

SINAMICS PERFECT HARMONY GH180

Medium-Voltage Air-Cooled Drives

SINAMICS Drives



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SINAMICS PERFECT HARMONY GH180 Medium-Voltage Air-Cooled Drives

Catalog D 15.1 · 2014 Germany Edition ¹⁾



Services and Documentation

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Introduction

SINAMICS PERFECT HARMONY GH180

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¹⁾ All SINAMICS PERFECT HARMONY GH180 medium-voltage air-cooled drives described in this catalog are manufactured in our Nuremberg, Germany location.

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Integrated technologies, vertical market expertise and services for greater productivity, energy efficiency, and flexibility.

The Siemens Industry Sector is the world's leading supplier of innovative and environmentally friendly products and solutions for industrial companies. End-to-end automation technology and industrial software, solid market expertise, and technology-based services are the levers we use to increase our customers' productivity, efficiency and flexibility. With a global workforce of more than 100 000 employees, the Industry Sector comprises the Industry Automation, Drive Technologies, and Customer Services divisions, as well as the Metals Technologies **Business Unit.**

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SINAMICS PERFECT HARMONY GH180 Introduction



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GH180 drive series

Medium-voltage drives

Overview

The reliable and complete range

Medium-voltage drive series	SINAMICS PERFECT HARMONY GH180	SINAMICS GM150 (IGBT/IGCT)	SINAMICS SM150 (IGBT/IGCT)	SINAMICS GL150	SINAMICS SL150
Power range	150 kW to 60 MW ¹⁾	700 kW to 17 MW	2.8 MW to 30.6 MW	6 MW to 120 MW	3 MW to 36 MW
Application	General-purpose applications	General-purpose applications	Sophisticated applications	General-purpose applications	Sophisticated applications
Motors	Induction and synchronous motors	Induction and synchronous motors	Induction and synchronous motors	Synchronous motors	Induction and synchronous motors
Energy recovery	-	-	Yes	Yes	Yes
Multi-motor drives	-	-	Yes	-	-
Semiconductor technology	LV-IGBT (cell-type topology)	HV-IGBT/IGCT (NPC topology)	HV-IGBT/IGCT (NPC topology)	Thyristor (LCI topology)	Thyristor (cycloconverters)
Typical applications	Pumps, fans, compres- sors, extruders, knead- ers, mixers, crushers, agitators, conveyor systems, presses, ESP, retrofit	Pumps, fans, compres- sors, extruders, knead- ers, mixers, crushers, agitators, conveyor systems, marine drives, presses, wire rod mills	Rolling mills, mine hoists, conveyor systems, test stands	Compressors, fans, pumps, extruders, marine drives, starting drives for blast fur- naces	Rolling mills, mine hoists, excavators, ore crushers and cement mills

The benchmark when it comes to medium-voltage drive systems

Siemens is the undisputed No. 1 in medium-voltage drives and around the globe sets the benchmark in this field – and not only involving power ratings and market share. Our range of products is also unique worldwide:

- All voltage classes from 2.3 to 13.8 kV
- A seamless range of power ratings from 150 kW to 120 MW
- All levels of dynamic response and performance
- · Single-motor drives and multi-motor systems
- Harmonized and coordinated systems with synchronous and induction motors
- Motor speeds from 10 to 15,000 rpm in the Megawatt range

The decisive plus when it comes to experience

Wherever it involves the highest degree of availability, a high number of users have been depending on medium-voltage drives from Siemens since decades – and that worldwide.

The reason for this lies in the reliability of our drive systems, which has become almost legendary. And all of this didn't just happen by chance. It is the result of our many years of experience, our power of innovation and our extensive know-how.

- From 1969: Variable-speed medium-voltage drive systems with current-source DC link
- From 1970: Cycloconverters with more than 700 drives, Siemens is the global market leader
- 1994: The cell technology of SINAMICS PERFECT HARMONY revolutionized medium-voltage drives
- 1996: Pioneered the use of high-rating voltage-source DC link drives in rolling mills
- 1998: Pioneered the use of high-voltage IGBTs for mediumvoltage drives
- 2003: Worldwide the highest rating high-speed drives (65 MW) with LCI for compressors in a gas liquefaction plant
- 2005: Highest rating drive with voltage-source DC link drives in a cell-type topology (65/45 MW) used in an LNG plant (LNG = Liquefied Natural Gas)

Well-proven as basis

Based on well-proven technological concepts, we are continually developing our medium-voltage drives. The result: Increasingly higher reliability and operational reliability and safety, continually more compact types of construction, continually lower energy requirement and service and maintenance costs as well as increasingly simpler handling – from engineering through installation, integration and commissioning.

Always the optimum solution

No matter which medium-voltage drive task is involved: We can always offer the optimum solution. We consequentially utilize the strengths of various technologies to implement these solutions. We have the widest range of drive technologies available – from cycloconverters and current-source DC link drives using thyristors through voltage-source DC link drives equipped with HV-IGBTs or IGCTs up to cell topology drives. With the latter, a medium voltage is obtained at the output by connecting low-voltage cells in series.

 Power ratings up to 60 MW, only with liquid cooling (not included in this catalog).

Perfect harmony of performance and benefits

Employed in applications ranging from power generation to oil and gas, water/wastewater and paper production, SINAMICS PERFECT HARMONY drives play a decisive role in substantially increasing productivity, improving energy efficiency and reducing operating costs.

Application



Siemens is the only supplier that covers the complete power range extending from 150 kW up to over 120 MW. SINAMICS PERFECT HARMONY can be perfectly adapted to address specific customer requirements - and with an installed base of more than 2.2 million kW worldwide, it proves itself every day in countless applications.

Ongoing development of proven technology

Since its introduction in 1994, SINAMICS PERFECT HARMONY has revolutionized drive technology – and continues to set industry standards for reliability and innovation. As power switching device technology advances and increases output voltage capability, we improve each generation of our SINAMICS PERFECT HARMONY drive in three key areas: increased reliability and availability, increased efficiency, and a smaller drive footprint.

We continue to develop our product line without "reinventing the wheel", like other drive manufacturers. We have kept the core topology of SINAMICS PERFECT HARMONY and continue to improve its performance, ensuring product support over its complete lifecycle. For our customers this means lower costs for maintenance and spare parts, higher quality and lower lifecycle costs. We improve our products by actively soliciting the input of our customers, and we look forward to counting you among them.

SINAMICS PERFECT HARMONY represents an evolution founded on experience garnered from our huge installed base, coupled with Siemens' unparalleled investments in R&D. As one of the largest companies in the world, Siemens provides confidence and financial stability in addition to exceptional technology. We offer you expertise across the globe and a world of innovation.

Benefits



According to energy authorities, industrial motors consume over a billion kilowatt hours of energy each year. This represents 50 percent of the world's energy usage. System enhancements such as improved sizing and proper matching to load, more efficient drive trains, and variable speed drives will help drive energy usage down, according to experts. That means that the right drive can help you drive cost out of your operation by providing more precise and efficient control.

The potential for reducing your costs is especially high if you are operating pumps, fans or other electrically-driven machines in your process. By not having the optimum process efficiency, you are losing enormous sums of money every month, which in turn has a negative impact on your operating result.



Siemens is the global market leader for medium-voltage drives. They offer a wealth of advantages:

- Lower operating costs
- Precise process control
- Lower maintenance costs
- Increased production efficiency
- Exceptional reliability
- Intuitive HMI

The outstanding record of SINAMICS PERFECT HARMONY has made it the drive of choice for demanding applications that require the highest levels of reliability, precision and long service life

SINAMICS PERFECT HARMONY GH180 drives are available in air-cooled and liquid-cooled versions. These product versions are available for different output power ranges. The following tables summarize the essential features of this drive series.





Power range	180 to 7040 kVA ¹⁾	3500 to 16000 kVA
Output voltage	2.4 to 7.2 kV	2.4 to 8.0 kV
Input voltage	2.4 to 13.8 kV, 50/60 Hz	2.4 to 13.8 kV (standard), up to 33 kV (optional), 50/60 Hz
Cooling type	Air-cooled	Liquid-cooled ²⁾
Power cell ratings	40, 70, 100, 140, 200 or 260 A at 750 V 3 AC 315, 375, 500 or 660 A at 690 V 3 AC 720 A at 630 V 3 AC	880 or 1250 A at 750 V 3 AC

¹⁾ Additional air-cooled drive types are available that go beyond the drives listed in this catalog (e.g. additional intermediate power ratings or output voltage 10/11 kV). If you have any queries, please contact your local Siemens sales representative.

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SINAMICS PERFECT HARMONY GH180 Air-Cooled Drives





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Overview

SINAMICS PERFECT HARMONY GH180 drive series

SINAMICS PERFECT HARMONY GH180 drives provide variable-speed operation by converting utility power at a fixed frequency and fixed voltage to variable frequency, variable voltage power. The main characteristics of the air-cooled drives described in this catalog are listed in the following table.

Power range overview

Article No.	Cell voltage V	Cell current A	Cooling method
6SR4	750	40 260	Air-cooled
6SR3	690	315 660	Air-cooled



Power range of air-cooled SINAMICS PERFECT HARMONY GH180 drives

Standards and regulations

SINAMICS PERFECT HARMONY GH180 drives are developed, manufactured and tested in Nuremberg, Germany in accordance with IEC standards.

They meet the applicable requirements of the following EU regulations:

Low-Voltage Directive (LVD)

A Declaration of Conformity and attached CE mark declares conformity of the low-voltage compartments of the product (e.g. control cabinet, excitation unit etc.) with LVD 2006/95/EC or 73/23/EEC (depending on the product) and the associated standard IEC 61800-5-1, Ed.2.

EMC Directive (EMCD)

A factory certificate declares that the products satisfy the requirements of EMCD 2004/108/EC or 89/336/EEC (depending on the product) concerning electromagnetic compatibility, when put to their intended use and conform to the associated standard IEC 61800-3.

• Machinery Directive (MD)

The products are intended solely for installation as components in a machine, system or plant. They are designed to satisfy the relevant requirements of IEC 61800-5-1, IEC 60204-1 and IEC 60204-11 to allow the machine manufacturer or system/plant integrator – by appropriate usage of the products – to meet the requirements of the Machinery Directive.

Within the European Economic Area (EEA), operation is prohibited until the conformity of the end product with Machinery Directive 2006/42/EC has been established. It is the sole responsibility of the machine manufacturer or system/plant integrator to ensure this.

Benefits

Low line harmonics

- SINAMICS PERFECT HARMONY GH180 drives meet the most stringent IEEE 519-1992 requirements for voltage and current harmonic distortion, even if the source capacity is no higher than the drive rating ¹⁾.
- In most cases this eliminates the need for costly and inefficient harmonic filters and their associated resonance problems.
- The drive protects other on-line equipment from harmonic disturbance (computers, telephones and other power converters).

Power quality output

- SINAMICS PERFECT HARMONY GH180 drives reduce common-mode voltage at the motor stator windings.
- Minimizes drive induced torque pulsations and associated torsional analysis compared to other medium-voltage topologies, by using a motor friendly pulse width modulation (PWM) output.
- The drive supplies a sinusoidal output that eliminates additional harmonic heating and can be used with new or existing motors without derating.

Maximized availability

Maximized availability can be achieved with the following options:

- In the event of a cell failure the drive remains operational by using the cell bypass option.
- The drive employs a Process Tolerant Protection Strategy (ProToPS) based on a hierarchical warning system that allows the operator to evaluate the drive disturbance and respond appropriately to avoid system shutdown.

Extended reliability

SINAMICS PERFECT HARMONY GH180 has an integrated transformer which offers the following additional advantages:

- Simple and robust way to cancel input current harmonics without the need for input harmonic filters or a complex active front-end
- · Protects power converter semiconductors against line transients
- Kinetic buffering
- Completely protects the motor in case of a ground fault in the drive, the motor cabling or insulation
- Negligible common mode voltage allows the use of a standard motor, thus eliminating the need for special high-voltage insulation.
- · Limits the fault energy in the drive in the unlikely event of a fault
- The incoming line voltage doesn't have to match the motor voltage.

 Compliance with standard IEEE 519-1992 can only be guaranteed in line supplies without previous disturbances or already existing harmonics.

Introduction

Benefits (continued)

Factory test offers the following advantages:

- Each transformer and drive is tested as a complete system at full load prior to delivery.
- Factory testing allows accurate efficiency measurements to ensure that drive performance meets customer specifications.
- Verification of sequence of operation and protection functions

Installation and maintenance

- The SINAMICS PERFECT HARMONY GH180 drives are easy to install and maintain.
- Customer needs to provide three cables in and three cables out. There is no customer site cabling required to connect the assembled sections.
- Power cells can be pulled out easily for maintenance due to their reduced weight and front accessible connections (6RS4...).
- Sophisticated microprocessor-based diagnostics pinpoint the location of any defects.

Shorter delivery time

Some predefined drive types with specific options can be ordered with significantly shorter delivery times when specifying option **B19** (Express Line).

Application

Typical applications for SINAMICS PERFECT HARMONY GH180 drives

SINAMICS PERFECT HARMONY GH180 drives are regularly used by reliability and quality conscious industries to address their most demanding applications. Application examples:

- Industrial pumps and fans
- Oil & gas pumps and compressors, e.g. electrical submersible pumps (ESPs) and high speed compressors
- Induced and forced draft boiler blowers for power generation
- Clean water and wastewater pumps
- Multi-motor synchronous transfer applications (such as pipelines in the oil & gas markets).

Design

Drive topology

SINAMICS PERFECT HARMONY GH180 drives achieve uncompromising performance by employing well-proven technology in a modular configuration. Medium-voltage levels are obtained by adding together the outputs of multiple low-voltage power cells. The low-voltage power cells are simplified variations of standard 2-level PWM motor drives for low-voltage service, which have been built in high volume for many years.



Topology of SINAMICS PERFECT HARMONY GH180 drive (3 cells)

For higher output voltages, up to five (6SR4...) or six (6SR3...) power cells can be connected in series in each phase. The number of secondary windings of the integrated input transformer increases accordingly.

Each power cell is capable of receiving input power at 750 V AC, 3-phase, 50/60 Hz (6SR4...) or 690 V AC (6SR3...) and delivering that power to a single phase load at a variable frequency from 0.5 to the maximum rated output frequency of the drive.

Transformer

The transformer is an integral part of the drive and cannot be specified or obtained separately. It has been carefully designed over several development stages to function properly with the SINAMICS PERFECT HARMONY GH180 drive.

The force-ventilated dry-type transformers have been designed specifically for use with a particular drive type and have 9 to 18 extended delta secondaries. The secondary currents are rich in harmonics, but the primary current is virtually sinusoidal. The usual standards, ANSI C57-12.51 and C57-12.91 (optionally IEC 60076-11:2004), apply to transformers with only a few windings and which are subject to sinusoidal currents. Thus, there are some important exceptions and modifications to the application of these standards to the GH180 transformers.

Proven IGBTs

Insulated Gate Bipolar Transistors (IGBTs) form the backbone of the SINAMICS PERFECT HARMONY GH180 drive. Built in high volumes and serving as a proven power device across the industrial power control industry, IGBT technology has been in existence for more than a decade. The stability and reliability of IGBTs ensure a long service life and a high degree of availability.

Introduction

Design (continued)

Linked low-voltage cells

In the SINAMICS PERFECT HARMONY GH180 drive, a series of low-voltage cells (see graphic "Schematic of a typical power cell") are linked together to build the medium-voltage power output of the drive system. This patented modular configuration gives the SINAMICS PERFECT HARMONY GH180 many advantages when it comes to maintenance, power quality and reliability. It also provides the basis for one of its most important advantages – increased availability through the advanced cell bypass option.



Schematic of a typical power cell

Advanced cell bypass

The SINAMICS PERFECT HARMONY GH180 drive is designed to withstand failures that conventional drives would not be able to cope with as redundancy options have been added to the system. The patented, cell-based configuration maximizes uptime and simplifies modifications.

Through a bypass control that is completely separate from each power cell, the SINAMICS PERFECT HARMONY GH180 ensures that a failed power cell is automatically bypassed in less than 500 ms.

Since the cells in each phase of a SINAMICS PERFECT HARMONY GH180 are in series, bypassing a cell has no effect on the output current of the drive, but the output voltage will be reduced. Usually the required motor voltage is roughly proportional to speed, so that the maximum speed at which the drive can fulfill the application requirements will also be reduced.

Therefore, it is important to maximize the motor voltage available after one or more cells have been bypassed. The following diagrams illustrate the voltage available from a SINAMICS PERFECT HARMONY GH180 drive, where the cells, represented by circles, are shown as simple voltage sources. The following diagram shows a 15-cell drive in which no cells are bypassed. With 100 % of the cells in use, 100 % of the original voltage is available. The voltage commands to the three phase groups of cells will have phase A displaced from phase B by 120°, and from phase C by 120°.



Simplified diagram of a 15-cell drive

When two cells are bypassed in phase A, the output voltage will tend to become imbalanced, as illustrated in the diagram below.



Drive output with 2 cells bypassed in phase A

One possible remedy is to bypass an equal number of cells in all three phases, even though some may not have failed. The following diagram illustrates this approach. Obviously, this method prevents imbalance but sacrifices possible voltage capability. In this diagram, 87 % of the cells are functional, but only 60 % are in use, and only 60 % of full voltage is available.



Drive output re-balanced by bypassing functional cells

Introduction

Design (continued)

A better approach is illustrated in the diagram on the right. This method takes advantage of the fact that the star-point of the cells is floating, and is not connected to the neutral of the motor. Therefore the star-point can be shifted away from the motor neutral, and the phase angles of the cell voltages can be adjusted, so that a balanced set of motor voltages is obtained even though the cell group voltages are not balanced.

Siemens calls this approach Neutral Shift. This approach is equivalent to introducing a zero-sequence component into the voltage command vectors for the cells. In the following diagram, all intact cells are operational, and 80 % of the original voltage is available. The phase angles of the cell voltages have been adjusted so that phase A is displaced from phase B and from phase C by 132.5°, instead of the normal 120°.



Drive output re-balanced by adjusting phase angles (Neutral Shift)

Function

Control, protection and monitoring functions

Closed-loop control	The drive can be controlled by means of vector control algorithm without an encoder (standard) or with it (option).
Auto tuning	Auto tuning involves the estimation of motor parameters required for motor control. This is done in two stages. In stage one, motor stator resistance and total leakage inductance are determined. This stage does not require spinning the motor. In stage two, the motor no-load current and total inertia are estimated. Estimation of these values requires the motor to be spun. Accuracy of the estimation is better if the load is de-coupled from the motor.
Automatic restart	The automatic restart switches the drive on again when the power is restored after a power failure or a general fault, and ramps up to the current speed setpoint.
Energy saver	Energy saver control allows the reduction of motor losses, and improves overall efficiency, when the demanded motor load is low. The drive adapts the motor flux depending on the particular motor load.
Flying restart	The flying restart function permits smooth connection of the drive to a rotating motor.
Diagnostics functions	Self-diagnosis of control hardware
	 Non-volatile memory for reliable diagnosis when the power supply fails
	 Monitoring of IGBTs with individual messages for each cell
	 User-friendly local operator panel with plain text messages
	 Fault log with first-in indication and time/date stamp
User configurable digital meters	The user can select indication of speed, voltage, current, input/output power, and efficiency on the operator panel.
Process control system	The optional Process Tolerant Protection Strategy (ProToPS) is a groundbreaking process control system available exclusively from Siemens. Instead of tripping the drive and automatically shutting down the system due to a malfunction, ProToPS provides a hierarchical system of warnings. This control strategy provides the time needed to evaluate the situation and respond appropriately to avoid a system shutdown.
Operating hours and switching cycle counter	The amount of the time that the drive was operational since it was commissioned can be displayed. The switching cycle counter can be generated by means of an event log from the drive controller.
Detection of actual motor speed	The control algorithm calculates actual motor speed from currents and voltages measured at the drive output.
Emergency Stop button	The drives are equipped as standard with an Emergency Stop button (red mushroom button with yellow collar), which is fitted in the cabinet door. The contacts of the pushbutton are connected in parallel to the terminal block so they can be integrated in a protection concept on the plant side.
Insulation monitoring	An output signal can be provided optionally to operate the customer protection.
I/O monitoring	I/O signals allow user-customization of the system and they can be monitored remotely or by using the operator panel display.
Thermal overload protection	Based on the output signals of the drive the thermal motor model is calculated. The motor thermal over- load protection algorithm prevents the motor from being exposed to excessive temperatures.

Introduction

Function (continued)

SINAMICS PERFECT HARMONY GH180



SINAMICS PERFECT HARMONY GH180 drives are designed for a voltage range from 2.4 up to 6.6 kV and a power range from 180 up to 7040 kVA. Power cells are available with rated currents from 40 up to 720 A.

		Article No. 6SR4	Article No. 6SR3
Power semiconductors		IGBTs, diodes	IGBTs, diodes
Line-side rectifier		18- to 30-pulse diode rectifier	24- to 36-pulse diode rectifier
Motor-side inverter		Multi-level drive (PWM) with IGBT power modules	Multi-level drive (PWM) with IGBT power modules
Power cell ratings	А	40, 70, 100, 140, 200, 260 at 750 V 3 AC	315, 375, 500, 660 at 690 V 3 AC (720 at 630 V 3 AC on request)
Input voltage range	kV	2.4 to 13.8	2.4 to 13.8
input voltage tolerance		±10 % of nominal rated input voltage	±10 % of nominal rated input voltage
Input frequency	Hz	50/60 ± 5 %	50/60 ± 5 %
Input power factor		\geq 0.95 above 10 % load	≥ 0.95 above 10 % load
Input harmonics		≤ 5 % TDD	≤ 5 % TDD
Output voltages	kV	2.4, 3.3, 4.0/4.16, 6.0, 6.6	4.16, 4.8, 6.0, 6.6
Output frequency and drift	Hz Hz	0.5 330 ± 0.5 % 10 167 at rated torque (2-quadrant operation)	0.5 330 ± 0.5 % 10 167 at rated torque (2-quadrant operation)
Output dV/dt	V/µs	< 3000	< 1000
Power range	kVA	180 2970	2200 7040
Cooling methods		Forced air-cooled	Forced air-cooled
Control		NXGII	NXGII
Motor control		Induction motors	Induction motors
		Synchronous motors	 Synchronous motors
		 Permanent magnet motors 	 Permanent magnet motors
		Wound rotor motors	Wound rotor motors

Note: Not all configurations of output voltages and/or power cell amperage might be available from the Nuremberg factory. See selection and ordering data in this section for details.

Overload capability of the cell

	Article I	Article No. 6SR4					Article No. 6SR3			
Required overload (/// _N)	Availabl A	vailable continuous output current per cell			Available continuous output current per cell A			er cell		
No overload	40	70	100	140	200	260	315	375	500	660
110 % (for 1 min, cycle time 10 min)	40	70	100	140	200	260	315	375	500	660
150 % (for 1 min, cycle time 10 min)	40	70	100	140	200	260	300	300	400	450

All air-cooled SINAMICS PERFECT HARMONY GH180 drives have as standard an overload capability of 110 % without derating for all of the rated cell currents

Selection and ordering data

Overview

You can select the right drive type from the following tables. The corresponding motor data and the article numbers are listed in these tables. The tables are organized according to the motor voltages. For the complete technical data of the listed drive types refer to chapter 3.

In order to select the right SINAMICS PERFECT HARMONY GH180 drive, please take into consideration the following steps:

Choosing the right cell size

1. Determine the maximum continuous motor current, temporary overload not included:

• Use the motor full load line current (FLA) if available or use the following formula to calculate motor current *I*.

$$I = \frac{P_{\text{motor}} \text{kW}}{\sqrt{3} \times V_{\text{motor}} \times PF_{\text{motor}} \times \eta_{\text{motor}}}$$

Where:

 P_{motor} kW = output (in kW)

$$V_{\text{motor}} = \text{motor voltage}$$

 PF_{motor} = motor power factor (= (cos φ)_{motor})

 η_{motor} = motor efficiency

(keeping in mind: motor service factor if utilized and/or overload requirements)

- If the motor power factor (*PF*_{motor}) and efficiency at full load are not known, then use the following default values:
 - $PF_{motor} = 0.88$

- η_{motor} = 0.94 for power cells up to 140 A

0.964 for power cells above 140 A

 Factor in the motor service factor (SF) if the application will make use of it under long term operation. You do so by multiplying the given/calculated current by the motor SF.

- 2. Determine the minimum continuous cell current rating:
 - If the drive is intended to operate within nominal parameters, the maximum continuous motor current will be the next higher rated current of the available cells. For the appropriate drive type, identify the smallest cell available that can provide the current calculated in the previous paragraph.
- 3. Factor in any overload requirements:
 - For the cell chosen on the previous paragraph, make sure it can handle the application overload requirements by checking overload capabilities (see page 2/6).
 - If the overload requirements exceed the output current of the chosen cell then the next cell size must be selected.

Note:

Please contact the factory or your local Siemens sales representative for derating calculations, if the drive is intended to operate outside the nominal conditions such as:

- High ambient temperatures
- High altitude installations
- Very low continuous operating frequencies at high current
- · High frequency operation for high speed motors
- Applications as starting drive

Selection and ordering data

Selection and ordering data Motor voltage 2.4 kV

	-							
Motor voltage	Type rating	Shaft output ¹⁾	Shaft output ¹⁾	Typical motor current ¹⁾	Power cell current	Number of cells	Transformer rating	Article No.
kV	kVA	kW	hp	А	А		kVA	
2.4	180	149	200	43	70	9	200	6SR4102-0 B32-0 0
2.4	270	224	300	65	70	9	300	6SR4102-0 B33-0 0
2.4	290	241	323	70	70	9	400	6SR4102-0 B34-0 0
2.4	360	298	400	87	100	9	400	6SR4102-0 C34-0 0
2.4	410	336	450	98	100	9	450	6SR4102-0 C34-5 0
2.4	415	344	461	100	100	9	500	6SR4102-0 C35-0 0
2.4	450	373	500	108	140	9	500	6SR4102-0 D35-0 0
2.4	540	448	600	130	140	9	600	6SR4102-0 D36-0 0
2.4	580	481	645	140	140	9	700	6SR4102-0 D37-0 0 0

For article No. key, see pages 2/13 to 2/15

Motor voltage 3.3 kV

Motor voltage	Type rating	Shaft output ¹⁾	Shaft output ¹⁾	Typical motor current ¹⁾	Power cell current	Number of cells	Transformer rating	Article No.
kV	kVA	kW	hp	А	А		kVA	
3.3	180	149	200	32	40	9	200	6SR4102-0 A32-0 0
3.3	225	189	254	40	40	9	300	6SR4102-0 A33-0 0
3.3	270	224	300	47	70	9	300	6SR4102-0 B33-0 0
3.3	360	298	400	63	70	9	400	6SR4102-0 B34-0 0
3.3	400	331	444	70	70	9	450	6SR4102-0 B34-5 0
3.3	410	336	450	71	100	9	450	6SR4102-0 C34-5 0
3.3	450	373	500	79	100	9	500	6SR4102-0 C35-0 0
3.3	540	448	600	95	100	9	600	6SR4102-0 C36-0 0
3.3	570	473	634	100	100	9	700	6SR4102-0 C37-0 0
3.3	630	522	700	110	140	9	700	6SR4102-0 D37-0 0
3.3	720	597	800	126	140	9	800	6SR4102-0 D38-0 0
3.3	800	662	887	140	140	9	900	6SR4102-0 D38-7 0

For article No. key, see pages 2/13 to 2/15

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

Selection and ordering data

Selection and ordering data (continued)

Motor voltage	4.0/4.16 kV
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Motor voltage	Type rating	Shaft output ¹⁾	Shaft output ¹⁾	Typical motor current ¹⁾	Power cell current	Number of cells	Transformer rating	Article No.
kV	kVA	kW	hp	А	А		kVA	
4.0/4.16 ²⁾	180	149	200	26	40	9	200	6SR4102-0 A32-0 0
4.0/4.16 ²⁾	270	224	300	39	40	9	300	6SR4102-0 A33-0 0
4.0/4.16 ²⁾	275	229	307	40	40	9	400	6SR4102-0 A34-0 0
4.0/4.16 ²⁾	360	298	400	52	70	9	400	6SR4102-0 B34-0 0
4.0/4.16 ²⁾	410	336	450	59	70	9	450	6SR4102-0 B34-5 0
4.0/4.16 ²⁾	450	373	500	65	70	9	500	6SR4102-0 B35-0 0
4.0/4.16 ²⁾	480	401	538	70	70	9	600	6SR4102-0 B36-0 0
4.0/4.16 ²⁾	540	448	600	78	100	9	600	6SR4102-0 C36-0 0
4.0/4.16 ²⁾	630	522	700	91	100	9	700	6SR4102-0 C37-0 0
4.0/4.16 ²⁾	690	573	768	100	100	9	800	6SR4102-0 C38-0 0
4.0/4.16 ²⁾	720	597	800	104	140	9	800	6SR4102-0 D38-0 0
4.0/4.16 ²⁾	810	671	900	117	140	9	900	6SR4102-0 D38-7 0
4.0/4.16 ²⁾	900	746	1000	130	140	9	1000	6SR4102-0 D41-0 0
4.0/4.16 ²⁾	965	802	1075	140	140	9	1100	6SR4102-0 D41-1 0
4.16	2200	1865	2500	305	315	12	2500	6SR3102-3 G42-5 0
4.16	2265	1925	2581	315	315	12	3000	6SR3102-3 G43-0 0
4.16	2640	2238	3000	366	375	12	3000	6SR3102-3 H43-0 0
4.16	2700	2292	3073	375	375	12	3500	6SR3102-3 H43-5 0
4.16	3080	2611	3500	427	500	12	3500	6SR3102-3 🗖 J43-5 🔳 🗖 0
4.16	3520	2984	4000	488	500	12	4000	6SR3102-3 J44-0 0
4.16	3600	3056	4097	500	500	12	5000	6SR3102-3 J45-0 0
4.16	4400	3730	5000	610	660	12	5000	6SR3102-3 K45-0 0
4.16	4540	3851	5162	630	660	12	6000	6SR3102-3 K46-0 0

For article No. key, see pages 2/13 to 2/15

 The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor cos \u03c8 and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.
 4.16 kV possible with overmodulation; under load, motor operates with 4.0 kV.

Selection and ordering data

Selection and ordering data (continued)

Motor voltage 4.8 kV

Motor voltage	Type rating	Shaft output ¹⁾	Shaft output ¹⁾	Typical motor current ¹⁾	Power cell current	Number of cells	Transformer rating	Article No.
kV	kVA	kW	hp	А	А		kVA	
4.8	2200	1865	2500	264	315	12	2500	6SR3102-3 G42-5 0
4.8	2615	2222	2978	315	315	12	3000	6SR3102-3 G43-0 0
4.8	2640	2238	3000	317	375	12	3000	6SR3102-3 H43-0 0
4.8	3080	2611	3500	370	375	12	3500	6SR3102-3 🖬 H43-5 🔳 🗖 0
4.8	3115	2645	3545	375	375	12	4000	6SR3102-3 H44-0 0
4.8	3520	2984	4000	423	500	12	4000	6SR3102-3 🗖 J44-0 🔳 🗖 0
4.8	4155	3526	4727	500	500	12	5000	6SR3102-3 🗖 J45-0 🔳 🗖 0
4.8	4400	3730	5000	529	660	12	5000	6SR3102-3 🔳 K45-0 🔳 🔳 0
4.8	5240	4443	5956	630	660	12	6000	6SR3102-3 🗖 K46-0 🗖 🗖 0

For article No. key, see pages 2/13 to 2/15

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

Selection and ordering data

Selection and ordering data (continued)

Motor voltage	6.0	kV	
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Motor voltage	Type rating	Shaft output ¹⁾	Shaft output ¹⁾	Typical motor current ¹⁾	Power cell current	Number of cells	Transformer rating	Article No.
kV	kVA	kW	hp	А	А		kVA	
6.0	270	224	300	26	40	15	300	6SR4102-2 A33-0 0
6.0	360	298	400	35	40	15	400	6SR4102-2 A34-0 0
6.0	415	344	461	40	40	15	500	6SR4102-2 A35-0 0
6.0	450	373	500	43	70	15	500	6SR4102-2 🗖 B35-0 🗖 🗖 0
6.0	540	448	600	52	70	15	600	6SR4102-2 B36-0 0
6.0	630	522	700	61	70	15	700	6SR4102-2 B37-0 0
6.0	720	597	800	69	70	15	800	6SR4102-2 B38-0 0
6.0	725	602	807	70	70	15	900	6SR4102-2 B38-7 0
6.0	810	671	900	78	100	15	900	6SR4102-2 C38-7 0
6.0	900	746	1000	87	100	15	1000	6SR4102-2 C41-0 0
6.0	1035	860	1152	100	100	15	1250	6SR4102-2 C41-2 0
6.0	1130	933	1250	108	140	15	1250	6SR4102-2 D41-2 0
6.0	1350	1119	1500	130	140	15	1500	6SR4102-2 D41-5 0
6.0	1450	1203	1613	140	140	15	1750	6SR4102-2 D41-7 0
6.0	1540	1306	1750	148	200	15	1750	6SR4102-2 E41-7 0
6.0	1760	1492	2000	169	200	15	2000	6SR4102-2 E42-0 0
6.0	1980	1679	2250	190	200	15	2250	6SR4102-2 E42-2 0
6.0	2075	1763	2363	200	200	15	2500	6SR4102-2 E42-5 0
6.0	2200	1865	2500	212	260	15	2500	6SR4102-2 🗖 F42-5 🗖 🗖 0
6.0	2640	2238	3000	254	260	15	3000	6SR4102-2 🗖 F43-0 🗖 🗖 0
6.0	2700	2292	3073	260	260	15	3500	6SR4102-2 🗖 F43-5 🗖 🗖 0
6.0	3080	2611	3500	296	315	15	3500	6SR3102-5 G43-5 0
6.0	3270	2777	3722	315	315	15	4000	6SR3102-5 G44-0 0
6.0	3520	2984	4000	338	375	15	4000	6SR3102-5 H44-0 0
6.0	3895	3306	4432	375	375	15	5000	6SR3102-5 H45-0 0
6.0	4400	3730	5000	423	500	15	5000	6SR3102-5 🖬 J45-0 🔳 🗖 0
6.0	5195	4408	5909	500	500	15	6000	6SR3102-5 J46-0 0
6.0	5280	4476	6000	508	660	15	6000	6SR3102-5 K46-0 0
6.0	6160	5222	7000	592	660	15	7000	6SR3102-5 K47-0 0
6.0	6550	5554	7445	630	660	15	8000	6SR3102-5 K48-0 0

For article No. key, see pages 2/13 to 2/15

Note:

The drive types in the color-coded rows of the table can be ordered with a significantly shorter delivery time with option **B19** (Express Line).

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

Selection and ordering data

Selection and ordering data (continued)

Motor voltage 6.6 kV

Motor voltage	Type rating	Shaft output ¹⁾	Shaft output ¹⁾	Typical motor current ¹⁾	Power cell current	Number of cells	Transformer rating	Article No.
kV	kVA	kW	hp	А	А		kVA	
6.6	270	224	300	24	40	15	300	6SR4102-2 A33-0 0
6.6	360	298	400	32	40	15	400	6SR4102-2 A34-0 0
6.6	450	373	500	39	40	15	500	6SR4102-2 A35-0 0
6.6	455	378	507	40	40	15	600	6SR4102-2 A36-0 0
6.6	540	448	600	47	70	15	600	6SR4102-2 B36-0 0
6.6	630	522	700	55	70	15	700	6SR4102-2 B37-0 0
6.6	720	597	800	63	70	15	800	6SR4102-2 B38-0 0
6.6	800	662	887	70	70	15	900	6SR4102-2 🗖 B38-7 🗖 🗖 0
6.6	810	671	900	71	100	15	900	6SR4102-2 C38-7 0
6.6	900	746	1000	79	100	15	1000	6SR4102-2 C41-0 0
6.6	1130	933	1250	99	100	15	1250	6SR4102-2 C41-2 0
6.6	1140	946	1268	100	100	15	1500	6SR4102-2 C41-5 0
6.6	1350	1119	1500	118	140	15	1500	6SR4102-2 D41-5 0
6.6	1580	1306	1750	138	140	15	1750	6SR4102-2 D41-7 0
6.6	1600	1324	1775	140	140	15	2000	6SR4102-2 D42-0 0
6.6	1760	1492	2000	154	200	15	2000	6SR4102-2 E42-0 0
6.6	1980	1679	2250	173	200	15	2250	6SR4102-2 E42-2 0
6.6	2200	1865	2500	192	200	15	2500	6SR4102-2 E42-5 0
6.6	2285	1939	2600	200	200	15	3000	6SR4102-2 E43-0 0
6.6	2640	2238	3000	231	260	15	3000	6SR4102-2 🗖 F43-0 🗖 🗖 0
6.6	2970	2521	3380	260	260	15	3500	6SR4102-2 F43-5 0
6.6	3080	2611	3500	269	315	18	3500	6SR3102-7 G43-5 0
6.6	3520	2984	4000	308	315	18	4000	6SR3102-7 G44-0 0
6.6	3600	3055	4095	315	315	18	5000	6SR3102-7 G45-0 0
6.6	4285	3636	4875	375	375	18	5000	6SR3102-7 H45-0 0
6.6	4400	3730	5000	385	500	18	5000	6SR3102-7 🗖 J45-0 🔳 🗖 0
6.6	5280	4476	6000	462	500	18	6000	6SR3102-7 🗖 J46-0 🔳 🗖 0
6.6	5715	4849	6500	500	500	18	7000	6SR3102-7 🗖 J47-0 🔳 🗖 0
6.6	6160	5222	7000	539	660	18	7000	6SR3102-7 K47-0 0
6.6	7040	5968	8000	615	660	18	8000	6SR3102-7 K48-0 0

For article No. key, see pages 2/13 to 2/15

Note:

The drive types in the color-coded rows of the table can be ordered with a significantly shorter delivery time with option **B19** (Express Line).

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

Selection and ordering data

Article No. key 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 1 SINAMICS PERFECT HARMONY GH180 s R 0 6 . Drive 6SR3.. 3 6SR4.. 4 Manufacturing location Nuremberg, Germany 1 Cooling Air-cooled 0 Line-side behavior Basic Infeed ("Direct Front End") 2 Rated max. output voltage Applies for 6SR4... 4.0 kV 3 AC, 9 cells 0 6.6 kV 3 AC, 15 cells 2 Applies for 6SR3... 4.9 kV 3 AC, 12 cells 3 6.1 kV 3 AC, 15 cells 5 7.3 kV 3 AC, 18 cells 7 Input voltage 2.4 kV 3 AC Α 3.0 kV 3 AC в 3.3 kV 3 AC С 4.16 kV 3 AC D 4.8 kV 3 AC Ε 6.0 kV 3 AC F 6.3 kV 3 AC G 6.6 kV 3 AC н 6.9 kV 3 AC J 7.2 kV 3 AC κ 8.4 kV 3 AC L 10.0 kV 3 AC Μ 11.0 kV 3 AC Ν 12.0 kV 3 AC Ρ 12.47 kV 3 AC Q 13.2 kV 3 AC R 13.8 kV 3 AC s Other voltage than standard (on request) Х

Selection and ordering data (continued)

Selection and ordering data

Selection and ordering data (continued)

Article No. key (continued)

	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
SINAMICS PERFECT HARMONY GH180	6	s	R	•	•	•	•	-	•		•	•	•	-	•			0
Cell rating																		
Applies for 6SB4																		
40 A											Α							
70 A											В							
100 A											С							
140 A											D							
200 A											Е							
260 A											F							
Applies for 6SR3																		
315 A											G							
375 A											Н							
500 A											J							
660 A											К							
T																		
Other transformer rating than standard												0	0		0			
												3	2		0			
300 kVA												3	2		0			
												3	4		0			
450 kVA												3	4		5			
500 kVA												3	5		0			
600 kVA												3	6		0			
700 kVA												3	7		0			
800 kVA												3	8		0			
900 kVA												3	8		7			
1000 kVA												4	1		0			
1100 kVA												4	1		1			
1250 kVA												4	1		2			
1500 kVA												4	1		5			
1750 kVA												4	1		7			
2000 kVA												4	2		0			
2250 kVA												4	2		2			
2500 kVA												4	2		5			
3000 kVA												4	3		0			
3500 kVA												4	3		5			
4000 kVA												4	4		0			
4500 kVA												4	4		5			
5000 kVA												4	5		0			
5500 kVA												4	5		5			
6000 kVA												4	6		0			
6500 kVA												4	6		5			
7000 kVA												4	7		0			
7500 kVA												4	7		5			
8000 kVA												4	8		0			

Selection and ordering data

Selection and ordering data (continued)																		
Article No. key (continued)																		
	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
SINAMICS PERFECT HARMONY GH180	6	S	R	•	•	•	·	-	•		•	•	•	-	·	•	•	0
Transformer configuration																		
60 Hz, CU																Α		
50 Hz, CU																В		
60 Hz, AL																Е		
50 Hz, AL																F		
Auxiliary voltage																		
380 V 3 AC, 50/60 Hz																	F	
400 V 3 AC, 50/60 Hz																	G	
415 V 3 AC, 50/60 Hz																	Н	-
460 V 3 AC, 60 Hz																	J	
480 V 3 AC, 60 Hz																	К	

Note: Not all of the configurations that the above article No. key allows can be configured. See the selection tables and engineering information for available drive configurations.

SINAMICS PERFECT HARMONY GH180 Air-Cooled Drives

Options

Options

The following tables show an overview of the options and their availability for the SINAMICS PERFECT HARMONY GH180 drive series (details see chapter 4, description of options).

Option text	Order	Articl	e No.
	code	6SR4	6SR3
Shorter delivery time			
Express Line ¹⁾	B19	1	-
Reduced number of cells			
Drive with reduced number of cells	N80	1	-
Availability			
ProToPS ²⁾	U10	1	1
Cell bypass ²⁾	U11	~	1
Redundant single cell	U12	1	1
Redundant rank of cells	U13	1	1
Redundant blower	M61	1	1
Certifications			
CE certificate	U02	1	1
GOST certificate	U04	1	1
Cooling type			
Drive prepared for connection to an external air discharge system, front connection	M64	1	1
Drive prepared for connection to an external air discharge system, rear connection	M68	1	1
Protection functions			
Make-proof grounding switch at drive input	N44	1	1
Make-proof grounding switch at drive output	N45	1	1
Mechanical door interlock - Castell	M10	1	1
Electrical door interlocks 3)	M12	1	1
Serial communication			
Modbus Plus interface, network 1	G21	1	1
Modbus interface (software activation), network 1	G22	1	1
DeviceNet profile 12 interface, network 1	G23	1	1
Control Net interface, network 1	G26	1	1
Modbus Ethernet interface (software activation), network 1	G28	1	1
Additional Modbus Plus interface	G31	1	1
Additional Modbus interface	G32	1	1
Additional Modbus Ethernet interface	G38	1	1
DeviceNet profile 12 interface, network 2	G43	1	1
Control Net interface, network 2	G46	~	1
PROFIBUS DP interface, network 1	G91	1	1
PROFIBUS DP interface, network 2	G93	1	1
Port connectors			
Ethernet port connector mounted on the door	G47	1	1

Option text	Order	Articl	e No.
	code	6SR4	6SR3
Functional options			
Engineering and parameter configuration for ESP applications	B09	1	~
Drive adapted to ZLU requirements (on request)	B10	1	1
Speed sensing module (requires a speed encoder)	K50	1	1
Output reactor (only for synch.)	L09	1	1
Bidirectional synchronized bypass operation	L29	1	1
Control and display instruments in the door	4)		
Indicator lights	K20	1	1
3 display instruments in the cabinet door	K21	1	1
Pushbutton kit	K29	1	1
Off/Local/Remote selector	K31	1	1
Off/Hand/Auto selector	K32	1	1
Keyed Off/Local/Remote selector	K33	1	1
Keyed Off/Hand/Auto selector	K34	1	1
Control voltage supply ⁵⁾			
Connection for control voltage 220/230 V AC by customer	K68	1	1
Control voltage 120 V AC internal	K69	1	1
Connection for control voltage 120 V AC by customer	K79	1	1
Control voltage 24 V DC for digital inputs/out- puts	K73	1	1
Control of auxiliaries ⁶⁾			
Controlled outgoing feeder for motor blowers	N30 to N33	1	1
Controlled outgoing feeder for anti-condensa- tion heating	N35 to N38	1	1
Power supply for external devices 24 V DC/2.5 A	N75	1	1
Temperature detection and evaluation			
2 x 2 thermistor protection relays	L81	1	1
3 x 2 thermistor protection relays	L82	1	1
2 Pt100 evaluation units with 3 inputs each	L91	1	1
Pt100 evaluation unit with 6 inputs and 2 analog outputs	L93	1	1
Pt100 evaluation unit with 6 inputs for ex-proof motors and 6 analog outputs	L95	1	1

- $^{1)}$ Option B19 is available exclusively for drives with article No. 6SR4... and motor voltages of 6.0 kV and 6.6 kV.
- ²⁾ Options "ProToPS" **U10** and "Cell bypass" **U11** are mutually exclusive.

 $^{3)}\,$ The option is included in the option U02.

- ⁴⁾ Options "control and display instruments in the door" K31 to K34 are mutually exclusive. Select one of them. K31 is the preset value.
- ⁵⁾ With options K68, K69 and K79 the power source is defined. These options are mutually exclusive. Select one of them. K69 is the preset value.
- 6) Options "control of auxiliaries" N30 to N33 as well as N35 to N38 are mutually exclusive.

Options

Options (continued)

Option text	Order	Articl	e No.
	ooue	6SR4	6SR3
Motor voltage			
Motor voltage 2.3 kV	V01	~	1
Motor voltage 2.4 kV	V02	1	✓
Motor voltage 3.0 kV	V03	1	1
Motor voltage 3.3 kV	V04	1	1
Motor voltage 4.0 kV	V05	1	1
Motor voltage 4.16 kV	V06	1	1
Motor voltage 4.8 kV	V07	1	1
Motor voltage 5.0 kV	V08	1	1
Motor voltage 5.5 kV	V09	1	1
Motor voltage 6.0 kV	V10	~	1
Motor voltage 6.3 kV	V11	1	1
Motor voltage 6.6 kV	V12	1	1
Motor voltage 6.9 kV	V13	-	1
Motor voltage 7.2 kV	V14	-	1
Motor rated data			
Motor rated frequency 50 Hz	V50	1	1
Motor rated frequency 60 Hz	V60	1	1
Motor data other than standard rated data, engineering and parameter settings	Y06	1	1
Documentation (standard: PDF format in English on CD-RO	M)		
Documentation in German ¹⁾	D00	1	1
Circuit diagram, terminal diagram and dimension drawing in dxf format	D02	1	1
One set of printed documentation in the selected language	D15	1	1
Documentation in Russian ¹⁾	D56	1	1
Documentation in Italian ¹⁾	D72	1	1
Documentation in English	D76	1	1
Documentation in French ¹⁾	D77	1	1
Documentation in Spanish ¹⁾	D78	1	1
Documentation in Portuguese (Brazil) ¹⁾	D79	1	1
Documentation in Chinese 1)	D84	1	1
Circuit diagrams (German/English) with	Y10	1	1

Circuit diagrams (German/English) with customer-specific description field

Option text	Order	Article No			
	code	6SR4	6SR3		
Production schedules ²⁾					
Production schedule: one issue	B43	1	1		
Production schedule: updated at 2-week intervals	B44	1	1		
Production schedule: updated once per month	B45	1	1		
Manufacturer data book	B49	1	1		
Color, texture and language of nameplate, wa operator panel foil ³⁾ (standard language Eng	arning la Ilish)	bels ar	d		
White plastic label with black font	Т03	1	1		
Stainless steel	T04	1	1		
Nameplate, warning labels in English/French, operator panel foil in English	T58	1	1		
Nameplate, warning labels in English/Spanish, operator panel foil in English	T60	1	1		
Nameplate, warning labels in English/German, operator panel foil in English	T74	1	1		
Nameplate, warning labels in English/Italian, operator panel foil in English	T80	1	1		
Nameplate, warning labels in English/Portuguese, operator panel foil in Portuguese	T82	1	1		
Nameplate, warning labels in English/Russian, operator panel foil in Russian	T85	1	1		
Nameplate, warning labels in English/Chinese, operator panel foil in Chinese	T91	1	1		
Drive acceptance tests, witnessed					
Visual acceptance of the drive	F03	1	1		
Functional acceptance of the drive with inductive load	F73	1	1		
Acceptance test of the insulation of the drive	F77	1	1		
Interface check with customer equipment (5 hours, on request)	F79	1	1		
Customer-specific acceptance	F97	•	•		

 Options "Documentation" D00, D56, D72, D77, D78, D79 and D84 are mutually exclusive.
 Options "production schedules" B43 to B45 are mutually exclusive. ³⁾ Options "Languages for nameplate, warning labels and operator panel foil" T58 to T91 are mutually exclusive.

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SINAMICS PERFECT HARMONY GH180 Air-Cooled Drives

Options

Options (continued)

Option text	Order	Articl	e No.
	code	6SR4	6SR3
Extension of liability for defects on drives (Standard: 12 months)			
Extension of 12 months to a total of 24 months	Q80	1	✓
Extension of 18 months to a total of 30 months	Q81	1	✓
Extension of 24 months to a total of 36 months	Q82	1	✓
Extension of 30 months to a total of 42 months	Q83	1	✓
Extension of 36 months to a total of 48 months	Q84	1	✓
Extension of 48 months to a total of 60 months	Q85	1	1
Other options			
EMC filter 1)	L03	1	1
Cabinet lighting and service socket outlet	L50	1	1
Cabinet anti-condensation heating, temperature-monitored	L55	1	1
Gland plates, aluminum ²⁾	M35	1	1
Gland plates, brass ²⁾	M36	1	1
Gland plates, stainless steel 2)	M37	1	1
IP42 degree of protection	M42	1	1
Version for harsh environmental conditions	M67	1	1
Extended space for bottom cable entry 3)	M69	1	_
Internal cabling with halogen-free cables	N50	1	1

Option text	Order code	Article No 6SR46SR			
Other options					
Interface drawing approval	P30	1	1		
Complete drawing approval	P31	1	1		
Separate transportation units (transformer and power section)	P82	1	1		
Customer-specific nameplate	Y05	1	1		
Paint finish other than standard	Y09	1	1		
Sine-wave filter	Y15	1	1		
Customer-specific cabinet labels	Y36	1	1		



Option not available

Option on request •

Note: The following options are coded in the article number (refer to article No. key)

- Line connection voltage
- Transformer configuration
- Auxiliary voltage

²⁾ The options M35 to M37 are mutually exclusive. One of these options must be ordered for units manufactured in Nuremberg. M35 is standard.

 $^{3)}$ Option $\rm M69$ is available exclusively for drives with article No. 6SR4... and motor voltages up to 4.16 kV and up to 140 A.

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Technical Data



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3/3	SINAMICS PERFECT HARMONY GH180, article number 6SR4
3/3	Schematic drawings
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3/6	Motor voltage 3.3 kV
3/8	Motor voltage 4.0/4.16 kV
3/11	Motor voltage 6.0 kV
0/15	
5/15	Motor voltage 6.6 KV
3/19	SINAMICS PERFECT HARMONY GH180, article number 6SR3
3/19 3/19	SINAMICS PERFECT HARMONY GH180, article number 6SR3 Schematic drawing
3/19 3/19 3/20	SINAMICS PERFECT HARMONY GH180, article number 6SR3 Schematic drawing Motor voltage 4.16 kV
3/19 3/19 3/20 3/22	SINAMICS PERFECT HARMONY GH180, article number 6SR3 Schematic drawing Motor voltage 4.16 kV Motor voltage 4.8 kV
3/19 3/19 3/20 3/22 3/24	Sinamics PERFECT HARMONY GH180, article number 6SR3 Schematic drawing Motor voltage 4.16 kV Motor voltage 4.8 kV Motor voltage 6.0 kV
3/19 3/19 3/20 3/22 3/24 3/26	Motor Voltage 6.6 kV SINAMICS PERFECT HARMONY GH180, article number 6SR3 Schematic drawing Motor voltage 4.16 kV Motor voltage 4.8 kV Motor voltage 6.0 kV Motor voltage 6.6 kV

General technical data

Technical data

General technical data	
Power semiconductors	Diodes, IGBTs
Line-side rectifier	18 to 36 pulse diode rectifiers
Motor-side inverter	Multi-level drive (PWM) with IGBT power modules
Closed-loop control	Sensorless closed-loop control
Drive quadrants	2
Potential separation (power section/ open- and closed-loop control)	Fiber-optic cable
Efficiency	Up to 96 % including transformer, across whole power range
Conformance	IEC, IEEE, ANSI, NEMA, CSA, CE and UL
Paint finish	RAL 7035
Degree of protection ¹⁾	IP21 (standard)IP42 (option)
Air cooling	Forced-air cooling
Altitude ²⁾ m ft	0 1000 without derating 0 3300 without derating
Permissible ambient temperature	Refer to table below

		Storage	Transport	Operation	
Climatic ambient conditions					
Ambient temperature	°C	+5 +40	-25 +60	+5 +40 ³⁾	
Relative air humidity		< 95 % (only slight condensation permit- ted; drive must be completely dry before commissioning)	< 95 % (only slight condensation permit- ted; drive must be completely dry before commissioning)	< 95 % (condensation not permitted)	
Other climatic conditions in accordance with class		1K3, 1Z2 in acc. with IEC 60721-3-1	2K2 in acc. with IEC 60721-3-2	3K3 in acc. with IEC 60721-3-3	
Degree of pollution		2 without conductive pollution in acc. with IEC 61800-5	2 without conductive pollution in acc. with IEC 61800-5	2 without conductive pollution in acc. with IEC 61800-5	
Mechanical ambient conditions					
Stationary vibration, sinusoidal		15 (0, 0, 1, 1, 1)			
Acceleration	mm m/s ² m/s ²	5 (9 200 Hz)	3.5 (2 9 HZ) 10 (9 200 Hz) 15 (200 to 500 Hz)	0.3 (2 9 HZ) 1 (9 200 Hz)	
Other mechanical conditions in accordance with class		1M2 in acc. with IEC 60721-3-1	2M2 in acc. with IEC 60721-3-2	3M1 in acc. with IEC 60721-3-3	
Other ambient conditions					
Biological ambient conditions in accordance with class		1B1 in acc. with IEC 60721-3-1	2B1 in acc. with IEC 60721-3-2	3B1 in acc. with IEC 60721-3-3	
Chemically active substances in accordance with class		1C1 in acc. with IEC 60721-3-1	2C1 in acc. with IEC 60721-3-2	3C1 in acc. with IEC 60721-3-3	
Mechanically active substances in accordance with class		1S1 in acc. with IEC 60721-3-1	2S1 in acc. with IEC 60721-3-2	3S1 (standard) in acc. with IEC 60721-3-3	

1) Acc. to IEC 60529.

²⁾ For altitudes above 1000 m (3300 ft), please contact the factory or your local Siemens sales representative.

³⁾ For ambient temperatures above 40 °C, please contact the factory or your local Siemens sales representative.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data

Schematic drawings



Schematic drawing \bm{A} for article numbers 6SR4... and motor voltages 2.4/3.3/4.0/4.16 kV



Schematic drawing **B** for article numbers 6SR4... and motor voltages 6.0/6.6 kV Dimensions of the SINAMICS PERFECT HARMONY GH180 drive, article number 6SR4..., see the following tables with technical data.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data

SINAMICS PERFECT HARMON air-cooled drive version	/ GH180	6SR4102- 0.B32-00	6SR4102- 0.B33-00	6SR4102- 0.B34-00	6SR4102- 0.C34-00	6SR4102- 0.C34-50
Motor voltage 2.4 kV						
Max. output voltage	kV	4.2	4.2	4.2	4.2	4.2
Type rating	kVA	180	270	290	360	410
Shaft output ¹⁾	kW hp	149 200	224 300	241 323	298 400	336 450
Typical motor current ¹⁾	А	43	65	70	87	98
Power cell current	А	70	70	70	100	100
Number of cells		9	9	9	9	9
Transformer rating	kVA	200	300	400	400	450
Aluminum transformer available		Yes ²⁾				
Power loss of drive system						
with copper transformerwith aluminum transformer	kW kW	< 6 < 6	< 8 < 9	< 9 < 10	< 11 < 12	< 12 < 14
Efficiency P_{out}/P_{in}^{3} of drive system	stem					
with copper transformerwith aluminum transformer	% %	96.5 96	96.5 96	96.5 96	96.5 96	96.5 96
Auxiliary supply						
 Single-phase w/o options ⁴) Single-phase w/ all options ⁴) Three-phase w/o CPT ⁵) 	kVA kVA kVA	< 1.5 < 3 < 4				
 Three-phase w/ CPT and all options ⁵⁾ 	kVA	< 7	< 7	< 7	< 7	< 7
Cooling medium flow rate	m ³ /s CFM	2.2 4700	2.2 4700	2.2 4700	2.2 4700	2.2 4700
Sound pressure level L _{pA} (1 m)	dB (A)	80	80	80	80	80
Power cabling cross-sections						
• Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶⁾	AWG/MCM (NEC, CEC) mm ²	1 x 250 MCM 1 x 120				
Cable cross-sections, motor-side max connectable	AWG/MCM	1 x 250 MCM				
per phase with M10 screw ⁶⁾ preliminary	(DIN VDE)	1 x 120				
• PE connection, max. connec- tion cross-section at enclosure	AWG/MCM (NEC, CEC)	2/0 AWG				
with write screw in preliminary	(DIN VDE)	70	70	70	70	70
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer	cabinet and c	ell cabinet)				
• Width	mm in	1680 66	1680 66	1680 66	1680 66	1680 66
Height (incl. blowers)	mm in	2812 111	2812 111	2812 111	2812 111	2812 111
• Depth	mm in	1065 42	1065 42	1065 42	1065 42	1065 42
Schematic drawing 7)		А	А	А	А	Α
Drive weight (transformer cabin	et and cell ca	abinet)				
• Weight, approx.	kg Ib	2200 4850	2300 5070	2500 5510	2500 5510	2600 5730

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

²⁾ For primary voltages > 7.2 kV, please contact the factory or your local Siemens sales representative.

³⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

4) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 - For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).
 - CPT is an option in other systems.

⁵⁾ Includes cooling blowers/pumps; data refers to the largest unit.

6) Maximum installable size per phase.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data (continued)					
SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR4102- 0.C35-00	6SR4102- 0.D35-00	6SR4102- 0.D36-00	6SR4102- 0.D37-00
Motor voltage 2.4 kV					
Max. output voltage	kV	4.2	4.2	4.2	4.2
Type rating	kVA	415	450	540	580
Shaft output 1)	kW hp	343 461	373 500	448 600	481 645
Typical motor current 1)	А	100	108	130	140
Power cell current	A	100	140	140	140
Number of cells		9	9	9	9
Transformer rating	kVA	500	500	600	700
Aluminum transformer available		Yes ²⁾	Yes ²⁾	Yes ²⁾	Yes ²⁾
Power loss of drive system					
with copper transformer with aluminum transformer	kW kW	< 13 < 14	< 14 < 15	< 16 < 18	< 17 < 20
Efficiency P_{out}/P_{in}^{3} of drive sy	stem				
with copper transformerwith aluminum transformer	% %	96.5 96	96.5 96	96.5 96	96.5 96
Auxiliary supply					
 Single-phase w/o options ⁴) Single-phase w/ all options ⁴) Three-phase w/o CPT ⁵) Three-phase w/ CPT and all options ⁵) 	kVA kVA kVA kVA	< 1.5 < 3 < 4 < 7			
Cooling medium flow rate	m ³ /s CEM	2.2 4700	2.2 4700	2.2 4700	2.2 4700
Sound pressure level / . (1 m)		80	80	80	80
Power cabling cross-sections	GD (7.)	00	66	00	
• Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶⁾	AWG/MCM (NEC, CEC) mm ²	1 x 250 MCM 1 x 120			
Cable cross-sections, motor-side, max. connectable	AWG/MCM (NEC, CEC)	1 x 250 MCM			
per phase with MTU screw ⁹⁷ preliminary	mm ² (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120
PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2/0 AWG 70	2/0 AWG 70	2/0 AWG 70	2/0 AWG 70
Degree of protection	. ,	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer	cabinet and o	cell cabinet)			
• Width	mm in	1680 66	1680 66	1680 66	1680 66
Height (incl. blowers)	mm in	2812 111	2812 111	2812 111	2812 111
• Depth	mm in	1065 42	1065 42	1065 42	1065 42
Schematic drawing ⁷⁾		A	А	A	А
	iet and cell c	adinet)	0700	0000	0100
 weight, approx. 	кg lb	≥700 5950	≥700 5950	∠900 6390	3 100 6830

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

²⁾ For primary voltages > 7.2 kV, please contact the factory or your local Siemens sales representative.

³⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

4) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
- For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).
- CPT is an option in other systems.

⁵⁾ Includes cooling blowers/pumps; data refers to the largest unit.

6) Maximum installable size per phase.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data

SINAMICS PERFECT HARMON	Y GH180	6SR4102- 0.A32-00	6SR4102- 0.A33-00	6SR4102- 0.B33-00	6SR4102- 0.B34-00	6SR4102- 0.B34-50	6SR4102- 0.C34-50
Motor voltage 3.3 kV							
Max. output voltage	kV	4.2	4.2	4.2	4.2	4.2	4.2
Type rating	kVA	180	225	270	360	400	410
Shaft output ¹⁾	kW hp	149 200	189 254	224 300	298 400	331 444	336 450
Typical motor current ¹⁾	A	32	40	47	63	70	71
Power cell current	A	40	40	70	70	70	100
Number of cells		9	9	9	9	9	9
Transformer rating	kVA	200	300	300	400	450	450
Aluminum transformer available		Yes ²⁾					
Power loss of drive system							
with copper transformerwith aluminum transformer	kW kW	< 6 < 6	< 7 < 8	< 8 < 9	< 11 < 12	< 12 < 14	< 12 < 14
Efficiency Pout/Pin ³⁾ of drive sys	stem						
with copper transformerwith aluminum transformer	% %	96.5 96	96.5 96	96.5 96	96.5 96	96.5 96	96.5 96
Auxiliary supply							
 Single-phase w/o options ⁴) Single-phase w/ all options ⁴) Three-phase w/o CPT ⁵) Three-phase w/ CPT and all options ⁵) 	kVA kVA kVA kVA	< 1.5 < 3 < 4 < 7					
Cooling medium flow rate	m ³ /s	2.2	2.2	2.2	2.2	2.2	2.2
Sound pressure level ((1 m)		80	80	80	80	80	80
Power cabling cross-sections	ub (A)	00	00	00	00	00	00
• Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1 x 250 MCM 1 x 120					
 Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶⁾ preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1 x 250 MCM 1 x 120					
• PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2/0 AWG 70					
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer	cabinet and o	cell cabinet)					
• Width	mm in	1680 66	1680 66	1680 66	1680 66	1680 66	1680 66
Height (incl. blowers)	mm in	2812 111	2812 111	2812 111	2812 111	2812 111	2812 111
• Depth	mm in	1065 42	1065 42	1065 42	1065 42	1065 42	1065 42
 Schematic drawing⁷⁾ 		А	А	А	A	А	А
Drive weight (transformer cabin	et and cell ca	abinet)					
Weight, approx.	kg Ib	2200 4850	2300 5070	2300 5070	2500 5510	2600 5730	2600 5730

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

 $^{2)}$ For primary voltages > 7.2 kV, please contact the factory or your local Siemens sales representative.

³⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

4) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 - For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).

- CPT is an option in other systems. ⁵⁾ Includes cooling blowers/pumps; data refers to the largest unit.

6) Maximum installable size per phase.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data (continued)							
SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR4102- 0.C35-00	6SR4102- 0.C36-00	6SR4102- 0.C37-00	6SR4102- 0.D37-00	6SR4102- 0.D38-00	6SR4102- 0.D38-70
Motor voltage 3.3 kV							
Max. output voltage	kV	4.2	4.2	4.2	4.2	4.2	4.2
Type rating	kVA	450	540	570	630	720	800
Shaft output ¹⁾	kW hp	373 500	448 600	473 634	522 700	597 800	662 887
Typical motor current ¹⁾	А	79	95	100	110	126	140
Power cell current	А	100	100	100	140	140	140
Number of cells		9	9	9	9	9	9
Transformer rating	kVA	500	600	700	700	800	900
Aluminum transformer available		Yes ²⁾	Yes ²⁾	Yes ²⁾	Yes ²⁾	On request	On request
Power loss of drive system						•	•
with copper transformerwith aluminum transformer	kW kW	< 14 < 15	< 16 < 18	< 17 < 19	< 19 < 21	< 21 -	< 24 -
Efficiency <i>P</i> _{out} / <i>P</i> _{in} ³⁾ of drive system	stem						
with copper transformerwith aluminum transformer	% %	96.5 96	96.5 96	96.5 96	96.5 96	96.5 -	96.5 -
Auxiliary supply							
 Single-phase w/o options ⁴) Single-phase w/ all options ⁴) Three-phase w/o CPT ⁵) Three-phase w/ CPT and all options ⁵) 	kVA kVA kVA kVA	< 1.5 < 3 < 4 < 7					
Cooling medium flow rate	m ³ /s CFM	2.2 4700	2.2 4700	2.2 4700	2.2 4700	2.2 4700	2.2 4700
Sound pressure level L _{pA} (1 m)	dB (A)	80	80	80	80	80	80
Power cabling cross-sections							
 Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶⁾ preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1 x 250 MCM 1 x 120					
 Cable cross-sections, motor-side, max. connectable per phase with M10 screw⁶) preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1 x 250 MCM 1 x 120					
• PE connection, max. connection cross-section at enclosure with M12 screw ⁶⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDF)	2/0 AWG 70					
Degree of protection	(==)	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer	cabinet and o	cell cabinet)	,		,		,
• Width	mm in	1680 66	1680 66	1680 66	1680 66	1680 66	1680 66
Height (incl. blowers)	mm in	2812 111	2812 111	2812 111	2812 111	2812 111	2812 111
• Depth	mm in	1065 42	1065 42	1065 42	1065 42	1065 42	1065 42
Schematic drawing ⁷⁾		Α	A	A	A	A	A
Drive weight (transformer cabin	et and cell ca	abinet)					
Weight, approx.	kg Ib	2700 5950	2900 6390	3100 6830	3100 6830	3300 7280	3400 7500

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

 $^{2)}$ For primary voltages > 7.2 kV, please contact the factory or your local Siemens sales representative.

³⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

4) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 - For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).

- CPT is an option in other systems.

⁵⁾ Includes cooling blowers/pumps; data refers to the largest unit.

6) Maximum installable size per phase.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data

SINAMICS PERFECT HARMON air-cooled drive version	(GH180	6SR4102- 0.A32-00	6SR4102- 0.A33-00	6SR4102- 0.A34-00	6SR4102- 0.B34-00	6SR4102- 0.B34-50
Motor voltage 4.0/4.16 kV						
Max. output voltage	kV	4.2	4.2	4.2	4.2	4.2
Type rating	kVA	180	270	275	360	410
Shaft output ¹⁾	kW hp	149 200	224 300	229 307	298 400	336 450
Typical motor current ¹⁾	А	26	39	40	52	59
Power cell current	А	40	40	40	70	70
Number of cells		9	9	9	9	9
Transformer rating	kVA	200	300	400	400	450
Aluminum transformer available		Yes ²⁾				
Power loss of drive system						
with copper transformerwith aluminum transformer	kW kW	< 6 < 6	< 8 < 9	< 9 < 10	< 11 < 12	< 12 < 14
Efficiency $P_{out}/P_{in}^{3)}$ of drive system	stem					
 with copper transformer with aluminum transformer 	% %	96.5 96	96.5 96	96.5 96	96.5 96	96.5 96
Auxiliary supply						
 Single-phase w/o options ⁴) Single-phase w/ all options ⁴) Three-phase w/o CPT ⁵) 	kVA kVA kVA	< 1.5 < 3 < 4				
 Ihree-phase w/ CP1 and all options ⁵⁾ 	kVA	< 7	< 7	< 7	< 7	< 7
Cooling medium flow rate	m ³ /s CFM	2.2 4700	2.2 4700	2.2 4700	2.2 4700	2.2 4700
Sound pressure level L _{pA} (1 m)	dB (A)	80	80	80	80	80
Power cabling cross-sections						
 Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶⁾ preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1 x 250 MCM 1 x 120				
 Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶⁾ preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1 x 250 MCM 1 x 120				
PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2/0 AWG 70				
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer	cabinet and o	cell cabinet)				
• Width	mm in	1680 66	1680 66	1680 66	1680 66	1680 66
Height (incl. blowers)	mm in	2812 111	2812 111	2812 111	2812 111	2812 111
• Depth	mm in	1065 42	1065 42	1065 42	1065 42	1065 42
 Schematic drawing⁷⁾ 		A	A	A	A	A
Drive weight (transformer cabin	et and cell ca	abinet)				
Weight, approx.	kg Ib	2200 4850	2300 5070	2500 5510	2500 5510	2600 5730

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

 $^{2)}\,$ For primary voltages > 7.2 kV, please contact the factory or your local Siemens sales representative.

³⁾ Values at 100 % of rated speed and torque, includes drive and input transformer.

- 4 120/240 V AC for NXGII control
 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).
 CPT is an option in other systems.

⁵⁾ Includes cooling blowers/pumps; data refers to the largest unit.

6) Maximum installable size per phase.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

recifical data (continued)						
SINAMICS PERFECT HARMON air-cooled drive version	/ GH180	6SR4102- 0.B35-00	6SR4102- 0.B36-00	6SR4102- 0.C36-00	6SR4102- 0.C37-00	6SR4102- 0.C38-00
Motor voltage 4.0/4.16 kV						
Max. output voltage	kV	4.2	4.2	4.2	4.2	4.2
Type rating	kVA	450	480	540	630	690
Shaft output ¹⁾	kW hp	373 500	401 538	448 600	522 700	573 768
Typical motor current ¹⁾	А	65	70	78	91	100
Power cell current	А	70	70	100	100	100
Number of cells		9	9	9	9	9
Transformer rating	kVA	500	600	600	700	800
Aluminum transformer available		Yes ²⁾	Yes ²⁾	Yes ²⁾	Yes ²⁾	On request
Power loss of drive system						
 with copper transformer with aluminum transformer 	kW kW	< 14 < 15	< 15 < 17	< 16 < 18	< 19 < 21	< 21 -
Efficiency <i>P</i> _{out} / <i>P</i> _{in} ³⁾ of drive system	stem					
with copper transformerwith aluminum transformer	% %	96.5 96	96.5 96	96.5 96	96.5 96	96.5
Auxiliary supply						
 Single-phase w/o options ⁴) Single-phase w/ all options ⁴) Three-phase w/o CPT ⁵) 	kVA kVA kVA	< 1.5 < 3 < 4	< 1.5 < 3 < 4	< 1.5 < 3 < 4	< 1.5 < 3 < 4	< 1.5 < 3 < 4
 Inree-phase w/ CPT and all options ⁵⁾ 	KVA	< /	< /	< /	< /	< /
Cooling medium flow rate	m ³ /s CFM	2.2 4700	2.2 4700	2.2 4700	2.2 4700	2.2 4700
Sound pressure level L _{pA} (1 m)	dB (A)	80	80	80	80	80
•						
Power cabling cross-sections						
Power cabling cross-sections • Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶) preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1 x 250 MCM 1 x 120	1 x 250 MCM 1 x 120	1 x 250 MCM 1 x 120	1 x 250 MCM 1 x 120	1 x 250 MCM 1 x 120
 Power cabling cross-sections Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶⁾ preliminary Cable cross-sections, motor-side, max. connectable 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC)	1 x 250 MCM 1 x 120 1 x 250 MCM	1 x 250 MCM 1 x 120 1 x 250 MCM	1 x 250 MCM 1 x 120 1 x 250 MCM	1 x 250 MCM 1 x 120 1 x 250 MCM	1 x 250 MCM 1 x 120 1 x 250 MCM
 Power cabling cross-sections Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶⁾ preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶⁾ preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120
 Power cabling cross-sections Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶) preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70
 Power cabling cross-sections Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶) preliminary Degree of protection 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21
 Power cabling cross-sections Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶) preliminary Degree of protection Drive dimensions (transformer 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) cabinet and cell	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 cabinet)	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21
 Power cabling cross-sections Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶) preliminary Degree of protection Drive dimensions (transformer • Width 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) cabinet and cell mm in	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 cabinet) 1680 66	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66
 Power cabling cross-sections Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶) preliminary Degree of protection Drive dimensions (transformer • Width Height (incl. blowers) 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) cabinet and cell mm in mm	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 cabinet) 1680 66 2812 111	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111
 Power cabling cross-sections Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶) preliminary Degree of protection Drive dimensions (transformer • Width Height (incl. blowers) Depth 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) Cabinet and cell mm in mm in	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 cabinet) 1680 66 2812 111 1065 42	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42
 Power cabling cross-sections Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶) preliminary Degree of protection Drive dimensions (transformer • Width Height (incl. blowers) Depth Schematic drawing ⁷) 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) cabinet and cell mm in mm in	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 cabinet) 1680 66 2812 111 1065 42 A	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42 A	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42 A	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42 A	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42 A
 Power cabling cross-sections Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶) preliminary Degree of protection Drive dimensions (transformer • Width Height (incl. blowers) Depth Schematic drawing ⁷) Drive weight (transformer cabin 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) Cabinet and cell mm in mm in mm in	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 cabinet) 1680 66 2812 111 1065 42 A het)	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42 A	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42 A	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42 A	1 x 250 MCM 1 x 120 1 x 250 MCM 1 x 120 2/0 AWG 70 NEMA1/IP21 1680 66 2812 111 1065 42 A

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

 $^{2)}\,$ For primary voltages > 7.2 kV, please contact the factory or your local Siemens sales representative.

 $^{3)}$ Values at 100 % of rated speed and torque; includes drive and input transformer.

4 120/240 V AC for NXGII control
 - 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 - For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).
 - CPT is an option in other systems.

⁵⁾ Includes cooling blowers/pumps; data refers to the largest unit.

6) Maximum installable size per phase.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data (continued)

SINAMICS PERFECT HARMON' air-cooled drive version	Y GH180	6SR4102- 0.D38-00	6SR4102- 0.D38-70	6SR4102- 0.D41-00	6SR4102- 0.D41-10
Motor voltage 4.0/4.16 kV					
Max. output voltage	kV	4.2	4.2	4.2	4.2
Type rating	kVA	720	810	900	965
Shaft output 1)	kW	597	671	746	802
	hp	800	900	1000	1075
Typical motor current 1)	A	104	117	130	140
Power cell current	A	140	140	140	140
Number of cells		9	9	9	9
Transformer rating	kVA	800	900	1000	1100
Aluminum transformer available		On request	On request	On request	On request
Power loss of drive system					
 with copper transformer 	kW	< 21	< 24	< 27	< 29
• with aluminum transformer	kW	-	-	-	-
Efficiency P_{out}/P_{in}^{2} of drive system	stem				
with copper transformer	%	96.5	96.5	96.5	96.5
	/0	-	-	-	-
• Single phase w/e options ³⁾		< 1.5	< 1.5	< 1.5	< 1.5
 Single-phase w/ all options ³⁾ 	kva kVA	< 1.5	< 1.5	< 1.5	< 1.5
• Three-phase w/o CPT ⁴⁾	kVA	< 4	< 4	< 4	< 4
Three-phase w/ CPT and all options ⁴⁾	kVA	< 7	< 7	< 7	< 7
Cooling medium flow rate	m ³ /s	2.2	2.2	2.2	2.2
	CFM	4700	4700	4700	4700
Sound pressure level L_{pA} (1 m)	dB (A)	80	80	80	80
Power cabling cross-sections					
• Cable cross-sections,	AWG/MCM	1 x 250 MCM			
phase with M10 screw ⁵⁾	(NEC, CEC) mm ²	1 x 120	1 x 120	1 x 120	1 x 120
				1	
motor-side, max, connectable	(NEC, CEC)				1 X 230 IVICIVI
per phase with M10 screw ⁵⁾	mm ²	1 x 120	1 x 120	1 x 120	1 x 120
preliminary	(DIN VDE)				
PE connection, max. connec-		2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
with M12 screw ⁵⁾ preliminary	(NEC, CEC) mm ²	70	70	70	70
	(DIN VDE)	10			10
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer	cabinet and o	cell cabinet)			
• Width	mm	1680	1680	1680	1680
	in	66	66	66	66
 Height (incl. blowers) 	mm	2812	2812	2812	2812
	in	111	111	111	111
• Depth	mm in	1065	1065	1065	1065
Schematic drawing ⁶⁾		<u>τ</u>	τ	τ	
- Ochematic drawing	not and call a		n	Π	^
			2400	2500	2000
 weight, approx. 	кg lb	3300 7280	3400 7500	3500 7720	3000 7940

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor cos \u03c6 and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 - For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).

- CPT is an option in other systems.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

⁶⁾ Please refer to page 3/3 for schematic drawings.
SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data							
SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR4102- 2.A33-00	6SR4102- 2.A34-00	6SR4102- 2.A35-00	6SR4102- 2.B35-00	6SR4102- 2.B36-00	6SR4102- 2.B37-00
Motor voltage 6.0 kV							
Max. output voltage	kV	6.6	6.6	6.6	6.6	6.6	6.6
Type rating	kVA	270	360	415	450	540	630
Shaft output ¹⁾	kW	224	298	344	373	448	522
-	hp	300	400	461	500	600	700
Typical motor current ¹⁾	А	26	35	40	43	52	61
Power cell current	А	40	40	40	70	70	70
Number of cells		15	15	15	15	15	15
Transformer rating	kVA	300	400	500	500	600	700
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes	Yes
Power loss of drive system							
 with copper transformer 	kW	< 8	< 11	< 13	< 14	< 16	< 19
with aluminum transformer	kW	< 9	< 12	< 14	< 15	< 18	< 21
Efficiency <i>P</i> _{out} / <i>P</i> _{in} ²⁾ of drive sy	stem						
 with copper transformer 	%	96.5	96.5	96.5	96.5	96.5	96.5
with aluminum transformer	%	96	96	96	96	96	96
Auxiliary supply							
• Single-phase w/o options ³⁾	kVA	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
 Single-phase w/all options Three-phase w/o CPT ⁴) 	KVA kVA	< 3	< 3	< 3	< 3	< 3	< 3
Three-phase w/ CPT and all	kVA	< 11	< 11	< 11	< 11	< 11	< 11
options ⁴⁾							
Cooling medium flow rate	m ³ /s	4.5	4.5	4.5	4.5	4.5	4.5
	CFM	9500	9500	9500	9500	9500	9500
Sound pressure level L_{pA} (1 m)	dB (A)	82	82	82	82	82	82
Power cabling cross-sections							
Cable cross-sections,		2 × 500 MCM	2 x 500 MCM				
phase with M10 screw ⁵⁾	(NEC, CEC) mm ²	2 x 240					
preliminary	(DIN VDE)						
Cable cross-sections,	AWG/MCM	2 x 500 MCM					
motor-side, max. connectable	(NEC, CEC)	2 × 240	2×240	2×240	2×240	2×240	2 × 240
preliminary	(DIN VDE)	2 X 240					
• PE connection, max. connec-	AWG/MCM	2/0 AWG					
tion cross-section at enclosure	(NEC, CEC)	70	70		70	70	70
with WT2 screw * preliminary	mm ² (DIN VDF)	70	70	70	70	70	70
Degree of protection	(8	NFMA1/IP21	NFMA1/IP21	NFMA1/IP21	NFMA1/IP21	NFMA1/IP21	NFMA1/IP21
Drive dimensions (transformer	cabinet and o	cell cabinet)					
• Width	mm	4165	4165	4165	4165	4165	4165
- Width	in	164	164	164	164	164	164
 Height (incl. blowers) 	mm	2990	2990	2990	2990	2990	2990
<u> </u>	in	117.5	117.5	117.5	117.5	117.5	117.5
• Depth	mm	1250	1250	1250	1250	1250	1250
-	in	49	49	49	49	49	49
 Schematic drawing⁶⁾ 		В	В	В	В	В	В
Drive weight (transformer cabin	net and cell ca	abinet)					
 Weight, approx. 	kg	4700	4900	5100	5100	5300	5500
	dl	10360	10800	11240	11240	11680	12130

¹⁾ The specifications for the typical motor current and the power data in hp and kW are approximate values only; these have been calculated for operation with induction motors and for a typical power factor cos \u03c6 and motor efficiency. Both approximate values have to be adapted to the motor that is actually used. ²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).
- CPT is an option in other systems.
- ⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data (continued)

SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR4102- 2.B38-00	6SR4102- 2.B38-70	6SR4102- 2.C38-70	6SR4102- 2.C41-00	6SR4102- 2.C41-20
Motor voltage 6.0 kV						
Max. output voltage	kV	6.6	6.6	6.6	6.6	6.6
Type rating	kVA	720	725	810	900	1035
Shaft output 1)	kW hp	597 800	602 807	671 900	746 1000	860 1152
Typical motor current ¹⁾	А	69	70	78	87	100
Power cell current	А	70	70	100	100	100
Number of cells		15	15	15	15	15
Transformer rating	kVA	800	900	900	1000	1250
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes
Power loss of drive system						
with copper transformerwith aluminum transformer	kW kW	< 21 < 24	< 22 < 25	< 24 < 27	< 27 < 30	< 31 < 35
Efficiency Pout/Pin ²⁾ of drive system	stem					
with copper transformerwith aluminum transformer	% %	96.5 96	96.5 96	96.5 96	96.5 96	96.5 96
Auxiliary supply						
Single-phase w/o options 3)	kVA	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options ³⁾	kVA	< 3	< 3	< 3	< 3	< 3
 Three-phase w/o CPT and all options ⁴⁾ 	kVA kVA	< 8 < 11				
Cooling medium flow rate	m ³ /s	4.5	4.5	4.5	4.5	5
	CFM	9500	9500	9500	9500	10600
Sound pressure level L_{pA} (1 m)	dB (A)	82	82	82	82	80
Power cabling cross-sections						
 Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 500 MCM 2 x 240				
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵⁾	AWG/MCM (NEC, CEC) mm ²	2 x 500 MCM 2 x 240				
preiminary	(DIN VDE)	0/0 000	0/0 000	0/0 000		0/0 000
 PE connection, max. connection cross-section at enclosure with M12 screw ⁵⁾ preliminary 	(NEC, CEC) mm ² (DIN VDE)	2/0 AWG 70				
Degree of protection	(BIITTEL)	NFMA1/IP21	NFMA1/IP21	NFMA1/IP21	NFMA1/IP21	NFMA1/IP21
Drive dimensions (transformer	cabinet and o	cell cabinet)	,	,		
• Width	mm in	4165 164	4165 164	4165 164	4165 164	4165 164
Height (incl. blowers)	mm in	2990 117.5	2990 117.5	2990 117.5	2990 117.5	2990 117.5
Depth	mm in	1250 49	1250 49	1250 49	1250 49	1250 49
 Schematic drawing ⁶⁾ 		В	В	В	В	В
Drive weight (transformer cabin	net and cell ca	abinet)				
Weight, approx.	kg Ib	5700 12570	5800 12790	5800 12790	5900 13010	6200 13670

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor cos \u03c6 and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 - For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).

- CPT is an option in other systems.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

⁶⁾ Please refer to page 3/3 for schematic drawings.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data (continued)						
SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR4102- 2.D41-20	6SR4102- 2.D41-50	6SR4102- 2.D41-70	6SR4102- 2.E41-70	6SR4102- 2.E42-00
Motor voltage 6.0 kV						
Max. output voltage	kV	6.6	6.6	6.6	6.6	6.6
Type rating	kVA	1130	1350	1450	1540	1760
Shaft output ¹⁾	kW hp	933 1250	1119 1500	1203 1613	1306 1750	1492 2000
Typical motor current ¹⁾	A	108	130	140	148	169
Power cell current	A	140	140	140	200	200
Number of cells		15	15	15	15	15
Transformer rating	kVA	1250	1500	1750	1750	2000
Aluminum transformer available	1	Yes	Yes	Yes	Yes	Yes
Power loss of drive system						
with copper transformerwith aluminum transformer	kW kW	< 33 < 38	< 40 < 45	< 43 < 49	< 46 < 53	< 53 < 60
Efficiency <i>P</i> _{out} / <i>P</i> _{in} ²⁾ of drive sy	stem					
with copper transformerwith aluminum transformer	% %	96.5 96	96.5 96	96.5 96	96.5 96	96.5 96
Auxiliary supply						
 Single-phase w/o options ³⁾ Single-phase w/ all options ³⁾ Three-phase w/o CPT ⁴⁾ Three-phase w/ CPT and all options ⁴⁾ 	kva kva kva kva	< 1.5 < 3 < 8 < 11				
Cooling medium flow rate	m ³ /s CFM	5 10600	5 10600	5 10600	5.6 11900	5.6 11900
Sound pressure level L _{pA} (1 m)	dB (A)	80	80	80	78	78
Power cabling cross-sections						
 Cable cross-sections, line-side, max. connectable per phase with M10 screw⁵) preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 500 MCM 2 x 240				
 Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵⁾ preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 500 MCM 2 x 240				
• PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2/0 AWG 70				
Degree of protection	()	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer	cabinet and o	cell cabinet)	., = .			··· - ·
• Width	mm in	4165 164	4165 164	4165 164	4165 164	4165 164
Height (incl. blowers)	mm in	2990 117.5	2990 117.5	2990 117.5	2990 117.5	2990 117.5
• Depth	mm in	1250 49	1250 49	1250 49	1250 49	1250 49
 Schematic drawing ⁶⁾ 		В	В	В	В	В
Drive weight (transformer cabir	net and cell ca	abinet)				
Weight, approx.	kg Ib	6200 13670	6500 14330	7000 15430	7000 15430	7500 16540

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor cos \u03c6 and motor efficiency. Both approximate values have to be adapted to the motor that is actually used. ²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 - For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).

- CPT is an option in other systems.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data (continued)

SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR4102- 2.E42-20	6SR4102- 2.E42-50	6SR4102- 2.F42-50	6SR4102- 2.F43-00	6SR4102- 2.F43-50
Motor voltage 6.0 kV						
Max. output voltage	kV	6.6	6.6	6.6	6.6	6.6
Type rating	kVA	1980	2075	2200	2640	2700
Shaft output ¹⁾	kW	1679	1763	1865	2238	2292
•	hp	2250	2363	2500	3000	3073
Typical motor current ¹⁾	А	190	200	212	254	260
Power cell current	А	200	200	260	260	260
Number of cells		15	15	15	15	15
Transformer rating	kVA	2250	2500	2500	3000	3500
Aluminum transformer available		Yes	Yes	Yes	On request	No
Power loss of drive system						
• with copper transformer	kW	< 60	< 62	< 66	< 79	< 81
 with aluminum transformer 	kW	< 68	< 71	< 75	-	-
Efficiency <i>P</i> out/ <i>P</i> in ²⁾ of drive sy	stem					
• with copper transformer	%	96.5	96.5	96.5	96.5	96.5
with aluminum transformer	%	96	96	96	-	-
Auxiliary supply						
• Single-phase w/o options ³⁾	kVA	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options ³	kVA	< 3	< 3	< 3	< 3	< 3
Three-phase w/OCPT Three-phase w/ CPT and all	κνΑ kVΔ	< 8	< 8	< 8	< 8	< 8
options ⁴⁾						
Cooling medium flow rate	m ³ /s	6.4	6.4	6.4	6.4	6.4
	CFM	13600	13600	13600	13600	13600
Sound pressure level L_{pA} (1 m)	dB (A)	80	80	80	80	80
Power cabling cross-sections						
 Cable cross-sections, 	AWG/MCM	2 x 500 MCM				
line-side, max. connectable per	(NEC, CEC)	0 × 040	0 × 040	0 v 040	0 × 040	2 × 240
preliminary	IIIIII (DIN VDE)	2 X 240				
 Cable cross-sections, 	AWG/MCM	2 x 500 MCM				
motor-side, max. connectable	(NEC, CEC)	0.040	0.040	0.040	0 040	0 040
preliminary	mm ² (DIN VDE)	2 x 240				
• PE connection, max. connec-	AWG/MCM	2/0 AWG				
tion cross-section at enclosure	(NEC, CEC)	70	70		70	70
with WI12 screw ³⁷ preliminary	mm ² (DIN VDE)	70	70	70	70	70
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer	cabinet and cell	cabinet)				
• Width	mm	4165	4165	4165	4165	4165
	In	164	164	164	164	164
• Height (Incl. blowers)	mm in	2990 117.5	2990 117.5	2990 117.5	2990 117.5	2990 117.5
• Donth		1250	1250	1250	1250	1250
- Dopui	in	49	49	49	49	49
 Schematic drawing ⁶⁾ 		В	B	B	В	В
Drive weight (transformer cabir	et and cell cabir	net)				
Weight approx	ka	8000	8400	8400	8700	9000
	lb	17640	18520	18520	19180	19840

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor cos \u03c6 and motor efficiency. Both approximate values have to be adapted to the motor that is actually used. ²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

 - 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 - For 6SR4... drives, customers can directly connect single-phase control power as an option (K68). - CPT is an option in other systems.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

⁶⁾ Please refer to page 3/3 for schematic drawings.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data							
SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR4102- 2.A33-00	6SR4102- 2.A34-00	6SR4102- 2.A35-00	6SR4102- 2.A36-00	6SR4102- 2.B36-00	6SR4102- 2.B37-00
Motor voltage 6.6 kV							
Max. output voltage	kV	6.6	6.6	6.6	6.6	6.6	6.6
Type rating	kVA	270	360	450	455	540	630
Shaft output ¹⁾	kW	224	298	373	378	448	522
	hp	300	400	500	507	600	700
Typical motor current ¹⁾	А	24	32	39	40	47	55
Power cell current	А	40	40	40	40	70	70
Number of cells		15	15	15	15	15	15
Transformer rating	kVA	300	400	500	600	600	700
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes	Yes
Power loss of drive system							
 with copper transformer 	kW	< 8	< 11	< 14	< 14	< 16	< 19
• with aluminum transformer	kW	< 9	< 12	< 15	< 16	< 18	< 21
Efficiency $P_{out}/P_{in}^{(2)}$ of drive sy	stem						
with copper transformer	%	96.5	96.5 96	96.5 06	96.5 06	96.5 06	96.5 06
	70	90	90	90	90	90	90
• Single phase w/s entions ³⁾	12/10	. 1 5	- 1 E	- 1 E	- 1 E	- 1 E	- 1 E
 Single-phase w/o options ³ 	kVA kVA	< 3	< 3	< 3	< 3	< 3	< 3
• Three-phase w/o CPT 4)	kVA	< 8	< 8	< 8	< 8	< 8	< 8
• Three-phase w/ CPT and all	kVA	< 11	< 11	< 11	< 11	< 11	< 11
Options "		4.5	4.5	4 5	4 5	4 5	4 5
Cooling medium now rate	CFM	4.5 9500	4.5 9500	4.5 9500	4.5 9500	4.5 9500	4.5 9500
Sound pressure level L_{pA} (1 m)	dB (A)	82	82	82	82	82	82
Power cabling cross-sections	. ,						
Cable cross-sections,	AWG/MCM	2 x 500 MCM					
line-side, max. connectable per	(NEC, CEC)						0.040
prase with M10 screw "	mm ² (DIN VDF)	2 x 240					
Cable cross-sections	AWG/MCM	2 x 500 MCM					
motor-side, max. connectable	(NEC, CEC)	2 / 000 ///0///	2 / 000 ///01	2 / 000 ///0///	2 / 000 11011	2 / 000 11011	2,0000
per phase with M10 screw ⁵⁾		2 x 240					
• PE connection may connec		2/0 ////G	2/0 AWG	2/0 4/4/6	2/0 4/4/6	2/0 4/4/6	2/0 4/4/6
tion cross-section at enclosure	(NEC, CEC)	2/0 AVIG	2/0 AVG	2/0 AVIG	2/0 AVIG	2/0 AVIG	2/0 AVVG
with M12 screw ⁵⁾ preliminary	mm ²	70	70	70	70	70	70
	(DIN VDE)						
Degree of protection	<u></u>	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer	cabinet and o	cell cabinet)	4405	1105	1105	1105	1105
• Wiath	mm in	4165 164	4165 164	4165 164	4165 164	4165 164	4165 164
• Height (incl. blowers)	mm	2990	2990	2990	2990	2990	2990
	in	117.5	117.5	117.5	117.5	117.5	117.5
Depth	mm	1250	1250	1250	1250	1250	1250
	in	49	49	49	49	49	49
 Schematic drawing ⁶⁾ 		В	В	В	В	В	В
Drive weight (transformer cabir	net and cell c	abinet)					
 Weight, approx. 	kg	4700	4900	5100	5300	5300	5500
	lb	10360	10800	11240	11680	11680	12130

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor cos \u03c6 and motor efficiency. Both approximate values have to be adapted to the motor that is actually used. ²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 - For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).

- CPT is an option in other systems.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data (continued)

SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR4102- 2.B38-00	6SR4102- 2.B38-70	6SR4102- 2.C38-70	6SR4102- 2.C41-00	6SR4102- 2.C41-20
Motor voltage 6.6 kV						
Max. output voltage	kV	6.6	6.6	6.6	6.6	6.6
Type rating	kVA	720	800	810	900	1130
Shaft output ¹⁾	kW hp	597 800	662 887	671 900	746 1000	933 1250
Typical motor current ¹⁾	А	63	70	71	79	99
Power cell current	А	70	70	100	100	100
Number of cells		15	15	15	15	15
Transformer rating	kVA	800	900	900	1000	1250
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes
Power loss of drive system						
with copper transformerwith aluminum transformer	kW kW	< 21 < 24	< 24 < 27	< 24 < 27	< 27 < 30	< 33 < 38
Efficiency $P_{out}/P_{in}^{2)}$ of drive system	stem					
with copper transformerwith aluminum transformer	% %	96.5 96	96.5 96	96.5 96	96.5 96	96.5 96
Auxiliary supply						
 Single-phase w/o options ³⁾ Single-phase w/ all options ³⁾ Three-phase w/o CPT ⁴⁾ 	kVA kVA kVA	< 1.5 < 3 < 8				
options ⁴⁾	KVA	< 11	< 11	< 11	< 11	< 11
Cooling medium flow rate	m ³ /s CFM	4.5 9500	4.5 9500	4.5 9500	4.5 9500	5 10600
Sound pressure level L _{pA} (1 m)	dB (A)	82	82	82	82	80
Power cabling cross-sections						
• Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 500 MCM 2 x 240				
Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 500 MCM 2 x 240				
PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2/0 AWG 70				
Degree of protection	()	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer	cabinet and o	cell cabinet)				
• Width	mm in	4165 164	4165 164	4165 164	4165 164	4165 164
Height (incl. blowers)	mm in	2990 117.5	2990 117.5	2990 117.5	2990 117.5	2990 117.5
Depth	mm in	1250 49	1250 49	1250 49	1250 49	1250 49
Schematic drawing ⁶⁾		В	В	В	В	В
Drive weight (transformer cabin	net and cell ca	abinet)				
Weight, approx.	kg Ib	5700 12570	5800 12790	5800 12790	5900 13010	6200 13670

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor cos \u03c6 and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).
- CPT is an option in other systems.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

⁶⁾ Please refer to page 3/3 for schematic drawings.

SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data (continued)			Technical data (continued)							
SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR4102- 2.C41-50	6SR4102- 2.D41-50	6SR4102- 2.D41-70	6SR4102- 2.D42-00	6SR4102- 2.E42-00				
Motor voltage 6.6 kV										
Max. output voltage	kV	6.6	6.6	6.6	6.6	6.6				
Type rating	kVA	1140	1350	1580	1600	1760				
Shaft output 1)	kW hp	946 1268	1119 1500	1306 1750	1324 1775	1492 2000				
Typical motor current ¹⁾	А	100	118	138	140	154				
Power cell current	А	100	140	140	140	200				
Number of cells		15	15	15	15	15				
Transformer rating	kVA	1500	1500	1750	2000	2000				
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes				
Power loss of drive system										
with copper transformerwith aluminum transformer	kW kW	< 34 < 38	< 40 < 45	< 46 < 53	< 47 < 53	< 53 < 60				
Efficiency <i>P</i> out/ <i>P</i> in ²⁾ of drive system	stem									
with copper transformerwith aluminum transformer	% %	96.5 96	96.5 96	96.5 96	96.5 96	96.5 96				
Auxiliary supply										
 Single-phase w/o options ³⁾ Single-phase w/ all options ³⁾ Three-phase w/o CPT ⁴⁾ Three-phase w/ CPT and all options ⁴⁾ 	kva kva kva kva	< 1.5 < 3 < 8 < 11	< 1.5 < 3 < 8 < 11	< 1.5 < 3 < 8 < 11	< 1.5 < 3 < 8 < 11	< 1.5 < 3 < 8 < 11				
Cooling medium flow rate	m ³ /s CFM	5 10600	5 10600	5 10600	5 10600	5.6 11900				
Sound processing lovel / (1 m)		90	90	90	90	78				
Sound pressure level L _{pA} (1 m)	ub (A)	00	80	80	80	70				
$\frac{\text{Sound pressure level } L_{pA} (1 \text{ m})}{\text{Power cabling cross-sections}}$	UB (A)	00	80	00	80	70				
 Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 500 MCM 2 x 240	2 x 500 MCM 2 x 240	2 x 500 MCM 2 x 240	2 x 500 MCM 2 x 240	2 x 500 MCM 2 x 240				
 Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵) 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ²	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240	2 × 500 MCM 2 × 240 2 × 500 MCM 2 × 240	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240	2 × 500 MCM 2 × 240 2 × 500 MCM 2 × 240				
 Sound pressure rever L_{pA} (Tin) Power cabling cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵) preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240				
 Sound pressure rever L_{PA} (111) Power cabling cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵) preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70	2 × 500 MCM 2 × 240 2 × 500 MCM 2 × 240 2/0 AWG 70	2 × 500 MCM 2 × 240 2 × 500 MCM 2 × 240 2/0 AWG 70	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70				
 Sound pressure rever L_{pA} (Trin) Power cabling cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵) preliminary PE connection, max. connection cross-section at enclosure with M12 screw ⁵) preliminary Degree of protection 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21	2 × 500 MCM 2 × 240 2 × 500 MCM 2 × 240 2/0 AWG 70 NEMA1/IP21	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21				
 Sound pressure rever L_{PA} (Trin) Power cabling cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵) preliminary PE connection, max. connection cross-section at enclosure with M12 screw ⁵) preliminary Degree of protection Drive dimensions (transformer 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) Cabinet and C	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 cell cabinet)	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21	2 × 500 MCM 2 × 240 2 × 500 MCM 2 × 240 2/0 AWG 70 NEMA1/IP21	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21				
 Sound pressure rever L_{PA} (111) Power cabling cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵) preliminary Degree of protection Drive dimensions (transformer Width 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) Cabinet and comm in	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 cell cabinet) 4165 164	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 4165 164	2 × 500 MCM 2 × 240 2 × 500 MCM 2 × 240 2/0 AWG 70 NEMA1/IP21 4165 164	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 4165 164	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 4165 164				
 Sound pressure rever L_{PA} (111) Power cabling cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵) preliminary Degree of protection Drive dimensions (transformer Width Height (incl. blowers) 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) cabinet and c mm in mm	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 cell cabinet) 4165 164 2990 117.5	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5	2 × 500 MCM 2 × 240 2 × 240 2 × 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5	2 x 500 MCM 2 x 240 2 x 240 2 x 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5	2 × 500 MCM 2 × 240 2 × 240 2 × 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5				
 Sound pressure rever L_{PA} (111) Power cabling cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵) preliminary PE connection, max. connection cross-section at enclosure with M12 screw ⁵) preliminary Degree of protection Drive dimensions (transformer Width Height (incl. blowers) Depth 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) cabinet and c mm in mm in mm	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 cell cabinet) 4165 164 2990 117.5 1250 49	2 x 500 MCM 2 x 240 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49	2 × 500 MCM 2 × 240 2 × 240 2 × 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49	2 x 500 MCM 2 x 240 2 x 240 2 x 240 2 x 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49	2 × 500 MCM 2 × 240 2 × 240 2 × 240 2 × 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49				
 Sound pressure rever L_{PA} (Trin) Power cabling cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵) preliminary PE connection, max. connection cross-section at enclosure with M12 screw ⁵) preliminary Degree of protection Drive dimensions (transformer Width Height (incl. blowers) Depth Schematic drawing ⁶) 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) Cabinet and c mm in mm in mm	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 cell cabinet) 4165 164 2990 117.5 1250 49 B	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49 B	2 × 500 MCM 2 × 240 2 × 240 2 × 240 2 × 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49 B	2 × 500 MCM 2 × 240 2 × 240 2 × 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49 B	2 × 500 MCM 2 × 240 2 × 500 MCM 2 × 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49 B				
 Sound pressure rever L_{PA} (111) Power cabling cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵) preliminary PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵) preliminary Degree of protection Drive dimensions (transformer Width Height (incl. blowers) Depth Schematic drawing ⁶) Drive weight (transformer cabin 	AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) AWG/MCM (NEC, CEC) mm ² (DIN VDE) Cabinet and c mm in mm in mm in mm	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2 x 240 2/0 AWG 70 NEMA1/IP21 2ell cabinet) 4165 164 2990 117.5 1250 49 B abinet)	2 x 500 MCM 2 x 240 2 x 500 MCM 2 x 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49 B	2 × 500 MCM 2 × 240 2 × 240 2 × 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49 B	2 × 500 MCM 2 × 240 2 × 240 2 × 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49 B	2 × 500 MCM 2 × 240 2 × 500 MCM 2 × 240 2/0 AWG 70 NEMA1/IP21 4165 164 2990 117.5 1250 49 B				

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor cos \u03c6 and motor efficiency. Both approximate values have to be adapted to the motor that is actually used. ²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 - For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).

- CPT is an option in other systems.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

6) Please refer to page 3/3 for schematic drawings.

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SINAMICS PERFECT HARMONY GH180 Article number 6SR4...

Technical data (continued)

SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR4102- 2.E42-20	6SR4102- 2.E42-50	6SR4102- 2.E43-00	6SR4102- 2.F43-00	6SR4102- 2.F43-50
Motor voltage 6.6 kV						
Max. output voltage	kV	6.6	6.6	6.6	6.6	6.6
Type rating	kVA	1980	2200	2285	2640	2970
Shaft output ¹⁾	kW	1679	1865	1939	2238	2521
	hp	2250	2500	2600	3000	3380
Typical motor current ¹⁾	A	173	192	200	231	260
Power cell current	А	200	200	200	260	260
Number of cells		15	15	15	15	15
Transformer rating	kVA	2250	2500	3000	3000	3500
Aluminum transformer available		Yes	Yes	Yes	On request	No
Power loss of drive system					•	
• with copper transformer	kW	< 59	< 66	< 68	< 79	< 89
 with aluminum transformer 	kW	< 68	< 75	< 78	_	_
Efficiency $P_{out}/P_{in}^{(2)}$ of drive sy	stem					
 with copper transformer 	%	96.5	96.5	96.5	96.5	96.5
 with aluminum transformer 	%	96	96	96	-	-
Auxiliary supply						
 Single-phase w/o options ³⁾ 	kVA	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options ³⁾	kVA	< 3	< 3	< 3	< 3	< 3
• Three-phase w/o CPT */	kVA kVA	< 8	< 8	< 8	< 8	< 8
options ⁴⁾	KVA	< 11	< 11	< 11	< 11	< 11
Cooling medium flow rate	m ³ /s	6.4	6.4	6.4	6.4	6.4
-	CFM	13600	13600	13600	13600	13600
Sound pressure level L _{pA} (1 m)	dB (A)	80	80	80	80	80
Power cabling cross-sections						
 Cable cross-sections, 	AWG/MCM	2 x 500 MCM				
line-side, max. connectable per	(NEC, CEC)	0 × 0 40	0 × 040	0 ~ 0 40	0040	0 × 040
preliminary	mm= (DIN VDE)	2 X 240				
Cable cross-sections,	AWG/MCM	2 x 500 MCM				
motor-side, max. connectable	(NEC, CEC)					0.040
preliminary	mm ² (DIN VDE)	2 x 240				
• PE connection, max, connec-	AWG/MCM	2/0 AWG				
tion cross-section at enclosure	(NEC, CEC)	_,	_,	_,	_,	_,
with M12 screw ³⁷ preliminary	mm ² (DIN VDE)	70	70	70	70	70
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer	cabinet and cell	cabinet)				
• Width	mm	4165	4165	4165	4165	4165
	IN	164	164	164	164	164
Height (incl. blowers)	mm	2990	2990	2990	2990	2990 117 5
• Dooth		1050	1250	1250	1050	1250
	in	49	1200 49	1200 49	1200 49	1200 49
 Schematic drawing ⁶⁾ 		B	 B	 B	 B	 B
Drive weight (transformer cabir	et and cell cabir		2	-	2	-
• Weight approx	ka	8000	8400	8700	8700	9000
	lb	17640	18520	19180	19180	19840

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor cos \u03c6 and motor efficiency. Both approximate values have to be adapted to the motor that is actually used. ²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- 6SR4... drives derive single-phase control power from a built-in CPT as standard.
 For 6SR4... drives, customers can directly connect single-phase control power as an option (K68).

- CPT is an option in other systems.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

⁶⁾ Please refer to page 3/3 for schematic drawings.

SINAMICS PERFECT HARMONY GH180 Article number 6SR3...

Technical data

Schematic drawing



Schematic drawing ${\bm C}$ for article numbers 6SR3... and motor voltages 2.4 to 6.6 kV

Dimensions of the SINAMICS PERFECT HARMONY GH180 drive, article number 6SR3..., see the following tables with technical data.

SINAMICS PERFECT HARMONY GH180 Article number 6SR3...

Technical data

SINAMICS PERFECT HARMON air-cooled drive version	/ GH180	6SR3102- 3.G42-50	6SR3102- 3.G43-00	6SR3102- 3.H43-00	6SR3102- 3.H43-50	6SR3102- 3.J43-50
Motor voltage 4.16 kV						
Max. output voltage	kV	4.9	4.9	4.9	4.9	4.9
Type rating	kVA	2200	2265	2640	2700	3080
Shaft output ¹⁾	kW hp	1865 2500	1925 2581	2238 3000	2292 3073	2611 3500
Typical motor current ¹⁾	А	305	315	366	375	427
Power cell current	А	315	315	375	375	500
Number of cells		12	12	12	12	12
Transformer rating	kVA	2500	3000	3000	3500	3500
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes
Power loss of drive system						
with copper transformerwith aluminum transformer	kW kW	< 66 < 66	< 68 < 68	< 79 < 79	< 81 < 81	< 92 < 92
Efficiency <i>P</i> _{out} / <i>P</i> _{in} ²⁾ of drive system	stem					
with copper transformerwith aluminum transformer	% %	> 96.5 > 96.5				
Auxiliary supply						
 Single-phase w/o options ³⁾ Single-phase w/ all options ³⁾ Three-phase w/o CPT ⁴⁾ Three-phase w/ CPT and all options ⁴⁾ 	kVA kVA kVA kVA	< 1.5 < 3 < 16 < 19				
Cooling medium flow rate	m ³ /s	8.5	8.5	8.5	8.5	8.5
	CFM	18000	18000	18000	18000	18000
Sound pressure level L _{pA} (1 m)	dB (A)	80	80	80	80	80
Power cabling cross-sections						
Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500				
Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500				
• PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ²	1000 MCM 500				
Degree of protection	(DIN VDE)					
Drive dimensions (input cabine	t transforme		ahinet) ⁶⁾			
Width	mm		6270	6270	6270	6270
Width	in	247	247	247	247	247
Height (incl. blowers)	mm in	2995 118	2995 118	2995 118	2995 118	2995 118
• Depth	mm in	1270 50	1270 50	1270 50	1270 50	1270 50
Schematic drawing 7)		С	С	С	С	С
Drive weight (input cabinet, tran	nsformer cab	inet and cell cabine	et)			
Weight, approx.	kg Ib	12000 26500	12000 26500	12000 26500	12500 27500	12500 27500

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- CPT is an option.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

⁶⁾ If an aluminum transformer is selected, drive dimensions may change.

SINAMICS PERFECT HARMONY GH180 Article number 6SR3...

Technical data (continued)					
SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR3102- 3.J44-00	6SR3102- 3.J45-00	6SR3102- 3.K45-00	6SR3102- 3.K46-00
Motor voltage 4.16 kV					
Max. output voltage	kV	4.9	4.9	4.9	4.9
Type rating	kVA	3520	3600	4400	4540
Shaft output 1)	kW hp	2984 4000	3056 4097	3730 5000	3851 5162
Typical motor current ¹⁾	A	488	500	610	630
Power cell current	A	500	500	660	660
Number of cells		12	12	12	12
Transformer rating	kVA	4000	5000	5000	6000
Aluminum transformer available		Yes	On request	On request	No
Power loss of drive system				•	
with copper transformer with aluminum transformer Efficiency Pour/Pin ²⁾ of drive system	kW kW stem	< 105 < 105	< 107 -	< 131 -	< 135 -
with copper transformer with aluminum transformer	% %	> 96.5 > 96.5	> 96.5 -	> 96.5 -	> 96.5 -
Auxiliary supply					
 Single-phase w/o options ³⁾ Single-phase w/ all options ³⁾ Three-phase w/o CPT ⁴⁾ Three-phase w/ CPT and all options ⁴⁾ 	kva kva kva kva	< 1.5 < 3 < 16 < 19			
Cooling medium flow rate	m ³ /s CFM	8.5 18000	8.5 18000	8.5 18000	8.5 18000
Sound pressure level L _{pA} (1 m)	dB (A)	80	80	80	80
Power cabling cross-sections					
Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500			
 Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵⁾ preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500			
• PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1000 MCM 500	1000 MCM 500	1000 MCM 500	1000 MCM 500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabine	t, transforme	r cabinet and cell cabin	et) ⁶⁾		
• Width	mm in	6270 247	6880 271	6880 271	6880 271
Height (incl. blowers)	mm in	2995 118	2995 118	2995 118	2995 118
• Depth	mm in	1270 50	1270 50	1270 50	1270 50
Schematic drawing 7)	·	С	С	С	С
Drive weight (input cabinet, trai	nsformer cab	inet and cell cabinet)			
Weight, approx.	kg Ib	12300 27100	14500 32000	15000 33000	15500 34000

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- CPT is an option.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

⁶⁾ If an aluminum transformer is selected, drive dimensions may change.

7) Please refer to page 3/19 for schematic drawing.

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SINAMICS PERFECT HARMONY GH180 Article number 6SR3...

Technical data

SINAMICS PERFECT HARMON air-cooled drive version	/ GH180	6SR3102- 3.G42-50	6SR3102- 3.G43-00	6SR3102- 3.H43-00	6SR3102- 3.H43-50	6SR3102- 3.H44-00
Motor voltage 4.8 kV						
Max. output voltage	kV	4.9	4.9	4.9	4.9	4.9
Type rating	kVA	2200	2615	2640	3080	3115
Shaft output 1)	kW hp	1865 2500	2222 2978	2238 3000	2611 3500	2645 3545
Typical motor current ¹⁾	А	264	315	317	370	375
Power cell current	А	315	315	375	375	375
Number of cells		12	12	12	12	12
Transformer rating	kVA	2500	3000	3000	3500	4000
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes
Power loss of drive system						
with copper transformerwith aluminum transformer	kW kW	< 66 < 66	< 78 < 78	< 79 < 79	< 92 < 92	< 93 < 93
Efficiency <i>P</i> out/ <i>P</i> in ²⁾ of drive system	stem					
with copper transformerwith aluminum transformer	% %	> 96.5 > 96.5				
Auxiliary supply						
 Single-phase w/o options ³⁾ Single-phase w/ all options ³⁾ Three-phase w/o CPT ⁴⁾ Three-phase w/ CPT and all options ⁴⁾ 	kVA kVA kVA kVA	< 1.5 < 3 < 16 < 19				
Cooling medium flow rate	m ³ /s	8.5	8.5	8.5	8.5	8.5
..	CFM	18000	18000	18000	18000	18000
Sound pressure level L _{pA} (1 m)	dB (A)	80	80	80	80	80
Power cabling cross-sections						
Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500				
Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500				
PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1000 MCM 500				
Degree of protection	()	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabine	t, transforme	r cabinet and cell c	abinet) ⁶⁾			· ·
• Width	mm in	6270 247	6270 247	6270 247	6270 247	6270 247
Height (incl. blowers)	mm in	2995 118	2995 118	2995 118	2995 118	2995 118
• Depth	mm in	1270 50	1270 50	1270 50	1270 50	1270 50
 Schematic drawing⁷⁾ 		С	С	С	С	С
Drive weight (input cabinet, tran	nsformer cab	inet and cell cabine	et)			
• Weight, approx.	kg Ib	12000 26500	12000 26500	12000 26500	12500 27500	12500 27500

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- CPT is an option.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

⁶⁾ If an aluminum transformer is selected, drive dimensions may change.

SINAMICS PERFECT HARMONY GH180 Article number 6SR3...

Technical data (continued)					
SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR3102- 3.J44-00	6SR3102- 3.J45-00	6SR3102- 3.K45-00	6SR3102- 3.K46-00
Motor voltage 4.8 kV					
Max. output voltage	kV	4.9	4.9	4.9	4.9
Type rating	kVA	3520	4155	4400	5240
Shaft output 1)	kW hp	2984 4000	3526 4727	3730 5000	4443 5956
Typical motor current ¹⁾	А	423	500	529	630
Power cell current	А	500	500	660	660
Number of cells		12	12	12	12
Transformer rating	kVA	4000	5000	5000	6000
Aluminum transformer available		Yes	On request	On request	No
Power loss of drive system					
with copper transformerwith aluminum transformer	kW kW	< 105 < 105	< 124 -	< 131 -	< 156 -
Efficiency <i>P</i> out/ <i>P</i> in ²⁾ of drive system	stem				
with copper transformerwith aluminum transformer	% %	> 96.5 > 96.5	> 96.5 -	> 96.5 -	> 96.5 -
Auxiliary supply					
 Single-phase w/o options ³⁾ Single-phase w/ all options ³⁾ Three-phase w/o CPT ⁴⁾ Three-phase w/ CPT and all options ⁴⁾ 	kva kva kva kva	< 1.5 < 3 < 16 < 19			
Cooling medium flow rate	m ³ /s CFM	8.5 18000	8.5 18000	8.5 18000	8.5 18000
Sound pressure level L _{pA} (1 m)	dB (A)	80	80	80	80
Power cabling cross-sections					
 Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁵⁾ preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500	2 × 1000 MCM 2 × 500	2 x 1000 MCM 2 x 500	2 × 1000 MCM 2 × 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500			
• PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1000 MCM 500	1000 MCM 500	1000 MCM 500	1000 MCM 500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabine	t, transforme	r cabinet and cell cabi	net) ⁶⁾		
• Width	mm in	6270 247	6880 271	6880 271	6880 271
Height (incl. blowers)	mm in	2995 118	2995 118	2995 118	2995 118
• Depth	mm in	1270 50	1270 50	1270 50	1270 50
 Schematic drawing⁷ 		С	С	С	С
Drive weight (input cabinet, trai	nsformer cab	inet and cell cabinet)			
• Weight, approx.	kg Ib	13000 28500	15000 33000	15500 34000	16000 35300

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- CPT is an option.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

⁶⁾ If an aluminum transformer is selected, drive dimensions may change.

SINAMICS PERFECT HARMONY GH180 Article number 6SR3...

Technical data

SINAMICS PERFECT HARMON air-cooled drive version	/ GH180	6SR3102- 5.G43-50	6SR3102- 5.G44-00	6SR3102- 5.H44-00	6SR3102- 5.H45-00	6SR3102- 5.J45-00
Motor voltage 6.0 kV						
Max. output voltage	kV	6.1	6.1	6.1	6.1	6.1
Type rating	kVA	3080	3270	3520	3895	4400
Shaft output ¹⁾	kW hp	2611 3500	2777 3722	2984 4000	3306 4432	3730 5000
Typical motor current ¹⁾	А	296	315	338	375	423
Power cell current	А	315	315	375	375	500
Number of cells		15	15	15	15	15
Transformer rating	kVA	3500	4000	4000	5000	5000
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes
Power loss of drive system						
with copper transformerwith aluminum transformer	kW kW	< 92 < 92	< 98 < 98	< 105 < 105	< 116 < 116	< 131 < 131
Efficiency Pout/Pin ²⁾ of drive sys	stem					
with copper transformerwith aluminum transformer	% %	> 96.5 > 96.5				
Auxiliary supply						
 Single-phase w/o options ³⁾ Single-phase w/ all options ³⁾ Three-phase w/o CPT ⁴⁾ Three-phase w/ CPT and all options ⁴⁾ 	kVA kVA kVA kVA	< 1.5 < 3 < 16 < 19				
Cooling medium flow rate	m ³ /s CFM	11.8 25000	11.8 25000	11.8 25000	11.8 25000	11.8 25000
Sound pressure level L_{pA} (1 m)	dB (A)	80	80	80	80	80
Power cabling cross-sections	- ()					
• Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500				
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500	2 × 1000 MCM 2 × 500	2 x 1000 MCM 2 x 500	2 x 1000 MCM 2 x 500	2 x 1000 MCM 2 x 500
• PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1000 MCM 500				
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabine	t, transforme	r cabinet and cell c	abinet) ⁶⁾			
• Width	mm in	7215 284	7215 284	7215 284	7825 308	7825 308
Height (incl. blowers)	mm in	2995 118	2995 118	2995 118	2995 118	2995 118
Depth	mm in	1370 54	1370 54	1370 54	1370 54	1370 54
 Schematic drawing⁷⁾ 		С	С	С	С	С
Drive weight (input cabinet, tran	nsformer cab	inet and cell cabine	et)			
Weight, approx.	kg Ib	11400 25100	12400 27300	12500 27500	14300 31500	14600 32200

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- CPT is an option.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

⁶⁾ If an aluminum transformer is selected, drive dimensions may change.

SINAMICS PERFECT HARMONY GH180 Article number 6SR3...

Technical data (continued)					
SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR3102- 5.J46-00	6SR3102- 5.K46-00	6SR3102- 5.K47-00	6SR3102- 5.K48-00
Motor voltage 6.0 kV					
Max. output voltage	kV	6.1	6.1	6.1	6.1
Type rating	kVA	5195	5280	6160	6550
Shaft output ¹⁾	kW	4408	4476	5222	5554
	hp	5909	6000	7000	7445
Typical motor current ¹⁾	А	500	508	592	630
Power cell current	А	500	660	660	660
Number of cells		15	15	15	15
Transformer rating	kVA	6000	6000	7000	8000
Aluminum transformer available		Yes	Yes	Yes	Yes ²⁾
Power loss of drive system					
with copper transformer	kW	< 155	< 157	< 183	< 195
 with aluminum transformer 	kW	< 155	< 157	< 183	< 195
Efficiency $P_{out}/P_{in}^{(3)}$ of drive system	stem				
 with copper transformer 	%	> 96.5	> 96.5	> 96.5	> 96.5
 with aluminum transformer 	%	> 96.5	> 96.5	> 96.5	> 96.5
Auxiliary supply					
 Single-phase w/o options⁴⁾ 	kVA	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options ⁴⁾	kVA	< 3	< 3	< 3	< 3
• Three-phase w/o CPT ³⁾	kVA	< 16	< 16	< 16	< 16
 Inree-phase w/ CPT and all options ⁵⁾ 	KVA	< 19	< 19	< 19	< 19
Cooling medium flow rate	m ³ /s	11.8	11.8	11.8	11.8
	CFM	25000	25000	25000	25000
Sound pressure level L_{nA} (1 m)	dB (A)	80	80	80	80
Power cabling cross-sections					
Cable cross-sections, line-side, max, connectable per	AWG/MCM (NEC, CEC)	2 × 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
phase with M10 screw ⁶⁾ preliminary	(DIN VDE)	2 × 500	2 x 500	2 x 500	2 x 500
 Cable cross-sections, motor-side, max. connectable 	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
per phase with M10 screw ⁶⁾ preliminary	mm ² (DIN VDE)	2 × 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connec- tion cross-section at enclosure	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM
with M12 screw ⁶⁾ preliminary	mm ² (DIN VDE)	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabine	t, transforme	r cabinet and cell cabin	et) ⁷⁾		
• Width	mm	7825	7825	7825	7825
	in	308	308	308	308
Height (incl. blowers)	mm in	2995 118	2995 118	3200 126	3200 126
• Depth	mm	1370	1370	1370	1370
	in	54	54	54	54
 Schematic drawing⁸⁾ 		С	С	С	С
Drive weight (input cabinet, tran	nsformer cab	inet and cell cabinet)			
• Weight, approx.	kg Ib	16000 35300	16500 36500	17000 37500	19000 42000

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used. ²⁾ For primary voltages > 6.6 kV, please contact the factory or your local Siemens sales representative.

³⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

4) 120/240 V AC for NXGII control

- CPT is an option.

⁵⁾ Includes cooling blowers/pumps; data refers to the largest unit.

6) Maximum installable size per phase.

7) If an aluminum transformer is selected, drive dimensions may change.

⁸⁾ Please refer to page 3/19 for schematic drawing.

SINAMICS PERFECT HARMONY GH180 Article number 6SR3...

Technical data

SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR3102- 7.G43-50	6SR3102- 7.G44-00	6SR3102- 7.G45-00	6SR3102- 7.H45-00	6SR3102- 7.J45-00	
Motor voltage 6.6 kV							
Max. output voltage	kV	7.37.37.37.3					
Type rating	kVA	3080	3520	3600	4285	4400	
Shaft output ¹⁾	kW hp	2611 3500	2984 4000	3055 4095	3636 4875	3730 5000	
Typical motor current ¹⁾	А	269	308	315	375	385	
Power cell current	А	315	315	315	375	500	
Number of cells		18	18	18	18	18	
Transformer rating	kVA	3500	4000	5000	5000	5000	
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes	
Power loss of drive system							
with copper transformerwith aluminum transformer	kW kW	< 92 < 92	< 105 < 105	< 107 < 107	< 128 < 128	< 131 < 131	
Efficiency <i>P</i> _{out} / <i>P</i> _{in} ²⁾ of drive sy	stem						
with copper transformerwith aluminum transformer	% %	> 96.5 > 96.5					
Auxiliary supply							
 Single-phase w/o options ³⁾ Single-phase w/ all options ³⁾ Three-phase w/o CPT ⁴⁾ Three-phase w/ CPT and all options ⁴⁾ 	kva kva kva kva	< 1.5 < 3 < 16 < 19					
Cooling medium flow rate	m ³ /s CFM	13.2 28000	13.2 28000	13.2 28000	13.2 28000	13.2 28000	
Sound pressure level L_{pA} (1 m)	dB (A)	80	80	80	80	80	
Power cabling cross-sections							
 Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁵) preliminary 	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500					
Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	2 x 1000 MCM 2 x 500					
PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁵⁾ preliminary	AWG/MCM (NEC, CEC) mm ² (DIN VDE)	1000 MCM 500					
Degree of protection	. ,	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	
Drive dimensions (input cabine	t, transforme	r cabinet and cell c	abinet) ⁶⁾				
Width	mm in	7215 284	7215 284	7825 308	7825 308	7825 308	
Height (incl. blowers)	mm in	2995 118	2995 118	2995 118	2995 118	2995 118	
• Depth	mm in	1370 54	1370 54	1370 54	1370 54	1370 54	
Schematic drawing 7)		С	С	С	С	С	
Drive weight (input cabinet, trai	nsformer cab	inet and cell cabine	et)				
• Weight, approx.	kg Ib	12500 27500	13500 30000	14000 31000	14000 31000	14400 31700	

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

²⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

3) 120/240 V AC for NXGII control

- CPT is an option.

⁴⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁵⁾ Maximum installable size per phase.

⁶⁾ If an aluminum transformer is selected, drive dimensions may change.

SINAMICS PERFECT HARMONY GH180 Article number 6SR3...

Technical data (continued)					
SINAMICS PERFECT HARMON air-cooled drive version	Y GH180	6SR3102- 7.J46-00	6SR3102- 7.J47-00	6SR3102- 7.K47-00	6SR3102- 7.K48-00
Motor voltage 6.6 kV					
Max. output voltage	kV	7.3	7.3	7.3	7.3
Type rating	kVA	5280	5715	6160	7040
Shaft output ¹⁾	kW hp	4476 6000	4849 6500	5222 7000	5968 8000
Typical motor current ¹⁾	A	462	500	539	615
Power cell current	Α	500	500	660	660
Number of cells		18	18	18	18
Transformer rating	kVA	6000	7000	7000	8000
Aluminum transformer available		Yes	Yes	Yes	Yes ²⁾
Power loss of drive system		100		100	
• with copper transformer	k\M	~ 157	~ 170	< 183	~ 209
with aluminum transformer	kW	< 157	< 170	< 183	< 209
Efficiency $P_{out}/P_{in}^{(3)}$ of drive system	stem				
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96.5	> 96.5	> 96.5	> 96.5
Auxiliary supply					
 Single-phase w/o options ⁴) Single-phase w/ all options ⁴) Three-phase w/o CPT ⁵) Three-phase w/ CPT and all options ⁵) 	kVA kVA kVA kVA	< 1.5 < 3 < 16 < 19			
Cooling medium flow rate	m ³ /s CFM	13.2 28000	13.2 28000	13.2 28000	13.2 28000
Sound pressure level L _{pA} (1 m)	dB (A)	80	80	80	80
Power cabling cross-sections					
• Cable cross-sections, line-side, max. connectable per phase with M10 screw ⁶⁾	AWG/MCM (NEC, CEC) mm ²	2 x 1000 MCM 2 x 500			
preliminary	(DIN VDE)				
 Cable cross-sections, motor-side, max. connectable per phase with M10 screw ⁶⁾ 	AWG/MCM (NEC, CEC)	2 x 1000 MCM			
preliminary	(DIN VDE)	2 × 500	2 × 500	2 × 500	2 × 500
• PE connection, max. connec- tion cross-section at enclosure with M12 screw ⁶⁾ preliminary	AWG/MCM (NEC, CEC) mm ²	1000 MCM 500	1000 MCM 500	1000 MCM 500	1000 MCM 500
	(DIN VDE)				
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabine	t, transforme	r cabinet and cell cabi	net) ⁽⁾		
• Width	mm in	7825 308	7825 308	7825 308	7825 308
Height (incl. blowers)	mm in	2995 118	3200 126	3200 126	3200 126
• Depth	mm in	1370 54	1370 54	1370 54	1370 54
 Schematic drawing⁸⁾ 		С	С	С	С
Drive weight (input cabinet, tran	nsformer cab	inet and cell cabinet)			
Weight, approx.	kg Ib	15500 34000	17500 38500	18000 39700	19500 43000

¹⁾ The specifications for the typical motor current and the power data in kW and hp are approximate values only; these have been calculated for operation with induction motors and for a typical power factor $\cos \varphi$ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used. ²⁾ For primary voltages > 6.6 kV, please contact the factory or your local Siemens sales representative.

³⁾ Values at 100 % of rated speed and torque; includes drive and input transformer.

4) 120/240 V AC for NXGII control

- CPT is an option.

⁵⁾ Includes cooling blowers/pumps; data refers to the largest unit.

⁶⁾ Maximum installable size per phase.

7) If an aluminum transformer is selected, drive dimensions may change.

⁸⁾ Please refer to page 3/19 for schematic drawing.

3

Notes



4/2	Options
4/2	B09 Engineering and parameter
	configuration for ESP applications
4/2	B10 Drive adapted to ZLU require- ments
4/2	B19 Express Line
4/3	B43 to B45 Production schedules
4/3	B49 Manufacturer data book
4/4	D00 to D84 Documentation
4/4	F03 to F97 Drive acceptance tests, witnessed
4/5	G21 to G93 Serial communication
4/5	G47 Ethernet port connector (mounted on the door)
4/6	K20 to K34 Control and display instruments in the door
4/6	K50 Speed sensing module (requires a speed encoder)
4/6	K68 to K79 Auxiliary and control voltage supply
4/7	L03 EMC filter
4/7	L09 Output reactor (only for sync.)
4/7	L29 Bidirectional synchronized bypass operation
4/7	L50 Cabinet lighting and service socket outlet
4/8	L55 Cabinet anti-condensation heat- ing, temperature-monitored
4/8	L81 2 x 2 Thermistor protection relays
4/8	L823x2Thermistor protection relays
4/8	L91 to L95 Temperature detection and evaluation
4/9	M10 Mechanical door interlock – Castell
4/9	M12 Electrical door interlocks
4/9	M35 to M37 Gland plates
4/9	M42 IP42 degree of protection
4/9	M61 Redundant blower
4/9	M64 Drive prepared for connection to an external air discharge system, front connection
4/10	M67 Version for harsh environmental conditions
4/10	M68 Drive prepared for connection to an external air discharge system, rear connection
4/10	M69 Extended space for bottom cable entry

/10	N30 to N33 Controlled outgoing feeder
	for motor blowers
'11	N35 to N38 Controlled outgoing feeder for
	anti-condensation heating
'11	N44 Make-proof grounding switch at
	drive input
'11	N45 Make-proof grounding switch at
/ - -	drive output
11	cables
/11	N75 Power supply for external devices
	24 V DC/2.5 A
'11	N80 Drive with reduced number of cells
'12	P30 Interface drawing approval
'12	P31 Complete drawing approval
'12	P82 Separate transportation units
	(transformer and power section)
'12	Q80 to Q85 Extension of liability for
40	defects on drives
13	T03, T04 Nameplate color and texture
13	158 to 191 Languages for nameplate,
13	LIN2 CE certificate
13	LI04 GOST certificate
13	U10 ProToPS
/13	U11 Cell bypass
/14	U12 Redundant single cell
'14	U13 Redundant rank of cells
'14	V01 to V14 Motor voltages
'14	V50, V60 Motor rated frequency 50 Hz,
	60 Hz
'14	Y05 Customer-specific nameplate
'14	Y06 Motor data other than standard rated
	data, engineering and parameter settings
14	Y09 Paint finish other than standard
14	Y10 Circuit diagrams (German/English)
14 E	V15 Since were filter
10	V36 Customor specific achiest labels
10	Additional evoluted entions for CCD4
10	drives up to 4.16 kV and up to 140 A

Description of options

Options

You will find a detailed description of the options in the following. The descriptions are alphabetically sorted according to order codes so that the required order code can be easily found.

Note

The following options are standard in the European Union, and therefore must be ordered for units manufactured in Nuremberg, Germany:

- Option **G47**
- (Ethernet port connector (mounted on the door)) Option N50
- (internal cabling with halogen-free cables)
- Option P82 (separate transportation units (transformer and power
- section)) Option **Ü02**
- (CE certificate)
- One of the options K31 to K34
- (control and display instruments in the door) One of the options K68, K69 and K79 (auxiliary and control voltage supply)
- One of the options M35 to M37
- (gland plates) One of the options T58 to T91 (languages for nameplate, warning labels and operator panel foil)

B09

Engineering and parameter configuration for ESP applications

By ordering option B09, the filter parameters are calculated and loaded as filter data (inductance and capacitance) into the drive parameter set.

Note:

Option B09 requires option Y15 (sine-wave filter).

B10

Drive adapted to ZLU requirements (on request)

With option **B10**, engineering support is provided to comply with ZLU requirements.

B19 Express Line

By ordering option **B19**, the drive can be delivered within 12 weeks (after the order has been completely clarified technically and from a logistical perspective).

The option is available for the following drives with article number 6SR4... and motor voltages 6.0 kV and 6.6 kV.

Motor voltage 6.0 kV:

- 6SR4102-2.A35-0FG0 • 6SR4102-2.B35-0FG0 6SR4102-2.B38-7FG0
- 6SR4102-2.C38-7FG0 6SR4102-2.C41-2FG0
- 6SR4102-2.D41-2FG0 ٠
- 6SR4102-2.D41-7FG0
- 6SR4102-2.E41-7FG0
- 6SR4102-2.E42-0FG0
- 6SR4102-2.E42-5FG0
- 6SR4102-2.F42-5FG0
- 6SR4102-2.F43-0FG0 6SR4102-2.F43-5FG0

Motor voltage 6.6 kV:

- 6SR4102-2.A35-0FG0 ٠
- 6SR4102-2.B38-7FG0
- 6SR4102-2.C38-7FG0 •
- 6SR4102-2.C41-2FG0
- 6SR4102-2.D41-7FG0 ٠
- 6SR4102-2.D42-0FG0 ٠
- 6SR4102-2.E42-0FG0 •
- 6SR4102-2.E42-5FG0
- 6SR4102-2.E43-0FG0 ٠
- 6SR4102-2.F43-0FG0 • 6SR4102-2.F43-5FG0
- The following input voltages are permissible
- (9th digit in the article number):
- 6.0 kV 3 AC (F)
- 6.3 kV 3 AC (G)
- 6.6 kV 3 AC (H)

Option B19 can be combined with the following additional options:

- B43, B44, B45
- D00, D56, D72, D76, D77, D78, D79, D84
- G22, G28, G91, G47
- K31, K32, K33, K34, K68, K69, K79, K73
- L03, L50, L55 ٠
- M12, M35, M36, M37, M42 ٠
- N44, N45
- P82 •
- Q80, Q81, Q82, Q83, Q84, Q85
- T58, T60, T74, T80, T82, T85, T91 U02. U04
- V10, V12

Description of options

Options (continued)

B43 to B45 Production schedules

Mutually exclusive options B43 to B45

Production schedule documentation	Code	B43	B44	B45
One issue	B43		-	-
Updated at 2-week intervals	B44	-		I
Updated once per month	B45	-	-	

Options are mutually exclusive.

Options **B43** to **B45** provide production schedule documents. These are sent via E-Mail as PDF file in English after order clarification.

Option	Description
B43	Production schedule: one issue
B44	Production schedule: updated at 2-week intervals
B45	Production schedule: updated once per month

B49 Manufa

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Manufacturer data book

With option **B49**, a printed manufacturer data book will be provided with the following content:

- Test certificates for the drive and its main components
- · Report of the drive type test

This document is used to verify that all quality assurance measures were performed during production. This is not part of the documentation on the CD-ROM and will be supplied separately.

Note:

The manufacturer data book is not included when testing the options **F03** to **F97** (drive acceptance test, witnessed).

Description of options

Options (continued)

D00 to D84 Documentation

Mutually exclusive options D00 to D84

Documentation (standard: PDF file on CD-ROM, English)	Code	D00	D02	D15	D56	D72	D76	D77	D78	D79	D84
Documentation in German	D00		1	1	-	_	1	-	_	_	-
Circuit diagram, terminal diagram and dimension drawing in dxf format	D02	1		1	1	1	1	1	1	1	1
One set of printed docu- mentation in the selected language	D15	1	1		1	1	1	~	1	1	1
Documentation in Russian	D56	-	1	1		-	1	-	-	-	-
Documentation in Italian	D72	-	1	1	-		1	1	1	1	-
Documentation in English	D76	1	1	1	1	1		1	1	1	1
Documentation in French	D77	_	1	1	-	1	1		1	1	-
Documentation in Spanish	D78	_	1	1	_	1	1	1		1	_
Documentation in Portuguese	D79	-	1	1	-	1	1	1	1		-
Documentation in Chinese	D84	-	1	1	-	-	1	-	-	-	

Options can be combined.

Options are mutually exclusive.

The standard documentation is supplied in English on CD-ROM. The circuit diagrams/terminal diagrams are available only in English.

Note:

Please contact the factory or your local Siemens sales representative for documentation in a language different from the ones specified below.

Option Description

D00 Documentation in German

With order code **D00**, the documentation is supplied in German on CD-ROM.

D02 Circuit diagram, terminal diagram and dimension drawing in dxf format Documents such as circuit diagrams, terminal diagrams, the

arrangement diagram and the dimension drawing can be ordered with order code **D02** in DXF format, e.g. for use in AutoCAD systems.

D15 One set of printed documentation in the selected language (multiple copies can be ordered) If documentation is also required on paper, this must be ordered using order code D15.

D56 Documentation in Russian

With order code **D56**, the documentation is supplied in Russian on CD-ROM.

D72 Documentation in Italian

With order code **D72**, the documentation is supplied in Italian on CD-ROM.

Option Description

D76	Documentation in English
	If a documentation language other than English is selected (options D00 or D54 to D84), an additional CD-ROM with documentation in English as second documentation language can be ordered by specifying order code D76 .
	Note: If option D15 (one set of printed documentation) is selected simultaneously, the printed documentation will be delivered in the first documentation language only.
D77	Documentation in French
	With order code D77 , the documentation is supplied in French on CD-ROM.
D78	Documentation in Spanish
	With order code D78 , the documentation is supplied in Spanish on CD-ROM.
D79	Documentation in Portuguese
	With order code D79 , the documentation is supplied in Portuguese on CD-ROM.
D84	Documentation in Chinese
	With order code D84 , the documentation is supplied in

Drive acceptance tests, witnessed

Mutually exclusive options F03 to F97

Drive acceptance tests, wit- nessed	Code	F03	F73	F77	F79	F97
Visual acceptance of the drive	F03		-	1	1	1
Functional acceptance of the drive with inductive load	F73	-		1	1	1
Acceptance test of the insulation of the drive	F77	1	1		1	1
Interface check with customer equipment (5 hours, on request)	F79	1	1	1		1
Customer-specific acceptance	F97	1	1	1	1	

Options can be combined.

- Options are mutually exclusive.

Option Description

F03	Visual acceptance of the drive
	Open doors/panels; inspection of drive before shipping
F73	Functional acceptance of the drive with inductive load
	Visual acceptance; functional test with inductive load, cooling system test.
	Option F73 includes option F03 (visual acceptance).
F77	Acceptance test of the insulation of the drive
	The following is included in the scope of the acceptance tests: • High-voltage test
	 The insulation resistance is measured
F79	Interface check with customer equipment (5 hours, on request)
	For details, please contact the factory or your local Siemens sales representative.
F97	Customer-specific acceptance
	For details, please contact the factory or your local Siemens sales representative.

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Options (continued)

G21 to G93 Serial communication

Mutually exclusive options G21 to G93

Serial commu- nication	Code	G21	G22	G23	G26	G28	G91	G31	G32	G38	G43	G46	G93
Modbus Plus interface	G21		-	-	-	-	-	1	1	1	1	1	1
Modbus inter- face (software activation)	G22	_		_	_	_	_	1	1	1	1	1	1
DeviceNet profile 12 interface	G23	_	_		_	_	_	1	~	1	1	1	1
Control Net interface	G26	-	-	-		-	-	1	1	1	1	1	1
Modbus Ether- net interface (software activation)	G28	_	_	_	_		-	1	1	1	1	1	1
PROFIBUS DP interface	G91	-	_	-	-	_		1	1	1	1	1	1
Additional Modbus Plus interface	G31	1	~	1	1	~	1		_	_	_	_	-
Additional Modbus inter- face	G32	~	~	~	~	~	1	-		_	_	-	-
Additional Modbus Ether- net interface	G38	1	~	1	1	~	1	_	_		_	_	-
DeviceNet profile 12 inter- face, network 2	G43	1	~	1	1	~	1	_	_	_		_	-
Control Net interface, network 2	G46	1	~	1	~	~	1	_	_	_	_		-
PROFIBUS DP interface, network 2	G93	1	1	1	1	1	1	-	-	-	-	-	

Options can be combined.

-

Options are mutually exclusive.

Various serial communication interfaces can be optionally selected (no more than two total):

Description of options

Option	Description
G21	Modbus Plus interface
	$\frac{Note:}{options}$ If a second Modbus Plus interface is required, select options G21 and G31 .
G22	Modbus interface (software activation)
	Software activation of the interface; available without additional hardware
	Note: If a second Modbus interface is required, select options $\fbox{G22}$ and $\fbox{G32}.$
G23	DeviceNet profile 12 interface
	Note: If a second DeviceNet interface is required, select options G23 and G43.
G26	Control Net interface
	Note: If a second Control Net interface is required, select options G26 and G46 .
G28	Modbus Ethernet interface (software activation)
	Software activation of the interface: available without
	additional hardware
	additional hardware <u>Note:</u> If a second Modbus Ethernet interface is required, select options G28 and G38 .
G31	additional hardware <u>Note:</u> If a second Modbus Ethernet interface is required, select options G28 and G38 . Additional Modbus Plus interface
G31 G32	additional hardware <u>Note:</u> If a second Modbus Ethernet interface is required, select options G28 and G38. Additional Modbus Plus interface Additional Modbus interface
G31 G32 G38	additional hardware <u>Note:</u> If a second Modbus Ethernet interface is required, select options G28 and G38. Additional Modbus Plus interface Additional Modbus Ethernet interface
G31 G32 G38 G43	additional hardware <u>Note:</u> If a second Modbus Ethernet interface is required, select options G28 and G38. Additional Modbus Plus interface Additional Modbus interface Additional Modbus Ethernet interface DeviceNet profile 12 interface, network 2
G31 G32 G38 G43 G46	additional hardware <u>Note:</u> If a second Modbus Ethernet interface is required, select options G28 and G38. Additional Modbus Plus interface Additional Modbus interface DeviceNet profile 12 interface, network 2 Control Net interface, network 2
G31 G32 G38 G43 G46 G91	additional hardware Note: If a second Modbus Ethernet interface is required, select options G28 and G38. Additional Modbus Plus interface Additional Modbus Ethernet interface DeviceNet profile 12 interface, network 2 Control Net interface, network 2 PROFIBUS DP interface
G31 G32 G38 G43 G46 G91	additional hardware <u>Note:</u> If a second Modbus Ethernet interface is required, select options G28 and G38. Additional Modbus Plus interface Additional Modbus interface Additional Modbus Ethernet interface DeviceNet profile 12 interface, network 2 Control Net interface, network 2 PROFIBUS DP interface <u>Note:</u> If a second PROFIBUS DP interface is required, select options G91 and G93.

Number of Anybus modules required for network implementation using NXGII

Network 2 Network 1	Modbus Plus (G31)	Modbus (G32)	Modbus Ethernet (G38)	DeviceNet profile 12 (G43)	Control Net (G46)	PROFIBUS DP (G93)
Modbus Plus (G21)	2	2	2	2	2	2
Modbus ¹⁾ (G22)	1	1	1	1	1	1
DeviceNet profile 12 (G23)	2	2	2	2	2	2
Control Net (G26)	2	2	2	2	2	2
Modbus Ethernet ²⁾ (G28)	1	1	1	1	1	1
PROFIBUS DP (G91)	2	2	2	2	2	2

G47 Ethernet port connector (mounted on the door)

For drives manufactured in Nuremberg, Germany, the Ethernet port connector is included in the standard scope of delivery. Option **G47** must be ordered.

¹⁾ Network 1 Modbus uses the COM port on the communications board.

²⁾ Network 1 Modbus Ethernet uses the Ethernet port on the CPU card. Customers must provide an additional Ethernet switch to guarantee the functionality of both ports.

Description of options

Options (continued)

K20 to K34

Control and display instruments in the door

Mutually exclusive options K31 to K34

Control and display instruments in the door	Code	K31	K32	K33	K34
Off/Local/Remote selector	K31		-	-	-
Off/Hand/Auto selector	K32	-		-	-
Keyed Off/Local/Remote selector	K33	-	_		-
Keyed Off/Hand/Auto selector	K34	-	-	-	

Options are mutually exclusive.

Option Description

K20 Indicator lights

With option K20, five indicator lights that display the operating status of the drive are provided in the cabinet door of the control section.

- Fault (red)
- Alarm (yellow)
- Operation (green)
- · Drive ready (white)
- Local operation (white)

K21 3 display instruments in the cabinet door

For display of process variables, analog display instruments are installed in the cabinet door indicating the measured value in %:

- Motor current (0 to +120 %)
 Motor speed (-120 % ... 0 ...
- +120 %)
- Motor voltage (0 to +120 %)

K29 Pushbutton kit

With option K29, a pushbutton kit is located on the door panel. It includes a start and a stop pushbutton, a fault reset button and a manual speed potentiometer. (Emergency Stop pushbutton is standard.)

K31 Off/Local/Remote selector

A three position selector switch mounted on the front of the drive.

Note: Options K31 to K34 are mutually exclusive. Select one of them.

K32 Off/Hand/Auto selector

A three position selector switch mounted on the front of the drive

Note: Options K31 to K34 are mutually exclusive. Select one of them.

K33 Keyed Off/Local/Remote selector

A three position, key-operated selector switch mounted on the front of the drive.

Note: Options K31 to K33 are mutually exclusive. Select one of them

K34 Keyed Off/Hand/Auto selector

A three position, key-operated selector switch mounted on the front of the drive

Note: Options K31 to K34 are mutually exclusive. Select one of them

Note:

Select one of the options K31 to K34. K31 is the preset value.

K50

Speed sensing module (requires a speed encoder)

Option K50 includes an I/O function to evaluate a speed encoder signal. For example, this is used in applications that require very accurate speed control, especially at low speeds. Note

Option K50 is used for speed encoder applications.

K68 to K79 Auxiliary and control voltage supply

Mutually exclusive options K68 to K79

Auxiliary and control voltage supply	Code	K68	K69	K79
Connection for control voltage 220/230 V AC by customer	K68		-	-
Control voltage 120 V AC internal	K69	-		-
Connection for control voltage 120 V AC by customer	K79	-	-	



With options K68, K69 and K79, the power source is defined. Select one of them. K69 is the preset value. The internal control voltage will be 120 V AC in either case.

With option K73, you can select a 24 V DC I/O voltage.

Option Description

K68	Connection for control voltage 220/230 V AC by customer
	With option K68 , the customer supplies the control voltage for the drive. The maximum current consumption is 4 A.
K69	Control voltage 120 V AC internal
	Option K69 includes a CPT (control power transformer) built into the drive. 120 V AC will be generated internally from the auxiliary voltage.
K79	Connection for control voltage 120 V AC by customer
	With option $\ensuremath{\textbf{K79}}$, the customer supplies the control voltage for the drive.
K73	Control voltage 24 V DC for digital inputs/outputs
	With option K73 , 24 V DC is available as input/output control signals.

Description of options

Options (continued)

L03 EMC filter

Drives with CE mark require an EMC line filter. With option **L03**, the filter will be installed downstream from the 3-phase control power disconnect switch. Control power cables from the customer's system are routed inside the metal cable duct and are connected at the control power disconnect switch.

Note:

Option L03 is required for the CE mark, and is included in option U02. For drive units supplied from Nuremberg, Germany, these must be ordered with CE mark. As a consequence, option L03 is not separately available.

L09

Output reactor (only for sync.)

Air-cooled drives are supplied with a reactor cabinet included in the drive lineup with the same degree of protection as the drive.

L29

Bidirectional synchronized bypass operation

Option **L29** offers automatic synchronization with seamless transfer of the motor to the line and take-over of the motor from the line. The drive synchronizes the motor to the line voltage (phase, frequency and amplitude). The motor is then connected in parallel to the line with the S3 circuit breaker before the output-side S2 circuit breaker opens.



Circuit breakers

The response time constants of the two circuit breakers (opening and closing times) are approximately 100 ms. The motor is transferred from the drive to the line within this time. This ensures a bumpless transfer of the motor to the line. If the motor is to be subsequently transferred from the line back to the drive, the transfer process is executed in the reverse order. The drive is first run up in no-load operation and its output voltage is synchronized to the line voltage with respect to phase, frequency and amplitude. Then S2 circuit breaker is closed before S3 is opened and the motor is isolated from the line. This means that the drive bumplessly takes over the motor, which can either be operated with closed-loop speed control or shut down in a controlled fashion. As a result of the variable-speed operation while starting or shutting down, no high starting torques or torque fluctuations are generated, which could damage the drive train or cause e.g. pressure fluctuations in the process. The S3 circuit breaker must be configured to protect the motor against overcurrents and overvoltages during line operation. If the motor has integrated temperature sensors, these must be monitored independently (plant-side) during line operation.

An output reactor (option ${\rm LO9})$ is additionally required to decouple the drive output during the commutation process.

Note:

The circuit breakers are not included in the scope of delivery. Contact the factory or your local Siemens sales representative when it comes to dimensioning the output reactor (option **L09**) and the circuit breakers. A motor protection relay should also be installed in the bypass circuit.

L50

Cabinet lighting and service socket outlet

If option L50 is chosen, a universal lamp and a service socket outlet (Schuko version) are installed in the control cabinet.

The power supply for the cabinet lighting and socket outlet is provided externally. The cabinet lighting is switched on manually using a switch.

Description of options

Options (continued)

L55

Cabinet anti-condensation heating, temperature-monitored

The anti-condensation heating is recommended at low ambient temperatures and high levels of humidity to prevent condensation. The number of cabinet heaters installed depends on the number of cabinet panels (refer to the table). A constant minimum temperature in the cabinet is ensured as the temperatures of the anti-condensation heaters are automatically monitored using a thermostat. The anti-condensation heating is controlled using a bimetallic switch that can be adjusted.

Article No.	Number and power of the heaters
6SR4, 2.4, 3.3 and 4.0/4.16 kV	3 heaters, 100 W each
6SR4, 6.0 and 6.6 kV	5 heaters, 100 W each
6SR3	7 heaters, 100 W each

Note:

This option includes overtemperature protection.

Note

The customer provides the supply voltage.

L81 2 x 2 thermistor protection relays

Option L81 includes four thermistor protection relays for PTC thermistors (type A) for alarm and trip. The power supply for the relay and the evaluation is provided in the drive.

L82

3 x 2 thermistor protection relays

Option L82 includes six thermistor protection relays for PTC thermistors (type A) for alarm and trip. The power supply for the relay and the evaluation is provided in the drive.

L91 to L95 Temperature detection and evaluation

Mutually exclusive options L91 to L95

Temperature detection and evaluation	Code	L91	L93	L95
2 Pt100 evaluation units with 3 inputs each	L91		-	-
Pt100 evaluation unit with 6 inputs and 2 ana- log outputs	L93	-		-
Pt100 evaluation unit with 6 inputs for ex-proof motors and 6 analog outputs	L95	I	I	

Options are mutually exclusive.

L91 2 Pt100 evaluation units with 3 inputs each

Each Pt100 evaluation unit can monitor up to three sensors. For all three sensors, the limits for alarm and trip must be set centrally. The output relays are integrated into the internal fault and shutdown circuit of the drive.

L93

Pt100 evaluation unit with 6 inputs and 2 analog outputs

The Pt100 evaluation unit can monitor up to six sensors. The limit values can be programmed by the user for each channel. In the standard setting, the measuring channels are divided into two groups of three channels each. With motors, for example, three Pt100 can be monitored in the stator windings and two Pt100 in the motor bearings. Channels that are not used can be suppressed using appropriate parameter settings.

The output relays are integrated into the internal fault and shutdown circuit of the drive. Additionally two freely programmable analog outputs (0/4 mA to 20 mA and 0/2 V to 10 V) are available.

Note:

The analog outputs are not evaluated by the control.

L95

Pt100 evaluation unit with 6 inputs for ex-proof motors and 6 analog outputs

For use in explosion-proof motors, Zone 2, Zone 22 (non-conductive dusts) Div. 2, and non-hazardous zones, six evaluation units are available (marking, explosion protection:

II (1) GD [EEx ia] IIC/IIB and II 3 G EEx nAC II T4). The resistance thermometers can be connected using a two-wire, three-wire or four-wire system. The following temperature sensors can be connected:

Resistance thermometers according to IEC 60751: Pt100, Pt500, Pt1000,

Resistance thermometers according to DIN 43760: Ni100, Ni500, Ni1000

The alarm and fault messages are combined and integrated into the signaling and shutdown circuit of the drive.

Note:

The analog outputs are not evaluated by the control.

Note:

The maximum cable cross-section that can be connected on the plant side is 1.5 mm². The cables for the intrinsically safe circuits are routed according to the layout diagram.

Description of options

Options (continued)

M10

Mechanical door interlock - Castell

With option **M10** the drive is supplied with a mechanical door interlock system.

The safety closing/interlocking system is based on the key transfer system from Castell. The opened circuit breaker releases the key for the key exchange unit, which in turn releases the keys to the drive cabinet doors of the power section. This ensures that the drive is isolated from the medium voltage and that the medium voltage is no longer present in the cabinet.

Note:

The units have as standard an electrical door interlock.

M12

Electrical door interlocks

The electrical door interlock system prevents access to the energized sections in the drive as long as hazardous voltages are present. This system also prevents the drive from being switched on until all doors of the energized sections in the drive are closed. It is possible to monitor the internal (options N44, N45) or external grounding switch.

Note:

Option **M12** is required for the CE mark, and is included in option **U02**. For drive units supplied from Nuremberg, Germany, these must be ordered with CE mark. As a consequence, option **M12 is not** separately available.

M35 to M37 Gland plates

With options **M35**, **M36** and **M37**, gland plates can be ordered in aluminum (**M35**), brass (**M36**) and stainless steel (**M37**) version. As standard the gland plates are aluminum.

The options **M35** to **M37** are mutually exclusive. One of these options must be ordered for units manufactured in Nuremberg.

Option	Description
M35	Gland plate
M36	Gland plate • Brass
M37	Gland plate • Stainless steel

Note:

Options **M35** to **M37** apply for input/output power cables only. Gland plates for control cables are always aluminum.

M42

IP42 degree of protection

As standard, the air-cooled drives are manufactured in compliance with NEMA 1. The corresponding standard degree of protection for 6SR4... and 6SR3... drives is IP21.

With option **M42**, the degree of protection for air-cooled 6SR4... and 6SR3... drives can be increased over what is provided as standard (NEMA 1 or IP21).

M61

Redundant blower

The drive is equipped with an additional blower to improve the system availability. If a blower in the drive cabinet fails, the redundant blower is activated by the drive control system preventing the drive from tripping. This avoids production downtimes or interruptions. The faulty blower can then be replaced at the next scheduled shutdown.

Note:

Option M61 is included in option U10 (ProToPS).

M64

Drive prepared for connection to an external air discharge system, front connection

With option **M64**, the drive is prepared for connection to an external air discharge system at the **front** of the blower assembly.

This option can be used when the customer is providing external exhaust ducting at the output of the blower to carry the hot air blowing out of the drive cabinet outside the room.

When configuring the exhaust air ducts for the drive ventilation system, it is essential to ensure that the air flow rates stipulated in the technical data are observed. The pressure drop between the air inlet and air outlet of the drive is different for different versions. The additional pressure drop due to the external exhaust air system must lie between 0 Pa and 50 Pa.

Attention:

Note the following regarding the connection of an external air duct:

- Suitable openings must be provided in the air duct in order to be able to replace the fans.
- It has to be assured that the cabinet doors can be opened/closed after installing the air duct.

Note

Selection of option **M64** can affect the sound pressure level depending on the design of the exhaust air system.

For more information about option **M64**, please contact the factory or your local Siemens sales representative.

Note:

Option **M64** requires that option **M42** is also ordered (degree of protection IP42).

Note:

When simultaneously ordering option **L09**, option **M64** is not valid for the additional reactor cabinet.

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Description of options

Options (continued)

M67

Version for harsh environmental conditions

With option **M67**, the drive can be equipped for harsh environmental conditions (high humidity, tropical or marine environment). This is not an option that is compliant for marine certification.

Properties:

- Aluminum parts coated or anodized
- · Galvanized parts coated or replaced by stainless steel parts
- Vacuum pressure impregnation (VPI) of the transformer (protection against salt-mist, environment class 3C2 acc. to IEC 60721-3-3)
- Paint finish for tropical conditions
- · Coated printed circuit boards

M68

Drive prepared for connection to an external air discharge system, rear connection

With option **M68**, the drive is prepared for connection to an external air discharge system at the rear of the blower assembly.

For additional information see option M64 (drive prepared for connection to an external air discharge system, front connection).

Note:

Option **M68** requires that option **M42** is also ordered (degree of protection IP42).

Note:

When simultaneously ordering option **L09**, option **M68** is not valid for the additional reactor cabinet.

M69

Extended space for bottom cable entry

Additional cabinet, mounted at the left side; Dimensions: 400 mm wide, 520 mm deep, cable entry area: 300 mm x 400 mm.

Note:

Only available for 6SR4... drives up to 4.16 kV and up to 140 A.

N30 to N33

Controlled outgoing feeder for motor blowers 400 V 3 AC or 460/480 V 3 AC

Mutually exclusive options N30 to N33

Control of auxiliaries	Code	N30	N31	N32	N33
Controlled outgoing feeder for motor blowers, max. 4/4.8 kW	N30		-	-	-
Controlled outgoing feeder for motor blowers, max. 7/8 kW	N31	-		-	-
Controlled outgoing feeder for motor blowers, max. 11/12.7 kW	N32	-	-		-
Controlled outgoing feeder for motor blowers, max. 15/17.5 kW	N33	-	-	-	

- Options are mutually exclusive.

The drive has a controlled outgoing feeder for the operation of external auxiliary equipment, e.g. separate blowers on the motor or pumps/oil supplies. It is controlled and is fused by motor circuit breakers. The power supply required must be provided externally. Depending on the drive power that is required, four different outgoing feeders are available.

The contactor is switched **on** with the ON command at the drive and switched **off** with the OFF command.

Option Description N30 Controlled outgoing feeder for motor blowers,

	max. 4/4.8 kW
	400 V 3 AC 50 Hz, max. 4 kW 460/480 V 3 AC 60 Hz, max. 4.8 kW (cos φ = 0.8; setting range of motor circuit breaker from 9 A to 12.5 A)
N31	Controlled outgoing feeder for motor blowers, max. 7/8 kW
	400 V 3 AC 50 Hz, max. 7 kW 460/480 V 3 AC 60 Hz, max. 8 kW (cos φ = 0.8; setting range of motor circuit breaker from 14 A to 20 A)
N32	Controlled outgoing feeder for motor blowers, max. 11/12.7 kW
	400 V 3 AC 50 Hz, max. 11 kW 460/480 V 3 AC 60 Hz, max. 12.7 kW (cos φ = 0.8; setting range of motor circuit breaker from 18 A to 25 A)
N33	Controlled outgoing feeder for motor blowers, max. 15/17.5 kW
	400 V 3 AC 50 Hz, max. 15 kW

460/480 V 3 AC 60 Hz, max. 17.5 kW (cos ϕ = 0.8; setting range of motor circuit breaker from 28 A to 40 A)

Description of options

Options (continued)

N35 to N38

Controlled outgoing feeder for anti-condensation heating 230 V 1 AC or 120 V 1 AC

Mutually exclusive options N35 to N38

Control of auxiliaries	Code	N35	N36	N37	N38
Controlled outgoing feeder for anti- condensation heating, max. 1.2/0.7 kW	N35		-	-	I
Controlled outgoing feeder for anti- condensation heating, max. 2.2/1.2 kW	N36	-		-	_
Controlled outgoing feeder for anti- condensation heating, max. 3.5/1.8 kW	N37	-	-		-
Controlled outgoing feeder for anti- condensation heating, max. 4.5/2.4 kW	N38	I	-	-	

Options are mutually exclusive.

A controlled outgoing feeder protected by miniature circuit breakers is available in the drive for controlling external auxiliaries, e.g. the anti-condensation heating for the motor. The power supply required for the drive, e.g. for the anti-condensation heating, must be provided externally. Depending on the power that is required, four different outgoing feeders are available.

The contactor is switched **off** with the ON command at the drive and switched **on** with the OFF command.

Option Description

- N35 Controlled outgoing feeder for anti-condensation heating, max. 1.2/0.7 kW 230 V 1 AC 50 Hz, max. 1.2 kW or 120 V 1 AC 60 Hz, max. 0.7 kW
- N36 Controlled outgoing feeder for anti-condensation heating, max. 2.2/1.2 kW 230 V 1 AC 50 Hz, max. 2.2 kW or 120 V 1 AC 60 Hz, max. 1.2 kW
- N37 Controlled outgoing feeder for anti-condensation heating, max. 3.5/1.8 kW 230 V 1 AC 50 Hz, max. 3.5 kW or 120 V 1 AC 60 Hz, max. 1.8 kW
- N38 Controlled outgoing feeder for anti-condensation heating, max. 4.5/2.4 kW 230 V 1 AC 50 Hz, max. 4.5 kW or 120 V 1 AC 60 Hz, max. 2.4 kW

N44

Make-proof grounding switch at drive input

If grounding on the line side is required for safety and protection reasons, a grounding switch can be ordered with order code **N44**.

For safety reasons, the drive control locks these grounding switches against activation while voltage is still present. The control is integrated into the protection and monitoring circuit of the drive.

In the event of maintenance work on the drive, it must be ensured on the plant side that there is no external voltage present, e.g. auxiliary voltage for blowers, the cooling system, controller and closed-loop control and any external drive outputs.

Note:

For 6SR4... drives up to 4.16 kV and up to 140 A, option **N44** is installed in an additional option cabinet (400 mm wide).

N45

Make-proof grounding switch at drive output

With certain operating modes/configurations of the load machine (e.g. drive group with gas turbines) or types of motor (e.g. PEM), operating states are possible where there is a risk that the motor will feed back energy into the drive. This can lead to dangerous voltages. In these cases, a grounding switch for the drive output side can be ordered with order code **N45**.

For safety reasons, the drive control locks the grounding switch against activation while voltage is still present. The control is integrated into the protection and monitoring circuit of the drive.

Note:

Options **N44** and **N45** are recommended for applications within Europe.

N50

Internal cabling with halogen-free cables

With option **N50**, only halogen-free cables are used for cabling inside the drive. The insulating materials and color coding are in compliance with IEC standards (EN 50178/VDE 0160 (IEC 62103) and EN 60204-1/VDE 0113-1 (IEC 60204-1)).

Note:

Only halogen-free cables are used for units manufactured in Nuremberg, Germany. Option **N50** must be ordered.

N75

Power supply for external devices 24 V DC/2.5 A

With option **N75** the drive is delivered with a power supply unit for 24 V DC auxiliaries. It provides 6 output terminals each for +24 V and 0 V. The total power consumption across all output terminals is limited to 2.5 A.

N80

Drive with reduced number of cells

With option **N80**, 6SR4... drive types 6.0 and 6.6 kV can be ordered with one cell per phase less. The maximum motor voltage is then reduced to 5.3 kV.

Description of options

Options (continued)

P30

Interface drawing approval

When this option is ordered, the customer will receive a set of drawings associated with control and interfaces for approval, four weeks after clarification of the order checklist in the factory.

The submitted drawings include:

- Dimension (outline) drawings
- Interconnection (interface) diagram
- Circuit diagram

These drawings will be submitted in the standard format of the factory.

Change requests must be received by the factory no later than two weeks after submittal of the approval drawings, otherwise changes will incur chargeable costs and the confirmed delivery date will have to be revised. Possibly required drawing changes will be executed by the factory within two weeks after receipt of a change request.

Drawings associated with long lead materials will not be submitted for approval. Siemens will order such materials - without customer approval - right away. Changes that affect such materials will always incur chargeable costs.

Note

This option does not cause a hold point in order processing.

P31

Complete drawing approval

When this option is ordered, the customer will receive a complete set of drawings for approval, six weeks after clarification of the order checklist in the factory.

The submitted drawings include:

- Dimension (outline) drawings
- Interconnection (interface) diagram
- · Circuit diagram
- Arrangement diagram
- Electrical data sheet
- Quality Control Plan
- Inspection & Test Plan

These drawings will be submitted in the standard format of the factory.

Until the customer has declared his final approval of the drawings in writing, no materials will be ordered.

Possibly required drawing changes will be executed by the factory within two weeks after receipt of a change request.

Final confirmation of the delivery date will only be possible after the customer's final approval has been received. If change requests are received the factory later than two weeks after submittal of the approval drawings, the preliminary confirmed delivery date will have to be revised.

This option causes a hold point in order processing

If this option is selected, the standard drive delivery time will be extended by approx. ten to twelve weeks.

P82 Separate transportation units (transformer and power section)

With option P82, the drive is delivered as two separate transportation units

Note

Option P82 is available for 6SR4... drives, 6.0 and 6.6 kV - and for the power range below 2 MVA. Option P82 must be ordered for the power range above 2 MVA as well as for drives with article number 6SR3....

Q80 to Q85

Extension of liability for defects on drives

We provide you with the option of extending existing liability for defect periods beyond the standard ones. The liability for defect period listed in our standard terms and conditions is 12 months.

This can be extended as follows

This can be exter	Ided as follows:
Extension of liabilit	y for defects on drives
Additional identifi- cation code -Z with order code	Additional text
Q80	Extension of liability for defects period by 12 months to a total of 24 months (2 years) from delivery
Q81	Extension of liability for defects period by 18 months to a total of 30 months (2½ years) from delivery
Q82	Extension of liability for defects period by 24 months to a total of 36 months (3 years) from delivery
Q83	Extension of liability for defects period by 30 months to a total of 42 months (3½ years) from

Q83	Extension of liability for defects period by 30 months to a total of 42 months (3½ years) from delivery
Q84	Extension of liability for defects period by 36 months to a total of 48 months (4 years) from delivery
Q85	Extension of liability for defects period by 48 months to a total of 60 months (5 years) from

You can find the currently valid conditions for extending the liability for defects period under:

delivery

http://support.automation.siemens.com/WW/view/en/56715113

Description of options

Options (continued)

T03, T04

Nameplate color and texture

Standard: Adhesive foil with black font

Option Description

103	White plastic label with black font
T04	Stainless steel

T58 to T91

Languages for nameplate, warning labels and operator panel foil

The nameplate and warning labels are supplied in two languages (standard, English/German). The operator panel foil is supplied in English as standard. The following language combinations are optionally available.

Option	Description
T58	Nameplate, warning labels in English/French Operator panel foil in English
T60	Nameplate, warning labels in English/Spanish Operator panel foil in English
T74	Nameplate, warning labels in English/German Operator panel foil in English ¹⁾
T80	Nameplate, warning labels in English/Italian Operator panel foil in English
T82	Nameplate, warning labels in English/Portuguese Operator panel foil in Portuguese
T85	Nameplate, warning labels in English/Russian Operator panel foil in Russian
T91	Nameplate, warning labels in English/Chinese Operator panel foil in Chinese

Note:

These language options only refer to the labeling on the outside of the drive cabinet. The warning labels inside the cabinet are all in English.

U02 CE corti

CE certificate

The drives manufactured in Nuremberg, Germany are always in conformance with CE (option **U02**).

Note:

Option **U02** includes options **L03** (EMC filter) and **M12** (electrical door interlock) and must be ordered.

U04 GOST certificate

With option ${\bf U04},$ a drive version in conformance with GOST is supplied.

U10 ProToPS

Mutually exclusive options U10 to U11

Availability	Code	U10	U11
ProToPS™	U10		-
Cell bypass	U11	-	

- Options are mutually exclusive.

With option **U10**, the "Process Tolerant Protection Strategy" process control system (ProToPS™) is integrated in the drive. This is a leading-edge process control system available exclusively from Siemens. Instead of simply tripping the drive and automatically shutting down the system due to a malfunction, ProToPS provides a hierarchical system of alarms in advance of any potential drive system trip. This control strategy provides the time needed to evaluate the situation and respond appropriately to avoid a system shutdown.

Note:

Option **U10** includes options **U11** (cell bypass) and **M61** (redundant blower for air-cooled drives only).

U11 Cell bypass

With option **U11**, the drive system automatically continues to operate uninterrupted if one or more cells has a fault. The continuous current rating is maintained with faulted cells but at a reduced voltage. This is a recommended option for critical processes. Faulted cells can then be replaced during scheduled maintenance.

Note:

Option **U11** is included in option **U10** (ProToPS).

 An operator panel foil in German is only available in conjunction with option **D00** (documentation in German).

Description of options

Options (continued)

U12

Redundant single cell

This option is to provide the ability for only a single cell in a drive to fail without the drive faulting or losing its full output power capability.

For detailed information, please contact the factory or your local Siemens sales representative.

Note:

Option **U12** requires that option **U11** (cell bypass) is also ordered.

U13

Redundant rank of cells

This option is to provide the ability for one cell in each phase of a drive to fail without the drive faulting or losing its full output power capability.

For detailed information, please contact the factory or your local Siemens sales representative.

Note:

Option **U13** requires that option **U11** (cell bypass) is also ordered.

V01 to V14 Motor voltages

The motor voltage can be selected with options **V01** to **V14**. These options are mutually exclusive. Select one of them.

Option	Motor voltage
V01	2.3 kV
V02	2.4 kV
V03	3.0 kV
V04	3.3 kV
V05	4.0 kV
V06	4.16 kV
V07	4.8 kV
V08	5.0 kV
V09	5.5 kV
V10	6.0 kV
V11	6.3 kV
V12	6.6 kV
V13	6.9 kV ¹⁾
V14	7.2 kV ¹⁾

V50, V60 Motor rated frequency 50 Hz, 60 Hz

Select option V50 (50 Hz) or option V60 (60 Hz) if the motor rated frequency does not correspond to the input (line) frequency (as encoded in MLFB).

Y05

Customer-specific nameplate

As standard the nameplate shows the rated data of the drive under nominal conditions.

If data on the nameplate should be adapted to special ambient conditions (temperature, altitude) or should reflect special load conditions (e.g. derating because of operation at low frequency), then option **Y05** must be selected.

Information to be supplied:

- Altitude
- Coolant temperature
- Rated voltage
- Rated current
- Rated power

Y06

Motor data other than standard rated data, engineering and parameter settings

Option **Y06** requires text input of motor data, e.g. 55 Hz, 32 Hz, 160 Hz, or could also require that the motor data sheet is submitted. Option **Y06** must be combined with **Y05** (customer-specific nameplate) which would specify the derating values for the drive.

Y09 Paint finish other than standard

As standard the drives are supplied with an RAL 7035 paint finish. A special color must be specified in plain text when ordering.

Note:

The cover of the filter mats also has the standard RAL 7035 color even though the cabinet has a special paint finish.

Y10

Circuit diagrams (German/English) with customer-specific description field

As standard, the circuit diagrams are in German/English and can be provided with customer-specific headers. The header must be specified in plain text (up to three lines of 45 characters per line).

 $^{1)}$ Only for 6SR4... drives, motor voltages 6.0 and 6.6 kV.

Options (continued)

Y15 Sine-wave filter

The sine-wave filters supply the motors with almost sine-wave motor currents and voltages. These filters are typically required when cable lengths at the drive output exceed 2.2 km (7500 ft). At such long distances, the effective switching frequency harmonics and sidebands may excite a cable resonance resulting in transmission line overvoltages at the motor terminals. These filters are very frequently required for applications involving longer cables, for instance for electrical submersible pumps (ESP).

The sine-wave filter mainly comprises L-C filters. These components are accommodated in transition cabinets. The reactors are typically custom engineered. The filter components are dimensioned based on the continuous current rating of the power cells and maximum drive voltage.

For more detailed information, please contact the factory or your local Siemens sales representative.

Y36 Customer-specific cabinet labels

Labels with customer-specific information (e.g. "Dedust blower No. 1") are applied to the drive cabinets according to Siemens standard.

The text and quantity of these labels need to be specified as plain text. As standard, the labels will be produced of formica, using black letters, white core.

Additional excluded options for 6SR4... drives up to 4.16 kV and up to 140 A

For 6SR4... drives up to 4.16 kV and up to 140 A, in addition to the exclusions listed above, additional options are excluded. The following table shows possible combinations of options that are important in terms of required space or number of connections.

Note:

The listed options do not mutually exclude one another if an option cabinet (300 mm wide) is used. This is available on request.

12 examples for possible combinations of specific options for 4.0 kV drives up to 140 A (for other combinations, consult the factory or your local Siemens sales representative):

Description of	Codo	Possible combinations											
options	COUE	1	2	3	4	5	6	7	8	9	10	11	12
Indicator lights	K20	-	-	1	-	-	-	-	1	1	-	1	-
3 display instru- ments in the cabinet door	K21	1	-	_	1	1	-	-	-	1	1	-	-
Pushbutton kit	K29	1	1	-	1	1	1	-	1	-	-	1	-
Speed sensing module (requires a speed encoder)	K50	~	~	~	_	_	_	~	~	~	-	-	-
Cabinet lighting and service socket outlet	L50	_	_	_	~	~	~	~	~	~	_	_	-
Cabinet anti-con- densation heating	L55	1	-	1	-	1	-	1	-	-	1	-	1
2 x 2 thermistor protection relays	L81	1	-	_	1	-	_	1	-	-	1	_	-
3 x 2 thermistor protection relays	L82	-	1	-	-	1	-	-	-	-	-	1	-
Output reactor bidirectional syn- chronized bypass operation	L09 L29	-	1	1	-	-	1	1	_	1	-	~	1
2 Pt100 evaluation units with 3 inputs each Pt100 evaluation unit with 6 inputs for ex-proof motors and 6 analog outputs	L91 or L95	-	_	1	-	-	1	-	_	1	-	_	1
Pt100 evaluation unit with 6 inputs and 2 analog outputs	L93	1	1	_	1	1	_	1	_	_	1	-	-
Controlled out- going feeder for motor blowers	N30 to N33	1	-	1	-	_	_	_	1	_	1	I	1
Controlled out- going feeder for anti-condensation heating	N35 to N38	_	_	_	5	_	1	_	1	_	5	_	1



Options are mutually exclusive.

Notes

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Engineering Information



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Engineering Information

Tools

Overview

NXGII ToolSuite

The NXGII ToolSuite is a PC-based, high-level Graphic User Interface (GUI) application that integrates various software tools used for NXGI1-based drives. ToolSuite runs under the Microsoft[®] Windows operating system. This allows you to navigate through the drive functions using a PC and a mouse or using a touch screen (instead of an operator panel), thus enabling you to monitor and control these functions quickly and easily. The NXGII control and the PC running the NXGII ToolSuite software communicate with one another using Ethernet and TCP/IP protocol. ToolSuite contains the following tools: Drive Tool, Debug Tool, and SOP Utilities.

Configuration

- Multilevel password to limit access
- Passwords are the same as used in the drive
- Folders for the individual drive configuration categories (i.e., drive (VFD) menu system)
 - Icon colors to differentiate between default and modified parameter values
 - On screen parameter identifier
 - Parameter editing assisted by minimum/maximum limits and defaults
- · Logs, parameters and system program can be uploaded
- System program and/or configuration data files can be downloaded

Graphic representation

- · Adjustable time scale
- Predefined variable list to select variables to be graphically displayed
- Up to 10 variables can be graphically displayed
- Individual variable offsets
- Individual variable scaling
- Customizable layout: Fonts, colors, formats
- · Screenshots can be made
- Screenshots can be made when faults occur
- Various triggers for screenshots
- Zoom function
- Printable graphics
- Exportable graphics

Status

- Programmable display variables
- Selection list with variables, exactly the same as the drive operator panel display list
- First 4 synchronized to operator panel display
- Fault and alarm indicators (traffic lights: red = fault, yellow = alarm, green = none)

Operator control (only if enabled via SOP)

- Manual start button
- Stop button
- Fault reset button

Drive Tool

It controls all of the drive functions and provides the user with a user-friendly view of the drive.

- The Drive Tool's main functions include:
- Drive configuration
- Graphic display of the drive variables
- Drive status (provides real time status of various parameters. measured values, and calculations)

Debug Tool

This application provides a distributed graphic user interface for Siemens medium-voltage SINAMICS PERFECT HARMONY NXGII drives. With the Debug Tool, the user can check drive variables using a PC and a mouse, in a simple and quick manner. The debug utility is intended to be used when testing, commissioning and troubleshooting the drive.

SOP Utilities

The System Operating Program (SOP) is the logic that assigns the internal and external I/O to the functionality of the drive. In its simplest form, it just assigns internal states to external points. In more complex forms, additional complex logic, in the form of Boolean logic, as well as timers, counters, and comparators. represent the system functionality to the drive.

SOP Utilities is a set of utility programs under the main ToolSuite program. Most of the program functions are executed on the PC on which the ToolSuite is installed. However, SOP Utilities also supports serial communication via an RS232 interface between the drive and the PC, in order to directly upload the system program to the drive or download it from the drive. The purpose of the SOP Utilities tool is to convert logic statements into machinereadable code for the integrated SOP interpreter.
Tools

Overview

SIZER WEB ENGINEERING

Drive engineering - flexible, individual and user-friendly

You can quickly find a solution for your drive application using this web-based tool: Menu-prompted workflows navigate you when selecting and dimensioning products and drive systems, including the associated accessories.

Using the integrated query functionality, SIZER WEB ENGINEERING also offers you individual special solutions for drive applications that cannot be addressed using standard products. This means that special emphasis is placed on flexibility to allow customized solutions to be created.

Currently, the following product groups are supported:

- · High-voltage motors
- Low-voltage motors
- · Medium-voltage drives
- Low-voltage drives
- DC converters

Beyond this, the following drive systems can be engineered:

- Medium-voltage systems
- Low-voltage systems:
- Basic single-axis applications for pumps, fans and compressors
- More complex applications
- (prerequisite: SIZER for Siemens Drives has been installed)

The tool provides comprehensive documentation, such as data sheets, startup calculations, dimensional drawings, offer documentation and a lot more.

The result: customized solutions for your drive applications.



Example: startup calculation

System prerequisites include Internet access as well as a standard browser (e.g. Internet Explorer V7.0 and higher, Firefox V3.0 and higher). After successful registration and release, you can use the SIZER WEB ENGINEERING tool 24 h/365 days.

Additional information

You can find additional information on the SIZER WEB ENGINEERING engineering tool at: www.siemens.com/sizer-we

SinaSave

Overview



SinaSave is a web-based tool for determining energy-saving potential and for estimating payback times that can be achieved by using energy-efficient products and technologies in industrial drive applications.

Function

If you compare two alternative drive concepts with different energy efficiencies, and you know the load profile and operating duration, you can determine the energy requirements and energy costs for each of these alternatives. The potential energy savings and cost savings that can be achieved by using the more efficient solution can be derived from the difference between the values.

By comparing the required investment against the achievable cost saving (payback analysis), you can also determine whether the more energy-efficient solution is also cost-effective. SinaSave provides these calculation options for the following topics:

- Energy-saving motors ("Fixed Speed" module) Cost saving by using motors with a higher energy efficiency class (e.g. IE3 instead of IE2) for line operation
- Variable-speed drives for pump/fan applications ("Variable Speed Drives Low Voltage/Medium Voltage" module)

Cost savings over – for example a throttle control – by controlling the pump or fan speed according to actual demand using a drive

 Direct drives ("High Torque Direct Drive" module) Cost savings by directly driving the load, therefore eliminating a gearbox and its associated losses

SinaSave calculates:

- Potential for reducing:
- Energy
- Energy costs
- CO₂ emissions
- Estimating:
- Payback on investment
- Payback time

Additional information

Access

Details of how to register, additional information about SinaSave, FAQs as well as how to call up the program can be found at the following address:

www.siemens.com/sinasave

Accessories

Accessories

Cell lifter

The power cells of SINAMICS PERFECT HARMONY GH180 drives can be replaced as a unit. To replace, the entire power cell must be removed from the drive and transported on a cell lifter. Appropriate cell lifters are available for air-cooled SINAMICS PERFECT HARMONY GH180 drives.

Cell lifter data		
Carrying capacity	kg	140
	lb	308
Highest platform position	mm	2050
	in	81
Article number		6SR0960-0SA30-0AA0

Accessories for grounding and short-circuiting the drive

For safety reasons, when working on the drive, which is in a novoltage condition, equipment must be provided to ground and short-circuit the drive (IEC 61230). This equipment is required, for example, when commissioning the system or when carrying out service work such as replacing fans or power cells.

The specified equipment must be available on the plant or system as this work is, to some extent, carried out by appropriately qualified personnel belonging to the operating company. If the specified safety equipment is not available, then it is not permissible to carry out work on the plant or system due to the electrical hazards which are present.

For SINAMICS PERFECT HARMONY GH180 drives, spherical grounding points are provided at the voltage AC input/output, which are short-circuited using an appropriate three-phase grounding harness. This must always be connected before starting any type of work when the system is in a no-voltage condition.

If the feeder cables to the AC input/output are interrupted, then it is also necessary to ground the interrupted cable a second time, e.g., at the line supply connection of the drive involved. A grounding harness with universal terminals can be used for this purpose.

If the appropriate equipment is not available on the plant/system, then the appropriate quantity of drive accessories must be ordered.

The following grounding harness can be ordered.

Ordering data for the grounding harness

Article No.	Description
6SY8101-0AB55	Three-pole grounding harness for 20 mm spherical grounding points for grounding and short-circuiting

Control overview

Mode of operation

Control features

The following table provides a summary of the performance offered by the SINAMICS PERFECT HARMONY GH180 drives with NXGII control.

Overview of control features

Feature	Description		
Output frequency	0 300 Hz $^{1)}$; for frequencies < 10 Hz and > 167 Hz, current derating is required.		
Modulation	Multi-level PWM		
Ride-through	Medium-voltage ride-through:	> 5 cycles	
	 Control power ride-through with UPS: 	> 5 cycles	
Rotating motor	 Instantaneous mode: allows fast bypass 		
	• Frequency scan mode: performed after residual	motor voltage has collapsed	
Induction motor control	• V/f control		
	 Vector control for induction motors without encoded 	der	
	 Vector control for induction motors 		
Synchronous motor control	 Vector control for synchronous motors without en 	loder	
	Vector control for synchronous motorsControl of permanent-magnet motors		
	 Control of brushless synchronous motors with exit 	citer	
Emergency Stop category	Emergency Stop category 0 is set as standard for an uncontrolled shutdown.		
	The function includes voltage disconnection of the Consequently the motor coasts down.	drive output by opening the circuit breaker.	
Energy-saving operation	Set using one parameter (for induction motors only	()	
Braking	Inverse speed (max. braking torque is approx. 0.2	5 % at full speed)	
Auto tuning	Available for induction motors as long as the drive	rated power exceeds 67 % of the motor rated power.	
Transparent cell bypass (option U11)	500 ms downtime with redundant cells; without rec circuit time constant.	dundant cells, the downtime depends on the motor open	
Synchronous transfer (option L29)	Synchronous transfer available for induction and s	ynchronous motors ²⁾	
Minimum voltage boost	Not implemented; as an alternative, automatic resistance compensation is available.		
Flux attenuation modeling	Not implemented; a simple (single parameter function) implementation is available.		
Zero speed control	Not implemented		

Drive input protection

SINAMICS PERFECT HARMONY GH180 drives utilize software functions to detect abnormal conditions due to internal drive faults and thus protect the drive. You will find a description below of some routines that are implemented in the NXGII control for drive protection.

Drive faults can be categorized into two types – "low impedance" (with high current) and "high impedance" (with low current) faults. A "low impedance" fault in the drive or the secondary side of the transformer would result in a significant reactive current on the primary side. The "one cycle protection" (or detection of excessive input reactive current) is implemented to detect such types of faults. A "high impedance" fault in the drive would result in low current that is difficult to detect on the primary side of the transformer but will result in measurable losses that can be used to detect the condition. The "excessive drive losses protection" allows faults such as these to be detected.

The current level identified by these functions cannot be easily detected and may be insufficient to activate the main primary protection. As a consequence, the fault signals issued by these routines should be used with suitable interlocking, e.g., via a relay output and/or serial communication, to disconnect the medium voltage at the drive input.

One cycle protection

(or detection of an excessive input reactive current)

NXGII control utilizes the reactive component of the drive input current to determine whether a "low impedance" fault on the secondary side of the transformer has occurred. For example, a short-circuit in one of the secondary windings will result in poor power factor on the high-voltage side of the transformer. A software model of the transformer, based on the power factor at rated load (typically 0.95), is implemented in the control processor. The drive input reactive current is continuously checked with the predicted value from the model. An alarm trip is generated if the actual reactive current exceeds the prediction by more than 10 %. This check is avoided during the first 0.25 seconds after medium voltage power-up to avoid the inrush current from causing nuisance trips.

Although 0 Hz can be produced by the drive, torque generation is limited at low output frequencies.

²⁾ Synchronous transfer applications with synchronous motors would require a PLC to manage the exciter control.

Control overview

Mode of operation (continued)

Protection against excessive drive losses

The protection against excessive drive losses uses the drive losses to protect the drive against "high impedance" faults. The drive losses are calculated as the difference between the measured input and output powers – and are compared with reference losses. Once the threshold is exceeded, a fault is issued and the drive trips.

If, in the idle state, the drive losses exceed the idle threshold by between 1 and 2 %, the control will issue a command to open the input breaker within 250 ms. This fast response time will significantly reduce the negative impact of a "high impedance" fault on the drive system.

Speed and torque control

Feature	V/f control	Vector con- trol without encoder	Vector con- trol
Speed range (for 100 % holding torque and 150 % starting torque)	40:1	100:1	200:1
Torque control (as % of the rated torque)	-/-	±2%	±2%
Torque linearity (as % of the rated torque)	-/-	±5%	< ± 5 %
Torque response 1)	-/-	> 750 rad/s	> 750 rad/s
Speed control (as % of the rated speed)	Motor slip	± 0.5 % ²⁾	± 0.1 % ³⁾
Speed response ⁴⁾	20 rad/s	20 rad/s	> 20 rad/s ⁵⁾
Torque pulsation (as % of the rated torque) without overmodulation ⁶⁾	< 1.0 %	< 1.0 %	< 1.0 %
Torque pulsation (as % of the rated torque) with overmodulation ⁶⁾	< 3.5 %	< 3.5 %	< 3.5 %

Note:

We recommend vector control for applications that require speeds below 1 % with a high load torque. In cases such as these a motor that has high full-load slip (> 1.0 %) and high breakdown torque should be selected.

- Torque response values apply for drives without output filter. Tuning may be required to achieve these values.
- ²⁾ A speed error of -0.3 % is typical. Worst-case speed error is equal to approx. 30 % of the rated motor slip.
- ³⁾ 0.1 % can be achieved with a 1024 ppr encoder. Speed accuracy depends on the encoder ppr (pulses per revolution).
- ⁴⁾ Speed response values apply as long as the torque limit is not reached.
- ⁵⁾ Testing is required to determine exact value.

⁶⁾ When SINAMICS PERFECT HARMONY GH180 drives are not operated with overmodulation, they exhibit torque pulsations of less than 1 % (see the table above). Torque pulsation at the 6th harmonic frequency is higher for drives operated in the overmodulation mode. This frequency only occurs in the speed range from 95 up to 100 % of the rated speed. Torque pulsations at all other harmonic frequencies are below 1 % of rated torque. Refer to pages 5/7, 5/8 for more information on the rated cell voltage and drive output voltage for which overmodulation is possible.

Output voltage and current

Function

Output voltage characteristics

Output voltage

Quantity	Value
Distortion at rated voltage (as a % of rated output voltage)	without overmodulation: ≤ 2 % (for the first 20 harmonics)
	with overmodulation: $\leq 3 \%$ ¹⁾ (for the first 20 harmonics)
Imbalance (as a % of rated output voltage)	≤ 1 %
dv/dt ²⁾	< 1000 V/µs for 6SR3 drives < 3000 V/µs for 6SR4 drives
Harmonic voltage factor (HVF) ³⁾	< 0.02 for drives with number of cells ≥ 9
	< 0.035 for drives with number of cells = 6

Harmonic voltage factor as a function of the number of 750 V cells (6SR4... drive types)

Number of cells	Output voltage kV	HVF
9	4.16 ⁴⁾	0.019
15	6.00	0.008
15	6.60	0.007
18	7.20	0.006
18	8.00	0.005
21	9.20	0.004
24	10.00	0.004

Harmonic voltage factor as a function of the number of 690 V cells (6SR3... drive types)

Number of cells	Output voltage kV	HVF
9	2.40	0.019
9	3.30	0.017
12	4.16	0.009
12	4.80	0.010
15	6.00	0.007
18	6.90	0.005

¹⁾ Also see footnote 4) of the following table.

- ²⁾ Although output dv/dt values are high, the control ensures that only one cell switches at a particular instant. The magnitude of voltage steps applied to the motor are thus smaller than the rated voltage (and equal to the DC bus voltage of a single cell), which limits the stress on the insulation of the first few turns (of the motor winding).
- ³⁾ NEMA MG 1, Part 30, recommends that no motor derating is required when the inverter voltage waveform has an HVF value that is less than 0.03. HVF is defined as:

$$HVF = \sqrt{\sum_{n \ge 5}^{\infty} \frac{V_n^2}{n}}$$

where V_n is the harmonic amplitude referred to the rated quantity, and n is the harmonic order (= ratio of harmonic frequency to fundamental frequency).

SINAMICS PERFECT HARMONY GH180 drives (with 9 cells or more) meet this requirement. Therefore, any temperature rise due to switching harmonics is negligible and no motor derating is needed.

Output current

Quantity	Value
DC component (as % of the rated output current)	≤ 1 %
Distortion or THD ^{5) 6)} (as % of the rated output current; when motor and drive ratings are equal and the motor leakage reactance is 16 % or higher)	without overmodulation: ≤ 3 % with overmodulation: ≤ 4.5 %

Output voltage capability

Speed reduction as a result of an undervoltage condition at the input

The drive limits are described in more detail below in the event that the input voltage falls below 90 %.

When the input line voltage drops below 90 % of its rated value, the drive limits the amount of power (and hence the torque) that can be delivered to the load. The maximum permissible drive power as a function of line voltage is shown in the diagram below. At 66 % input voltage, the maximum drive power is limited to 50 %, and is quickly reduced to a slightly negative value ("regen limit") at 65 %. This limit forces the drive to absorb power from the motor and maintain the (power cell) DC bus voltages in case the input voltage recovers during MV ride-through. The limit is implemented as an inverse function of speed in order to maintain constant power flow to the (cell) DC bus.



Drive power (P_{max}) as a function of input voltage imbalance (E_{rms})

- ⁴⁾ Note: Although overmodulation is allowed for all drives with article number 6SR4..., only those with this cell count and this rated output voltage can operate in overmodulation in the 95 to 100 % speed range. Higher output voltage and current harmonics are present for the 5th and 7th harmonic frequencies. This is reflected in the THD and torque pulsation values.
- ⁵⁾ The maximum output current distortion limit of 3 % is valid for drives with number of cells ≥ 9 and no overmodulation. As the number of cells increases, the current distortion decreases to below 2 % for 18 cell drives with a typical motor.
- ⁶⁾ Most motors have a leakage reactance that is greater than 16 %. Output current distortion is inversely proportional to motor leakage reactance, i.e. as motor leakage reactance decreases, output current distortion increases.

Output voltage and current

Function (continued)

Once the input voltage falls below 65 %, the drive reduces output power to a slightly negative value and maintains synchronism with the motor for longer than five cycles. Once the input voltage has recovered, the drive first magnetizes the motor and then starts to generate torque. There is no delay in drive restart.

If the input voltage has not recovered after five cycles, the drive maintains synchronism with the motor as long as the power cells can operate without input power or as long as there is motor voltage (to synchronize to). The drive trips as the input medium voltage is lost if one of the power cells fails or the motor voltage drops significantly.

With all cells operational

The maximum output voltage of the drive in terms of the number of ranks (rows of cells) and the secondary-side cell voltage is given as:

$$V_{\text{out}} = 1.78 \times \text{N} \times \frac{V_{\text{cell_rating}} \times \text{Tap_setting} \times V_{\text{input}}}{V_{\text{input rated}}}$$

Where:

N	=	the number of rows of cells in the drive (or total number of cells = 3^*N)
V _{cell rating} V _{input} V _{input rated}	= = =	630, 690 or 750 V (depending on the design) actual input voltage rated input voltage
Tap_setting	=	1.00 (for 0 % tap), 0.95 (for +5 % tap) or 1.05 (for -5 % tap)

The above formula is valid for all air-cooled drives.

Output voltage capability of the drive must be calculated based on worst-case line voltage (minimum value).

With overmodulation (for 750 V cells only)

When the control operates with overmodulation to boost the voltage, then the maximum output voltage increases by 5 %. Note:

It is recommended not to use overmodulation. However, in exceptional cases, overmodulation can be utilized but only after consulting the factory or your local Siemens sales representative.

Example of calculating the output voltage capability

Consider a drive with 18 cells, each rated for 690 V. The maximum output voltage that can be delivered for the +5 % tap with rated line voltage is (with N = 6 and V_{cell} = 690 V):

 $V_{\text{out}} = 1.78 \cdot 6 \cdot 690 \text{ V} \cdot 0.95 \cdot 1.0 = 7000 \text{ V}$

where 1.0 is the ratio of actual to rated line voltage.

Interfaces

Overview



Overview of the SINAMICS PERFECT HARMONY GH180 drive interfaces

Interfaces

Overview (continued)

The closed-loop control of air-cooled SINAMICS PERFECT HARMONY GH180 drives is known as NXGII. This control system provides digital and analog input and output functions in the form of the I/O board and the WAGO I/O modules. 6SR4... drives use the I/O board, while 6SR3... drives use the I/O board as well as the WAGO I/O modules.

I/O board

This board has 20 digital inputs, 16 digital outputs, 3 analog inputs and 2 analog outputs. The main features are shown in the following table.

Main features of the I/O board

Signal type	Quantity	Configuration
Digital inputs	20	24 V DC or 120 V AC
Digital outputs	16	24 V DC or 120 V AC
Analog inputs	3	4 20 mA or 0 10 V DC
Analog outputs	2	4 20 mA

WAGO I/O modules

WAGO[™] is an off the shelf solution for interfacing digital and analog I/O to the NXGII control via the Modbus protocol. The table below shows some of the WAGO I/O modules that can be optionally used.

Features of the WAGO I/O modules

Signal type	Channels	Configuration
Digital inputs	1 2 1 4	120 V AC 24 V DC
Digital outputs	1 2	Relay output, rated for 250 V AC at 1 A or 40 V DC at 1 A
Analog inputs	1 2 1 2	4 20 mA 0 10 V DC
Analog outputs	1 2	4 20 mA

Standard input/output assignments

The following tables provide an overview of the preassignment of interfaces in the standard versions of SINAMICS PERFECT HARMONY GH180 drives.

Terminal	Туре		Preassignment	Comments	
+1.CC-X2:					
1	Pushbutton	-		EMERGENCY-	
2	(NC contact)			OFF at the drive	
3	Isolated	-		Feedback signal	
4	CONTACT			OFF active	
45	Isolated	-		Switch-on enable,	
46	contact			medium voltage	
5	Digital inputs	DI-0A	Remote inhibit	-	
7	-	DI-1A	Remote start	-	
9		DI-2A	Remote stop	-	
11		DI-3A	Remote fault reset	-	
59		COM	Reference ground	-	
23		-	Make-proof ground- ing switch at drive input	-	
24	-	-	Isolated contact (NC)	-	
55	-	-	Make-proof ground- ing switch at drive input	-	
56	-	-	Isolated contact (NO)	-	
25	Digital inputs	-	Make-proof ground- ing switch at drive output	-	
26	-	-	Isolated contact (NC)	-	
57	-	-	Make-proof ground- ing switch at drive output	-	
58	-	-	Isolated contact (NO)	-	
27	Digital outputs	DO-0	Speed demand in	-	
28	-		IOCAI AL VED		
29		DO-1	Drive ready to run	-	
30					
31		DO-2	Drive running	-	
32					
33		DO-3	Drive alarm	-	
34					
35		DO-4	Drive fault	-	
36					
49	Feedback signals, safety circuit	_		Feedback signal, main medium- voltage switch (24 V DC, 110 V DC, 240 V AC)	
50		-		Not assigned	
51		-		OPEN command to the circuit breaker	
52		-		CLOSE command to the circuit breaker	

Interfaces

Overview	v (continued)			
Terminal	Туре		Preassignment	Comments
+1.CC-X3	3:			
1	Analog outputs	AO 1	Motor actual speed, 4 20 mA	-
2	-		20 mA (-)	_
3	-		PE	_
4		AO 2	Motor torque, 4 20 mA	-
5	-		20 mA (-)	_
6	-		PE	_
7	Analog input	Al 1	Speed setpoint 1, 4 20 mA	-
8	-		20 mA (-)	_
9			Reference ground, not assigned	
19	Encoder	A+	_	-
20	Internace	A-	_	_
21	-	B+	-	-
22		B-	-	-
23		+15 V	-	-
24		+15 V _{RET}	-	-
25		Shield	-	-
+1.CC-X4	4:			
1	Auxiliary supply	L1	-	Auxiliary power supply 3 AC/PE, 400 V ±10 %, 15 A, 50 Hz, ±3 %
2		L2	-	-
3		L3	-	-
Ν		Ν	_	-
PE		PE	-	-
+1.CC-X1	10:			
1	Digital outputs	DO-1A	Process alarm	Option U10 – digi-
2				tai output
3		DO-1B	Process fault	
4				
+1.CC-X2	20:			
	Ethernet, network 1	-	-	-

Terminal	Туре		Preassignment	Comments
+1.CC-X29:				
1	Digital outputs	DO-1A	Desynchronization	Option L29 –
2			completed	WAGO module
3	_	DO-1B	Synchronization	
4			completed	_
5		DO-1C	Desynchronization	
6			loady	_
7	_	DO-1D	Synchronization	
8			loudy	
9	Digital inputs	DI-1A	Synchronization requested	Optional WAGO inputs, 24 V DC
10		DI-1B	Desynchronization requested	
11		24 V DC	P24	
12		DI-1C	Acknowledge line circuit breaker	-
13		DI-1D	Acknowledge drive circuit breaker	-
14	Digital output	DO-1E	Feedback signal cir-	Option L29 –
15			cuit breaker open	WAGO module
+1.CC-X3	30:			
1	Digital output	-	Fuse for the con-	_
2		-	feeder	-
3	Controlled out-	-	L1	400 V/460 V,
4	-going leeder	-	L2	50/60 Hz,
5	-	-	L3	4 kW/4.8 kW output
PE	-	-	PE	- '
6	External line	-	L1	400 V/460 V,
7	CONNECTION	-	L2	50/60 Hz,
8		-	L3	4 kW/4.8 kW input
PE		-	PE	
+1.CC-X	51:			
	PROFIBUS DP network 2	-		

Interfaces

Overview (continued)

Terminal	Туре		Preassignment	Comments	
+1.CC-X	55:				
1	Line connec-	-	L1	Option L55 – cab-	
2	customer	-	Ν	sation heating	
PE		-	PE	L1/N/PE 115 230 V AC, 50/60 Hz, power: max. 700 W	
+1.CC-X6	61:				
1	Line connec-	-	L1	Option L50 – cab-	
2	customer	-	Ν	service socket	
PE	_	PE	outlet L1/N/PE 115 230 V AC, 50/60 Hz		

Terminal	Туре		Preassignment	Comments
+1.CC-X				
1	Power supply	-	-24 V DC	Option N75 –
2	devices	-	+24 V DC	-2 X 24 V DC, 2 A
3	-	-	-24 V DC	_
4	-	-	+24 V DC	_
+1.CC-X	79:			
3	Control volt-	-	L1	Option K79 –
4	customer	-	N	customer,
PE	-	-	PE	1 AC/N/PE 120 V, 60 Hz

Operator panel

Overview

SINAMICS PERFECT HARMONY GH180 drives have a userfriendly operator panel. This operator panel is located on the front of the control cabinet, and is used for operating, monitoring and commissioning the drive.



Operator panel of the SINAMICS PERFECT HARMONY GH180 drive

- The operator panel offers the following functions and features:
- Multi-line LCD display with backlighting for plain text display and drive data
- 5 languages are integrated: English, German, Chinese, Russian, Portuguese
- · LEDs for displaying the operational status
- Numerical keypad to enter setpoints or parameter values
- Cursor keys to navigate in the LCD display (up, down, left, right)
- Fault reset key to reset fault messages
- · Automatic key switches the drive into the automatic mode
- Manual start key enables the operator to control the drive from the operator panel
- Manual stop key to shut down the drive in a controlled manner
- · Security access code for secure operation

One of the most important functions of the operator panel is parameter monitoring. Below is a list with several parameters that can be monitored on the operator panel:

- Input voltage in V
- Input voltage harmonics (consecutively)
- Input current in A
- Input current harmonics (consecutively)
- Input power factor
- Input power in kW
- Input reactive power in kVAr
- Input energy in kWh
- Input phase sequence
- Loss of phase
- Low voltage
- Transformer overload
- Output power in kW
- Output energy in kWh
- Output current in A
- Output voltage in V
- Drive efficiency
- Motor torque in Nm
- Motor speed in rpm
- Motor slip in %
- Drive output frequency in Hz
- Magnetizing current in A
- Torque current in A
- Motor flux in Wb

Scope of delivery

Overview

The standard scope of delivery of the SINAMICS PERFECT HARMONY GH180 drive comprises:

Basic units

The basic unit of each SINAMICS PERFECT HARMONY GH180 drive comprises the following components:

- Input cabinet
- Transformer cabinet
- Cell cabinet
- · Control cabinet
- Output cabinet

Items not included in the standard scope of delivery

The following items are **not** included in the standard scope of delivery:

- Cables, cable lugs and glands
- Disconnectors, contactors or circuit breakers
- Make-proof grounding switch (optionally available)
- Motors
- Cable runways or cable ducts
- Harmonic filters
- Harmonic analysis
- Torsional analysis
- Erection work
- Commissioning
- Acceptance test with experts for the complete drive system

Note:

Documentation see chapter 6.

Services and Documentation



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6/2	Faster and more applicable know-how: Hands-on training from the manufacturer
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6

Services and Documentation Training

Overview

Faster and more applicable know-how: Hands-on training from the manufacturer

Siemens Industry Training provides you with comprehensive support in solving your tasks.

Training by the market leader in the industry enables you to make independent decisions with confidence. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning.



First-class know-how directly pays for itself: In shorter startup times, high-quality end products, faster troubleshooting and reduced downtimes. In other words, increased profits and lower costs.

Achieve more with Siemens Industry Training

- · Shorter times for startup, maintenance and servicing
- · Optimized production operations
- Reliable configuration and startup
- Minimization of plant downtimes
- · Flexible plant adaptation to market requirements
- · Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

Contact

Visit our site on the Internet at:

www.siemens.com/sitrain

or let us advise you personally.

Siemens Industry Training Customer Support Germany:

Phone: +49 (911) 895-7575 Fax: +49 (911) 895-7576 E-Mail: info@sitrain.com

Highlights Siemens Industry Training

Top trainers

Our trainers are skilled teachers with direct practical experience. Course developers have close contact with product development, and directly pass on their knowledge to the trainers.

Practical experience

The practical experience of our trainers enables them to teach theory effectively. But since theory can be pretty drab, we attach great importance to practical exercises which can comprise up to half of of the course time. You can therefore immediately implement your new knowledge in practice. We train you on stateof-the-art methodically/didactically designed training equipment. This training approach will give you all the confidence you need.

Wide variety

With a total of about 300 local attendance courses, we train the complete range of Siemens Industry products as well as interaction of the products in systems.

Tailor-made training

We are only a short distance away. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You wish to have individual training instead of one of our 300 courses? Our solution: We will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or at your company.

The right mixture: Blended learning

"Blended learning" is a combination of various training media and sequences. For example, a local attendance course in a Training Center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Additional effect: Reduced traveling costs and periods of absence.



Services and Documentation

Training

SITRAIN courses for SINAMICS PERFECT HARMONY

Here you will find an overview of the training courses available for SINAMICS PERFECT HARMONY. The courses have a modular structure and are intended for a variety of target groups as well as individual customer requirements.

All modules contain as many practical exercises as possible, in order to enable intensive and direct training on the drive system and with the tools in small groups. More information on course contents, dates and prices is available on the Internet at:

www.siemens.com/sitrain



Range of courses

Commissioning engineers, configuration engineers							
Programmers				Service personnel			
Project managers, project team members				Ope	rators	, users	
Decision makers, sales perso	Decision makers, sales personnel				Main	tenance pers	onnel
Title		Target o	group			Duration	Short title
SINAMICS PERFECT HARMONY GH180 course for operators			•	~	V	4 days	DR-PH-B

SINAMICS PERFECT HARMONY GH180 course for operators

Description/objective

This training course covers the operation and maintenance of SINAMICS PERFECT HARMONY GH180 drives. You will understand the principle of operation and the control structures. You will parameterize the drive, diagnose its status and analyze its function using the integral cabinet control panel, the TOOL SUITE PC program and the DEBUG tool.

Target group

Service personnel, operators, users, maintenance personnel

Content

- · Basics of the drive and motor
- · Personal safety with drives
- Design and function of the SINAMICS PERFECT HARMONY GH180 drive
- Power topology: transformer and pre-charging, power cells, cell bypass, actual value monitoring, hardware identification and circuit diagrams
- Application, function and interaction of control boards
- Analyzing alarm and fault messages
- Parameter assignment, diagnosis and data backup (using the integral cabinet control panel and the TOOL SUITE PC program)
- Functionality and analysis of "command generator diagram" and "control"
- Extensive lab work on setting parameters and analyzing the drive's functions (using the integral cabinet control panel and the TOOL SUITE PC program)

Additional comments

Please note that this course has been primarily designed for end customers; gaining commissioning know-how is not part of this training. Lab work is carried out on an air-cooled SINAMICS PERFECT HARMONY GH180 drive with motor and on simulators (original control boards with simulated power semiconductors and motor).

Juration: 4 days	Order code: DR-PH-B
------------------	---------------------

Services and Documentation Documentation

Documentation

The standard documentation describes the SINAMICS PERFECT HARMONY GH180 drive and provides the user with information on how to handle it – from the time the equipment is supplied up to its disposal.

As standard, following shipment of the drive, the documentation will be sent separately to the customer on a CD-ROM in PDF format in English. Additional languages can be ordered if required (see Description of Options **D00** to **D84**).

Standard scope of the documentation:

- Operating instructions with order-specific documents, for example, arrangement diagrams, dimension (outline) drawings, circuit and terminal diagrams as well as test certificates
- NXG Control Manual
- NXG Communications Manual

The operating instructions are intended to help users so that they can safely handle the drive as well as its associated components and boards/modules.

They provide users with information so that they can assemble, install and maintain the unit safely and professionally.

The NXG Control Manual describes the NXG control as well as the associated hardware and user interfaces. It explains the parameter settings necessary for operation, and provides descriptions of functions that may be required for using the NXG control.

The NXG Communications Manual describes the NXG communication board (a component of the NXG control) as well as the communication protocols that support communication with the drive. It includes programming and configuration information for each communication protocol, special function descriptions and parameter assignments, which are necessary for establishing communication and for operation.

Services and Documentation Services



Industry Services

Your machines and plant can do more – with Industry Services.

Whether it is production or process industry - in view of rising cost pressure, growing energy costs, and increasingly stringent environmental regulations, services for industry are a crucial competitive factor in manufacturing as well as in process industries.

All over the world Siemens supports its customers with product, system, and application-related services throughout the entire life cycle of a plant. Right from the earliest stages of planning, engineering, and building, all the way to operation and modernization. These services enable customers to benefit from the Siemens experts' unique technological and product knowledge and industry expertise.

Thus downtimes are reduced and the utilization of resources is optimized. The bottom line: increased plant productivity, flexibility, and efficiency, plus reduced overall costs.

Discover all advantages of our service portfolio: www.siemens.com/industry-services



Siemens supports its clients with technology based Services across a plants entire life cycle.

Services and Documentation Services

Industry Services for the entire life cycle

Online Support

Online support is a comprehensive information system for all questions relating to products, systems, and solutions that Siemens has developed for industry over time. With more than 300,000 documents, examples and tools, it offers users of automation and drive technology a way to quickly find up-to-date information. The 24-hour service enables direct, central access to detailed product information as well as numerous solution examples for programming, configuration and application.

The content, in six languages, is increasingly multimediabased – and now also available as a mobile app. Online support's "Technical Forum" offers users the opportunity to share information with each other. The "Support Request" option can be used to contact Siemens' technical support experts. The latest content, software updates, and news via newsletters and Twitter ensure that industry users are always up to date.



www.siemens.com/industry/onlinesupport

Online Support App



Using the Online Support app, you can access over 300,000 documents covering all Siemens industrial products - anywhere, any time. Regardless of whether you need help implementing your project, fault-finding, expanding your system or are planning a new machine.

You have access to FAQs, manuals, certificates, characteristics curves, application examples, product notices (e.g. announcements of new products) and information on successor products in the event that a product is discontinued.

Just scan the product code printed on the product directly using the camera of your mobile device to immediately see all technical information available on this product at a glance. The graphical CAx information (3D model, circuit diagrams or EPLAN macros) is also displayed. You can forward this information to your workplace using the e-mail function.

Technical Support

The ability to quickly analyze system and error messages and take appropriate action are key factors in ensuring that plants run safely and efficiently. Questions can arise at any time and in any industry, whether it's an individual product or a complete automation solution. Siemens technical support offers individual technical assistance in matters related to functionality, how to operate, applications, and fault clearance in industrial products and systems – at any time and globally, over the phone, by email, or via remote access. Experienced experts from Siemens answer incoming questions promptly. Depending on the requirements, they first consult specialists in the areas of development, on-site services, and sales. Technical support is also available for discontinued products that are no longer available. Using the support request number, any inquiry can be clearly identified and systematically tracked.

The search function retrieves product information and articles and supports you with a personalized suggestion list. You can find your favorite pages – articles you need frequently – under "mySupport". You also receive selected news on new functions, important articles or events in the News section.



The app is available free of charge from the Apple App Store (iOS) or from Google Play (Android).

www.siemens.com/industry/onlinesupportapp



http://support.automation.siemens.com/WW/view/en/16605032

Services and Documentation Services

Industry Services for the entire life cycle

Spare Parts

Drive and automation systems must be available at all times. Even a single missing spare part can bring the entire plant to a standstill - and result in substantial financial losses for the operator. The spare parts services from Siemens protects against such losses - with the aid of quickly available, original spare parts that ensure smooth interaction with all other system components. Spare parts are kept on hand for up to ten years; defective parts can be returned. For many products and solutions, individual spare parts packages ensure a preventive stock of spare parts on-site. The spare parts services is available around the world and around the clock. Optimum supply chain logistics ensure that replacement components reach their destination as quickly as possible. Siemens' logistics experts take care of planning and management as well as procurement, transportation, customs handling, warehousing, and complete order management for spare parts.



http://support.automation.siemens.com/WW/view/en/43502238

Repair Services

Reliable electrical and electronic equipment is crucial for operating continuous processes. That is why it is essential that motors and converters always undergo highly specialized repair and maintenance. Siemens offers complete customer and repair services – on site and in repair centers – as well as technical emergency services worldwide. The repair services include all measures necessary to quickly restore the functionality of defective units. In addition, services such as spare parts logistics, spare parts storage and rapid manufacturing are available to plant operators in all verticals. With a global network of certified repair shops operated by Siemens as well as third parties, Siemens handles the maintenance and overhaul of motors, converters, and other devices as an authorized service partner.



http://support.automation.siemens.com/WW/view/en/43512848

Field Services

It's a top priority in all industries: the availability of plants and equipment. Siemens offers specialized maintenance services such as inspection and upkeep as well as rapid fault clearance in industrial plants – worldwide, continuously, and even with emergency services as needed. The services include startup as well as maintenance and fault clearance during operation. The startup service includes checking the installation, function tests, parameterization, integration tests for machines and plants, trial operation, final acceptance, and employee training. All services, including remote maintenance of drives, are also available as elements of customized service contracts.



http://support.automation.siemens.com/WW/view/en/66012486

Services and Documentation Services

Industry Services for the entire life cycle

Training

Increasingly, up-to-date knowledge is becoming a determining factor in success. One of the key resources of any company is well-trained staff that can make the right decision at the right moment and take full advantage of the potential. With SITRAIN – Training for Industry, Siemens offers comprehensive advanced training programs. The technical training courses convey expertise and practical knowledge directly from the manufacturer. SITRAIN covers Siemens' entire product and system portfolio in the field of automation and drives. Together with the customer, Siemens determines the company's individual training needs and then develops an advanced training program tailored to the desired requirements. Additional services guarantee that the knowledge of all Siemens partners and their employees is always up-to-date.



http://support.automation.siemens.com/WW/view/en/43514324

Technical Consulting & Engineering Support

The efficiency of plants and processes leads to sustainable economic success. Individual services from Siemens help save substantial time and money while also guaranteeing maximum safety. Technical consulting covers the selection of products and systems for efficient industrial plants. The services include planning, consulting, and conceptual design as well as product training, application support, and configuration verification – in all phases of a plant's lifecycle and in all questions related to product safety. Engineering support offers competent assistance throughout the entire project, from developing a precise structure for startup to product-specific preparation for implementation as well as support services in areas such as prototype development, testing and acceptance.



Energy & Environmental Services

Efficient energy use and resource conservation – these top sustainability concerns pay off – both for the environment and for companies. Siemens offers integrated solutions that unlock all technical and organizational potential for successful environmental management. Customized consulting services are aimed at sustainably lowering the cost of energy and environmental protection and thus increasing plant efficiency and availability. The experts provide support in the conceptual design and implementation of systematic solutions in energy and environmental management, enabling maximum energy efficiency and optimized water consumption throughout the entire company. Improved data transparency makes it possible to identify savings potential, reduce emissions, optimize production processes, and thereby noticeably cut costs.



http://support.automation.siemens.com/WW/view/en/42350774

Services and Documentation Services

Industry Services for the entire life cycle

Modernization & Optimization Services

High machine availability, expanded functionality and selective energy savings – in all industries, these are decisive factors for increasing productivity and lowering costs. Whether a company wants to modernize individual machines, optimize drive systems, or upgrade entire plants, Siemens' experts support the projects from planning to commissioning.

Expert consulting and project management with solution responsibility lead to security and make it possible to specifically identify savings potential in production. This secures investments over the long term and increases economic efficiency in operation.



http://support.automation.siemens.com/WW/view/en/66005532

Plant Maintenance & Condition Monitoring

Modern industrial plants are complex and highly automated. They must operate efficiently in order to ensure the company's competitive strength. In addition, the steadily increasing networking of machines and plants require consistent security concepts. Maintenance and status monitoring as well as the implementation of integrated security concepts by Siemens' experts support optimum plant use and avoid downtime. The services include maintenance management as well as consulting on maintenance concepts, including the complete handling and execution of the necessary measures. Complete solutions also cover remote services, including analysis, remote diagnosis, and remote monitoring. These are based on the Siemens Remote Services platform with certified IT security.



Service Contracts

Making maintenance costs calculable, reducing interfaces, speeding up response times, and unburdening the company's resources – the reduced downtimes that these measures achieve increase the productivity of a plant. Service contracts from Siemens make maintenance and repairs more cost-effective and efficient. The service packages include local and remote maintenance for a system or product group in automation and drive technology. Whether you need extended service periods, defined response times, or special maintenance intervals, the services are compiled individually and according to need. They can be adjusted flexibly at any time and used independently of each other. The expertise of Siemens' specialists and the capabilities of remote maintenance thus ensure reliable and fast maintenance processes throughout a plant's entire lifecycle.



http://support.automation.siemens.com/WW/view/en/65961857

Services and Documentation

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Service Contracts

overview

SITRAIN courses

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SIZER WEB ENGINEERING

Spare Parts Speed and torque control Speed sensing Standards and regulations

Sinasave Sine-wave filter

Service socket outlet

SINAMICS PERFECT HARMONY GH180

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Mobile Media



Appendix

Notes

Appendix

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- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"1)

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SINAMICS GM150, SINAMICS SM150	D 12	
SINAMICS PERFECT HARMONY GH180 Medium-Voltage Air-Cooled Drives	D 15.1	
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SINAMICS S150 Converter Cabinet Units		
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Synchronous Motors with Permanent-Magnet	D 86.2	
DC Motors	DA 12	
SIMOREG DC MASTER 6RA70 Digital Chassis	DA 21.1	
SIMOREG K 6RA22 Analog Chassis Converters Digital: SIMOREG DC MASTER 6RM70 Digital	DA 21.2 <i>DA 22</i>	
SIMOVERT PM Modular Converter Systems	DA 45	
SIEMOSYN Motors	DA 48	
MICROMASTER 420/430/440 Inverters	DA 51.2	
SIMOVERT MASTERDRIVES Vector Control	DA 51.3 DA 65.10	
SIMOVERT MASTERDRIVES Motion Control	DA 65.11	
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3	
SIMODRIVE 611 universal and POSMO	DA 65.4	
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Low-Voltage Three-Phase-Motors		
SIMOTICS Low-Voltage Motors	D 81.1	
MOTOX Geared Motors	D 87.1	
SIMOGEAR Gearboxes with adapter	MD 50.11 MD 50.11	
Mechanical Driving Machines		
FLENDER Standard Couplings	MD 10.1	
FLENDER High Performance Couplings	MD 10.2	
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	3WT Air Circuit Breakers up to 4000 A	LV 35
	Digital: 3VT Molded Case Circuit Breakers up to 1600 A	LV 36
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	Digital: DELTA Switches and Socket Outlets	ET D1
	Motion Control	
	SINUMERIK & SIMODRIVE	NC 60
	Automation Systems for Machine Tools	
	SINUMERIK & SINAMICS	NC 61
	SINUMERIK 840D sl Type 1B	NC 62
	Equipment for Machine Tools	
	SINUMERIK 808	NC 81.1
	Equipment for Machine Tools	
	SINUMERIK 828	NC 82
		DMAG
	SIMUTION, SINAMICS ST2U & SIMUTICS	PIVI 21
	Drive and Control Components for Cranes	CR 1
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	Power supply SITOP Safety Integrated Safety Technology for Factory Automation	KT 10.1 SI 10
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