

A photograph of a Siemens SINAMICS Perfect Harmony GH150 drive cabinet. The cabinet is light grey with a teal vertical stripe on the left side. On the front panel, there are four analog meters, a digital display, and several control buttons. The Siemens logo is in the top left corner.

SIEMENS

SINAMICS PERFECT HARMONY GH150

Versatility. Availability. The choice is easy.

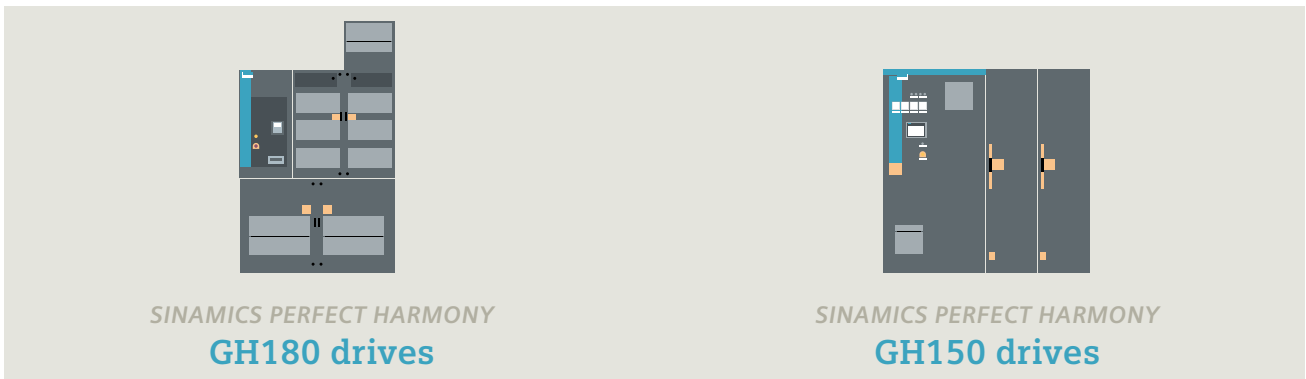
[siemens.com/sinamics-perfect-harmony-gh150](https://www.siemens.com/sinamics-perfect-harmony-gh150)

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. They have become one of the world's best-selling medium-voltage drives since the introduction of the first PERFECT HARMONY drive in 1994. They have become synonymous with reliability, efficiency, and versatility. The 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 Siemens' commitment to customer satisfaction and industry-leading quality standards.

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



Why choose a drive because it can meet the basic requirements, when you could be choosing one that is perfect for your applications requirements and maximizes its performance, efficiency and long-term reliability? It is time to make smarter choices and choose drives based on the natural benefits and appropriateness of the technology. One topology or drive configuration does not fit all applications.

As the world's leading manufacturer for medium-voltage drives, Siemens sets standards worldwide – in terms of its installed power base and offering the most diverse and reliable portfolio of drives. With over 4 decades of experience manufacturing nearly every type of medium-voltage drive that exists today, we have created our portfolio of drive technologies to specifically suit your most basic or most specialized applications.

|  |  |  |  |  |  |  |
|---|---|---|---|--|---|---|
| SINAMICS PERFECT HARMONY GH180 | SINAMICS PERFECT HARMONY GH150 | SINAMICS GM150 | SINAMICS SM150 | SINAMICS SM120 CM | SINAMICS GL150 | SINAMICS SL150 |
| 180 kVA – 10 MVA (air-cooled) 5 – 24.4 MVA (water-cooled) | 4 – 47 MVA (higher on request) (water-cooled) | 1 – 10.1 MVA (air-cooled) 2 – 24.4 MVA (water-cooled) | 3.4 – 5.8 MVA (air-cooled) 4.6 – 31 MVA (water-cooled) | 4 – 13.3 MVA (water-cooled) | 1.4 – 19.4 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 kV | Output voltage 4.16 – 11 kV | 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 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 | Water-cooled | Air- & water-cooled | Air- & water-cooled | Water-cooled | Air- & water-cooled | Air- & water-cooled |

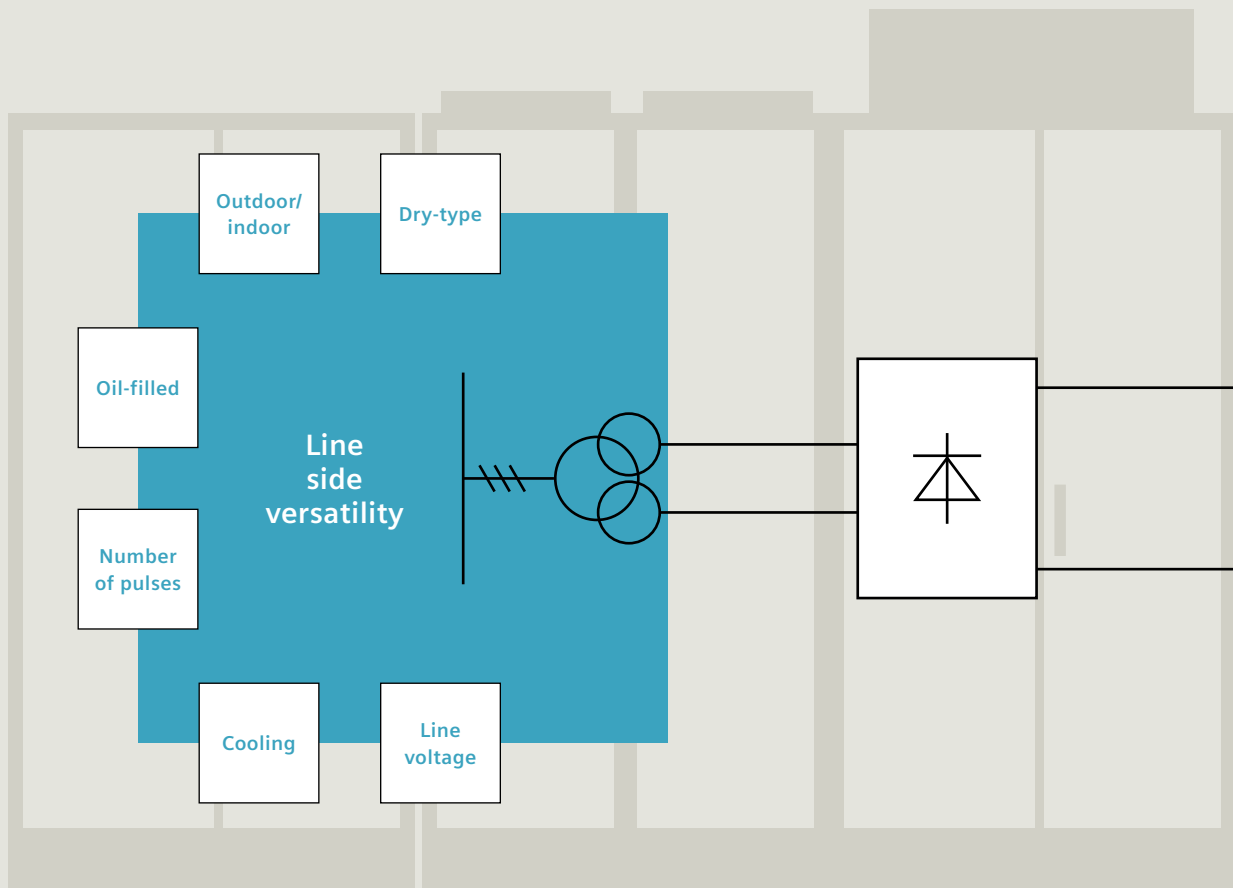
Versatile enough to suit nearly any plant's needs

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. This helps adjust the footprint of the drive and optimize the 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 for cell-based medium-voltage drives: Site conditions can require the use of a transformer in a separate location, either inside or outside the plant, and the flexibility to allow for different transformer specifications, such as cooling, size, pulse number, and primary voltage. Answering this demand, SINAMICS PERFECT HARMONY GH150 can also help minimize initial investment cost for electrical room air-conditioning as well as continuous operating costs. The option to choose a standard transformer may even reduce cost of ownership thanks to local sourcing.

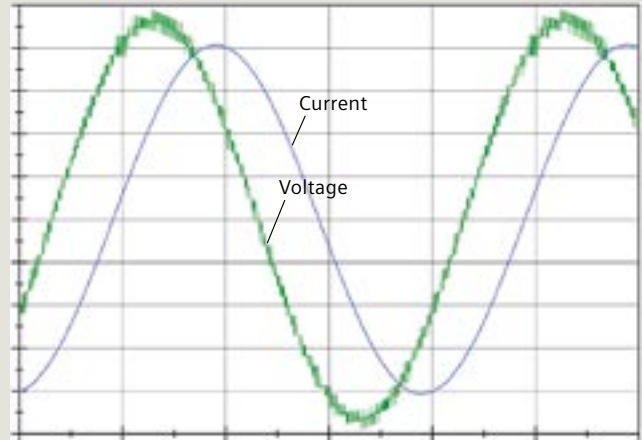


Motor side versatility

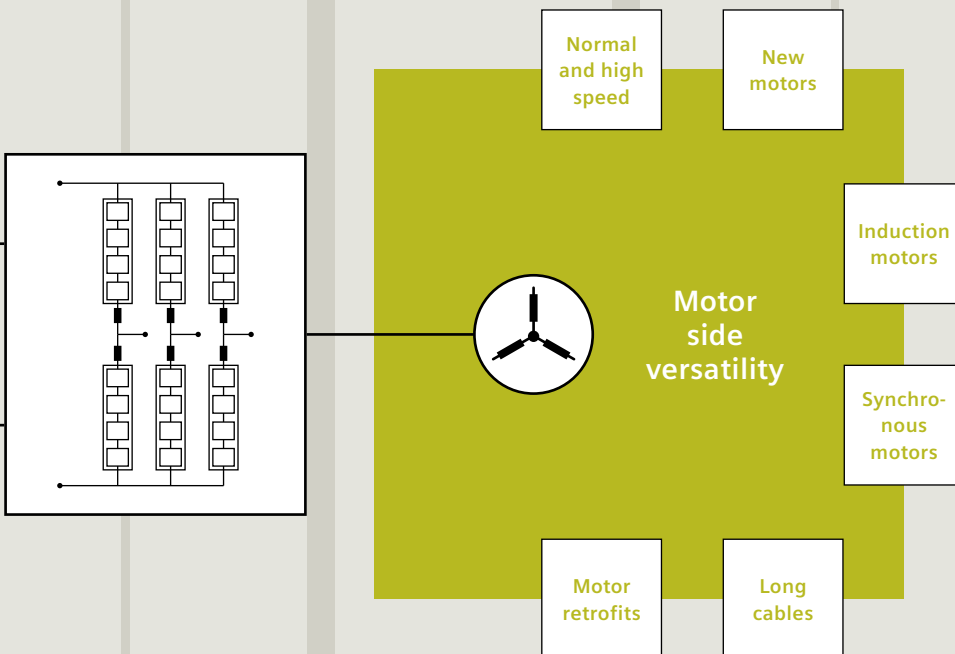
SINAMICS PERFECT HARMONY GH150 drives are capable of working with almost any induction or synchronous motor available, which makes them perfect for retrofit projects and high-speed applications. They also provide great flexibility in operating a motor with long cables even above several kilometers.

Optimal setup for high-speed motor applications

This drive is often used with high speed compressors or integrated compressors that have need of high output frequencies. The higher the motor speed, the higher the required VFD output frequency. The GH150 with its inherent and highly effective switching frequency requires less or no current derating, which leads to less oversizing of the drive and results in higher efficiency. Additional losses in the motor often have to be minimized due to the compact motor design.



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



For pumps, fans, compressors in...



Oil and gas – Upstream



Power generation



Oil and gas – Midstream



Metals



Oil and gas – Downstream



Test Stands

The SINAMICS PERFECT HARMONY GH150 is optimally suited for pumps, fans, and compressors in applications with a separate transformer. It also further expands the number of applications already served by SINAMICS PERFECT HARMONY drives by adding the ability to support marine and offshore applications.

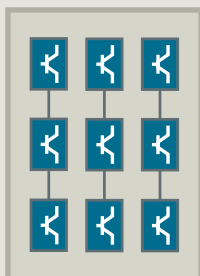
SINAMICS PERFECT HARMONY GH150 drives serve some of the most demanding applications all around the world in industries such as:

- Oil and gas
- Power generation
- Metals
- Mining
- Water and wastewater
- Marine
- Offshore applications

Standard Performance 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. SINAMICS PERFECT HARMONY GH150 offers two different levels of process performance for your application. Choose the level that best supports the needs of your application:

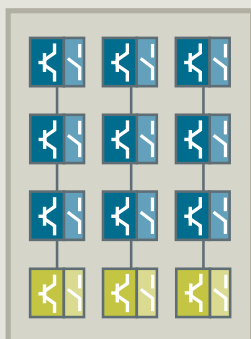
Standard Performance



Standard Performance

Our basic performance class matches the industry standard found in most of today's medium-voltage drives, but it also features our motor-friendly M2C motor modul. Due to the cell-based design, the drive is also able to offer the advantage of an almost sinusoidal wave form similar to that of our well-known SINAMICS PERFECT HARMONY GH180 drives.

Full Performance Protection



Full Performance Protection

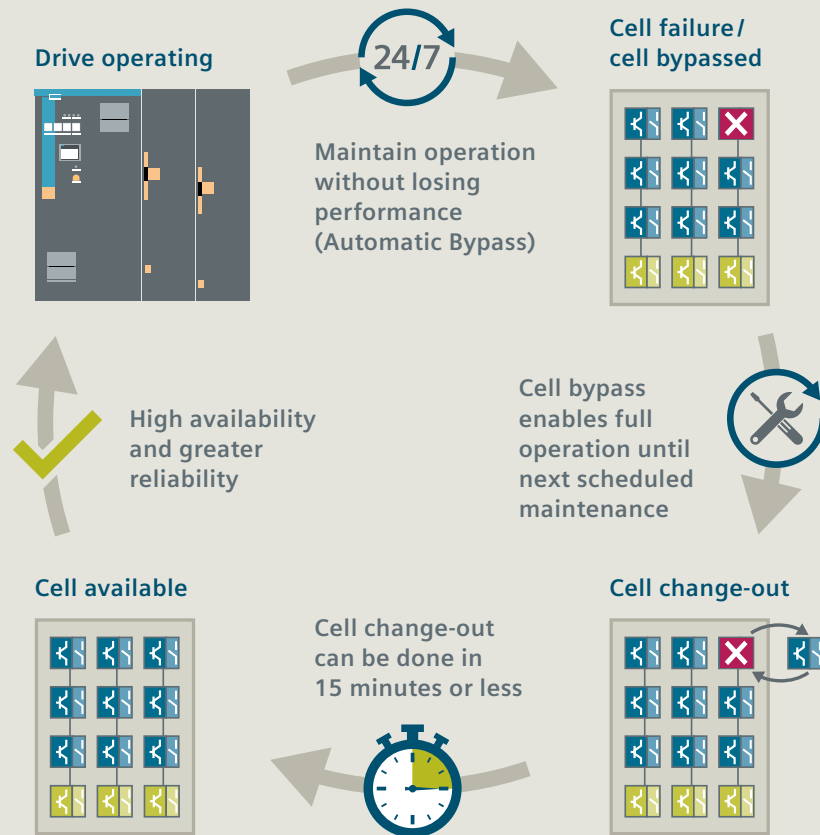
When availability is paramount for your process flow, this better performance class gives you confidence in the uninterrupted long-term productivity of your application. The entire Full Performance Protection design offers you advantages that no other competitor can match, it is truly unique. This protection class offers all the benefits of the Standard design, but also offers the industry's fastest cell bypass functionality and cell redundancy. This ensures that if a cell should fail, you not only maintain uninterrupted operation, but you also see no drop in the operational performance or efficiency.

The SINAMICS PERFECT HARMONY GH150 is the perfect solution for large, high-speed compressors in the oil & gas industry due to its high availability and high output frequency capabilities.



Photographer: Florian Gantner

Outstanding availability and reliability thanks to extremely fast cell bypass and quick change-out



Scalability is the key to redundancy

A drive can be built with additional cells as part of our Full Performance Protection design. This further adds to the applications' overall reliability and maximizes their process availability by ensuring full performance in the event of a failed cell via the use of redundant cells.

When a SINAMICS PERFECT HARMONY GH150 drive includes redundant cells and one cell is bypassed, 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 or experiences any drop in performance.



Siemens stands for world-class quality and reliability



Committed to providing the best product every time

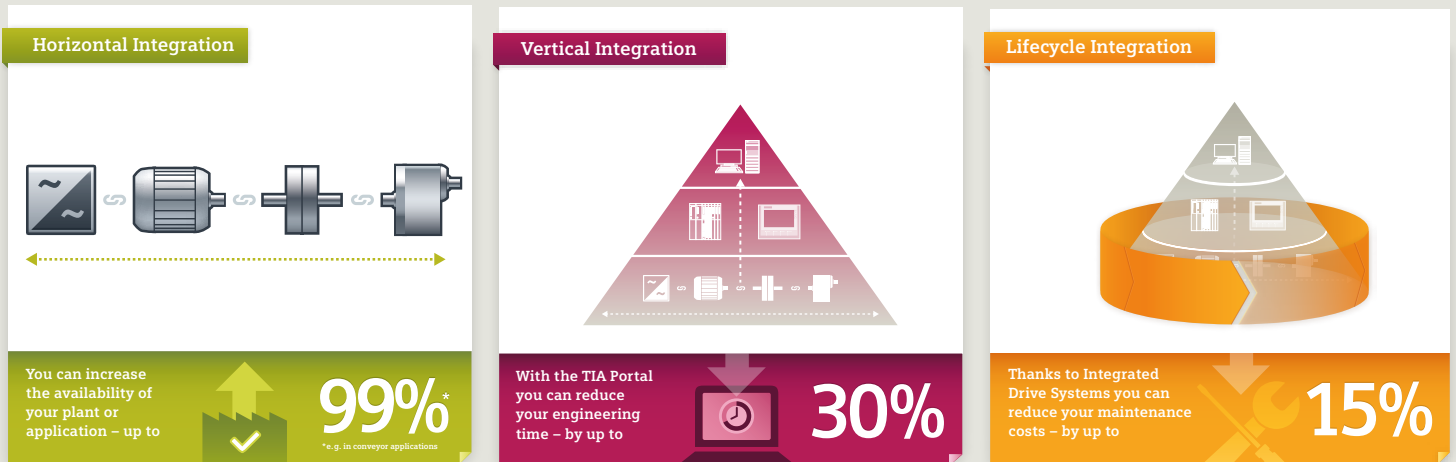
Siemens is known for our commitment to our customers and partners. However our commitment is also providing motors and drives of the highest quality and reliability. To ensure our customers receive this high industry standard:

- All of our products are put through rigorous tests in our state-of-the-art testing centers
- Our suppliers are put through strenuous qualification processes and are constantly under evaluation
- All components can be tracked and monitored to ensure quality control both in production and with drives already in operation
- All new software, features and technology utilized in a drive are put through extensive testing to ensure optimal performance and eliminate risk

Nothing leaves our factories without meeting our quality standards; we would rather ensure your process reliability than provide you with a product that is not able to perform up to your expectations – or ours. We never want to see a product leave our factory without it performing its best. We stand behind our products with extensive warranties and a commitment to helping you reach and exceed your performance goals.

“The innovative strength of Siemens and the outstanding quality of our products and solutions are central to the success of our company, and our customers.”

The ideal drive for your Integrated Drive System



Plant-, system- and motor-friendly

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

- operate high-speed applications
- adjust to high input voltages
- reduce high inrush currents when being turned on (transformer)
- operate with different cable lengths
- be combined with virtually any kind of motor
- be adjusted to any performance level
- transformer flexibility

These elements of the SINAMICS PERFECT HARMONY GH150 drive provide the highest degree of system flexibility and the greatest potential for implementing the optimal solution in your application.

The SINAMICS PERFECT HARMONY GH150 offers you the opportunity to maximize your plant layout, drive system concept, drive availability and overall application reliability in a very customizable way.



Easily adaptable to your individual requirements

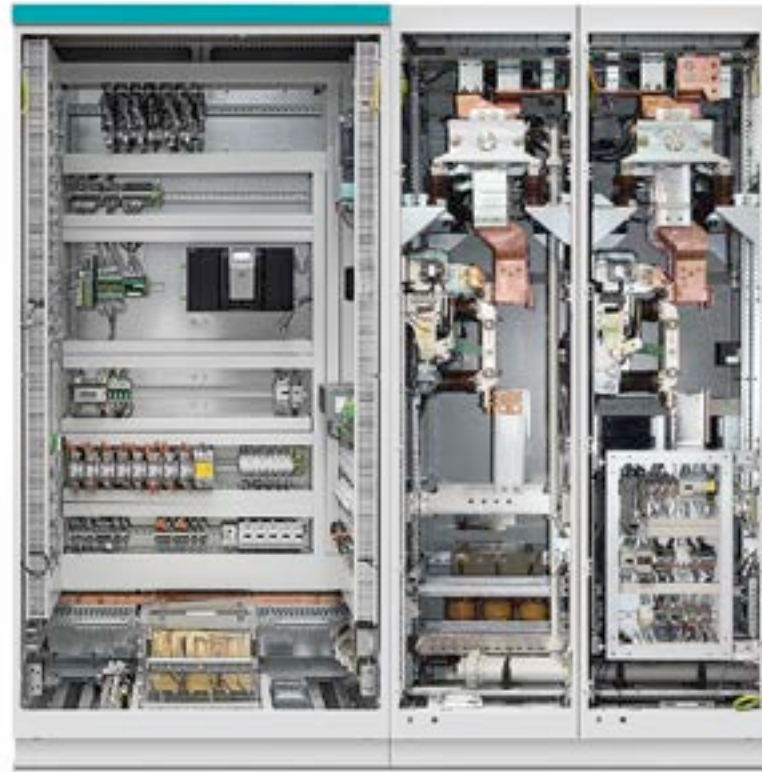
High flexibility thanks to separate dry-type or oil-filled standard converter transformers.

Maximized process reliability thanks to cell-based drive with cell bypass and redundant cells.

Extremely motor-friendly behavior thanks to almost sinusoidal output voltage.

Option to integrate dynamic braking for controlled and fast shutdown.

Plant safety concepts become easier thanks to internal arc-fault-tested design based on IEC 62271-200.



Additional benefits at a glance

- Flexible transformer and control cabinet placement for smaller footprint in the operation area, facilitated maintenance, and increased safety thanks to modular design.
- Accommodation of any transformer type, size, primary voltage or number of pulses.
- High-speed cell bypass feature maintains a reliable and balanced output voltage with no speed reduction.
- Front access design makes overall drive maintenance easier and allows for installation close to a wall.
- Also available in a marine version that meets the requirements of all major marine classification organizations.

Input

- Line side: 12- to 36-pulse diode rectifier without regenerative feedback
- Input frequency: 50 / 60 Hz
- Line power factor: > 0.95

Output

- Modular multi-level converter with configurations between 24 and 48 power cells
- Power range: up to 47 MVA; higher power configurations on request
- Motor voltages: 4.0 – 11 kV
- Output frequency: 0 – 150 Hz, higher values on request
- Max. motor cables length: 1,000 m; longer distances on request



Motor control

- Vector control
- Speed encoder (optional)
- Induction motors
- Synchronous motors

Drive

- Cooling type: water-cooled
- Redundant recooling pumps
- Dynamic braking as option
- Conformance with standards:
IEC, CE, CSA, UL, marine classifications

Software functions

- Cell bypass and cell redundancy
- Automatic restart following interruptions in operation as a result of a power failure
- Smooth connection of converter to rotating motor
- Kinetic buffering
- Automatic motor identification for control optimization
- Programmable ramp-up and ramp-down times
- Ramp smoothing

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 | 5,000 | 6.1 | 6,000 | 7.3 | 6,400 | 7.3 | 6,620 | 8.5 | 7,220 | |
| | | 1100 | | 1,180 | 8,200 | 6.3 | 6,680 | 7.5 | 7,000 | 7.5 | 7,220 | 8.7 | 7,820 | |
| 4.16 | | 700 | | 710 | 5,100 | 6.1 | 6,000 | 7.3 | 6,400 | 7.3 | 6,620 | 8.5 | 7,220 | |
| 1100 | | 1,160 | | 8,400 | 6.3 | 6,680 | 7.5 | 7,000 | 7.5 | 7,220 | 8.7 | 7,820 | | |
| 4.0 | 30 | 700 | 12–36 pulse | 760 | 5,300 | 6.8 | 6,710 | 8.0 | 7,320 | 8.0 | 7,330 | 9.2 | 7,930 | |
| | | 1100 | | 1,280 | 8,900 | 7.2 | 7,400 | 8.4 | 8,010 | 8.4 | 8,020 | 9.6 | 8,620 | |
| 4.16 | | 700 | | 760 | 5,500 | 6.8 | 6,710 | 8.0 | 7,320 | 8.0 | 7,330 | 9.2 | 7,930 | |
| | | 1100 | | 1,280 | 9,200 | 7.2 | 7,400 | 8.4 | 8,010 | 8.4 | 8,020 | 9.6 | 8,620 | |
| 5.5 | | 700 | | 710 | 6,800 | 6.8 | 6,710 | 8.0 | 7,320 | 8.0 | 7,330 | 9.2 | 7,930 | |
| | | 1100 | | 1,140 | 10,900 | 7.2 | 7,400 | 8.4 | 8,010 | 8.4 | 8,020 | 9.6 | 8,620 | |
| 6.0 | | 700 | | 580 | 6,000 | 6.8 | 6,710 | 8.0 | 7,320 | 8.0 | 7,330 | 9.2 | 7,930 | |
| | | 1100 | | 930 | 9,700 | 7.2 | 7,400 | 8.4 | 8,010 | 8.4 | 8,020 | 9.6 | 8,620 | |
| 5.5 | 36 | 700 | 12–36 pulse | 790 | 7,500 | 6.8 | 6,960 | 8.0 | 7,570 | 8.0 | 7,580 | 9.2 | 8,180 | |
| | | 1100 | | 1,270 | 12,100 | 7.2 | 7,700 | 8.4 | 8,310 | 8.4 | 8,320 | 9.6 | 8,920 | |
| 6.0 | | 700 | | 790 | 8,200 | 6.8 | 6,960 | 8.0 | 7,570 | 8.0 | 7,580 | 9.2 | 8,180 | |
| | | 1100 | | 1,220 | 12,700 | 7.2 | 7,700 | 8.4 | 8,310 | 8.4 | 8,320 | 9.6 | 8,920 | |
| 6.6 | | 700 | | 720 | 8,200 | 6.8 | 6,960 | 8.0 | 7,570 | 8.0 | 7,580 | 9.2 | 8,180 | |
| | | 1100 | | 1,160 | 13,300 | 7.2 | 7,700 | 8.4 | 8,310 | 8.4 | 8,320 | 9.6 | 8,920 | |
| 6.9 | | 700 | | 690 | 8,200 | 6.8 | 6,960 | 8.0 | 7,570 | 8.0 | 7,580 | 9.2 | 8,180 | |
| | | 1100 | | 1,110 | 13,300 | 7.2 | 7,700 | 8.4 | 8,310 | 8.4 | 8,320 | 9.6 | 8,920 | |
| 6.6 | 42 | 700 | 12–36 pulse | 790 | 9,000 | 7.1 | 7,330 | 8.3 | 7,940 | 8.3 | 7,950 | 9.5 | 8,550 | |
| | | 1100 | | 1,260 | 14,400 | 7.5 | 8,100 | 8.7 | 8,710 | 8.7 | 8,720 | 9.9 | 9,320 | |
| 6.9 | | 700 | | 790 | 9,400 | 7.1 | 7,330 | 8.3 | 7,940 | 8.3 | 7,950 | 9.5 | 8,550 | |
| | | 1100 | | 1,240 | 14,800 | 7.5 | 8,100 | 8.7 | 8,710 | 8.7 | 8,720 | 9.9 | 9,320 | |
| 6.6 | 48 | 700 | 36 pulse | For drives with 48 cells, data is identical to the 42 cells' data given above. These versions can be used for redundancy purposes. | | 7.4 | 7,720 | 8.6 | 8,330 | 8.6 | 8,340 | 9.8 | 8,940 | |
| | | 7.8 | | | | 8,510 | 9.0 | 9,120 | 9.0 | 9,130 | 10.2 | 9,730 | | |
| 6.9 | | 700 | | | | 7.4 | 7,720 | 8.6 | 8,330 | 8.6 | 8,340 | 9.8 | 8,940 | |
| | | 1100 | | | | 7.8 | 8,510 | 9.0 | 9,120 | 9.0 | 9,130 | 10.2 | 9,730 | |
| 10 | 54 | 1100 | | 36 pulse | 1,180 | 20,400 | – | – | – | – | – | – | 11.6 | 11,800 |
| | | 1100 | | | 1,020 | 19,400 | – | – | – | – | – | – | – | 11.6 |
| 10 | 60 | 1100 | | 36 pulse | 1,250 | 21,700 | – | – | – | – | – | – | 11.9 | 12,300 |
| | | 1100 | | | 1,200 | 22,900 | – | – | – | – | – | – | – | 11.9 |
| 10 | 66 | 1100 | 36 pulse | 1,250 | 21,700 | – | – | – | – | – | – | 12.2 | 12,800 | |
| | | 1100 | | 1,250 | 23,800 | – | – | – | – | – | – | – | 12.2 | 12,800 |

Footnote:

All SINAMICS PERFECT HARMONY GH150 drives listed above are based on an IP43 design.

All drive cabinets have a maximum height of approx. 2.8 m. Drives with an output voltage of 6.9 kV have a depth of 1,275 mm.

Drives with an output voltage of 10 or 11 kV have a depth of approx. 1.5 m. The control cabinet has a depth of 600 mm.

| Dual circuit drive | | | | | | |
|--------------------|--|-------------------|-----------|-------------|-----------|-------------|
| | | | 24-pulse | | 36-pulse | |
| Pulse number | Output current (A) | Type rating (kVA) | Width (m) | Weight (kg) | Width (m) | Weight (kg) |
| 24 – 36 pulse | 1,440 | 10,000 | 10.4 | 11,600 | 12.8 | 12,400 |
| | 2,360 | 16,400 | 10.8 | 12,800 | 13.2 | 13,600 |
| | 1,420 | 10,200 | 10.4 | 11,600 | 12.8 | 12,400 |
| | 2,320 | 16,700 | 10.8 | 12,800 | 13.2 | 13,600 |
| 24 – 36 pulse | 1,520 | 10,500 | 11.8 | 13,020 | 14.2 | 14,240 |
| | 2,560 | 17,700 | 12.6 | 14,400 | 15.0 | 15,620 |
| | 1,520 | 11,000 | 11.8 | 13,020 | 14.2 | 14,240 |
| | 2,560 | 18,400 | 12.6 | 14,400 | 15.0 | 15,620 |
| | 1,420 | 13,500 | 11.8 | 13,020 | 14.2 | 14,240 |
| | 2,280 | 21,700 | 12.6 | 14,400 | 15.0 | 15,620 |
| | 1,160 | 12,100 | 11.8 | 13,020 | 14.2 | 14,240 |
| | 1,860 | 19,300 | 12.6 | 14,400 | 15.0 | 15,620 |
| 24 – 36 pulse | 1,580 | 15,100 | 11.8 | 13,520 | 14.2 | 14,740 |
| | 2,540 | 24,200 | 12.6 | 15,000 | 15.0 | 16,220 |
| | 1,580 | 16,400 | 11.8 | 13,520 | 14.2 | 14,740 |
| | 2,440 | 25,400 | 12.6 | 15,000 | 15.0 | 16,220 |
| | 1,440 | 16,500 | 11.8 | 13,520 | 14.2 | 14,740 |
| | 2,320 | 26,500 | 12.6 | 15,000 | 15.0 | 16,220 |
| | 1,380 | 16,500 | 11.8 | 13,520 | 14.2 | 14,740 |
| | 2,220 | 26,500 | 12.6 | 15,000 | 15.0 | 16,220 |
| 24 – 36 pulse | 1,580 | 18,100 | 12.4 | 14,260 | 14.8 | 15,480 |
| | 2,520 | 28,800 | 13.2 | 15,800 | 15.6 | 17,020 |
| | 1,580 | 18,900 | 12.4 | 14,260 | 14.8 | 15,480 |
| | 2,480 | 29,600 | 13.2 | 15,800 | 15.6 | 17,020 |
| | For drives with 48 cells, data is identical to the 42 cells' data given above. These versions can be used for redundancy purposes. | | 13.0 | 15,040 | 15.4 | 16,260 |
| | | | 13.8 | 16,620 | 16.2 | 17,840 |
| | | | 13.0 | 15,040 | 15.4 | 16,260 |
| | | | 13.8 | 16,620 | 16.2 | 17,840 |
| 36 pulse | 2,360 | 40,900 | – | – | 21.0 | 22,800 |
| | 2,040 | 38,900 | – | – | 21.0 | 22,800 |
| 36 pulse | 2,500 | 43,300 | – | – | 21.6 | 23,800 |
| | 2,400 | 45,700 | – | – | 21.6 | 23,800 |
| 36 pulse | 2,500 | 43,300 | – | – | 22.2 | 24,800 |
| | 2,500 | 47,600 | – | – | 22.2 | 24,800 |



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of production plants
and entire companies
in every sector.

The advantages
of Integrated
Drive Systems
at a glance



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