

SIEMENS



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Uptime. All the time.

Siemens SINAMICS PERFECT HARMONY GH180 liquid-cooled drive

Answers for industry.



Downtime is not an option.

When your plant powers a city of three million people, shutdowns are serious business. When your rig is anchored 20 miles offshore without a speck of land in sight, service calls aren't simple. And when your pipeline has to pump 150,000 barrels a day to stay on schedule, uptime is everything. When it comes to improving throughput and increasing efficiency, operating conditions will never be perfect—but at least your drives can be.

SINAMICS PERFECT HARMONY is:

- **Highly reliable**
Provides fault tolerance via cell redundancy and Advanced Cell Bypass
- **Energy-efficient**
Increases process control to improve throughput and reduce energy waste
- **Line-friendly**
Achieves a near-unity power factor by eliminating harmonic voltage and current distortion
- **Motor-friendly**
Eliminates harmonic heating and insulation stress
- **Load-friendly**
Eliminates significant torque pulsations
- **Process-focused**
Prevents system shutdown by proactively warning the operator of any issues

SINAMICS Perfect Harmony sets the standard for reliability.

The SINAMICS Perfect Harmony GH180 liquid-cooled drive draws on decades of experience with a wide range of industry applications—including more than 80 types of pumps, 34 types of fans and a dozen different compressors—to deliver the most reliable medium voltage variable frequency drive (VFD) available today. Virtually any motor can be paired or retrofitted with a SINAMICS Perfect Harmony drive to provide optimal versatility, efficiency and process availability for critical applications.

Every element of a SINAMICS Perfect Harmony drive is engineered to maximize productivity and protect your process in a way that other drives can't. Its modularity and 50+ patented technologies allow for a scalable solution that achieves 99.99 percent availability, which means greater productivity and a significantly reduced total cost of ownership over the drive's lifecycle. It's not only the No.1 selling drive worldwide—it's also the most trusted.



The reliability behind the world's #1 selling drive

Advanced Cell Bypass

In less than a quarter of a second, the SINAMICS Perfect Harmony GH180 drive can bypass multiple failed cells to maintain a balanced output voltage. With one cell in bypass, the drive still produces sufficient voltage to allow the process to continue uninterrupted, and the quality of the voltage and the waveform remain virtually unchanged.

Synchronous Transfer

Synchronous transfer is used to soft-start multiple motors in a series and efficiently transfer them across the line without stressing the power grid. This closed-transfer approach not only increases energy efficiency, but also helps protect motors and equipment from excessive torque transients.

Process-Tolerant Protection Strategy (ProToPS™)

With a proven record of 99.99 percent process uptime, ProToPS™ protects your process from faulty sensors or data. Unlike typical systems that simply trip the drive and automatically shut down the system due to a malfunction, ProToPS™ offers a proactive control strategy for applications where failure avoidance is critical.

Clean Power Input

SINAMICS Perfect Harmony drives meet the most stringent IEEE 519-1992 requirements for voltage and current harmonic distortion. An integrated sinusoidal converter not only eliminates the need for harmonic filters, power factor correction capacitors or extra bus capacity, but also protects other online equipment from harmonic disturbances.

High-Quality Output

No drive offers a higher-quality waveform output than SINAMICS Perfect Harmony. With 21 levels of non-harmonic output voltage, it accommodates any standard motor without requiring additional output or dv/dt filters—which can reduce efficiency and reliability—and it provides the lowest peak voltage to the motor windings to help extend motor life.

Environmental Tolerance

Only SINAMICS Perfect Harmony drives are engineered to operate reliably in environments with ambient temperatures ranging from -40°C to $+50^{\circ}\text{C}$. No other drive can tolerate such a broad range of extreme conditions. An optional PDC allows the drive to withstand even the harshest outdoor conditions, from tropical environments to ocean platforms.

Technical data at a glance

Efficiency

- Typical power converter: 99%
- Typical total drive system: 97%

Input Transformer

- Copper windings, liquid-cooled

Line Supply Connection

- Input voltage and voltage tolerance: 2.3 to 13.8 kV, $\pm 10\%$
- Input frequency: 50 or 60 Hz, $\pm 5\%$
- Input power factor: ≥ 0.95 above 10% load

Motor-Side Inverter

- Multilevel drive PWM topology
- IGBT power modules

Motor Control

- Induction motors
- Synchronous motors
- Permanent magnet motors
- Wound rotor motors

Output dv/dt

- 1,000 to 3,000 V/ μ s (dependent on model)

Output Torque

- Rated torque (2Q) available from 10 to 167 Hz

Control

- Vector Control (NXGII series)

Input Current Harmonics

- $\leq 5\%$ TDD (total demand distortion)
- Meets or exceeds IEEE-519-1992

Ride-Through

- Minimum of five cycles after loss of input MV without tripping

Regenerative Operation

- 4Q available as option

Output Frequency and Drift

- 0.5 to 330 Hz, $\pm 0.5\%$

Output Voltage Harmonics (THDi)

- Between 2.0 to 2.5%



Fully integrated solutions

Based on the world's most comprehensive range of drive products, Siemens Integrated Drive Systems (IDS) address the increasingly complex challenges of drive technology by providing a single source for your entire drive system—drive, motor, gearbox and couplings. This not only simplifies specification, purchase, implementation, operation and maintenance, but also increases your drive system's overall reliability with integrated design efficiencies.

Each component is engineered for optimal compatibility and performance, and upon delivery the IDS is installed directly onto the equipment—saving you a significant amount of time in project startup. Every aspect of the IDS is designed to your specifications, including custom service contracts and extended warranty options that reinforce the lifetime reliability of your system.



Advantages of an Integrated Drive System:

Reliability

- Improved operating times
- Faster supply of new and replacement components
- Condition monitoring
- CAPEX security

Productivity

- Higher throughput
- Reduced engineering effort
- High degree of flexibility
- Shorter time to market

Efficiency

- More energy-efficient
- Simplified maintenance
- Better environmental protection
- Reduced OPEX

When uptime is everything, everything has to be perfect.

Delivering reliability to the nuclear industry

Nuclear plants have traditionally used motor-generator (MG) sets to drive their reactor circulating pumps, a method of control that is difficult and imprecise.

In 2000, the nuclear power industry turned to Siemens for a more reliable solution, and six SINAMICS PERFECT HARMONY VFDs were installed at the Browns Ferry Nuclear Plant.

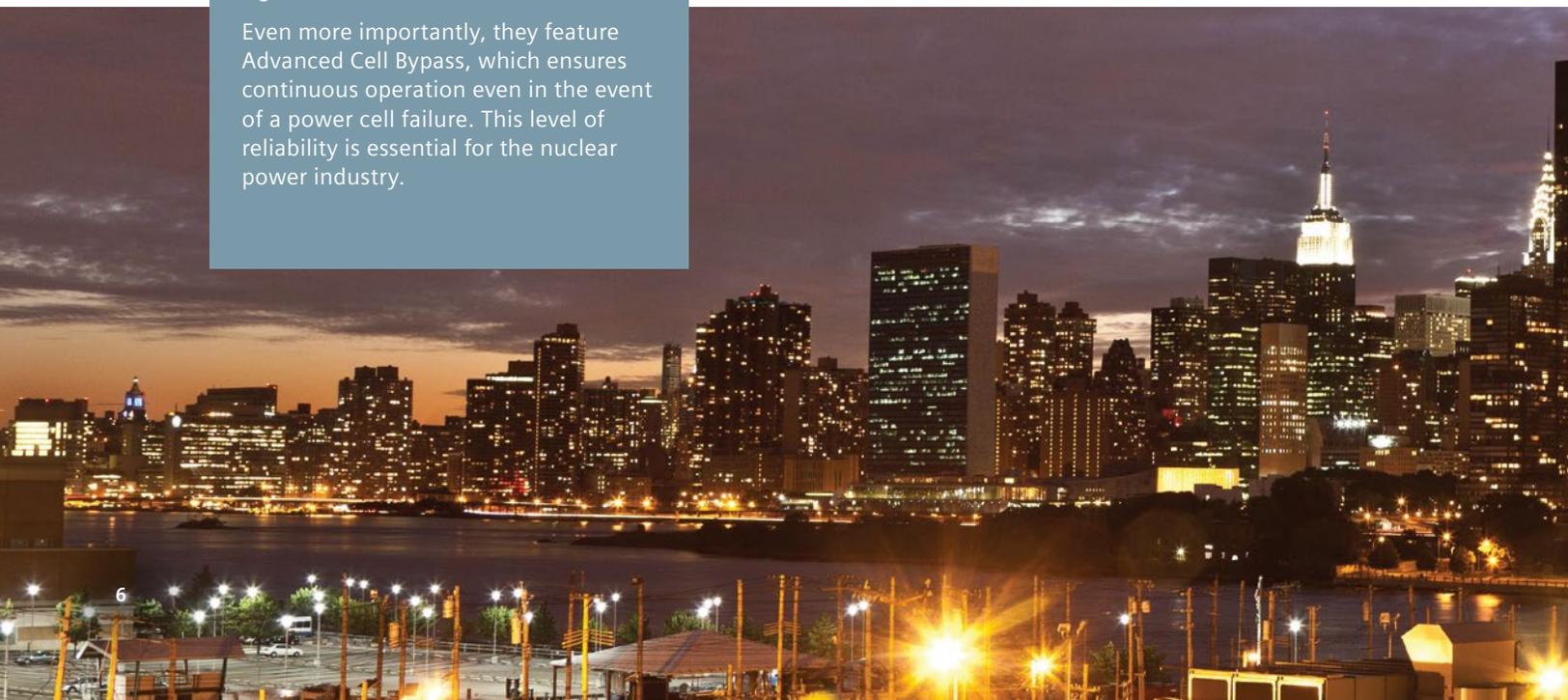
The drives were able to predictably and accurately control the nuclear plant's circulating pump speed to within 1 rpm of the desired speed command, allowing the plant to operate closer to the reactor's allowed thermal power limit and generate additional electricity.

At full load and full speed, Siemens VFDs achieve 96.5 percent efficiency. By improving energy efficiency and enabling power plants to generate additional electricity, VFDs deliver a significant return on investment.

Even more importantly, they feature Advanced Cell Bypass, which ensures continuous operation even in the event of a power cell failure. This level of reliability is essential for the nuclear power industry.

Any variable frequency drive will improve control over your process, but only SINAMICS Perfect Harmony drives will optimize the control you have. With 50+ patented technologies proven to increase reliability and reduce energy consumption, SINAMICS Perfect Harmony is designed to boost productivity while lowering your total cost of ownership.

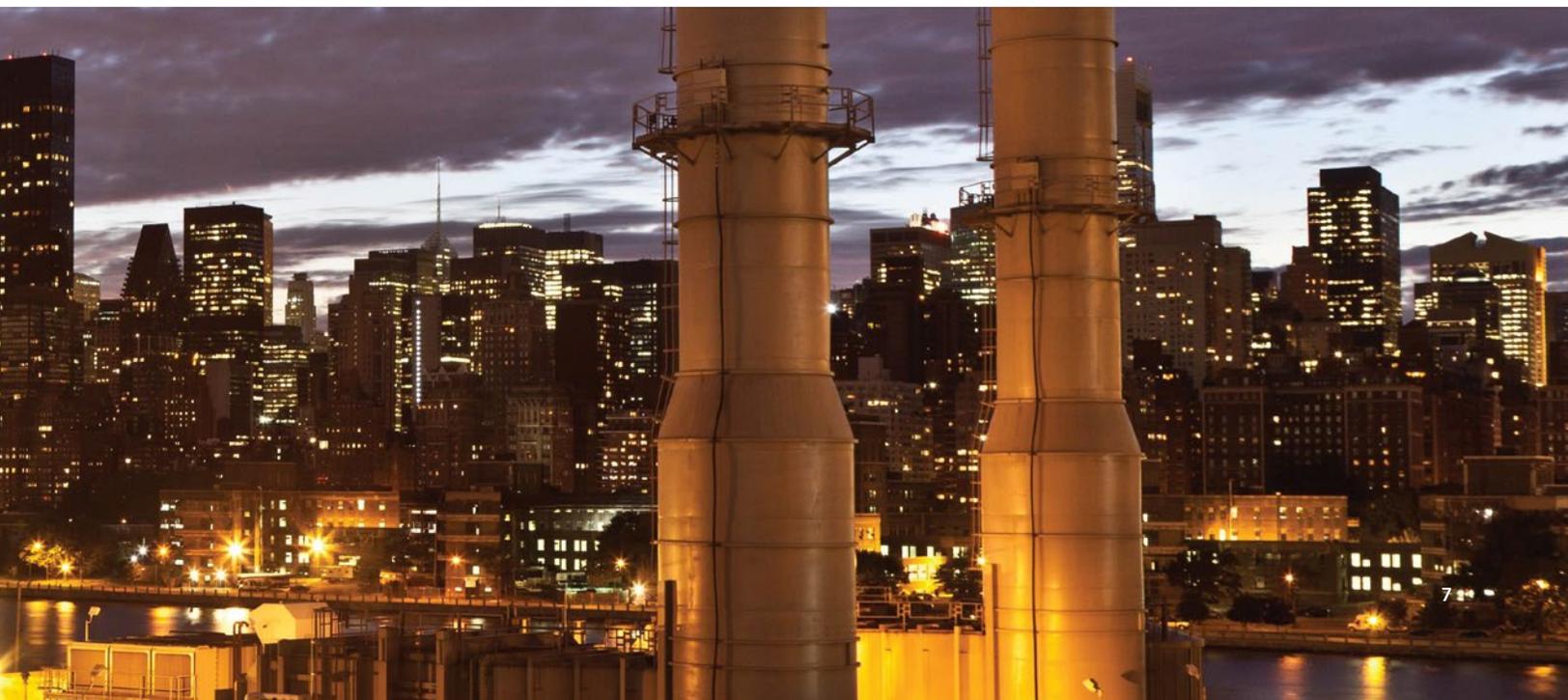
Visit usa.siemens.com/perfectharmony to tour the GH180 liquid-cooled drive and learn more about how it can help you improve your process, your production and your bottom line.



SINAMICS Perfect Harmony GH180 liquid-cooled drive specifications

No. of cells	Output current	Type rating	Shaft output**		kVA	Motor voltage	Height*		Width*		Depth*		Order number (MLFB)***
	A	kVA	kW	Hp		kVA	in.	mm	in.	mm	in.	mm	
Motor voltage—3.3 kV													
9	880	5,025	4,271	5,726	6,000	3.3	114	2,896	370	9,398	66	1,677	6SR3252-0[[B46-0]][[]]0
9	1,250	7,140	6,067	8,133	8,500	3.3	115	2,921	378	9,602	66	1,677	6SR3252-0[[C48-5]][[]]0
9	880	6,095	5,177	6,940	7,000	4.16	114	2,896	370	9,398	66	1,677	6SR3252-0[[B47-0]][[]]0
9	1,250	8,660	7,354	9,858	10,000	4.16	115	2,921	378	9,602	66	1,677	6SR3252-0[[C52-0]][[]]0
12	880	7,315	6,213	8,329	8,500	4.6/4.8	115	2,921	406	10,313	66	1,677	6SR3252-1[[B48-5]][[]]0
12	1,250	10,390	8,825	11,830	12,000	4.6/4.8	115	2,921	412	10,469	70	1,778	6SR3252-1[[C52-4]][[]]0
15	880	9,140	7,766	10,411	11,000	6.0	115	2,921	439	11,151	70	1,778	6SR3252-2[[B52-2]][[]]0
15	1,250	12,990	11,031	14,787	15,000	6.0	115	2,921	439	11,151	70	1,778	6SR3252-2[[C53-0]][[]]0
15	880	10,055	8,542	11,451	12,000	6.6	115	2,921	439	11,151	70	1,778	6SR3252-2[[B52-4]][[]]0
15	1,250	14,285	12,134	16,266	17,000	6.6	115	2,921	439	11,151	70	1,778	6SR3252-2[[C53-4]][[]]0
18	880	10,970	9,319	12,492	13,000	6.9/7.2	115	2,921	474	12,040	70	1,778	6SR3252-3[[B52-6]][[]]0
18	1,250	15,585	13,237	17,744	18,000	6.9/7.2	125	2,921	478	12,142	76	1,931	6SR3252-3[[C53-6]][[]]0

* Reflects typical output power; motor type or size may affect actual output power.
 ** Typical output value provided; output power may change based on the type or size of motor.
 *** Brackets denote additional digits to be determined based on order detail.



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