



SIEMENS

Ingenuity for life



**SINAMICS PERFECT
HARMONY GH150**

**Versatility. Availability. Power.
The choice is easy.**







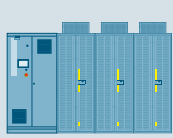
usa.siemens.com/perfectharmony

Market-leading performance you can count on

Siemens cell-based SINAMICS PERFECT HARMONY drives, which connect a series of low-voltage cells together to build the medium-voltage power output of the drive, are a true success story. First introduced in 1994, PERFECT HARMONY drives have become synonymous with reliability, efficiency and versatility, making them one of the world's best-selling medium voltage drives today. Their innovative and proven cell-based technology has provided customers with improved drive system reliability and performance in thousands of applications worldwide.

All drives are backed by the Siemens commitment to customer satisfaction and industry-leading quality standards.

To provide even greater versatility, Siemens recently added the SINAMICS PERFECT HARMONY GH150 to its product line. This continues the Siemens tradition of offering customers an unparalleled range of features and advantages for new applications as well as retrofits.

						
SINAMICS PERFECT HARMONY GH180	SINAMICS PERFECT HARMONY GH150	SINAMICS GM150	SINAMICS SM150	SINAMICS SH 150 CM	SINAMICS GL150	SINAMICS SL150
180 kVA–10 MVA (air-cooled) 5–24.4 MVA (water-cooled)	4–70 MVA (air-cooled) 4–47 MVA (water-cooled)	1–10.1 MVA (air-cooled) 2–24.4 MVA (water-cooled)	3.4–5.8 MVA (air-cooled) 4.6–31.5 MVA (water-cooled)	4–16 MVA (water-cooled)	1.4–30 MVA (air-cooled) 6–85 MVA (water-cooled) (higher power on request)	2.9–18.8 MVA (air-cooled) 12–40 MVA (water-cooled)
Output voltage 2.3–11.0 kV	Output voltage 4.16–13.8 kV (air-cooled) 4.16–11.0 kV (water-cooled)	Output voltage 2.3–4.16 kV	Output voltage 3.3 kV (IGCT & IGBT) 4.16 kV (IGBT)	Output voltage 3.3–7.2 kV	Output voltage 1.4–10.3 kV	Output voltage 1.5–4.0 kV
Multi-cell voltage source inverter (PH VSI)	Multi-cell voltage source inverter (M2C VSI)	3-Level NPC voltage source inverter (DFE VSI)	3-Level NPC voltage source inverter (AFE VSI)	Customizable modular voltage source system (VSI)	Load-commutated inverter (LCI)	Cycloconverter (CC)
Air- & water-cooled	Air- & water-cooled	Air- & water-cooled	Air- & water-cooled	Water-cooled	Air- & water-cooled	Air- & water-cooled

Why choose a drive that only meets the minimum requirements when you could have one that is optimized for your application's requirements and engineered to maximize its performance, efficiency and long-term reliability? Topologies and drive configurations are not one-size-fits-all. To get the most out of your purchase, you'll want to select a drive with the technology and benefits that best fit your application.

As the world's leading manufacturer of medium voltage drives, Siemens sets the standard worldwide in terms of its installed power base and ability to offer the most diverse and reliable portfolio of drives. With more than four decades of experience manufacturing nearly every type of medium voltage drive that exists today, Siemens has created its portfolio of drive technologies to specifically suit your most basic or most specialized applications.

Siemens stands for world-class quality and reliability

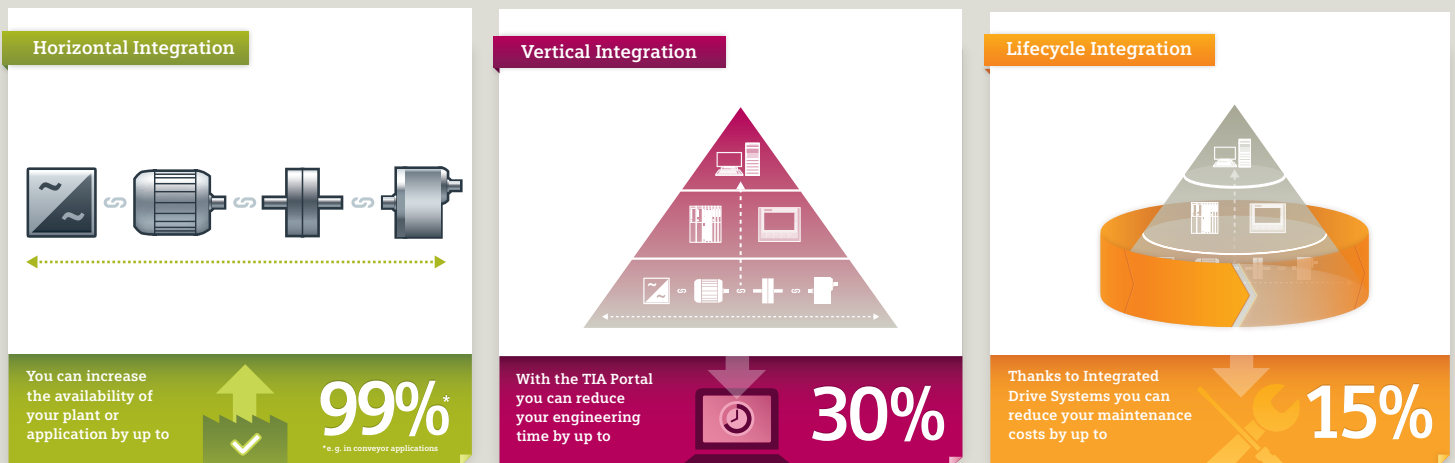
Committed to providing the best product every time

Siemens is known for its commitment to its customers and partners. This includes providing motors and drives of the highest quality and reliability. To maintain this high industry standard:

- All products are put through rigorous tests in Siemens state-of-the-art testing centers.
- Every supplier is put through rigorous qualification processes and is constantly under evaluation.

- All components can be tracked and monitored to ensure quality control both in production and in the field.
- All new software, features and technology utilized in a drive are put through extensive testing to eliminate risk and ensure optimal performance.

Nothing leaves the factory without meeting stringent quality standards. Siemens stands behind its products with extensive warranties and a commitment to helping you reach and exceed your performance goals.



Plant-, system- and motor-friendly

The SINAMICS PERFECT HARMONY GH150 drive has a number of benefits that make it the optimal drive for an integrated drive solution. The SINAMICS PERFECT HARMONY GH150 can be easily configured to:

- Operate high-speed applications
- Adjust to high-input voltages
- Operate with different cable lengths
- Integrate with virtually any kind of motor
- Adjust to any performance level
- Add transformer flexibility
- Cooling method versatility

These elements provide the highest degree of system flexibility, making the SINAMICS PERFECT HARMONY GH150 the optimal solution for virtually any application.

The SINAMICS PERFECT HARMONY GH150 not only makes it easy to customize your plant layout and drive system components; it also maximizes drive availability and application reliability.

Versatile enough to suit nearly any plant's needs

Drive flexibility

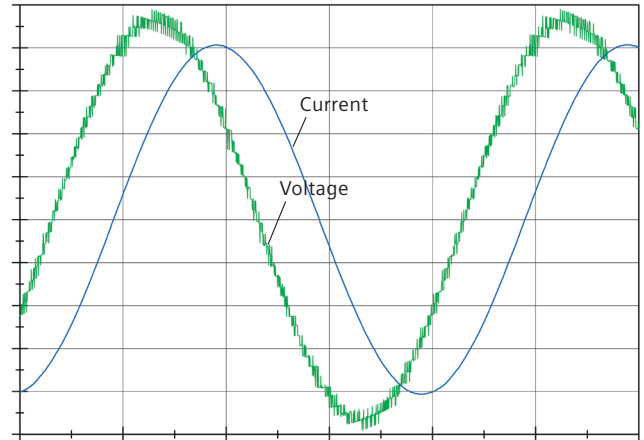
SINAMICS PERFECT HARMONY GH150 drives are specially designed to offer greater versatility and easy integration. Their modular design enables the use of a separate transformer as well as a separate control cabinet. The modular design creates an adjustable footprint that allows for a more flexible plant layout. The control cabinet can even be installed in a low-voltage operator's room for facilitated operation of the drive.

Line-side versatility

The SINAMICS PERFECT HARMONY GH150 raises the standards for transformer flexibility in cell-based medium voltage drives: By allowing for different transformer specifications—such as cooling, size, pulse number and primary voltage—it can accommodate site conditions that require remote placement of the transformer, either inside or outside the plant. The SINAMICS PERFECT HARMONY GH150 can also help minimize initial investment cost for electrical room air conditioning as well as continuous operating costs. The ability to choose a locally sourced standard transformer may even help reduce the total cost of ownership.

Motor-side versatility

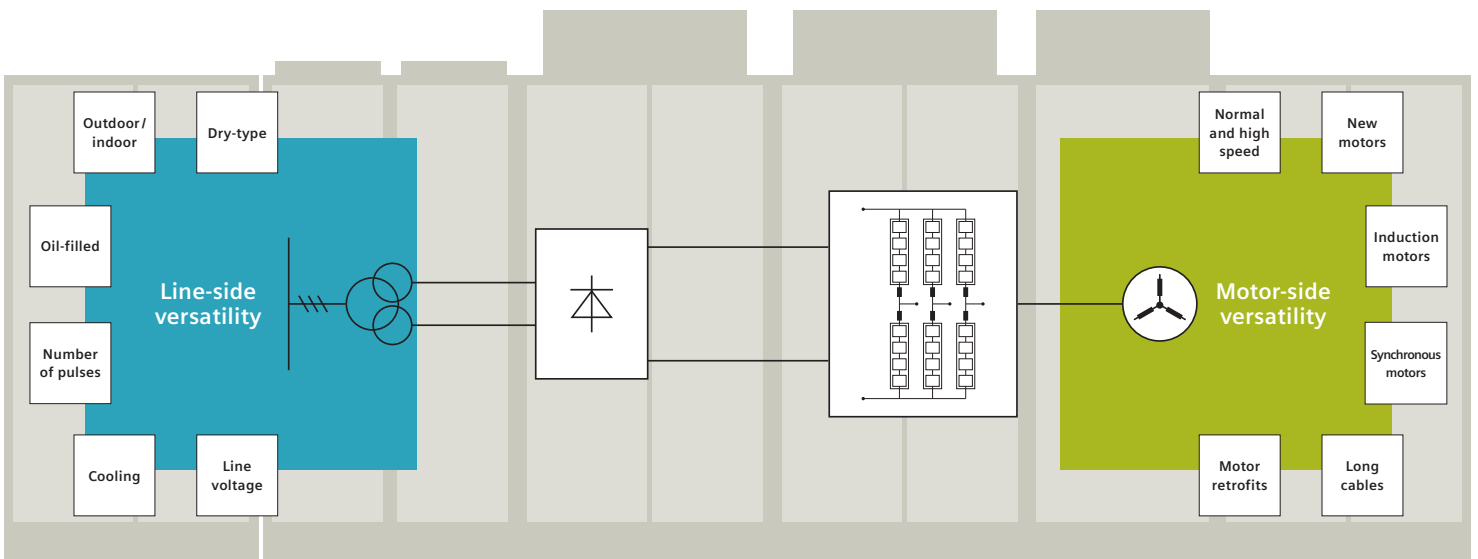
SINAMICS PERFECT HARMONY GH150 drives are capable of working with almost any induction or synchronous motor available, which makes them perfect for retrofit projects and high-speed applications. They also provide great flexibility in operating a motor with cables that are several miles long.



The SINAMICS PERFECT HARMONY GH150's cell-based design ensures such low harmonic distress on the motor that a separate output filter is not required.

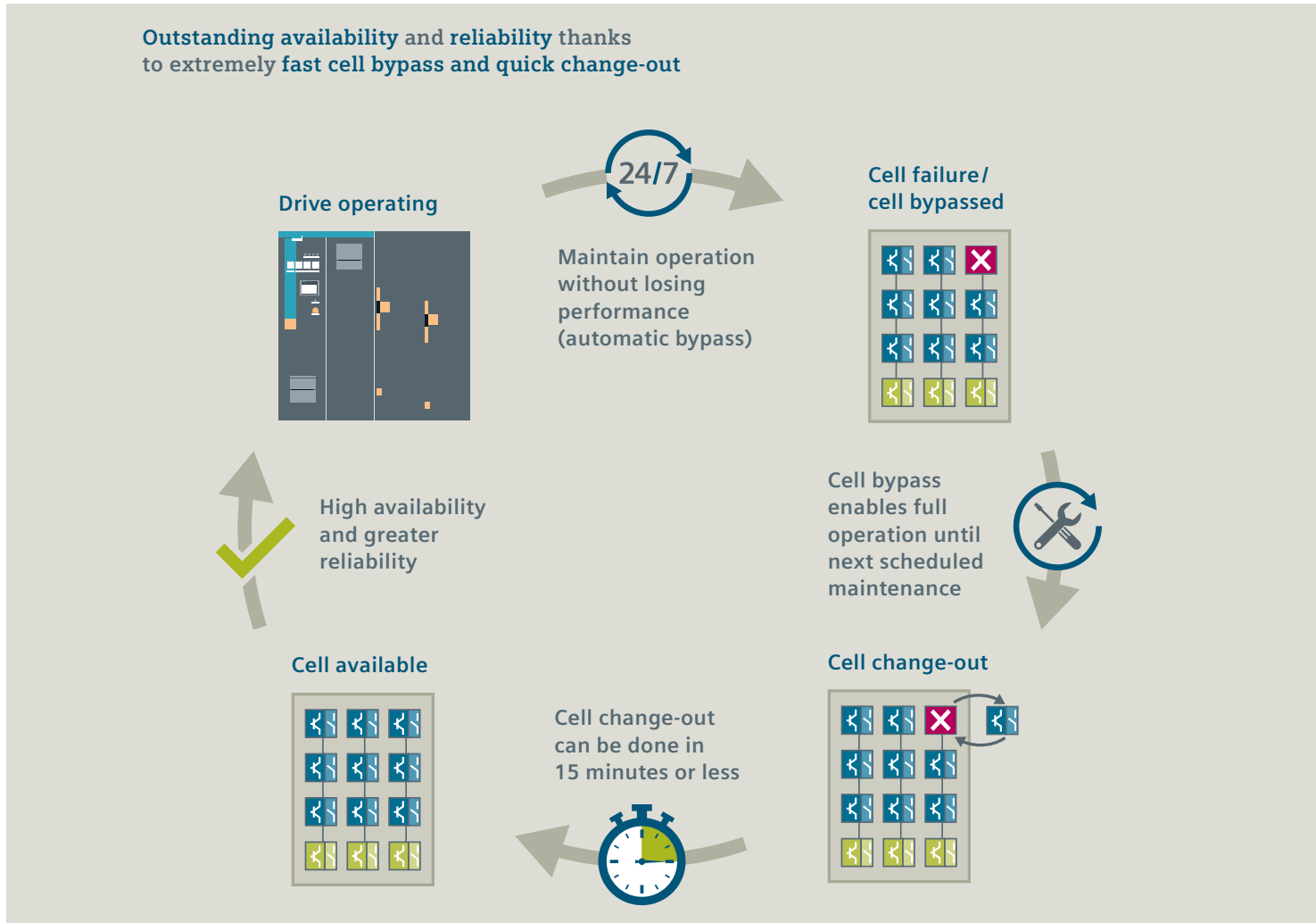
Optimal setup for high-speed motor applications

The SINAMICS PERFECT HARMONY GH150 drive is often used with high-speed compressors or integrated compressors that need high output frequencies. The higher the motor speed, the higher the required VFD output frequency. With its inherent and highly effective switching frequency, the SINAMICS PERFECT HARMONY GH150 drive requires little-to-no derating, which means less oversizing and higher efficiency.



Standard or Full Performance Protection

Every application or process has different requirements in terms of the levels of availability that they must maintain to maximize their productivity and profitability.



Scalability is the key to redundancy

Additional cells can be incorporated into the drive as part of the Full Performance Protection design. This built-in redundancy further enhances your application's overall reliability and process availability by continuing to provide ample output power even in the event of a cell failure.

When a cell is bypassed in a SINAMICS PERFECT HARMONY GH150 drive that has redundant cells, the drive still produces sufficient voltage for the process to continue uninterrupted, and the output quality and voltage waveform remain virtually unchanged.

High-speed cell bypass

In less than one millisecond, the SINAMICS PERFECT HARMONY GH150 drives can bypass any failed cells to maintain an uninterrupted output voltage. In other words, your process is not disturbed and you won't experience any drop in performance.



SINAMICS PERFECT HARMONY GH150 water-cooled drive

The SINAMICS PERFECT HARMONY GH150 water-cooled drive is the perfect solution for marine applications.

The SINAMICS PERFECT HARMONY GH150 water-cooled drive is designed to:

Enhance protection from the ocean's harsh conditions – With a close-loop cooling system, IP44 enclosure rating and ability to operate at high ambient temperatures up to 45 °C

Meet the challenges of subsea applications with inherently long cable capability – As water depth and cable length increase, no additional filters are required up to 1000 meters

Withstand extreme motion conditions – The drive can operate while withstanding up to a 22.5-degree tilt angle

Meet the space constraints on platforms – With a flexible transformers and control cabinet when real estate is at a premium

Available with all major marine classifications:

- American Bureau of Shipping (ABS)
- Bureau Veritas (BV)
- Det Norske Veritas (DNV)
- Lloyd's Register (LR)



Drive

- Water-cooled
- Redundant recooling pumps
- Dynamic braking as option
- Conformance with IEC, CE, CSA and marine classification standards

Input

- Line side: 12- to 36-pulse diode rectifier
- Input frequency: 50 / 60 Hz
- Line power factor: > 0.95

Output

- Modular multilevel converter with configuration between 24 to 66 power cells using low-voltage IGBTs
- Power range: up to 47 MVA **
- Motor voltages: 4.0-11.0 kV
- Output frequency: 0-150 Hz *
- Max. motor cables length: 1,000 m *

* Additional configuration available upon request.

** Dual Channel

SINAMICS PERFECT HARMONY GH150 air-cooled drive

With available power ratings up to 45,000 HP, the SINAMICS PERFECT HARMONY GH150 air-cooled drive is the largest, single-channel, air-cooled VFD in the world.

The SINAMICS PERFECT HARMONY GH150 air-cooled drive has been designed to improve your process availability and help control the rising costs of operations. This drives' total cost of ownership is reduced in the following ways:

Reduced filter maintenance –

With the IP54 design, there are no filters or ionizer tanks to replace

Reduced blower maintenance –

With a life of 100,000+ hours, this blower is the best in the business

Simplified cooling configuration –

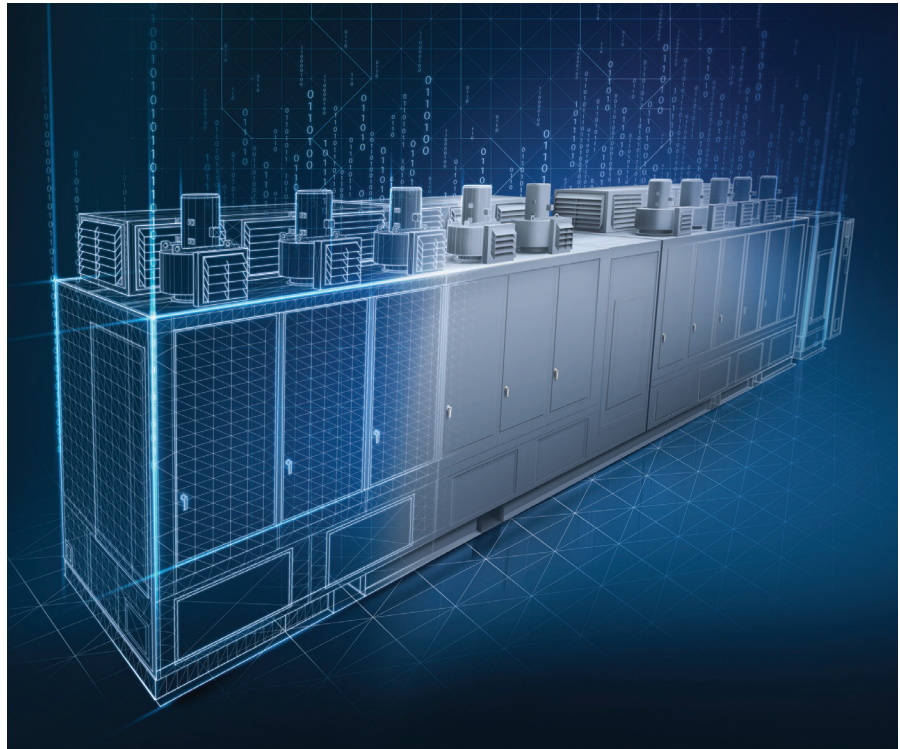
Few components to maintain in a single-loop cooling design

Lower HVAC requirements –

95 percent of heat losses rejected outside or into the water

Reduce downtime – Increase availability with cell bypass and redundancy

Extensive monitoring – High resolution for real time trending combined with advanced diagnostics to decrease your process loss time



Drive

- Air-cooled
- Redundant cooling fan
- Dynamic braking as option
- Conformance with IEC, CE, CSA, UL

Input

- Line side: 24-pulse diode rectifier
- Input frequency: 50/60 Hz
- Line power factor: > 0.95

Output

- Modular multilevel converter with configuration between 24 to 72 power cells using low-voltage IGBTs
- Power range: up to 70 MVA **
- Motor voltages: 4.0-13.8 kV
- Output frequency: 0-150 Hz *
- Max. motor cables length: 1,000 m *

* Additional configuration available upon request.

** Dual Channel

SINAMICS PERFECT HARMONY GH150 water-cooled

Drive technical data

Drive Power Ratings														
			Single-circuit Drive											
					12-pulse		18-pulse		24-pulse		36-pulse			
Output Voltage (kV)	No. of Cells	Cell Type	Pulse Number	Output Current (A)	Type Rating (kVA)	Width (m)	Weight (kg)	Width (m)	Weight (kg)	Width (m)	Weight (kg)	Width (m)	Weight (kg)	
4.0	24	700	12-36 pulse	720	5000	6.1	6000	7.3	6400	7.3	6620	8.5	7220	
		1100		1180	8200	6.3	6680	7.5	7000	7.5	7220	8.7	7820	
		700		710	5100	6.1	6000	7.3	6400	7.3	6620	8.5	7220	
		1100		1160	8400	6.3	6680	7.5	7000	7.5	7220	8.7	7820	
4.0 4.16	30	700	12-36 pulse	760	5300	6.8	6710	8.0	7320	8.0	7330	9.2	7930	
		1100		1280	8900	7.2	7400	8.4	8010	8.4	8020	9.6	8620	
		700		760	5500	6.8	6710	8.0	7320	8.0	7330	9.2	7930	
		1100		1280	9200	7.2	7400	8.4	8010	8.4	8020	9.6	8620	
		700		710	6800	6.8	6710	8.0	7320	8.0	7330	9.2	7930	
		1100		1140	10900	7.2	7400	8.4	8010	8.4	8020	9.6	8620	
		700		580	6000	6.8	6710	8.0	7320	8.0	7330	9.2	7930	
		1100		930	9700	7.2	7400	8.4	8010	8.4	8020	9.6	8620	
5.5 6.0	36	700	12-36 pulse	790	7500	6.8	6960	8.0	7570	8.0	7580	9.2	8180	
		1100		1270	12100	7.2	7700	8.4	8310	8.4	8320	9.6	8920	
		700		790	8200	6.8	6960	8.0	7570	8.0	7580	9.2	8180	
		1100		1220	12700	7.2	7700	8.4	8310	8.4	8320	9.6	8920	
		700		720	8200	6.8	6960	8.0	7570	8.0	7580	9.2	8180	
		1100		1160	13300	7.2	7700	8.4	8310	8.4	8320	9.6	8920	
		700		690	8200	6.8	6960	8.0	7570	8.0	7580	9.2	8180	
		1100		1110	13300	7.2	7700	8.4	8310	8.4	8320	9.6	8920	
6.6 6.9	42	700	12-36 pulse	790	9000	7.1	7330	8.3	7940	8.3	7950	9.5	8550	
		1100		1260	14400	7.5	8100	8.7	8710	8.7	8720	9.9	9320	
		700		790	9400	7.1	7330	8.3	7940	8.3	7950	9.5	8550	
		1100		1240	14800	7.5	8100	8.7	8710	8.7	8720	9.9	9320	
6.6 6.9	48	700	12-36 pulse	For drives with 48 cells, data is identical to the 42-cell drive data given above. These versions can be used for redundancy purposes.	790	9000	7.1	7330	8.3	7940	8.3	7950	9.5	8550
		1100			1260	14400	7.5	8100	8.7	8710	8.7	8720	9.9	9320
		700			790	9400	7.1	7330	8.3	7940	8.3	7950	9.5	8550
		1100			1240	14800	7.5	8100	8.7	8710	8.7	8720	9.9	9320
10 11	54	1100	36 pulse	1180	20400	-	-	-	-	-	-	11.6	11800	
		1100		1020	19400	-	-	-	-	-	-	-	11.6	11800
10 11	60	1100	36 pulse	1250	21700	-	-	-	-	-	-	11.9	12300	
		1100		1200	22900	-	-	-	-	-	-	-	11.9	12300
10 11	66	1100	36 pulse	1250	21700	-	-	-	-	-	-	12.2	12800	
		1100		1250	23800	-	-	-	-	-	-	-	12.2	12800

8 All SINAMICS PERFECT HARMONY GH150 drives listed above are based on an IP43 design. All drive cabinets have a maximum height of 2,810 mm; all cabinets, except the control cabinet, have a depth of 1,275 mm.

ed drive

Dual-circuit Drive

Pulse Number	Output Current (A)	Type Rating (kVA)	24-pulse		36-pulse	
			Width (m)	Weight (kg)	Width (m)	Weight (kg)
24-36 pulse	1440	10000	10.4	11600	12.8	12400
	2360	16400	10.8	12800	13.2	13600
	1420	10200	10.4	11600	12.8	12400
	2320	16700	10.8	12800	13.2	13600
24-36 pulse	1520	10500	11.8	13020	14.2	14240
	2560	17700	12.6	14400	15.0	15620
	1520	11000	11.8	13020	14.2	14240
	2560	18400	12.6	14400	15.0	15620
	1420	13500	11.8	13020	14.2	14240
	2280	21700	12.6	14400	15.0	15620
	1160	12100	11.8	13020	14.2	14240
	1860	19300	12.6	14400	15.0	15620
24-36 pulse	1580	15100	11.8	13520	14.2	14740
	2540	24200	12.6	15000	15.0	16220
	1580	16400	11.8	13520	14.2	14740
	2440	25400	12.6	15000	15.0	16220
	1440	16500	11.8	13520	14.2	14740
	2320	26500	12.6	15000	15.0	16220
	1380	16500	11.8	13520	14.2	14740
	2220	26500	12.6	15000	15.0	16220
24-36 pulse	1580	18100	12.4	14260	14.8	15480
	2520	28800	13.2	15800	15.6	17020
	1580	18900	12.4	14260	14.8	15480
	2480	29600	13.2	15800	15.6	17020
24-36 pulse	For drives with 48 cells, data is identical to the 42-cell drive data given above. These versions can be used for redundancy purposes.	13.0	15040	15.4	16260	
		13.8	16620	16.2	17840	
		13.0	15040	15.4	16260	
		13.8	16620	16.2	17840	
36 pulse	2360	40900	-	-	21.0	22800
	2040	38900	-	-	21.0	22800
36 pulse	2500	43300	-	-	21.6	23800
	2400	45700	-	-	21.6	23800
36 pulse	2500	43300	-	-	22.2	24800
	2500	47600	-	-	22.2	24800



SINAMICS PERFECT HARMONY GH150 air-cooled c

Drive technical data

Output Voltage kV	No. of Cells	Number of Pulses	Cell Type	Type Rating	Shaft Output		Height	
			A	kVA	kW	Hp	ft.	m
4.0	24	24	900	6250	5229	7012	9.8	3
			1100	7650	6385	8562	9.8	3
			1300	9000	7545	10118	9.8	3
			1500	10400	8706	11675	9.8	3
4.16	24	24	900	6500	5433	7285	9.8	3
			1100	8000	6640	8904	9.8	3
			1300	9400	7847	10523	9.8	3
			1500	10800	9055	12142	9.8	3
6.6	36	24	900	10300	8619	11558	9.9	3
			1100	12600	10535	14127	9.9	3
			1300	14900	12450	16695	9.9	3
			1500	17150	14365	19264	9.9	3
6.9	36	24	900	10750	9011	12084	9.9	3
			1100	13150	11013	14769	9.9	3
			1300	15550	13016	17454	9.9	3
			1500	18000	15018	20140	9.9	3
10.0	54	24	900	15600	13059	17513	10.3	3.2
			1100	19000	15961	21404	10.3	3.2
			1300	22500	21841	29289	10.3	3.2
			1500	26000	25201	33795	10.3	3.2
11.0	54	24	900	17150	14365	19264	10.3	3.2
			1100	21000	17558	23545	10.3	3.2
			1300	24800	24025	32218	10.3	3.2
			1500	28600	27721	37174	10.3	3.2
13.8	72	24	900	21500	20867	27982	11.1	3.4
			1100	26300	25504	34201	11.1	3.4
			1300	31100	30141	40419	11.1	3.4
			1500	35800	34778	46637	11.1	3.4

rive

Width		Depth	
ft.	m	ft.	m
22.3	6.8	5.2	15.6
22.3	6.8	5.2	15.6
22.3	6.8	5.2	15.6
22.3	6.8	5.2	15.6
22.3	6.8	5.2	15.6
22.3	6.8	5.2	15.6
22.3	6.8	5.2	15.6
22.3	6.8	5.2	15.6
22.3	6.8	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
27.5	8.5	5.2	15.6
35.8	10.9	5.2	15.6
35.8	10.9	5.2	15.6
35.8	10.9	5.2	15.6
35.8	10.9	5.2	15.6
35.8	10.9	5.2	15.6
35.8	10.9	5.2	15.6
35.8	10.9	5.2	15.6
35.8	10.9	5.2	15.6
35.8	10.9	5.2	15.6
35.8	10.9	5.2	15.6
35.8	10.9	5.2	15.6
41.3	12.6	5.3	16.1
41.3	12.6	5.3	16.1
41.3	12.6	5.3	16.1
41.3	12.6	5.3	16.1

Get more out of your SINAMICS drives with Digitalization

SINAMICS drives are an integral component of SIDRIVE IQ, the digital platform to optimize drive systems. SINAMICS drives are equipped with a connectivity box (SINAMICS CONNECT 500) so that they can be integrated into this digital, cloud-based solution.

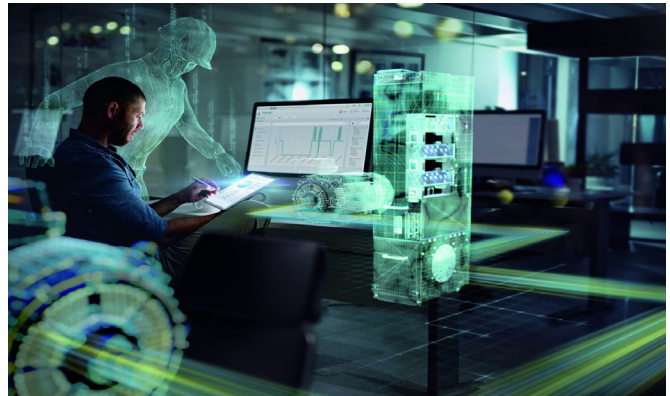
Condition data such as drive information, historic log, parameter and fault logs are evaluated, processed and sent to the cloud for analysis.

After uploading, they can be analyzed with our brand-new MindApp SIDRIVE IQ. With this App you can track and analyze all conditions of your drives. There you can see trends, error messages and reports. The goal of SIDRIVE IQ is to:

- Increase reliability
- Boost productivity and
- Improve your services

SIDRIVE IQ – the digital assistant for your drive system

www.siemens.com/sidrive-iq



- 1) The specifications for the typical motor current and the power data are approximate values only; these have been calculated for operation with induction motors and for typical power factor cos (sigma) of 88% and motor efficiency of 95.2%,
- 2) 41.3For 54 cell configuration with 1300 and 1500A cell rating and all ratings for 72 cell configuration, the power is calculated for synchronous motor with typical power factor cos (sigma) of 100% and motor efficiency of 97%.
- 3) Control is 95" (2400mm) (Height) X 24" (605mm) (Width) X 24" (605mm) (Depth). Control cabinet dimensions are not included in the tables.
- 4) For Air-to-Air Hex additional width and weight apply, the actual size will depend on configuration.

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is solely responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens recommends that Siemens' guidance on appropriate security measures are taken into account. For more information about industrial security, please visit www.siemens.com/industrialsecurity.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that Customer to apply product updates as soon as they are available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats. To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under

www.siemens.com/industrialsecurity.

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