



variable speed drives

LOW VOLTAGE MOTORS

MICROMASTER Variable Speed Drives 0.12 kW–250 kW

COMBIMASTER Distributed Drive Solutions

High Efficiency Motors **EFF I** **EFF 2**

Customer Support and Training

Complementary AC and DC Drive Technology

SIEMENS

Variable Speed Drives and Low Voltage Motors – an ideal solution for every application

Siemens Automation & Drives supplies a comprehensive range of automation, electrical distribution and drives products worldwide and is the largest supplier of variable speed drives in Europe. Our drives manufacturing facility in Congleton, Cheshire ranks amongst the world's largest variable speed drive factories, producing in excess of 2000 drives per day.

This latest short form catalogue highlights the main features and benefits of our MICROMASTER drives and EFF1 / EFF2 high efficiency motor ranges and complements our latest drives and motors catalogues. With a reputation for innovative technology and the highest quality, our complete family of MICROMASTER drives can fulfil a vast range of application requirements. Add to that our high efficiency motors – robust and cost effective, and Siemens has the optimum solution for all drive applications.

No product range is complete without comprehensive service and training support and this is where Siemens is unrivalled amongst other suppliers. Whether you are looking for applications assistance, training solutions, or breakdown support, you can be assured of a professional and efficient service from Siemens. Our aim is to provide our customers with an outstanding level of support, which safeguards production and contributes to future success.



Call our hotline to arrange a free consultation with one of our expert drive specialists – **0161 446 6400**
E-mail: adsales@plcman.siemens.co.uk

STOP
PRESS

Enclosed units (including IP54)
available on request

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Introduction

The latest Siemens MICROMASTER Variable Speed Drives range is now firmly established as the UK's premier brand. The product family is characterised by its ease of installation, simple set up, flexibility, and ease of integration into automation projects.

The integrated MICROMASTER family covers a range of applications unequalled by any of its rivals.

SIEMENS – THE BENCHMARK FOR DRIVE TECHNOLOGY

Easy to Install

A *no compromise* approach has been adopted to ensure the easiest installation in its class. Wiring is arranged for easy access from the front when installed on the mounting panel of a typical switchgear cubicle. The option of integrated EMC filters across the range avoids the cost of separate filter installation. The control connections are quick-release terminals which significantly reduce the typical connection time and provide higher reliability.

Easy to Set-Up

With its class-beating features, the drive is as easy to set up as the most basic of ac drives. This is achieved by separating the most commonly required parameters into a "quick commissioning" group, which is all that will be required by the majority of users. Most applications will be set up with only **12 parameters**.

Robust

Designed to cope with the most demanding environments, and to exceed all European and international standards for immunity to mains voltage disturbance. These units will keep on working where others fail, ensuring trouble-free operation at all times and providing a range of special functions and features to adapt to your requirements.

Fast Response

Through careful optimisation of software performance, a class-beating response time and repeatability to control signals has been achieved.

Totally Integrated Automation

The real problem facing today's plant manager or process engineer is finding system components that can be integrated together seamlessly, using common communications protocols, address registers, databases and user interfaces. This is where the idea of Totally Integrated Automation (TIA) comes in. TIA is a unique way of applying automation and drive solutions, that ensures reduced engineering costs, faster commissioning and increased plant availability.



MICROMASTER 410 (0.12 kW – 0.75 kW)

"The low-priced" choice for variable speed control with single-phase networks. Ideal for pumps, fans, billboards and access control equipment.

MICROMASTER 420 (0.12 kW– 11 kW)

The universal drive for single and three phase supplies. Especially suited for conveyors, pumps and fans.

MICROMASTER 430 (7.5 kW – 250 kW)

"The specialist drive for pumps and fans" with optimised operator panel (manual / auto switchover), matched software functionality and optimised power efficiency.

MICROMASTER 440 (0.12 kW – 250 kW)

"The all-purpose" drive with advanced vector control (with and without encoder feedback) and integrated logic control functions. For demanding applications in sectors such as conveying systems, textiles, elevators, hoisting gear and machine control requirements.

COMBIMASTER 411 (0.37 kW – 3 kW)

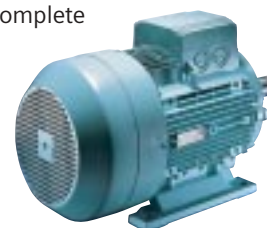
"Drive and motor combined". Motor and drive combine to give a perfect solution for decentralised applications from simple individual pump or fans through to multiple drive conveyors.

MICROMASTER Options

Operator panels, remote mounting kits, EMC filtering, fieldbus modules, PC to inverter connection kit, line commutating chokes, output reactors, gland plates, etc.

Motors

As global market leader, we ship more than 8,000 MW of motor power annually. With a complete range of standard motors that manage the majority of different requirements, and with customised designs where required. All are extremely cost-effective.



The MICROMASTER 410 – “Low Cost”

Developed specifically for single phase supply networks for simple low power applications such as pumps, fans, conveyors, billboards, access control, labelling machines, wrapping machines etc.



- Output up to 0.75 kW
- Overload capability max. 150% for 60 s
- Compact housing dimensions
- Simple to install and commission
- Self cooling with no fan to eliminate maintenance
- Contactor style connections
- Can be mounted sideways
- Remote I / O function via serial communication link.

Performance Features and Benefits

- Simple selection
- Integrated Class B filter option
- Flux-current control (FCC) to optimise the dynamic response and motor control
- Fast simple commissioning with only a few parameters
- “Flying re-start” function allows the inverter to be re-connected to spinning motors
- Freely-programmable digital inputs and outputs
- Fast reaction time to analogue and digital commands
- Complete inverter and motor protection comprising under-voltage / over-voltage, inverter over-temperature, earth fault protection, short circuit protection, motor thermal protection, locked motor and stall prevention
- MICROMASTER 410 carries the CE mark for conformance to the low voltage and EMC directives. It is also and listed.

The Detail

- Three fully programmable opto-isolated digital inputs (4th binary input available via the analogue input)
- Analogue input, 0-10 V (can accommodate 0 / 4-20 mA using an additional resistor link)
- Fully programmable relay output, DC 30 V / 5 A resistive, AC 230 V / 2 A inductive
- Integral RS485 communications for low cost networking

Supply Voltage – single phase 200 / 240 V						
Rating	Frame size	Industrial	List price	Class B Filtered ¹⁾	List price	
0.12 kW / 0.9 A	AA	6SE6410-2UB11-2AA0	£93	6SE6410-2BB11-2AA0	£107	
0.25 kW / 1.7 A	AA	6SE6410-2UB12-5AA0	£100	6SE6410-2BB12-5AA0	£115	
0.37 kW / 2.3 A	AA	6SE6410-2UB13-7AA0	£106	6SE6410-2BB13-7AA0	£123	
0.55 kW / 3.2 A	AB	6SE6410-2UB15-5BA0	£117	6SE6410-2BB15-5BA0	£134	
0.75 kW / 3.6 A	AB	6SE6410-2UB17-5BA0	£128	6SE6410-2BB17-5BA0	£147	
Supply Voltage – single phase 100 / 120 V						
Rating	Frame size	Industrial	List price			
0.12 kW / 0.9 A	AA	6SE6410-2UA11-2AA0	£98			
0.25 kW / 1.7 A	AA	6SE6410-2UA12-5AA0	£105			
0.37 kW / 2.3 A	AA	6SE6410-2UA13-7AA0	£112			
0.55 kW / 2.7 A	AB	6SE6410-2UA15-5BA0	£123			
Options						
6SE6400-OSP00-OAA0		Simple Operator Panel (SOP)				£15
6SE6400-OPLO0-OAA0		PC-MICROMASTER Connection Kit				£73
6SE6400-ODR00-OAA0		MM410 DIN Rail Mounting Kit				£7
6SE6400-5EA00-1AGO		Software Tools and Documentation CD				£11
6SE6400-5EA00-OBPO		Operating Instructions ²⁾				£42
6SE6400-5EB00-OBPO		Parameter List ²⁾				£42

¹⁾ Integrated ‘Class B’ EMC filter for domestic applications (first environment).

²⁾ Available on internet at www.siemens.com/micromaster.

The MICROMASTER 420 – “The Universal”

“The universal” inverter is suitable for motor speed control in a vast range of industrial variable speed drive applications such as pumps, fans and conveyor systems. It is especially characterised by its performance, flexibility, and ease of use.



- Output up to 11 kW
- Compact housing dimensions
- Simple to install and commission
- Robust construction
- Designed to make EMC compliance easy
- Wide range of user interfaces and communications options
- Operating temperature –10°C to +50°C
- Integrated PI Controller
- Remote I / O function via serial communication or fieldbus link
- Integrated compound braking function – often eliminates the need for external braking modules.

Performance Features and Benefits

- Flux-current control (FCC) to optimise the dynamic response and motor control
- Slip compensation ensuring constant motor speeds under changing load conditions
- “Flying re-start” function allows the inverter to be re-connected to motors which are still spinning after brief power interruptions
- Freely-programmable digital inputs and outputs
- The analogue I / O can be flexibly programmed (offset, range, addition to the digital set point etc)
- Multi-point V / f characteristics for simple adaption to different motor types
- Sophisticated dc injection braking and “compound braking” to assure minimum motor stopping times
- Fast current limit (FCL) guarantees that if the specified ramp times are too short for the load the drive adapts and does not trip
- Integrated kilowatt-hour (kWh) measurement for energy consumption
- Binary and analogue connection technology (BICO) allows the inputs / outputs to be soft-wired to internal function blocks
- Complete inverter and motor protection comprising under-voltage / overvoltage, inverter over-temperature, earth fault protection, short circuit protection, motor thermal protection, locked motor and stall prevention
- MICROMASTER 420 carries the CE mark for conformance to the low voltage and EMC Directives. It is UL and cUL listed.

The Detail

- Three fully programmable opto-isolated digital inputs (4th binary input available via the analogue input)
- Analogue input, 0-10 V (can accommodate 0 / 4 - 20 mA using a resistor link)
- Programmable and scalable analogue output, 0 (4) mA to 20 mA
- Fully programmable relay output, DC 30 V / 5 A resistive, AC 230 V / 2 A inductive
- Opto-isolated digital inputs for improved EMC immunity
- Fast reaction time to analogue, digital and fieldbus commands
- Integrated RS485 port for serial communications.

Supply Voltage – single phase 200 / 240 V*					
Rating	Frame size	Industrial	List price	Filtered †	List price
0.12 kW / 0.9 A	A	6SE6420-2UC11-2AA1	£109	6SE6420-2AB11-2AA1	£122
0.25 kW / 1.7 A	A	6SE6420-2UC12-5AA1	£118	6SE6420-2AB12-5AA1	£132
0.37 kW / 2.3 A	A	6SE6420-2UC13-7AA1	£125	6SE6420-2AB13-7AA1	£144
0.55 kW / 3.0 A	A	6SE6420-2UC15-5AA1	£137	6SE6420-2AB15-5AA1	£153
0.75 kW / 3.9 A	A	6SE6420-2UC17-5AA1	£150	6SE6420-2AB17-5AA1	£169
1.1 kW / 5.5 A	B	6SE6420-2UC21-1BA1	£172	6SE6420-2AB21-1BA1	£195
1.5 kW / 7.4 A	B	6SE6420-2UC21-5BA1	£196	6SE6420-2AB21-5BA1	£225
2.2 kW / 10.4 A	B	6SE6420-2UC22-2BA1	£233	6SE6420-2AB22-2BA1	£266
3 kW / 13.6 A	C	6SE6420-2UC23-0CA1	£269	6SE6420-2AB23-0CA1	£326

*Three phase 200 / 240 V units on request.

† Class A EMC filtered for commercial or light industrial applications. Additional filter options (eg class B) on request.

Supply Voltage – three phase 380 / 480 V					
Rating	Frame size	Industrial	List price	Filtered †	List price
0.37 kW / 1.2 A	A	6SE6420-2UD13-7AA1	£273	6SE6400-2FA00-6AD0 ¹⁾	£59
0.55 kW / 1.6 A	A	6SE6420-2UD15-5AA1	£283	6SE6400-2FA00-6AD0 ¹⁾	£59
0.75 kW / 2.1 A	A	6SE6420-2UD17-5AA1	£294	6SE6400-2FA00-6AD0 ¹⁾	£59
1.1 kW / 3.0 A	A	6SE6420-2UD21-1AA1	£311	6SE6400-2FA00-6AD0 ¹⁾	£59
1.5 kW / 4.0 A	A	6SE6420-2UD21-5AA1	£329	6SE6400-2FA00-6AD0 ¹⁾	£59
2.2 kW / 5.9 A	B	6SE6420-2UD22-2BA1	£371	6SE6420-2AD22-2BA1	£415
3 kW / 7.7 A	B	6SE6420-2UD23-0BA1	£420	6SE6420-2AD23-0BA1	£470
4 kW / 10.2 A	B	6SE6420-2UD24-0BA1	£462	6SE6420-2AD24-0BA1	£518
5.5 kW / 13.2 A	C	6SE6420-2UD25-5CA1	£588	6SE6420-2AD25-5CA1	£659
7.5 kW / 19.0 A	C	6SE6420-2UD27-5CA1	£708	6SE6420-2AD27-5CA1	£793
11 kW / 26.0 A	C	6SE6420-2UD31-1CA1	£911	6SE6420-2AD31-1CA1	£1,020

† Class A EMC filtered for commercial or light industrial applications. Additional filter options (eg class B) on request.

¹⁾ External footprint module to be used in conjunction with the standard industrial drive.

Options		
6SE6400-0BP00-0AA0	Basic Operator Panel (BOP)	£26
6SE6400-0AP00-0AA1	Advanced Operator Panel (AOP)	£99
6SE6400-1PC00-0AA0	PC-MICROMASTER Connection Kit	£22
6SE6400-0MD00-0AA0	Multidrop Panel Mounting Kit (for AOP)	£73
6SE6400-0PM00-0AA0	Standard Panel Mounting Kit (for BOP or AOP)	£66
6SE6400-1PB00-0AA0	PROFIBUS Module	£88
6SE6400-1DN00-0AA0	Device Net Module	£88
6SE6400-1CB00-0AA0	CAN Bus Module	£88
6SE6400-0GP00-0AA0	Frame Size A Gland Plate	£7
6SE6400-0GP00-0BA0	Frame Size B Gland Plate	£15
6SE6400-0GP00-0CA0	Frame Size C Gland Plate	£22
6SE6400-5AA00-0BP0	Operating Instructions ¹⁾	£45
6SE6400-5BA00-0BP0	Parameter List ¹⁾	£45
6SE6400-5AB00-1AP0	Docu pack – supplied with drive	£4

¹⁾ Available on internet at www.siemens.com/micromaster.



The MICROMASTER 430 – “The Specialist For Pumps and Fans”

The MICROMASTER 430 is specifically designed for integration into systems requiring variable speed control on industrial pump and fan applications including HVAC.



- Output up to 250 kW
- Compact IP20 housing
- Simple to install and commission
- Robust construction
- Energy saving mode and hibernation facility
- Motor / pump staging
- Manual / auto mode
- Load torque detection (detects dry running pumps)
- Designed to make EMC compliance easy
- Facility for external bypass control
- Direct “ptc” or “kty” motor temperature protection
- Remote I / O function via serial communication or fieldbus link.

Performance Features and Benefits

- Flux Current Control (FCC) for improved dynamic response and optimised motor control
- Programmable V / f characteristic
- Energy saving mode (eg stopping of a pump at low speeds)
- Motor staging (connection and disconnection of additional motors, use of inverter as the control drive in a pump cascade system – for example duty / assist)
- Manual / automatic mode with Basic Operator Panel 2 (BOP-2)
- Slip compensation ensuring constant motor speeds under changing load conditions
- “Flying re-start” function allows the inverter to be re-connected to motors which are still spinning after brief power interruptions
- Multi-point V / f characteristics for simple adaption to different motor types
- Fast current limit (FCL) guarantees that if the specified ramp times are too short for the load the drive adapts and does not trip
- Integrated kilowatt-hour (kWh) measurement for energy consumption monitoring
- Binary and analogue connection technology (BICO) allows the inputs / outputs to be soft-wired to internal function blocks for logic and arithmetic functions
- Complete inverter and motor protection comprising under-voltage / overvoltage, inverter over temperature, earth fault protection, short circuit protection, motor thermal protection, locked motor and stall prevention
- MICROMASTER 430 carries the CE mark for conformance to the low voltage and EMC directives. It is  and  listed.

The Detail

- 6 fully programmable opto-isolated digital inputs (7th / 8th inputs via analogue inputs)
- 2 scalable, freely programmable analogue inputs, 0-10 V, 0 / 4 - 20 mA
- 2 programmable and scalable analogue outputs, 0 (4) mA to 20 mA
- 3 fully programmable relay outputs
- Integrated RS485 serial port for communication
- Fast and repeatable reaction time to analogue, digital and fieldbus commands
- Detachable control board.

Supply Voltage – three phase 380 / 480 V					
Rating	Frame size	Industrial	List price	Filtered †	List price
7.5 kW / 19 A	C	6SE6430-2UD27-5CA0	£784	6SE6430-2AD27-5CA0	£964
11 kW / 26 A	C	6SE6430-2UD31-1CA0	£940	6SE6430-2AD31-1CA0	£1,058
15 kW / 32 A	C	6SE6430-2UD31-5CA0	£1,176	6SE6430-2AD31-5CA0	£1,324
18.5 kW / 38 A	D	6SE6430-2UD31-8DA0	£1,489	6SE6430-2AD31-8DA0	£1,614
22 kW / 45 A	D	6SE6430-2UD32-2DA0	£1,685	6SE6430-2AD32-2DA0	£1,826
30 kW / 62 A	D	6SE6430-2UD33-0DA0	£1,959	6SE6430-2AD33-0DA0	£2,124
37 kW / 75 A	E	6SE6430-2UD33-7EA0	£2,508	6SE6430-2AD33-7EA0	£2,712
45 kW / 90 A	E	6SE6430-2UD34-5EA0	£2,900	6SE6430-2AD34-5EA0	£3,135
55 kW / 110 A	F	6SE6430-2UD35-5FA0	£3,331	6SE6430-2AD35-5FA0	£3,605
75 kW / 145 A	F	6SE6430-2UD37-5FA0	£3,762	6SE6430-2AD37-5FA0	£4,067
90 kW / 178 A	F	6SE6430-2UD38-8FA0	£4,428	6SE6430-2AD38-8FA0	£4,788
110 kW / 205 A	FX	6SE6430-2UD41-1FA0	£5,704	6SL3000-0BE32-5AA0 ¹⁾	£862
132 kW / 250 A	FX	6SE6430-2UD41-3FA0	£6,593	6SL3000-0BE34-4AA0 ¹⁾	£1,425
160 kW / 302 A	GX	6SE6430-2UD41-6GA0	£7,408	6SL3000-0BE34-4AA0 ¹⁾	£1,425
200 kW / 370 A	GX	6SE6430-2UD42-0GA0	£8,371	6SL3000-0BE34-4AA0 ¹⁾	£1,425
250 kW / 477 A	GX	6SE6430-2UD42-5GA0	£9,779	6SL3000-0BE36-0AA0 ¹⁾	£1,642

† Class A EMC filtered for commercial or light industrial applications. Additional filter options (eg class B) on request.

¹⁾ External module to be used in conjunction with the standard industrial drive.

Options		
6SE6400-0BE00-0AA0	Basic Operator Panel (BOP2)	£26
6SE6400-1PC00-0AA0	PC-MICROMASTER Connection Kit	£22
6SE6400-0PM00-0AA0	Standard Panel Mounting Kit for BOP2	£66
6SE6400-1PB00-0AA0	PROFIBUS Module	£88
6SE6400-1DN00-0AA0	Device Net Module	£88
6SE6400-1CB00-0AA0	CAN Bus Module	£88
6SE6400-5AE00-0BP0	Operating Instructions ¹⁾	£45
6SE6400-5AF00-0BP0	Parameter List ¹⁾	£45
6SE6400-5AE00-1AP0	Docu pack – supplied with drive	£4

¹⁾ Available on internet at www.siemens.com/micromaster.

Siemens also offers a complete range of financing options!

- Low risk project financing
- Profit recovery using energy payback
- Finance packages designed to ensure that the cost savings outweigh the cost of finance.

MICROMASTER drives are an essential part of energy saving strategies

The MICROMASTER 440 – “The All Purpose”

The MM440 is the flagship model in the MICROMASTER family whose flexibility and performance ensure its suitability for a vast array of drive applications. In addition to variable torque pump and fan applications, for which dual ratings are provided, the 440 also covers more demanding tasks such as: cranes and hoisting gear, extruders, high bay warehouses, packaging machines etc.



- Output up to 250 kW
- Overloads available up to 200%
- Compact IP20 housing
- Simple to install and commission
- Integrated logic control functions
- Robust construction
- Designed to make EMC compliance easy
- Wide range of user interface and communications options
- Operating temperature -10°C to $+50^{\circ}\text{C}$ (0°C to $+40^{\circ}\text{C}$ over 75 kW and variable torque ratings)
- Integrated PID Controller
- Integral (100% rated) brake chopper for all units to 75 kW – (separate module available for units 90-250 kW)
- Remote I / O function via serial communication or fieldbus link
- Direct plc connection for low cost networking.

Worldwide voltages on request.

Performance Features and Benefits

- High quality sensorless Vector control system as standard with encoder feedback option when required
- Flux Current Control (FCC) for improved dynamic response and optimised motor control
- Torque control mode
- Simple positioning function
- Kinetic buffering for ride through of brief supply interruptions
- Slip compensation ensuring constant motor speeds under changing load conditions
- “Flying re-start” function allows the inverter to be re-connected to motors which are still spinning after brief power interruptions
- Multi-point V / f characteristics for simple adaption to different motor types
- Sophisticated dc injection braking and “compound braking” to ensure minimum motor stopping times without external braking resistors
- Fast current limit (FCL) guarantees that if the specified ramp times are too short for the load the drive adapts and does not trip
- Integrated kilowatt-hour (kWh) measurement for energy consumption monitoring
- Binary and analogue connection technology (BICO) allows the inputs / outputs to be soft-wired to blocks in the drive inverter. (Includes logic and arithmetic functions)
- Complete inverter and motor protection comprising under-voltage / overvoltage, inverter over temperature, earth fault protection, short circuit protection, motor thermal protection, locked motor and stall prevention
- MICROMASTER 440 carries the CE mark for conformance to the low voltage and EMC directives. It is UL and cUL listed.

The Detail

- 6 fully programmable opto-isolated digital inputs (7th and 8th binary inputs available via the analogue inputs)
- 2 scalable, freely programmable analogue inputs, 0-10 V, 0 / 4 - 20 mA
- 2 programmable and scalable analogue outputs, 0 (4) mA to 20 mA
- 3 fully programmable relay outputs
- Integrated RS485 serial port for communication
- Fast and repeatable reaction time to analogue, digital and fieldbus commands
- Detachable control board for rapid product replacement.

Supply Voltage – single phase 200 / 240 V*					
Rating	Frame size	Industrial	List price	Filtered †	List price
0.12 kW / 0.9 A	A	6SE6440-2UC11-2AA1	£154	6SE6440-2AB11-2AA1	£174
0.25 kW / 1.7 A	A	6SE6440-2UC12-5AA1	£163	6SE6440-2AB12-5AA1	£184
0.37 kW / 2.3 A	A	6SE6440-2UC13-7AA1	£177	6SE6440-2AB13-7AA1	£201
0.55 kW / 3.0 A	A	6SE6440-2UC15-5AA1	£192	6SE6440-2AB15-5AA1	£217
0.75 kW / 3.9 A	A	6SE6440-2UC17-5AA1	£202	6SE6440-2AB17-5AA1	£228
1.1 kW / 5.5 A	B	6SE6440-2UC21-1BA1	£232	6SE6440-2AB21-1BA1	£262
1.5 kW / 7.4 A	B	6SE6440-2UC21-5BA1	£265	6SE6440-2AB21-5BA1	£299
2.2 kW / 10.4 A	B	6SE6440-2UC22-2BA1	£312	6SE6440-2AB22-2BA1	£351
3 kW / 13.6 A	C	6SE6440-2UC23-0CA1	£365	6SE6440-2AB23-0CA1	£410

*Three phase 200-240 V units on request.

† Class A EMC filtered for commercial or light industrial applications. Additional filter options (eg class B) on request.

Supply Voltage – three phase 380 / 480 V						
Rating CT / VT	Frame size	Industrial	List price	Filtered †	List price	
0.37 kW / 1.3 A	A	6SE6440-2UD13-7AA1	£340	6SE6400-2FA00-6AD0 ¹⁾	£59	
0.55 kW / 1.7 A	A	6SE6440-2UD15-5AA1	£355	6SE6400-2FA00-6AD0 ¹⁾	£59	
0.75 kW / 2.2 A	A	6SE6440-2UD17-5AA1	£368	6SE6400-2FA00-6AD0 ¹⁾	£59	
1.1 kW / 3.1 A	A	6SE6440-2UD21-1AA1	£392	6SE6400-2FA00-6AD0 ¹⁾	£59	
1.5 kW / 4.1 A	A	6SE6440-2UD21-5AA1	£440	6SE6400-2FA00-6AD0 ¹⁾	£59	
2.2 kW / 5.9 A	B	6SE6440-2UD22-2BA1	£510	6SE6440-2AD22-2BA1	£573	
3 kW / 7.7 A	B	6SE6440-2UD23-0BA1	£573	6SE6440-2AD23-0BA1	£644	
4 kW / 10.2 A	B	6SE6440-2UD24-0BA1	£645	6SE6440-2AD24-0BA1	£724	
CT	VT					
5.5 kW / 13 A	7.5 kW / 19 A	C	6SE6440-2UD25-5CA1	£791	6SE6440-2AD25-5CA1	£888
7.5 kW / 19 A	11 kW / 26 A	C	6SE6440-2UD27-5CA1	£968	6SE6440-2AD27-5CA1	£1,086
11 kW / 26 A	15 kW / 32 A	C	6SE6440-2UD31-1CA1	£1,249	6SE6440-2AD31-1CA1	£1,401
15 kW / 32 A	18.5 kW / 38 A	D	6SE6440-2UD31-5DA1	£1,578	6SE6440-2AD31-5DA1	£1,706
18.5 kW / 38 A	22 kW / 45 A	D	6SE6440-2UD31-8DA1	£1,810	6SE6440-2AD31-8DA1	£1,956
22 kW / 45 A	30 kW / 62 A	D	6SE6440-2UD32-2DA1	£2,101	6SE6440-2AD32-2DA1	£2,270
30 kW / 62 A	37 kW / 75 A	E	6SE6440-2UD33-0EA1	£2,703	6SE6440-2AD33-0EA1	£2,921
37 kW / 75 A	45 kW / 90 A	E	6SE6440-2UD33-7EA1	£3,125	6SE6440-2AD33-7EA1	£3,377
45 kW / 90 A	55 kW / 110 A	F	6SE6440-2UD34-5FA1	£3,610	6SE6440-2AD34-5FA1	£3,900
55 kW / 110 A	75 kW / 145 A	F	6SE6440-2UD35-5FA1	£4,098	6SE6440-2AD35-5FA1	£4,427
75 kW / 145 A	90 kW / 178 A	F	6SE6440-2UD37-5FA1	£4,824	6SE6440-2AD37-5FA1	£5,212
90 kW / 178 A	110 kW / 205 A	FX	6SE6440-2UD38-8FA1	£6,004	6SL3000-0BE32-5AA0 ¹⁾	£862
110 kW / 205 A	132 kW / 250 A	FX	6SE6440-2UD41-1FA1	£6,940	6SL3000-0BE34-4AA0 ¹⁾	£1,425
132 kW / 250 A	160 kW / 302 A	GX	6SE6440-2UD41-3GA1	£7,798	6SL3000-0BE34-4AA0 ¹⁾	£1,425
160 kW / 302 A	200 kW / 370 A	GX	6SE6440-2UD41-6GA1	£8,812	6SL3000-0BE34-4AA0 ¹⁾	£1,425
200 kW / 370 A	250 kW / 477 A	GX	6SE6440-2UD42-0GA1	£10,293	6SL3000-0BE36-0AA0 ¹⁾	£1,642

¹⁾ External module to be used in conjunction with the standard industrial drive. † Class A EMC filtered for commercial or light industrial applications. Additional filter options (eg class B) on request. CT = Constant torque duty, eg conveyors. VT = Variable torque duty, eg fans and centrifugal pumps.

Options		
6SE6400-OBP00-0AA0	Basic Operator Panel (BOP)	£26
6SE6400-OAP00-0AA1	Advanced Operator Panel (AOP)	£99
6SE6400-1PC00-0AA0	PC – MICROMASTER Connection Kit	£22
6SE6400-0MD00-0AA0	Multidrop Panel Mounting Kit (for AOP)	£73
6SE6400-0PM00-0AA0	Standard Panel Mounting Kit (for BOP or AOP)	£66
6SE6400-1PB00-0AA0	PROFIBUS Module	£88
6SE6400-1DN00-0AA0	Device Net Module	£88
6SE6400-1CB00-0AA0	CAN Bus Module	£88
6SE6400-0EN00-0AA0	Encoder Feedback Module	£110
6SE6400-0GP00-0AA0	Frame Size A Gland Plate	£7
6SE6400-0GP00-0BA0	Frame Size B Gland Plate	£15
6SE6400-0GP00-0CA0	Frame Size C Gland Plate	£22
6SE6400-5AW00-0BPO	Operating Instructions ²⁾	£45
6SE6400-5BB00-0BPO	Parameter List ²⁾	£45
6SE6400-5AD00-1APO	Docu pack – supplied with drive	£4

²⁾ Available on internet at www.siemens.com/micromaster.

MICROMASTER 411 (the drive “brick”)/ COMBIMASTER 411 (combined drive and motor)

The MICROMASTER and COMBIMASTER 411 are ideally suited to decentralised drive applications where a high “IP” protection rating is required. It has been designed for use in a broad range of applications from simple pump and fans through to multiple drive conveyor applications including networked control systems.



- Output up to 3 kW
- IP66 protection rating for drive “brick”
- Modular construction with many options
- Operation possible without the need for an operator panel (using jumper / potentiometer)
- Integrated control potentiometer
- Thermally efficient heatsink design to allow mounting of inverter in all orientations (except upside-down)
- Operating temperature -10°C to $+40^{\circ}\text{C}$
- Screwless I / O terminals for easy connection and high resistance to vibration.

Performance Features and Benefits

- Flux-current control (FCC) for improved dynamic response and optimised motor control
- Slip compensation ensuring constant motor speeds under changing load conditions
- “Flying re-start” function allows the inverter to be re-connected to motors which are still spinning after brief power interruptions
- Freely-programmable digital inputs and outputs
- The analogue I / O can be flexibly programmed (offset, range, addition to the digital set point etc)
- Multi-point V / f characteristics for simple adaption to different motor types
- Sophisticated dc injection braking and “compound braking” to ensure minimum motor stopping times
- Fast current limit (FCL) guarantees that if the specified ramp times are too short for the load the drive adapts and does not trip
- Integrated kilowatt-hour (kWh) measurement for energy consumption
- Binary and analogue connection technology (BICO) allows the inputs / outputs to be soft-wired to internal function blocks
- Ramp smoothing for reduced mechanical wear
- Complete inverter and motor protection comprising under-voltage / overvoltage, inverter over-temperature, earth fault protection, short circuit protection, motor thermal protection, locked motor and stall prevention
- MICROMASTER 411 carries the CE mark for conformance to the low voltage and EMC directives. It is UL and cUL listed.

The Detail

- Three fully programmable opto-isolated digital inputs (4th binary input available via analogue input)
- Analogue input, 0-10 V (0 / 4-20 mA using an additional resistor link)
- Programmable and scalable analogue output, 0(4) mA to 20 mA
- Fully programmable relay output, DC 30 V / 5 A resistive, AC 230 V / 2 A inductive
- PI feedback for simple process control
- Opto-isolated digital inputs for improved EMC immunity
- Fast reaction time to analogue, digital and fieldbus commands
- 150% load capability for 60 s in 5 mins.

MICROMASTER 411 Supply Voltage – three phase 380 / 480 V						
Rating	Frame size	Industrial	List price	Filtered †	List price	
0.37 kW / 1.2 A	B	6SE6411-6UD13-7BA1	£351	6SE6411-6BD13-7BA1	£430	
0.55 kW / 1.6 A	B	6SE6411-6UD15-5BA1	£358	6SE6411-6BD15-5BA1	£440	
0.75 kW / 2.1 A	B	6SE6411-6UD17-5BA1	£366	6SE6411-6BD17-5BA1	£447	
1.1 kW / 3.0 A	B	6SE6411-6UD21-1BA1	£384	6SE6411-6BD21-1BA1	£463	
1.5 kW / 4.0 A	B	6SE6411-6UD21-5BA1	£406	6SE6411-6BD21-5BA1	£487	
2.2 kW / 5.9 A	C	6SE6411-6UD22-2CA1	£519	6SE6411-6BD22-2CA1	£607	
3 kW / 7.7 A	C	6SE6411-6UD23-0CA1	£539	6SE6411-6BD23-0CA1	£631	

† Class A EMC filtered for commercial or light industrial applications. Additional filter options (eg class B) on request.

COMBIMASTER 411 Supply Voltage – three phase 380 / 480 V							
Rating	Frame size	Industrial 2 pole	Industrial 4 pole	List price	Filtered † 2 pole	Filtered † 4 pole	List price
0.37 kW / 1.2 A	B	1UA1070-2AU2*	1UA1073-4AU2*	£613	1UA1070-2AB2*	1UA1073-4AB2*	£705
0.55 kW / 1.6 A	B	1UA1073-2AU2*	1UA1080-4AU2*	£622	1UA1073-2AB2*	1UA1080-4AB2*	£718
0.75 kW / 2.1 A	B	1UA1080-2AU2*	1UA1083-4AU2*	£641	1UA1080-2AB2*	1UA1083-4AB2*	£732
1.1 kW / 3.0 A	B	1UA1083-2AU2*	1UA1090-4AU2*	£657	1UA1083-2AB2*	1UA1090-4AB2*	£755
1.5 kW / 4.0 A	B	1UA1090-2AU2*	1UA1096-4AU2*	£686	1UA1090-2AB2*	1UA1096-4AB2*	£778
2.2 kW / 5.9 A	C	1UA1096-2AU2*	1UA1106-4AU2*	£889	1UA1096-2AB2*	1UA1106-4AB2*	£988
3 kW / 7.7 A	C	1UA1106-2AU2*	1UA1107-4AU2*	£1,007	1UA1106-2AB2*	1UA1107-4AB2*	£1,109

*Note: underlined digits denote frame size code, ie 1UA1107-4AU2
 ↑ frame size 100

† Class A EMC filtered for commercial or light industrial applications. Additional filter options (eg class B) on request.

Additional Order number suffix with -Z Order Code	Ref	Frame size	List price
Paint Finish (Motor)			
Other paint colours (eg M16)	M16	71 / 80 / 90 / 100	£33
Special paint finish on request (Y54 + Ral Code)	Y54	71 / 80 / 90 / 100	£46
Unpainted (cast iron parts primed)	K23	71 / 80 / 90 / 100	foc
Unpainted – primed	K24	71 / 80 / 90 / 100	foc
Modular Technology / Mounting			
Mounting of 2LM brake	G26	71 / 80 / 90 / 100	£203
Mounting of 2LM brake & encoder 1XP8001-1	H61	100	£859
Mounting of 2LM brake & separately driven fan 2CW2	H63	100	£895
As H63 + encoder 1XP8001-1	H64	100	£1,331
Mechanical Features			
PTC thermistors embedded in windings	A11	71 / 80 / 90 / 100	£43
External Earthing	L13	71 / 80 / 90 / 100	£8
Extra rating plate loose	K31	71 / 80 / 90 / 100	£5
Extra rating plate for purchasers data	Y82	71 / 80 / 90 / 100	£15
Wire-lattice pallet	L99	71 / 80 / 90 / 100	foc
Electromechanical brake control module	M55	71 / 80 / 90 / 100	£145
Communication			
Profibus	M54	71 / 80 / 90 / 100	£219

Selection product specific options	List price
6SE6401-1PB00-0AA0	411 – PROFIBUS Module £219
6SE6400-0AC00-0AA0	Advanced operator panel (AOP) £99
6SE6401-1DF00-0AA0	Operator panel mounting Kit £29
6SE6401-1BL00-0AA0	Interface link cable (pc programming without isolation) £18
6SE6401-1CA00-0AA0	5m cable assembly for door mount kit £18
6SE6401-1EM00-0AA0	411 – Electromechanical Brake control £139
6SE6400-0BP00-0AA0	Basic operator panel £26
6SE6400-1PC00-0AA0 ¹⁾	PC to inverter connection kit (with isolation) £22
6SE6401-0WM00-0AA0	Wall mounting kit £66

¹⁾ For use in conjunction with operator panel mounting kit.

MICROMASTER Options Overview

DRIVE PROGRAMMING

Basic Operator Panel (BOP)

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



It can be directly mounted on the inverter or in a control-cabinet door using a mounting kit.

Operator Panel (OP) (MICROMASTER 410 Only)

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

An OP can be used for several inverters. It can be mounted directly on the drive.

Advanced Operator Panel (AOP)

The AOP enables MICROMASTER parameter sets to be easily read and modified. The value and meaning can be displayed in several languages.

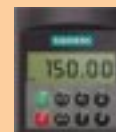


The AOP can be directly mounted on the drive or communicate via a door mounting kit. With the door mounting kit for multiple inverter control the AOP can communicate with up to 31 drives.

For servicing purposes the AOP supports download and upload of complete parameter sets.

Basic Operator Panel 2 (BOP-2) (MICROMASTER 430 Only)

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



PC to Drive Connection Kit

For parameterising the drive directly from a PC. Kit consists of an isolated RS-232 adaptor board for reliable point-to-point connection and an RS-232 standard cable.

KEYPAD PANEL MOUNTING KITS

BOP / AOP door mounting kit for single drive control

For mounting an operator panel in a control cabinet door. Degree of protection is IP56. Contains a cable adaptor board with screwless terminals for use with standard cables.

AOP door mounting kit for multiple drive control

For mounting an operator panel in a control cabinet door. Degree of protection is IP56. The AOP can communicate with 31 drives over the RS-485 connection.

FIELDBUS COMMUNICATION & ENCODER MODULE

PROFIBUS module

Remote connection at up to 12 Mbaud is possible on the PROFIBUS network. The module has a separate 24 V connection which can be used if access is required with the main power removed.



CAN bus module

For integrating MICROMASTERS into the CAN bus fieldbus system.

Remote and local operation of the inverter can be combined by using an operator panel with any of the communication modules.

DeviceNet module

For networking the inverters to the DeviceNet fieldbus system. A maximum transmission rate of 500 kbaud is possible.

Encoder Module

The module enables direct connection of the most widely used HTL and TTL digital pulse encoders. This offers the following functions

- Full load torque at zero speed
- Extremely accurate speed control
- Increased dynamic response of speed and torque control.



COMPATIBILITY

Accessories	Order No.	MICROMASTER
		410 420 430 440
Operator Panels		• Possible combination
OP	6SE6400-OSP00-OAAO	•
BOP	6SE6400-OBP00-OAAO	• •
AOP	6SE6400-OAP00-OAA1	• •
BOP-2	6SE6400-OBE00-OAAO	•

Accessories	Order No.	MICROMASTER
		410 420 430 440
Modules		• Possible combination
PROFIBUS	6SE6400-1PB00-OAAO	• • •
DeviceNet	6SE6400-1DN00-OAAO	• • •
CAN bus	6SE6400-1CB00-OAAO	• • •
Pulse encoder evaluation	6SE6400-OEN00-OAAO	• •

ELECTROMAGNETIC COMPATIBILITY (EMC)

EMC Filters

The complete range of EMC filter options are available – our sales consultants can provide any guidance required.

Industrial

Generally suited to heavy industrial applications where the consumer receives power via a local HV / LV transformer (second environment).

Class A EMC Filtering

Generally used in commercial / light industrial applications for installations with sensitive electronic equipment.

The majority of MICROMASTER units can be purchased with integrated Class A EMC filters.

Class B EMC Filtering

Generally used for domestic environments.

Footprint mounted EMC filters are available which fulfil the requirements of EN 55 011, Class B.

Class B – with low leakage currents

With this filter leakage currents are reduced to <3.5 mA as required by some applications, eg portable appliances.

Note: The appropriate EMC filtering should be established by the site 'EMC Plan' in accordance with the product standard BS EN 61800-3. Correct installation techniques are an essential pre-requisite for electromagnetic compatibility.

Gland Plates

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

The gland plate enables shielded connection of the power and control cables, ensuring optimum EMC performance.

MICROMASTER – Line Chokes / Output Reactors / Braking Resistors



Line Chokes*

Used to smooth voltage peaks, bridge commutating dips and reduce harmonics on the power supply. Recommended where the supply line impedance is less than 1%.

Output Reactors*

Output reactors (chokes) should be used to reduce capacitive currents and dV/dt in long motor cables. Typically required when the cable length exceeds 50-150 m depending on power rating and cable type with higher powers allowing longer cable lengths. Motor cable runs of several hundred metres can be accommodated.†

*Footprint mounted to 37 kW (Block type for 45-250 kW). † Refer to Siemens for specific advice if necessary.

Braking Resistors

MICROMASTER 440 has an integrated 100% rated braking chopper (to 75 kW) for direct connection of a braking resistor where high braking duties are required. Selections below are nominally rated. For high braking duties, refer to our customer hotline.

Supply Voltage – single phase 200 / 240 V						
Rating	Input Choke	List price	Output Choke	List price	Brake Resistor (MM440 only)	List price
0.12 kW	6SE6400-3CC00-4AB3	£51	6SE6400-3TC00-4AD3	£80	6SE6400-4BC05-0AA0	£89
0.25 kW	6SE6400-3CC00-4AB3	£51	6SE6400-3TC00-4AD3	£80	6SE6400-4BC05-0AA0	£89
0.37 kW	6SE6400-3CC01-0AB3	£51	6SE6400-3TC00-4AD3	£80	6SE6400-4BC05-0AA0	£89
0.55 kW	6SE6400-3CC01-0AB3	£51	6SE6400-3TC00-4AD3	£80	6SE6400-4BC05-0AA0	£89
0.75 kW	6SE6400-3CC01-0AB3	£51	6SE6400-3TC00-4AD3	£80	6SE6400-4BC05-0AA0	£89
1.1 kW	6SE6400-3CC02-6BB3	£74	6SE6400-3TC01-0BD3	£102	6SE6400-4BC11-2BA0	£128
1.5 kW	6SE6400-3CC02-6BB3	£74	6SE6400-3TC01-0BD3	£102	6SE6400-4BC11-2BA0	£128
2.2 kW	6SE6400-3CC02-6BB3	£74	6SE6400-3TC01-0BD3	£102	6SE6400-4BC11-2BA0	£128
3 kW	6SE6400-3CC03-5CB3	£75	6SE6400-3TC03-2CD3	£110	6SE6400-4BC12-5CA0	£146

Supply Voltage – three phase 380 / 480 V							
Rating (CT / VT) ¹⁾	Input Choke	List price	Output Choke	List price	Brake Resistor (MM440 only)	List price	
0.37 kW	6SE6400-3CC00-2AD3	£60	6SE6400-3TC00-4AD2	£99	6SE6400-4BD11-0AA0	£110	
0.55 kW	6SE6400-3CC00-2AD3	£60	6SE6400-3TC00-4AD2	£99	6SE6400-4BD11-0AA0	£110	
0.75 kW	6SE6400-3CC00-4AD3	£75	6SE6400-3TC00-4AD2	£99	6SE6400-4BD11-0AA0	£110	
1.1 kW	6SE6400-3CC00-4AD3	£75	6SE6400-3TC00-4AD2	£99	6SE6400-4BD11-0AA0	£110	
1.5 kW	6SE6400-3CC00-6AD3	£77	6SE6400-3TC00-4AD2	£99	6SE6400-4BD11-0AA0	£110	
2.2 kW	6SE6400-3CC01-0BD3	£94	6SE6400-3TC01-0BD3	£102	6SE6400-4BD12-0BA0	£170	
3 kW	6SE6400-3CC01-0BD3	£94	6SE6400-3TC01-0BD3	£102	6SE6400-4BD12-0BA0	£170	
4 kW	6SE6400-3CC01-4BD3	£94	6SE6400-3TC01-0BD3	£102	6SE6400-4BD12-0BA0	£170	
CT	VT						
5.5 kW	7.5 kW	6SE6400-3CC02-2CD3	£110	6SE6400-3TC03-2CD3	£105	6SE6400-4BD16-5CA0	£214
7.5 kW	11 kW	6SE6400-3CC02-2CD3	£110	6SE6400-3TC03-2CD3	£105	6SE6400-4BD16-5CA0	£214
11 kW	15 kW	6SE6400-3CC03-5CD3	£111	6SE6400-3TC03-2CD3	£105	6SE6400-4BD16-5CA0	£214
15 kW	18.5 kW	6SE6400-3CC04-4DD0	£176	6SE6400-3TC05-4DD0	£249	6SE6400-4BD21-2DA0	£268
18.5 kW	22 kW	6SE6400-3CC04-4DD0	£176	6SE6400-3TC03-8DD0	£256	6SE6400-4BD21-2DA0	£268
22 kW	30 kW	6SE6400-3CC05-2DD0	£176	6SE6400-3TC05-4DD0	£256	6SE6400-4BD21-2DA0	£268
30 kW	37 kW	6SE6400-3CC08-3ED0	£249	6SE6400-3TC08-0ED0	£585	6SE6400-4BD22-2EA0	£348
37 kW	45 kW	6SE6400-3CC08-3ED0	£249	6SE6400-3TC07-5ED0	£585	6SE6400-4BD22-2EA0	£348
45 kW	55 kW	6SE6400-3CC11-2FD0	£263	6SE6400-3TC14-5FD0 ²⁾	£388	6SE6400-4BD24-0FA0	£573
55 kW	75 kW	6SE6400-3CC11-2FD0	£263	6SE6400-3TC15-4FD0 ²⁾	£388	6SE6400-4BD24-0FA0	£573
75 kW	90 kW	6SE6400-3CC11-7FD0	£256	6SE6400-3TC14-5FD0 ²⁾	£388	6SE6400-4BD24-0FA0	£573
90 kW	110 kW	6SL3000-OCE32-3AA0	£496	On Application ³⁾		On Application	
110 kW	132 kW	6SL3000-OCE32-8AA0	£512	On Application ³⁾		On Application	
132 kW	160 kW	6SL3000-OCE33-3AA0	£559	On Application ³⁾		On Application	
160 kW	200 kW	6SL3000-OCE35-1AA0	£972	On Application ³⁾		On Application	
200 kW	250 kW	6SL3000-OCE35-1AA0	£972	On Application ³⁾		On Application	

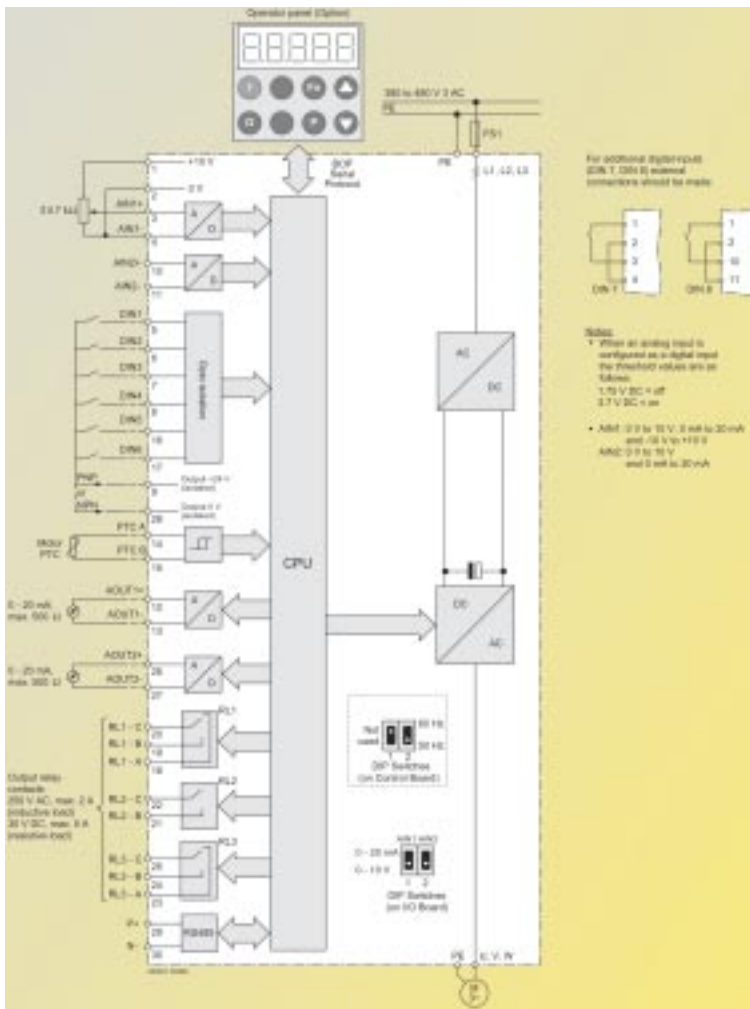
¹⁾ CT = Constant torque duty VT = Variable torque duty.

²⁾ Typically not required for motor cables shorter than 100 m.

³⁾ Block mounted 45 kW upwards.

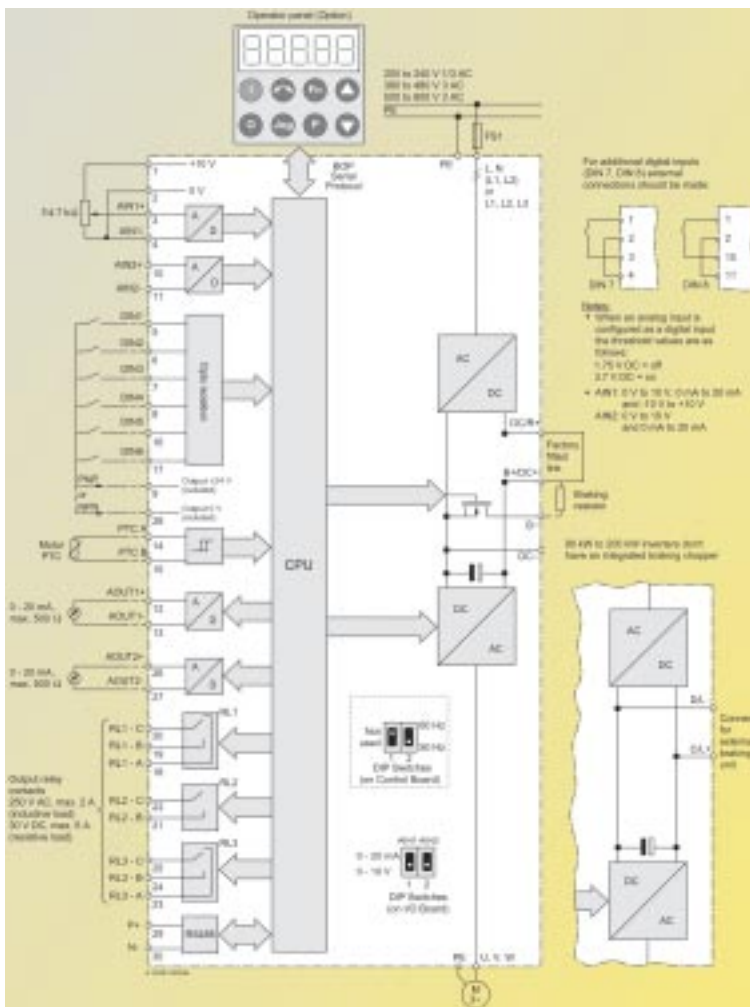
MICROMASTER 430

Interface Connection Schematic



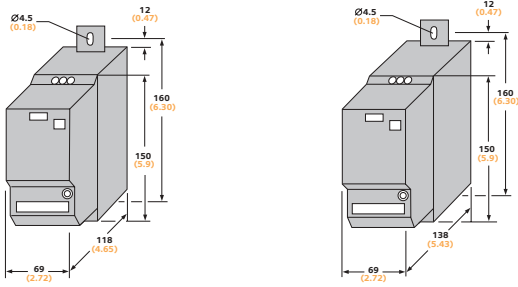
MICROMASTER 440

Interface Connection Schematic



DIMENSIONS

MICROMASTER 410



Frame size AA

Frame size AB

Notes:

1. Side mounting possible
2. Enquire for reduced depth versions.

Notes:

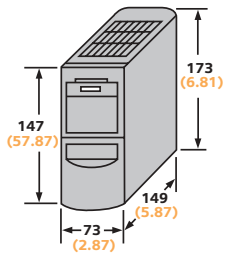
For cabinet sizing purposes, allow for 3% of the drive rating as heat loss.

Allow ventilation clearances around the drives as follows:

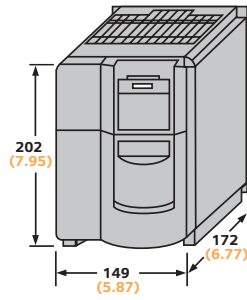
Frame Size	Above mm	Below mm	Side mm
AA & AB	100	100	30
A, B & C	100	100	zero
D & E	300	300	zero
F	350	350	zero
FX & GX	250	150	zero

Note: FX & GX also require 100 mm clearance in front of the drive

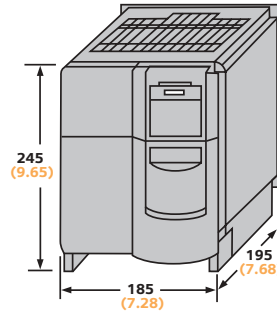
MICROMASTER 420/430/440 – Standard Frame Sizes



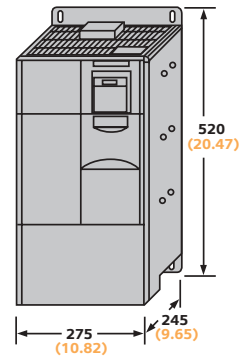
Frame size A



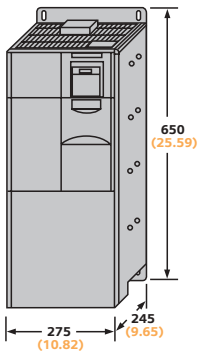
Frame size B



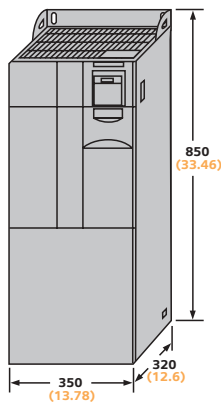
Frame size C



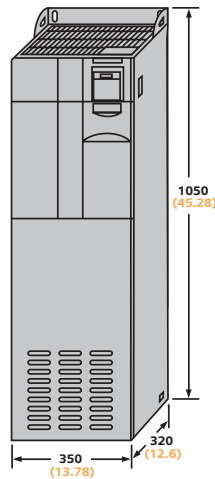
Frame size D



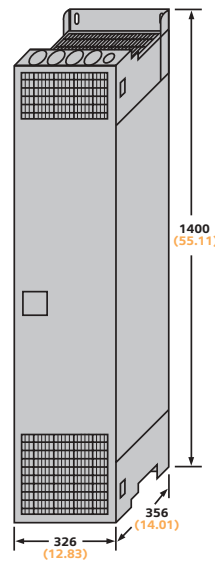
Frame size E



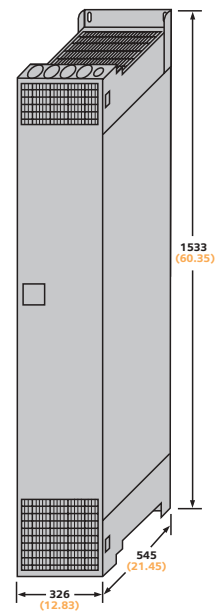
Frame size F industrial



Frame size F with class A EMC filter



Frame size FX



Frame size GX

Totally Integrated Automation (Drive ES)

MICROMASTER drives, COMBIMASTER and low-voltage motors are integral components of Totally Integrated Automation (TIA) – using the Drive ES engineering tool in conjunction with the market leading S7 plc range. This breakthrough allows automation tasks to be handled by drives in a unified, user-friendly fashion.

Many suppliers can connect to Fieldbus, but only Siemens offers TIA.

Seamless integration

Using the Drive ES (engineering system), Siemens drives have been fully embedded and integrated into the engineering and programming software of TIA (Simatic Manager for Step 7). This Drive ES tool has been specifically developed to provide:

- Unified solution for all Automation & Drives equipment
- Simple programming facility via the Profibus network
- Reduced engineering overhead
- Faster installation, commissioning and diagnostics
- Single package for configuration, data management and communications
- Fast 'drive swap' facility without programming.

Siemens is the first manufacturer in the world with the ability to seamlessly integrate variable speed drives into the automation environment.

Simpler and faster to commission

Within Simatic Manager, Drive ES handles all of the projects and libraries for the Simatic product platform and for all drives. Drive ES Basic does more than just allow the drives to be fully integrated into TIA. It also permits the configuring tools, which were previously only available individually (eg, the function block library for drives or Starter the configuration package), to be fully integrated into the Step 7 environment. In addition, Drive ES Simatic also offers standard libraries and uniform operator control interfaces for a standard "look and feel" and for simpler handling of all the TIA automation and drive components.

The Drive ES PCS7 package enables simple integration into a PCS7 SCADA package with pre written faceplates.



Drive ES Basic	6SW1700-5JA00-2AA0	£239
Drive ES SIMATIC	6SW1700-5JC00-3AA0	£357
Drive ES PCS7	6SW1700-5JD00-2AA0	£821

A software update service can be ordered for all packages

Microsystems



- Lowest cost networking
- Direct RS485 connection to S7-200 plc from all Siemens variable speed drives
- Pre-written control and function blocks available.

Commissioning Tools – STARTER

Starter is the graphical commissioning package for the MICROMASTER / COMBIMASTER. Included are features such as simple wizards to guide you through the set up process, the ability to generate user definable parameter sets and a control panel to take local control of the drive.



Starter is provided free of charge for drive commissioning using the PC connection kit option. When using the Drive ES package, STARTER is integrated so a common user interface is maintained.

Low Voltage Motors – The World’s Best Selling Motors

As global market leader, we ship more than 8,000 MW of motor power annually. With a complete portfolio of standard motors and customised designs which cover every application from pumps, fans and compressors through to highly sophisticated drive systems.

Energy Saving Motors EFF 1 EFF 2

With increasing emphasis on the need to reduce CO₂ within the environment, Siemens offers a comprehensive range of high efficiency, energy saving motors. These motors offer significantly lower operating costs, with up to 42% less power loss within the motor. The results are impressive:

- Lowest lifetime cost
- Improved bearing life
- Low noise design as standard
- Service factor 1.15
- EFF1 designs in standard frame sizes
- Inverter resistant patented insulation system (supply voltages ≤500 V)
- Energy technology list qualified motors to 400 kW
- Payback times as low as 3 months.

Lower running costs, longer lifetimes, resulting in quicker payback time of your capital.



Frame sizes:	56 to 450
Power range:	0.06 to 1,000 kW (4-pole)
Number of Poles:	2, 4, 6, 8
Degree of protection:	IP55 (or greater)
Voltages:	All common voltages
Frequency:	50 Hz and 60 Hz
Design:	IM B3, IM B5, IM B35, IM B14, and others
Enclosure:	Frame sizes 56M – 225M aluminium Frame sizes 100L ... 450 cast iron
Type of cooling:	Fan cooled
Temperature class:	F, utilised according to B
Insulating system:	Inverter-proof insulation system DURIGNIT® IR 2000

For frame sizes 280 and above on inverter duty, an insulated non-drive end (NDE) bearing is recommended – available as a standard option.

Modular mounting concept – a modular system for every requirement

The modular concept provides the flexibility to enhance standard motor features, and includes the following options:

- Mechanical brake assembly options
- Rotary pulse encoder (attached to fan cover / non-drive end shaft)
- Force ventilation unit (fitted to provide cooling at high or low motor speeds)
- Multi-mount features
- Flexible terminal box position
- COMBIMASTER included in modular concept design.

To provide complete flexibility, a range of additional modifications is available including increased IP ratings, fitting of anti-condensation heaters and thermistors.



To complement the extensive range of energy efficient motors, the portfolio is enhanced by:

- Motors for ‘hazardous areas’ – including ‘flameproof’, ‘increased safety’ and ‘non sparking’ designs
- Smoke extraction motors – F200 / F300 / F400 to EN12103-1
- MICROSTARTER direct on reversing integrated motor / starter with ASi option
- Marine motors in accordance with DNV, GL, ABS and LRS certification.



ATEX certified motors are available, including motors for variable speed use

Complementary Drive Technology

For high performance 'engineered drive' applications, many of which may benefit from modular design philosophies, the Masterdrive range is the most advanced system currently available. This extensive portfolio is characterised by complete flexibility of mechanical construction, performance levels and system design:

Masterdrive Vector Control (VC)

The MasterDrive VC drive offer the latest technology available in an expandable and modular architecture. The VC drive may control traditional AC asynchronous motors or the 1PH square frame motors in both open loop and closed loop vector control modes.



Masterdrive Motion Control (MC)

The MasterDrive MC drives offer the latest technology for high performance servo applications. The MC drive may control traditional brushless servomotors or AC asynchronous motors featuring resolver or encoder feedback.



The following functions can be parameterised:

- Indexing
- Absolute positioning
- Synchronised CAM profiles
- Electronic gearbox synchronisation and registration
- PID loop control.

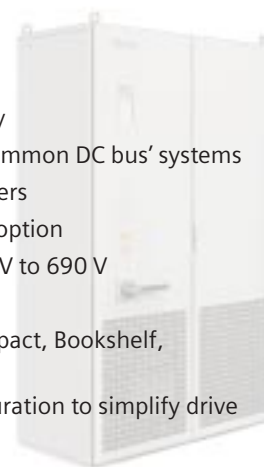
Masterdrive DC

The Masterdrive DC drive variant offers state-of-the-art control of dc motors. This means that the complete range of benefits offered by the Masterdrive family is now available for dc motor control.



Masterdrive Features:

- From 0.55 to 5000 kW+
- Converters fed from AC supply
- Inverters for connection to 'common DC bus' systems
- Single or four quadrant rectifiers
- Clean power (harmonic free) option
- Three phase supply from 200 V to 690 V
- Air or water cooled options
- Four construction types: Compact, Bookshelf, Chassis, Cabinet
- Function Block (BICO) Configuration to simplify drive engineering.



Masterdrive Options

Special technology modules with dedicated firmware are available to add functionality to the drives. This functionality is thus removed from the PLC or front end control, providing decentralised intelligence.

- Sophisticated PID control and additional I / O
- Process drive control with firmware options:
 - Winder software (for unwind and rewind applications)
 - Synchronisation and registration software
 - Multi motor control
 - Positioning control.
- PROFIBUS, CAN or DeviceNet communications cards
- SIMOLINK – fibre optic communications.

POSMO

This new integrated servo motor, drive, motion control and gearbox is designed for simple machine "make ready" operations. Controlled by PROFIBUS, POSMO expands the possibilities in distributed drive architecture.



ServoMaster Brushless – AC motors

The ServoMaster motor range covers the complete spectrum of high performance motors from the economy range of 1FK6 servomotors, high dynamic IFT6 motors through to high performance square frame induction motors (including IPH7 and IPL6 types).

They feature:

- High power density with low physical volume
- Typically conform to dc motor sizes
- High degree of protection
- Water cooled options available
- High speed ranges and maximum mechanical speeds
- Speed to zero without torque reduction
- Robust with low maintenance requirements
- Integrated feedback devices as standard.



Technical Support, Service and Warranty

From project concept to implementation and beyond, Siemens Automation & Drives provides comprehensive life cycle support. Our extensive support team includes Applications and Technical Support Engineers, Product Specialists and Field Service Engineers, who provide a wide range of services:

- Application consultancy
- Technical support
- Field service, including installation, commissioning, maintenance, breakdown recovery
- Warranty handling, including repair, parts replacement, service exchange
- On line – a comprehensive information system available on the internet at [www.siemens.com / micromaster](http://www.siemens.com/micromaster).



In addition to the above, we offer a number of proactive services to optimise the availability and performance of all types of installations, such as

- **Service / maintenance contract options**
 - 7 days / week, 365 days / year
 - fast response to site
 - tailored service contracts available to meet individual customer requirements.
- **Asset management options**
 - plant maintenance management – including preventative measures
 - bonded stock availability
 - repair contracts
 - software update service (SUS)
 - asset management software solutions
 - leasing.

■ Process improvement strategies

- consultancy
- best practice programmes
- site audits.

We also address a number of issues which are of particular importance to drives installations and have outlined below two such examples covering harmonics and energy efficiency.



Harmonic Measurement Service and Power Quality Analysis

Power frequency harmonics are a key consideration for many users and



Siemens are able to offer a comprehensive package of products, system analysis, software tools and the services to guarantee compliance to the UK regulations G5/4: Planning levels for harmonic distortion in the UK supply network (available from the electricity association).

Available both as pre and post installation services, to measure harmonic levels of either the drive itself, the application or the whole site. The audit will report harmonic levels and make remedial recommendations, such as additional mains filtering, to ensure that harmonic levels fall within current requirements.

Energy Efficiency Consultation

Electric motors use two thirds of electrical energy in industry. High efficiency motors and variable speed drives offer significant potentials for energy savings. Additionally, we can offer a complete service including software tools, energy management systems, high efficiency products and site services. Furthermore, a range of financial options including low cost leasing can underpin the package.

We can offer a comprehensive energy efficiency audit service to measure energy consumption trends, over extended operating periods, for a wide range of plant including pumps and fans. Using the latest energy monitoring equipment engineers are able to calculate optimum operational conditions and make recommendations for energy optimisation by the correct use of motor drive technology. Repeat audits can then be used to confirm cost saving predictions after the installation is complete.



Unrivalled in our scope of technical support, we can assure you of a competent service – whatever your requirement.

Help Desk Number: 0161 446 5545

E-mail: cstech@plcman.siemens.co.uk

24hr information available from [www.siemens.com / micromaster](http://www.siemens.com/micromaster)

SITRAIN® – Customer Training Solutions

Customer training is part of a range of Siemens support programmes aimed at optimising the skills of staff involved in designing, installing and maintaining Siemens automation and drives systems.

Training plans often need to be integrated with a planned service approach to optimise automation system performance. Siemens Automation & Drives Training will work with customers to develop a training programme which will meet their specific needs for developing staff and complementing their chosen service option. SITRAIN® provides quality training solutions based on a hands-on, 'learning by doing' approach.



Professional Training from SITRAIN:

- Is the fastest way to acquire knowledge
- Reduces the cost of downtime
- Motivates and retains staff
- Aids decision making processes producing cost benefits.

As part of the comprehensive programme of training solutions for Siemens automation and drives applications, SITRAIN offers the following MICROMASTER Drives Course which can be attended in standard format as a scheduled course. Alternatively the course can be tailored to customer requirements and delivered either at Siemens or the customer site.

MICROMASTER 4 servicing, commissioning SI-MM4 (2 days) £650 + VAT

This is a practical introduction to commissioning and maintaining the Micromaster 4 drive, as well as the use of associated software, and includes:

- Basic drive theory
- Overview of MICROMASTER
- Connections on MICROMASTER 420 / 440
- Commissioning
- Analogue / digital, inputs and outputs
- Drive Monitor configuration software
- BICO technology
- Free blocks
- Factory default
- Faults and Alarms
- Starter configuration software
- Profibus DP
- S7 PLC operation with MICROMASTER.



Computer Based Training (CBT) SM-MM4 and Web Based Training (WBT) WT-MM4

Commissioning is carried out in interactive mode using the MICROMASTER 420 frequency inverter. In particular, handling of the simulated parameter keypad 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.

**For CBT and WBT training options,
log on to: www.sitrain.com**

For all your training needs contact:

Tel: 0161 446 5741 / 5744 / 6782

Fax: 0161 446 5742

Further information is contained in the following catalogues:

Standard drives	MICROMASTER range	DA51.2
	COMBIMASTER range	DA51.3
Engineered drives	Masterdrives VC	DA65.10
	Masterdrives MC	DA65.11
High performance motors	Servomaster	DA65.3
Low voltage motors	EFF1 and EFF2	M11

Please call our literature hotline **0845 7 70 50 70** to obtain the above, or further information on the complete range of automation and drives products and solutions. Literature can be ordered or downloaded at the following website:
[www.siemens-industry.co.uk / literature](http://www.siemens-industry.co.uk/literature)

Additional information on the complete range of drives can be obtained from:

[www.siemens.com / drives](http://www.siemens.com/drives)

distributor stamp

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