440-2AB21-5BA1			**3RV1031-4EA10**
	2.2	6SE6440-2AB22-2BA1	**3NA3810**		**3RV1031-4FA10**
	3.0	6SE6440-2AB23-0CA1	**3NA3812**		**3RV1031-4HA10**
200 V to 240 V 3 AC	3.0	6SE6440-2AC23-0CA1	**3NA3810**	●	**3RV1031-4EA10**
	4.0	6SE6440-2AC24-0CA1	**3NA3812**		**3RV1031-4FA10**
	5.5	6SE6440-2AC25-5CA1	**3NA3814**		**3RV1031-4HA10**
380 V to 480 V 3 AC	2.2	6SE6440-2AD22-2BA1	**3NA3005**	●	**3RV1021-1KA10**
	3.0	6SE6440-2AD23-0BA1			**3RV1021-4AA10**
	4.0	6SE6440-2AD24-0BA1	**3NA3007**		**3RV1021-4BA10**
	5.5	6SE6440-2AD25-5CA1			**3RV1031-4EA10**
	7.5	6SE6440-2AD27-5CA1	**3NA3012**		**3RV1031-4FA10**
	11.0	6SE6440-2AD31-1CA1	**3NA3014**		**3RV1031-4HA10**
	15.0	6SE6440-2AD31-5DA1	**3NA3020**	**3NE1817-0**	**3RV1042-4KA10**
	18.5	6SE6440-2AD31-8DA1	**3NA3022**	**3NE1818-0**	
	22	6SE6440-2AD32-2DA1	**3NA3024**	**3NE1820-0**	**3RV1042-4MA10**
	30	6SE6440-2AD33-0EA1	**3NA3030**	**3NE1021-0**	**3VL1712-.DD33-....**
	37	6SE6440-2AD33-7EA1	**3NA3032**	**3NE1022-0**	**3VL1716-.DD33-....**
	45	6SE6440-2AD34-5FA1	**3NA3036**	**3NE1224-0**	**3VL3720-.DC36-....**
	55	6SE6440-2AD35-5FA1		**3NE1225-0**	**3VL3725-.DC36-....**
	75	6SE6440-2AD37-5FA1	**3NA3140**		**3VL4731-.DC36-....**

● Use in America requires UL-listed fuses such as e.g. the Class NON range from Bussmann.

Ordering Data for Variant Independent Options

The options listed here are suitable for all MICROMASTER 440 Inverters.

Options	Order No.
Basic Operator Panel (BOP)	**6SE6400-0BP00-0AA0**
Advanced Operator Panel (AOP)	**6SE6400-0AP00-0AA0** **6SE6400-0AP00-0AA1** (available from mid 2002)
PROFIBUS module	**6SE6400-1PB00-0AA0**
DeviceNet module	**6SE6400-1DN00-0AA0**
Pulse encoder evaluation module	**6SE6400-0EN00-0AA0**
RS485/PROFIBUS bus connector	**6GK1500-0FC00**
Connection set for PC to inverter	**6SE6400-1PC00-0AA0**
Connection set for PC to AOP	**6SE6400-0PA00-0AA0**
Inverter-door mounting kit for single inverter control	**6SE6400-0PM00-0AA0**
AOP-door mounting kit for multiple inverter control (USS)	**6SE6400-0MD00-0AA0**

Technical data of the communications modules

		PROFIBUS module 6SE6400-1PB00-0AA0	**DeviceNet module** 6SE6400-1DN00-0AA0
Size (height x width x depth)		161 mm x 73 mm x 46 mm	
Degree of protection		IP 20	
Degree of pollution		2 to IEC 60664-1 (DIN VDE 0110/T1), no condensation permitted during operation	
Mechanical strength • Stationary • Transport	 Deflection Acceleration Deflection Acceleration	to DIN IEC 60068-2-6 (if module installed correctly) 0.15 mm in the frequency range of 10 Hz to 58 Hz 19.6 m/s^2 in the frequency range of 58 Hz to 500 Hz 3.5 mm in the frequency range of 5 Hz to 9 Hz 9.8 m/s^2 in the frequency range of 9 Hz to 500 Hz	
Climatic category (during operation)		3K3 to DIN IEC 60721-3-3	
Cooling method		Natural air cooling	
Permissible ambient or cooling agent temperature • in operation • during storage and transport		 –10 °C to +50 °C (14 °F to 122 °F) –25 °C to +70 °C (–13 °F to 158 °F)	
Relative humidity (permissible humidity rating) • in operation • during storage and transport		 ≤ 85 % (non-condensing) ≤ 95 %	
Electromagnetic compatibility	Emission Interference radiation	to EN 55011 (1991) Class A to IEC 60801-3 and EN 61000-4-3	
Supply voltage		6.5 V ± 5 %, max. 300 mA, internal from inverter or 24 V ± 10 %, max. 350 mA, external	6.5 V ± 5 %, max. 300 mA internal from inverter or 24 V, max. 60 mA from DeviceNet bus
Output voltage		5 V ± 10 %, max. 100 mA, galvanically isolated supply • for terminating the serial interface bus or • for supplying the OLP (Optical Link Plug)	–
Data transmission rate		max. 12 Mbaud	125, 250 and 500 kbaud

Options

Variant Independent Options

Technical data of the pulse encoder evaluation module

		Pulse encoder evaluation module 6SE6400-0EN00-0AA0
Size (height x width x depth)		161 mm x 73 mm x 42 mm
Degree of protection		IP 20
Degree of pollution		2 to IEC 60 664-1 (DIN VDE 0110/T1), no condensation permitted during operation
Mechanical strength • Stationary • Transport	 Deflection Acceleration Deflection Acceleration	to DIN IEC 60 068-2-6 (if module installed correctly) 0.15 mm in the frequency range of 10 Hz to 58 Hz 19.6 m/s^2 in the frequency range of >58 Hz to 500 Hz 3.5 mm in the frequency range of 5 Hz to 9 Hz 9.8 m/s^2 in the frequency range of 9 Hz to 500 Hz
Climatic category (during operation)		3K3 to DIN IEC 60 721-3-3
Cooling method		Natural air cooling
Permissible ambient or cooling agent temperature • in operation • during storage and transport		 –10 °C to +50 °C (14 °F to 122 °F) –20 °C to +70 °C (–14 °F to 158 °F)
Electromagnetic compatibility	Emission Interference radiation	to EN 55 011 (1991) Class A to IEC 60 801-3 and EN 61 000-4-3
Relative humidity (permissible humidity rating) • in operation • during storage and transport		 ≤ 85 % (non-condensing) ≤ 95 %
Supply voltage		5 V ± 5 %, 330 mA or 18 V non-regulated, 140 mA, short-circuit-proof
Pulse frequency		max. 300 kHz

Documentation

Type of documentation	Language	Order No.
Docu-Pack, supplied with each inverter, containing CD-ROM [1]) and Getting Started Guide [2]) (paper version)	Multilanguage	**6SE6400-5AD00-1AP0** **6SE6400-5AC00-1AP0** (available from 05/2002)
Operating instruction[2]) (paper version)	German	**6SE6400-5AC00-0AP0**
	English	**6SE6400-5AC00-0BP0**
	French	**6SE6400-5AC00-0DP0**
	Italian	**6SE6400-5AC00-0CP0**
	Spanish	**6SE6400-5AC00-0EP0**
Parameter list [2]) (paper version)	German	**6SE6400-5BB00-0AP0**
	English	**6SE6400-5BB00-0BP0**
	French	**6SE6400-5BB00-0DP0**
	Italian	**6SE6400-5BB00-0CP0**
	Spanish	**6SE6400-5BB00-0EP0**

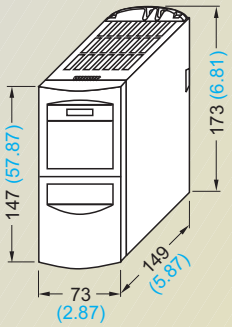
1) The CD-ROM contains operating instructions, parameter list, commissioning tools STARTER and DriveMonitor, multilanguage.

2) Available on Internet at http://www.siemens.com/micromaster

MICROMASTER 440 Inverter

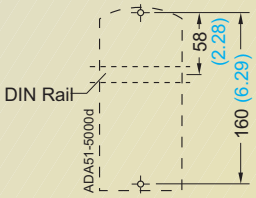
Frame size	200 V to 240 V 1/3 AC	380 V to 480 V 3 AC	500 V to 600 V 3 AC
A	0.12 kW to 0.75 kW	0.37 kW to 1.5 kW	–
B	1.1 kW to 2.2 kW	2.2 kW to 4 kW	–
C	3 kW to 5.5 kW	5.5 kW to 11 kW	0.75 kW to 11 kW

The quoted outputs are valid for CT operation.

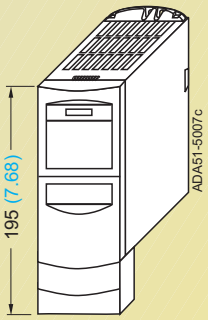


Inverter frame size **A**

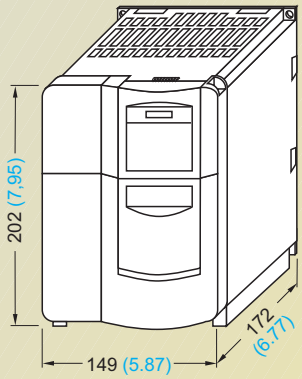
Drill and fixing pattern



Fixing with
2 bolts M4, 2 nuts M4,
2 washers M4
or snap on to the DIN rail
Tightening torque with
washers fitted: 2.5 Nm
Ventilation clearance required
at top and bottom: 100 mm

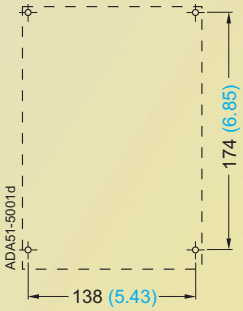


Inverter frame size **A**
with **gland plate**

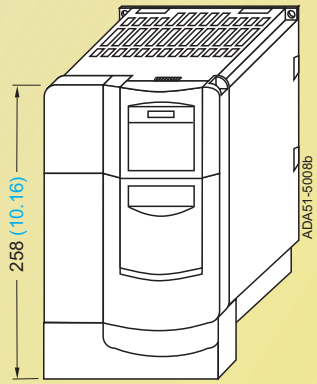


Inverter frame size **B**

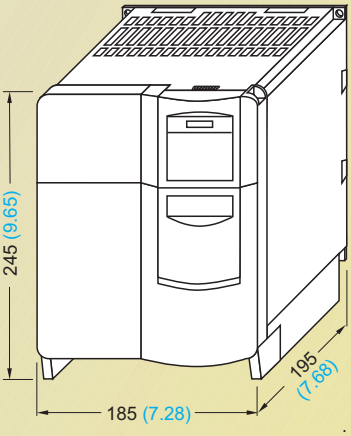
Drill pattern



Fixing with
4 bolts M4, 4 nuts M4,
4 washers M4
Tightening torque with
washers fitted: 2.5 Nm
Ventilation clearance required
at top and bottom: 100 mm

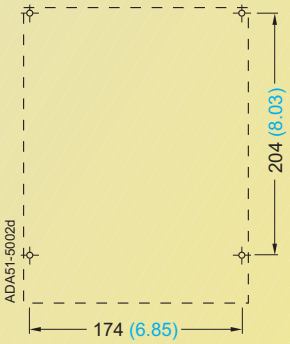


Inverter frame size **B**
with **gland plate**

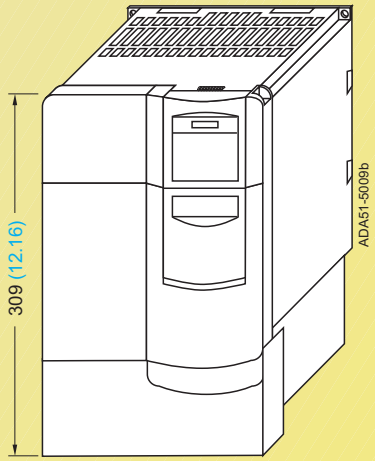


Inverter frame size **C**

Drill pattern



Fixing with
4 bolts M5, 4 nuts M5,
4 washers M5
Tightening torque with
washers fitted: 3.0 Nm
Ventilation clearance required
at top and bottom: 100 mm



Inverter frame size **C**
with **gland plate**

With a communications module, the mounting depth increases by 23 mm (0.91 Inches).
If a pulse encoder evaluation module is additionally inserted, the mounting depth is increased by a further 23 mm (0.91 Inches).

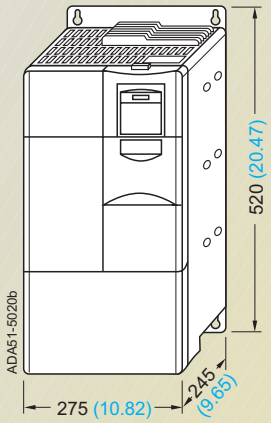
All dimensions are in mm (values in brackets are in inches)

Dimension Drawings

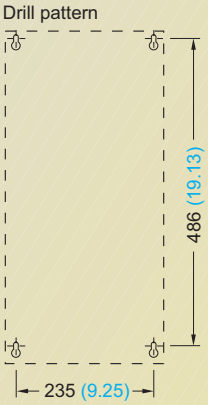
MICROMASTER 440 Inverter (continued)

Frame size	200 V to 240 V 3 AC	380 V to 480 V 3 AC	500 V to 600 V 3 AC
D	7.5 kW to 15 kW	15 kW to 22 kW	15 kW to 22 kW
E	18.5 kW to 22 kW	30 kW to 37 kW	30 kW to 37 kW
F	37 kW to 45 kW	45 kW to 75 kW	45 kW to 75 kW

The quoted outputs are valid for CT operation.

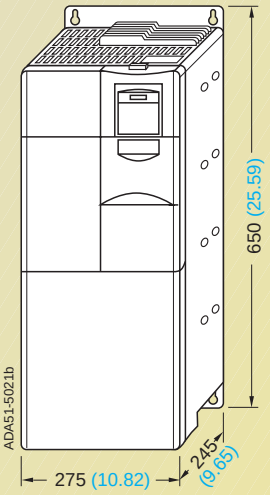


Inverter frame size **D**

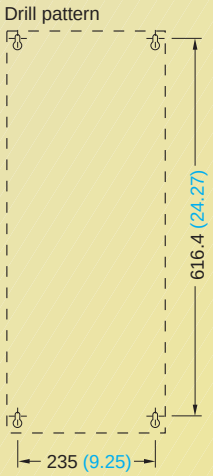


Fixing with
4 bolts M8, 4 nuts M8,
4 washers M8

Tightening torque with
washers fitted: 3.0 Nm
Ventilation clearance required
at top and bottom: 300 mm

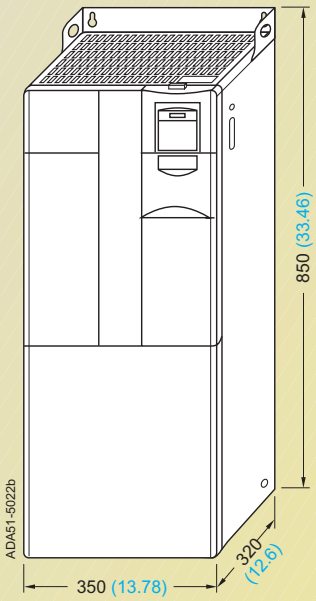


Inverter frame size **E**

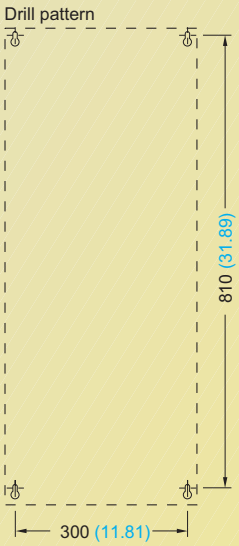


Fixing with
4 bolts M8, 4 nuts M8,
4 washers M8

Tightening torque with
washers fitted: 3.0 Nm
Ventilation clearance required
at top and bottom: 300 mm

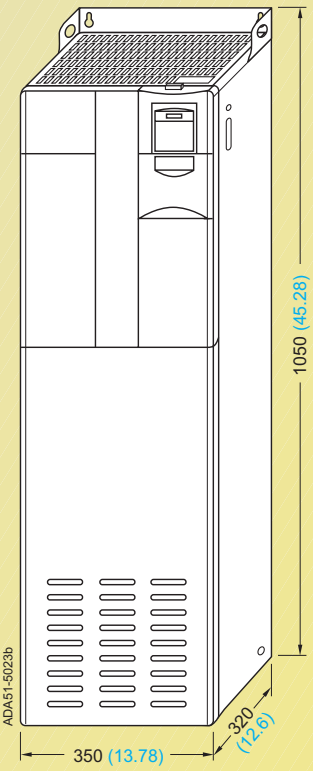


Inverter frame size **F**
without filter

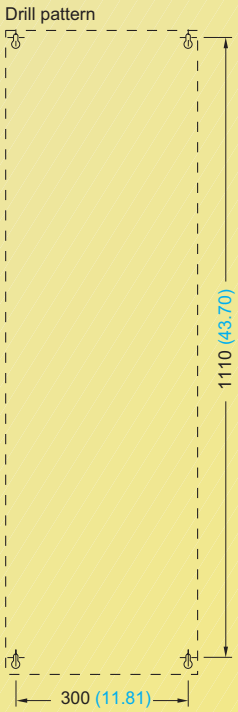


Fixing with
4 bolts M8, 4 nuts M8,
4 washers M8

Tightening torque with
washers fitted: 3.0 Nm
Ventilation clearance required
at top and bottom: 350 mm



Inverter frame size **F**
with filter



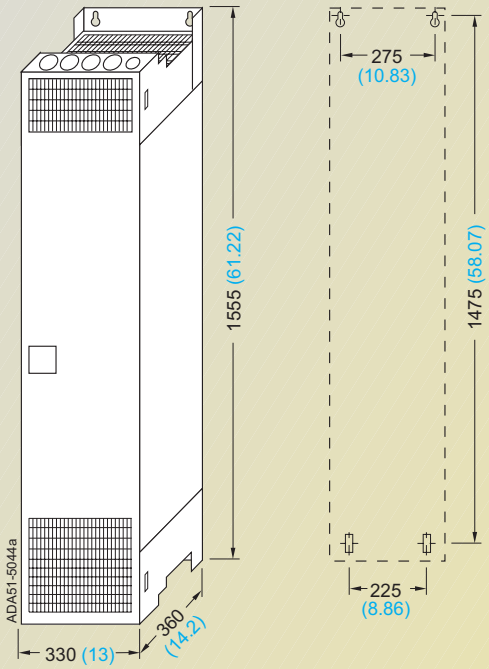
Fixing with
4 bolts M8, 4 nuts M8,
4 washers M8

Tightening torque with
washers fitted: 3.0 Nm
Ventilation clearance required
at top and bottom: 350 mm

All dimensions are in mm (values in brackets are in inches)

Frame size	380 V to 480 V 3 AC
FX	90 kW to 110 kW
GX	132 kW to 200 kW

The quoted outputs are valid for CT operation.



Inverter frame size **FX**

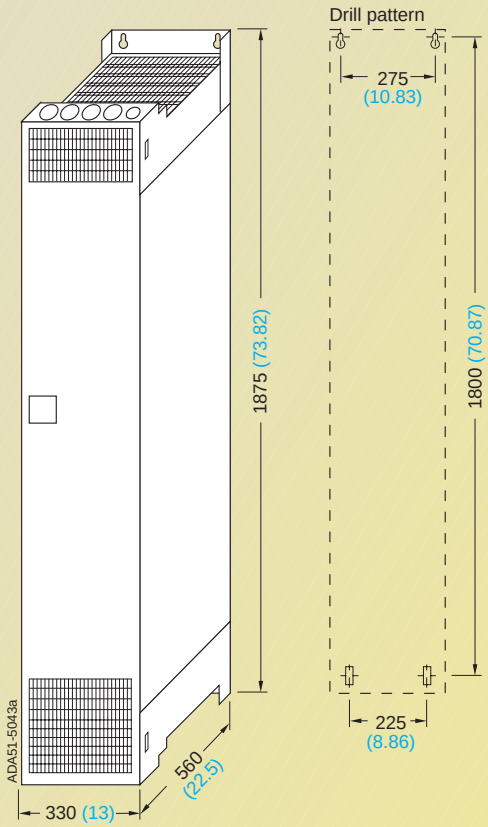
Fixing with
4 bolts M8
4 nuts M8
4 washers M8
for connection to DIN rail

Tightening torque with
washers fitted: 13 Nm + 30 %

Ventilation clearance required
top: 250 mm
bottom: 150 mm
front: 100 mm

Power connection

Max. cable cross-section	mm^2	1 x 185 or 2 x 120
	AWG	1 x 350 or 2 x 4/0
Barrel lug to DIN 46 235		10 mm



Inverter frame size **GX**

Fixing with
4 bolts M8
4 nuts M8
4 washers M8
for connection to DIN rail

Tightening torque with
washers fitted: 13 Nm + 30 %

Ventilation clearance required
top: 250 mm
bottom: 150 mm
front: 100 mm

Power connection

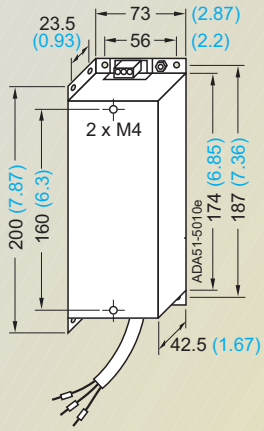
Max. cable cross-section	mm^2	2 x 240
	AWG	2 x 400
Barrel lug to DIN 46 235		10 mm

All dimensions are in mm (values in brackets are in inches)

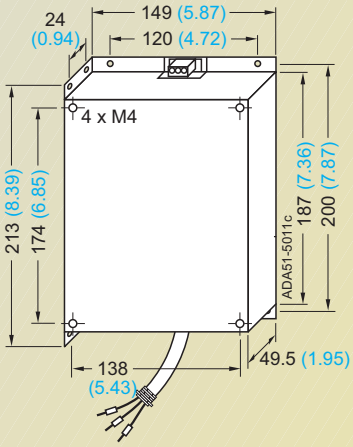
4

Dimension Drawings

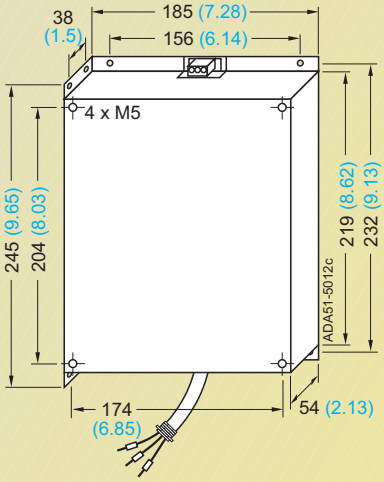
Filters



Filter for frame size **A**



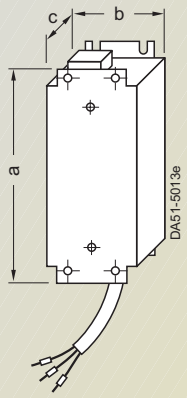
for frame size **B**



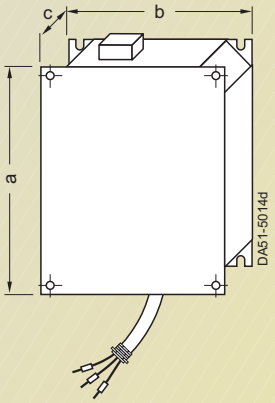
for frame size **C**

All dimensions are in mm (values in brackets are in inches)

Line commutating chokes

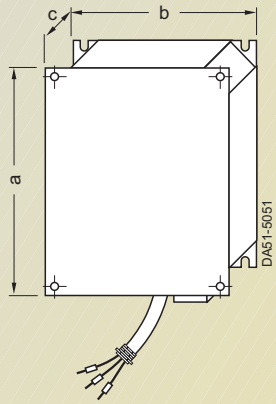


Line commutating choke for frame size **A**



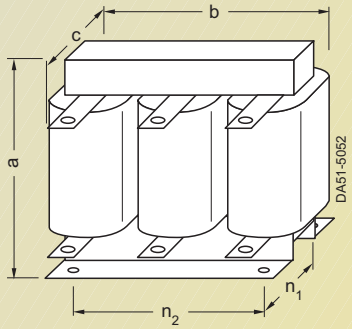
for frame sizes **B** and **C**

Line commutating choke for	Dim. a	b	c	Weight (max.) kg
frame size **A**	200 (7.87)	75.5 (2.97)	50 (1.97)	0.8
frame size **B**	213 (8.39)	150 (5.91)	50 (1.97)	1.3
frame size **C**	245 (9.65)	185 (7.28)	50 (1.97)	2.3



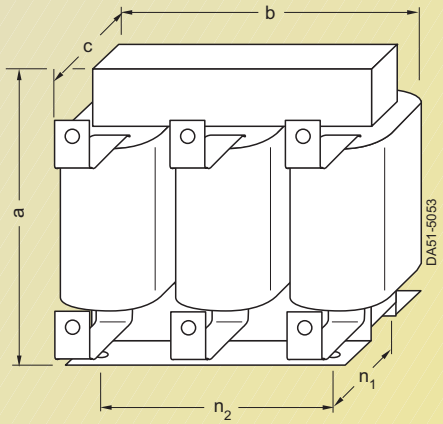
Line commutating choke for frame sizes **D** and **E**

Line commutating choke for	Dim. a	b	c	Weight (max.) kg
frame size **D**	520 (20.47)	275 (10.83)	85 (3.35)	9.5
frame size **E**	650 (25.59)	275 (10.83)	95 (3.74)	17.0



Line commutating choke for inverter frame size **F**

Line commutating choke Type 6SE6400-	for inverter frame size (FS)	Dim. a	b	c	n_1	n_2	Weight (max.) kg
3CC11-....	**F**	210 (8.27)	240 (9.45)	141 (5.55)	109 (4.29)	190 (7.48)	25.0



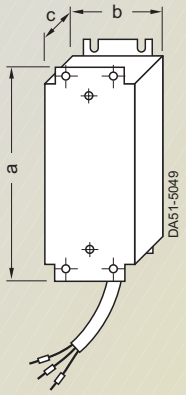
Line commutating choke for inverter frame sizes **FX** and **GX**

Line commutating choke Type 6SL3000-	for inverter frame size (FS)	Dim. a	b	c	n_1	n_2	Weight (max.) kg
0CE32-....	**FX**	248 (9.76)	255 (10.04)	203 (7.99)	101 (3.98)	200 (7.87)	24.0
0CE33-....	**GX**	248 (9.76)	255 (10.04)	203 (7.99)	101 (3.98)	200 (7.87)	25.0
0CE35-....	**GX**	269 (10.59)	275 (10.83)	210 (8.27)	118 (4.65)	224 (8.82)	35.0

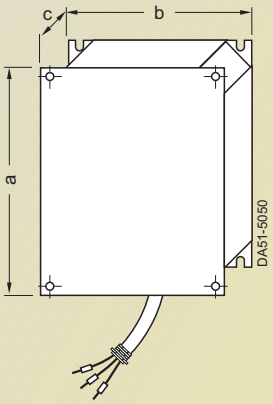
All dimensions are in mm (values in brackets are in inches)

Dimension Drawings

Output chokes



Output choke for frame size **A**



for frame sizes **B** and **C**

Output choke for	Dim. a	b	c	Weight (max.) kg
frame size **A**	200 (7.87)	75.5 (2.97)	50 (1.97)	0.8
frame size **B**	213 (8.39)	150 (5.91)	70 (2.76)	3.4
frame size **C**	245 (9.65)	185 (7.28)	80 (3.15)	5.6

Figure 1

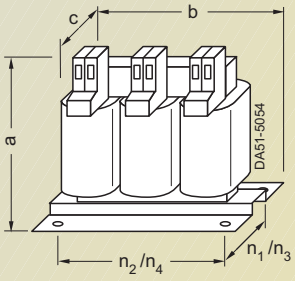
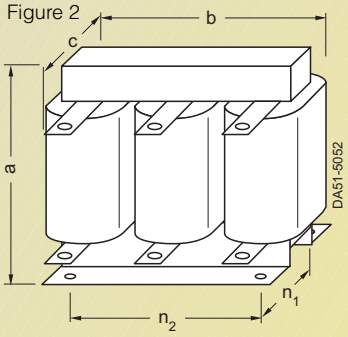


Figure 2



Output choke Type 6SE6400-	for inverter frame size (FS)	Figure No.	Dim. a	b	c	to DIN 41 308 n_1	n_2	to DIN EN 60 852-4 n_3	n_4	Weight (max.) kg
3TC02-2DE0	**D**	1	122 (4.80)	124 (4.88)	73 (2.87)	42 (1.65)	[1]	53 (2.09)	112 (4.41)	1.2
3TC02-7DE0	**D**	1	139 (5.47)	148 (5.83)	78 (3.07)	49 (1.93)	90 (3.54)	58 (2.28)	136 (5.35)	2.5
3TC02-8DC0	**D**	1	122 (4.80)	124 (4.88)	73 (2.87)	42 (1.65)	[1]	53 (2.09)	112 (4.41)	1.3
3TC03-2DE0	**D**	2	210 (8.27)	225 (8.86)	179 (7.05)	76 (2.99)	176 (6.93)	–	–	16.0
3TC03-8DD0	**D**	2	210 (8.27)	225 (8.86)	179 (7.05)	76 (2.99)	176 (6.93)	–	–	16.1
3TC05-2EE0	**E**	1	159 (6.26)	178 (7.01)	73 (2.87)	49 (1.93)	113 (4.45)	53 (2.09)	166 (6.54)	3.3
3TC05-4DD0	**D**	2	210 (8.27)	225 (8.86)	150 (5.91)	76 (2.99)	176 (6.93)	–	–	10.7
3TC06-2FE0	**F**	2	269 (10.59)	300 (11.81)	220 (8.66)	100 (3.94)	224 (8.82)	–	–	33.9
3TC07-5ED0	**E**	2	248 (9.76)	270 (10.63)	209 (8.23)	88 (3.46)	200 (7.87)	–	–	24.9
3TC08-0ED0	**E**	2	210 (8.27)	225 (8.86)	150 (5.91)	76 (2.99)	176 (6.93)	–	–	10.4
3TC08-8FE0	**F**	2	321 (12.64)	350 (13.78)	288 (11.34)	120 (4.72)	264 (10.39)	–	–	51.5
3TC14-5FD0	**F**	2	321 (12.64)	350 (13.78)	288 (11.34)	120 (4.72)	264 (10.39)	–	–	51.5
3TC15-4FD0	**F**	2	210 (8.27)	225 (8.86)	150 (5.91)	76 (2.99)	176 (6.93)	–	–	11.2

1) Mounting slot in center of foot.

Output choke for inverter frame sizes **D**, **E** and **F**

All dimensions are in mm (values in brackets are in inches)

Brake resistors

Figure 1

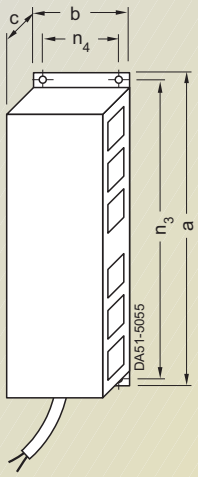
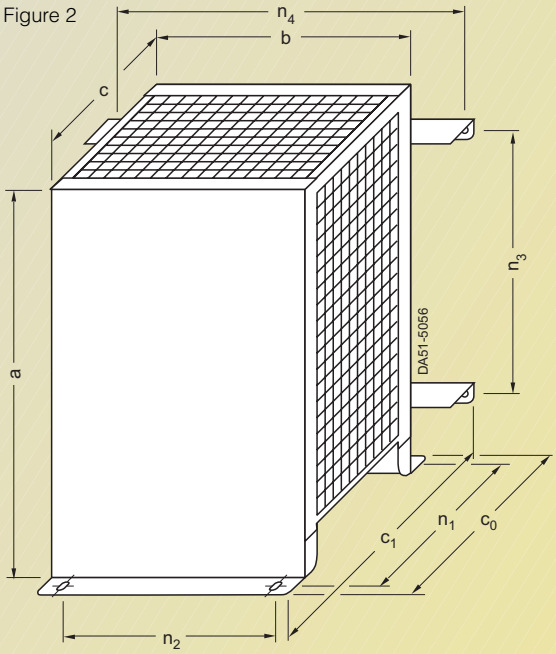


Figure 2



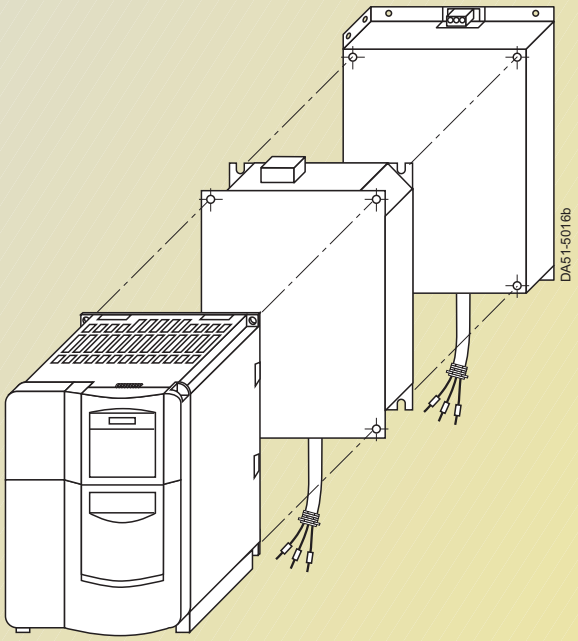
Brake resistor Type 6SE6400-	for inverter frame size (FS)	Fig. No.	Dim.					for console mounting		for wall mounting		Weight (max.)
			a	b	c	c_0	c_1	n_1	n_2	n_3	n_4	kg
4BC05-0AA0	**A**	1	230 (9.06)	72 (2.83)	43.5 (1.71)	–	–	–	–	217 (8.54)	56 (2.20)	1.0
4BC11-2BA0	**B**	1	239 (9.41)	149 (5.87)	43.5 (1.71)	–	–	–	–	226 (8.90)	138 (5.43)	1.6
4BC12-5CA0	**C**	2	285 (11.22)	185 (7.28)	150 (5.91)	185 (7.28)	217 (8.54)	170 (6.69)	145 (5.71)	200 (7.87)	230 (9.06)	3.8
4BC13-0CA0	**C**	2	285 (11.22)	185 (7.28)	150 (5.91)	185 (7.28)	217 (8.54)	170 (6.69)	145 (5.71)	200 (7.87)	230 (9.06)	3.8
4BC18-0DA0	**D**	2	515 (20.28)	270 (10.63)	175 (6.89)	210 (8.27)	242 (9.53)	195 (7.68)	205 (8.07)	350 (13.78)	315 (12.40)	7.4
4BC21-2EA0	**E**	2	645 (25.39)	270 (10.63)	175 (6.89)	210 (8.27)	242 (9.53)	195 (7.68)	205 (8.07)	480 (18.90)	315 (12.40)	10.6
4BC22-5FA0	**F**	2	650 (25.59)	400 (15.75)	315 (12.40)	382 (15.04)	382 (15.04)	335 (13.19)	270 (10.63)	510 (20.08)	435 (17.13)	16.7
4BD11-0AA0	**A**	1	230 (9.06)	72 (2.83)	43.5 (1.71)	–	–	–	–	217 (8.54)	56 (2.20)	1.0
4BD12-0BA0	**B**	1	239 (9.41)	149 (5.87)	43.5 (1.71)	–	–	–	–	226 (8.90)	138 (5.43)	1.6
4BD16-5CA0	**C**	2	285 (11.22)	185 (7.28)	150 (5.91)	185 (7.28)	217 (8.54)	170 (6.69)	145 (5.71)	200 (7.87)	230 (9.06)	3.8
4BD21-2DA0	**D**	2	515 (20.28)	270 (10.63)	175 (6.89)	210 (8.27)	242 (9.53)	195 (7.68)	205 (8.07)	350 (13.78)	315 (12.40)	7.4
4BD22-2EA0	**E**	2	645 (25.39)	270 (10.63)	175 (6.89)	210 (8.27)	242 (9.53)	195 (7.68)	205 (8.07)	480 (18.90)	315 (12.40)	10.6
4BD24-0FA0	**F**	2	650 (25.59)	400 (15.75)	315 (12.40)	382 (15.04)	382 (15.04)	335 (13.19)	270 (10.63)	510 (20.08)	435 (17.13)	16.7
4BE14-5CA0	**C**	2	285 (11.22)	185 (7.28)	150 (5.91)	185 (7.28)	217 (8.54)	170 (6.69)	145 (5.71)	200 (7.87)	230 (9.06)	3.8
4BE16-5CA0	**C**	2	285 (11.22)	185 (7.28)	150 (5.91)	185 (7.28)	217 (8.54)	170 (6.69)	145 (5.71)	200 (7.87)	230 (9.06)	3.8
4BE21-3DA0	**D**	2	515 (20.28)	270 (10.63)	175 (6.89)	210 (8.27)	242 (9.53)	195 (7.68)	205 (8.07)	350 (13.78)	315 (12.40)	7.4
4BE21-8EA0	**E**	2	645 (25.39)	270 (10.63)	175 (6.89)	210 (8.27)	242 (9.53)	195 (7.68)	205 (8.07)	480 (18.90)	315 (12.40)	10.6
4BE24-2FA0	**F**	2	650 (25.59)	400 (15.75)	315 (12.40)	382 (15.04)	382 (15.04)	335 (13.19)	270 (10.63)	510 (20.08)	435 (17.13)	16.7

Brake resistors for inverter frame sizes **A** to **F**

All dimensions are in mm (values in brackets are in inches)

Dimension Drawings

Assembly of inverter and options



Example:
Assembly of inverter, choke and filter

If additional accessories are required, they must be mounted at the side.

MICROMASTER 410/420/430/440

Appendix

A/2 Environment, Resources and Recycling

A/3 Certificates ISO 9001

A/4 Conformity with Standards

A/6 Demonstration Case

A/7 Training Center
Training Courses

A/8 Overview of Motors

A/10 Siemens European Companies and Representatives

A/11 Siemens Companies and Representatives Worldwide

A/13 Online Services

A/14 Service and Support

A/15 Subject Index

A/16 Order No. Index
Note for ordering

A/17 Conditions of Sale and Delivery
Export Regulations

A

Appendix

Environment, Resources and Recycling

Siemens AG feels a responsibility to play a role in protecting our environment and saving our valuable natural resources. This is true for both our production and our products.

Even during development, we consider any possible environment impact of future products/systems. Our aim is to prevent harmful environment effects, or at least to reduce them to an absolute minimum – beyond present regulations and legislation.

The most important activities for protecting our environment are as follows:

- We are constantly endeavoring to reduce the environmental impact of our products, as well as their consumption of energy and resources, over and above the statutory environmental protection regulations.
- We take every possible step to prevent damage to the environment.
- Environmental impact is assessed and considered at the earliest possible stage of product and process planning.
- Our optimized environmental management strategy ensures that our environment policy is put into practice effectively. The necessary technical and organizational procedures are reviewed at regular intervals and continuously updated.
- An awareness for environmental problems is expected of all our employees. Establishing and furthering a sense of responsibility for the environment on all levels represents a permanent challenge for the corporate management.
- We urge our business partners to act according to the same environmental principles as ourselves. We cooperate with the responsible public authorities.
- We inform interested members of the public about the consequences of our corporate policies for the environment as well as our achievements to the benefit of the environment.
- Our complete documentation is printed on chlorine-free bleached paper.

A

Certificates ISO 9001

Z E R T I F I K A T

DQS Deutsche Gesellschaft zur Zertifizierung von Managementsystemen mbH

Siemens AG
Automatisierungs- und Antriebstechnik
Standardantriebe

Qualitätsmanagementsystem

DIN EN ISO 9001

Certificate of Registration

BSI

REGISTERED

SIEMENS PLC
SIEMENS HOUSE
EATON BANK INDUSTRIAL ESTATE
VARLEY ROAD
CONGLETON
CHESHIRE
CW12 1PR

Conformity with Standards

CE Marking

CE

The MICROMASTER inverters 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.

Machine Directive

The inverters are suitable for installation in machines. Compliance with the machine directive 89/392/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 completed 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 identification according to the EMC directive.
- The frequency inverters as components on their own are only classified as "Limited availability" for persons and users with the necessary EMC knowledge. They are not envisaged for unlimited sale or as "General availability" 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 or external 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 there 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

No impermissible electromagnetic irradiation occurs if the installation guidelines specific to the product are correctly observed.

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

The inverters were installed according to the guidelines with shielded motor cables and shielded control cables.

EMC phenomenon Standard/test		Relevant criteria	Limit value
Emitted interference EN 61 800-3 (1st environment [1]))	Conducted via mains cable	150 kHz to 30 MHz	Unfiltered – not tested Internal/external filter: General availability [2]) (category C1): limit complies with EN 55 011 Class B (only applies to MICROMASTER 410) Limited availability [3]) (category C2): limit complies with EN 55 011, Class A, Group 1
	Emitted by the drive	30 MHz to 1 GHz	All devices: Limited availability [3]): limit complies with EN 55 011 Group 1, 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 to 1 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

UL Listing

c UL us LISTED

Ⓤ and cⓊ- listed power conversion equipment type 5B33 in accordance with UL508C.

For use in pollution degree 2 environment.

A

1) **1st environment**
(living accommodation, business and industrial areas): environment which includes living accommodation and also equipment which is directly connected to a low-voltage power supply system without intermediate transformers, where this system also supplies living accommodation.

2) **General availability**
Sales channel where installation is independent of the customer's or user's EMC knowledge.

Category C1:
Power Drive System (PDS) with rated voltage < 1000 V.
For use in 1st environment.

3) **Limited availability:**
Sales channel where installation is limited to dealers, customers or users who – either individually or together – have technical EMC knowledge.

Category C2:
Power Drive System (PDS) with rated voltage < 1000 V.
When used in 1st environment, installation and start-up only by EMC experts.

Appendix

Demonstration Case

With the MICROMASTER 420 and 440 demonstration case, one of these inverters can be selected using a switch.

The inverters are equipped with status display panels (SDP). A BOP, AOP or other options must be ordered separately.

The demonstration case has the following features:

- 2 inverters (MICROMASTER 420 and MICROMASTER 440)
- Asynchronous motor 1LA7 from Siemens
- Precise, mechanical brake for demonstration of torque control
- Double voltage range (90 V to 130 V and 190 V to 265 V)
- Extremely rugged metal case, particularly suitable for traveling.

Demonstration case	Order No.	Weight, approx. kg
MICROMASTER 420 and 440	**6SE6400-0DC40-0AA0**	15

SIDEMO Demonstration Case System

The SIDEMO range of modular demonstration case systems also includes cases for the MICROMASTER inverters.

The MICROMASTER demonstration cases can be operated on their own or together with other demonstration systems such as e.g. LOGO!, SIMATIC S7-200, SITOP DC-UPS.

The demonstration systems are fitted in dark blue transport cases (400 x 300 x 210 mm) which can be stacked.

When expanding the MICROMASTER 420/440 demonstration case by a PROFIBUS module (not included in delivery of case), it is also possible to demonstrate the incorporation into TIA when using the SIMATIC S7-300 Compact and Touch Panel TP170B demonstration systems.

SIDEMO demonstration case	Order No.	Weight, approx. kg
MICROMASTER 410 • including **OP** operator panel	**6AG1062-1AA08-0AA0**	10
MICROMASTER 420 • including **BOP** operator panel	**6AG1062-1AA02-0AA0**	10
MICROMASTER 440 • including **BOP** operator panel	**6AG1062-1AA02-1AA1**	10
MICROMASTER 440 • including **BOP** operator panel • the motor is equipped with a **load unit**	**6AG1062-1AA06-0AA0**	10
MICROMASTER 440 • including **BOP** operator panel and pulse encoder evaluation module • the motor is equipped with an **encoder** and a **load unit**	**6AG1062-1AA07-0AA0**	10

Further information available on the Internet at: http://www.siemens.com/sidemo

Training Center

Siemens A&D Training Centers are located worldwide, and offer the courses listed below for MICROMASTER. Individual course contents, or training on site at customers, can also be carried out.

Contact partner:

Every A&D Information and Training Center in the regions and the regional companies in Germany:
Tel.: +49 (0) 911-895 32 02

Headquarters:

Siemens AG
Automation and Drives
Training Center
P.O. Box 48 48
D-90327 Nuremberg
Germany

E-mail:
A&D.Kursbuero@nbgm.siemens.de
Phone:
+49 (0) 9 11-8 95-32 00
Fax:
+49 (0) 9 11-8 95-32 75

Training Courses

MICROMASTER 4 servicing, commissioning

SD-MM4 (2 days)

This course is aimed at commissioning and servicing engineers for the MICROMASTER 4 drives. It covers proper utilization of the MICROMASTER 440 inverter functionality, as well as that of the MICROMASTER 420 inverter. This course is also suitable for beginners, since it can be adapted to provide more in-depth knowledge if required.

Course targets/contents:

- Fundamentals of asynchronous motors
- Fundamentals of inverters
- Programming using BOP, AOP
- PC programs: DriveMonitor/STARTER
- Commissioning using *V/f* characteristic and vector control
- Optional programming of input and output terminals
- Use of special functions such as flying restart, DC brakes
- Warnings and fault signals
- Practical exercises using the field-proven demonstration cases.

MICROMASTER 4 communication

SD-MM4-COM (2 days)

This course is aimed at commissioning and servicing engineers working with the MICROMASTER 4 on the PROFIBUS-DP. Knowledge of MICROMASTER and SIMATIC S7 are prerequisites.

It imparts knowledge on the concept of Totally Integrated Automation (TIA).

Course targets/contents:

- Fundamentals of PROFIBUS-DP with emphasis on drive technology
- Design of the PROFIBUS-DP bus system
- Configuration of a PROFIBUS-DP network in Step 7
- Commissioning of the MICROMASTER inverter on the PROFIBUS-DP
- Transmission of process data and parameter values (protocol, PNO profile)
- PROFIBUS-DP with Motion Control expansion (lateral communication, equidistance, clock synchronization)
- Block library
- Drive ES SIMATIC
- Fault diagnostics of the drive via the bus system
- Practical exercises on the MICROMASTER 440 demonstration cases and the SIMATIC S7 demonstration cases with CPU 315-2 DP.

Tip:
The course sometimes directly follows the SD-MM4 course. Participants need then only travel once.

Note:
This course handles the DriveES SIMATIC block library. The SD-MD-COM course provides comprehensive information on alternatives such as loading/transfer commands, system functions, DVA-S7 blocks.

Computer based Training (CBT) and Web based Training (WBT)

Commissioning is carried out in interactive mode using the MICROMASTER 420 frequency inverter. In particular, handling of the parameter keyboard is practically identical to the original. The training time is 3 to 4 hours depending on the level of knowledge.

Contents:

- Asynchronous motors connected to power supply and inverter
- Overview of MICROMASTER inverter
- Electrical installation
- Parameter input, structure of parameter set
- Rating plate of motor
- Simple commissioning
- Assignment of different functions to the terminals.

You can find further information in the Catalog ITC or at ***http://www.sitrain.com***.

Appendix

Overview of Motors

Siemens motors are an ideal supplement to the MICROMASTER inverters.

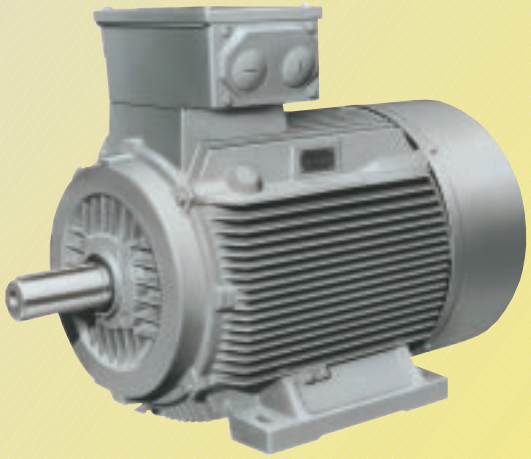
The table provides an overview of the most common types of motors from Siemens.

In addition to the motors listed in the table, explosion-proof motors, marine motors and combustion gas motors are also available.

Catalogs M 11 and M 15 contain the complete range of products with ordering data, technical details and explanations.

Motors with gray cast iron casing

Efficiency class	EFF 1 *)	EPACT	EFF 2 *)		
Motor type	**1LG6**	**1LA6****)	**1LA6**	**1LG4**	**1LA8**
Rating (4-pole)	18.5-200 kW	50-200 hp	2.2-15 kW	18.5-200 kW	250-1000 kW
Speed/torque	Speed rpm 3000 1500 1000 750	Speed rpm 3600 1800 1200	Speed rpm 3000 1500 1000 750		
Voltage (at 50 Hz if not specified otherwise)	230/400 V Δ/Y 400/690 V Δ/Y	60 Hz 460 V Δ	230/400 V Δ/Y 400/690 V Δ/Y		400/690 V Δ/Y
Size	180-315	225-315	100-160	180-315	315-450
Design	IM B3 IM B5 IM V1 IM B14 (sizes 100 to 160) IM B35				IM B3 IM V1 IM B35
Casing	Gray cast iron				
Degree of protection	IP 55 (IP 65, IP 56)				IP 55 (IP 56)



Example of 1LA6 motor

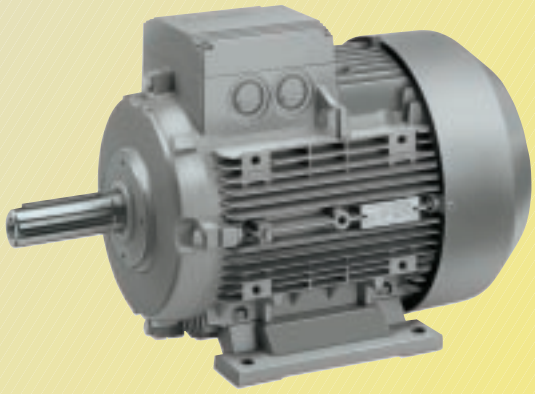
*) 1.1 kW to 90 kW, 2-pole and 4-pole
**) Successor type 1LG6

A

Motors with aluminium casing

Gear motors

EFF 1 *)	EPACT	EFF 2 *)		Spur gear	Flat gear	Bevel gear	Spur worm gear
1LA9	**1LA9**	**1LA7**	**1LA5**	**2KG11**	**2KG12**	**2KG13**	**2KG14**
0.06-30 kW	0.08-40 hp	0.06-15 kW	18.5-45 kW	0.09-7.5 kW			0.12-7.5 kW
Speed rpm	Speed rpm	Speed rpm		Torque Nm	Torque Nm	Torque Nm	Torque Nm
3000 1500 1000	3600 1800 1200	3000 1500 1000 750		80-550	130-660	120-800	70-1400
230/400 V Δ/Y 400/690 V Δ/Y	60 Hz 460 V Δ	230/400 V Δ/Y 400/690 V Δ/Y		230/400 V Δ/Y; 500 V Y 400/690 V Δ/Y			
56-200		56-160	180-225	63-132			
IM B3 IM B5 IM V1 IM B14 (sizes 56 to 160) IM B35				Foot-mounting type Flange-mounting type Universal mounting type			
Aluminium				Chilled casting	Aluminium	Aluminium or gray cast iron	
IP 55 (IP 65, IP 56)				IP 55 (IP 65, IP 56)			



Example of motor 1LA7

Example of spur gear motor 2KG11

*) 1.1 kW to 90 kW, 2-pole and 4-pole

A

Appendix

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Dar-es-Salaam

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Sanaa
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Milton
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Perth
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St. Leonards
Sydney

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Siemens (NZ) Limited
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A

A&D in the WWW

A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

The Siemens Automation and Drives Group (A&D) has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

http://www.siemens.com/automation

you will find everything you need to know about products, systems and services.

Product Selection Using the Interactive Catalogs

Detailed information together with convenient interactive functions:
The interactive catalogs CA 01 and ET 01 cover more than 80,000 products and thus provide a full summary of the Siemens Automation and Drives product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.
All information is linked into a user interface which is easy to work with and intuitive.

After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalogs can be found in the Internet under

http://www.siemens.com/automation/ca01

or on CD-ROM.

Automation and Drives, CA 01
Order No.:
E86060-D4001-A110-B7-7600

Electrical installation technology, ET 01
Order No.:
E86060-D8200-A107-A2-7600

Easy Shopping with the Siemens Mall

The Siemens Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the Siemens Mall on the Internet under:

http://www.siemens.com/automation/mall

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Appendix

Customer Support Automation and Drives

Whether you need a service expert or a spare part, a product specialist for advice, or if you just have a query, then the Customer Support is the address for you – the team that meets all your needs!

Helpline for Service and Support

You need help but do not know who to address. We take care that help is on the way quickly.

The helplines ensure that the right specialist in your vicinity will be of skilled assistance to you. The Helpline e. g. for Germany helps in German and English 24 hours/day, 365 days/year.

Tel.: 0180 50 50 111

Online Support

Our Online Support guarantees quick and efficient assistance – around the clock, worldwide and in five languages.

The Online Support offers all technical information:

- FAQs, tips & tricks, downloads and news
- Free manuals
- Useful programs and software

http://www.siemens.com/automation/service&support

Field Service

Your system is installed and now you need quick on-site help. We have the specialists with the know-how you require, worldwide and at hand.

Thanks to our comprehensive service network, we are able to realize short response times – with competence, reliability, and speed.

You can request an expert in Germany 24 hours/day and 365 days/year.

Tel.: 0180 50 50 444

Of course we offer also service contracts customized to your requirements. Your Siemens Office is always at your disposal.

Spare Parts and Repairs

Our worldwide network of local spare parts stocks and repair centers react with speed and reliable logistics.

For requests about repairs or spare parts please call the following telephone number (in Germany):

Tel.: 0180 50 50 446

Outside the office hours and on weekends, dial this number for our spare parts stand-by service.

Technical Support

Technical advice for implementation of products, systems and solutions in automation and drive technology is provided in German and English.

- Competent, qualified and experienced specialists offer teleservice and video conferencing for specific problems.
- FreeContact – the way to the free Technical Support.
- in Europe (headquarter)

Tel.: +49 (0)180 50 50 222
Fax: +49 (0)180 50 50 223
E-mail: techsupport@ad.siemens.de

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