Medium-Voltage Air-Cooled Drives

Catalog D 15.1 · 2011
Germany Edition

ROBICON Perfect Harmony

Answers for industry.

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ROBICON Perfect Harmony
Medium-Voltage Air-Cooled Drives

Catalog D 15.1 · 2011
Germany Edition [1)]

[1)] All ROBICON Perfect Harmony medium-voltage air-cooled drives described in this catalog are manufactured in our Nuremberg, Germany location.

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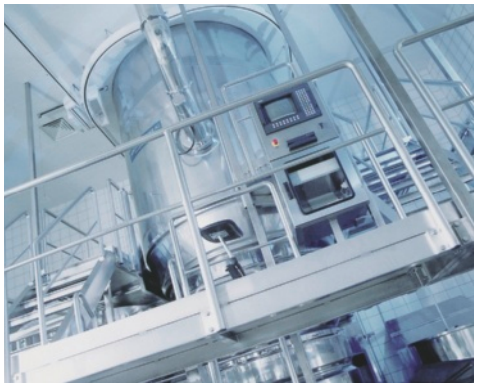

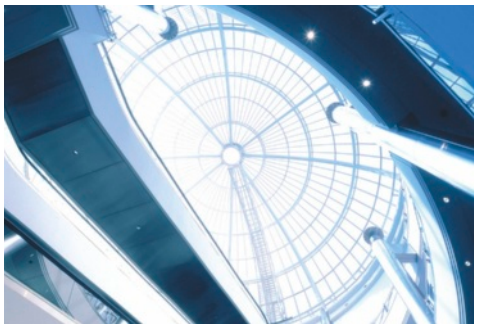

Answers for industry.

Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

Siemens offers automation, drive, and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.

ROBICON Perfect Harmony
Introduction

Medium-voltage drives

Overview

The reliable and complete range

Medium-voltage drive series	ROBICON Perfect Harmony	SINAMICS GM150 (IGBT/IGCT)	SINAMICS SM150 (IGBT/IGCT)	SINAMICS GL150	SINAMICS SL150
Power range	150 kW to 120 MW	800 kW to 17.5 MW	2.8 MW to 31.5 MW	6 MW to 120 MW	3 MW to 36 MW
Application range	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 topology)	HV-IGBT/IGCT (NPC topology)	HV-IGBT/IGCT (NPC topology)	Thyristor (LCI topology)	Thyristor (Cycloconverters)
Typical applications	Pumps, fans, compressors, extruders, kneaders, mixers, crushers, agitators, conveyor systems, presses, ESP, retrofit	Pumps, fans, compressors, extruders, kneaders, 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 furnaces	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 sector – 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

Everywhere where it involves the highest degree of availability, an uncountable 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 that 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 topology of ROBICON 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 medium-voltage drives
- 2003: worldwide the highest rating high-speed drives (65 MW) with LCI for compressors of a gas liquification 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 up to operator control.

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 drives technologies available: From cycloconverters and load-commutated 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.

Perfect harmony of performance and value

Benefits

According to energy authorities, industrial motors consume over a billion kilowatt hours of energy each year – fully 50 percent of the world's energy usage. System enhancements such as improved sizing and proper matching to load, more efficient drive trains, and adjustable 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 of motors, fans, pumps, and other devices.

If your process includes motors, fans, or pumps and you haven't installed a drive yet, you're letting thousands of dollars of energy costs eat away at your bottom line every month because of process inefficiencies.

Siemens drives, the market-leader in medium-voltage air-cooled drives in the world, deliver an impressive combination of benefits:

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

The ROBICON Perfect Harmony's™ outstanding record has made it the drive of choice for demanding applications that require the highest levels of reliability, precision, and longevity. Employed in applications ranging from power generation to oil and gas, water/waste water, and paper production, the ROBICON Perfect Harmony drive is a versatile performer that can help you significantly increase productivity, enhance energy efficiency, and reduce operating costs.

Application

Siemens can provide a custom-engineered ROBICON Perfect Harmony drive to maximize your process. We're the only company that offers drives from 150 to 60,000 kW. And with an installed base exceeding more than 2.2 million kW worldwide, the ROBICON Perfect Harmony is a proven workhorse that can perform brilliantly for you, too.

A bright future built on a firm foundation

Since its introduction in 1994, the ROBICON Perfect Harmony drive has revolutionized power conversion and continues to set industry standards for reliability and innovation. As power switching device technology advances and increases output voltage capability, Siemens improves each generation of the ROBICON Perfect Harmony in three key areas: increased reliability and availability, increased efficiency, and a smaller drive footprint.

Advances to our product line are made without "reinventing the wheel" like other drive manufacturers. We have maintained the ROBICON Perfect Harmony's core topology and continue to advance its capability, ensuring life-cycle product support. By keeping the same topology, our customers see a reduction in maintenance and spare parts as well as an increase in quality and lower life-cycle costs. We improve our products by actively soliciting the input of our customers, and we look forward to counting you among them.

The ROBICON Perfect Harmony of today 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.

ROBICON Perfect Harmony family

Design

The ROBICON Perfect Harmony drive family consists of three core design configurations, where they are functionally identical and share a common controller. These three designs are targeted at distinct output power configurations with little overlap between the frame sizes. The ROBICON Perfect Harmony family is summarized in the tables below.

Air-cooled family

	GenIV	GenIIIe
		
Power range	0.15 to 2.60 MW (200 to 3500 hp)	1.30 to 5.97 MW (1750 to 8000 hp)
Output voltage	2.3 to 6.6 kV (10/11 kV [1])	2.3 to 7.2 kV
Input voltage	2.4 to 13.8 kV AC (standard), 50/60 Hz	2.4 to 13.8 kV AC (standard), 50/60 Hz
Cooling type	Air-cooled	Air-cooled
Power cell ratings	40, 70, 100, 140, 200 or 260 A at 750 V AC	315, 375, 500 or 660 A at 690 V AC

Liquid-cooled family [1]

	WC III
	
Power range	3 MW to 14.2 MW (4000 to 19000 hp)
Output voltage	2.3 to 8.0 kV
Input voltage	2.4 to 13.8 kV AC (standard) up to 33 kV (option), 50/60 Hz
Cooling type	Liquid-cooled
Power cell ratings	880 or 1250 A at 750 V AC

[1] 10/11 kV air-cooled Perfect Harmony drives and liquid-cooled Perfect Harmony drives are not subject of this catalog, please contact your local Siemens sales representative for any questions or inquiries.

ROBICON Perfect Harmony Air-Cooled Drives

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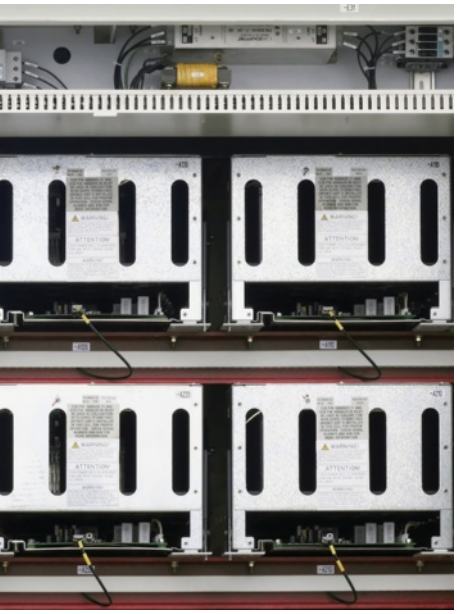


Introduction

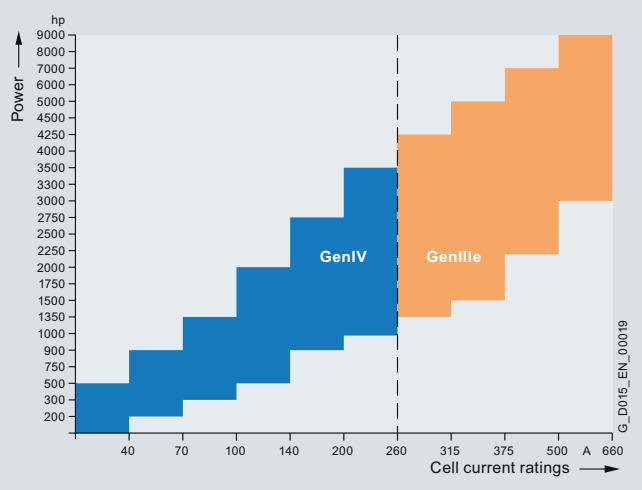
Overview

ROBICON Perfect Harmony Overview

The ROBICON Perfect Harmony series drives provide variable speed operation by converting utility power at fixed frequency and fixed voltage to variable frequency, variable voltage power. This conversion is done electronically without moving parts. The following table shows main characteristics of the ROBICON Perfect Harmony air-cooled generations discussed in this catalog and the short terms used.

Overview of generations

Short term	Cell voltage V	Cell current A	Cooling method	Order numbers
GenIV	750	40 ... 260	Air-cooled	6SR4
GenIIIe	690	315 ... 660	Air-cooled	6SR3



Power range for ROBICON Perfect Harmony air-cooled drives

Standards and regulations

ROBICON Perfect Harmony drives are designed, manufactured and tested according to applicable NEMA, ANSI, IEEE and IEC standards.

ROBICON Perfect Harmony drives 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 cubicle, 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 offered products are intended solely for installation as components into a machine, system or plant. They are designed to satisfy the relevant requirements of the standards 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 2006/95/EC has been established. It is the sole responsibility of the machine manufacturer or system/plant integrator to ensure this.

Benefits

Clean power input

The ROBICON Perfect Harmony drive:

- Meets the most stringent IEEE 519-1992 requirements for voltage and current harmonic distortion, even if the source capacity is no larger than the drive rating [1)]
- In most cases eliminates the need for costly and inefficient harmonic filters and its associated resonance problems
- Protects other on-line equipment from harmonic disturbance (computers, telephones and other power converters).

Power quality output

The ROBICON Perfect Harmony drive:

- Reduces common-mode voltage on 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
- Offers sinusoidal output that eliminates additional harmonic heating and can be used with new or existing motors without derating.

Maximized availability

The ROBICON Perfect Harmony drive:

- Remains operational in the event of a cell failure by using the cell bypass option which bypasses the faulted cell
- Offers 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

The ROBICON Perfect Harmony drive provides 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
- Improves ride-through capabilities
- Completely protects the motor in case of a ground fault in the converter, the motor cabling or insulation
- Negligible common mode voltage allows the use of a standard motor eliminating the need for special high-voltage insulation
- Limits the fault energy into the converter in the unlikely event of a fault
- The incoming service voltage doesn't have to match the motor voltage.

[1)] IEEE 519-1992 compliance can only be guaranteed in networks without prior disturbances or harmonics already present.

Benefits (continued)

Factory test offers the following advantages:

- Each transformer and converter is tested as a complete system at full load prior 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 ROBICON Perfect Harmony 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.
- Sophisticated microprocessor-based diagnostics pinpoint the location of any defects.

Application

ROBICON Perfect Harmony typical applications

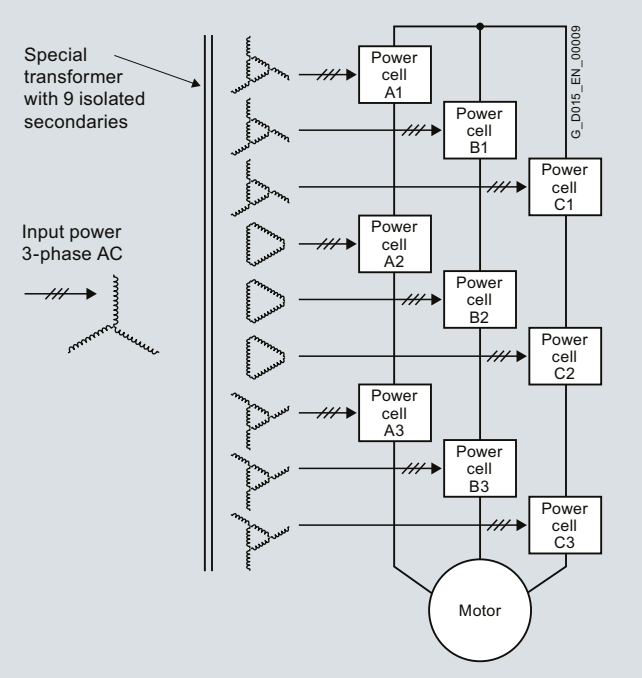
The ROBICON Perfect Harmony is regularly applied by the most reliability and quality conscious industries and their most demanding applications, for example:

- 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

The ROBICON Perfect Harmony series drives achieve an uncompromising performance by employing well-proven technology in a modular configuration, as shown in figure "Topology of ROBICON Perfect Harmony drives (3 cells)". 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 ROBICON Perfect Harmony drives (3 cells)

For higher output voltage capabilities, the ROBICON Perfect Harmony topology would be extended to have up to 5 power cells in series in each phase (in case of a GenIV drive [1]), with additional secondary windings (number of secondaries equals number of power cells) on the integral isolation transformer.

Each power cell is capable of receiving input power at 750 V AC [2], 3-phase, 50/60 Hz 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 generations to function properly with the ROBICON Perfect Harmony drive.

ROBICON Perfect Harmony transformers are dry-type forced-air. They are designed specifically for use with a particular ROBICON Perfect Harmony drive and have 9 to 18 extended delta secondaries. The secondary currents are rich in harmonics, but the primary current is virtually sinusoidal. It is very important to recognize that this is no ordinary transformer which can be obtained as an off-the-shelf item. 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 subjected to sinusoidal currents. Thus, there are some important exceptions and modifications to the application of these standards to ROBICON Perfect Harmony transformers.

Proven IGBTs

Insulated Gate Bipolar Transistors (IGBTs) form the backbone of the ROBICON Perfect Harmony 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 availability of IGBTs give reliable, long-term, life-cycle confidence.

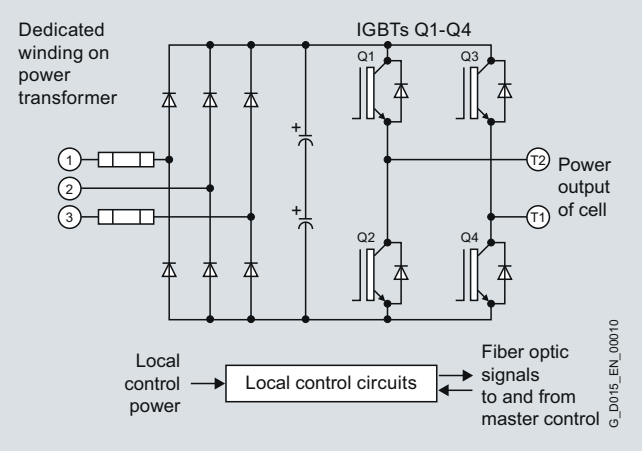
[1] Up to 6 power cells in series in each phase in case of a GenIIIe drive.

[2] 690 V AC in case of a GenIIIe power cell.

Design (continued)

Linked low-voltage cells

In the ROBICON Perfect Harmony, a series of low-voltage cells (see figure "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 ROBICON Perfect Harmony 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

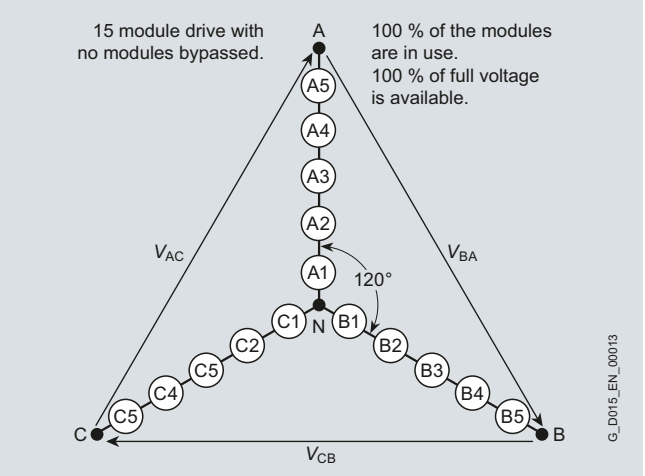
Advanced cell bypass

The ROBICON Perfect Harmony is designed to withstand failures that would overwhelm conventional drives because redundancy options are added into the system. The patented, cell-based configuration maximizes uptime and simplifies modifications.

Through a redundant bypass control that is completely separated from each power cell, the ROBICON Perfect Harmony ensures automatic bypass of a failed power cell in less than 500 ms.

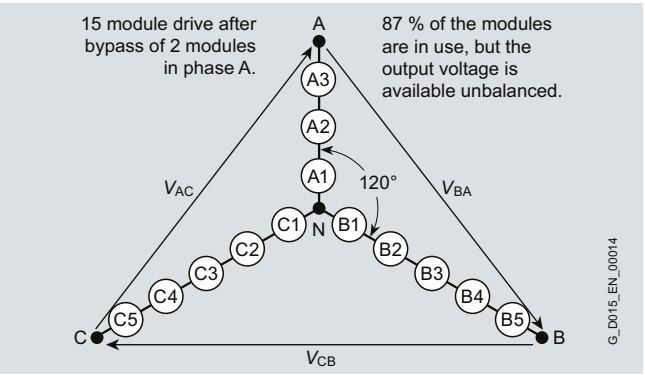
Since the cells in each phase of a ROBICON Perfect Harmony drive are in series, bypassing a cell has no effect on the current capability of the drive, but the voltage capability will be reduced. Usually the required motor voltage is roughly proportional to speed, so that the maximum speed at which the 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 figures illustrate the voltage available from a ROBICON Perfect Harmony drive, where the cells, represented by circles, are shown as simple voltage sources. The following figure 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°.



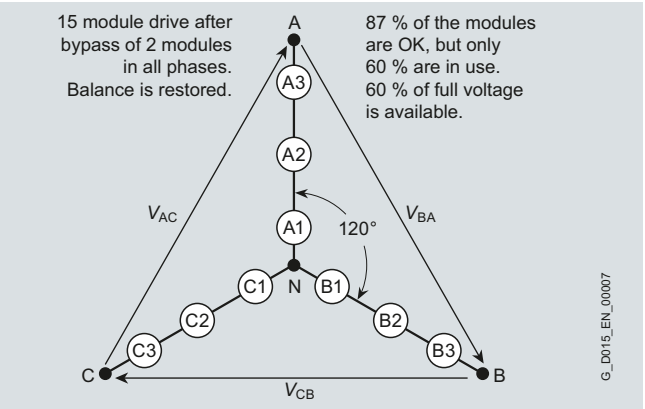
Simplified diagram of a 15 cell drive

When two cells are bypassed in phase A, the output voltage will tend to become unbalanced, as illustrated in the figure 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 faulted. The following figure illustrates this approach. Obviously, this method prevents unbalance but sacrifices possible voltage capability. In this figure, 87 % of the cells are functional, but only 60 % are in use, and only 60 % of full voltage is available.

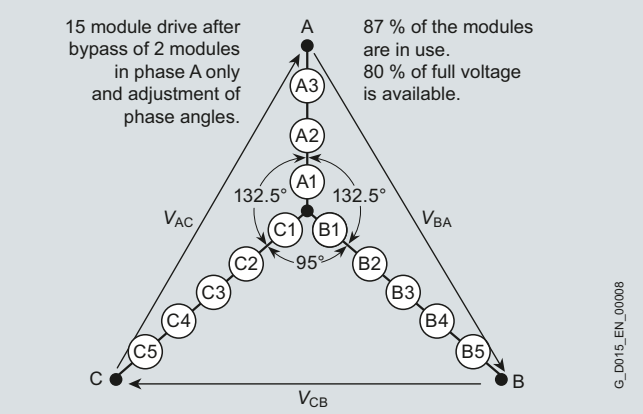


Drive output re-balanced by bypassing functional cells

Design (continued)

A better approach is illustrated in the figure 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 figure below, the full remaining 87 % of functional cells are in use, 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 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. Depending on the motor load, the control will reduce motor flux. As motor load increases, the control will increase motor flux.
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 allows time 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 optional 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 overload protection algorithm prevents the motor from being exposed to excessive temperatures.

Introduction

Function (continued)

GenIV

ROBICON Perfect Harmony GenIV (4.0 kV)

GenIV is the fourth generation of forced air-cooled medium-voltage, voltage source inverter drives offered in the patented ROBICON Perfect Harmony topology, together with NXGII controller.

The GenIV is a series of adjustable speed AC motor drives presently available in 2300 to 6600 V outputs, and loads ranging from 0.15 to 2.60 MW (200 to 3500 hp). Six power cell amperage types are available: 40, 70, 100, 140, 200 and 260. Drives in this product series provide an efficient, cost effective, and reliable method of adjusting the speed of an AC motor. The core unit contains a wide range of expandable features, enabling it to meet the demands of many types of industrial applications.

ROBICON Perfect Harmony GenIV characteristics

Power semiconductors		IGBTs, diodes
Line-side rectifier		18- to 30-pulse diode rectifier
Motor-side inverter		Multi-level drive (PWM) with IGBT power modules
Power cell ratings	A	40, 70, 100, 140, 200, 260 at 750 V
Input voltage range	kV	2.3 to 13.8
Input voltage tolerance		±10 % of nominal rated input voltage
Input frequency	Hz	50/60 ± 5 %
Input power factor		≥ 0.95 above 10 % load
Input harmonics		≤ 5 % TDD
Output voltages	kV	2.3/2.4, 3.3, 4.0/4.16, 6.0, 6.6
Output frequency and drift	Hz	0.5 ... 330 ± 0.5 %
Output torque	Hz	10 ... 167 rated torque (2-quadrant)
Output d*V*/d*t*	V/µs	< 3000
Power range	MW	0.15 to 2.60 (200 to 3500 hp)
Cooling methods		Forced air-cooled
Control		NXGII
Motor control		• Induction motor control • Synchronous motor control • Permanent magnet motors • Wound rotor motors

GenIV cell overload capability

Required overload (I/I_N)	**Available continuous output current per cell A**					
No overload	40	70	100	140	200	260
110 % (for 1 min, cycle time 10 min)	40	70	100	140	200	260
150 % (for 1 min, cycle time 10 min)	40	70	100	140 [1)]	200	260

The GenIV drives as standard provide a 150 % overload capability for all cell ratings without any derating.

[1)] The available continuous rating of 140 A will reduce to 130 A when operated at or above 45 °C ambient temperature.

Function (continued)

GenIIIe

ROBICON Perfect Harmony GenIIIe

GenIIIe is the third generation of forced air-cooled medium-voltage pulse width modulated variable frequency motor drives, offered in the patented ROBICON Perfect Harmony power topology in concert with proprietary NXGII hardware control platform and embedded software. GenIIIe is an extension of the GenIII series offering a higher current rating.

The GenIIIe is a series of adjustable speed AC motor drives presently available in an output voltage range from 2.3 kV to 7.2 kV, and loads ranging from 1.30 to 5.97 MW (3000 to 9000 hp). Four power cell amperage types are available: 315, 375, 500, and 660 A at 690 V AC.

ROBICON Perfect Harmony GenIIIe, characteristics

Power semiconductors		IGBTs, diodes
Line-side rectifier		18 to 36-pulse diode rectifier
Motor-side inverter		Multi-level drive (PWM) with IGBT power modules
Power cell ratings	A	315, 375, 500, 660 at 690 V
Input voltage range	kV	2.3 to 13.8
Input voltage tolerance		±10 % of nominal rated input voltage
Input frequency	Hz	50/60 ± 5 %
Input power factor		≥ 0.95 above 10 % load
Input harmonics		≤ 5 % TDD
Output voltages	kV	2.3/2.4, 3.3, 4.16, 4.6/4.8, 6.0, 6.6, 7.2
Output frequency and drift	Hz	0.5 ... 330 ± 0.5 %
Output torque	Hz	10 ... 167 rated torque (2-quadrant)
Output d*V*/d*t*	V/µs	< 1000
Power range	MW	1.30 to 5.97 (1750 to 8000 hp)
Cooling method		Forced air-cooled
Control		NXGII
Motor control		• Induction motor control • Synchronous motor control • Permanent magnet motors • Wound rotor motors

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

GenIIIe cell overload capability

Required overload (I/I_N)	**Available continuous output current per cell A**			
No overload	315	375	500	660
110 % (for 1 min, cycle time 10 min)	315	375	500	660
150 % (for 1 min, cycle time 10 min)	300	300	400	450

The GenIIIe drives as standard provide a 110 % overload capability for all cell ratings without any derating.

2

Overview

The following tables help you to select the right converter type and give an overview of the corresponding motor data and order numbers. The tables are organized according to the motor voltages. For the complete technical data of the listed converter types refer to chapter 3.

In order to select the right ROBICON Perfect Harmony drive, please take into consideration the following steps:

Step 1 – Choosing the right cell size

1.1 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*.

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

where,
P_{motor_kW} = output (in kW)
V_{motor} = motor voltage
PF_{motor} = motor power factor (= $(\cos \varphi)_{motor}$)
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 (from step 1.1) by the motor SF.

1.2 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 minimum continuous cell current rating. For the appropriate converter type, identify the smallest cell available that can source the current calculated in the previous paragraph.

1.3 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 pages 2/6 and 2/7)
- If the overload requirements exceed the capabilities of the chosen cell then the next cell size must be selected.

Step 2 – Choosing the right transformer

2.1 The ROBICON Perfect Harmony transformer rating is based on the motor shaft horsepower:

- If the drive is intended to operate within nominal parameters and without added redundant cells, the maximum continuous motor horsepower (hp) will be used to rate the transformer using a straight formula:

  1 transformer kVA per each motor hp

- The above rule is followed regardless of motor type.

2.2 The transformer is designed to support the temporary overloads associated with the cells it feeds. If those levels are exceeded by the application requirements, please contact the factory or your local Siemens sales representative.

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.

Selection and ordering data

Motor voltage 2.3/2.4 kV

Motor voltage	Type rating	Shaft output [1]	Shaft output [1]	Typical motor current [1]	Power cell current	Number of cells	Transformer rating	Order number	Gene-ration
kV	kVA	kW	hp	A	A		kVA		
2.4	180	149	200	43	70	9	200	**6SR4102-0 ■ B32-0 ■ ■ 0**	GenIV
2.4	270	224	300	65	70	9	300	**6SR4102-0 ■ B33-0 ■ ■ 0**	GenIV
2.4	290	241	323	70	70	9	400	**6SR4102-0 ■ B34-0 ■ ■ 0**	GenIV
2.4	360	298	400	87	100	9	400	**6SR4102-0 ■ C34-0 ■ ■ 0**	GenIV
2.4	410	336	450	98	100	9	450	**6SR4102-0 ■ C34-5 ■ ■ 0**	GenIV
2.4	415	344	461	100	100	9	500	**6SR4102-0 ■ C35-0 ■ ■ 0**	GenIV
2.4	450	373	500	108	140	9	500	**6SR4102-0 ■ D35-0 ■ ■ 0**	GenIV
2.4	540	448	600	130	140	9	600	**6SR4102-0 ■ D36-0 ■ ■ 0**	GenIV
2.4	580	481	645	140	140	9	700	**6SR4102-0 ■ D37-0 ■ ■ 0**	GenIV
2.4	1305	1111	1489	315	315	9	1750	**6SR3102-1 ■ G41-7 ■ ■ 0**	GenIIIe
2.4	1540	1306	1750	370	375	9	1750	**6SR3102-1 ■ H41-7 ■ ■ 0**	GenIIIe
2.4	1555	1322	1773	375	375	9	2000	**6SR3102-1 ■ H42-0 ■ ■ 0**	GenIIIe
2.4	1760	1492	2000	423	500	9	2000	**6SR3102-1 ■ J42-0 ■ ■ 0**	GenIIIe
2.4	1980	1679	2250	476	500	9	2250	**6SR3102-1 ■ J42-2 ■ ■ 0**	GenIIIe
2.4	2075	1763	2363	500	500	9	2500	**6SR3102-1 ■ J42-5 ■ ■ 0**	GenIIIe
2.4	2200	1865	2500	529	660	9	2500	**6SR3102-1 ■ K42-5 ■ ■ 0**	GenIIIe
2.4	2620	2222	2978	630	660	9	3000	**6SR3102-1 ■ K43-0 ■ ■ 0**	GenIIIe

For order number supplements see pages 2/15 to 2/17

[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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

2

Selection and ordering data (continued)

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	Order number	Gene-ration
kV	kVA	kW	hp	A	A		kVA		
3.3	180	149	200	32	40	9	200	**6SR4102-0 ■ A32-0 ■ ■ 0**	GenIV
3.3	225	189	254	40	40	9	300	**6SR4102-0 ■ A33-0 ■ ■ 0**	GenIV
3.3	270	224	300	47	70	9	300	**6SR4102-0 ■ B33-0 ■ ■ 0**	GenIV
3.3	360	298	400	63	70	9	400	**6SR4102-0 ■ B34-0 ■ ■ 0**	GenIV
3.3	400	331	444	70	70	9	450	**6SR4102-0 ■ B34-5 ■ ■ 0**	GenIV
3.3	410	336	450	71	100	9	450	**6SR4102-0 ■ C34-5 ■ ■ 0**	GenIV
3.3	450	373	500	79	100	9	500	**6SR4102-0 ■ C35-0 ■ ■ 0**	GenIV
3.3	540	448	600	95	100	9	600	**6SR4102-0 ■ C36-0 ■ ■ 0**	GenIV
3.3	570	473	634	100	100	9	700	**6SR4102-0 ■ C37-0 ■ ■ 0**	GenIV
3.3	630	522	700	110	140	9	700	**6SR4102-0 ■ D37-0 ■ ■ 0**	GenIV
3.3	720	597	800	126	140	9	800	**6SR4102-0 ■ D38-0 ■ ■ 0**	GenIV
3.3	800	662	887	140	140	9	900	**6SR4102-0 ■ D38-7 ■ ■ 0**	GenIV
3.3	1540	1306	1750	269	315	9	1750	**6SR3102-1 ■ G41-7 ■ ■ 0**	GenIIIe
3.3	1760	1492	2000	308	315	9	2000	**6SR3102-1 ■ G42-0 ■ ■ 0**	GenIIIe
3.3	1800	1527	2047	315	315	9	2250	**6SR3102-1 ■ G42-2 ■ ■ 0**	GenIIIe
3.3	1980	1679	2250	346	375	9	2250	**6SR3102-1 ■ H42-2 ■ ■ 0**	GenIIIe
3.3	2140	1818	2437	375	375	9	2500	**6SR3102-1 ■ H42-5 ■ ■ 0**	GenIIIe
3.3	2200	1865	2500	385	500	9	2500	**6SR3102-1 ■ J42-5 ■ ■ 0**	GenIIIe
3.3	2640	2238	3000	462	500	9	3000	**6SR3102-1 ■ J43-0 ■ ■ 0**	GenIIIe
3.3	2855	2424	3250	500	500	9	3500	**6SR3102-1 ■ J43-5 ■ ■ 0**	GenIIIe
3.3	3080	2611	3500	539	660	9	3500	**6SR3102-1 ■ K43-5 ■ ■ 0**	GenIIIe

For order number supplements see pages 2/15 to 2/17

[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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

Selection and ordering data (continued)

Motor voltage 4.0/4.16 kV

Motor voltage	Type rating	Shaft output [1]	Shaft output [1]	Typical motor current [1]	Power cell current	Number of cells	Transformer rating	Order number	Gene-ration
kV	kVA	kW	hp	A	A		kVA		
4.0/4.16 [2]	180	149	200	26	40	9	200	**6SR4102-0 ■ A32-0 ■ ■ 0**	GenIV
4.0/4.16 [2]	270	224	300	39	40	9	300	**6SR4102-0 ■ A33-0 ■ ■ 0**	GenIV
4.0/4.16 [2]	275	229	307	40	40	9	400	**6SR4102-0 ■ A34-0 ■ ■ 0**	GenIV
4.0/4.16 [2]	360	298	400	52	70	9	400	**6SR4102-0 ■ B34-0 ■ ■ 0**	GenIV
4.0/4.16 [2]	410	336	450	59	70	9	450	**6SR4102-0 ■ B34-5 ■ ■ 0**	GenIV
4.0/4.16 [2]	450	373	500	65	70	9	500	**6SR4102-0 ■ B35-0 ■ ■ 0**	GenIV
4.0/4.16 [2]	480	401	538	70	70	9	600	**6SR4102-0 ■ B36-0 ■ ■ 0**	GenIV
4.0/4.16 [2]	540	448	600	78	100	9	600	**6SR4102-0 ■ C36-0 ■ ■ 0**	GenIV
4.0/4.16 [2]	630	522	700	91	100	9	700	**6SR4102-0 ■ C37-0 ■ ■ 0**	GenIV
4.0/4.16 [2]	690	573	768	100	100	9	800	**6SR4102-0 ■ C38-0 ■ ■ 0**	GenIV
4.0/4.16 [2]	720	597	800	104	140	9	800	**6SR4102-0 ■ D38-0 ■ ■ 0**	GenIV
4.0/4.16 [2]	810	671	900	117	140	9	900	**6SR4102-0 ■ D38-7 ■ ■ 0**	GenIV
4.0/4.16 [2]	900	746	1000	130	140	9	1000	**6SR4102-0 ■ D41-0 ■ ■ 0**	GenIV
4.0/4.16 [2]	965	802	1075	140	140	9	1100	**6SR4102-0 ■ D41-1 ■ ■ 0**	GenIV
4.16	1980	1679	2250	275	315	12	2250	**6SR3102-3 ■ G42-2 ■ ■ 0**	GenIIIe
4.16	2200	1865	2500	305	315	12	2500	**6SR3102-3 ■ G42-5 ■ ■ 0**	GenIIIe
4.16	2265	1925	2581	315	315	12	3000	**6SR3102-3 ■ G43-0 ■ ■ 0**	GenIIIe
4.16	2640	2238	3000	366	375	12	3000	**6SR3102-3 ■ H43-0 ■ ■ 0**	GenIIIe
4.16	2700	2292	3073	375	375	12	3500	**6SR3102-3 ■ H43-5 ■ ■ 0**	GenIIIe
4.16	3080	2611	3500	427	500	12	3500	**6SR3102-3 ■ J43-5 ■ ■ 0**	GenIIIe
4.16	3520	2984	4000	488	500	12	4000	**6SR3102-3 ■ J44-0 ■ ■ 0**	GenIIIe
4.16	3600	3056	4097	500	500	12	5000	**6SR3102-3 ■ J45-0 ■ ■ 0**	GenIIIe
4.16	4400	3730	5000	610	660	12	5000	**6SR3102-3 ■ K45-0 ■ ■ 0**	GenIIIe
4.16	4540	3851	5162	630	660	12	6000	**6SR3102-3 ■ K46-0 ■ ■ 0**	GenIIIe

For order number supplements see pages 2/15 to 2/17

[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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

[2] 4.16 kV possible with overmodulation; under load, motor is run at 4.0 kV.

Selection and ordering data (continued)

Motor voltage 4.6/4.8 kV

Motor voltage	Type rating	Shaft output [1]	Shaft output [1]	Typical motor current [1]	Power cell current	Number of cells	Transformer rating	Order number	Gene-ration
kV	kVA	kW	hp	A	A		kVA		
4.8	2200	1865	2500	264	315	12	2500	**6SR3102-3 ■ G42-5 ■ ■ 0**	GenIIIe
4.8	2615	2222	2978	315	315	12	3000	**6SR3102-3 ■ G43-0 ■ ■ 0**	GenIIIe
4.8	2640	2238	3000	317	375	12	3000	**6SR3102-3 ■ H43-0 ■ ■ 0**	GenIIIe
4.8	3080	2611	3500	370	375	12	3500	**6SR3102-3 ■ H43-5 ■ ■ 0**	GenIIIe
4.8	3115	2645	3545	375	375	12	4000	**6SR3102-3 ■ H44-0 ■ ■ 0**	GenIIIe
4.8	3520	2984	4000	423	500	12	4000	**6SR3102-3 ■ J44-0 ■ ■ 0**	GenIIIe
4.8	4155	3526	4727	500	500	12	5000	**6SR3102-3 ■ J45-0 ■ ■ 0**	GenIIIe
4.8	4400	3730	5000	529	660	12	5000	**6SR3102-3 ■ K45-0 ■ ■ 0**	GenIIIe
4.8	5240	4443	5956	630	660	12	6000	**6SR3102-3 ■ K46-0 ■ ■ 0**	GenIIIe

For order number supplements see pages 2/15 to 2/17

[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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

Selection and ordering data (continued)

Motor voltage 6.0 kV

Motor voltage	Type rating	Shaft output [1]	Shaft output [1]	Typical motor current [1]	Power cell current	Number of cells	Transformer rating	Order number	Gene-ration
kV	kVA	kW	hp	A	A		kVA		
6.0	270	224	300	26	40	15	300	**6SR4102-2 ■ A33-0 ■ ■ 0**	GenIV
6.0	360	298	400	35	40	15	400	**6SR4102-2 ■ A34-0 ■ ■ 0**	GenIV
6.0	415	344	461	40	40	15	500	**6SR4102-2 ■ A35-0 ■ ■ 0**	GenIV
6.0	450	373	500	43	70	15	500	**6SR4102-2 ■ B35-0 ■ ■ 0**	GenIV
6.0	540	448	600	52	70	15	600	**6SR4102-2 ■ B36-0 ■ ■ 0**	GenIV
6.0	630	522	700	61	70	15	700	**6SR4102-2 ■ B37-0 ■ ■ 0**	GenIV
6.0	720	597	800	69	70	15	800	**6SR4102-2 ■ B38-0 ■ ■ 0**	GenIV
6.0	725	602	807	70	70	15	900	**6SR4102-2 ■ B38-7 ■ ■ 0**	GenIV
6.0	810	671	900	78	100	15	900	**6SR4102-2 ■ C38-7 ■ ■ 0**	GenIV
6.0	900	746	1000	87	100	15	1000	**6SR4102-2 ■ C41-0 ■ ■ 0**	GenIV
6.0	1035	860	1152	100	100	15	1250	**6SR4102-2 ■ C41-2 ■ ■ 0**	GenIV
6.0	1130	933	1250	108	140	15	1250	**6SR4102-2 ■ D41-2 ■ ■ 0**	GenIV
6.0	1350	1119	1500	130	140	15	1500	**6SR4102-2 ■ D41-5 ■ ■ 0**	GenIV
6.0	1450	1203	1613	140	140	15	1750	**6SR4102-2 ■ D41-7 ■ ■ 0**	GenIV
6.0	1540	1306	1750	148	200	15	1750	**6SR4102-2 ■ E41-7 ■ ■ 0**	GenIV
6.0	1760	1492	2000	169	200	15	2000	**6SR4102-2 ■ E42-0 ■ ■ 0**	GenIV
6.0	1980	1679	2250	190	200	15	2250	**6SR4102-2 ■ E42-2 ■ ■ 0**	GenIV
6.0	2075	1763	2363	200	200	15	2500	**6SR4102-2 ■ E42-5 ■ ■ 0**	GenIV
6.0	2200	1865	2500	212	260	15	2500	**6SR4102-2 ■ F42-5 ■ ■ 0**	GenIV
6.0	2640	2238	3000	254	260	15	3000	**6SR4102-2 ■ F43-0 ■ ■ 0**	GenIV
6.0	2700	2292	3073	260	260	15	3500	**6SR4102-2 ■ F43-5 ■ ■ 0**	GenIV
6.0	3080	2611	3500	296	315	15	3500	**6SR3102-5 ■ G43-5 ■ ■ 0**	GenIIIe
6.0	3270	2777	3722	315	315	15	4000	**6SR3102-5 ■ G44-0 ■ ■ 0**	GenIIIe
6.0	3520	2984	4000	338	375	15	4000	**6SR3102-5 ■ H44-0 ■ ■ 0**	GenIIIe
6.0	3895	3306	4432	375	375	15	5000	**6SR3102-5 ■ H45-0 ■ ■ 0**	GenIIIe
6.0	4400	3730	5000	423	500	15	5000	**6SR3102-5 ■ J45-0 ■ ■ 0**	GenIIIe
6.0	5195	4408	5909	500	500	15	6000	**6SR3102-5 ■ J46-0 ■ ■ 0**	GenIIIe
6.0	5280	4476	6000	508	660	15	6000	**6SR3102-5 ■ K46-0 ■ ■ 0**	GenIIIe
6.0	6160	5222	7000	592	660	15	7000	**6SR3102-5 ■ K47-0 ■ ■ 0**	GenIIIe
6.0	6550	5554	7445	630	660	15	8000	**6SR3102-5 ■ K48-0 ■ ■ 0**	GenIIIe

For order number supplements see pages 2/15 to 2/17

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2

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	Order number	Gene-ration
kV	kVA	kW	hp	A	A		kVA		
6.6	270	224	300	24	40	15	300	**6SR4102-2 ■ A33-0 ■ ■ 0**	GenIV
6.6	360	298	400	32	40	15	400	**6SR4102-2 ■ A34-0 ■ ■ 0**	GenIV
6.6	450	373	500	39	40	15	500	**6SR4102-2 ■ A35-0 ■ ■ 0**	GenIV
6.6	455	378	507	40	40	15	600	**6SR4102-2 ■ A36-0 ■ ■ 0**	GenIV
6.6	540	448	600	47	70	15	600	**6SR4102-2 ■ B36-0 ■ ■ 0**	GenIV
6.6	630	522	700	55	70	15	700	**6SR4102-2 ■ B37-0 ■ ■ 0**	GenIV
6.6	720	597	800	63	70	15	800	**6SR4102-2 ■ B38-0 ■ ■ 0**	GenIV
6.6	800	662	887	70	70	15	900	**6SR4102-2 ■ B38-7 ■ ■ 0**	GenIV
6.6	810	671	900	71	100	15	900	**6SR4102-2 ■ C38-7 ■ ■ 0**	GenIV
6.6	900	746	1000	79	100	15	1000	**6SR4102-2 ■ C41-0 ■ ■ 0**	GenIV
6.6	1130	933	1250	99	100	15	1250	**6SR4102-2 ■ C41-2 ■ ■ 0**	GenIV
6.6	1140	946	1268	100	100	15	1500	**6SR4102-2 ■ C41-5 ■ ■ 0**	GenIV
6.6	1350	1119	1500	118	140	15	1500	**6SR4102-2 ■ D41-5 ■ ■ 0**	GenIV
6.6	1580	1306	1750	138	140	15	1750	**6SR4102-2 ■ D41-7 ■ ■ 0**	GenIV
6.6	1600	1324	1775	140	140	15	2000	**6SR4102-2 ■ D42-0 ■ ■ 0**	GenIV
6.6	1760	1492	2000	154	200	15	2000	**6SR4102-2 ■ E42-0 ■ ■ 0**	GenIV
6.6	1980	1679	2250	173	200	15	2250	**6SR4102-2 ■ E42-2 ■ ■ 0**	GenIV
6.6	2200	1865	2500	192	200	15	2500	**6SR4102-2 ■ E42-5 ■ ■ 0**	GenIV
6.6	2285	1939	2600	200	200	15	3000	**6SR4102-2 ■ E43-0 ■ ■ 0**	GenIV
6.6	2640	2238	3000	231	260	15	3000	**6SR4102-2 ■ F43-0 ■ ■ 0**	GenIV
6.6	2970	2521	3380	260	260	15	3500	**6SR4102-2 ■ F43-5 ■ ■ 0**	GenIV
6.6	3080	2611	3500	269	315	18	3500	**6SR3102-7 ■ G43-5 ■ ■ 0**	GenIIIe
6.6	3520	2984	4000	308	315	18	4000	**6SR3102-7 ■ G44-0 ■ ■ 0**	GenIIIe
6.6	3600	3055	4095	315	315	18	5000	**6SR3102-7 ■ G45-0 ■ ■ 0**	GenIIIe
6.6	4285	3636	4875	375	375	18	5000	**6SR3102-7 ■ H45-0 ■ ■ 0**	GenIIIe
6.6	4400	3730	5000	385	500	18	5000	**6SR3102-7 ■ J45-0 ■ ■ 0**	GenIIIe
6.6	5280	4476	6000	462	500	18	6000	**6SR3102-7 ■ J46-0 ■ ■ 0**	GenIIIe
6.6	5715	4849	6500	500	500	18	7000	**6SR3102-7 ■ J47-0 ■ ■ 0**	GenIIIe
6.6	6160	5222	7000	539	660	18	7000	**6SR3102-7 ■ K47-0 ■ ■ 0**	GenIIIe
6.6	7040	5968	8000	615	660	18	8000	**6SR3102-7 ■ K48-0 ■ ■ 0**	GenIIIe

For order number supplements see pages 2/15 to 2/17

[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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

Selection and ordering data (continued)

Order No. supplements

	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
ROBICON Perfect Harmony drive	**6**	**S**	**R**	.	.	.	.	–	.	■	.	.	.	–	.	■	■	**0**
Generation																		
Generation 3 (GenIIIe)				**3**														
Generation 4 (GenIV)				**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 GenIV																		
4.0 kV 3 AC, 9 cells									**0**									
6.6 kV 3 AC, 15 cells									**2**									
Applies for GenIIIe																		
3.6 kV 3 AC, 9 cells									**1**									
4.9 kV 3 AC, 12 cells									**3**									
6.1 kV 3 AC, 15 cells									**5**									
7.3 kV 3 AC, 18 cells									**7**									
Primary input voltage																		
2.4 kV 3 AC										**A**								
3.0 kV 3 AC										**B**								
3.3 kV 3 AC										**C**								
4.16 kV 3 AC										**D**								
4.8 kV 3 AC										**E**								
6.0 kV 3 AC										**F**								
6.3 kV 3 AC										**G**								
6.6 kV 3 AC										**H**								
6.9 kV 3 AC										**J**								
7.2 kV 3 AC										**K**								
8.4 kV 3 AC										**L**								
10.0 kV 3 AC										**M**								
11.0 kV 3 AC										**N**								
12.0 kV 3 AC										**P**								
12.47 kV 3 AC										**Q**								
13.2 kV 3 AC										**R**								
13.8 kV 3 AC										**S**								
Other voltage than standard (on request)										**X**								

Selection and ordering data (continued)

Order No. supplements (continued)

	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
ROBICON Perfect Harmony drive	**6**	**S**	**R**	.	.	.	.	–	.	■	.	.	.	–	.	■	■	**0**
Cell rating																		
Applies for GenIV																		
40 A											**A**							
70 A											**B**							
100 A											**C**							
140 A											**D**							
200 A											**E**							
260 A											**F**							
Applies for GenIIIe																		
315 A											**G**							
375 A											**H**							
500 A											**J**							
660 A											**K**							
Transformer rating																		
Other transformer rating than standard												**0**	**0**		**0**			
200 kVA												**3**	**2**		**0**			
300 kVA												**3**	**3**		**0**			
400 kVA												**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 (continued)

Order No. supplements (continued)

	1	2	3	4	5	6	7		8	9	10	11	12		13	14	15	16
ROBICON Perfect Harmony drive	**6**	**S**	**R**	.	.	.	.	–	.	■	.	.	.	–	.	■	■	**0**

Transformer configuration	
60 Hz, CU	**A**
50 Hz, CU	**B**
60 Hz, AL [1]	**E**
50 Hz, AL [1]	**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	**H**
460 V 3 AC, 60 Hz	**J**
480 V 3 AC, 60 Hz	**K**

Note: Not all configurations that the above order no. key allows can be configured. See the selection tables and configuration information for available drive configurations.

[1] GenIV units with input voltages above 7.2 kV or transformer ratings above 3000 kVA, are available on request only.

Options

Options

The following tables show an overview of the options and their availability for the drive types GenIV and GenIIIe (details see chapter 4 description of options):

Option text	Order code	GenIV	GenIIIe
Transformer			
Removal of surge arrestors	**N83**	✓	✓
Availability [1]			
ProToPS	**U10**	✓	✓
Cell bypass	**U11**	✓	✓
Redundant blower	**M61**	✓	✓
Certifications [2]			
Version with CE conformity	**U02**	✓	✓
Version with CE and GOST conformity	**U02 & U04**	✓	✓
Design of cooling			
Drive prepared for duct flange connection in front	**M64**	✓	✓
Drive prepared for duct flange connection in rear	**M68**	✓	✓
Protection functions			
Make-proof grounding switch at drive input (manually driven)	**N44**	✓	✓
Make-proof grounding switch at drive output (manually driven)	**N45**	✓	✓
Mechanical door interlock – Castell	**M10**	✓	✓
Electrical door interlocks [3]	**M12**	✓	✓
Serial communication			
Modbus Plus interface, network 1	**G21**	✓	✓
Modbus RTU interface, network 1	**G22**	✓	✓
DeviceNet profile 12 interface, network 1	**G23**	✓	✓
Control Net interface, network 1	**G26**	✓	✓
Modbus Ethernet interface, network 1	**G28**	✓	✓
Modbus Plus interface, network 2	**G31**	✓	✓
Modbus RTU interface, network 2	**G32**	✓	✓
Modbus Ethernet interface, network 2	**G38**	✓	✓
DeviceNet profile 12 interface, network 2	**G43**	✓	✓
Control Net interface, network 2	**G46**	✓	✓
PROFIBUS DP interface, network 1	**G91**	✓	✓
PROFIBUS DP interface, network 2	**G93**	✓	✓
Port connectors			
Ethernet port connector mounted on the door	**G47**	✓	✓
Functional options			
Electrical submersible pumps applications	**B09**	✓	✓
Converter adapted to ZLU requirements	**B10**	✓	✓
Vector control with speed encoder	**K50**	✓	✓
Output reactor	**L09**	✓	✓
Bidirectional synchronized transfer	**L29**	✓	✓

Option text	Order code	GenIV	GenIIIe
Control and display instruments in the door [4]			
Signal lamps in the cabinet door	**K20**	✓	✓
Display instruments in the cabinet door for voltage, current and speed	**K21**	✓	✓
Pushbutton kit	**K29**	✓	✓
Off-Local-Remote selector	**K31**	✓	✓
Off-Hand-Auto selector	**K32**	✓	✓
Keyed Off-Local-Remote selector	**K33**	✓	✓
Keyed Off-Hand-Auto selector	**K34**	✓	✓
Control voltage supply [5]			
Connection for control voltage 220/230 V AC by customer	**K68**	✓	✓
Control voltage 120 V AC by Siemens	**K69**	✓	✓
Connection for control voltage 120 V AC by customer	**K79**	✓	✓
I/O signal voltage 24 V DC	**K73**	✓	✓
Control of auxiliaries [6]			
Controlled outgoing feeder for auxiliaries 400 V 3 AC or 460/480 V 3 AC	**N30 to N33**	✓	✓
Controlled outgoing feeder for auxiliaries 230 V 1 AC or 120 V 1 AC	**N35 to N38**	✓	✓
Power supply for auxiliaries 24 V DC/2.5 A via terminals	**N75**	✓	✓
Temperature detection and evaluation			
2 x 2 thermistor protection relays for alarm and fault	**L81**	✓	✓
3 x 2 thermistor protection relays for alarm and fault	**L82**	✓	✓
2 Pt100 evaluation units with 3 inputs each	**L91**	✓	✓
Pt100 evaluation unit with 6 inputs and 2 analog outputs	**L93**	✓	✓
Pt100 evaluation unit with 6 inputs for exproof motors and 2 analog outputs	**L95**	✓	✓
Motor voltage			
Motor voltage 2.3 kV	**V01**	✓	✓
Motor voltage 2.4 kV	**V02**	✓	✓
Motor voltage 3.0 kV	**V03**	✓	✓
Motor voltage 3.3 kV	**V04**	✓	✓
Motor voltage 4.0 kV	**V05**	✓	✓
Motor voltage 4.16 kV	**V06**	✓	✓
Motor voltage 4.8 kV	**V07**	✓	✓
Motor voltage 5.0 kV	**V08**	✓	✓
Motor voltage 5.5 kV	**V09**	✓	✓
Motor voltage 6.0 kV	**V10**	✓	✓
Motor voltage 6.3 kV	**V11**	✓	✓
Motor voltage 6.6 kV	**V12**	✓	✓
Motor voltage 6.9 kV	**V13**	–	✓
Motor voltage 7.2 kV	**V14**	–	✓

1) Options "availability" **U10** and **U11** are mutually exclusive.

2) Either option **U02** or the combination **U02 & U04** must be ordered. Both include options "EMC filter" **L03** and "Electrical door interlocks" **M12**.

3) Option is included by option **U02** and the combination of the options **U02 & U04**.

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. Select one of them. **K69** is the preset value.

6) Options "control of auxiliaries" **N35** to **N38** are mutually exclusive. For GenIV drives, select one of them; the preset value is **N35**.

Options (continued)

Option text	Order code	GenIV	GenIIIe
Motor rated data			
Motor rated frequency 50 Hz	**V50**	✓	✓
Motor rated frequency 60 Hz	**V60**	✓	✓
Motor data other than the standard rated conditions	**Y06**	✓	✓
Documentation (standard: PDF format in English on CD-ROM)			
Documentation in German [1]	**D00**	✓	✓
Circuit diagrams, terminal diagrams and dimension drawings in DXF format	**D02**	✓	✓
One set of printed documentation	**D15**	✓	✓
Documentation in Czech	**D54**	•	•
Documentation in Polish	**D55**	•	•
Documentation in Russian [1]	**D56**	✓	✓
Documentation in Japanese	**D57**	•	•
Documentation in Danish	**D62**	•	•
Documentation in Romanian	**D71**	•	•
Documentation in Italian [1]	**D72**	✓	✓
Documentation in Finnish	**D73**	•	•
Documentation in Dutch	**D74**	•	•
Documentation in Turkish	**D75**	•	•
Documentation in English	**D76**	✓	✓
Documentation in French	**D77**	•	•
Documentation in Spanish	**D78**	•	•
Documentation in Portuguese (Brazil) [1]	**D79**	✓	✓
Documentation in Bulgarian	**D80**	•	•
Documentation in Norwegian	**D81**	•	•
Documentation in Hungarian	**D82**	•	•
Documentation in Swedish	**D83**	•	•
Documentation in Chinese [1]	**D84**	✓	✓
Documentation in Slovenian	**D85**	•	•
Documentation in Greek	**D86**	•	•
Documentation in Slovakian	**D87**	•	•
Documentation in Estonian	**D88**	•	•
Documentation in Latvian	**D89**	•	•
Documentation in Lithuanian	**D90**	•	•
Circuit diagrams with customer-specific description field	**Y10**	✓	✓
Production schedules [2]			
Production schedule: one issue	**B43**	✓	✓
Production schedule: updated at 2-week intervals	**B44**	✓	✓
Production schedule: updated once per month	**B45**	✓	✓
Manufacturer data block			
Manufacturer data block	**B49**	✓	✓

Option text	Order code	GenIV	GenIIIe
Nameplate color, texture and language, warning labels [3] (standard language English)			
White letters with black core	**T03**	✓	✓
Stainless steel	**T04**	✓	✓
English/Danish	**T09**	✓	✓
English/Romanian	**T12**	✓	✓
English/Bulgarian	**T13**	✓	✓
English/Turkish	**T14**	✓	✓
English/Greek	**T15**	✓	✓
English/Dutch	**T16**	✓	✓
English/Estonian	**T17**	✓	✓
English/Latvian	**T18**	✓	✓
English/Lithuanian	**T19**	✓	✓
English/Slovakian	**T20**	✓	✓
English/Finnish	**T21**	✓	✓
English/Slovenian	**T22**	✓	✓
English/Norwegian	**T23**	✓	✓
English/Swedish	**T24**	✓	✓
English/Czech	**T25**	✓	✓
English/Hungarian	**T26**	✓	✓
English/French	**T58**	✓	✓
English/Spanish	**T60**	✓	✓
English/German	**T74**	✓	✓
English/Italian	**T80**	✓	✓
English/Portuguese (Brazil)	**T82**	✓	✓
English/Russian	**T85**	✓	✓
English/Polish	**T86**	✓	✓
English/Japanese	**T90**	✓	✓
English/Chinese	**T91**	✓	✓
Drive acceptance tests, witnessed			
Visual acceptance	**F03**	✓	✓
Functional acceptance (without motor)	**F73**	✓	✓
Insulation test	**F77**	✓	✓
Interface check with customer equipment (5 hours, on request)	**F79**	✓	✓
Customer-specific acceptance (on request, without motor)	**F97**	•	•
Extension of liability for defects on drives (standard 12 months) [4]			
Extension of 12 months to a total of 24 months	**Q80**	✓	✓
Extension of 18 months to a total of 30 months	**Q81**	✓	✓
Extension of 24 months to a total of 36 months	**Q82**	✓	✓
Extension of 30 months to a total of 42 months	**Q83**	✓	✓
Extension of 36 months to a total of 48 months	**Q84**	✓	✓
Extension of 48 months to a total of 60 months	**Q85**	✓	✓

[1] Options "documentation" **D00, D56, D72, D79** and **D84** are mutually exclusive.

[2] Options "production schedules" **B43** to **B45** are mutually exclusive.

[3] Options "nameplate language" **T74** to **T91** are mutually exclusive.

[4] For a more detailed description of the options **Q80** to **Q85**, refer to chapter 6, services and docmentation.

Options

2

Options (continued)

Option text	Order code	GenIV	GenIIIe
Other options			
EMC filter [1]	**L03**	✓	✓
Cabinet lighting and service socket outlet	**L50**	✓	✓
Anti-condensation heating for cabinet	**L55**	✓	✓
Gland plates, aluminum	**M35**	✓	✓
Gland plates, brass	**M36**	✓	✓
Gland plates, stainless steel	**M37**	✓	✓
IP42 degree of protection	**M42**	✓	✓
Version for harsh environment conditions	**M67**	✓	✓
Extended space for bottom cable entry (GenIV, 4.0 kV, up to 140 A only)	**M69**	✓	–
Delivery as two separate transportation units	**P82**	✓	✓
Customer-specific nameplate	**Y05**	✓	✓
Paint finish other than standard	**Y09**	✓	✓
Sine-wave filter	**Y15**	•	•
Additional testing options on request [2]			
Heat run, unwitnessed	**F04**	•	•
Heat run, witnessed	**F05**	•	•
Heat run with rise by resistance test (RBR), unwitnessed	**F06**	•	•
Heat run with rise by resistance test (RBR), witnessed	**F07**	•	•
Calculation of power factor, unwitnessed	**F12**	•	•
Measurement of no-load characteristic and determination of losses and efficiency, unwitnessed	**F14**	•	•
Measurement of no-load characteristic and determination of losses and efficiency, witnessed	**F15**	•	•
No-load noise measurement, without noise analysis, unwitnessed	**F28**	•	•
No-load noise measurement, without noise analysis, witnessed	**F29**	•	•
Measurement of line harmonics, unwitnessed	**F68**	•	•
Measurement of line harmonics, witnessed	**F69**	•	•
Function acceptance (without motor), unwitnessed (description see option **F73**)	**F72**	•	•
Insulation test, unwitnessed (description see option **F77**)	**F76**	•	•

✓ Option available
– Option not available
• Option on request

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

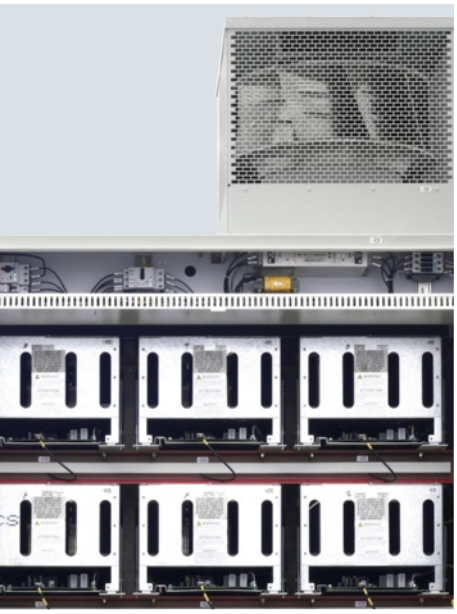
- Line connection voltage
- Transformer configuration
- Auxiliary voltage

[1] Option is included by option **U02** and the combination of the options **U02 & U04**.

[2] For the following options please contact the factory or your local Siemens sales representative.

Technical Data

3



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, fully digital with signal processor
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
Regulations compliances		IEC, IEEE, ANSI, NEMA, CSA, CE and UL
Paint finish		RAL 7035
Degree of protection		• IP21 (standard) [1] • IP42 (optional) [1]
Air cooling		Forced-air cooling with integrated blowers
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 to +45	-25 to +70	+5 to +40 [3]
Relative air humidity		< 95 % (only slight condensation permitted; drive must be completely dry before commissioning)	< 95 % (only slight condensation permitted; 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				
• Displacement	mm	1.5 (2 to 9 Hz)	3.5 (2 to 9 Hz)	0.3 (2 to 9 Hz)
• Acceleration	m/s^2	5 (9 to 200 Hz)	10 (9 to 200 Hz)	1 (9 to 200 Hz)
	m/s^2		15 (200 to 500 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
Chemical 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
Mechanical 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

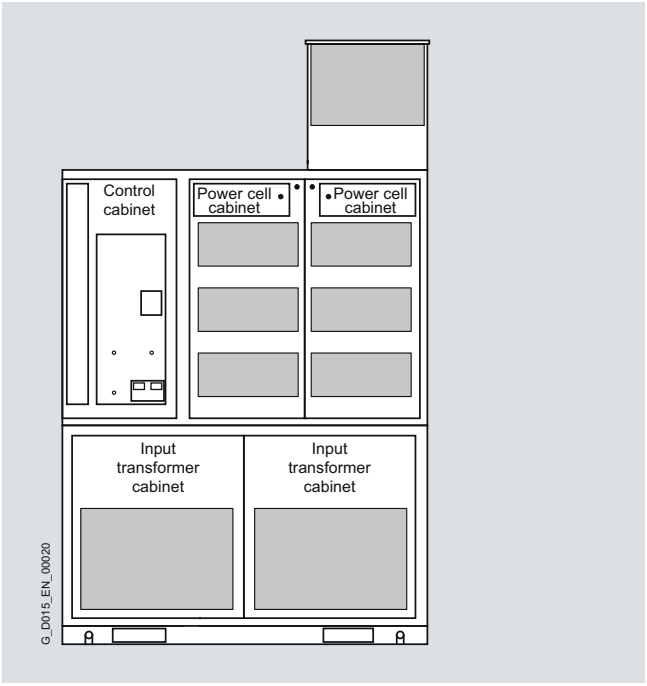
[1] Acc. to IEC 60529.

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

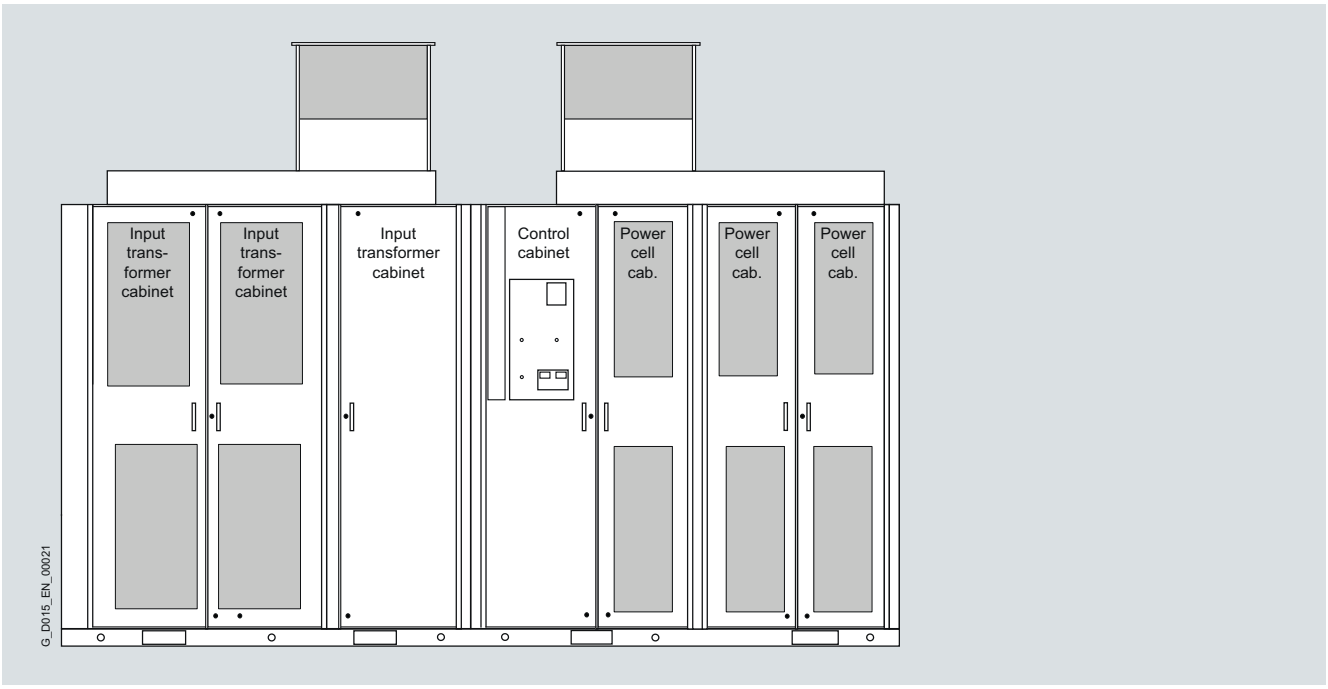
[3] For ambient temperatures above 40 °C, please contact the factory or your local Siemens sales representative.

Technical data

Schematic drawings of GenIV drives:



GenIV for motor voltages 2.3/2.4/3.3/4.0/4.16 kV: schematic drawing **A**



GenIV for motor voltages 6.0/6.6 kV: schematic drawing **B**

For dimensions of GenIV drives, see the following technical data tables.

GenIV

Technical data

ROBICON Perfect Harmony air-cooled drive version		6SR4102-0.B32-0..0	6SR4102-0.B33-0..0	6SR4102-0.B34-0..0	6SR4102-0.C34-0..0	6SR4102-0.C34-5..0
Motor voltage 2.3/2.4 kV						
Max. output voltage	kV	4	4	4	4	4
Type rating	kVA	180	270	290	360	410
Shaft output [1]	kW	149	224	241	298	336
	hp	200	300	323	400	450
Typical motor current [1]	A	43	65	70	87	98
Power cell current	A	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	Yes	Yes	Yes	Yes
Power losses of drive system						
• with copper transformer	kW	< 6	< 9	< 10	< 13	< 14
• with aluminum transformer	kW	< 7	< 11	< 12	< 14	< 16
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	96.5	96.5	96.5	96.5	96.5
• with aluminum transformer	%	96	96	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 [4]	kVA	< 4	< 4	< 4	< 4	< 4
• Three-phase w/ CPT and all options [4]	kVA	< 7	< 7	< 7	< 7	< 7
Cooling air requirement	m^3/s	2.2	2.2	2.2	2.2	2.2
	CFM	4700	4700	4700	4700	4700
Sound pressure level L_{pA} (1 m)	dB	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)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	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	1680	1680	1680	1680	1680
	in	66	66	66	66	66
• Height (incl. blowers)	mm	2780	2780	2780	2780	2780
	in	110	110	110	110	110
• Depth	mm	1065	1065	1065	1065	1065
	in	42	42	42	42	42
• Schematic drawing [6]		A	A	A	A	A
Drive weight (transformer cabinet and cell cabinet)						
• Weight, approx.	kg	2200	2300	2500	2500	2600
	lb	4850	5070	5510	5510	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 φ 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
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[4] Includes cooling blowers/pumps; largest unit shown.

[5] Maximum installable size per phase.

[6] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR4102-0.C35-0..0	6SR4102-0.D35-0..0	6SR4102-0.D36-0..0	6SR4102-0.D37-0..0
Motor voltage 2.3/2.4 kV					
Max. output voltage	kV	4	4	4	4
Type rating	kVA	415	450	540	580
Shaft output [1]	kW	344	373	448	481
	hp	461	500	600	645
Typical motor current [1]	A	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	Yes	Yes	Yes
Power losses of drive system					
• with copper transformer	kW	< 15	< 16	< 19	< 20
• with aluminum transformer	kW	< 17	< 18	< 22	< 23
Efficiency P_{out}/P_{in} [2] **of drive system**					
• with copper transformer	%	96.5	96.5	96.5	96.5
• with aluminum transformer	%	96	96	96	96
Auxiliary supply					
• Single-phase w/o options [3]	kVA	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options [3]	kVA	< 3	< 3	< 3	< 3
• 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 air requirement	m^3/s	2.2	2.2	2.2	2.2
	CFM	4700	4700	4700	4700
Sound pressure level L_{pA} (1 m)	dB	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)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	mm^2 (DIN VDE)	70	70	70	70
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer cabinet and cell cabinet)					
• Width	mm	1680	1680	1680	1680
	in	66	66	66	66
• Height (incl. blowers)	mm	2780	2780	2780	2780
	in	110	110	110	110
• Depth	mm	1065	1065	1065	1065
	in	42	42	42	42
• Schematic drawing [6]		A	A	A	A
Drive weight (transformer cabinet and cell cabinet)					
• Weight, approx.	kg	2700	2700	2900	3100
	lb	5950	5950	6390	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 φ 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
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[4] Includes cooling blowers/pumps; largest unit shown.

[5] Maximum installable size per phase.

[6] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

GenIV

Technical data

ROBICON Perfect Harmony air-cooled drive version		6SR4102-0.A32-0..0	6SR4102-0.A33-0..0	6SR4102-0.B33-0..0	6SR4102-0.B34-0..0	6SR4102-0.B34-5..0	6SR4102-0.C34-5..0
Motor voltage 3.3 kV							
Max. output voltage	kV	4	4	4	4	4	4
Type rating	kVA	180	225	270	360	400	410
Shaft output [1]	kW	149	189	224	298	331	336
	hp	200	254	300	400	444	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	Yes	Yes	Yes	Yes	Yes
Power losses of drive system							
• with copper transformer	kW	< 6	< 8	< 9	< 13	< 14	< 14
• with aluminum transformer	kW	< 7	< 9	< 11	< 14	< 16	< 16
Efficiency P_{out}/P_{in} [2] **of drive system**							
• 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 [3]	kVA	< 3	< 3	< 3	< 3	< 3	< 3
• Three-phase w/o CPT [4]	kVA	< 4	< 4	< 4	< 4	< 4	< 4
• Three-phase w/ CPT and all options [4]	kVA	< 7	< 7	< 7	< 7	< 7	< 7
Cooling air requirement	m^3/s	2.2	2.2	2.2	2.2	2.2	2.2
	CFM	4700	4700	4700	4700	4700	4700
Sound pressure level L_{pA} (1 m)	dB	80	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)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	mm^2 (DIN VDE)	70	70	70	70	70	70
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer cabinet and cell cabinet)							
• Width	mm	1680	1680	1680	1680	1680	1680
	in	66	66	66	66	66	66
• Height (incl. blowers)	mm	2780	2780	2780	2780	2780	2780
	in	110	110	110	110	110	110
• Depth	mm	1065	1065	1065	1065	1065	1065
	in	42	42	42	42	42	42
• Schematic drawing [6]		A	A	A	A	A	A
Drive weight (transformer cabinet and cell cabinet)							
• Weight, approx.	kg	2200	2300	2300	2500	2600	2600
	lb	4850	5070	5070	5510	5730	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 φ 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
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[4] Includes cooling blowers/pumps; largest unit shown.

[5] Maximum installable size per phase.

[6] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR4102-0.C35-0..0	6SR4102-0.C36-0..0	6SR4102-0.C37-0..0	6SR4102-0.D37-0..0	6SR4102-0.D38-0..0	6SR4102-0.D38-7..0
Motor voltage 3.3 kV							
Max. output voltage	kV	4	4	4	4	4	4
Type rating	kVA	450	540	570	630	720	800
Shaft output [1]	kW	373	448	473	522	597	662
	hp	500	600	634	700	800	887
Typical motor current [1]	A	79	95	100	110	126	140
Power cell current	A	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	Yes	Yes	Yes	Yes [2]	Yes [2]
Power losses of drive system							
• with copper transformer	kW	< 16	< 19	< 20	< 22	< 25	< 28
• with aluminum transformer	kW	< 18	< 22	< 23	< 25	< 29	< 32
Efficiency P_{out}/P_{in} [3] **of drive system**							
• 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 [4]	kVA	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options [4]	kVA	< 3	< 3	< 3	< 3	< 3	< 3
• Three-phase w/o CPT [5]	kVA	< 4	< 4	< 4	< 4	< 4	< 4
• Three-phase w/ CPT and all options [5]	kVA	< 7	< 7	< 7	< 7	< 7	< 7
Cooling air requirement	m^3/s	2.2	2.2	2.2	2.2	2.2	2.2
	CFM	4700	4700	4700	4700	4700	4700
Sound pressure level L_{pA} (1 m)	dB	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)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [6] preliminary	AWG/MCM (NEC, CEC)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120
• PE connection, max. connection cross-section at enclosure with M12 screw [6] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	mm^2 (DIN VDE)	70	70	70	70	70	70
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer cabinet and cell cabinet)							
• Width	mm	1680	1680	1680	1680	1680	1680
	in	66	66	66	66	66	66
• Height (incl. blowers)	mm	2780	2780	2780	2780	2780	2780
	in	110	110	110	110	110	110
• Depth	mm	1065	1065	1065	1065	1065	1065
	in	42	42	42	42	42	42
• Schematic drawing [7]		A	A	A	A	A	A
Drive weight (transformer cabinet and cell cabinet)							
• Weight, approx.	kg	2700	2900	3100	3100	3300	3400
	lb	5950	6390	6830	6830	7280	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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

[2] If aluminum transformer is selected, drive dimensions may change. Not available for 50 or 60 Hz transformers with primary voltages > 7200 V.

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

[4] 120/240 V AC for NXGII control
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[5] Includes cooling blowers/pumps; largest unit shown.

[6] Maximum installable size per phase.

[7] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

GenIV

Technical data

ROBICON Perfect Harmony air-cooled drive version		6SR4102-0.A32-0..0	6SR4102-0.A33-0..0	6SR4102-0.A34-0..0	6SR4102-0.B34-0..0	6SR4102-0.B34-5..0
Motor voltage 4.0/4.16 kV						
Max. output voltage	kV	4	4	4	4	4
Type rating	kVA	180	270	275	360	410
Shaft output [1]	kW	149	224	229	298	336
	hp	200	300	307	400	450
Typical motor current [1]	A	26	39	40	52	59
Power cell current	A	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	Yes	Yes	Yes	Yes
Power losses of drive system						
• with copper transformer	kW	< 6	< 9	< 10	< 13	< 14
• with aluminum transformer	kW	< 7	< 11	< 11	< 14	< 16
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	96.5	96.5	96.5	96.5	96.5
• with aluminum transformer	%	96	96	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 [4]	kVA	< 4	< 4	< 4	< 4	< 4
• Three-phase w/ CPT and all options [4]	kVA	< 7	< 7	< 7	< 7	< 7
Cooling air requirement	m^3/s	2.2	2.2	2.2	2.2	2.2
	CFM	4700	4700	4700	4700	4700
Sound pressure level L_{pA} (1 m)	dB	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)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	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	1680	1680	1680	1680	1680
	in	66	66	66	66	66
• Height (incl. blowers)	mm	2780	2780	2780	2780	2780
	in	110	110	110	110	110
• Depth	mm	1065	1065	1065	1065	1065
	in	42	42	42	42	42
• Schematic drawing [6]		A	A	A	A	A
Drive weight (transformer cabinet and cell cabinet)						
• Weight, approx.	kg	2200	2300	2500	2500	2600
	lb	4850	5070	5510	5510	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 φ 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
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[4] Includes cooling blowers/pumps; largest unit shown.

[5] Maximum installable size per phase.

[6] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR4102-0.B35-0..0	6SR4102-0.B36-0..0	6SR4102-0.C36-0..0	6SR4102-0.C37-0..0	6SR4102-0.C38-0..0
Motor voltage 4.0/4.16 kV						
Max. output voltage	kV	4	4	4	4	4
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]	A	65	70	78	91	100
Power cell current	A	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	Yes	Yes	Yes	Yes [2]
Power losses of drive system						
• with copper transformer	kW	< 16	< 17	< 19	< 22	< 24
• with aluminum transformer	kW	< 18	< 19	< 22	< 25	< 28
Efficiency P_{out}/P_{in} [3] **of drive system**						
• with copper transformer	%	96.5	96.5	96.5	96.5	96.5
• with aluminum transformer	%	96	96	96	96	96
Auxiliary supply						
• Single-phase w/o options [4]	kVA	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options [4]	kVA	< 3	< 3	< 3	< 3	< 3
• Three-phase w/o CPT [5]	kVA	< 4	< 4	< 4	< 4	< 4
• Three-phase w/ CPT and all options [5]	kVA	< 7	< 7	< 7	< 7	< 7
Cooling air requirement	m^3/s	2.2	2.2	2.2	2.2	2.2
	CFM	4700	4700	4700	4700	4700
Sound pressure level L_{pA} (1 m)	dB	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)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [6] preliminary	AWG/MCM (NEC, CEC)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120	1 x 120
• PE connection, max. connection cross-section at enclosure with M12 screw [6] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	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 in	1680 66	1680 66	1680 66	1680 66	1680 66
• Height (incl. blowers)	mm in	2780 110	2780 110	2780 110	2780 110	2780 110
• Depth	mm in	1065 42	1065 42	1065 42	1065 42	1065 42
• Schematic drawing [7]		A	A	A	A	A
Drive weight (transformer cabinet and cell cabinet)						
• Weight, approx.	kg lb	2700 5950	2900 6390	2900 6390	3100 6830	3300 7280

[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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

[2] If aluminum transformer is selected, drive dimensions may change. Not available for 50 or 60 Hz transformers with primary voltages > 7200 V.

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

[4] 120/240 V AC for NXGII control
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[5] Includes cooling blowers/pumps; largest unit shown.

[6] Maximum installable size per phase.

[7] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR4102-0.D38-0..0	6SR4102-0.D38-7..0	6SR4102-0.D41-0..0	6SR4102-0.D41-1..0
Motor voltage 4.0/4.16 kV					
Max. output voltage	kV	4	4	4	4
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		Yes [2]	Yes [2]	Yes [2]	Yes [2]
Power losses of drive system					
• with copper transformer	kW	< 25	< 28	< 32	< 34
• with aluminum transformer	kW	< 29	< 32	< 36	< 39
Efficiency P_{out}/P_{in} [3] **of drive system**					
• with copper transformer	%	96.5	96.5	96.5	96.5
• with aluminum transformer	%	96	96	96	96
Auxiliary supply					
• Single-phase w/o options [4]	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 [5]	kVA	< 4	< 4	< 4	< 4
• Three-phase w/ CPT and all options [5]	kVA	< 7	< 7	< 7	< 7
Cooling air requirement	m^3/s	2.2	2.2	2.2	2.2
	CFM	4700	4700	4700	4700
Sound pressure level L_{pA} (1 m)	dB	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)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [6] preliminary	AWG/MCM (NEC, CEC)	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM	1 x 250 MCM
	mm^2 (DIN VDE)	1 x 120	1 x 120	1 x 120	1 x 120
• PE connection, max. connection cross-section at enclosure with M12 screw [6] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	mm^2 (DIN VDE)	70	70	70	70
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer cabinet and cell cabinet)					
• Width	mm	1680	1680	1680	1680
	in	66	66	66	66
• Height (incl. blowers)	mm	2780	2780	2780	2780
	in	110	110	110	110
• Depth	mm	1065	1065	1065	1065
	in	42	42	42	42
• Schematic drawing [7]		A	A	A	A
Drive weight (transformer cabinet and cell cabinet)					
• Weight, approx.	kg	3300	3400	3500	3600
	lb	7280	7500	7720	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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

[2] If aluminum transformer is selected, drive dimensions may change. Not available for 50 or 60 Hz transformers with primary voltages > 7200 V.

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

[4] 120/240 V AC for NXGII control
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[5] Includes cooling blowers/pumps; largest unit shown.

[6] Maximum installable size per phase.

[7] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

Technical data

ROBICON Perfect Harmony air-cooled drive version		6SR4102-2.A33-0..0	6SR4102-2.A34-0..0	6SR4102-2.A35-0..0	6SR4102-2.B35-0..0	6SR4102-2.B36-0..0	6SR4102-2.B37-0..0
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]	A	26	35	40	43	52	61
Power cell current	A	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 losses of drive system							
• with copper transformer	kW	< 9	< 13	< 15	< 16	< 19	< 22
• with aluminum transformer	kW	< 11	< 14	< 17	< 18	< 22	< 25
Efficiency P_{out}/P_{in} [2] **of drive system**							
• 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 [3]	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 options [4]	kVA	< 11	< 11	< 11	< 11	< 11	< 11
Cooling air requirement	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	82	82	82	82	82	82
Power cabling cross sections							
• Cable cross-sections, line-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	mm^2 (DIN VDE)	70	70	70	70	70	70
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer cabinet and cell cabinet)							
• Width	mm	4165	4165	4165	4165	4165	4165
	in	164	164	164	164	164	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]		B	B	B	B	B	B
Drive weight (transformer cabinet and cell cabinet)							
• Weight, approx.	kg	4700	4900	5100	5100	5300	5500
	lb	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 φ 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
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[4] Includes cooling blowers/pumps; largest unit shown.

[5] Maximum installable size per phase.

[6] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

GenIV

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR4102-2.B38-0..0	6SR4102-2.B38-7..0	6SR4102-2.C38-7..0	6SR4102-2.C41-0..0	6SR4102-2.C41-2..0
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	597	602	671	746	860
	hp	800	807	900	1000	1152
Typical motor current [1]	A	69	70	78	87	100
Power cell current	A	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 losses of drive system						
• with copper transformer	kW	< 25	< 25	< 28	< 32	< 36
• with aluminum transformer	kW	< 29	< 29	< 32	< 36	< 41
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	96.5	96.5	96.5	96.5	96.5
• with aluminum transformer	%	96	96	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 [4]	kVA	< 8	< 8	< 8	< 8	< 8
• Three-phase w/ CPT and all options [4]	kVA	< 11	< 11	< 11	< 11	< 11
Cooling air requirement	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	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)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	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
	in	117.5	117.5	117.5	117.5	117.5
• Depth	mm	1250	1250	1250	1250	1250
	in	49	49	49	49	49
• Schematic drawing [6]		B	B	B	B	B
Drive weight (transformer cabinet and cell cabinet)						
• Weight, approx.	kg	5700	5800	5800	5900	6200
	lb	12570	12790	12790	13010	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 φ 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
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[4] Includes cooling blowers/pumps; largest unit shown.

[5] Maximum installable size per phase.

[6] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR4102-2.D41-2..0	6SR4102-2.D41-5..0	6SR4102-2.D41-7..0	6SR4102-2.E41-7..0	6SR4102-2.E42-0..0
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	933	1119	1203	1306	1492
	hp	1250	1500	1613	1750	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		Yes	Yes	Yes	Yes	Yes
Power losses of drive system						
• with copper transformer	kW	< 40	< 47	< 51	< 54	< 62
• with aluminum transformer	kW	< 45	< 54	< 58	< 62	< 70
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	96.5	96.5	96.5	96.5	96.5
• with aluminum transformer	%	96	96	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 [4]	kVA	< 8	< 8	< 8	< 8	< 8
• Three-phase w/ CPT and all options [4]	kVA	< 11	< 11	< 11	< 11	< 11
Cooling air requirement	m^3/s	5	5	5	5.6	5.6
	CFM	10600	10600	10600	11900	11900
Sound pressure level L_{pA} (1 m)	dB	80	80	80	78	78
Power cabling cross sections						
• Cable cross-sections, line-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	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
	in	117.5	117.5	117.5	117.5	117.5
• Depth	mm	1250	1250	1250	1250	1250
	in	49	49	49	49	49
• Schematic drawing [6]		B	B	B	B	B
Drive weight (transformer cabinet and cell cabinet)						
• Weight, approx.	kg	6200	6500	7000	7000	7500
	lb	13670	14330	15430	15430	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 φ 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
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[4] Includes cooling blowers/pumps; largest unit shown.

[5] Maximum installable size per phase.

[6] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

GenIV

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR4102-2.E42-2..0	6SR4102-2.E42-5..0	6SR4102-2.F42-5..0	6SR4102-2.F43-0..0	6SR4102-2.F43-5..0
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]	A	190	200	212	254	260
Power cell current	A	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	Yes [2]	No
Power losses of drive system						
• with copper transformer	kW	< 69	< 73	< 77	< 92	< 95
• with aluminum transformer	kW	< 79	< 83	< 88	< 106	–
Efficiency P_{out}/P_{in} [3] **of drive system**						
• with copper transformer	%	96.5	96.5	96.5	96.5	96.5
• with aluminum transformer	%	96	96	96	96	–
Auxiliary supply						
• Single-phase w/o options [4]	kVA	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options [4]	kVA	< 3	< 3	< 3	< 3	< 3
• Three-phase w/o CPT [5]	kVA	< 8	< 8	< 8	< 8	< 8
• Three-phase w/ CPT and all options [5]	kVA	< 11	< 11	< 11	< 11	< 11
Cooling air requirement	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	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)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [6] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• PE connection, max. connection cross-section at enclosure with M12 screw [6] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	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
	in	117.5	117.5	117.5	117.5	117.5
• Depth	mm	1250	1250	1250	1250	1250
	in	49	49	49	49	49
• Schematic drawing [7]		B	B	B	B	B
Drive weight (transformer cabinet and cell cabinet)						
• Weight, approx.	kg	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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

[2] If aluminum transformer is selected, drive dimensions may change. Not available for 50 or 60 Hz transformers with primary voltages > 7200 V.

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

[4] 120/240 V AC for NXGII control
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[5] Includes cooling blowers/pumps; largest unit shown.

[6] Maximum installable size per phase.

[7] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

Technical data

ROBICON Perfect Harmony air-cooled drive version		6SR4102-2.A33-0..0	6SR4102-2.A34-0..0	6SR4102-2.A35-0..0	6SR4102-2.A36-0..0	6SR4102-2.B36-0..0	6SR4102-2.B37-0..0
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]	A	24	32	39	40	47	55
Power cell current	A	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 losses of drive system							
• with copper transformer	kW	< 9	< 13	< 16	< 16	< 19	< 22
• with aluminum transformer	kW	< 11	< 14	< 18	< 18	< 22	< 25
Efficiency P_{out}/P_{in} [2] **of drive system**							
• 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 [3]	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 options [4]	kVA	< 11	< 11	< 11	< 11	< 11	< 11
Cooling air requirement	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	82	82	82	82	82	82
Power cabling cross sections							
• Cable cross-sections, line-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	mm^2 (DIN VDE)	70	70	70	70	70	70
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (transformer cabinet and cell cabinet)							
• Width	mm	4165	4165	4165	4165	4165	4165
	in	164	164	164	164	164	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]		B	B	B	B	B	B
Drive weight (transformer cabinet and cell cabinet)							
• 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 φ 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
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[4] Includes cooling blowers/pumps; largest unit shown.

[5] Maximum installable size per phase.

[6] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

GenIV

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR4102-2.B38-0..0	6SR4102-2.B38-7..0	6SR4102-2.C38-7..0	6SR4102-2.C41-0..0	6SR4102-2.C41-2..0
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	597	662	671	746	933
	hp	800	887	900	1000	1250
Typical motor current [1]	A	63	70	71	79	99
Power cell current	A	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 losses of drive system						
• with copper transformer	kW	< 25	< 28	< 28	< 32	< 40
• with aluminum transformer	kW	< 29	< 32	< 32	< 36	< 45
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	96.5	96.5	96.5	96.5	96.5
• with aluminum transformer	%	96	96	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 [4]	kVA	< 8	< 8	< 8	< 8	< 8
• Three-phase w/ CPT and all options [4]	kVA	< 11	< 11	< 11	< 11	< 11
Cooling air requirement	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	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)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	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
	in	117.5	117.5	117.5	117.5	117.5
• Depth	mm	1250	1250	1250	1250	1250
	in	49	49	49	49	49
• Schematic drawing [6]		B	B	B	B	B
Drive weight (transformer cabinet and cell cabinet)						
• Weight, approx.	kg	5700	5800	5800	5900	6200
	lb	12570	12790	12790	13010	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 φ 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
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[4] Includes cooling blowers/pumps; largest unit shown.

[5] Maximum installable size per phase.

[6] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR4102-2.C41-5..0	6SR4102-2.D41-5..0	6SR4102-2.D41-7..0	6SR4102-2.D42-0..0	6SR4102-2.E42-0..0
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	946	1119	1306	1324	1492
	hp	1268	1500	1750	1775	2000
Typical motor current [1]	A	100	118	138	140	154
Power cell current	A	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 losses of drive system						
• with copper transformer	kW	< 40	< 47	< 55	< 56	< 62
• with aluminum transformer	kW	< 46	< 54	< 63	< 64	< 70
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	96.5	96.5	96.5	96.5	96.5
• with aluminum transformer	%	96	96	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 [4]	kVA	< 8	< 8	< 8	< 8	< 8
• Three-phase w/ CPT and all options [4]	kVA	< 11	< 11	< 11	< 11	< 11
Cooling air requirement	m^3/s	5	5	5	5	5.6
	CFM	10600	10600	10600	10600	11900
Sound pressure level L_{pA} (1 m)	dB	80	80	80	80	78
Power cabling cross sections						
• Cable cross-sections, line-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	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
	in	117.5	117.5	117.5	117.5	117.5
• Depth	mm	1250	1250	1250	1250	1250
	in	49	49	49	49	49
• Schematic drawing [6]		B	B	B	B	B
Drive weight (transformer cabinet and cell cabinet)						
• Weight, approx.	kg	6500	6500	7000	7500	7500
	lb	14330	14330	15430	16540	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 φ 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
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

[4] Includes cooling blowers/pumps; largest unit shown.

[5] Maximum installable size per phase.

[6] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

GenIV

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR4102-2.E42-2..0	6SR4102-2.E42-5..0	6SR4102-2.E43-0..0	6SR4102-2.F43-0..0	6SR4102-2.F43-5..0
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	A	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 [2]	Yes [2]	No
Power losses of drive system						
• with copper transformer	kW	< 69	< 77	< 80	< 92	< 104
• with aluminum transformer	kW	< 79	< 88	< 91	< 106	–
Efficiency P_{out}/P_{in} [3] **of drive system**						
• with copper transformer	%	96.5	96.5	96.5	96.5	96.5
• with aluminum transformer	%	96	96	96	96	–
Auxiliary supply						
• Single-phase w/o options [4]	kVA	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options [4]	kVA	< 3	< 3	< 3	< 3	< 3
• Three-phase w/o CPT [5]	kVA	< 8	< 8	< 8	< 8	< 8
• Three-phase w/ CPT and all options [5]	kVA	< 11	< 11	< 11	< 11	< 11
Cooling air requirement	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	78	78	78	78	78
Power cabling cross sections						
• Cable cross-sections, line-side, max. connectable per phase with M10 screw [6] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [6] preliminary	AWG/MCM (NEC, CEC)	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM	2 x 500 MCM
	mm^2 (DIN VDE)	2 x 240	2 x 240	2 x 240	2 x 240	2 x 240
• PE connection, max. connection cross-section at enclosure with M12 screw [6] preliminary	AWG/MCM (NEC, CEC)	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG	2/0 AWG
	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
	in	117.5	117.5	117.5	117.5	117.5
• Depth	mm	1250	1250	1250	1250	1250
	in	49	49	49	49	49
• Schematic drawing [7]		B	B	B	B	B
Drive weight (transformer cabinet and cell cabinet)						
• Weight, approx.	kg	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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

[2] If aluminum transformer is selected, drive dimensions may change. Not available for 50 or 60 Hz transformers with primary voltages > 7200 V.

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

[4] 120/240 V AC for NXGII control
- GenIV derives single-phase control power from a built-in CPT as standard
- For GenIV, single-phase control power can be fed directly by the customer as an option (K68)
- CPT is an option in other systems.

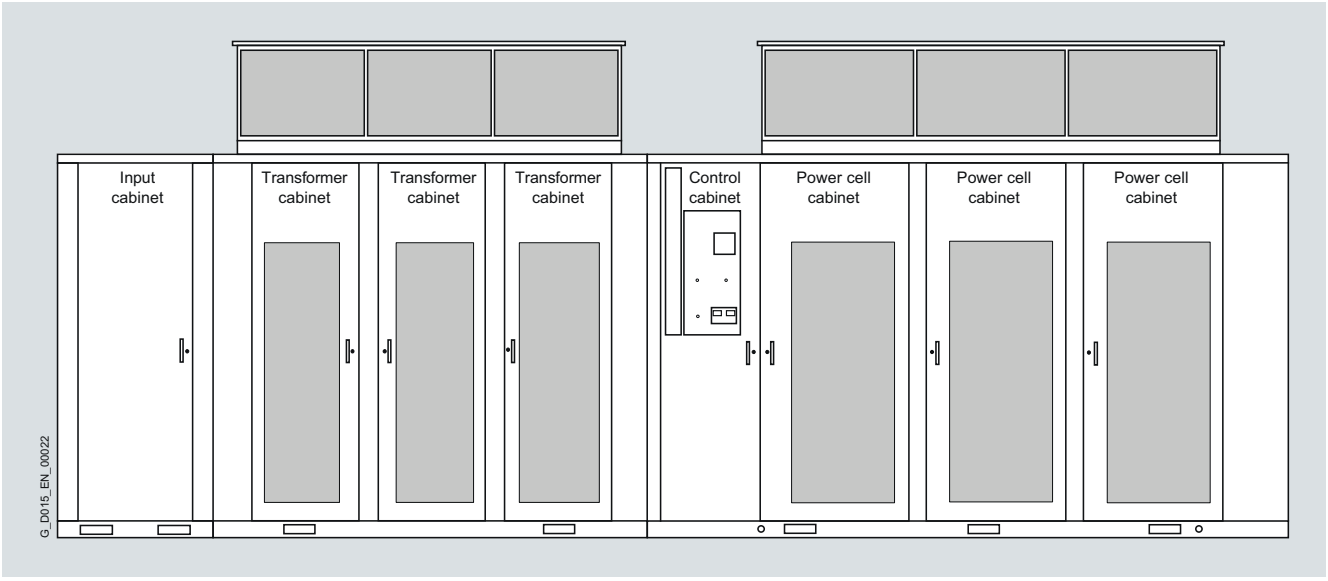
[5] Includes cooling blowers/pumps; largest unit shown.

[6] Maximum installable size per phase.

[7] Please refer to page 3/3 for schematic drawings. The letters A and B refer to the particular drawing.

Technical data

Schematic drawing of GenIIIe drives:



GenIIIe for motor voltages 2.3 to 6.6 kV: schematic drawing **C**

For dimensions of GenIIIe drives, see the following technical data tables.

GenIIIe

Technical data

ROBICON Perfect Harmony air-cooled drive version		6SR3102-1.G41-7..0	6SR3102-1.H41-7..0	6SR3102-1.H42-0..0	6SR3102-1.J42-0..0
Motor voltage 2.3/2.4 kV					
Max. output voltage	kV	3.6	3.6	3.6	3.6
Type rating	kVA	1305	1540	1555	1760
Shaft output [1]	kW	1111	1306	1322	1492
	hp	1489	1750	1773	2000
Typical motor current [1]	A	315	370	375	423
Power cell current	A	315	375	375	500
Number of cells		9	9	9	9
Transformer rating	kVA	1750	1750	2000	2000
Aluminum transformer available		Yes	Yes	Yes	Yes
Power losses of drive system					
• with copper transformer	kW	< 46	< 54	< 54	< 62
• with aluminum transformer	kW	< 52	< 62	< 62	< 70
Efficiency P_{out}/P_{in} [2] **of drive system**					
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 96	> 96
Auxiliary supply					
• Single-phase w/o options [3]	kVA	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options [3]	kVA	< 3	< 3	< 3	< 3
• Three-phase w/o CPT [4]	kVA	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [4]	kVA	< 19	< 19	< 19	< 19
Cooling air requirement	m^3/s	7.1	7.1	7.1	7.1
	CFM	15000	15000	15000	15000
Sound pressure level L_{pA} (1 m)	dB	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [6]					
• Width	mm	5285	5285	5285	5285
	in	208	208	208	208
• Height (incl. blowers)	mm	2970	2970	2970	2970
	in	117	117	117	117
• Depth	mm	1270	1270	1270	1270
	in	50	50	50	50
• Schematic drawing [7]		C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)					
• Weight, approx.	kg	11000	11000	11000	11500
	lb	24500	24500	24500	25500

[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 φ 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; largest unit shown.

[5] Maximum installable size per phase.

[6] If aluminum transformer is selected drive dimensions may change.

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

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR3102-1.J42-2..0	6SR3102-1.J42-5..0	6SR3102-1.K42-5..0	6SR3102-1.K43-0..0
Motor voltage 2.3/2.4 kV					
Max. output voltage	kV	3.6	3.6	3.6	3.6
Type rating	kVA	1980	2075	2200	2620
Shaft output [1]	kW	1679	1763	1865	2222
	hp	2250	2363	2500	2978
Typical motor current [1]	A	476	500	529	630
Power cell current	A	500	500	660	660
Number of cells		9	9	9	9
Transformer rating	kVA	2250	2500	2500	3000
Aluminum transformer available		Yes	Yes	Yes	Yes
Power losses of drive system					
• with copper transformer	kW	< 69	< 73	< 77	< 92
• with aluminum transformer	kW	< 79	< 83	< 88	< 106
Efficiency P_{out}/P_{in} [2] **of drive system**					
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 96	> 96
Auxiliary supply					
• Single-phase w/o options [3]	kVA	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options [3]	kVA	< 3	< 3	< 3	< 3
• Three-phase w/o CPT [4]	kVA	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [4]	kVA	< 19	< 19	< 19	< 19
Cooling air requirement	m^3/s	7.1	7.1	7.1	7.1
	CFM	15000	15000	15000	15000
Sound pressure level L_{pA} (1 m)	dB	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [6]					
• Width	mm	5285	5690	5690	5690
	in	208	224	224	224
• Height (incl. blowers)	mm	2970	2995	2995	2995
	in	117	118	118	118
• Depth	mm	1270	1270	1270	1270
	in	50	50	50	50
• Schematic drawing [7]		C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)					
• Weight, approx.	kg	11000	12500	12500	12500
	lb	24500	27500	27500	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 φ 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; largest unit shown.

[5] Maximum installable size per phase.

[6] If aluminum transformer is selected drive dimensions may change.

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

GenIIIe

Technical data

ROBICON Perfect Harmony air-cooled drive version		6SR3102-1.G41-7..0	6SR3102-1.G42-0..0	6SR3102-1.G42-2..0	6SR3102-1.H42-2..0	6SR3102-1.H42-5..0
Motor voltage 3.3 kV						
Max. output voltage	kV	3.6	3.6	3.6	3.6	3.6
Type rating	kVA	1540	1760	1800	1980	2140
Shaft output [1]	kW	1306	1492	1527	1679	1818
	hp	1750	2000	2047	2250	2437
Typical motor current [1]	A	269	308	315	346	375
Power cell current	A	315	315	315	375	375
Number of cells		9	9	9	9	9
Transformer rating	kVA	1750	2000	2250	2250	2500
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes
Power losses of drive system						
• with copper transformer	kW	< 54	< 62	< 63	< 69	< 75
• with aluminum transformer	kW	< 62	< 70	< 72	< 79	< 86
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 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 [4]	kVA	< 16	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [4]	kVA	< 19	< 19	< 19	< 19	< 19
Cooling air requirement	m^3/s	7.1	7.1	7.1	7.1	7.1
	CFM	15000	15000	15000	15000	15000
Sound pressure level L_{pA} (1 m)	dB	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [6]						
• Width	mm	5285	5285	5285	5285	5690
	in	208	208	208	208	224
• Height (incl. blowers)	mm	2970	2970	2970	2970	2995
	in	117	117	117	117	118
• Depth	mm	1270	1270	1270	1270	1270
	in	50	50	50	50	50
• Schematic drawing [7]		C	C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)						
• Weight, approx.	kg	11000	11000	11000	11000	12500
	lb	24500	24500	24500	24500	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 φ 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; largest unit shown.

[5] Maximum installable size per phase.

[6] If aluminum transformer is selected drive dimensions may change.

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

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR3102-1.J42-5..0	6SR3102-1.J43-0..0	6SR3102-1.J43-5..0	6SR3102-1.K43-5..0
Motor voltage 3.3 kV					
Max. output voltage	kV	3.6	3.6	3.6	3.6
Type rating	kVA	2200	2640	2855	3080
Shaft output [1]	kW	1865	2238	2424	2611
	hp	2500	3000	3250	3500
Typical motor current [1]	A	385	462	500	539
Power cell current	A	500	500	500	660
Number of cells		9	9	9	9
Transformer rating	kVA	2500	3000	3500	3500
Aluminum transformer available		Yes	Yes	Yes	Yes
Power losses of drive system					
• with copper transformer	kW	< 77	< 92	< 100	< 108
• with aluminum transformer	kW	< 88	< 106	< 114	< 123
Efficiency P_{out}/P_{in} [2] **of drive system**					
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 96	> 96
Auxiliary supply					
• Single-phase w/o options [3]	kVA	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options [3]	kVA	< 3	< 3	< 3	< 3
• Three-phase w/o CPT [4]	kVA	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [4]	kVA	< 19	< 19	< 19	< 19
Cooling air requirement	m^3/s	7.1	7.1	7.1	7.1
	CFM	15000	15000	15000	15000
Sound pressure level L_{pA} (1 m)	dB	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [6]					
• Width	mm	5690	5690	5690	5690
	in	224	224	224	224
• Height (incl. blowers)	mm	2995	2995	2995	2995
	in	118	118	118	118
• Depth	mm	1270	1270	1270	1270
	in	50	50	50	50
• Schematic drawing [7]		C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)					
• Weight, approx.	kg	12500	12500	12500	12500
	lb	27500	27500	27500	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 φ 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; largest unit shown.

[5] Maximum installable size per phase.

[6] If aluminum transformer is selected drive dimensions may change.

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

GenIIIe

Technical data

ROBICON Perfect Harmony air-cooled drive version		6SR3102-3.G42-2..0	6SR3102-3.G42-5..0	6SR3102-3.G43-0..0	6SR3102-3.H43-0..0	6SR3102-3.H43-5..0
Motor voltage 4.16 kV						
Max. output voltage	kV	4.9	4.9	4.9	4.9	4.9
Type rating	kVA	1980	2200	2265	2640	2700
Shaft output [1]	kW	1679	1865	1925	2238	2292
	hp	2250	2500	2581	3000	3073
Typical motor current [1]	A	275	305	315	366	375
Power cell current	A	315	315	315	375	375
Number of cells		12	12	12	12	12
Transformer rating	kVA	2250	2500	3000	3000	3500
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes
Power losses of drive system						
• with copper transformer	kW	< 69	< 77	< 79	< 92	< 95
• with aluminum transformer	kW	< 79	< 88	< 91	< 106	< 108
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 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 [4]	kVA	< 16	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [4]	kVA	< 19	< 19	< 19	< 19	< 19
Cooling air requirement	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	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [6]						
• Width	mm	5870	6270	6270	6270	6270
	in	231	247	247	247	247
• Height (incl. blowers)	mm	2995	2995	2995	2995	2995
	in	118	118	118	118	118
• Depth	mm	1270	1270	1270	1270	1270
	in	50	50	50	50	50
• Schematic drawing [7]		C	C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)						
• Weight, approx.	kg	11500	12000	12000	12000	12500
	lb	25500	26500	26500	26500	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 φ 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; largest unit shown.

[5] Maximum installable size per phase.

[6] If aluminum transformer is selected drive dimensions may change.

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

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR3102-3.J43-5..0	6SR3102-3.J44-0..0	6SR3102-3.J45-0..0	6SR3102-3.K45-0..0	6SR3102-3.K46-0..0
Motor voltage 4.16 kV						
Max. output voltage	kV	4.9	4.9	4.9	4.9	4.9
Type rating	kVA	3080	3520	3600	4400	4540
Shaft output [1]	kW	2611	2984	3056	3730	3851
	hp	3500	4000	4097	5000	5162
Typical motor current [1]	A	427	488	500	610	630
Power cell current	A	500	500	500	660	660
Number of cells		12	12	12	12	12
Transformer rating	kVA	3500	4000	5000	5000	6000
Aluminum transformer available		Yes	Yes	Yes	Yes	Yes
Power losses of drive system						
• with copper transformer	kW	< 108	< 123	< 126	< 154	< 159
• with aluminum transformer	kW	< 123	< 141	< 144	< 176	< 182
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 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 [4]	kVA	< 16	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [4]	kVA	< 19	< 19	< 19	< 19	< 19
Cooling air requirement	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	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [6]						
• Width	mm	6270	6270	6880	6880	6880
	in	247	247	271	271	271
• Height (incl. blowers)	mm	2995	2995	2995	2995	2995
	in	118	118	118	118	118
• Depth	mm	1270	1270	1270	1270	1270
	in	50	50	50	50	50
• Schematic drawing [7]		C	C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)						
• Weight, approx.	kg	12500	12300	14500	15000	15500
	lb	27500	27100	32000	33000	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 φ 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; largest unit shown.

[5] Maximum installable size per phase.

[6] If aluminum transformer is selected drive dimensions may change.

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

GenIIIe

Technical data

ROBICON Perfect Harmony air-cooled drive version		6SR3102-3.G42-5..0	6SR3102-3.G43-0..0	6SR3102-3.H43-0..0	6SR3102-3.H43-5..0	6SR3102-3.H44-0..0
Motor voltage 4.6/4.8 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	1865	2222	2238	2611	2645
	hp	2500	2978	3000	3500	3545
Typical motor current [1]	A	264	315	317	370	375
Power cell current	A	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 losses of drive system						
• with copper transformer	kW	< 77	< 92	< 92	< 108	< 109
• with aluminum transformer	kW	< 88	< 105	< 106	< 123	< 125
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 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 [4]	kVA	< 16	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [4]	kVA	< 19	< 19	< 19	< 19	< 19
Cooling air requirement	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	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [6]						
• Width	mm	6270	6270	6270	6270	6270
	in	247	247	247	247	247
• Height (incl. blowers)	mm	2995	2995	2995	2995	2995
	in	118	118	118	118	118
• Depth	mm	1270	1270	1270	1270	1270
	in	50	50	50	50	50
• Schematic drawing [7]		C	C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)						
• Weight, approx.	kg	12000	12000	12000	12500	12500
	lb	26500	26500	26500	27500	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 φ 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; largest unit shown.

[5] Maximum installable size per phase.

[6] If aluminum transformer is selected drive dimensions may change.

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

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR3102-3.J44-0..0	6SR3102-3.J45-0..0	6SR3102-3.K45-0..0	6SR3102-3.K46-0..0
Motor voltage 4.6/4.8 kV					
Max. output voltage	kV	4.9	4.9	4.9	4.9
Type rating	kVA	3520	4155	4400	5240
Shaft output [1]	kW	2984	3526	3730	4443
	hp	4000	4727	5000	5956
Typical motor current [1]	A	423	500	529	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	Yes	Yes	Yes
Power losses of drive system					
• with copper transformer	kW	< 123	< 145	< 154	< 183
• with aluminum transformer	kW	< 141	< 166	< 176	< 210
Efficiency P_{out}/P_{in} [2] **of drive system**					
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 96	> 96
Auxiliary supply					
• Single-phase w/o options [3]	kVA	< 1.5	< 1.5	< 1.5	< 1.5
• Single-phase w/ all options [3]	kVA	< 3	< 3	< 3	< 3
• Three-phase w/o CPT [4]	kVA	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [4]	kVA	< 19	< 19	< 19	< 19
Cooling air requirement	m^3/s	8.5	8.5	8.5	8.5
	CFM	18000	18000	18000	18000
Sound pressure level L_{pA} (1 m)	dB	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [6]					
• Width	mm	6270	6880	6880	6880
	in	247	271	271	271
• Height (incl. blowers)	mm	2995	2995	2995	2995
	in	118	118	118	118
• Depth	mm	1270	1270	1270	1270
	in	50	50	50	50
• Schematic drawing [7]		C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)					
• Weight, approx.	kg	13000	15000	15500	16000
	lb	28500	33000	34000	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 φ 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; largest unit shown.

[5] Maximum installable size per phase.

[6] If aluminum transformer is selected drive dimensions may change.

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

GenIIIe

Technical data

ROBICON Perfect Harmony air-cooled drive version		6SR3102-5.G43-5..0	6SR3102-5.G44-0..0	6SR3102-5.H44-0..0	6SR3102-5.H45-0..0	6SR3102-5.J45-0..0
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	2611	2777	2984	3306	3730
	hp	3500	3722	4000	4432	5000
Typical motor current [1]	A	296	315	338	375	423
Power cell current	A	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 losses of drive system						
• with copper transformer	kW	< 108	< 114	< 123	< 136	< 154
• with aluminum transformer	kW	< 123	< 131	< 141	< 156	< 176
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 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 [4]	kVA	< 16	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [4]	kVA	< 19	< 19	< 19	< 19	< 19
Cooling air requirement	m^3/s	11.8	11.8	11.8	11.8	11.8
	CFM	25000	25000	25000	25000	25000
Sound pressure level L_{pA} (1 m)	dB	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [6]						
• Width	mm	7215	7215	7215	7825	7825
	in	284	284	284	308	308
• Height (incl. blowers)	mm	2995	2995	2995	2995	2995
	in	118	118	118	118	118
• Depth	mm	1370	1370	1370	1370	1370
	in	54	54	54	54	54
• Schematic drawing [7]		C	C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)						
• Weight, approx.	kg	11400	12400	12500	14300	14600
	lb	25100	27300	27500	31500	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 φ 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; largest unit shown.

[5] Maximum installable size per phase.

[6] If aluminum transformer is selected drive dimensions may change.

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

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR3102-5.J46-0..0	6SR3102-5.K46-0..0	6SR3102-5.K47-0..0	6SR3102-5.K48-0..0
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]	A	500	508	592	630
Power cell current	A	500	660	660	660
Number of cells		15	15	15	15
Transformer rating	kVA	6000	6000	7000	8000
Aluminum transformer available		Yes	Yes	Yes	[2]
Power losses of drive system					
• with copper transformer	kW	< 182	< 185	< 216	< 229
• with aluminum transformer	kW	< 208	< 211	< 246	< 262
Efficiency P_{out}/P_{in} [3] **of drive system**					
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 96	> 96
Auxiliary supply					
• Single-phase w/o options [4]	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 [5]	kVA	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [5]	kVA	< 19	< 19	< 19	< 19
Cooling air requirement	m^3/s	11.8	11.8	11.8	11.8
	CFM	25000	25000	25000	25000
Sound pressure level L_{pA} (1 m)	dB	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [6] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [6] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [7]					
• Width	mm	7825	7825	7825	7825
	in	308	308	308	308
• Height (incl. blowers)	mm	2995	2995	3200	3200
	in	118	118	126	126
• Depth	mm	1370	1370	1370	1370
	in	54	54	54	54
• Schematic drawing [8]		C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)					
• Weight, approx.	kg	16000	16500	17000	19000
	lb	35300	36500	37500	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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

[2] Please contact the factory or your local Siemens 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; largest unit shown.

[6] Maximum installable size per phase.

[7] If aluminum transformer is selected drive dimensions may change.

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

GenIIIe

Technical data

ROBICON Perfect Harmony air-cooled drive version		6SR3102-7.G43-5..0	6SR3102-7.G44-0..0	6SR3102-7.G45-0..0	6SR3102-7.H45-0..0	6SR3102-7.J45-0..0
Motor voltage 6.6 kV						
Max. output voltage	kV	7.3	7.3	7.3	7.3	7.3
Type rating	kVA	3080	3520	3600	4285	4400
Shaft output [1]	kW	2611	2984	3055	3636	3730
	hp	3500	4000	4095	4875	5000
Typical motor current [1]	A	269	308	315	375	385
Power cell current	A	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 losses of drive system						
• with copper transformer	kW	< 108	< 123	< 126	< 150	< 154
• with aluminum transformer	kW	< 123	< 141	< 144	< 171	< 176
Efficiency P_{out}/P_{in} [2] **of drive system**						
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 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 [4]	kVA	< 16	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [4]	kVA	< 19	< 19	< 19	< 19	< 19
Cooling air requirement	m^3/s	13.2	13.2	13.2	13.2	13.2
	CFM	28000	28000	28000	28000	28000
Sound pressure level L_{pA} (1 m)	dB	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [5] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [5] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [6]						
• Width	mm	7215	7215	7825	7825	7825
	in	284	284	308	308	308
• Height (incl. blowers)	mm	2995	2995	2995	2995	2995
	in	118	118	118	118	118
• Depth	mm	1370	1370	1370	1370	1370
	in	54	54	54	54	54
• Schematic drawing [7]		C	C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)						
• Weight, approx.	kg	12500	13500	14000	14000	14400
	lb	27500	30000	31000	31000	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 φ 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; largest unit shown.

[5] Maximum installable size per phase.

[6] If aluminum transformer is selected drive dimensions may change.

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

Technical data (continued)

ROBICON Perfect Harmony air-cooled drive version		6SR3102-7.J46-0..0	6SR3102-7.J47-0..0	6SR3102-7.K47-0..0	6SR3102-7.K48-0..0
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	4476	4849	5222	5968
	hp	6000	6500	7000	8000
Typical motor current [1]	A	462	500	539	615
Power cell current	A	500	500	660	660
Number of cells		18	18	18	18
Transformer rating	kVA	6000	7000	7000	8000
Aluminum transformer available		Yes	Yes	Yes	[2]
Power losses of drive system					
• with copper transformer	kW	< 185	< 200	< 216	< 246
• with aluminum transformer	kW	< 211	< 229	< 246	< 282
Efficiency P_{out}/P_{in} [3] **of drive system**					
• with copper transformer	%	> 96.5	> 96.5	> 96.5	> 96.5
• with aluminum transformer	%	> 96	> 96	> 96	> 96
Auxiliary supply					
• Single-phase w/o options [4]	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 [5]	kVA	< 16	< 16	< 16	< 16
• Three-phase w/ CPT and all options [5]	kVA	< 19	< 19	< 19	< 19
Cooling air requirement	m^3/s	13.2	13.2	13.2	13.2
	CFM	28000	28000	28000	28000
Sound pressure level L_{pA} (1 m)	dB	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)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• Cable cross-sections, motor-side, max. connectable per phase with M10 screw [6] preliminary	AWG/MCM (NEC, CEC)	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM	2 x 1000 MCM
	mm^2 (DIN VDE)	2 x 500	2 x 500	2 x 500	2 x 500
• PE connection, max. connection cross-section at enclosure with M12 screw [6] preliminary	AWG/MCM (NEC, CEC)	1000 MCM	1000 MCM	1000 MCM	1000 MCM
	mm^2 (DIN VDE)	500	500	500	500
Degree of protection		NEMA1/IP21	NEMA1/IP21	NEMA1/IP21	NEMA1/IP21
Drive dimensions (input cabinet, transformer cabinet and cell cabinet) [7]					
• Width	mm	7825	7825	7825	7825
	in	308	308	308	308
• Height (incl. blowers)	mm	2995	3200	3200	3200
	in	118	126	126	126
• Depth	mm	1370	1370	1370	1370
	in	54	54	54	54
• Schematic drawing [8]		C	C	C	C
Drive weight (input cabinet, transformer cabinet and cell cabinet)					
• Weight, approx.	kg	15500	17500	18000	19500
	lb	34000	38500	39700	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 φ and motor efficiency. Both approximate values have to be adapted to the motor that is actually used.

[2] 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; largest unit shown.

[6] Maximum installable size per phase.

[7] If aluminum transformer is selected drive dimensions may change.

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

Notes

Description of Options

Description of options

Options

In the following you find a detailed description of the options. To easily find the required order code and its associated parameters, the descriptions are sorted alphabetically by order codes in the paragraphs below.

B09
Electrical submersible pumps applications

With option B09, filter parameters will be calculated and uploaded to the drive parameter set as of actual filter data (inductance and capacitance) and motor cable data (specific resistance).

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

B10
Converter adapted to ZLU requirements

- Transformer realized acc. to IEC 60076-11 (incl. double VPIed windings and routine test of partial discharge level > 10 pC)
- Engineering support to fulfill the following ZLU requirements:
  - operational between 0.8 $U_n \leq U \leq 1.1\ U_n$ and 47.5 Hz $\leq f_n \leq$ 52.5 Hz
  - operation assured on load shedding by the generator and short time frequency rise to 1.1 f_n for 5 seconds and simultaneous voltage rise to 1.25 U_n for 2 seconds

This option does not contain a customer witness test of the transfomers at the vendor's location. In case this test is required it needs separate offering/negotiating/ordering.

B43 to B45
Production schedules

Mutually exclusive options **B43** to **B45**

Production schedules	Code	**B43**	**B44**	**B45**
Production schedule: one issue	**B43**		–	–
Production schedule: updated at 2-week intervals	**B44**	–		–
Production schedule: updated once per month	**B45**	–	–	

– Options are mutually exclusive

The 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
Manufacturer data block

With Option **B49** a manufacturer data block will be established (paper copy). It is a signed document with test certificates, conformity certificates and type test certificate to prove all quality assurance measures have been taken up during production.

Note: This book will not be part of the documentation CD-ROM but can be downloaded from the Internet later on.

D00 to D90
Documentation

Mutually exclusive options **D00** to **D84** [1)]

Documentation (standard: PDF format in English on CD-ROM)	Code	**D00**	**D02**	**D15**	**D56**	**D76**	**D79**	**D84**
Documentation in German	**D00**		✓	✓	–	✓	–	–
Circuit diagrams, terminal diagrams and dimension drawings in DXF format, (English only)	**D02**	✓		✓	✓	✓	✓	✓
One set of printed documentation	**D15**	✓	✓		✓	✓	✓	✓
Documentation in Russian	**D56**	–	✓	✓		✓	–	–
Documentation in English	**D76**	✓	✓	✓	✓		✓	✓
Documentation in Portuguese (Brazil)	**D79**	–	✓	✓	–	✓		–
Documentation in Chinese	**D84**	–	✓	✓	–	✓	–	

✓ 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.

[1)] For each documentation language listed in the table on the following page, the same mutual exclusions with other languages will apply as for German, Russian, Portuguese and Chinese.

Options (continued)

Option	Description
D00	**Documentation in German** With order code **D00**, the documentation is supplied in German on CD-ROM.
D02	**Circuit diagrams, terminal diagrams and dimension drawings in DXF format (English only)** 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 (multiple orders possible)** If documentation is also required on paper, this must be ordered using order code **D15**.
D54	**Documentation in Czech (on request)** With order code **D54**, the documentation is supplied in Czech on CD-ROM.
D55	**Documentation in Polish (on request)** With order code **D55**, the documentation is supplied in Polish on CD-ROM.
D56	**Documentation in Russian** With order code **D56**, the documentation is supplied in Russian on CD-ROM.
D57	**Documentation in Japanese (on request)** With order code **D57**, the documentation is supplied in Japanese on CD-ROM.
D62	**Documentation in Danish (on request)** With order code **D62**, the documentation is supplied in Danish on CD-ROM.
D71	**Documentation in Romanian (on request)** With order code **D71**, the documentation is supplied in Romanian on CD-ROM.
D72	**Documentation in Italian** With order code **D72**, the documentation is supplied in Italian on CD-ROM.
D73	**Documentation in Finnish (on request)** With order code **D73**, the documentation is supplied in Finnish on CD-ROM.
D74	**Documentation in Dutch (on request)** With order code **D74**, the documentation is supplied in Dutch on CD-ROM.
D75	**Documentation in Turkish (on request)** With order code **D75**, the documentation is supplied in Turkish on CD-ROM.
D76	**Documentation in English** If a documentation language other than English is selected (options **D00** or **D54** to **D90**), an additional CD-ROM with documentation in English as second documentation language can be ordered using 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.

Option	Description
D77	**Documentation in French (on request)** With order code **D77**, the documentation is supplied in French on CD-ROM.
D78	**Documentation in Spanish (on request)** With order code **D78**, the documentation is supplied in Spanish on CD-ROM.
D79	**Documentation in Portuguese (Brazil)** With order code **D79**, the documentation is supplied in Portuguese on CD-ROM.
D80	**Documentation in Bulgarian (on request)** With order code **D80**, the documentation is supplied in Bulgarian on CD-ROM.
D81	**Documentation in Norwegian (on request)** With order code **D81**, the documentation is supplied in Norwegian on CD-ROM.
D82	**Documentation in Hungarian (on request)** With order code **D82**, the documentation is supplied in Hungarian on CD-ROM.
D83	**Documentation in Swedish (on request)** With order code **D83**, the documentation is supplied in Swedish on CD-ROM.
D84	**Documentation in Chinese** With order code **D84**, the documentation is supplied in Chinese on CD-ROM.
D85	**Documentation in Slovenian (on request)** With order code **D85**, the documentation is supplied in Slovenian on CD-ROM.
D86	**Documentation in Greek (on request)** With order code **D86**, the documentation is supplied in Greek on CD-ROM.
D87	**Documentation in Slovakian (on request)** With order code **D87**, the documentation is supplied in Slovakian on CD-ROM.
D88	**Documentation in Estonian (on request)** With order code **D88**, the documentation is supplied in Estonian on CD-ROM.
D89	**Documentation in Latvian (on request)** With order code **D89**, the documentation is supplied in Latvian on CD-ROM.
D90	**Documentation in Lithuanian (on request)** With order code **D90**, the documentation is supplied in Lithuanian on CD-ROM.

Description of options

Options (continued)

F03 to F97
Drive acceptance tests, witnessed

Mutually exclusive options **F03** to **F97**

Drive acceptance tests, witnessed	Code	**F03**	**F73**	**F77**	**F79**	**F97**
Visual acceptance	**F03**		–	–	–	✓
Functional acceptance (without motor)	**F73**	–		✓	✓	✓
Insulation test	**F77**	–	✓		–	✓
Interface check with customer equipment (5 hours, on request)	**F79**	–	✓	–		✓
Customer-specific acceptance (on request, without motor)	**F97**	✓	✓	✓	✓	

✓ Options can be combined
– Options are mutually exclusive

Option	Description
F03	**Visual acceptance** Open doors/panels; inspection of drive before shipping
F73	**Functional acceptance (without motor)** Visual acceptance; functional test with inductive load, cooling system validation. Option **F73** includes option **F03** (visual acceptance).
F77	**Insulation test** The following is included in the scope of the acceptance tests: • High-voltage test • The insulation resistance is measured The insulation test can only be ordered in connection with option **F73** (functional acceptance).
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 (on request, without motor)** For details please contact the factory or your local Siemens sales representative.

F04 to F76
Additional testing options

Option	Description
F04	Heat run, unwitnessed
F05	Heat run, witnessed
F06	Heat run with rise by resistance test (RBR), unwitnessed
F07	Heat run with rise by resistance test (RBR), witnessed
F12	Calculation of power factor, unwitnessed
F14	Measurement of no-load characteristic and determination of losses and efficiency, unwitnessed
F15	Measurement of no-load characteristic and determination of losses and efficiency, witnessed
F28	No-load noise measurement, without noise analysis, unwitnessed
F29	No-load noise measurement, without noise analysis, witnessed
F68	Measurement of line harmonics, unwitnessed
F69	Measurement of line harmonics, witnessed
F72	Functional acceptance (without motor), unwitnessed (description see option **F73**)
F76	Insulation test, unwitnessed (description see option **F77**)

Options (continued)

G21 to G93
Serial communication

Mutually exclusive options **G21** to **G93**

Serial communication	Code	G21	G22	G23	G26	G28	G91	G31	G32	G38	G43	G46	G93
Modbus Plus interface, network 1	**G21**		–	–	–	–	–	✓	✓	✓	✓	✓	✓
Modbus RTU interface, network 1	**G22**	–		–	–	–	–	✓	✓	✓	✓	✓	✓
DeviceNet profile 12 interface, network 1	**G23**	–	–		–	–	–	✓	✓	✓	✓	✓	✓
Control Net interface, network 1	**G26**	–	–	–		–	–	✓	✓	✓	✓	✓	✓
Modbus Ethernet interface, network 1	**G28**	–	–	–	–		–	✓	✓	✓	✓	✓	✓
PROFIBUS DP interface, network 1	**G91**	–	–	–	–	–		✓	✓	✓	✓	✓	✓
Modbus Plus interface, network 2	**G31**	✓	✓	✓	✓	✓	✓		–	–	–	–	–
Modbus RTU interface, network 2	**G32**	✓	✓	✓	✓	✓	✓	–		–	–	–	–
Modbus Ethernet interface, network 2	**G38**	✓	✓	✓	✓	✓	✓	–	–		–	–	–
DeviceNet profile 12 interface, network 2	**G43**	✓	✓	✓	✓	✓	✓	–	–	–		–	–
Control Net interface, network 2	**G46**	✓	✓	✓	✓	✓	✓	–	–	–	–		–
PROFIBUS DP interface, network 2	**G93**	✓	✓	✓	✓	✓	✓	–	–	–	–	–	

✓ Options can be combined

– Options are mutually exclusive

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

Option	Description
G21	**Modbus Plus interface, network 1** Note: If a second Modbus Plus interface is required, select options **G21** and **G31**.
G22	**Modbus RTU interface, network 1** Software activation of the interface; available without additional hardware Note: If a second Modbus interface is required, select options **G22** and **G32**.
G23	**DeviceNet profile 12 interface, network 1** Note: If a second DeviceNet interface is required, select options **G23** and **G43**.
G26	**Control Net interface, network 1** Note: If a second Control Net interface is required, select options **G26** and **G46**.
G28	**Modbus Ethernet interface, network 1** Software activation of the interface; available without additional hardware Note: If a second Modbus Ethernet interface is required, select options **G28** and **G38**.
G31	**Modbus Plus interface, network 2**
G32	**Modbus RTU interface, network 2**
G38	**Modbus Ethernet interface, network 2**
G43	**DeviceNet profile 12 interface, network 2**
G46	**Control Net interface, network 2**
G91	**PROFIBUS DP interface, network 1** Note: If a second PROFIBUS DP interface is required, select options **G91** and **G93**.
G93	**PROFIBUS DP interface, network 2**

Number of Anybus modules required for network implementation using NXGII

Network 1 \ Network 2	Modbus Plus (**G31**)	Modbus RTU (**G32**)	Modbus Ethernet (**G38**)	DeviceNet profile 12 (**G43**)	Control Net (**G46**)	PROFIBUS DP (**G93**)
Modbus Plus (**G21**)	2	2	2	2	2	2
Modbus RTU [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

The Ethernet port connector is standard for all Perfect Harmony drives.

[1] Network 1 Modbus uses the COM port on the comminications board.

[2] Network 1 Modbus Ethernet uses the Ethernet port on CPU card (additional Ethernet switch is required).

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	**Signal lamp in the cabinet door** With option **K20**, five signal lamps 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 instrumens in the cabinet door for voltage, current and speed** 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: The 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: The options **K31** to **K34** are mutually exclusive. Select one of them.
K33	**Keyed Off-Local-Remote selector** A three position selector switch mounted on the front of the drive provided with keyed protection. Note: The options **K31** and **K33** are mutually exclusive. Select one of them.
K34	**Keyed Off-Hand-Auto selector** A three position selector switch mounted on the front of the drive with keyed protection. Note: The 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
Vector control with speed encoder

With Option **K50**, I/O for evaluation of a speed encoder signal is integrated. For example, this is used in applications that require very accurate speed control, especially at low speeds.

Note: Option **K50** is applied to 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 by Siemens	**K69**	–		–
Connection for control voltage 120 V AC by customer	**K79**	–	–	

– Options are mutually exclusive

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** Using option **K68**, the customer will supply control voltage to the drive. The maximum current consumption is 4 A.
K69	**Control voltage 120 V AC by Siemens** Option **K69** includes a CPT (control power transformer) built into the drive. 120 V AC will be generated internally from the auxilliary supply.
K79	**Connection for control voltage 120 V AC by customer** Using option **K79**, the customer will control voltage to the drive.
K73	**I/O signal voltage 24 V DC** With option **K73**, 24 V DC is available as Input/Output control signals.

Options (continued)

L03
EMC filter [1)]

CE mark drives require an EMC line filter. With option **L03**, the filter will be installed downstream from the 3-phase control power disconnect switch. Customer input control power cables will be routed inside the metallic wire-way before being terminated at the control power disconnect switch.

Note: Option **L03** is included by option **U02** which is mandatory for GenIV units. It is **not** available separately for these drives.

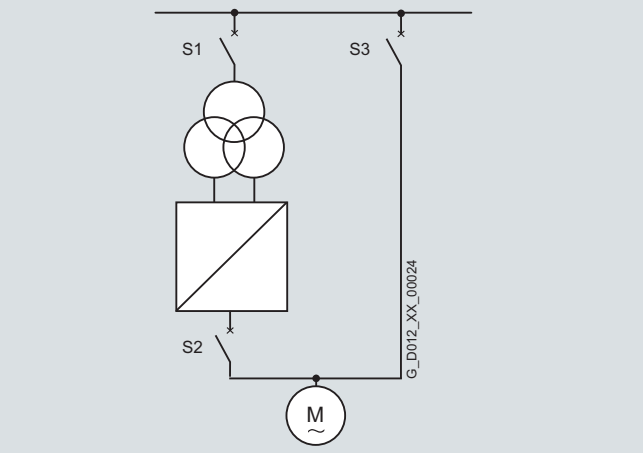
L09
Output reactor

The air-cooled units will be supplied with a reactor cabinet included in the drive lineup with IP protection same as the drive.

Option **L09** cannot be combined with options **M64** or **M68** (drive prepared for duct flange connection).

L29
Bidirectional synchronized transfer

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 supply voltage (phase relation, frequency and amplitude). The motor is subsequently connected in parallel to the line with the S3 circuit-breaker/contactor before the output-side S2 circuit-breaker/contactor opens.



Circuit-breakers/contactors

Approximately 100 ms pass under consideration of the response time constants of the two circuit-breakers/contactors (opening and closing times). Within this period of time the motor is transferred from the drive to the line. This ensures a bumpless transfer of the motor to the line.

If the motor is to be subsequently taken from the line and operated via the drive again, the transfer process is executed in reverse order. The drive is first run up in no-load operation and its output voltage is synchronized to the line voltage in its phase relation, frequency and amplitude. Then circuit-breaker/contactor S2 is closed before S3 is opened and the motor is isolated from the line. In this case the motor is taken over bumplessly by the drive and can either be operated under speed control or shut down under control. Variable speed operation during running up and shutting down does not produce any high starting and transient torques that could damage the drive train or cause e.g. pressure fluctuations in the process. The S3 circuit-breaker/contactor must be configured to protect the motor against over currents and over voltages during line operation. If temperature sensors are fitted in the motor, these must be monitored independently (plant-side) during line operation.

An output reactor (option **L09**) is additionally required for the decoupling of the drive output during the commutation process.

Note: The circuit-breakers/contactors are not included in the scope of delivery. For the dimensioning of the the output reactor (option **L09**) and the circuit-breakers/contactors contact the factory or your local Siemens sales representative. A motor protection relay should also be considered in the bybass circuit.

Attention: Option **L29** is only possible if the drive output voltage is the same as the line voltage.

[1)] Option is included by option **U02** and the combination of the options **U02 & U04**.

Description of options

Options (continued)

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 voltage supply for the cabinet lighting and socket outlet (on terminal block) is provided externally. The cabinet light-ing is switched on manually via a switch.

L55
Anti-condensation heating for cabinet

The anti-condensation heating is recommended at low ambient temperatures and high levels of humidity to prevent condensation. The number of cabinet heaters fitted depends on the number of cabinet panels (refer to the table). The anti-condensation heaters are controlled with a thermostat.

Note: The supply voltage for the anti-condensation heating (110 to 240 V AC) **must** be supplied externally.

Drive type	Number and power of heaters
GenIIIe	7 heaters, 100 W each
GenIV	
9 cells, up to 140 A	3 heaters, 100 W each
15 cells	5 heaters, 100 W each

L81
2 x 2 thermistor protection relays for alarm and fault

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

L82
3 x 2 thermistor protection relays for alarm and fault

Option **L82** offers six thermistor protection relays for PTC thermistors (type A) for alarm and trip. The power supply for the relay and the evaluation is provided within 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 analog outputs	**L93**	–		–
PT100 evaluation unit with 6 inputs for explosion-proof motors and 2 analog outputs	**L95**	–	–	

– Options are mutually exclusive

Note: These exclusions apply for 6.6 kV drives up to 260 A only.

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 sequence of the drive.

L93
PT100 evaluation unit with 6 inputs and 2 analog outputs

The PTt100 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 sequence 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 explosion-proof motors and 2 analog outputs

Six evaluation units are available for use in explosion-proof motors Zone 2, Zone 22 (non-conductive dusts) Div. 2 and safe areas (inherently safe input: [Ex ia] IIC). The resistance thermometers (PT100, PT500, PT1000) can be operated in a two-wire, three-wire or four-wire system. The six evaluation units are arranged in two groups of three units each. For each group the alarm and fault messages are combined together and integrated into the alarm and fault reporting chain of the drive. Furthermore, a temperature measured value is led to an analog input of the drive in each group so that it is available to the drive control for measurement and display purposes.

Note: The analog outputs are not evaluated by the control.

Note: The maximum cable cross section that can be connected plant-side is 1.5 mm^2. For the cables, an extra cable duct has to be provided, causing the restriction that option **L95** can be connected from top only (for GenIV, 4.0 kV) and from bottom only (for GenIIIe and GenIV, 6.6 kV).

Options (continued)

M10
Mechanical door interlock – Castell

With the 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 to 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: Units have as a standard an electrical door interlock.

M12
Electrical door interlocks [1)]

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 energized until all doors into 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 CE marking. **M12** is included by the mandatory option **U02** for CE marked units delivered from Nuremberg. It is not available separately for these drives.

M35 to M37
Gland plates

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

The options **M35** to **M37** are mutually exclusive.

Option	Description
M35	**Gland plates** • aluminum
M36	**Gland plates** • brass
M37	**Gland plates** • stainless steel

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

M42
IP42 degree of protection

As standard the air-cooled drives are supplied with NEMA 1 compliance. The corresponding standard degree of protection for the GenIIIe and GenIV drives is IP21.

With option **M42**, the degree of protection for the air-cooled GenIIIe and GenIV drives can be enhanced over the standard offering (NEMA 1 or IP21).

M61
Redundant blower

To improve system availability, an additional blower is added to the drive. If a blower within the drive cabinet fails, the redundant blower is activated by the drive control system preventing the drive from tripping. This prevents production down times or interruptions. Replacement of the faulty blower can be postponed until the next scheduled shutdown.

Note: Option **M61** is included by the option **U10** (ProToPS).

M64
Drive prepared for duct flange connection in front

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

This option is applicable 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 not be lower than 0 Pa and higher than 50 Pa.

Attention:

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

- For changing the blowers, suitable openings have to be provided in the air duct.
- It has to be assured that the cabinet doors can be opened/closed after mounting the air duct.

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

For more implementation details on option **M64**, please contact the factory or your local Siemens sales representative.

M67
Version for harsh environment conditions

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

Measures comprise:

- Aluminum parts coated or anodized
- Galvanized parts coated or replaced with stainless steel parts
- Double 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 duct flange connection in rear

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

Further description see option **M64** (drive prepared for duct flange connection in front).

M69
Extended space for bottom cable entry (GenIV, 4.0 kV, up to 140 A only)

Extra cabinet, mounted at the left side, Dimensions: 300 mm width, 520 mm depth, cable entry area: 320 x 100 mm (min.).

Note: Only available for GenIV 4 kV up to 140 A.

Note: This option will be also used for option **N44** (Make-proof grounding switch at converter input).

[1)] Option is included by option **U02** and the combination of the options **U02 & U04**.

Description of options

Options (continued)

N30 to N33
Controlled outgoing feeder for auxiliaries
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, 400 or 460/480 V 3 AC, max. 4/4.8 kW	**N30**		–	–	–
Controlled outgoing feeder, 400 or 460/480 V 3 AC, max. 7/8 kW	**N31**	–		–	–
Controlled outgoing feeder, 400 or 460/480 V 3 AC, max. 11/12.7 kW	**N32**	–	–		–
Controlled outgoing feeder, 400 or 460/480 V 3 AC, max. 15/17.5 kW	**N33**	–	–	–	

– Options are mutually exclusive

A controlled outgoing feeder for the operation of external auxiliary equipment, e.g. separate blowers on the motor or pumps/oil supplies, is available in the drive. It is controlled and is fused by motor circuit-breakers. The voltage supply required for the drive 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 auxiliaries** 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 auxiliaries** 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 auxiliaries** 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 auxiliaries** 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)

N35 to N38
Controlled outgoing feeder for auxiliaries
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, 230 or 120 V 1 AC, max. 1.2 kW	**N35**		–	–	–
Controlled outgoing feeder, 230 or 120 V 1 AC, max. 2.2 kW	**N36**	–		–	–
Controlled outgoing feeder, 230 or 120 V 1 AC, max. 3.5 kW	**N37**	–	–		–
Controlled outgoing feeder, 230 or 120 V 1 AC, max. 4.5 kW	**N38**	–	–	–	

– 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 voltage 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 auxiliaries** 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 auxiliaries** 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 auxiliaries** 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 auxiliaries** 230 V 1 AC 50 Hz, max. 4.5 kW or 120 V 1 AC 60 Hz, max. 2.4 kW

Note: For GenIV drives, select one of the options **N35** to **N38**; the preset value is **N35**.

Options (continued)

N44
Make-proof grounding switch at drive input (manually driven)

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 controller locks these grounding switches against activation while voltage is still present. The control is integrated into the protection and monitoring chain 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 outputs in the drive.

Attention: For the GenIV units with 4.0 kV and up to 140 A, option **N44** is installed in an extra option cabinet (width 350 mm) which is available on request.

N45
Make-proof grounding switch at drive output (manually driven)

With certain operating modes/configurations of the load machine (e.g. drive group with gas turbines) or types of drive machine (e.g. PEM), there can be operating statuses at which there is a risk that energy will be fed back into the drive from the motor. 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 controller locks the grounding switch against activation while voltage is still present. The control is integrated into the protection and monitoring chain of the drive.

Note: Both options **N44** and **N45** are recommended for plants in the EU scope of application.

N75
Power supply for auxiliaries 24 V DC/2.5 A via terminals

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

N83
Removal of surge arrestors

With option **N83**, the drive is delivered without any arrestors on the integrated transformer.

P82
Delivery as two separate transportation units

With option **P82**, the drive is delivered as two separate transportation units instead of the standard single transportation unit.

Note: Option **P82** is available for GenIV units and for the power range below 2 MVA only; from 2 MVA, two transportation units as standard.

Q80 to Q85
Extension of liability for defects on drives

For a description of the options **Q80** to **Q85**, refer to the chapter 6, services and documentation, pages 6/10 and 6/11.

T03, T04
Nameplate color and texture

Option	Description
T03	White letters with black core (standard: black letters, white core)
T04	Stainless steel (standard: phenolic)

T09 to T91
Nameplate languages, warning labels

Mutually exclusive options **T74** to **T91**

Nameplate language	Code	**T74**	**T82**	**T85**	**T91**
English/German	**T74**		–	–	–
English/Portuguese (Brazil)	**T82**	–		–	–
English/Russian	**T85**	–	–		–
English/Chinese	**T91**	–	–	–	

– Options are mutually exclusive

Nameplates can be supplied in two languages. The following order codes provide a list of available languages.

Note: Please contact the factory or your local Siemens sales representative for languages different from the ones specified below.

Option	Description
T09	English/Danish
T12	English/Romanian
T13	English/Bulgarian
T14	English/Turkish
T15	English/Greek
T16	English/Dutch
T17	English/Estonian
T18	English/Latvian
T19	English/Lithuanian
T20	English/Slovakian
T21	English/Finnish
T22	English/Slovenian
T23	English/Norwegian
T24	English/Swedish
T25	English/Czech
T26	English/Hungarian
T58	English/French
T60	English/Spanish
T74	English/German
T80	English/Italian
T82	English/Portuguese (Brazil)
T85	English/Russian
T86	English/Polish
T90	English/Japanese
T91	English/Chinese

Description of options

Options (continued)

U02
Version with CE conformity

With option **U02**, a drive version with CE conformity is supplied.

Note: Either option **U02** or the combination **U02** & **U04** (GOST conformity) **must** be ordered for units built in Nuremberg. Both include options **L03** (EMC filter) and **M12** (electrical door interlocks) then.

U02 & U04
Version with CE and GOST conformity

With the combination **U02** & **U04**, a drive version with CE and GOST conformity is supplied.

Note: Either option **U02** or the combination **U02** & **U04** (GOST conformity) **must** be ordered for units built in Nuremberg. Both include options **L03** (EMC filter) and **M12** (electrical door interlocks) then.

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 control system Process Tolerant Protection Strategy (ProToPS™) is integrated – 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 in advance of potential drive system trip. This control strategy allows time to evaluate the situation and respond appropriately to avoid a system shutdown.

Note: Option **U10** includes the options **U11** (cell bypass) and **M61** (redundant blower on the air-cooled units only).

Note: Contact the factory or your local Siemens sales representative for option **U10**.

U11
Cell bypass

With option **U11**, the drive system will automatically continue 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 at a convenient planned maintenance window.

Note: Option **U11** is included by the option **U10** (ProToPS).

V01 to V14
Motor voltages

With the options **V01** to **V14**, the motor voltage can be selected. 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 motor rated frequency is not equal input (line) frequency (as encoded in MLFB).

[1)] For GenIIIe only.

Options (continued)

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) the 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 conditions

Option **Y06** requires text input of motor data, e.g. 55 Hz, 32 Hz, 160 Hz, or could also require the submission of a motor data sheet. Option **Y06** must be accompanied by **Y05** (customer-specific nameplate) which would specify the derated values for the drive.

Y09
Paint finish other than standard

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

Y10
Circuit diagrams with customer-specific description field

The circuit diagrams are given customer-specific headers. The data for the header must be specified in plain text (up to three lines of 45 characters per line).

Y15
Sine-wave filter (on request)

The sine-wave filters supply the motors with almost sine-wave motor currents and voltages. These filters are typically required when cable lengths on the output of the drive 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 most commonly required for long cables application like Electrical Submersible Pumps (ESP).

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

For further details please contact the factory or your local Siemens sales representative.

Description of options

Options (continued)

Additional exclusions for GenIV drives with 4.0 kV and up to 140 A

For GenIV drives with 4.0 kV and up to 140 A, additional exclusions to the above apply. The following table shows possible combinations of options that are critical in terms of required space or number of connections.

Note: These exclusions do not apply, if an option cabinet (width 350 mm) is used. This is available on request.

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

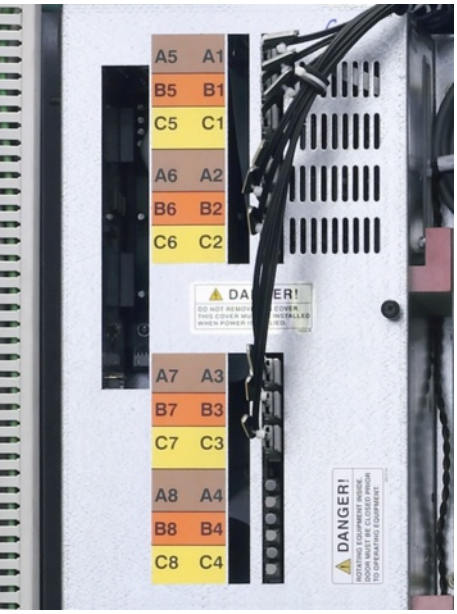
Option description	Code	Possible combinations											
		1	2	3	4	5	6	7	8	9	10	11	12
Signal lamps in the cabinet door	**K20**	–	–	✓	–	–	–	–	✓	✓	–	✓	–
Display instruments in the cabinet door	**K21**	✓	–	–	✓	✓	–	–	–	✓	✓	–	–
Pushbutton kit	**K29**	✓	✓	–	✓	✓	✓	–	✓	–	–	✓	–
Vector control with speed encoder	**K50**	✓	✓	✓	–	–	–	✓	✓	✓	–	–	–
Cabinet lighting and service socket outlet	**L50**	–	–	–	✓	✓	✓	✓	✓	✓	–	–	–
Air-condensation heating	**L55**	✓	–	✓	–	✓	–	✓	–	–	✓	–	✓
2 x 2 thermistor protection relays for alarm and fault	**L81**	✓	–	–	✓	–	–	✓	–	–	✓	–	–
3 x 2 thermistor protection relays for alarm and fault	**L82**	–	✓	–	–	✓	–	–	–	–	–	✓	–
Output reactor bidirectional synchronized transfer	**L09 L29**	–	✓	✓	–	–	✓	✓	–	✓	–	✓	✓
2 PT100 evaluation units with 3 inputs each or PT100 evaluation unit with 6 inputs for explosion-proof motors and 2 AO	**L91 or L95**	–	–	✓	–	–	✓	–	–	✓	–	–	✓
PT100 evaluation unit with 6 inputs and 2 AO	**L93**	✓	✓	–	✓	✓	–	✓	–	–	✓	–	–
Controlled outgoing feeder, 400 V 3 AC or 400/480 V 3 AC	**N30 to N33**	✓	–	✓	–	–	–	–	✓	–	✓	–	✓
Controlled outgoing feeder, 230 V 1 AC or 120 V 1 AC	**N35 to N38**	–	–	–	✓	–	✓	–	✓	–	✓	–	✓

✓ Options can be combined

– Options are mutually exclusive

Engineering Information

5



Tools

Overview

NXGII ToolSuite

The NXGII ToolSuite is a PC-based high-level Graphical User Interface (GUI) application that integrates various software tools used for NXGII based drives. ToolSuite, equipped with the Microsoft Windows Operating System, allows navigation through a drive's features by using a PC and a mouse or by using a touch screen (instead of an operator panel) – allowing you to monitor and control that drive's functions quickly and easily. The NXGII Control and the PC running the NXGII ToolSuite software, interface 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 same as used in drive
- Folders for each drive configuration category (i.e., VFD Menu system)
  - Icon colors to indicate default and modified parameter values
  - On screen parameter identifier (matches operator panel IDs for speed menus)
  - Parameter editing assisted by minimum/maximum limits and defaults
- Ability to upload logs, parameters, system program
- Ability to download system program and/or configuration data files

Graphing

- Adjustable time scale
- Predefined variable list to select variable to be graphed
- Graph up to 10 variables
- Individual variable offsets
- Individual variable scaling
- Customizable graphics – fonts, color, styles
- Freeze graphics
- Freeze graph on fault
- Freeze on selectable trigger
- Zoom graph
- Printable graphics
- Exportable graphics

Status

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

Control (only if enabled by SOP)

- Manual start button
- Stop button
- Fault reset button

Drive Tool

Its purpose is to manage all of the drive features and provide the user with a user-friendly view of the drive.

The Drive Tool's main features include:

- Drive configuration
- Drive variable graphing
- Drive status (provides real time status of various parameters, measured values, and calculations)

Debug Tool

This application provides a remote graphical user interface for Siemens medium-voltage ROBICON Perfect Harmony NXGII series drives. With the Debug Tool, the user can examine drive variables using a PC and a mouse, in a simple and quick manner. The debug utility is intended for use during test, commissioning, and troubleshooting of the drive.

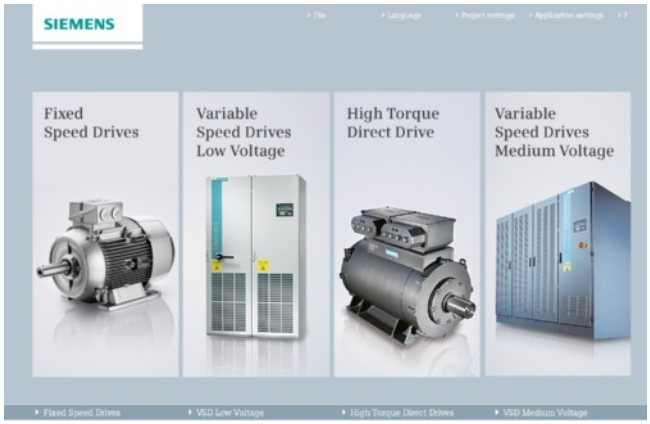
SOP Utilities

The System Operating Program (SOP) is the logic that maps the internal and external I/O into the functionality of the drive. In its simplest form, it just maps 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, express the system functionality to the drive.

The SOP Utilities is a group of utilities under the ToolSuite umbrella program. It performs most of the functionality on the PC running the ToolSuite, but has serial communications capability for uploading and downloading the System Program directly to the drive via an RS232 interface between the drive and the PC. The purpose of the SOP Utilities Tool is to convert logic statements into a form of machine-recognizable code that is run under the built-in drive SOP interpreter.

Overview (continued)

SinaSave



You can philosophize as much as you like about potential cost saving – but the SinaSave software tool supplies the facts:

Based on characteristic plant values, SinaSave calculates the possible cost-saving potential for the specific application. A payback time is obtained from the monthly overall saving of the application and the purchase and installation costs for the motor or frequency drive. This payback time is frequently just a few months.

Function

SinaSave is designed to select an energy-efficient motor for line operation or a frequency drive for variable-speed and therefore energy-saving operation.

For line operation, the tool can calculate the cost savings as well as the payback time for Siemens energy-saving motors, class IE2 or NEMA Premium using three comparison cases: In comparison to IE1 or EPAct motors, individually selected and known motors or in comparison to known motors when investigating a complete plant.

For drive operation, SinaSave takes into account all of the necessary plant or system-specific parameters as well as the values required for the process; these include, for example, the flow rate for pumps, the specific density of the medium being transported and the efficiency of the fluid flow machines of the complete plant. Additional basic data that the program requires includes the number of working days and work shifts as well as the pumping profile over a day and a year, which are decisive for the energy-saving impact.

Using the plant-specific data, the program selects the optimum drive system, calculates the price of a suitable frequency drive and determines the energy requirements of the variable-speed drive system when compared to all of the alternative concepts that could be possibly considered.

In addition to high-efficiency motors (IE2) SinaSave also includes low-voltage and medium-voltage frequency drives, which are predestined for pump and fan application.

Further, the motor side has been supplemented by a new feature that takes into consideration the mechanical system. High-torque motors have also been recently integrated. User-friendly functions such as an automatic update function, an up-to-date currency table and improved functions (e.g. sending pdfs by e-mail) round-off the functionality of this energy-saving tool.

Additional information

Additional information on services relating to energy-saving topics is provided on the Internet:
www.siemens.com/sinasave
www.siemens.com/energy-saving

Accessories

Cell lifter

The power cells of the ROBICON Perfect Harmony drives can be replaced as a unit. To replace, the entire power cell must be extracted from the drive and transported on a cell lifter. There are different versions of the cell lifter available, suitable for the the ROBICON Perfect Harmony air-cooled drives (GenIIIe and GenIV).

Cell lifter data

		GenIV	GenIIIe
Carrying capacity	kg	140	140
	lb	308	308
Highest platform position	mm	2050	2050
	in	81	81
Order number		6SR0960-0SA30-0AA0	6SR0960-0SA30-0AA0

Accessories for grounding and short-circuiting the drive

For safety reasons, when working on the drive, which is in a no-voltage condition, equipment must be provided to ground and short-circuit the drive (e.g. 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 Perfect Harmony, 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 and grounded when the system is in a no-voltage condition, before starting any work of any type.

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 drive accessories must be ordered.

The following grounding harness can be ordered.

Ordering data grounding harness

Order 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 ROBICON Perfect Harmony drives with NXGII control.

Overview of control features

Feature	Description
Output frequency	0 ... 300 Hz [1]; above 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
Spinning load	• Instantaneous mode: allows fast bypass • Frequency scan mode: performed after residual motor voltage has collapsed
Induction motor control	• V/Hz for parallel motors (VHz) • Open-loop vector control for induction motors (OLVC) • Closed-loop vector control for induction motors (CLVC)
Synchronous motor control	• Open-loop vector control for synchronous motors (OSMC) • Closed-loop vector control for synchronous motors (CSMC)
Emergency Stop category	Emergency stop category 0 is set as standard for an uncontrolled shutdown. The function includes voltage disconnection of the drive output by opening the circuit-breaker. Consequently the motor coasts down.
Energy saver	Single parameter driven (for induction motors only)
Braking	• Inverse speed (max. braking torque is approx. 0.3 % at full speed) • Dual frequency (typical braking torque at full speed is 7.5 %)
Auto tuning	Available for induction motors as long as the drive rating is higher than 67 % of the motor
Transparent cell bypass (option U11)	500 ms downtime with redundant cells; without redundant cells, the downtime depends on the motor open circuit time constant
Synchronous transfer (option L29)	Closed synchronous transfer available for induction and synchronous motors [2]
Voltage minimum boost	Not implemented; as an alternate, automatic resistance compensation is available in OLVC/CLVC/OSMC/CSMC control modes (also see description for flux attenuation shaping)
Flux attenuation shaping	Not implemented; a simple (single parameter function) implementation is available
Zero speed control	Not implemented

5

Drive input protection

ROBICON Perfect Harmony utilizes software functions to detect abnormal conditions due to an internal drive failure and thus provides protection to the drive. Below you find a description of some routines that are implemented in NXGII control for drive protection.

Faults within the drive can be categorized into two types – "low impedance" (with high current) and "high impedance" (with low current) faults. A "low impedance" fault within 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 excessive input reactive current detection) is implemented to detect such types of faults. A "high impedance" fault within 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 sense the condition. The "excessive drive losses protection" allows the detection of such faults.

The level of currents detected by these functions cannot be easily detected and may be insufficient to activate the main primary protection. Hence the fault signals issued by these routines should be used with suitable interlocking, via a relay output and/or serial communication, to disconnect medium-voltage from the drive input.

One cycle protection (or excessive input reactive current detection)

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 is used to predict the reactive component of primary current based on the known load. An alarm and trip are generated when the actual reactive current exceeds this prediction based on an inverse time curve. Further information on this curve and the time to trip is provided below. This event will normally cause the input disconnect device to open. The one cycle protection is defeated during the first 0.25 seconds after primary voltage is applied, to allow transformer saturation inrush to decay.

[1] Although 0 Hz can be produced by the drive, torque production is limited at low output frequencies.

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

Mode of operation (continued)

Excessive drive losses protection

The excessive drive losses protection uses drive losses to protect the drive against "high impedance" fault conditions. The drive losses are calculated as the difference between the measured input and output powers, and compared against reference losses. Once the threshold is exceeded, a fault is issued and the drive trips based on an inverse time curve.

During the idle state if the drive losses exceeds the idle threshold by 1 to 2 % the control will issue a command to open the input breaker within 250 ms. Such a fast response will greatly reduce the adverse effect of a "high impedance" fault on the drive system.

Speed and torque control

Feature	V/Hz control	Open-loop vector control	Closed-loop vector control
Speed range (for 100 % holding torque and 150 % starting torque)	40:1	100:1	200:1
Torque regulation (% of rated)	n/a	± 2 %	± 2 %
Torque linearity (% of rated)	n/a	± 5 %	< ± 5 %
Torque response [1]	n/a	> 750 rad/s	> 750 rad/s
Speed regulation (% of rated)	Motor slip	± 0.5 % [2]	± 0.1 % [3]
Speed response [4]	20 rad/s	20 rad/s	> 20 rad/s [5]
Torque pulsation (% of rated) without overmodulation [6]	< 1.0 %	< 1.0 %	< 1.0 %
Torque pulsation (% of rated) with overmodulation [6]	< 3.5 %	< 3.5 %	< 3.5 %

Note

Applications that require lower than 1 % speed operation under high load torque should use the CLVC mode. In such cases it is preferable to select a motor that has high full-load slip (> 1.0 %) and high breakdown torque.

1) Torque response values are valid for drive without an output filter. Tuning may be required to achieve these values.

2) Approx. 0.3 % speed error is typical. Worst-case speed error is equal to approximately 30 % of rated motor slip.

3) 0.1 % can be achieved with a 1024 PPR encoder. Speed accuracy depends on the encoder PPR.

4) Speed response numbers apply as long as torque limit is not reached.

5) Testing is required to determine exact value.

6) ROBICON Perfect Harmony drives when not operated in overmodulation, will have torque pulsation amplitudes of less than 1 % as listed in the above table. For a drive operating in overmodulation the torque pulsation is higher at the 6^{th} harmonic frequency (i.e. 6f component) which is introduced only in the speed range of 95 to 100 % of rated. Torque pulsations at all other frequencies are under 1 % of rated. Refer to pages 5/6, 5/7 for more information on the cell voltage and drive output voltage ratings that will operate with overmodulation.

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: ≤ 3 % [1] (for the first 20 harmonics)
Unbalance (as a % of rated output voltage)	≤ 1 %
dV/dt [2]	< 1000 V/µs for GenIIIe < 3000 V/µs for GenIV
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 ranks with 750 V cells (GenIV)

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 ranks with 690 V cells (GenIIIe)

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

Output current

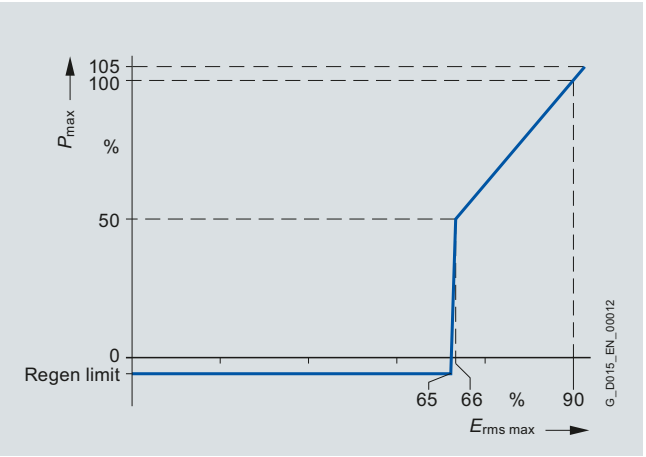
Quantity	Value
DC component (as a % of rated output current)	≤ 1 %
Distortion or THD [5] [6] (as a % of rated output current; when motor and drive ratings are equal and the motor leakage reactance is 16 % or higher)	without overmodulation: ≤ 3 % with overmodulation: ≤ 4.5 %

Output voltage capability

Input under-voltage rollback

In the event that the input voltage falls below 90 %, the attached description provides details of drive limitations.

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 allowable drive power as a function of line voltage is shown in the figure 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 magnitude (E_{rms})

[1] See also 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, suggests that no motor derating is required when the inverter voltage waveform has a HVF value that is less than 0.03. HVF is defined as:

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

where, V_n is the harmonic amplitude in per-unit, and n is the harmonic order (= ratio of harmonic frequency to fundamental frequency).
All Perfect Harmony configurations (with 9 cells or more) meet this requirement. Therefore, heating due to switching harmonics is negligible and no motor derating is needed.

[4] Note: Although overmodulation is allowed with all GenIV drives, only those with this cell count and this rated output voltage will operate in overmodulation in the 95 to 100 % speed range. Higher output voltage and current harmonic components at 5^{th} and 7^{th} harmonic frequencies will exist as reflected in the THD and torque pulsation values.

[5] The 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.

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 a period greater than five cycles. Once input voltage is restored, the drive begins by magnetizing the motor and then continues with torque production. There is no delay in drive restart.

If input voltage is not restored 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). Once operation of any power cell stops or if motor voltage decays significantly, the drive trips on a loss of input medium-voltage.

With all cells operating

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

$$V_{out} = 1.78 \times N \times \frac{V_{cell\_rating} \times Tap\_setting \times V_{input}}{V_{input\_rated}}$$

where,

N	=	number of ranks in drive (or total number of cells = 3*N)
$V_{cell\ rating}$	=	630, 690, or 750 V (depending on design)
V_{input}	=	actual input line voltage
$V_{input\ rated}$	=	rated drive 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 must be calculated based on worst-case line voltage (minimum value).

With overmodulation (for 750 V cells only)

When overmodulation is used in the control for additional voltage capability, the maximum output voltage increases by 5 %.

Note:
Overmodulation is not advised to be used. However, in exceptional cases overmodulation can be utilized but only after consulting the factory or your local Siemens sales representative.

Example of calculating output voltage capability

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

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

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

Configuration

Overview

The air-cooled ROBICON Perfect Harmony drive has a common control system namely NXGII. This control system offers digital and analog input and output capabilities through the use of the I/O breakout board and the I/O WAGO modules. The GenIV drive series uses the I/O breakout board while the GenIIIe drive series uses both, the I/O breakout board and the I/O WAGO modules.

I/O breakout board

This board consists of 20 digital inputs, 16 digital outputs, 3 analog inputs and 2 analog outputs. The following table shows the main characteristics of the I/O breakout board.

I/O breakout board characteristics

Signal type	Quantity	Configuration
Digital inputs	6	24 V DC or 120 V AC
Digital outputs	5	24 V DC or 120 V AC
Analog inputs	3 [1)]	4 ... 20 mA or 0 ... 10 V DC
Analog outputs	2	4 ... 20 mA

I/O WAGO modules

WAGO™ is an off the shelf solution for interfacing digital and analog I/O to the NXGII controller via Modbus protocol. The table below shows some of the WAGO modules used in the GenIIIe series drive.

WAGO modules characteristics

Signal type	Channels	Configuration
Digital inputs	1 ... 2 1 ... 4	120 V AC 24 V DC
Digital outputs	1 ... 2	relay output, rated 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

1) Only two out of three analog inputs can be 0 to 10 V; one analog input will always be 4 to 20 mA.

Configuration (continued)

Standard input/output assigments

The following tables provide an overview of the preassignment function of interfaces in the standard versions of GenIV and GenIIIe drives.

GenIV, I/O Assignments

Signal name	Function		Options involved
GenIV	Nine cells	Fifteen cells	
I/O breakout board digital input signals			
Internal digital input 0A	Remote inhibit	Remote inhibit	–
Internal digital input 1A	Remote start	Remote start	–
Internal digital input 2A	Remote stop	Remote stop	–
Internal digital input 3A	Remote fault reset	Remote fault reset	–
Internal digital input 0B	SW1-off	SW1-off	–
Internal digital input 1B	SW1-remote/auto	SW1-remote/auto	–
Internal digital input 2B	Door closing system	Door closing system	M12
Internal digital input 3B	Door closing system	Door closing system	M12
Internal digital input 0C	SPARE	SPARE	N44, N45
Internal digital input 1C	SPARE	SPARE	Warning: L81, L82, L91, L93, L95
Internal digital input 2C	SPARE	SPARE	Fault: L81, L82, L91, L93, L95
Internal digital input 3C	Transformer air flow temperature, high	Transformer air flow temperature, high	–
Internal digital input 0D	Transformer air flow temperature, high-high	Transformer air flow temperature, high-high	–
Internal digital input 1D	Cooling blower 1 (BLW1) O.K.	Cooling blower 1 (TBLW1) O.K.	–
Internal digital input 2D	Redundant cooling blower 2 (BLW2) O.K. (optional)	Cooling blower 2 (CBLW1) O.K.	–
Internal digital input 3D	SPARE	SPARE	M61
Internal digital input 0E	SPARE	SPARE	M61
Internal digital input 1E	SPARE	SPARE	–
Internal digital input 2E	SPARE	SPARE	–
Internal digital input 3E	Latch fault relay (LFR) feedback	Latch fault relay (LFR) feedback	–

Configuration (continued)

Signal name	Function		Options involved
GenIV	Nine cells	Fifteen cells	
I/O breakout board digital output signals			
Internal digital output 0	Speed demand in local at VFD	Speed demand in local at VFD	–
Internal digital output 1	Drive ready to run	Drive ready to run	–
Internal digital output 2	Drive running	Drive running	–
Internal digital output 3	Drive alarm	Drive alarm	–
Internal digital output 4	Drive fault	Drive fault	–
Internal digital output 5	Door closing system	Door closing system	M12
Internal digital output 6	SPARE	SPARE	N44, N45
Internal digital output 7	SPARE	SPARE	N30 to N33, N35 to N38
Internal digital output 8	Cooling blower 1 (BLW1) starter	Cooling blower 1 (TBLW1) starter	–
Internal digital output 9	Redundant cooling blower 2 (BLW2) starter (optional)	Cooling blower 2 (CBLW1) starter	–
Internal digital output 10	SPARE	Redundant cooling blower 1R (TBLW2) starter (optional)	–
Internal digital output 11	SPARE	Redundant cooling blower 2R (CBLW2) starter (optional)	–
Internal digital output 12	SPARE	SPARE	–
Internal digital output 13	SPARE	SPARE	–
Internal digital output 14	Coordinated input protection scheme	Coordinated input protection scheme	–
Internal digital output 15	Latch fault relay (LFR), set pulse	Latch fault relay (LFR), set pulse	–
I/O breakout board analog input signals			
Internal analog input 1	Remote speed demand, 4 ... 20 mA	Remote speed demand, 4 .... 20 mA	–
Internal analog input 2	SPARE	SPARE	K29 (potentiometer)
Internal analog input 3	SPARE	SPARE	–
I/O breakout board analog output signals			
Internal analog output 1	Motor speed, 4 ... 20 mA	Motor speed, 4 ... 20 mA	–
Internal analog output 2	Motor torque, 4 ... 20 mA	Motor torque, 4 ... 20 mA	–

Interfaces

Configuration (continued)

GenIIIe, nine to eighteen cells – I/O assignments

Signal name GenIIIe	Function Nine to eighteen cells	Options involved
I/O breakout board digital input signals		
Internal digital input 0A	Remote inhibit	–
Internal digital input 1A	Remote start	–
Internal digital input 2A	Remote stop	–
Internal digital input 3A	Remote fault reset	–
Internal digital input 0B	SW1-off	–
Internal digital input 1B	Remote mode	–
Internal digital input 2B	Door closing system	M12
Internal digital input 3B	Door closing system	M12
Internal digital input 0C	SPARE	N44, N45
Internal digital input 1C	SPARE	Warning: L81, L82, L91, L93, L95
Internal digital input 2C	SPARE	Fault: L81, L82, L91, L93, L95
Internal digital input 3C	Transformer thermal switch 170 deg C	–
Internal digital input 0D	Transformer thermal switch 190 deg C	–
Internal digital input 1D	Cooling blower 1 (TBLW1) O.K.	–
Internal digital input 2D	Cooling blower 2 (TBLW2) O.K.	–
Internal digital input 3D	Cooling blower 3 (TBLW3) O.K. (redundant) (else SPARE)	–
Internal digital input 0E	Cooling blower 1 (CBLW1) O.K.	–
Internal digital input 1E	Cooling blower 2 (CBLW2) O.K.	–
Internal digital input 2E	Cooling blower 3 (CBLW3) O.K. (redundant) (else SPARE)	–
Internal digital input 3E	Latch fault relay (LFR) feedback	–
I/O breakout board digital output signals		
Internal digital output 0	Speed demand in local at VFD	–
Internal digital output 1	Drive ready to run	–
Internal digital output 2	Drive running	–
Internal digital output 3	Drive alarm	–
Internal digital output 4	Drive fault	–
Internal digital output 5	Door closing system	M12
Internal digital output 6	SPARE	N44, N45
Internal digital output 7	SPARE	N30 to N33, N35 to N38
Internal digital output 8	Cooling blower 1 (TBLW1) starter	–
Internal digital output 9	Cooling blower 2 (TBLW2) starter	–
Internal digital output 10	Cooling blower 3 (TBLW3) starter	–
Internal digital output 11	Cooling blower 1 (CBLW1) starter	–
Internal digital output 12	Cooling blower 2 (CBLW2) starter	–
Internal digital output 13	Cooling blower 3 (CBLW3) starter	–
Internal digital output 14	Coordinated input protection scheme – MV enable	–
Internal digital output 15	Latch fault relay (LFR), set pulse	–
I/O breakout board analog input signals		
Internal analog input 1	Remote speed demand, 4 ... 20 mA	–
Internal analog input 2	Speed potentiometer 0 ... 10 V or 4 ... 20 mA (else SPARE)	–
Internal analog input 3	SPARE	–
I/O breakout board analog output signals		
Internal analog output 1	Motor speed, 4 ... 20 mA	–
Internal analog output 2	Motor torque, 4 ... 20 mA	–

Overview

The ROBICON Perfect Harmony drive series contains a user-friendly operator panel. This operator panel is located on the front of the control cabinet for operation, monitoring and commissioning of the drive. The operator panel is illustrated in figure below.

The operator panel of the ROBICON Perfect Harmony drive series

The operator panel offers the following features and characteristics:

- LCD display (2 x 24 characters).
- LEDs for displaying operational status.
- Numerical keypad to enter set points or parameter values
- Automatic key set the drive in 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 safe operation

One of the most important functions of the operator panel is parameter monitoring. Below you find a reduced list of parameters that can be monitored by using the operator panel:

- Input voltage in V
- Input voltage harmonics (one at a time)
- Input current in A
- Input current harmonics (one at a time)
- 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
- VFD 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

[1] Note: This digital input signal is not present in the case of 24 V DC systems.

Scope of delivery

Overview

The standard scope of delivery of the ROBICON Perfect Harmony comprises:

Basic units

The basic unit of each ROBICON Perfect Harmony product-line consists of the following:

- 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, lugs and glands
- Isolators, contactors or circuit-breakers (optionally available),
- 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

6

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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 state-of-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" means 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.

SITRAIN course offer for Perfect Harmony

Here you will find an overview of the training courses available for 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

Course offer

Commissioning engineers, configuration engineers
Programmers
Service personnel
Project managers, project team members
Operators, users
Decision makers, sales personnel
Maintenance personnel

Title	Target group					Duration	Short title
ROBICON Perfect Harmony for Operators			✔	✔	✔	3 Days	DR-PH-B

ROBICON Perfect Harmony for Operators

Description/Objective

This training course covers operating and and maintaining Siemens Perfect Harmony drives. You will understand the functional concept 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 tool and the DEBUG tool.

Target group

Service personnel, Operators, users, Maintenance personnel

Content

- Basics of VFD and motor
- Personal safety with drives
- Design and function of the SIEMENS Perfect Harmony 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 (via integral control panel, via 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 (via integral control panel, via 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 Siemens Perfect Harmony drive with motor and on simulators (original control boards with simulated power device and motor).

Duration: 3 Days ***Order code:*** DR-PH-B

Documentation

The O&M manual will be send to the customer following the shipment of the ROBICON Perfect Harmony air-cooled drive. This manual includes the following standard sections:

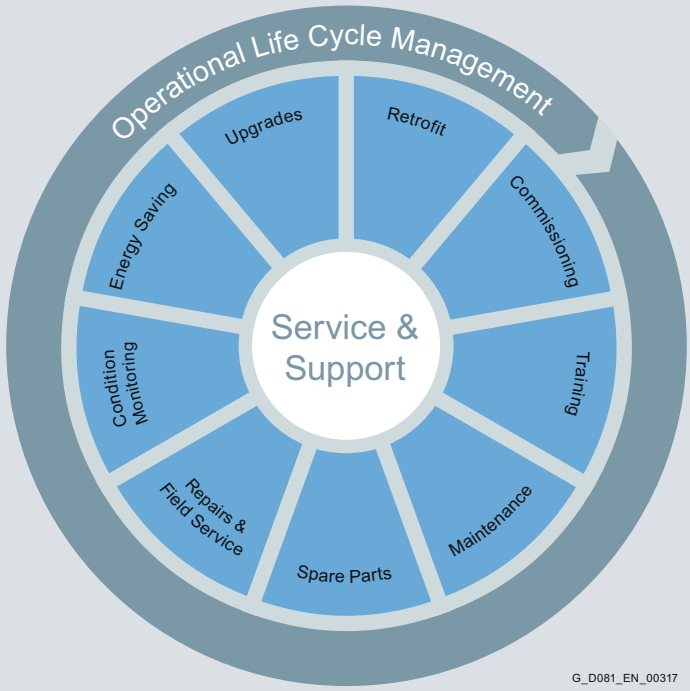
- Supplied spare parts list
- Maintenance instructions
- Field service information
- Storage requirements
- Recommended spare parts
- Liability for defects information
- Product user manuals
- System operating program (SOP)
- Drawings of the air-cooled drives (outline & wiring)

The documentation is in English. Further languages can be ordered if required (see description of options).

Perfectly organized for worldwide service over the complete life cycle

Overview

Our Service & Support is at your disposal worldwide and supports you in all areas of Siemens drive technology. Directly on site in over 100 countries – throughout the entire life cycle of your machines and plants – around the clock.



You will find your regional contact partner as well as further information under:
www.siemens.com/automation/partner
www.siemens.com/ld-service

The correct solution in every phase of the **product life cycle**

Product Introduction	Operation	Product Phase-Out	Product Discontinuation
Delivery	**Support**		**Replacement**
■ Installation & Commissioning	■ Support & Remote Services	■ Support & Remote Services	■ Limited Availability of Spare Parts
■ Training	■ Training	■ Spare Parts & Repair Services	■ Repair Service is limited to Components
■ Support & Remote Services	■ Spare Parts & Repair Services	■ Maintenance & Field Service	■ Retrofit/ Modernization Services
■ Spare Parts	■ Maintenance & Field Service	■ Retrofit/ Modernization Services	■ Energy Optimization of Drive Systems
■ Product Support & Maintenance Contracts	■ Optimization Services	■ Energy Optimization of Drive Systems	

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Perfectly organized for worldwide service over the complete life cycle

Commissioning of drive systems

Our services:

Commissioning and on-site servicing of motors and drives including auxiliary equipment/built-on components for variable-speed drives up to 60 MW in medium-voltage applications.

Services on offer → see page 6/9.

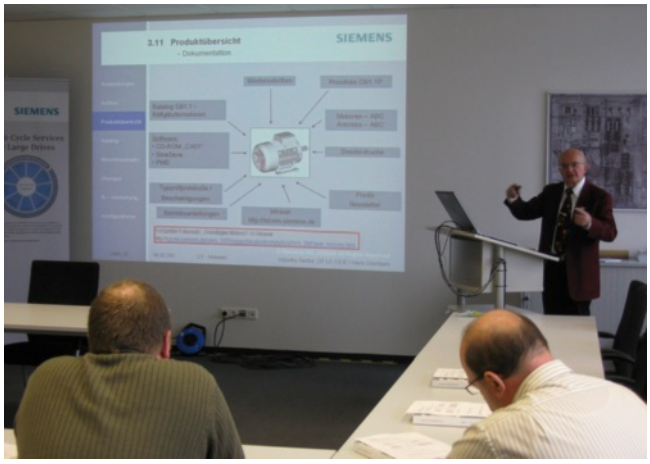
With a focus on the following sectors

- Oil and gas
- Chemical industry
- Energy
- Steel
- Paper
- Shipbuilding
- Mining
- Cement
- Water, waste water
- Wind power
- Auxiliary equipment
  - Water cooling systems
  - Oil cooling systems
  - Control monitoring
  - Protective equipment
  - Excitation equipment/excitation rectifiers
  - Transformer protection

The advantages at a glance:

- High flexibility and cost benefits thanks to global network of qualified service personnel
- Direct contact between the customer and the manufacturer in close collaboration with local service center
- Short communication paths across all organizational levels
- "Global resource management" for worldwide applications with observation of statutory and tax provisions
- Cross-sector drive know-how through to the complete system
- Highly qualified variable speed drives specialists

Customer-specific training for drives



Maintenance training:

- On-site training at customer site as workshop training
- Training in the Siemens factory
- Length of training according to requirements and necessity

The advantages at a glance:

- Build-up of expertise of the customer's own maintenance and operating personnel
- Adherence to and correct implementation of device-specific maintenance work internally → cost and time savings
- Quick and competent recording and calculation of fault causes → real-time troubleshooting
- In the event of a fault, the customer's own maintenance personnel are able to make the correct decisions quickly and reliably
- Targeted contact with Siemens Service with competent error description
- Experienced selection and stockkeeping of a basic assortment of specific spare parts → quick replacement and restart in the case of a plant standstill

Perfectly organized for worldwide service over the complete life cycle

Maintenance and inspection of drives

Our services:

Inspection:

- Recording and determining the current status values of electric motors and drives
- Extensive product inspection according to checklist
- Definition of other necessary measures, including report
- Services on offer → see page 6/9.

Maintenance contracts:

- Definition of the desired maintenance intervals
- Remote support and availability of a technical contact
- Inspection date coordination
- Spare parts, service materials and tools
- Training of customer service personnel

The advantages at a glance:

Inspection:

- Inventory and taking measurements/ diagnostics according to checklist
- Determining the maintenance requirement
- Recommendations for the optimum spare parts inventory
- Investigation of possibilities for improving the operating conditions

Maintenance:

- Maximizing the service life
- Minimizing the wear of components
- Avoiding unplanned production downtimes and the associated costs
- Monitoring the product life cycle, and advice on alternatives

Spare parts for drives

Our services:

Spare parts packages on site:

For drives – especially in the medium-voltage range – which often play an essential role as main drive, the availability of spare parts is also just as important.

In addition to individual spare parts, we can also offer you complete spare parts packages – starting from the equipment-specific spare part overviews. These have been created from our extensive service experience when it comes to maintenance and troubleshooting drives and components.

Various types of spare parts packages for low- and medium-voltage units are available:

- "Basic spare package"
  Spare parts package with the most important electronic components such as e.g. for commissioning
- "Advanced spare package"
  Spare parts package which has been expanded by additional electronic and power components in order to secure the supply of spare parts for the first years of operation
- "Premium spare package"
  Comprehensive spare parts package – which includes the spare parts necessary to extend the lifetime.
  The stock of spare parts can be checked and individually adapted as part of annual maintenance

Spare parts information and database:

Using the Siemens order number and the associated serial number you can download spare parts information from a database for almost all current drives → **Spares On Web**
https://b2b-extern.automation.siemens.com/spares_on_web

The advantages at a glance:

- Minimization of fault downtimes
- No additional waiting times for delivery of spare parts in the event of a fault
- Increased availability for the drive units
- Cost advantages for assembling spare parts packages
- Individual assembly of package contents depending on customer requirements and plant requirements over the entire life cycle

Perfectly organized for worldwide service over the complete life cycle

Remote Services – Expert knowledge close at hand

Our remote service offering:

- Online condition monitoring
- Fault-tolerant data storage
- Trend analysis, archiving and comparison of the saved data
- Support for on-site services from experts
- Assistance of site personnel by video transmission
- Definition of other necessary measures, including report

The advantages at a glance:

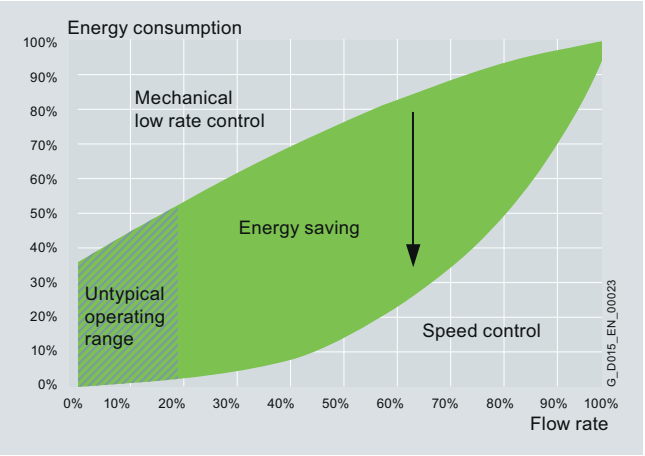
Remote service:

- Best technology on the market for highly secure connections with maximum availability
- Large number of supported software applications
- Best practice remote service platform in industry
- Support desk available 24/7
- Transparency through monitoring and reporting of all connections

Condition monitoring:

- Minimization of unplanned plant downtimes and reduction of consequential damage
- Increased plant availability
- Provides the basis for status-oriented maintenance
- Optimization and planning of maintenance and service activities
- Resource-saving handling of materials as an important contribution to environmental protection
- Optimization of spare parts inventories
- Graded, flexible hardware and software concept → scalable and allows flexible adaptation to the respective drive system

Energy savings in drive technology



Our services:

Energy optimization measures:

1. Identification of potential savings
The energy requirement is determined and potentials for energy savings are highlighted.

2. Evaluation of the data obtained
The savings potentials identified are evaluated using various methods, so that a stable basis for decision-making is created.

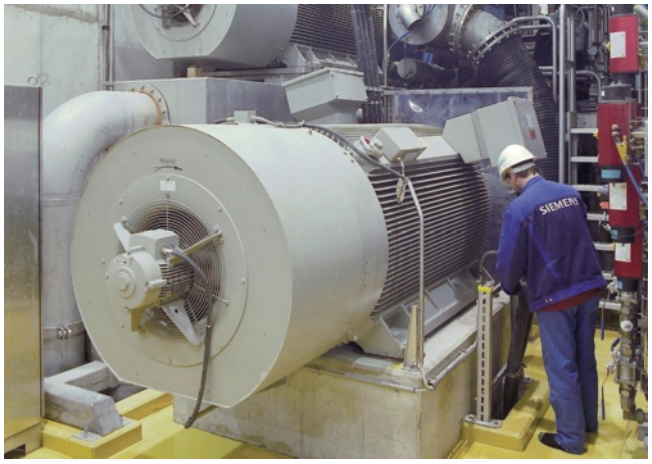
3. Implementation of the energy optimization measures
The right products and targeted implementation measures are determined and implemented.

The advantages at a glance:

- Efficient use of energy, by use of modern energy-saving drive technology
- Efficient use of energy, through conversion to variable-speed drives
- Less line-side reactive-power demand
- Improved startup characteristics of the motor
- Reduced harmonic loading of the supply
- Reduced noise
- Optimized production conditions
- Reduced wear due to matched speeds

Calculate your potential for savings with the energy efficiency software SinaSave (refer to chapter 5 "Engineering information").

Modernization of drives



Our services:

Modernization of drives - also known as retrofitting – is a major component of the product life cycle.

The old technologies are replaced with state-of-the-art drives and motors from our current product range. Function or plant expansions or changes to the drive concept are not normally necessary.

Retrofit measures for drives:

- Replacement of older converters by new, state-of-the-art medium-voltage drive units.
- Service advantages:
  + 100% availability of spare parts
  + Availability of know-how
  + State-of-the-art diagnostic features
  + Low maintenance costs
  + Availability of software updates

The advantages at a glance:

- Reduced maintenance cost in later part of life cycle
- Improved efficiency
- Process optimization
- Increased energy efficiency, and adaptation to the current environmental requirements
- Reduced risks associated with failures

Services on offer

The following services can be ordered for medium-voltage drives:

- Standard inspection of medium-voltage drives for each unit respectively:

Time Days	Order No.	Standard inspection to be executed
2	**9LD1240-0AA35**	Perfect Harmony GenIV, air-cooled, without excitation rectifier

- Service products

Order No.	Type of service order
9LD1040-0AF00	Repair order
9LD1360-0AF00	Product support & Maintenance contract
9LD1140-0AF00	Field service application for commissioning and trouble-shooting
9LD1540-0AF00	Retrofit order

Notes:

All services and products are billed at cost.

The ordering information and requests for quotations have to be addressed to the responsible Siemens distribution partner.

When ordering, the text of the order must specify the product with its order no., the respective serial no. and the quotation no.

Further information are available under:
www.siemens.com/ld-service

Extension of liability for defects

For the products in this catalog, it is possible to obtain an extension of liability for defects beyond the standard liability for defects period.

The standard liability for defects period is quoted in the standard conditions of supply and delivery and is 12 months.

1. For the case of a new product order

With the following optional order suffixes listed in the table, extension of liability for defects beyond the standard liability for defects period is possible in conjunction with a new order for a product.

The additional product price is graded according to the duration of the extension.

Extension of liability for defects on drives	
Order No. supplement **–Z** with order code	Text
Q80	Extension of liability for defects, by 12 months to a total of 24 months (2 years) from delivery
Q81	Extension of liability for defects, by 18 months to a total of 30 months (2½ years) from delivery
Q82	Extension of liability for defects, by 24 months to a total of 36 months (3 years) from delivery
Q83	Extension of liability for defects, by 30 months to a total of 42 months (3½ years) from delivery
Q84	Extension of liability for defects, by 36 months to a total of 48 months (4 years) from delivery
Q85	Extension of liability for defects, by 48 months to a total of 60 months (5 years) from delivery

2. For the case of re-ordering after product delivery

A re-order for an extension of liability for defects after delivery can only be processed during the standard period of liability for defects (< 12 months).

The price is staggered according to the duration of the extension and takes into account the previously ordered options.

At the time of ordering, the name of the product complete with the order number and the associated serial number must be specified in the item text (SAP).

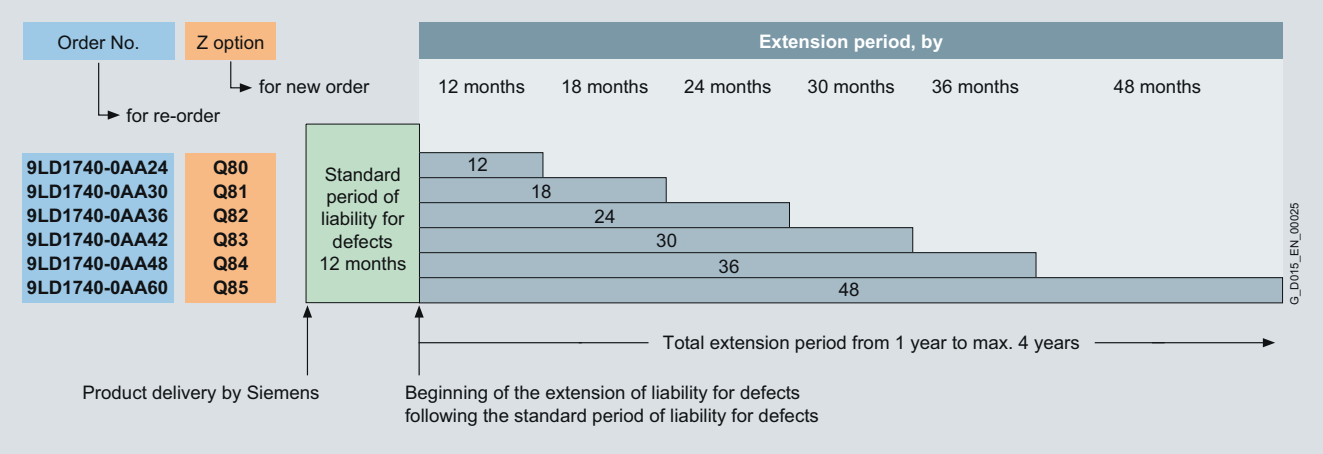
After expiry of the standard liability for defects (> 12 months) an extension is only available under a special agreement.

This is ordered with the following order numbers:

Extension of liability for defects on drives	
Order No.	Text
9LD1740-0AA24	Extension of liability for defects, by 12 months to a total of 24 months (2 years) from delivery
9LD1740-0AA30	Extension of liability for defects, by 18 months to a total of 30 months (2½ years) from delivery
9LD1740-0AA36	Extension of liability for defects, by 24 months to a total of 36 months (3 years) from delivery
9LD1740-0AA42	Extension of liability for defects, by 30 months to a total of 42 months (3½ years) from delivery
9LD1740-0AA48	Extension of liability for defects, by 36 months to a total of 48 months (4 years) from delivery
9LD1740-0AA60	Extension of liability for defects, by 48 months to a total of 60 months (5 years) from delivery

Extension of liability for defects (continued)

Overview of the extension of liability for defects

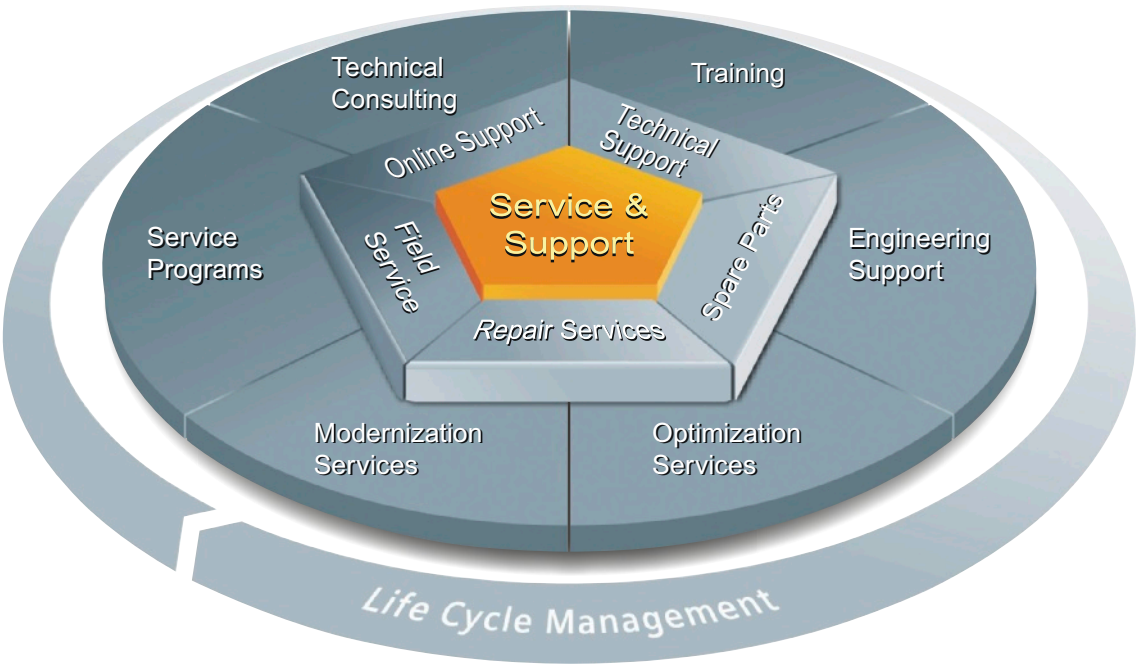


Conditions for an extension of liability for defects:

1. For the duration of the extended liability for defects in the case of a new order and reordering after delivery, the final destination of the product must be specified. The process EUNA is available at www.siemens.com/euna for the purpose of this notification process, which must be performed by your Siemens sales contact.
2. For all durations of the extension of liability for defects of 4 and 5 years (Q84/9LD1740-0AA48, Q85/9LD1740-0AA60) this can only be agreed in conjunction with a corresponding service contract including regular inspection. This maintenance contract must be agreed via the responsible service center. The process EUNA is available at www.siemens.com/euna for the purpose of documenting this, which must be performed by your Siemens sales contact.
3. The general storage conditions described in the operating instructions must be adhered to, especially the specifications for long-term storage.
4. Commissioning must be performed by appropriately qualified personnel. When claiming under liability for defects, it is necessary under certain circumstances to supply the corresponding commissioning.
5. Periodic maintenance must be performed in accordance with the specifications in the operating instructions. When claiming under liability for defects, it is necessary under certain circumstances to supply the corresponding maintenance records.
6. The operating conditions must correspond to the specifications in the operating instructions, configuration manual, or special conditions specified in the contract.
7. The extension of liability for defects excludes wear parts, such as carbon brushes or rolling-contact bearings.
   An exception applies if irrefutable evidence of their premature failure is provided.
8. Otherwise the general liability for defects conditions apply.

Service & Support

The unmatched complete service for the entire life cycle



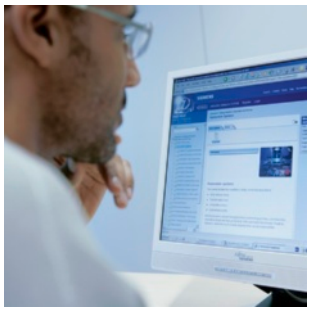
For machine constructors, solution providers and plant operators: The service offering from Siemens Industry, Automation and Drive Technologies includes comprehensive services for a wide range of different users in all sectors of the manufacturing and process industry.

To accompany our products and systems, we offer integrated and structured services that provide valuable support in every phase of the life cycle of your machine or plant - from planning and implementation through commissioning as far as maintenance and modernization.

Our Service & Support accompanies you worldwide in all matters concerning automation and drives from Siemens. We provide direct on-site support in more than 100 countries through all phases of the life cycle of your machines and plants.

You have an experienced team of specialists at your side to provide active support and bundled know-how. Regular training courses and intensive contact among our employees - even across continents - ensure reliable service in the most diverse areas.

Online Support



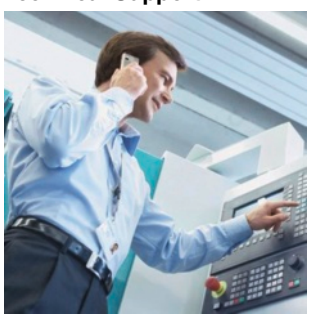
The comprehensive online information platform supports you in all aspects of our Service & Support at any time and from any location in the world.

www.siemens.com/automation/service&support

Technical Consulting

Support in planning and designing your project: From detailed actual-state analysis, definition of the goal and consulting on product and system questions right through to the creation of the automation solution.

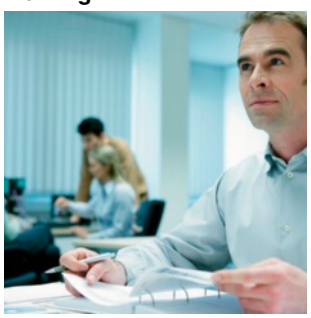
Technical Support



Expert advice on technical questions with a wide range of demand-optimized services for all our products and systems.

www.siemens.com/automation/support-request

Training



Extend your competitive edge - through practical know-how directly from the manufacturer.

www.siemens.com/sitrain

Contact information is available in the Internet at:
www.siemens.com/automation/partner

The unmatched complete service for the entire life cycle

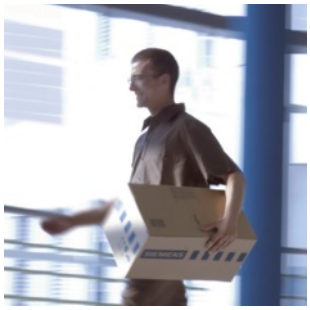
Engineering Support

Support during project engineering and development with services fine-tuned to your requirements, from configuration through to implementation of an automation project.

Field Service

Our Field Service offers you services for commissioning and maintenance - to ensure that your machines and plants are always available.

Spare parts



In every sector worldwide, plants and systems are required to operate with constantly increasing reliability. We will provide you with the support you need to prevent a standstill from occurring in the first place: with a worldwide network and optimum logistics chains.

Repairs

Downtimes cause problems in the plant as well as unnecessary costs. We can help you to reduce both to a minimum - with our worldwide repair facilities.

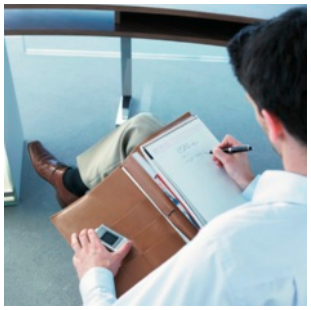
Optimization

During the service life of machines and plants, there is often a great potential for increasing productivity or reducing costs. To help you achieve this potential, we are offering a complete range of optimization services.

Modernization

You can also rely on our support when it comes to modernization - with comprehensive services from the planning phase all the way to commissioning.

Service programs



Our service programs are selected service packages for an automation and drives system or product group. The individual services are coordinated with each over to ensure smooth coverage of the entire life cycle and support optimum use of your products and systems.

The services of a Service Program can be flexibly adapted at any time and used separately.

Examples of service programs:

- Service contracts
- Plant IT Security Services
- Life Cycle Services for Drive Engineering
- SIMATIC PCS 7 Life Cycle Services
- SINUMERIK Manufacturing Excellence
- SIMATIC Remote Support Servicess

Advantages at a glance:

- Reduced downtimes for increased productivity
- Optimized maintenance costs due to a tailored scope of services
- Costs that can be calculated and therefore planned
- Service reliability due to guaranteed response times and spare part delivery times
- Customer service personnel will be supported and relieved of additional tasks
- Comprehensive service from a single source, fewer interfaces and greater expertise

Contact information is available in the Internet at:
www.siemens.com/automation/partner

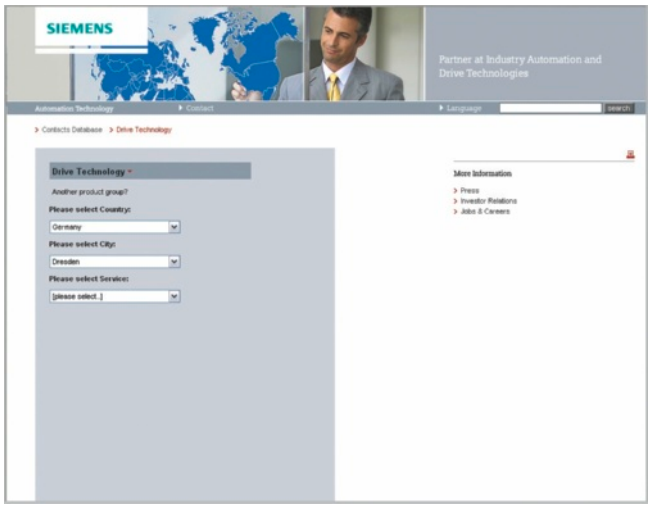
Notes

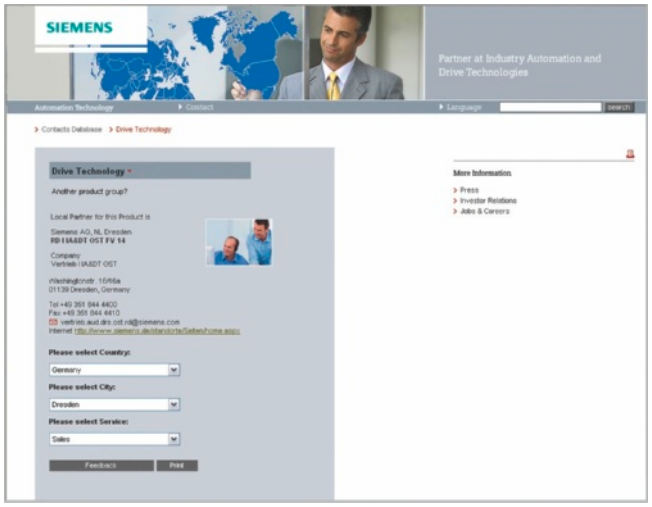
Appendix

Subject index

Subject index

Partner at Siemens





At Siemens Industry Automation and Drive Technologies, more than 85 000 people are resolutely pursuing the same goal: long-term improvement of your competitive ability. We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at:
www.siemens.com/automation/partner

You start by selecting a

- Product group,
- Country,
- City,
- Service.

Information and Ordering in the Internet and on DVD

Siemens Industry Automation and Drive Technologies in the WWW

A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

www.siemens.com/industry

you will find everything you need to know about products, systems and services.

Product Selection Using the Offline Mall of Industry

Detailed information together with convenient interactive functions:
The Offline Mall CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.
All information is linked into a user interface which is easy to work with and intuitive.

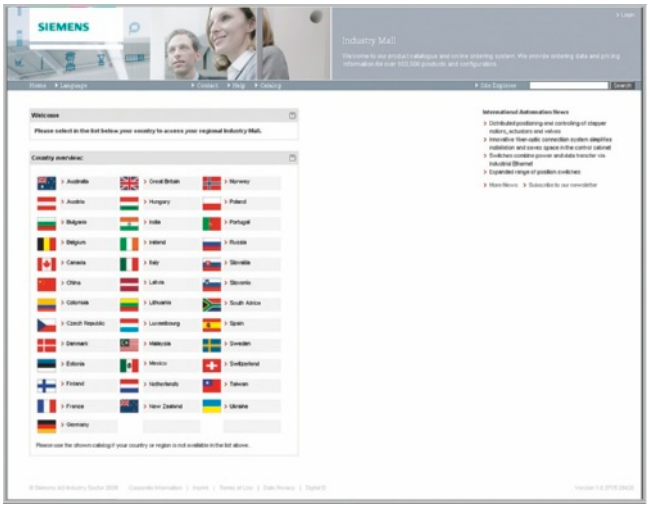
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the Offline Mall CA 01 can be found in the Internet under

www.siemens.com/automation/ca01

or on DVD.

Easy Shopping with the Industry Mall



The Industry Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the Industry Mall on the Internet under:

www.siemens.com/industrymall

Notes

Conditions of sale and delivery
Export regulations

Terms and Conditions of Sale and Delivery

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following terms apply exclusively for orders placed with Siemens AG.

For customers with a seat or registered office in Germany

The "General Terms of Payment" as well as the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany" shall apply.

For customers with a seat or registered office outside of Germany

The "General Terms of Payment" as well as the "General Conditions for Supplies of Siemens, Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

General

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

Surcharges will be added to the prices of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order.
The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used. The metal factor, provided it is relevant, is included with the price information of the respective products.

An exact explanation of the metal factor and the text of the Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA1
  (for customers based in Germany)
- 6ZB5310-0KS53-0BA1
  (for customers based outside Germany)

or download them from the Internet
www.siemens.com/industrymall
(Germany: Industry Mall Online-Help System)

Export regulations

Our obligation to fulfill this agreement is subject to the proviso that the fulfillment is not prevented by any impediments arising out of national and international foreign trade and customs requirements or any embargos and/or other sanctions.

If you transfer goods (hardware and/ or software and/ or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you shall comply with all applicable national and international (re-) export control regulations.

If required to conduct export control checks, you, upon request by us, shall promptly provide us with all information pertaining to particular end customer, destination and intended use of goods, works and services provided by us, as well as any export control restrictions existing.

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the German Export List Products marked other than "N" require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "AL" not equal to "N" are subject to a European or German export authorization when being exported out of the EU.
ECCN	Export Control Classification Number Products marked other than "N" are subject to a reexport license to specific countries. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "ECCN" not equal to "N" are subject to a US re-export authorization.

Even without a label or with an "AL: N" or "ECCN: N", authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

Errors excepted and subject to change without prior notice.

Catalogs

Industry Automation, Drive Technologies and Low Voltage Distribution

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

Interactive Catalog on DVD	*Catalog*
for Industry Automation, Drive Technologies and Low Voltage Distribution	**CA 01**

Drive Systems

Variable-Speed Drives	
SINAMICS G110, SINAMICS G120 Standard Inverters SINAMICS G110D, SINAMICS G120D Distributed Inverters	D 11.1
SINAMICS G130 Drive Converter Chassis Units SINAMICS G150 Drive Converter Cabinet Units	D 11
SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12
SINAMICS S120 Chassis Format Units and Cabinet Modules SINAMICS S150 Converter Cabinet Units	D 21.3
SINAMICS DCM Converter Units	D 23.1
Three-phase Induction Motors • H-compact • H-compact PLUS	D 84.1
Asynchronous Motors Standardline	D 86.1
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
DC Motors	DA 12
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2
PDF: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units	*DA 22*
SIMOVERT PM Modular Converter Systems	DA 45
SIEMOSYN Motors	DA 48
MICROMASTER 420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
SIMOVERT MASTERDRIVES Vector Control	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
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
SINAMICS S110 The Basic Positioning Drive	PM 22
Low-Voltage Three-Phase-Motors	
IEC Squirrel-Cage Motors	D 81.1
MOTOX Geared Motors	D 87.1
Automation Systems for Machine Tools SIMODRIVE • Motors • Converter Systems SIMODRIVE 611/POSMO	NC 60
Automation Systems for Machine Tools SINAMICS • Motors • Drive System SINAMICS S120	NC 61
Mechanical Driving Machines	
FLENDER Standard Couplings	MD 10.1
FLENDER SIG Standard industrial gear unit	MD 30.1

Low-Voltage Power Distribution and Electrical Installation Technology

Protection, Switching, Measuring & Monitoring Devices	LV 10.1
Switchboards and Distribution Systems	LV 10.2
GAMMA Building Management Systems	ET G1
PDF: DELTA Switches and Socket Outlets	*ET D1*
SICUBE System Cubicles and Cubicle Air-Conditioning	LV 50
SIVACON 8PS Busbar Trunking Systems	LV 70

Motion Control

	Catalog
SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60
SINUMERIK & SINAMICS Equipment for Machine Tools	NC 61
SINUMERIK 828D BASIC T/BASIC M, SINAMICS S120 Combi and 1FK7/1PH8 motors	NC 82
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
SINAMICS S110 The Basic Positioning Drive	PM 22

Power Supply and System Cabling

Power supply SITOP	KT 10.1
System cabling SIMATIC TOP connect	KT 10.2

Process Instrumentation and Analytics

Field Instruments for Process Automation	FI 01
SIREC Recorders and Accessories	MP 20
SIPART, Controllers and Software	MP 31
Products for Weighing Technology	WT 10
Process Analytical Instruments	PA 01
PDF: Process Analytics, Components for the System Integration	*PA 11*

Safety Integrated

Safety Technology for Factory Automation	SI 10

SIMATIC HMI/PC-based Automation

Human Machine Interface Systems/ PC-based Automation	ST 80/ ST PC

SIMATIC Ident

Industrial Identification Systems	ID 10

SIMATIC Industrial Automation Systems

Products for Totally Integrated Automation and Micro Automation	ST 70
SIMATIC PCS 7 Process Control System	ST PCS 7
Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7.1
PDF: Migration solutions with the SIMATIC PCS 7 Process Control System	*ST PCS 7.2*

SIMATIC NET

Industrial Communication	IK PI

SINVERT Photovoltaics

Inverters and Components for Photovoltaic Installations	RE 10

SIRIUS Industrial Controls

SIRIUS Industrial Controls	IC 10
SIRIUS Industrial Controls (selected content from catalog IC 10)	IC 90

System Solutions

Applications and Products for Industry are part of the interactive catalog CA 01

PDF: These catalogs are only available as pdf files.

Download-Center

PDF versions of the catalogs are available on the Internet at:
www.siemens.com/drives/infocenter

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