SIEMENS

SIMOVERT® MV

Medium Voltage AC Drives
400HP to 8,000HP

Experience. Innovation. Performance

It's a clear road
to project success

Thanks to the SIMOVERT® MV's flexible, modular design, there is now a "customized" medium voltage AC drive solution without the usual high cost and long turn-around time requirements. Many of the drive features that our competitors offer only as options, we offer as standard. And even among those items sold as options, our experience and size has given us the advantage of quicker turnaround. **These reasons combined make our SIMOVERT MV the most cost effective drive available.**

The SIMOVERT MV product range covers the entire medium voltage (2.3kV-6.0kV) range, meeting customer requirements for motor sizes from 400hp to 8,000hp. And boasting one of the smallest footprints in the world.

There's a wealth of features packed in the standard design. The customer selects the add-on components to complete the configuration. All units feature HV-IGBT technology. The customer selects from 12-pulse, 24-pulse, or the top-of-the-line Active Front End (AFE) supply-side rectification and filtering. Precision speed control is available from 0 to 9000 rpm. Air cooling is offered from the smaller sizes through 4MVA units.

All the important standards are met: IEC, CSA, UL, IEEE, EN and NEMA. Design, manufacturing and service for the Systems Division has been ISO 9001 certified since 1994.

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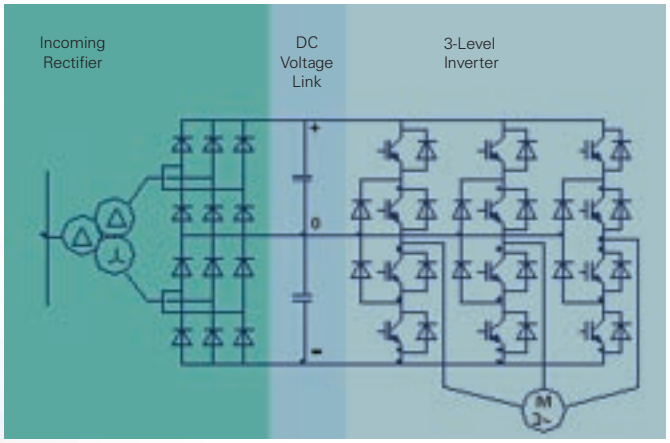
High Technology at a Reasonable Price

Part of our ability to deliver the latest technology at a reasonable cost is our unique modular approach. But equally important, we simply care about our customers and their success. Delivering the best technology at the most cost-effective price is a tall order, but it's something we pride ourselves in being able to deliver.

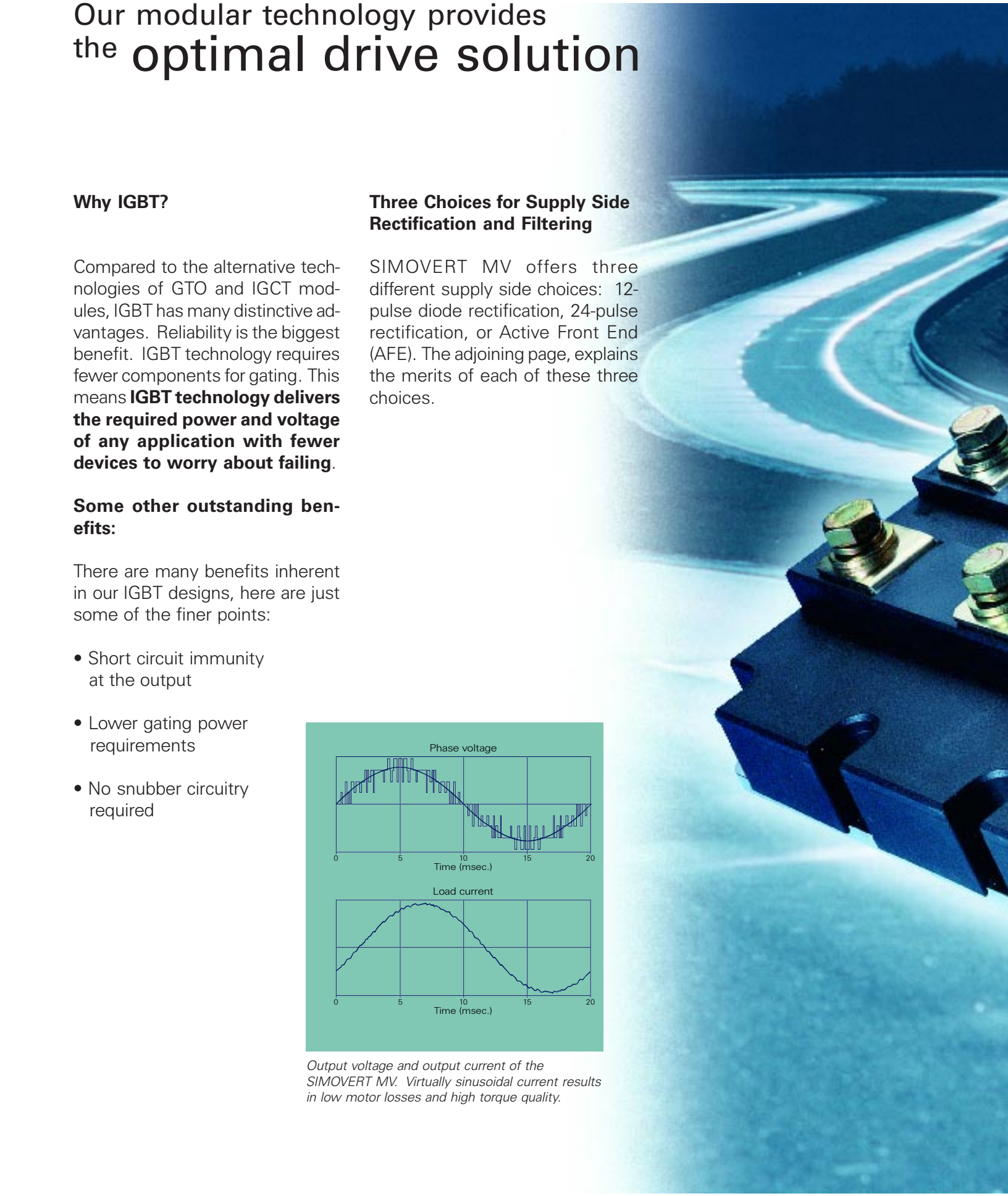
Flexibility Solutions to Match Project Needs

No matter what the application, Siemens offers the customer a flexible SIMOVERT MV solution. We've covered all the bases. No matter which horsepower is required, how large the speed control range, or which level of supply-side rectification the customer chooses, we have the flexibility to deliver just what the customer needs.

Our supply side rectification and filtering systems are not just modular. Our AFE IGBT technology puts us far ahead of the competition.



Our modular technology provides the optimal drive solution



Why IGBT?

Compared to the alternative technologies of GTO and IGCT modules, IGBT has many distinctive advantages. Reliability is the biggest benefit. IGBT technology requires fewer components for gating. This means **IGBT technology delivers the required power and voltage of any application with fewer devices to worry about failing**.

Some other outstanding benefits:

There are many benefits inherent in our IGBT designs, here are just some of the finer points:

- Short circuit immunity at the output
- Lower gating power requirements
- No snubber circuitry required

Three Choices for Supply Side Rectification and Filtering

SIMOVERT MV offers three different supply side choices: 12-pulse diode rectification, 24-pulse rectification, or Active Front End (AFE). The adjoining page, explains the merits of each of these three choices.

Output voltage and output current of the SIMOVERT MV. Virtually sinusoidal current results in low motor losses and high torque quality.

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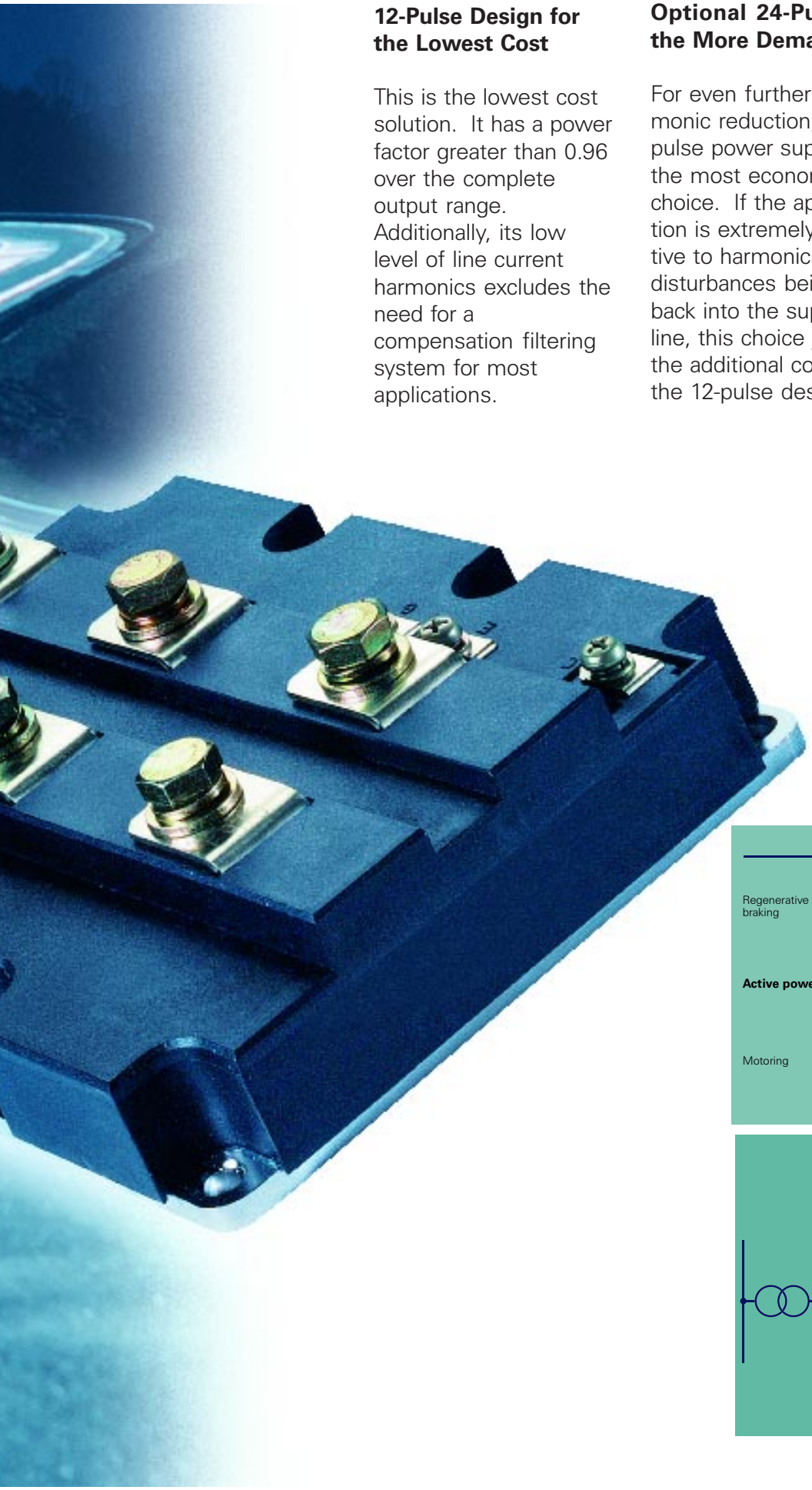


12-Pulse Design for the Lowest Cost

This is the lowest cost solution. It has a power factor greater than 0.96 over the complete output range. Additionally, its low level of line current harmonics excludes the need for a compensation filtering system for most applications.

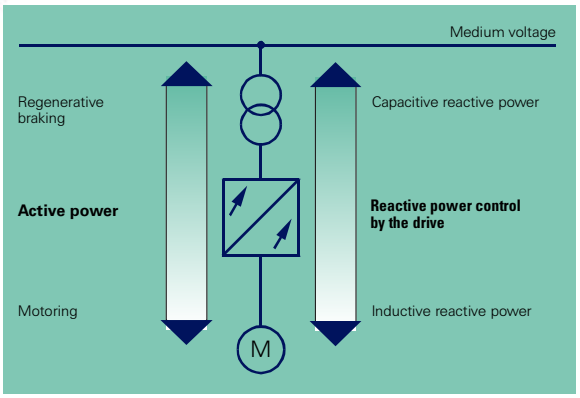
Optional 24-Pulse for the More Demanding

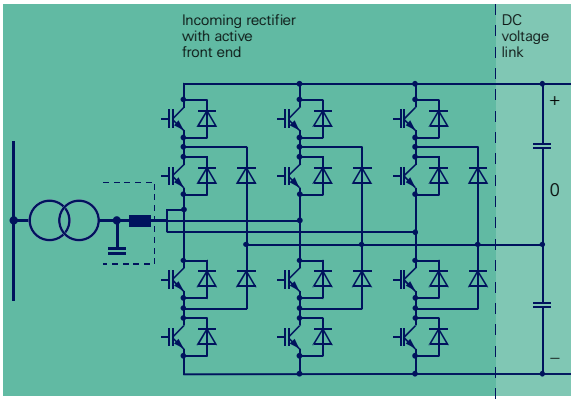
For even further harmonic reduction, 24-pulse power supply is the most economical choice. If the application is extremely sensitive to harmonics and disturbances being fed back into the supply line, this choice justifies the additional cost over the 12-pulse design.

Active Front End (AFE)

There are a number of advantages available when this top of the line supply side solution is chosen. Of course, its special input filtering delivers the optimal reduction in harmonics, as well as no reactive power demand. AFE also provides the ability to control power flow– both real and reactive.

AFE delivers an outstanding p.f. level of COS Ø=1. Additionally, it can compensate the reactive power of other loads that may be connected to the same line supply, provided the AFE is sized for the additional load.





Covering the entire spectrum of motor size requirements

From the smaller size motors to the largest Above-NEMA size motors, there is a SIMOVERT MV solution available. We have designed the entire modular approach with optimized designs for every horsepower size.

Whether it's a new installation or a retrofit, Siemens has the best drive solution. It makes no difference whose motor is being matched to the drive.

It makes no difference whether the motor is synchronous or induction, our modular choices provide just the right drive for the application. Our drives can even make existing fixed speed medium-voltage motors operate at variable speeds.

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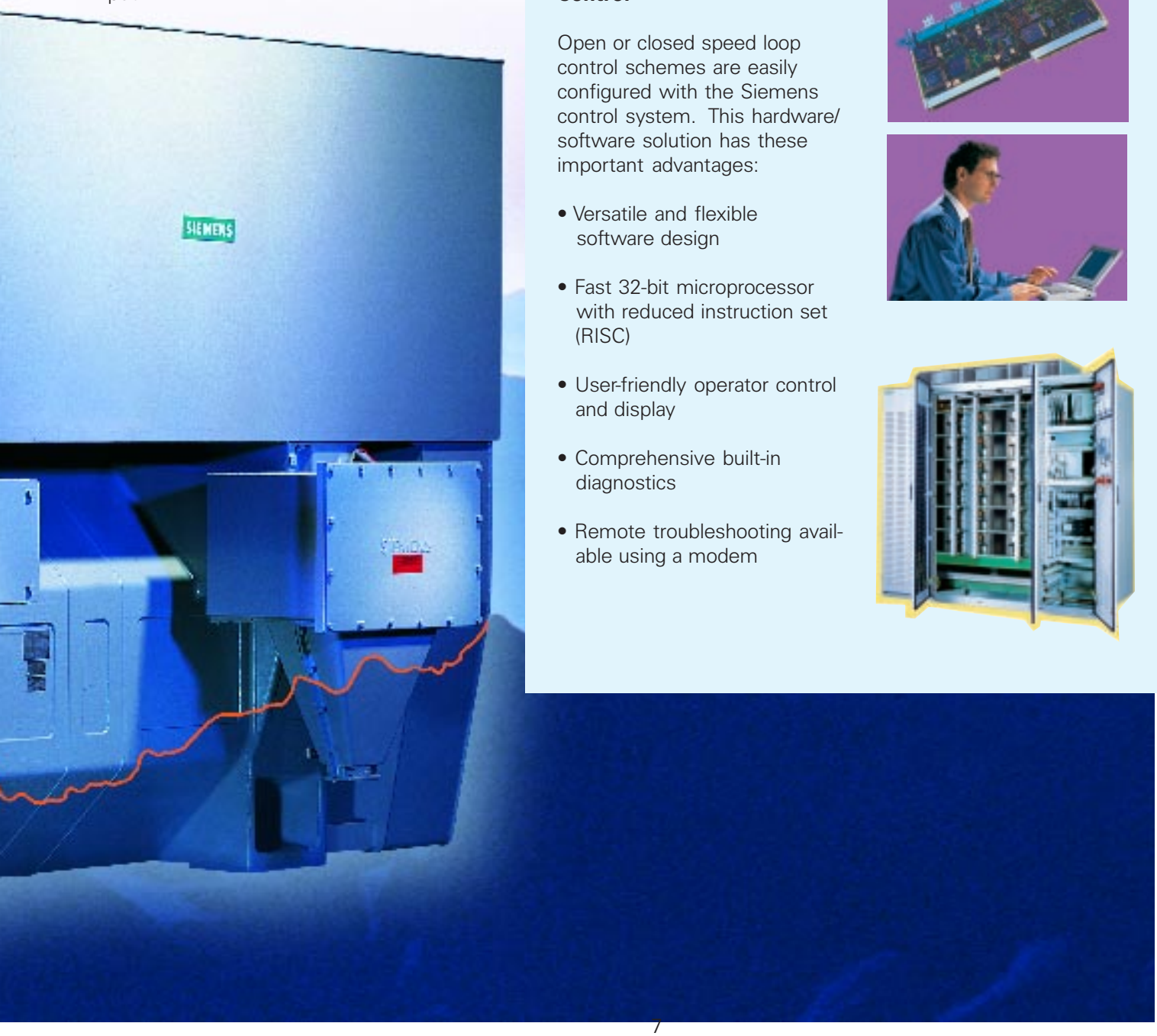
User-Friendly Operator Control Panel

Readability and ease of use are readily apparent when one examines the control panel of any SIMOVERT MV. They feature large, dual-function, multi-lingual keys.

The operator panel features a 2-line, 40-character LED display with up to 24 drive-monitored signals. Stores all alarm and trip information in your selected language. Includes date and time stamp. Provides local speed control input.

Vector Control for Optimum Performance

All units provide vector field-oriented control. Siemens pioneered vector control, utilizing space vector approximation in conjunction with pulse patterns. This results in low motor losses, as well as optimal control and dynamic performance. Vector control puts SIMOVERT MV performance a notch above the competition.



Open-loop and Closed-loop Control

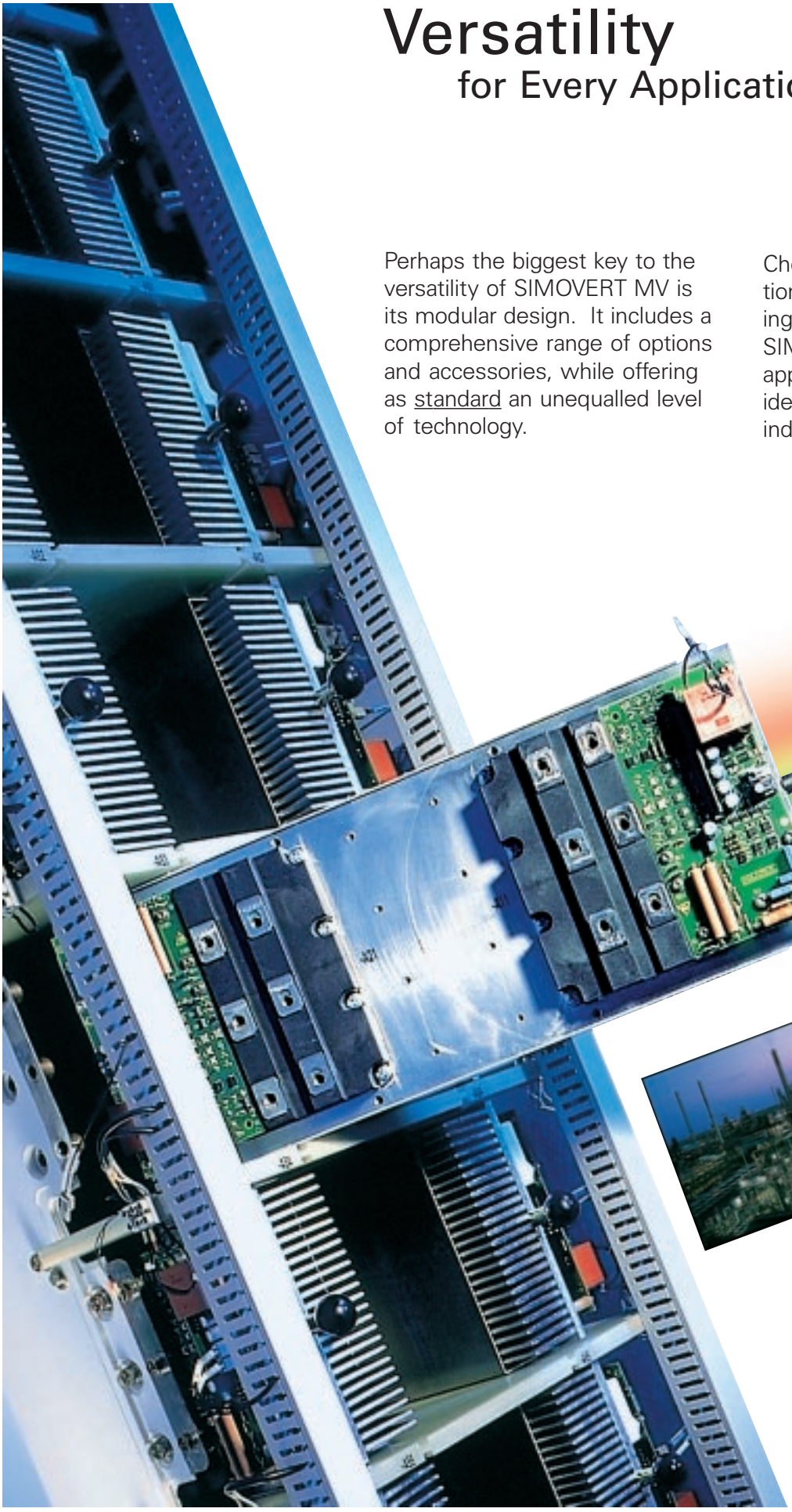
Open or closed speed loop control schemes are easily configured with the Siemens control system. This hardware/software solution has these important advantages:

- Versatile and flexible software design
- Fast 32-bit microprocessor with reduced instruction set (RISC)
- User-friendly operator control and display
- Comprehensive built-in diagnostics
- Remote troubleshooting available using a modem

Versatility
for Every Application

Perhaps the biggest key to the versatility of SIMOVERT MV is its modular design. It includes a comprehensive range of options and accessories, while offering as standard an unequalled level of technology.

Choosing from motor applications up to 8,000 hp and operating speeds up to 9000 rpm, SIMOVERT MV has all the applications covered. It's the ideal product for virtually every industrial sector.



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Flexible Modularity and Built-in Diagnostics

- Easy to replace fan
- IGBT's can be removed in 5 minutes or less.
- Optical gating device that plugs in and out

- Built-in messaging and troubleshooting:
  - Circuit breaker status
  - Line supply voltage (over/under)
  - Transformer monitoring
  - Fan failure reporting
  - Motor monitoring
  - IGBT monitoring
  - DC link voltage monitoring
  - Ground fault monitoring
  - Auxiliary voltage monitoring
  - Plus over 300 more parameters

Just-In-Time (JIT) Program

Our customer-oriented production and logistics policies assure on-time deliveries.

Worldwide Service

Our customers have access to a service network, spanning the globe in more than 130 countries. Our drive specialists are always up-to-date and well trained on the latest drive developments.

Major service centers are located in:
- Alpharetta-USA
- Erlangen-Europe
- Singapore-SE Asia
- Sao Paulo-S. America

These worldwide centers provide 24-hour service. Services include:
-technical support
-replacement parts
-spare parts
-troubleshooting
-repair

Call our 24-hour hotline at:
1.800.241.4453

Typical Applications	
Water/water treatment	pumps
Oil and gas/offshore	pumps, compressors
OEM/machine builders	pumps and fans, constant-torque drives
Sugar	centrifugal drives, pumps
Marine	propeller drives, bow thruster drives, transverse thruster drives
Cement	blowers,mills
Open-cast mining	conveyor belt systems, shakers, excavators, mills
Hot rolling mills	Mill drives, coilers, sheer drives, descale pumps
Cold rolling mills	main rolling mill drives, coilers
Wire/precision rolling	wire drawing plants
Power generation/power stations	pumps, fans, coal crushers
Paper	refiners, pumps
Underground mining	conveyor machines, shaft fans

Features/Options

Our standard drive package is loaded with features:

Standard Features
Single or multi-motor applications; -induction/synchronous
Comprehensive diagnostics
Flying restart
Built-in communications: -RS485 and RS 232
Analog and digital I/O (selectable)
Frequency avoidance
OP2 operator interface includes: -2-line alpha numeric display -40 characters per line
Fully digital keypad for direct numeric entry
Complete drive control functions

Customization with a host of available options and services:
To assure that our customer's AC drive exactly meets the needs of its intended application, we provide a wide range of options and additonal services. Here is a partial list:

SIMOVERT MV Options
Active Front End with input filter
24-pulse diode rectifier
Water cooling
Braking chopper with brake resistor
Transformer integrated in cabinet
Circuit breaker/isolator
SIMOVIS (parameterization, diagnostics)
Modern interface (remote diagnostics via modem)
Message printer
2-quadrant or full 4-quadrant regenerative converter sections available
Auto-synchronizing
Kinetic buffering
Other Services
Torsional analysis
Load and harmonic analysis

Technical Data

General	
Power components	Diodes/HV-IGBT
Line-side drive converter	12-pulse diode rectifier (standard) 24-pulse diode rectifier (optional) Active Front End (optional)
Motor-side drive converter	3-level drive converter (PWM)
Closed-loop control	Vector control, (fully digital,32-bit)
Drive quadrants	12-/24-pulse 2 directions of rotation,driving (2 quadrant) braking with optional braking chopper with brake resistor AFE 2 directions of rotation, driving and braking (4 quadrant)
Protective functions	Over-current, short circuit, ground fault, output phase loss, over-voltage, under-voltage, over-temperature, motor overload, motor stall protection, and many others
Ambient temperature (operation)	32°F to 104°F (higher with derating) 0°C to 40°C (higher with derating)
Enclosure classes	Air-cooled: -NEMA1A -IP21 Water-cooled: -IP31
Overload capacity	Various overload capacities such as 110%, 150% and 250% are available on request. Consult factory.
Efficiency	>98.5% at the rated operating point
Bus interface	Profibus; others available upon request.
Standards	EN (IEC),ANSI, CSA, VDE, BS, NEMA, UL, IEEE

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Technical Data

Input quantities data

Drive Type:	**Transformer Primary Voltage**:	**Transformer Secondary Voltage**:
12-pulse diode front end (DFE)	(User specified)	2x1.2kV 2x2.2kV
24-pulse diode front end (DFE)	(User specified)	4x0.6kV 4x1.1 kV
Active Front End (AFE)	(User specified)	1x2.4kV 1x4.4 kV
Supply voltage tolerance	+/- 10%	
Supply frequency	50 Hz/60 Hz, +/- 3%	
Auxiliary voltage	400 VAC +/- 10%,50/60 Hz 480 VAC +/- 10%,60 Hz 575 VAC +/- 10%,60 Hz	
Power demand Auxiliary power	Dependent upon the drive output max. 13 kVA	
Input power factor (12-pulse&24-pulse)	cos Ø>0.96	
Input power factor (AFE)	cos Ø adjustable	

Rated motor voltage **2.3 kV**		Rated motor voltage **4.16 kV**		Rated motor voltage **3.3 kV**		Rated motor voltage **6.0 kV**	
Output current	Output	Output current	Output	Output current	Output	Output current	Output
200 A	0.8 MVA	180 A	1.3 MVA	180 A	1.0 MVA	(Consult the factory.)	
250 A	1.0 MVA	240 A	1.7 MVA	230 A	1.3 MVA		
300 A	1.2 MVA	280 A	2.0 MVA	260 A	1.5 MVA		
350 A	1.4 MVA	320 A	2.3 MVA	315 A	1.8 MVA		
400 A	1.6 MVA	370 A	2.6 MVA	370 A	2.1 MVA		
450 A	1.8 MVA	400 A	2.9 MVA	400 A	2.3 MVA		
500 A	2.0 MVA	460 A	3.3 MVA	460 A	2.6 MVA		
550 A	2.2 MVA	510 A	3.7 MVA	510 A	2.9 MVA		
600 A	2.4 MVA	550 A	4.0 MVA	550 A	3.1 MVA		
For higher output ratings, consult the factory.		For higher output rates, consult the factory.		For higher output rates, consult the factory.			

Max. output frequency	150 Hz
Frequency control range	1:100
Speed control range	1:100
Frequency stability	0.01%

Dimensions-Drive converter:

Rated motor voltage	Rated output	W x H x T (inches)	Approximate weight
2.3 kV	0.8 MVA-2.4 MVA	95 x 105 x 48	3740lb-4180lb
4.0 kV	1.3 MVA	95 x 105 x 48	4620lb
4.0 kV	1.7 MVA-4.0 MVA	119 x 105 x 48	5280lb-5720lb

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