SIEMENS

Standard Drives Always the Right Power



Siemens standard drives – perfect drive solutions for every situation



Siemens standard drives always provide you with the right power, across a vast range of uses and applications in industries and building systems worldwide. The basis is a complete range of standard drives, which meet an enormous variety of requirements, as well as being available in special customized versions. This is a range of drives for maximum efficiency and economy.

Siemens frequency inverters and low-voltage motors are optimally

matched to one another. As far as innovation is concerned, our standard drives have always been at the top. As the leading supplier of low-voltage motors and standard inverters worldwide, we can offer even more than innovative technology with our world-class range of products: we can offer our local presence all around the world – in production, sales and service.

Exclusive to Siemens

Totally Integrated Automation (TIA) – the Siemens concept of threeway integration in configuring, data management and communication – now enables automation tasks to be performed consistently, conveniently and cost-effectively using standard drives.

All Siemens standard drives are integrated in the TIA concept. Within TIA, standard drives are linked via PROFIBUS-DP[®] and engineering software to SIMATIC.

With TIA, Siemens customers can save up to 30% of the costs and considerable amounts of time.

Quality: seamlessly tested

When it comes to quality too, our standard drives simply deliver everything that emphasizes the highest quality: ISO 9001, EFQM Business Excellence, product type-tests, compliance with all current international standards – any more questions?

Highest performance

Our standard drives are compact, easy to operate and can be used worldwide. Furthermore, they pack a lot of benefits into an extremely small space, for the widest variety of applications: in the food and packaging industry, for pumps, conveying heating and ventilation systems and many other applications.

This is because our standard drives combine the highest technical demands with versatile functionality as standard: from the basic version for simple applications to the highperformance versions with sensorless vector control for sophisticated applications. Each version also has an impressive price/performance ratio.

Overview of standard drives:

- Energy-saving motors with IEC and NEMA-compliant dimensions
- Modular mounting concept
- Explosion-protected motors
- Inverter motors
- Single-phase motors
- Standard inverters for industrial and building applications
- Customer-specific solutions





Power ahead with Totally Integrated Automation®

Energy-saving motors – earning in a profit for you



High energy costs have a significant impact on operating costs since they account for 97% of life cycle costs of a motor, with purchase and installation accounting for only 3%. In Germany alone, there are potential savings of about 1.5 billion euros per year to be gained from the use of energy-optimized drives. Significantly lower operating costs, up to 45% less power losses, extended service life, low maintenance – our new energy-saving motors pay for themselves in every respect.

Our enormously powerful energy-saving motors are based on Siemens low-voltage motors, millions of them are in use around the world. They can easily be integrated anywhere, they comply with all current international standards and cover more than 90% of all conceivable applications worldwide. With their aluminum or cast-iron enclosures, frame sizes from 56 to 450 mm, outputs of between 0.06 and 1,000 kW – our rugged, energy-saving motors offer an excellent price-performance ratio and high operational reliability and they are compatible with every drive concept.

Selection of types

We are one of the few motor suppliers in the world to offer a complete range of energy-saving motors:

- High-efficiency energy-saving motors that comply with EU High Efficiency class EFF1
- Improved-efficiency energysaving motors that comply with the EU Improved Efficiency class EFF2
- Energy-saving motors in accordance with US EPACT (Energy Policy Act of 1992) for 60-Hz operation

Energy-saving motors – the benefits at a glance :

- Noticeable reduction of operating costs due to optimization of efficiency
- 1LA9/1LG6 motors comply with both EFF1 and EPACT efficiency
- Easier selection of motors due to efficiency factor classification (EFF1/EFF2) and Siemens energy-saving program: www.siemens.de/energiesparmotoren
- Longer motor service life and lubrication intervals due to lower motor temperature for EFF1 and EPACT motors
- High overload reserves in continuous operation (SF 1.15 for 1LA9/1LG6)
- All motors are inverter-resistant up to 500 V
- Less harm to environment due to reduction of CO_2
- Integration into Totally Integrated Automation via frequency inverters and PROFIBUS-DP®

Frame sizes:	56M to 450
Power range:	0.06 to 1,000 kW
Number of poles:	2, 4, 6, 8
Classification:	- EU/CEMEP
	efficiency classification
	EFF1: 1.1 - 90 kW, 2-, 4-pole
	EFF2: 1.1 - 90 kW, 2-, 4-pole
	- US/EPACT: 1–200 HP, 2-,4-,6-pole
Degree of protection:	IP55
Voltages:	All common voltages
Frequency:	50 Hz and 60 Hz
Type of construction:	All common constructions
Enclosure:	Frame sizes 56M 225M aluminum
	Frame sizes 100L 450 cast iron
Type of cooling:	Surface cooled
Temperature class:	F utilized according to B
Insulating system:	DURIGNIT [®] IR 2000, inverter-
	resistant up to 500 V, 690 V on
	request

Overview of energy-saving motors:







Energy-saving motor: 1LG4 FS180M, 1LA9 FS160L, 1LA9 FS100L with flange

Modular mounting concept – a modular system for every requirement



The basic idea behind our modular concept is as simple as it is efficient: The basic model can be equipped with whatever you need, for example a rotary pulse encoder, brakes or a separately driven fan – a single motor for the widest range of drive solutions.

This modular concept shows its class in all areas. Wherever highly specialized drives have to work together quickly and precisely – in wire-drawing or packing machines, production lines for fibers or foils.

Or wherever motors have to be extremely flexible in use – and their stocking costs have to be as inexpensive as possible. Or wherever drive technology has to be fit for the future – for easy adaptation to new demands. A motor concept cannot be more flexible and cost-effective than this.

Modular mounting concept

Our new energy saving motor with an aluminum enclosure and degree of protection IP55 is extremely robust. It has high efficiency (EFF1,EFF2) and the inverter-resistant insulation system DURIGNIT[®] IR 2000 as standard. It is available for all international voltages – and the best part is: It is completely modular.

The brakes, rotary pulse encoder and separately driven fan modules single or in all combinations make it an all-rounderThese components can be retrofitted at any time: quickly and easily thanks to the patented

Siemens modular technology.

Rotary pulse encoder module

A precision drive can be quickly created: Mount the encoder module to the motor shaft and fan shroud on the cooling side and it is ready. Retrofitting is possible without special tools.

Mechanical brake module

Our energy saving motor easily masters the highest demands with its mechanical brake module: From setting-up and positioning machines to high-bay racking, conveyer and tooling equipment technology.

Separately driven fan module

The separately driven fan module reliably guarantees a cooling air flow. Low-noise and consistent cooling, even at high or low motor speeds.

Reduced costs across the board

The modular concept reduces costs across the board. Because everything operates faster and more smoothly: When designing the drive with standard modules, at installation, start-up and during operation, adaptation and storage. And our modules also have an unbeatable price.

Mounting module	Motor frame size
Rotary pulse encoder	100 L – 315 L
Brake	63 – 225 M
Braking torque	5 – 400 Nm
Separately driven fan	100 L – 225 M





Modular concept, 1LA7 FS100L with brake, rotary pulse encoder and separately driven fan



The fan side of the motor has a centering with thread for mounting a rotary pulse encoder



The braking module masters a lot of requirements.



The separately driven fan module cools reliably, consistently and quietly.

EEx motors – bringing safety to hazardous environments



In hazardous areas such as those found in the chemical and oil industries or in gas works, motors must meet the highest safety standards – and you can always rely on Siemens explosion-protected motors. With a simple and rugged drive technology that runs for extremely long periods even under extreme conditions. These have already proved themselves a hundred thousand times worldwide.

Here, too, we offer a seamless program for all requirements with maximum security and the highest efficiency. For the explosion protection types "enhanced safety" –

"e" (EEx e II), flameproof enclosure – "d" (EEx de IIC) and non-sparking – "n" (EEx nA, Ex nA) for gas explosion protection. A new addition to the series are the motors for dust explosion protection.

Siemens explosion-protected motors are tested by the PTB (German Physical Federal Testing Laboratory) or by the Deutschen Montan Technologie GmbH company (DMT).

Motors	In explosion protection type "e"	In explosion protection type "d"	In explosion protection type "n"	For dust explosion protection
Frame sizes:	63M to 355	71M to 450	56M to 450	56M to 315L
Power range:	0.12 to 400 kW	0.25 to 630 kW	0.06 to 1,000 kW	0.06 to 200 kW
Number of poles:	2, 4, 6	2, 4, 6, 8	2, 4, 6, 8	2, 4, 6, 8
Temperature class:	T1 – T3	T1 – T4	ТЗ	-
Explosion protection type:	II 2 G EEx e II to DIN EN 50014/ DIN EN 50019	II 2 G EEx de IIC to DIN EN 50014/ DIN EN 50018	II 3 G EEx n A to DIN EN 50021 Ex n A to II 3 G IEC 60079-15	Zone 21: II 2DT 125°C Zone 22: II 3DT 125°C to DIN EN 50281/ IEC 61241
Guideline:	94/9/EG, ATEX 100a	94/9/EG, ATEX 100a	94/9/EG, ATEX 100a	94/9/EG, ATEX 100a
Degree of protection:	IP55	IP55	IP55	Zone 21: IP65
Voltages:	All common voltages	All common voltages	All common voltages	All common voltages
Frequency:	50 Hz and 60 Hz	50 Hz and 60 Hz	50 Hz and 60 Hz	50 Hz and 60 Hz
Type of construction:	All common construc- tions	All common construc- tions	All common construc- tions	All common construc- tions
Enclosure:	Frame sizes 63M 160L aluminum Frame sizes 100L 355 cast iron	Cast iron	Frame sizes 56M 225M aluminum Frame sizes 100L 450 cast iron	Frame sizes 56M 225M aluminum Frame sizes 100L 315L cast iron
Type of cooling:	Surface cooled	Surface cooled	Surface cooled	Surface cooled
Heat class:	F utilized according to B	F utilized according to B	F utilized according to B	F utilized according to B
Insulating system:	DURIGNIT® IR 2000	DURIGNIT [®] IR 2000, inverter-resistant up to 500 V	DURIGNIT [®] IR 2000, inverter-resistant up to 500 V, 690 V on request	DURIGNIT® IR 2000, inverter-resistant up to 500 V, 690 V on request

Overview of explosion-protected motors





EEx motor: EEx de IIC 1 MJ6, FS180 M



EEx motor: EEx e II 1 MA6, FS200 L

NEMA motors – powerful, robust, reliable



For the special requirements of the North American market, Siemens manufactures a range of low-voltage NEMA motors at our production site in Guadalajara, Mexico. Robust in design, these motors are manufactured strictly in accordance with the DIN EN ISO 9001 global quality standard and they can stand the test of even the most rugged industrial applications.

Our flexible series of NEMA motors is available in a wide range of

variants to suit every application: the series has everything to offer, from EPACT motors and explosion protection to highly-efficient premium motors.

All our motors, however, incorporate innovative Siemens technology. For the greatest degree of operational safety and maximum service life, giving the greatest reliability and efficiency.

EPACT motors – rugged and economical

Our EPACT motors (RGZP) meet every need. They are reliable in the most rugged applications and they approach the premium efficiency level.

Horizontal or vertical positioning as required

Our NEMA motors can be installed horizontally or vertically, with C- or D-flange.

Premium motors for maximum performance

Our motors with the premium efficiency factor (RGZESDX) exceed all the requirements of IEEE-841 1994 for rated output 1 to 500 HP. With their cast-iron enclosure they guarantee even in aggressive industrial environments maximum performance and service life. As variable-speed drives they can be used on IGBT inverters. All things considered, optimum economy over the entire service life.

Explosion-proof motors – for maximum safety

Our RGZZESD motors offer reliable explosion protection even in the harshest conditions. They comply with the stringent requirements stipulated for Division 1, Class 1 (Group D) and Class 2 (Groups F & G). They are designed in accordance with temperature class B. For optimum safety, these motors can also be upgraded for Division 1, Class 2 (Group E).

The major technical features:				
Frame sizes:	56 to 440			
Power range:	0.75 to 500 HP			
Number of poles:	2, 4, 6, 8			
Voltages:	200 / 230 / 460 / 575			
Frequency:	60 Hz, 50 Hz on request			
Construction:	Foot mount, D-flange, C-flange,			
	P-flange			
Enclosure:	Cast iron; FS 56: steel			
Type of cooling:	Surface cooled			
Temperature class:	Of the motor designed			
	according to B			

The benefits at a glance:

- Optimized for the NEMA market
- Suitable for every drive concept
- Easy to integrate anywhere
- High operating quality
- High degree of efficiency
- Robust, long-lived, maintenance-free
- High operating reliability
- Can be used in extreme atmosphere
- All common pole numbers







NEMA motor: RGZSD

NEMA motor: RGZZESD

COMBIMASTER 411 – the distributed drive solutions



Our COMBIMASTER 411, combining inverter (MICROMASTER 411) and EFF2 energysaving motor into a single unit, sets totally new efficiency and ruggedness standards for variable-speed drives from 0,12 kW to 75 kW. Thanks to use in distributed configurations, MICROMASTER 411 – in degree of protection IP66 – saves on cabling, installation and configuring costs, and simultaneously reduces the space required in the switching cabinet.

MICROMASTER 411 – the rugged inverter with degree of protection IP66 – has been specially designed for attaching to standard motors. Only four fixing screws are needed for MICROMASTER to turn any standard motor into a variable-speed drive. MICROMASTER 411 and COMBIMASTER 411 increase fault immunity and, when used in distributed configurations, they offer up to 30% savings in costs compared to conventional solutions.

Rugged, compact, space-saving

With degree of protection IP66 for the inverter (motor IP55; both IP56 and IP65 on request), COMBIMASTER 411 can also be used in the harshest of conditions. And as further proof of its ruggedness, there are no cables between the inverter and the motor, so there is less electromagnetic interference (EMC). The optimal integration of the inverter-motor combination makes the drive small and compact, thus saving space and making handling easier.

Ready to start

Where requirements are simple, the COMBIMASTER 411 is ready to go right away: standard parameters have already been set at the factory end.

Easy to adjust

The MICROMASTER operator panel modules (BOP/AOP) are available for adapting to special tasks. With these, drive values can be set quickly and safely and modified at any time according to your wishes.

Versatile in use

A wealth of options such as PROFIBUS®, mechanical brake control and EMC filters Class B, open up the multiplicity of potential applications. COMBIMASTER411/ MICROMASTER 411 are fully compatible in parameterization and operation with all MICROMASTER products of the 4th generation, that is, parameterization is the same as on the MICROMASTER 420/440.

The most important technical features:			
Frame size :	56 to 132		
Power range:	0.12 to 7.5 kW		
Delivery:	Up to 4 kW;		
	Planned: 07/01		
	Up to 7.5 kW;		
	Planned 01/02		
Number of poles:	2 and 4		
Voltages:	200–230 V 3 AC		
	or 400–480 V 3 AC		
Frequency:	50 and 60 Hz		
Type of design (motor):	IM B3, IM B5, IM B35, a. o.		
Housing:	Aluminum		
Method of cooling:	Surface cooled		
Temperature class:	of the motor F used		
	according to B		
Insulating system:	DURIGNIT [®] IR 2000,		
	inverter-proof insulating		
	system		

The benefits at a glance:

- Perfectly matched duo
- Simplest possible installation/assembly
- Less cabling overhead
- Reduced switching cabinet requirements
- High degree of EMC
- Integral potentiometer
- Degree of protection IP66 for inverter and fully self-cooled, IP55 for motor, IP65 on request
- Inverter suitable for attachment to any motor
- Separation of electronics and terminal compartment installation and wiring present no hazard to the electronic circuits
- Same parameterization, operator panels, performance and start-up software as MICROMASTER 420/440
- Modular concept with many options
- Integrated into Totally Integrated Automation





MICROMASTER 411, CS B



COMBIMASTER 411 family

MICROMASTER 420 – unique in the world of standard inverters



Starting from now, you can relax back into your easy chair when the subject of frequency inverters comes up, because the new MICROMASTER 420 makes life easy for you: everything about it is so simple that configuring, assembly and start-up become as much fun as operation and parameterization.

The new MICROMASTER 420 range of inverters is suitable for many applications thanks to its innovative concept.

MICROMASTER 420 is characterized by the simplest possible connections, innovative parameter structure, flux current control (FCC) and the integral COMPOUND BRAKING[™] system.

MICROMASTER 420 is also fast and reliable with short delivery times worldwide. And MICROMASTER 420 fills the bill for top quality too: ISO 9001, EFOM Business Excellence, product tests, and compliance with an abundance of international standards.

MICROMASTER 420 always fills the bill

MICROMASTER 420 is modular. The modules are simply attached – and you're ready to go. With the host of available options, it fits into any drive concept:

- Input and output reactors
- EMC filters of Class A and B in accordance with EN 55011, with low leakage currents (3.5 mA Class B)
- PROFIBUS module
- Advanced operator panel (AOP)
- Basic operator panel (BOP)
- Assembly kits for connection to PC and for installing the operator panels in cabinet doors
- PC inverter assembly kit
- and much more

Super extras that fit in

Everything fits in on the MICROMASTER 420, including all its other features:

- COMPOUND BRAKING[™] that controls braking without brake resistors
- PI controllers for simple closedloop process control
- Automatic adaptation of the acceleration and deceleration times to prevent shutdowns on faults when current and voltage limits are reached
- Automatic restart function following power failure or faults
- Innovative, user-friendly start-up tool "STARTER"
- The MICROMASTER 420 can be integrated ideally into the SIMATIC automation system via its PROFIBUS-DP[®] interface and engineering software and is therefore fully integrated into Totally Integrated Automation (TIA). Customers can reduce costs by upto 30% with the Siemens TIA concept.

MICROMASTER 420: The advantages in brief

- Power range: 0,12 kW to 11 kW
- Operating temperature: -10 to +50°C
- Modular design
- Simple assembly and start-up
- Analog output
- Flux current control (FCC) for improved dynamic characteristics
- Parameterizable V/f characteristic
- Fast reproducible response of the digital inputs
- Integral RS485 interface
- Removable Y-capacitor for use in IT line supplies
- Output frequency range 0 to 650 Hz
- Various integral protection functions: undervoltage or overvoltage, overload, short-circuit, stalling protection, rotor blocking protection, overtemperature, parameter interlock
- Standards: CE, UL, cUL, c-tick





MICROMASTER 440 – more performance, even more potential



There's been a new addition to the 4th generation of the MICROMASTER: following the MICROMASTER 420, the MICROMASTER 440 has now seen the light of day. And its got what it takes: more power, more performance, and more applications. Added to this are the MICROMASTER 420 already familiar features regarding ease of assembly and fast start-up.

The decisive efficiency edge is supplied by optimized vector control: from now on, fast-response inputs enable precise start/stop operation. Even slow reverse current

braking can be mastered in this way. And the MICROMASTER 440 holds out great promise for the future: if desired, you can also go for a high-performance PROFIBUS-DP[®] option – so that you are always accessible at all levels of the Ethernet and PROFIBUS-DP[®] hierarchy. Last but not least an optional Devicenet is also available.

Start-up the way you like it

The MICROMASTER 440 makes it easy for you, starting with assembly and start-up:

- Easy-to-assemble and clearly structured connections with color-coding of the input/output terminals and control cable connection
- Fast start-up of the vectorcontrolled drive with less than 20 parameters in the shortest possible time
- Status display panel (SDP) for the simplest applications, if the default settings are used unchanged
- All parameters are accessible optionally via the basic operator panel (BOP), or the advanced operator panel (AOP); the AOP has plain-text information (multilanguage) and memory capacity for up to 10 complete parameters
- Fast series start-up through copying of parameters from unit to unit
- With the AOP, automatic detection of attached optional modules

MICROMASTER 440: flexible, multifunctional, always suitable

- The most up-to-date vector control and a new machine model with flow monitor enable regulated operation even at the lowest frequencies and the slowest reverse current braking
- Control of velocity, speed, frequency or torque
- Integral brake chopper for the shortest possible braking and the shortest possible deceleration time
- Integral EMC filter
- Monitoring and reporting function for simple monitoring of process or machine
- Parameterizable interconnections for configuring the inputs/outputs and internal states
- Free PID controller with autotuning function for implementing higher-level closed-loop control concepts
- Can be easily integrated into the communications networks with PROFIBUS[®] or DeviceNET, if desired
- TIA: integration into the modern automation concepts with SIMATIC: system configuring with integral data management opens up all the inverter's potential: configuring, startup, and program integration
- Removable Y-capacitor for use in IT networks

MICROMASTER 440: The highlights in brief

- Power range from 0.12 kW to 75 kW in six sizes
- Clear and simple connections
- Pre-assigned parameters for fast start-up
- 13 digital or analog inputs/outputs with freely parameterizable line-side connection
- Optimized vector control for improved start/stop operation and reversing
- Fast, reproducible response of the digital inputs
- Integral brake chopper
- Full incorporation into TIA
- Integral protection functions
- Standards: CE, UL, cUL, cTick



MICROMASTER 440 for the power range from 0.12 kW bis 75/90 kW



Worldwide support



This also distinguishes Siemens as market leader from other suppliers: Our experts are always there for you locally and worldwide in over 130 countries.

You can count on this unique service network in any eventuality. When it comes to designing a drive, shipment, installation, startup and maintenance – you can depend on our experience and knowhow.

One of our strengths is, without question, the ability to design a drive to precisely fit an application. No matter what your goal, we show you the optimum solution. We take into consideration all of your requirements and fully utilize the potential of our world-class "Motors & Inverters." And we are also absolute specialists in customized solutions – for cost-effective drive applications.

Customer satisfaction

The ultimate goal is to achieve and secure an outstanding level of customer satisfaction through total company quality and to be the most reliable partner for our customers throughout the world.

Proximity to our customers has topmost priority

Our customers have access to a finely-meshed sales and service network. And we are committed to constantly improve and expand this network – worldwide. The address where you will find your regional partner for standard drives very quickly is as follows : www. siemens.com/automation/partner

Customer support helps without speed-limit

When you need a service specialist, a spare part, a product expert, or you just have a simple question please contact us. We will help you out at once. Efficiently and without time loss. With our customer support service we have a worldwide network for Service & Support which have Service centres in your vicinity. Short ways for professional Service & Support which you can depend on.

Customer support – the rapid contact to us

Helpline Service & Support: Phone: +49 (0) 180 5050 111

Field Service: Phone: +49 (0) 180 5050 444

Technical Support: Free Contact Phone: +49 (0) 180 5050 222

Fast Contact: Phone: +49 (0) 911 895 7777

E-mail: techsupport@siemens.de

Online support: www. siemens.com/automation/ support





Siemens in your region Standard Drives

www.siemens.de/standarddrives

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