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http://www.siemens.de/automation/partner

13629 Berlin
Siemensdamm 50
Tel. +49 (0)30 3 86-3 22 60
Fax +49 (0)30 3 86-3 32 76

40219 Düsseldorf
Völklinger Straße 1
Tel. +49 (0)2 11 3 99-27 43
Fax +49 (0)2 11 3 99-18 48

45128 Essen
Kruppstraße 16
Tel. +49 (0)2 01 8 16-29 39
Fax +49 (0)2 01 8 16-21 75

20099 Hamburg
Lindenplatz 2
Tel. +49 (0)40 28 89-26 74
Fax +49 (0)40 28 89-26 19

30880 Hannover-Laatzen
Werner-von-Siemens-Platz 1
Tel. +49 (0)5 11 8 77-22 59
Fax +49 (0)5 11 8 77-20 79

04103 Leipzig
Schützenstraße 4–10
Tel. +49 (0)3 41 2 10-43 13
Fax +49 (0)3 41 2 10-43 02
68165 Mannheim

Dynamostraße 4
Tel. +49 (0)6 21 4 56-36 15
Fax +49 (0)6 21 4 56-29 68

81679 München
Richard-Strauss-Straße 76
Tel. +49 (0)89 92 21-22 09
Fax +49 (0)89 92 21-38 43

90439 Nürnberg
Von-der-Tann-Straße 30
Tel. +49 (0)9 11 6 54-33 25
Fax +49 (0)9 11 6 54-34 36

70499 Stuttgart
Weissacher Straße 11
Tel. +49 (0)7 11 1 37-29 84
Fax +49 (0)7 11 1 37-24 25

Belgien
Siemens S.A.
Chaussée de Charleroi 116
1060 Bruxelles
Tel. +32 (0)25 36 25 15
Fax +32 (0)25 36 22 06

Dänemark
Siemens A/S
Borupvang 3
2750 Ballerup
Tel. +45 (0)44 77 42 36
Fax +45 (0)44 77 40 23

Finnland
Siemens Osakeyhtiö
Majurinkatu 6
02601 Espoo
Tel. +3 58 (0)1 05 11 33 50
Fax +3 58 (0)1 05 11 37 00

Frankreich
Siemens S.A.S.
39–47, boulevard Ornano
93527 Saint-Denis
Tel. +33 (0)1 49 22 36 75
Fax +33 (0)1 49 22 35 23

Griechenland
Siemens A.E.
Artemidos 8
P.O.B. 6 10 11
15125 Amaroussio/Athen
Tel. +30 (0)1 68 64-5 14
Fax +30 (0)1 68 64-5 56

Großbritannien
Siemens plc
Drives & Standard Products
Sir William Siemens House
Princess Road
Manchester M20 2UR
Tel. +44 (0)16 14 46 53 30
Fax +44 (0)16 14 46 54 71

Irland
Siemens Ltd.
Slaney Road
Dublin 11
Tel. +3 53 (0)16 03 24 35
Fax +3 53 (0)16 03 24 99

Italien
Siemens S.p.A.
Via dei Valtorta, 48
20127 Milano
Tel. +39 (0)02 66 76 22 81
Fax +39 (0)02 66 76 22 16

Luxemburg
Siemens S.A.
20, rue des Peupliers
2328 Luxemburg-Hamm
Tel. +3 52 (0)43 84 34 03
Fax +3 52 (0)43 84 34 49

Niederlande
Siemens Nederland N.V.
Prinses Beatrixlaan 26
2500 BB Den Haag
Tel. +31 (0)7 03 33 34 50
Fax +31 (0)7 03 33 32 91

Norwegen
Siemens A/S
Division Industrie und Schifft
Bratsbergvn. 5
7005 Trondheim
Tel. +47 (0)73 95 96 09
Fax +47 (0)73 95 91 90

Österreich
Siemens AG Österreich
Siemensstraße 88–92
1211 Wien
Tel. +43 (0)5 17 07-2 30 48
Fax +43 (0)5 17 07-5 43 85

Polen
Siemens Sp.z.o.o.
ul. Zupnicza 11
03-821Warschau
Tel. +48 (0)2 28 70 91 12
Fax +48 (0)2 28 70 91 49

Portugal
Siemens S.A.
Rua Irmaos Siemens, 1
2720-093 Amadora
Tel. +3 51 (0)2 14 17 82 14
Fax +3 51 (0)2 14 17 80 89

Russland
Siemens A/O
Malaja Kaluzhskaja 17
117071 Moskau
Tel. +7 09 57 37 23 90
Fax +7 09 57 37 23 98

Schweden
Siemens AB
Johanneslundsvägen 12–14
19487 Upplands Väsby
Tel. +46 (0)87 28 14 02
Fax +46 (0)87 28 10 82

Schweiz
Freilagerstrasse 28–40
8047 Zürich
Tel. +41 (0)14 95 57 89
Fax +41 (0)14 95 42 43

Slowakische Republik
Siemens s.r.o.
A&D Industriesysteme
Komenského 3
04001 Kosice
Tel. +4 21 (0)9 56 22 31 24
Fax +4 21 (0)9 56 23 25 15

Spanien
Siemens S.A.
Div. Accionamientos
Ronda de Europa 5
28760 Tres Cantos (Madrid)
Tel. +34 (9)15 14 70 63
Fax +34 (9)15 14 70 32

Tschechische Republik
Siemens Elektromotory s.r.o.
Na Strizi 40
14021 Prag
Tel. +4 20 (0)61 09 52 05
Fax +4 20 (0)61 09 52 52

Türkei
SIMKO Ticaret ve Sanayi A.S.
Atatürk Bulvari 169/6
06680 Ankara
Tel. +90 (0)21 64 59 37 11
Fax +90 (0)21 64 59 39 74

Ungarn
Siemens Rt.
Lajos u. 109
1036 Budapest
Tel. +36 (0)14 57 16 76
Fax +36 (0)14 57 17 04

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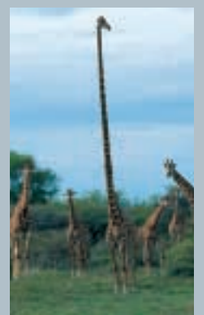
Subject to change without prior notice 03/02 | Order No. E20001-A140-P510-X-7600 | DISPO 21506 | MK.LD.XX.LDMV.52.2.01 | 21D6312 WS 03023. | Printed in Germany

SIMOVERT MV Drive Converters:
HV-IGBT technology makes them more than reliable

drive converter SIMOVERT MV

Siemens Aktiengesellschaft
Automation and Drives
Large Drives
P.O. Box 47 43
D-90025 Nuremberg

www.siemens.com/simovert-mv



SIEMENS

Variable-speed, medium-voltage drives –
that extra plus for the cost-effectiveness of your plant.

High availability for low overall costs

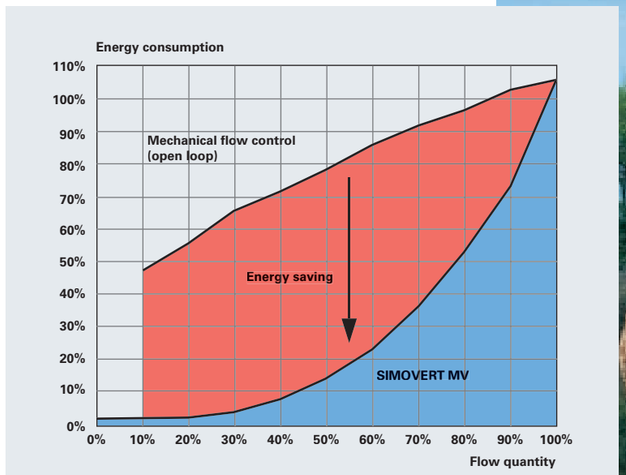
Nothing is more expensive than when production is down. IGBT technology has already proven itself over a long period of time for low-voltage drives, has now been available for several years for medium voltage, resulting in an extremely high drive availability. Your advantage – low overall life cycle costs.

The drive which reduces energy consumption

SIMOVERT® MV medium-voltage drive converters are used to implement variable-speed drive solutions. This means that you can save significant amounts of energy and increase product quality as you have better control over your processes. You should take full advantage of this cost-saving potential.

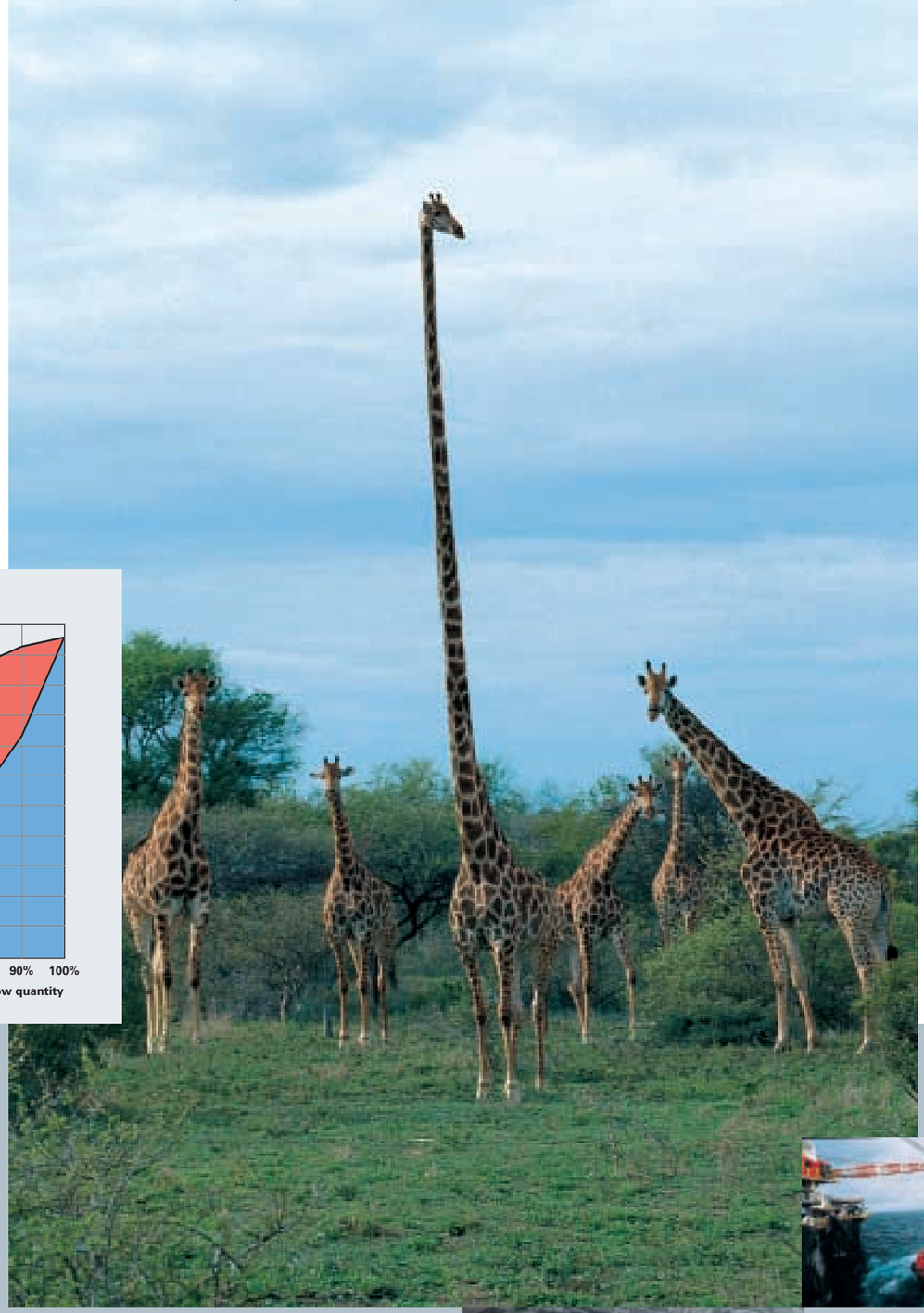
Medium-voltage for low operating costs

As medium-voltage drive converter using HV-IGBT technology, SIMOVERT MV offers some unique advantages with respect to other solutions as a result of the higher efficiency when converting the power. This has an extremely positive impact on the operating costs – at any output and for every voltage from 2.3 to 6.6 kV.



Energy-saving drives for pumps and fans

When SIMOVERT MV is used to drive fans and pumps, significant amounts of energy can be saved. When using SIMOVERT MV, the payback time is frequently between one and two years.



This is where you especially benefit from SIMOVERT MV

SIMOVERT MV is a medium-voltage drive converter for a wide range of applications. Profit from its wealth of advantages, e.g. for:

- Pumps, fans, and compressors
- Crushers and shakers
- Wire-drawing systems
- Marine drives
- Excavators and conveyor equipment
- Paper and rolling mill systems

SIMOVERT MV:
A high availability is good –
but an even higher one is better!

The reason for the success of SIMOVERT MV is based on this simple formula. The superior technology of the SIMOVERT series was used as platform to develop the first series medium-voltage drive converter with innovative HV-IGBT technology. This is how SIMOVERT MV significantly increases the standard and that across the board.

$$\text{Availability} = \frac{\Sigma \text{ Operating times}}{\Sigma \text{ Operating times} + \Sigma \text{ Downtimes}}$$

Take control of the future using HV-IGBTs
For many years now, IGBT technology has established itself for low-voltage drives. It is now clearly establishing itself for medium-voltage applications. The first SIMOVERT MV units with HV-IGBT power semiconductors have already been operating for years. Leading power semiconductor manufacturers are investing in this technology. The reason for this is that the advantages of HV-IGBTs make it the component of the future. Grasp the opportunity and fully utilize the experience that we have gained as technology leader in this sector.

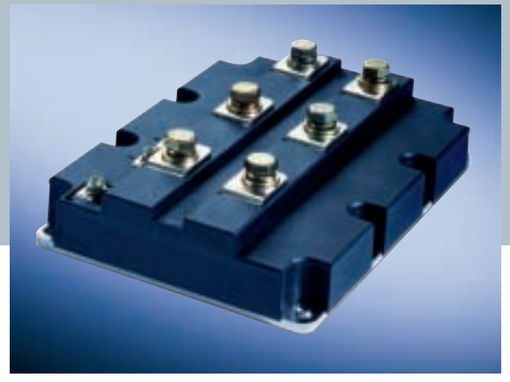
Extremely simple design – highest reliability
SIMOVERT MV with HV-IGBTs distinguishes itself as a result of the fact that it requires absolutely no snubber circuitry. This means fewer components and an extremely simple power section design. Not only this, but the simple gating technology with its extremely low gating power requires extremely few components. This has a major positive impact on the reliability.

Short-circuits – a thing of the past
The intelligent IGBT technology simultaneously provides excellent protection against short-circuits. It makes drive converters short-circuit-proof without having to use any additional filter. The fact that SIMOVERT MV does not require a filter means that the energy losses are reduced together with the costs for additional equipment. This ensures higher dynamic performance and a higher availability.

Availability is far more than reliability
In order to achieve a high degree of availability, production uptimes must be maximized. This means high reliability. If you wish to achieve a higher availability, then possible downtimes must be minimized. This also means faster diagnostics and faster service.

The closed-loop control has literally everything under control
The rugged, high dynamic performance TRANSVEKTOR® control, proven many times over, guarantees stable operation even under the toughest conditions. The objective of the monitoring and diagnostic functions is, where at all possible, to maintain operation when faults actually occur – which is extremely seldom. It also allows fast diagnostics and troubleshooting by providing clear information and instructions.

Service in record time
We have one of the most tightly-meshed service networks worldwide. Spare parts are available 24 hours a day, specialists are on call – and a mechanical design which was optimized from the very beginning to allow parts to be quickly replaced. All of these features guarantee that your downtimes remain extremely short when service is required.

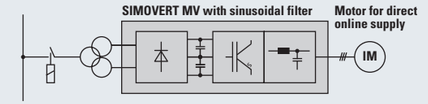


The HV-IGBT module – innovative power semiconductors

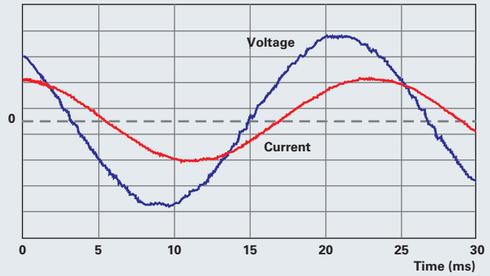
You only pay for what you actually require.
This means that you get a lot more.

We offer the optimum drive solution for every application. SIMOVERT MV is the basis. Depending on the particular requirement, this can be complemented by the appropriate Siemens motor. Your advantage – the drive system is cost-effective and the drive components are perfectly harmonized with one another – and, not only this, but you do not require an output filter. This additionally increases the cost-effectiveness. The result – the optimum solution for new drives.

There is also an optimum solution for the retrofit business – by combining SIMOVERT MV with existing fixed-speed motors which are connected to the line supply. In this case, only an additional output filter is required. This approach allows you to transform every fixed-speed, medium-voltage motor into a cost-effective, variable-speed drive which at the same time has a high degree of availability.

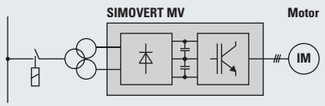


Current and voltage characteristics at the motor



The combination possibilities:
SIMOVERT MV with H-compact or H-compact PLUS – always the ideal team

Integrated drive system
When SIMOVERT MV is combined with the matching Siemens motor, an output filter is not required. This reduces costs, saves space, reduces the drive complexity, lowers the losses, and therefore permanently increases the overall cost-effectiveness of your system. At the same time, this combination allows high speed drives to be implemented up to a max. of 7500 revolutions per minute.



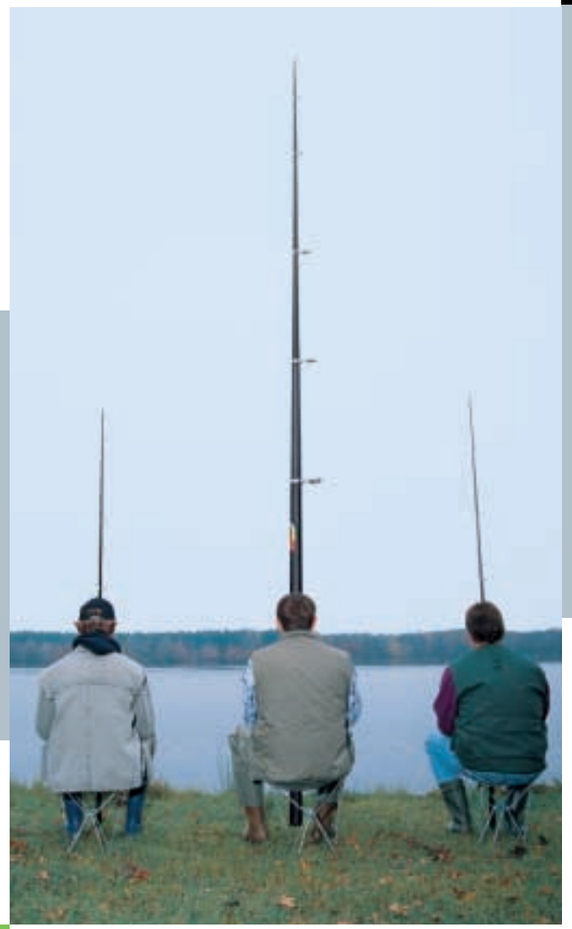
Retrofit your fixed-speed drive
We also have the right solution when you wish to retrofit a fixed-speed drive: the output filter which is additionally required is available as standard option. In fact, for the 6 kV and 6.6 kV models, this is already integrated as standard!

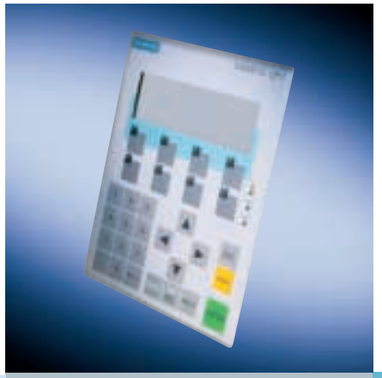
Availability is more than reliability.
SIMOVERT MV fulfills the highest demands.

From the very start, topmost priority was given to the high availability of SIMOVERT MV. When selecting the concept, considerable emphasis was placed on the low number of parts and components and a reliable power semiconductor which is easy to use – the HV-IGBT. However, availability is more than just reliability. With numerous associated deviations in the process, the drive initially continues to operate but signals the problem. You can further increase the availability by using various options. Downtimes are shortened as a result of the integrated diagnostic functions and the modular and service-friendly mechanical design. This is complemented by the finely meshed service network which provides fast support when and where it becomes necessary. As you can see when it comes to availability, for SIMOVERT MV we have left nothing to chance.

It runs and runs and alarms
SIMOVERT MV includes various functions which detect when the drive performance deviates from what it should be. This is then signaled but the drive is not powered down. This means that you can make all of the preparations required to resolve the fault while the drive continues to run. The thermal drive converter model, the speed-dependent torque limiting, and temperature monitoring are just some of these functions.

Options for even higher availability
You can select several options if you want to further increase the availability:
– Emergency operation when fans fail
– Redundant fans
– Redundancy in the water cooling system
– Automatic restart
– Spare parts packages
– Service options





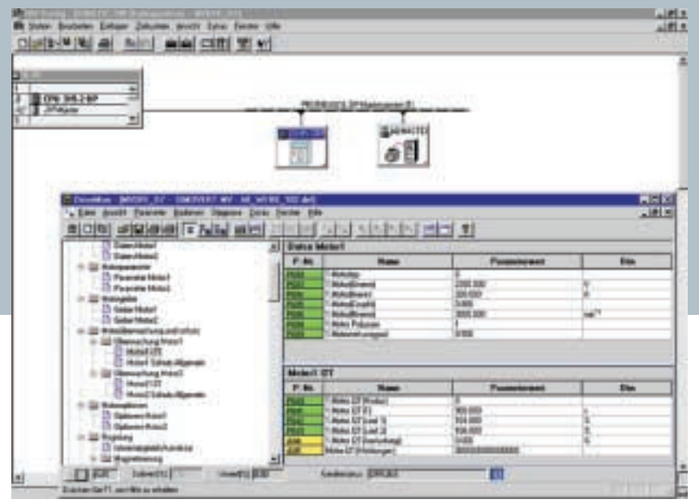
Fast diagnostics
When service is actually required, fast troubleshooting is the name of the game. Good diagnostics capabilities help. SIMOVERT MV has an operator panel with plain text messages, additional help texts, and an internal memory for fault messages. A trace memory saves the various characteristics. Service personnel are supported by test functions during commissioning and service.

Service-friendly design
When service is required, downtimes are kept shorter thanks to the excellent accessibility of all of the parts and components. The HV-IGBT Powercards can be replaced, without using special tools, in just a few minutes. Many of the modules can be simply inserted and are easy to handle. For instance, the closed-loop control module or the optical firing device.

From engineering the drive to commissioning:
Integrated tools for Siemens drives.

High-performance tools provide efficient support even during the first steps – before your SIMOVERT MV is used: the DRIVE ES software to engineer, parameterize, and commission the drives is part of an integrated set of tools for Siemens automation technology. This makes engineering and commissioning especially cost-effective and efficient. Furthermore, DRIVE ES is fully integrated into the SIMATIC STEP 7 tool environment.
You benefit from a common and integrated data management for both the automation and drives.

Configuration and commissioning
The DRIVE ES software tool significantly simplifies configuring and commissioning a drive. The drive is parameterized using tables which can be individually generated, or directly via the staggered menus. Parameter sets can be read, written, and managed. This is complemented by the process data handling and the generation and editing of script files. Embedded in the SIMATIC STEP 7 Manager, communications to the higher-level SIMATIC automation system can be configured at the same time.



Whether support, logistics, or service:
The complete SIMOVERT MV environment is optimally aligned to our customers.

Our organization consequentially focuses on your requirements as customer: we see ourselves as partner. From support, generating a drive concept up to services after the drive has been supplied, which includes service/maintenance, troubleshooting, and much more. Our mindset and our organization make many things a lot easier for you. This is because we offer more than just technology. You always have access to a competent partner who can provide you with information about the progress of your particular order. And, as a result of our logistics and production control system, we can flexibly respond to your individual customer requirements – and provide you with what you require in-line with the market requirements. And all of this with the recognized Siemens quality.

You can freely select from a wide range of Siemens training courses. For all Siemens drive systems

In 130 countries worldwide
You can always depend on Siemens. We are one of the world's leading electronic and electrical engineering companies and we are close to our customers: In about 130 countries and in more than 240 cities – our support is always close by. And you will always find a contact partner.

Fit for the field: Siemens training courses
We offer a wide range of training courses for all of the Siemens drive products: from basic through expert training courses for commissioning and service up to individually tailored training courses.

24-hour spare parts service
As part of our global service network, we offer you a sophisticated logistics concept for short delivery times, high on-time delivery, fast handling, and prompt service. Furthermore, our worldwide service center has a spare part inventory for a 24-hour service when repair is required.

You can reach our experienced service personnel by telephone around the clock

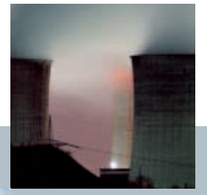
Technical data

General	
Power semiconductors	HV-IGBTs; diodes
Line-side converter	12-pulse diode rectifier (standard) 24-pulse diode rectifier (option)
Motor-side converter	3-level converter (PWM) with HV-IGBT
Closed-loop control	TRANSVEKTOR closed-loop control, fully digital with signal processor
Drive quadrants	Driving: 2 directions of rotation (2 quadrant) Braking: with optional braking chopper and brake resistor
Potential separation: power section – Open-loop and closed-loop control	Fiber-optic cable
Permissible humidity rating	Relative air humidity < 95 %, moisture condensation is not permissible
Noise level	Approx. 80 dB (A)
Efficiency (standard version)	> 98.4 % at the rated operating point
Regulations which are complied with	IEC, EN
Paint finish	RAL 7032

Degree of protection	**Acc. to DIN VDE 0470, IEC 60529, EN 60529**
– standard	IP 21 (air cooling), IP 23 (water cooling)
– optional	IP 23, IP 41(air cooling), IP 43, IP 54 (water cooling)

Cooling type	
Air cooling	**Forced air cooling with integrated fans**
Permissible ambient and cooling-medium temperature	
– in operation	0 °C to + 40 °C: 100% load capability + 40 °C to + 45 °C: current de-rating
– during storage	– 25 °C to + 55 °C, 2K2
– during transport	– 25 °C to + 70 °C, 1K2

Water cooling	**De-ionized water with integrated water-to-water heat exchanger**
Permissible ambient temperature	
– in operation	+ 5 °C to + 40 °C
– during storage	– 25 °C to + 55 °C (without de-ionized water)
– during transport	– 25 °C to + 70 °C (without de-ionized water)
Permissible cooling-medium temperature (raw water)	
– intake	+ 5 °C to + 35 °C
– outlet	max. + 40 °C



It does not matter where you use your drives. And it doesn't make any difference as to whether your system is new or it involves retrofitting an existing system – SIMOVERT MV offers you a high degree of flexibility

Supply data		
Rated line supply voltage	for rated motor voltage	Rated supply voltage
(12-pulse diode incoming	2.3 kV	2 x 1.2 kV
rectifier DFE)	3.3 kV	2 x 1.7 kV
	4.16 kV	2 x 2.2 kV
	6.0 kV	2 x 1.2 kV
	6.6 kV	2 x 1.2 kV
Line supply voltage tolerance	± 10%	
Line supply frequency	50 Hz/60 Hz, ± 3%	
Auxiliary power supply	3-ph. 400 V AC, ± 10%	
Output	Depends on the drive output	
Basic fundamental power factor	cos φ > 0.96	

Output parameters					
Rated motor voltage 2.3 kV		Rated motor voltage 3.3 kV		Rated motor voltage 4.16 kV	
Output current	Output	Output current	Output	Output current	Output
200 A	0.8 MVA	175 A	1.0 MVA	180 A	1.3 MVA
250 A	1.0 MVA	230 A	1.3 MVA	240 A	1.7 MVA
300 A	1.2 MVA	260 A	1.5 MVA	280 A	2.0 MVA
350 A	1.4 MVA	315 A	1.8 MVA	320 A	2.3 MVA
400 A	1.6 MVA	370 A	2.1 MVA	360 A	2.6 MVA
450 A	1.8 MVA	400 A	2.3 MVA	400 A	2.9 MVA
500 A	2.0 MVA	460 A	2.6 MVA	460 A	3.3 MVA
550 A	2.2 MVA	510 A	2.9 MVA	510 A	3.7 MVA
600 A	2.4 MVA	550 A	3.1 MVA	550 A	4.0 MVA

Rated motor voltage 6.0 kV		Rated motor voltage 6.6 kV		Rated motor voltage 4.16 kV (parallel circuit configuration)	
Output current	Output	Output current	Output	Output current	Output
65 A	0.66 MVA	60 A	0.66 MVA	2 x 325 A	4.7 MVA
95 A	1.0 MVA	90 A	1.0 MVA	2 x 360 A	5.2 MVA
115 A	1.2 MVA	105 A	1.2 MVA	2 x 415 A	5.9 MVA
125 A	1.3 MVA	116 A	1.3 MVA	2 x 460 A	6.7 MVA
145 A	1.5 MVA	130 A	1.5 MVA	2 x 495 A	7.2 MVA
175 A	1.8 MVA	160 A	1.8 MVA	Higher outputs on request	
190 A	2.0 MVA	175 A	2.0 MVA		
Max. output frequency		100 Hz, higher frequencies on request; for 6.0 kV and 6.6 kV: 66 Hz			
Speed control range		1:1000 (with encoder)			

Dimensions – drive converter (air cooling)			
Rated motor voltage	Rated output	W x H x D (mm)	Approx. weight
2.3 kV	0.8 MVA	1,818 x 2,570 x 1,259	1,200 kg
	1.0–2.4 MVA	2,418 x 2,570 x 1,259	1,750–1,900 kg
3.3 kV	1.0 MVA	1,818 x 2,570 x 1,259	1,500 kg
	1.3–3.1 MVA	2,418 x 2,570 x 1,259	2,050–2,700 kg
4.16 kV	1.3 MVA	1,818 x 2,570 x 1,259	1,500 kg
	1.7–4 MVA	2,418 x 2,570 x 1,259	2,050–2,700 kg
	4.7–7.2 MVA	4,218 x 2,570 x 1,259	3,600–3,700 kg
6.0 kV; 6.6 kV	0.66–2.0 MVA	(3,018–4,218) x 2,570 x 1,259	4,550–6,500 kg