



NORDAC

Electronic Drive Technology

E3000

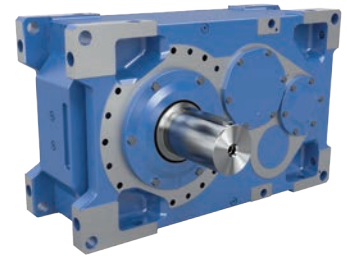


Complete Drive Solutions from a Single Source



NORD Delivers

NORD offers first-class customer service and support along with full-featured drive solutions that can tackle the toughest requirements. All components are carefully selected and precisely configured to meet your exact specifications. In the rare case that standard components won't meet your needs, our in-house engineering team will work with you to design custom components or a complete customized system.



Reduce Lead Times and Decrease Inventory

- ▶ Fastest lead times in the industry with NO expedite fees
- ▶ Over 20,000,000 standard configurations to reduce or eliminate the need for custom components
- ▶ Modular drives, motors, and electronic controls minimize inventory of replacement units and parts



Global Product Designs, Standards, and Support

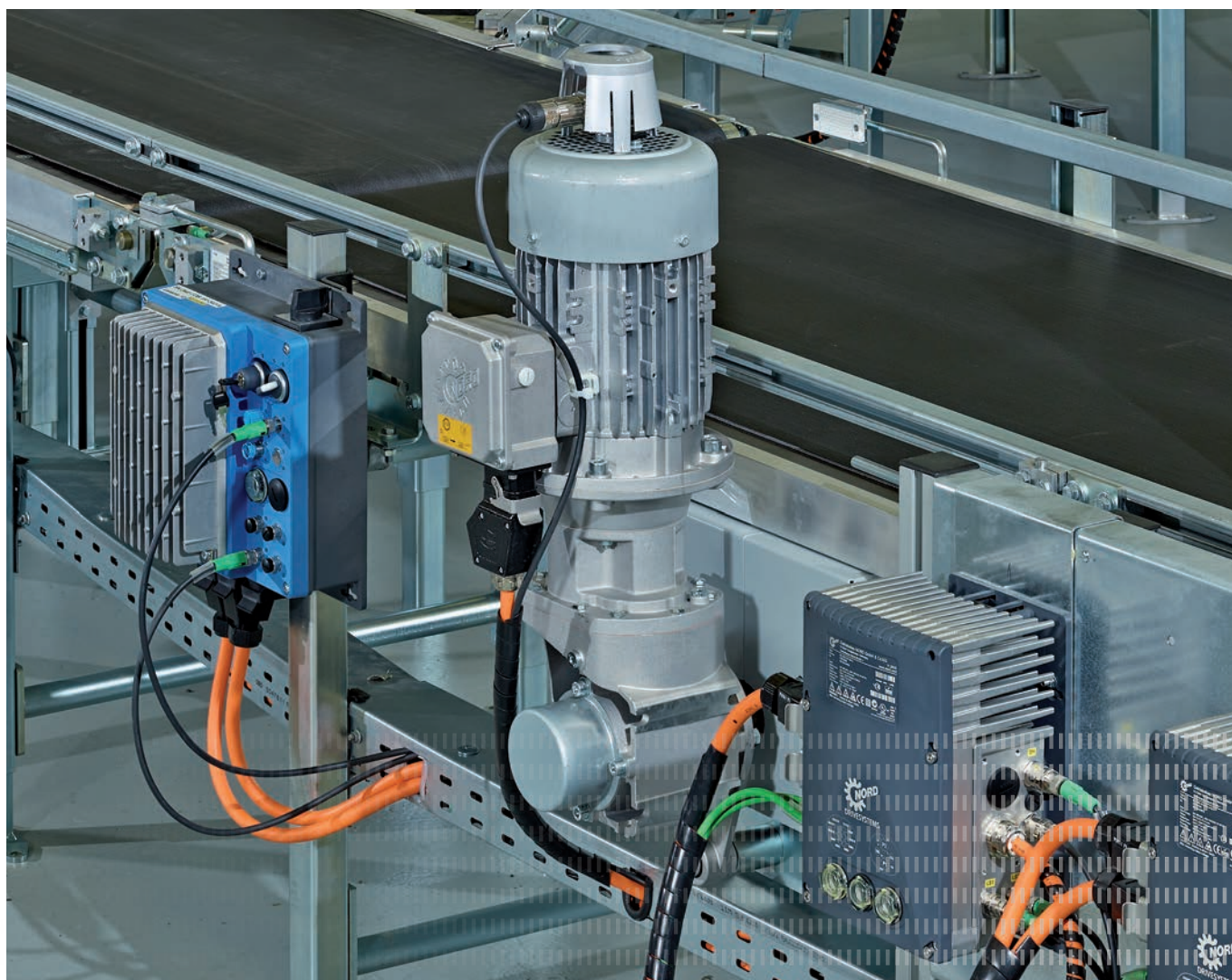
- ▶ Innovative, industry-standard products to support a wide range of applications
- ▶ Global sales and support network
- ▶ Dedicated mechanical and electrical application engineers ready to assist you
- ▶ Online resources available to you any time
- ▶ 24/7/365 emergency breakdown service



Increase Efficiency and Reduce Operation Costs

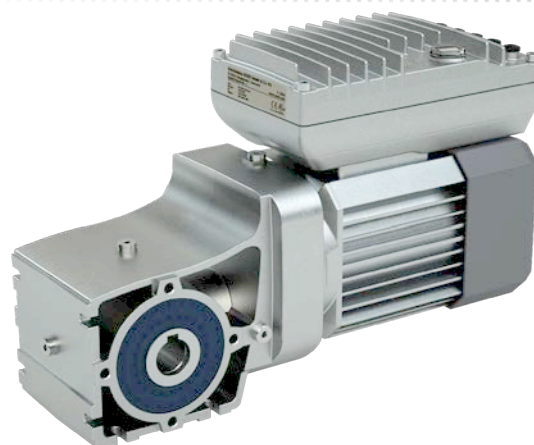
- ▶ myNORD online tools for fast selection, configuration, ordering, and tracking of your drive units
- ▶ Drive systems that are perfectly matched to your application for optimum performance and energy efficiency
- ▶ Program personalization, such as weekly shipment schedules and custom nameplates
- ▶ Partner with a company that is easy to do business with and wants to see you succeed!





Integrated Solutions for the Special Requirements of Industries Worldwide

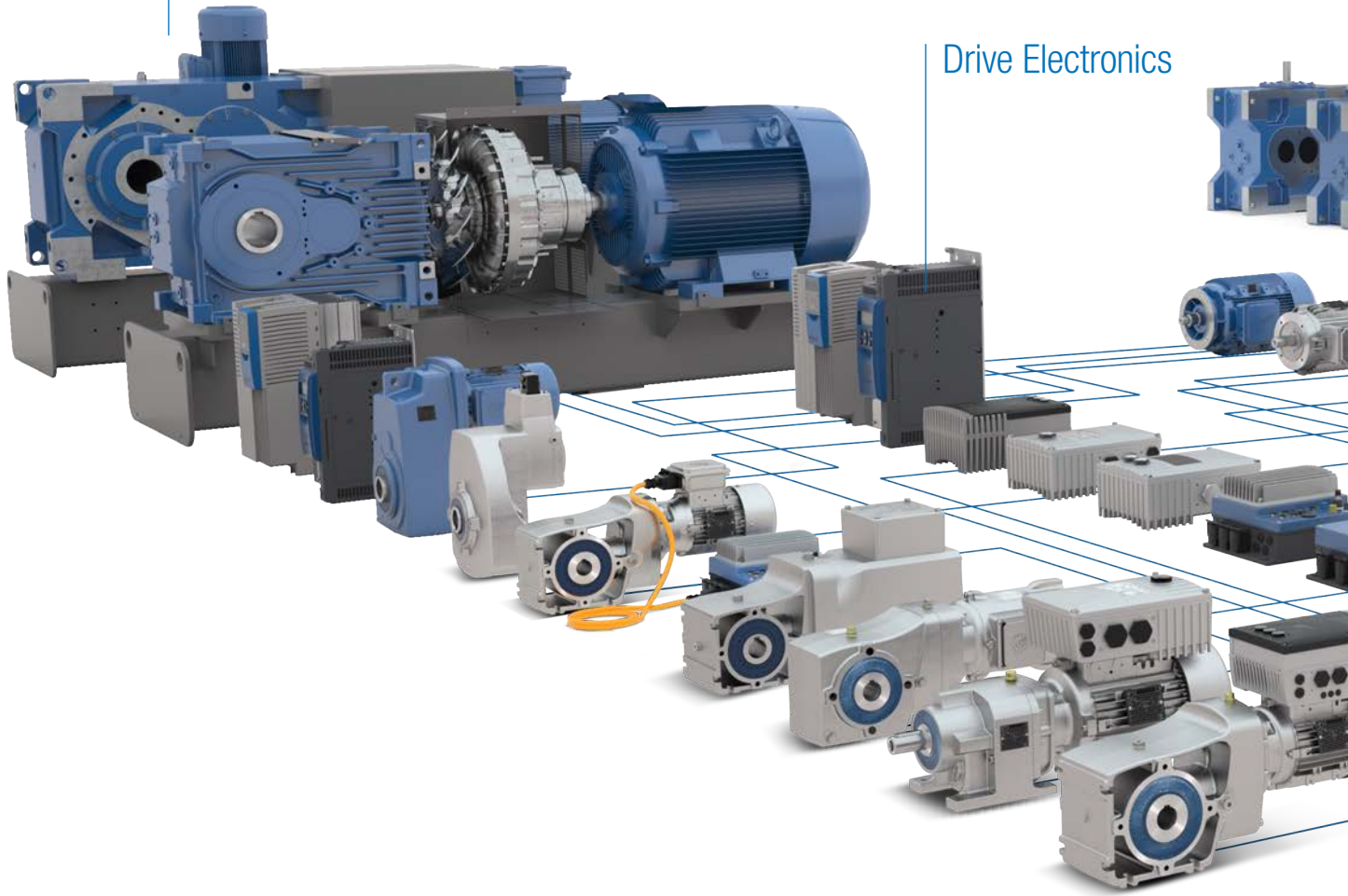
- ▶ Simple commissioning
- ▶ Easy maintenance and safe, reliable operation
- ▶ Lower total cost of ownership
- ▶ Modular design
- ▶ Energy savings
- ▶ Project and product support
- ▶ Global NORD sales and support network

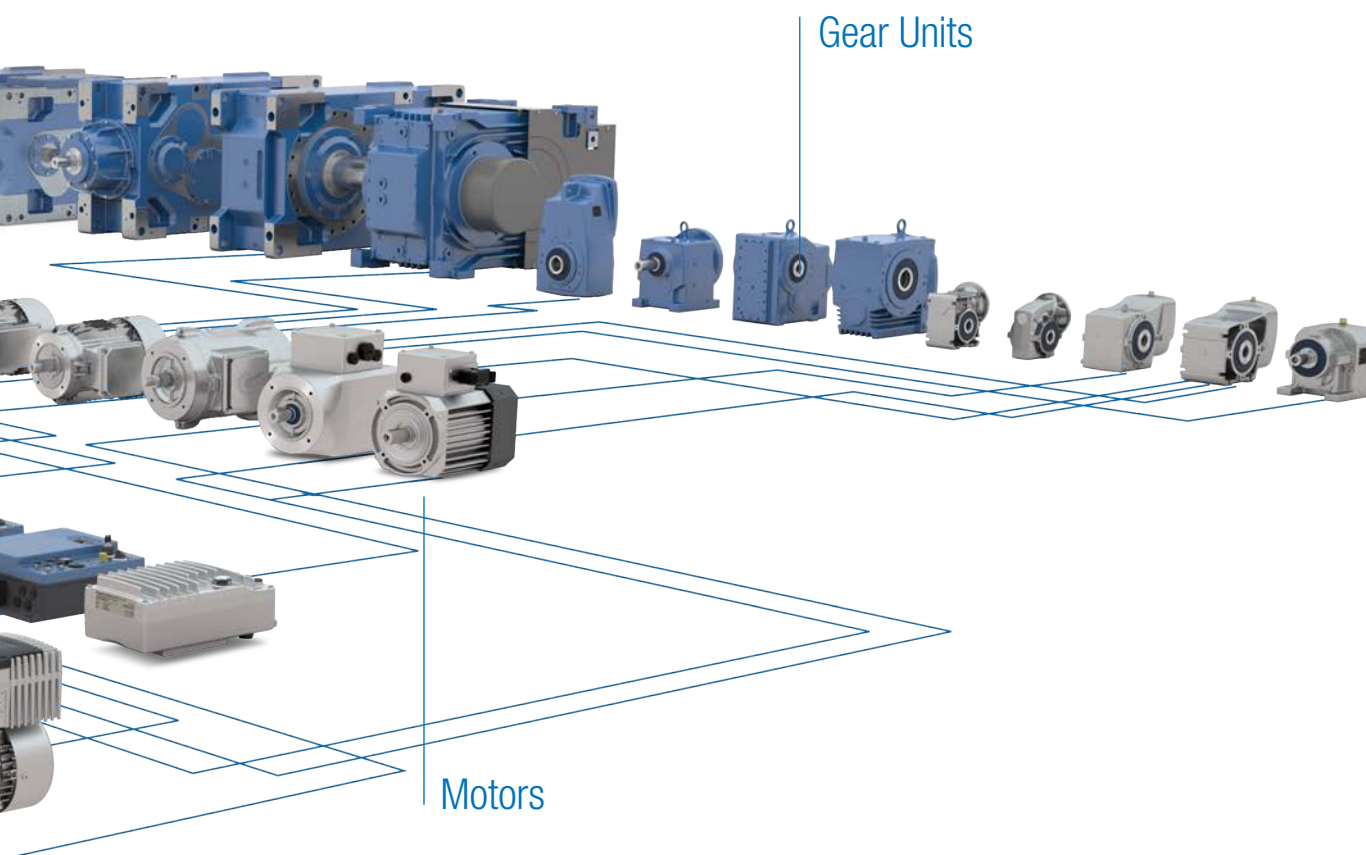


Complete Drive Solutions from a Single Source

Drive Solutions

Drive Electronics





Gear Units

Motors

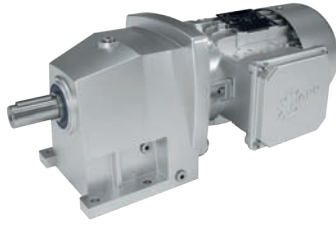
ATEX

Our products are available in ATEX certified versions.

The NORD modular system consists of gearboxes, motors, and drive electronics that can be tailored to provide an optimized solution tailored to individual needs. The modular products are perfectly matched and can be combined in many variations. In addition, we offer planning, project management, installation, and service from a single source. If required, industry solutions can be

configured as a complete logistics package that is programmed and ready for use. Each modular NORD solution combines the highest product quality, short planning and assembly times, high delivery availability, and a good price/performance ratio. Our products are also available in ATEX certified versions.

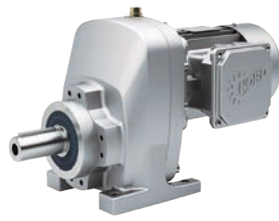
Geared Motors



UNICASE™ Helical Inline Gear Units

- ▶ Foot or flange mounted
- ▶ Long life, low-maintenance
- ▶ UNICASE housing
- ▶ Optimum sealing

Sizes	11
hp	0.16 – 200
lb-in	89 – 230,119
i	1.35:1 – 14,340.31:1



NORDBLOC.1® Helical Inline Gear Units

- ▶ Foot or flange mounted
- ▶ Die-cast aluminium housing
- ▶ UNICASE housing
- ▶ Industry standard dimensions

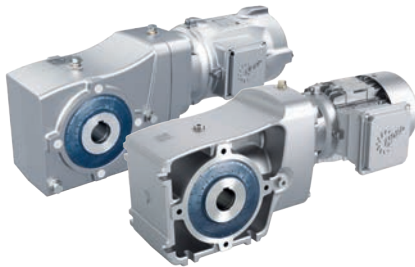
Sizes	13
hp	0.16 – 50
lb-in	266 – 29,207
i	1.07:1 – 456.77:1



UNICASE™ Parallel Shaft Gear Units

- ▶ Foot, flange, or face mounted
- ▶ Hollow or solid shaft
- ▶ UNICASE housing
- ▶ Compact design

Sizes	15
hp	0.16 – 250
lb-in	974 – 680,200
i	4.03:1 – 15,685.03:1



NORDBLOC.1® 2-Stage Bevel Gear Units

- ▶ Foot, flange, or face mounted
- ▶ Hollow or solid shaft
- ▶ UNICASE housing

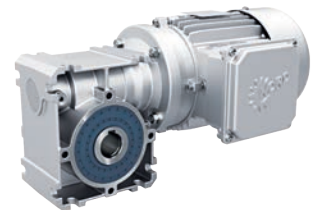
Sizes	6
hp	0.16 – 10
lb-in	443 – 5,842
i	3.03:1 – 70:1



UNICASE™ Helical Worm Gear Units

- ▶ Foot, flange, or face mounted
- ▶ Hollow or solid shaft
- ▶ UNICASE housing

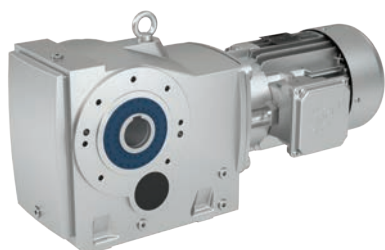
Sizes	6
hp	0.16 – 20
lb-in	823 – 27,066
i	4.40:1 – 7,095.12:1



UNIVERSAL SI Worm Gear Units

- ▶ Universal mounting
- ▶ Modular
- ▶ Lubricated for life

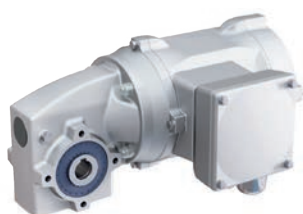
Sizes	5
hp	0.16 – 5.00
lb-in	186 – 3,780
i	5.00:1 – 3,000.00:1



UNICASE™ Helical Bevel Gear Units

- ▶ Foot, flange, or face mounted
- ▶ Hollow or solid shaft
- ▶ UNICASE housing

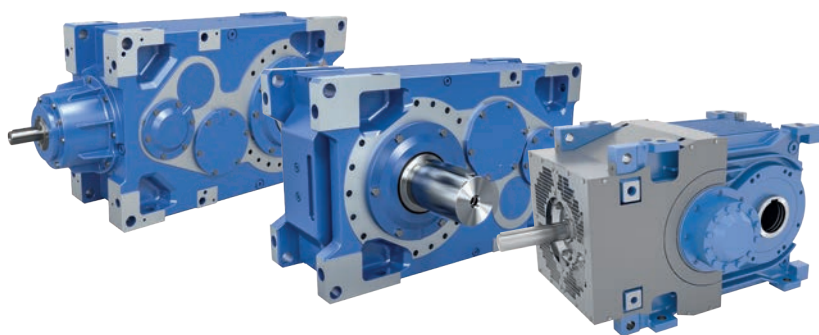
Sizes	11
hp	0.16 – 250
lb-in	1,593 – 442,537
i	8.04:1 – 13,432.68:1



UNIVERSAL SMI Worm Gear Units

- ▶ Universal mounting
- ▶ Smooth surfaces
- ▶ Lubricated for life

Sizes	5
hp	0.16 – 5.00
lb-in	186 – 3,780
i	5.00:1 – 3,000.00:1



MAXXDRIVE® Industrial Gear Units

- ▶ All bearing points and sealing surfaces are machined in a single operation
- ▶ UNICASE housing, no sealing surfaces subject to torque
- ▶ High-precision axis alignment, quiet operation
- ▶ Gear ratio range 5.54 to 400:1 with the same foot dimensions
- ▶ Parallel axis and right-angled gear units

	MAXXDRIVE®	MAXXDRIVE® XT
Sizes	11	7
hp	2.50 – 8,075	30 – 2,825
lb-in	132,8000 – 2,495,900	132,800 – 663,800
i	5.60:1 – 30,000:1	6.3:1 – 22.4:1



DuoDrive Integrated Gear Unit and Motor

- ▶ IE5+ motor and a single-stage helical gear unit in one housing
- ▶ Extremely high system efficiency
- ▶ Compact wash-down design

Sizes	2
hp	0.50 - 4.00
lb-in	230 – 2,186
i	3.24:1 – 18.1:1

NORD is the only manufacturer that produces modular industrial gear units with an output torque of up to 2,495,900 lb-in in a one-piece UNICASE housing.

ATEX

NORD gear motors and industrial gear units are also available in ATEX certified versions.

Drive Electronics

Functions

- ▶ High precision regulation with current vector control
- ▶ Compatible with all common bus systems
- ▶ 4-quadrant operation
- ▶ Integrated PLC functionality for drive-related functions
- ▶ Energy-saving function during partial load operation
- ▶ Control and parameterization tools and simple parameter structure
- ▶ Integrated line filter for compliance with EMC regulations
- ▶ Operation of synchronous and asynchronous motors
- ▶ Control and closed loop regulation
- ▶ POSICON – integrated positioning mode and synchronization
- ▶ STO and SS1 – integrated functional safety
- ▶ Integrated brake rectifier for motor brake control

Advantages

- ▶ Scalable functionality – flexibility of equipment and function
- ▶ High torque capability for all drive applications
- ▶ Simple commissioning and operation

NORD drive electronics are available in ATEX certified versions.



NORDAC LINK:
Variable Frequency Drive
SK 250E-FDS



NORDAC LINK:
Motor Starter
SK 155E-FDS

The field distribution system for flexible, decentralized installation. Configurable based on application requirements and available as a variable frequency drive or starter version. Fast commissioning through high level of plug-in capability. Simple servicing of the system through integrated maintenance switch and local manual control facility.

Nominal ratings:

- ▶ Power range up to 10 hp
- ▶ Wall mounting
- ▶ IP55, IP65

Nominal ratings:

- ▶ Power range up to 4 hp
- ▶ Wall mounting
- ▶ IP55, IP65



NORDAC START:
Motor Starter SK 135E

The decentralized starter for all types of soft starting. With integrated motor protection and reversing function for flexible integration into the system.

Nominal ratings:

- ▶ Power range up to 10 hp
- ▶ Wall or motor mounting
- ▶ IP55, IP66, IP69K



NORDAC BASE:
Decentralized Variable
Frequency Drive SK 180E

Economical decentralized solution for simple drive applications. Low installation costs as well as robust design for simple installation outside the control cabinet.

Nominal ratings:

- ▶ Power range up to 3 hp
- ▶ Wall or motor mounting
- ▶ IP55, IP66, IP69K



NORDAC FLEX:
Decentralized Variable
Frequency Drive SK 200E

Modular decentralized drive unit with versatile installation options, simple commissioning and maintenance through extensive plug-in capability, and simple parameter transfer via EEPROM.

Nominal ratings:

- ▶ Power range up to 30 hp
- ▶ Wall or motor mounting
- ▶ IP55, IP66

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Motors



Energy-saving motors



Switchable pole motors



Single-phase motors



Smooth motors



ATEX
Explosion protected motors,
gas atmospheres



ATEX
Explosion protected motors,
dust atmospheres

Special Features

- ▶ Motors developed and produced by NORD
- ▶ We produce energy-efficient products for all parts of the world
- ▶ Products available at all international locations
- ▶ IE2, IE3, IE4, IE5+



NORDAC ON:
Decentralized Variable
Frequency Drive SK 300P

Decentralized drive unit specially developed to meet the special requirements of horizontal conveyor applications and compatibility with the new IE5+ synchronous motor.

Nominal ratings:

- ▶ Power range up to 4 hp
- ▶ Wall or motor mounting
- ▶ IP55, IP66



NORDAC PRO:
Control Cabinet Variable
Frequency Drive SK 500E

The frequency drive for all drive applications. Proven technology, large power range, and capable of functional expansion with plug-in option modules. Optimized heat dissipation thanks to the variable cooling concept.

Nominal ratings:

- ▶ Power range up to 200 hp
- ▶ Control cabinet installation
- ▶ IP20



NORDAC PRO:
Control Cabinet Variable
Frequency Drive SK 500P

The innovative next generation of control cabinet variable frequency drives. Features a compact size, extremely flexible communication and interface concept, and functional expansion with optional modules.

Nominal ratings:

- ▶ Power range up to 30 hp
- ▶ Control cabinet installation
- ▶ IP20

Why Drive Solutions from NORD DRIVESYSTEMS are the Ideal Choice

For more than 50 years we have provided our customers with extensive advice for the planning and implementation of standardized and customized drive solutions with electronic drive technology.

- ▶ NORD provides everything from a single source. All components such as gear units, motors, and drive electronics are optimally matched.
- ▶ NORD provides competent local support throughout the world for the planning, design and integration of suitable drive technology.
- ▶ NORD supplies pre-assembled drive systems that are simple and easy to install and maintain.



Experience, competence, and innovation for over 30 years

In addition to excellent quality and reliability, drive solutions from **NORD DRIVESYSTEMS** also feature a great depth of production. The drive specialist produces all high-quality components in its own facilities. At the beginning of the 1980s, **NORD** started to produce electronic drive technology in Aurich, Lower Saxony. Over the years, the range of variable frequency drives, motor starters, and electronics has continually expanded and now includes electronic drive technology up to 214 hp.

The production facility has also been continually expanded with up to 400,000 units capable of being produced per year.



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Drives Designed with Safety in Mind

Basic Operational Standards



User Friendliness

- ▶ Easy adaptation to bus communication systems with optional hardware/software options
- ▶ Quick and simple diagnostics via easily visible LED indicators
- ▶ Technology units available for display, operation, and parameterization
- ▶ Clear display by large LCD screen in 14 languages (optional)
- ▶ Simple operation and parameterization through logical parameter structure and intuitive layout of control elements
- ▶ Variants for control cabinet installation, hand-held technology, or direct mounting on the VFD available (only *NORDAC PRO*)
- ▶ Wireless interface for operation and parameterization with mobile terminal devices available



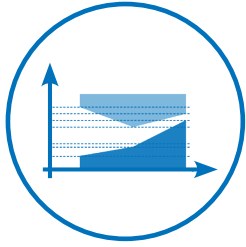
Protection and Safety Functions

- ▶ Protective monitoring of
 - ▶ Overvoltage
 - ▶ Temperature
 - ▶ Excess current
- ▶ Communication monitoring
 - ▶ Timeout functions
- ▶ Motor protection through
 - ▶ Overload monitoring
 - ▶ Thermistor evaluation
 - ▶ Temperature monitoring
- ▶ Functional safety
 - ▶ Safe torque switch-off STO
 - ▶ Safe stop SS1
 - ▶ Safe speed SLS, SOS
 - ▶ Secure bus communication

(not available in all series)



Electronic Drive Technology Basic to Advanced Functionality



Load Monitoring

- ▶ Monitoring of load torque depending on the output frequency
- ▶ Individual adaptation of load monitoring to protect the system from overload in particular frequency ranges



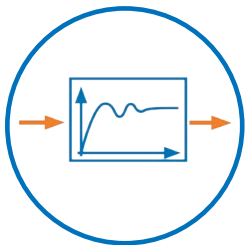
Energy-Saving Function

- ▶ Maximum efficiency in partial load operation
- ▶ Reduced operating costs due to energy savings of up to 60%
- ▶ Simple adjustment



Lifting Gear Functions

- ▶ High-precision current vector control for rapid and precise load take-up
- ▶ Integrated brake chopper to divert generated energy to a brake resistor (brake resistor optional)
- ▶ Brake management for optimum control of an electromechanical holding brake for wear-free brake actuation



PI Process Controller/PID Controller

- ▶ Feedback and evaluation of actual values for implementation of closed-loop control circuit (e.g. flow or dancer control)
- ▶ P and I components can be set separately





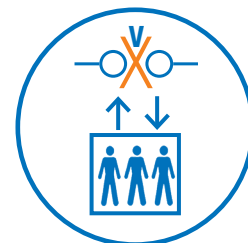
Master/Follower Operation

- ▶ Control of one or more drives from a single drive that is designated as the Master
- ▶ Communication via USS or CANopen with control word and setpoint values



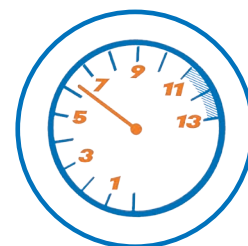
Evacuation Run

- ▶ Evacuation run possible if the main supply fails
- ▶ Emergency operation with low DC voltage from UPS (e.g. battery) possible
(not available in all series)



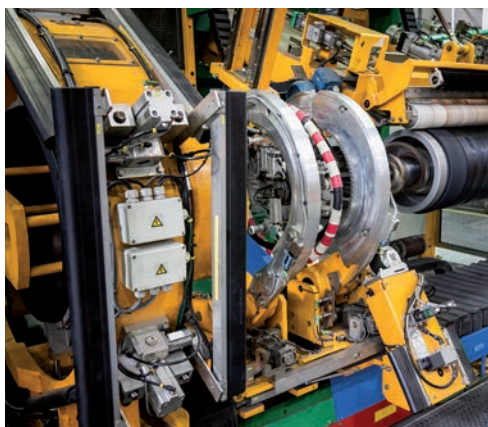
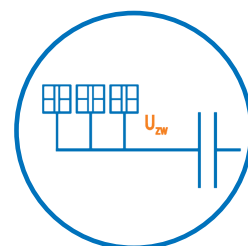
Encoder Feedback (Servo Mode)

- ▶ High-precision speed regulation
 - ▶ Highest possible acceleration due to direct feedback of the actual speed characteristics to the variable frequency drive
 - ▶ Full torque down to standstill (0 speed)
 - ▶ Digital speed controller with wide range of setting
- (not available in all series)



Link circuit coupling

- ▶ Coupling of the link circuits of multiple variable frequency drives
- ▶ Energy-saving effect with balanced motor and generator operation
- ▶ Elimination of brake resistors possible
(not available in all series)



NORDAC Variable Frequency Drives for CO₂ Reduction:



Electronic Speed Adjustment

Electronic speed adjustment of system drives can save mechanical power losses from control methods such as throttle valves or bypass lines in pump systems. Regulated by a variable frequency drive, the motor provides the exact speed needed by the system – saving energy, operational costs, and protecting the environment.

For this purpose, NORD offers different frequency drive solutions that can be integrated in almost all system topologies. The customer can choose between conventional cabinet mounted installation or a decentralized motor or wall mounted solution.

NORD Variable Frequency Drives

Whether motor-mounted, wall-mounted, or installed in a control cabinet – NORD VFDs are highly efficient and comply with the current energy efficiency regulation IE2. In the devices' technical documentation, NORD indicates the power loss values for several operating points – providing general technical data as well as characteristics for different operating points. Individual workload of the driven machine is also included into the selection of the most suitable variable frequency drive.



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Motors in the Partial Load Range

Oversized drive systems are widespread and often done to maintain safety factors, standardize drive components, and to accommodate dynamic characteristics during system operation. This often causes the motor to operate in a partial load range rather than in a nominal operation range. The optimum efficiency of an asynchronous motor is only achieved around its nominal operating point. For speeds and powers below the nominal operating point, its efficiency significantly decreases. Here is where the variable frequency drive can help: it recognizes the workload situation and, after a short time in the partial load range, lowers the motor magnetism to the reduced, required level. This results in reduced motor losses and optimized efficiency. For higher load requirements, an automatic readjustment takes place.



Environmentally Friendly Drive Technology

Modern electric motors such as the IE4 or IE5+ motors from NORD, are at their most efficient when used in combination with a variable frequency drive. These synchronous motors offer a considerably higher efficiency than asynchronous motors and expand the nominal speed and power range beyond what asynchronous motors are capable of.

NORDAC frequency drives and IE4/IE5+ high-efficiency motors have been jointly developed and perfectly matched. This optimized combination also offers the potential to quickly pay for itself through energy cost savings - making it the perfect modern engineering solution for environmentally friendly drive technology.



Condition Monitoring for Predictive Maintenance

Condition Monitoring for Predictive Maintenance

With condition monitoring, drive and status data are recorded periodically or continuously in order to optimize operational safety and efficiency of machines and systems. Condition monitoring can provide important information for predictive maintenance. The objective is to maintain machines and plants proactively, to reduce downtimes, and to increase the overall efficiency of the entire plant.

Customer Benefits

- ▶ Detection and avoidance of impermissible operating states at an early stage
- ▶ Status oriented maintenance replaces time-based maintenance
- ▶ Plannable machinery and plant downtimes based on real drive and process data
- ▶ Reduction of service and material costs
- ▶ Longer service life of components and machines
- ▶ Increase in system availability
- ▶ Avoidance of unplanned downtimes
- ▶ Plannable and cost-optimized maintenance

Condition Monitoring

The **INDUSTRIAL INTERNET of THINGS (IIoT)** focuses on use of the internet in industrial processes and procedures. **IIoT** aims to increase operational efficiency, reduce costs, and speed up processes. Sensors and sensor data play a central role to provide the basis for condition monitoring and predictive maintenance.

- ▶ Condition monitoring solutions for predictive maintenance systems integrated into the variable frequency drive
- ▶ System is **IIoT** / INDUSTRY 4.0 READY!
- ▶ Available for decentralized and control cabinet solutions

Sensors

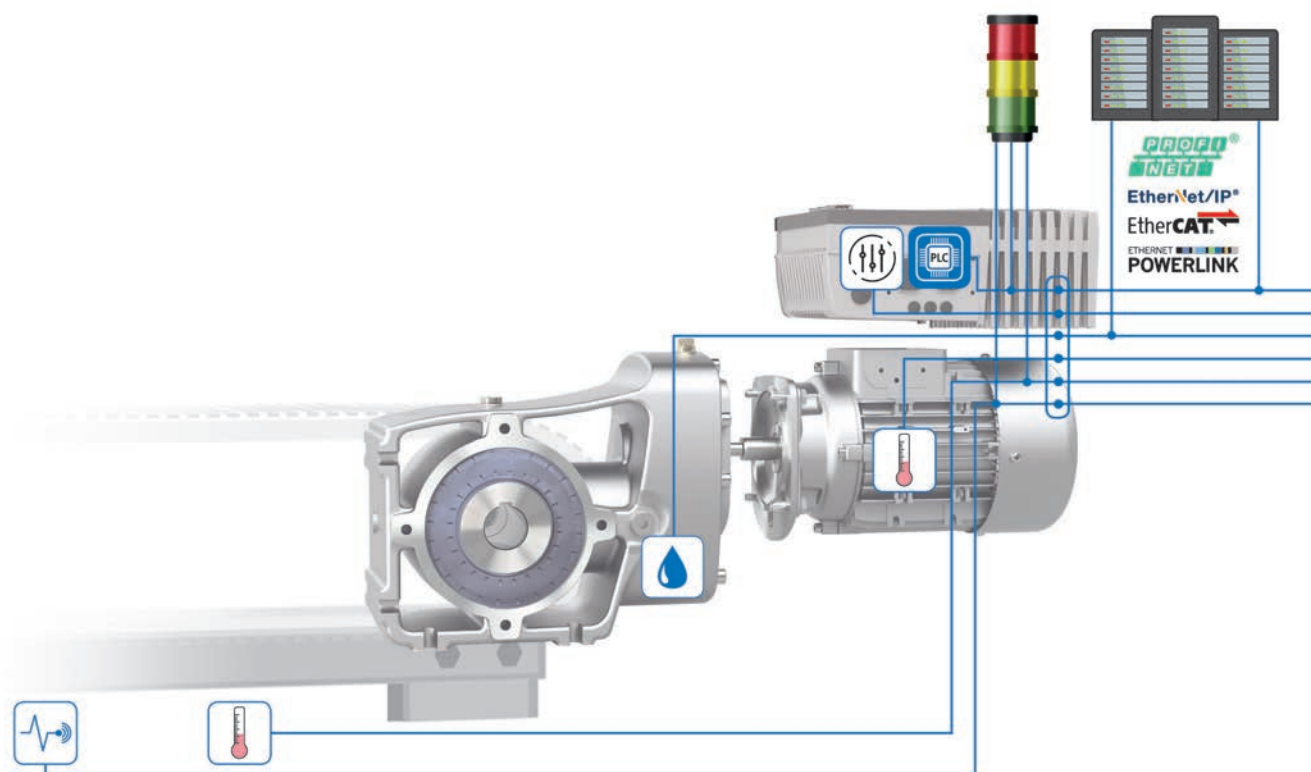
- ▶ Interface for digital/analog sensors
- ▶ Virtual sensors – The integrated PLC can calculate information such as the optimal oil change time

Communication Interfaces

- ▶ Threshold values or general status information can be communicated externally (via common Industrial Ethernet dialects)

Integrated PLC

- ▶ Local pre-processing of data with the integrated PLC
- ▶ Pre-processing of threshold values



Functional Scope

A series of three function ranges is available for condition monitoring (CM). The NORD **SmartOilChange** (SOC) function is also available as an option.

CM1

CM1 includes the transfer of selected drive information parameters from the frequency drive to a database in a local industrial computer (IPC). The frequency drive's integrated PLC is not used and an integrated Ethernet interface is necessary to transfer the data to the local IPC. The IPC provides the additional opportunity to collect all drive information parameters and to pass them on to a customer cloud.

CM2

CM2 additionally uses the VFD's integrated PLC for threshold-based evaluation of external sensors (vibration sensor and motor temperature) or drive information parameters.

CM3

CM3 provides visualization of the data for each drive in a proprietary NORD dashboard.

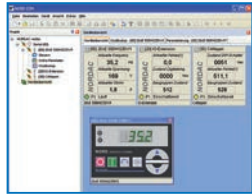
SOC

The optional SOC function enables determination of the optimum oil change time on the basis of the virtual oil temperature. The algorithm is executed in the integrated PLC. At present this function is only available for 2-stage bevel gear units.

NORDCON Software Inclusive

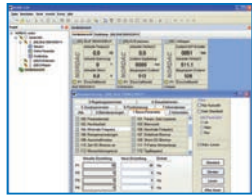
NORDCON Software

NORDCON is the free operating software for control, parameterization, and diagnostics of all NORD variable frequency drives and motor starters.



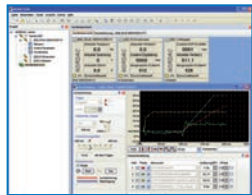
Control

A virtual control unit, analogous to a SimpleBox (optional control and parameterization unit), enables the display of operating values, parameterization, and control of a connected variable frequency drive or motor starter.



Parameterization

The user can view and adjust each available parameter via a convenient overview. With the corresponding printing option, parameter lists are generated in printed form completely or only with the values which deviate from the factory settings. The final data sets can be saved on a PC/laptop and either archived for future use or sent by e-mail.

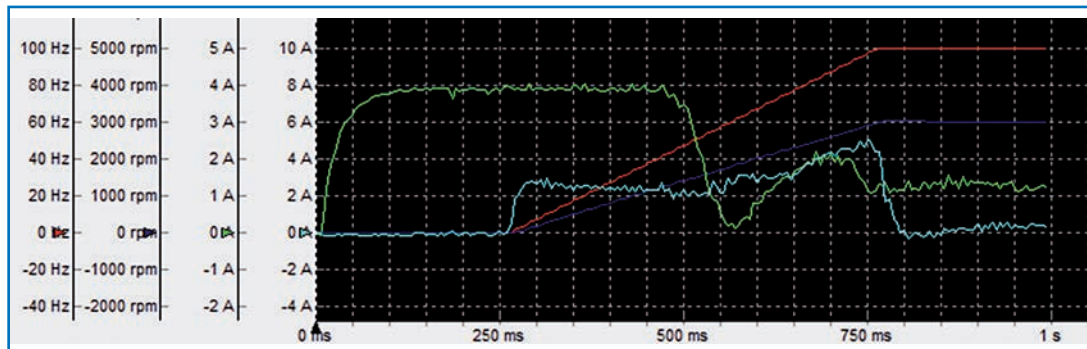
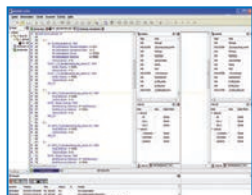


Diagnosis

The NORDCON oscilloscope function is an extremely useful instrument for optimum adjustment of drive systems. By means of line graphs, all drive characteristics (current, torque, etc.) can be recorded and analyzed. Based on the results, the relevant drive unit can be fine tuned to the ideal parameter settings.

PLC Programming

A PLC editor is available for creating, editing, and managing the PLC program. The PLC programs can also be tested (debugged) with this editor and communicated to the variable frequency drive. The programming languages "Structured Text" and "Instruction List" according to IEC 61131-3 are supported.



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Wireless Communication is Possible

NORD DRIVESYSTEMS Opens up a New Communication Method

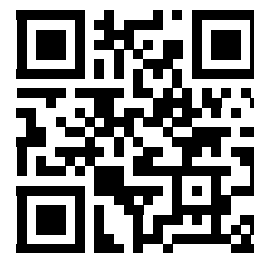
You can now make 1:1 connections to your mobile terminal device with the NORDAC *ACCESS BT* removable Bluetooth stick. Together with the free NORDCON *APP*, available for both Android and iOS, you have a practical, smart tool in your pocket that conveniently enables access to your variable frequency drive. Available functions such as display operating values, parameterization, and oscilloscope functions are reimaged from the Windows-based NORDCON software with next level intelligence.



Service with the NORDCON APP

The NORDCON *APP* is a mobile commissioning and service solution with the following advantages for all NORD drives:

- ▶ Dashboard-based visualization for drive monitoring and fault diagnosis
- ▶ Parameterization with help function and rapid access to parameters
- ▶ Individually configurable oscilloscope function for drive analysis
- ▶ Backup and recovery function for simple handling of drive parameters

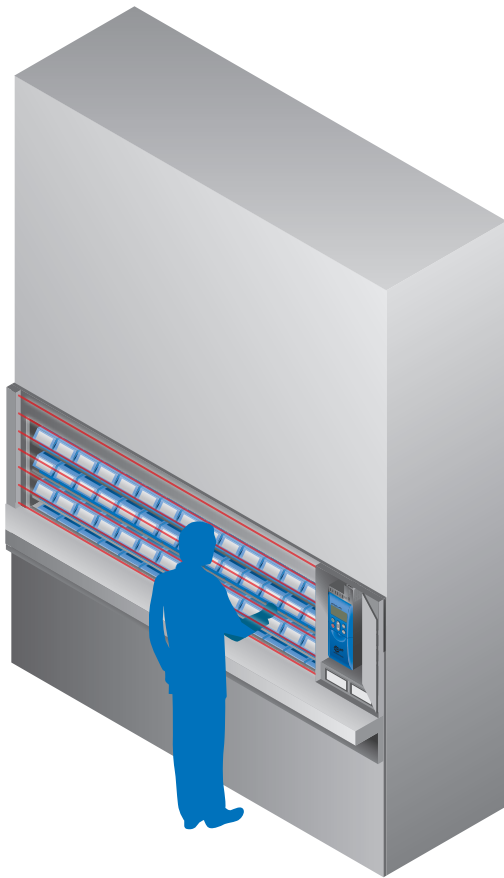


[NORDCON APP](#)

Wireless Works Harder

- ▶ Increases radius of action when you are working on the device
- ▶ Communication with a device inside a safety area without having to enter the danger zone

For Any Occurrence Safe Stop STO and SS1



Safe Stop

Personnel safety and reliable machine availability are the focus in system operations. After a safety circuit is actuated by opening a safety cover or door, it must be ensured that no rotating components can result in an accident.

A motor controlled by a NORD VFD uses a Safe Plus Block that provides a safe shut-down method for stopping the drive and protection against the motor restarting in compliance with safety standards.

This safe block includes the voltage supply to the circuit breaker by means of a safety switching device. The frequency drive is therefore immediately ready to be switched on without re-initialization after the safety circuit is closed.

Standards

- ▶ DIN EN ISO 13849-1:
Performance Level e
- ▶ DIN EN 61508: SIL 3
- ▶ DIN EN 60204-1: Stop function
- ▶ DIN EN 61800-5-2:
Safety functions

Applications

- ▶ Rotating machine tools (e.g. milling machines)
- ▶ Closed moving systems with safety doors

Advantages at a Glance

- ▶ Certified by TÜV NORD
- ▶ Safe Torque Off (STO)
- ▶ Safe Stop 1 (SS1)
- ▶ High availability through continuous online operation
- ▶ Elimination of contactor components
- ▶ Elimination of initialization times
- ▶ Long service life due to electronic switching (no electromechanical contacts)
- ▶ Low-cost solution with a compact device

Functional Safety in Bus Communication

PROFIsafe

For drives that have been integrated in system controls via Industrial Ethernet, safe communication can be flexibly transmitted via this already existing Ethernet-based network. The need to hardwire a fail-safe wiring, for an STO function for example, is eliminated.

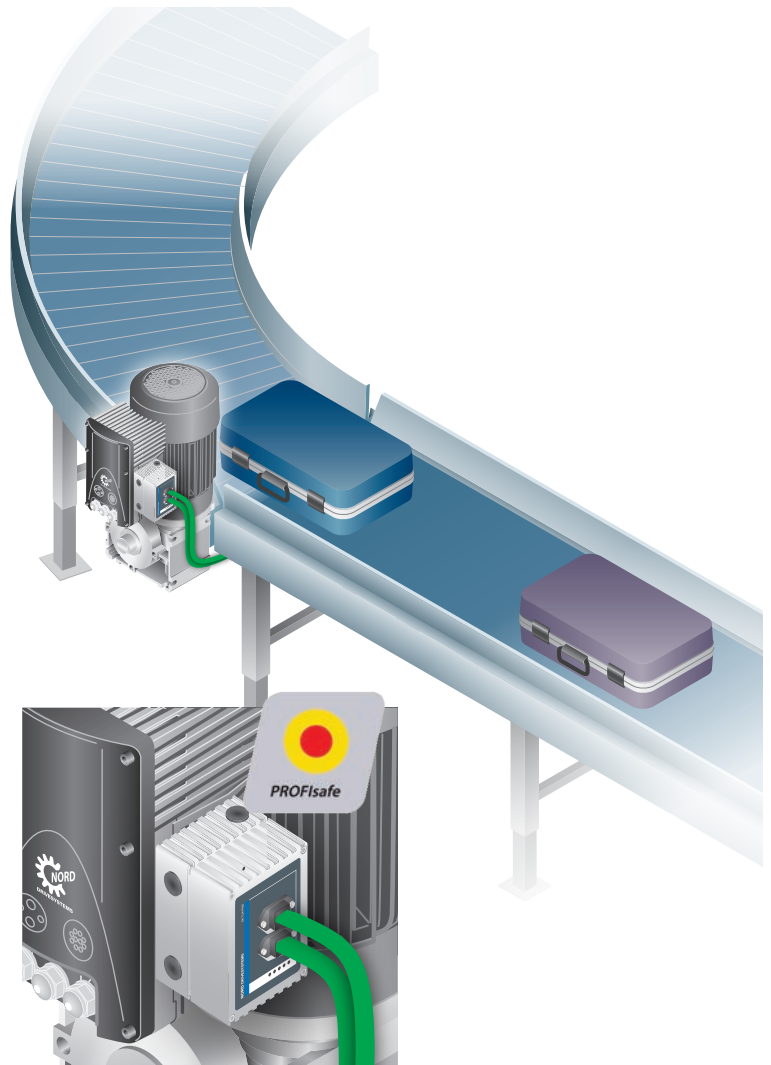
In this case, drive control information and safety information are transmitted via the same network. The decentralized and integrated functional safety from a NORD drive system allows for new safety concepts in different industries. Fail-safe functions in application solutions can be implemented without needing to stop the machine. The optional modules read a fail-safe encoder for the fail-safe monitoring of movements. In combination with a higher-level and fail-safe control, these modules can monitor speed ranges and recognize safe directions of rotation. The NORD solution also provides opportunities to connect functional elements of the operational safety environment such as light-blocking grille or emergency stop switch to the module, and to transmit the signal states as fail-safe to the control.

Standards

- ▶ DIN EN ISO 13849-1:
Performance Level e
- ▶ DIN EN 61508: SIL 3
- ▶ DIN EN 61800-5-2:
Safety functions
- ▶ DIN EN 61800-3-2

Advantages at a Glance

- ▶ Connection and evaluation of a fail-safe SIN /COS encoder possible
- ▶ Support of safety functions SLS, SSR, SDI, SOS, SSM



PROFIsafe modules

SK TU4-PNS(-M12)(-C)
Available for NORDAC FLEX
(SK 21xE / SK 23xE)

SK CU4-PNS(-C)
Available for NORDAC LINK
(SK 260E-FDS / SK 280E-FDS)

Encoders

If the main aim of a drive application is maximum accuracy, the integration of an encoder into the drive system is essential. The encoder's task can be subdivided into two categories: [speed detection](#) and [position detection](#).

Speed Detection for Speed Control

A frequency drive with integrated speed control can control the motor speed with utmost accuracy and directly compensate load changes. This requires the use of an [incremental encoder](#). The encoder is directly mounted on the motor shaft and connected to the VFD. The variable frequency drive evaluates the speed detected by the encoder and uses it to control the motor speed.

Position Detection for Position Control

Variable frequency drives with integrated position control ([POSICON](#)) enable performance of drive applications involving exact positioning without additional components such as photocells or limit switches.

Continuously monitoring operating values of NORDAC VFDs allows for optimum control of target positioning at any time and acceleration values matched to the drive application.

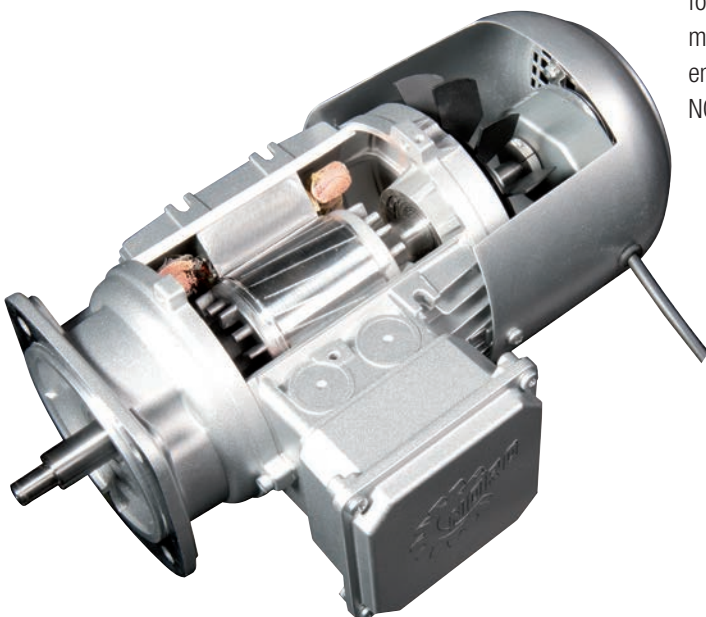
Any common encoder type such as [incremental encoders](#), [absolute encoders](#), or [combination encoders](#) (absolute encoders with additional incremental track) may be used for position control. When using position control, the encoder is usually mounted on the motor shaft and connected to the frequency drive.

Encoder Types

[Absolute encoders](#) and [combination encoders](#) register the rotation angle and the number of rotations of the encoder shaft. They code this as a unique position that is transmitted to the VFD for direct processing. Absolute and combination encoders “remember” the position and can correctly render it even upon system switch-off and switch-on. Referencing the encoder (adjustment to one reference point) is thus not required or only required once during system commissioning.

[Incremental encoders](#), however, only transmit binary pulses to the VFD. These pulses are based on the so-called encoder resolution, that is the number of defined pulses per rotation of the encoder shaft. The frequency drive determines the position by counting the pulses sent by the encoder. By using two tracks shifted by 90° (¼ pulse width), the frequency drive identifies the direction of rotation of the drive. As incremental encoders can only submit pulses but not absolute positions, faults on the encoder cables may lead to misinterpretations by the frequency drive. Encoders with an additional zero track, however, deliver an additional “zero pulse” per full rotation of the encoder shaft and can be used to compensate minor faults. Switching off the system will lead to the total loss of the position. Positioning tasks with an incremental encoder therefore require additional measures (e.g. regular referencing) and, where necessary, additional components (limit or referencing switches) to ensure permanent and safe positioning operation.

The following table gives an overview of the common encoders approved by NORD. Further information on the encoder types can be found under “Options” in the motor catalogs [M7000](#) (asynchronous motors) or [M5000](#) (synchronous motors). Depending on the type of encoder, they can be combined with certain motors from NORD and NORDAC variable frequency drives.



Encoder		Motors			Variable Frequency Drives					
Interface	Cable Length Max. [m]	Asynchronous (ASM), no ATEX	Synchronous (PMSM) IE4	Synchronous (PMSM) IE5+	NORDAC PRO 500E	NORDAC PRO 500P	NORDAC FLEX	NORDAC LINK	NORDAC ON+	NORDAC BASE
HTL	10	IG12 IG22 IG42	IG12 IG22 IG42	IG62	● ¹	● ²	●	●	● ¹	○
MG Contelec	3	MGZ	MGZ	MGZ ¹	○	●	●	●	● ¹	○
TTL	50	IG11 IG21 IG41	IG11 IG21 IG41	IG61P8	● ³	●	○	○	○	○
RS 485	20	○	○	IG6	○	● ⁵	○	○	● ⁶	○
SSI	20	AE2	○	○	● ⁴	● ^{1.5}	○	○	●	○
BISS	20	○	○	○	● ⁴	● ⁵	○	○	●	○
EnDat	20	○	○	○	● ⁴	● ⁵	○	○	○	○
Hiperface	20	○	○	○	● ⁴	● ⁵	○	○	○	○
CANopen	20	AG1 ⁷	AG1 ⁷	○	●	●	○	○	○	○
		AG4 ⁸	AG4 ⁸	○	○	● ²	●	●	○	○
		AG7 ¹	AG7 ¹	○	●	●	●	●	○	○
		AG8 ⁸	AG8 ⁸	○	○	● ²	●	●	○	○
		AG9 ⁷	AG9 ⁷	○	●	●	○	○	○	○

- Available
- Not available

IG = Incremental encoder
 AG = Absolute/combination encoder
 MGZ = Incremental encoder with zero track

- ¹ Positioning only, no closed-loop operation
- ² No PMSM closed-loop operation
- ³ SK 520E or SK 530P and higher
- ⁴ SK 540E and higher
- ⁵ SK 530P and higher, firmware version 1.4 and higher, and only in combination with the optional SK CU5-MLT customer unit
- ⁶ Standard version for IE5+
- ⁷ Combination encoder, AG with TTL track
- ⁸ Combination encoder, AG with HTL track

When Extreme Precision is Required

POSION and PLC



POSION

Variable frequency drives with integrated POSICON functionality are able to accurately determine the position of the drive. Incremental encoders (TTL/HTL) and absolute encoders are available as interfaces via CANopen® (NORDAC PRO from SK 540E and above, SK 530P and above.) Sine wave encoders, SSI, BiSS, EnDat 2.1, and HIPERFACE are also available. In addition to conventional point-to-point positioning (absolute positioning), POSICON also provides relative positioning of multiple axes as well as various functions like a rotating platform with travel optimization, synchronous operation, and flying saw.

With standard POSICON position memory and features such as Teach In, Approach Reference Point, Reset Position, Offset Position, Target Window Positioning and S-ramp, the VFD can carry out fully independent positioning control. The tasks for the external control system are reduced to the starting pulse and communication of the target position (via digital I/O or at the field bus level). The variable frequency drive can even monitor the positioning process and report the operating status.

Applications

- ▶ Lifting gear/shelf storage and retrieval devices requiring precise positions
- ▶ Running gear of material conveyors/portal cranes with synchronization of all driven axes
- ▶ Rotating table functions for tool magazines on machines
- ▶ Flying saw: coupling and parallel movement of a positioning axis relative to a moving object

PLC

Intelligent drive electronics with integrated PLC functionality greatly reduce the load on the higher level system control unit and enables a modular system design. Application data is able to be evaluated in real time by the decentralized PLC, for example: the optimization of diagnostic facilities. The PLC functionality enables the application to accurately respond according to the situation.

- ▶ The PLC can be programmed with the NORDCON software (IEC 61131-3, Structured Text ST, and Instruction List IL).
- ▶ There are no license fees or other runtime costs.
- ▶ Customer specific control functions can be easily integrated with the PLC. Evaluation of sensor data and control of actuators replaces the machine control or drive control.
- ▶ Motion control function blocks for implementation of movement control based on the PLCopen standard are available.

Applications

- ▶ Regulation/control of one or more devices by the frequency drive

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variable frequency drives up to 30 hp
for control cabinet applications

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NORDAC *PRO*, SK 500E series
variable frequency drives up to 200 hp
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NORDAC *LINK*, SK 250E-FDS series
NORDAC *LINK*, SK 155E-FDS series
field distributors as variable frequency drives up to 10 hp,
field distributors as motor starters up to 4 hp
for decentralized applications

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NORDAC *ON*, SK 300P series
variable frequency drives up to 1.27 hp
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NORDAC *FLEX*, SK 200E series
variable frequency drives up to 30 hp
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NORDAC *BASE*, SK 180E series
variable frequency drives up to 3 hp
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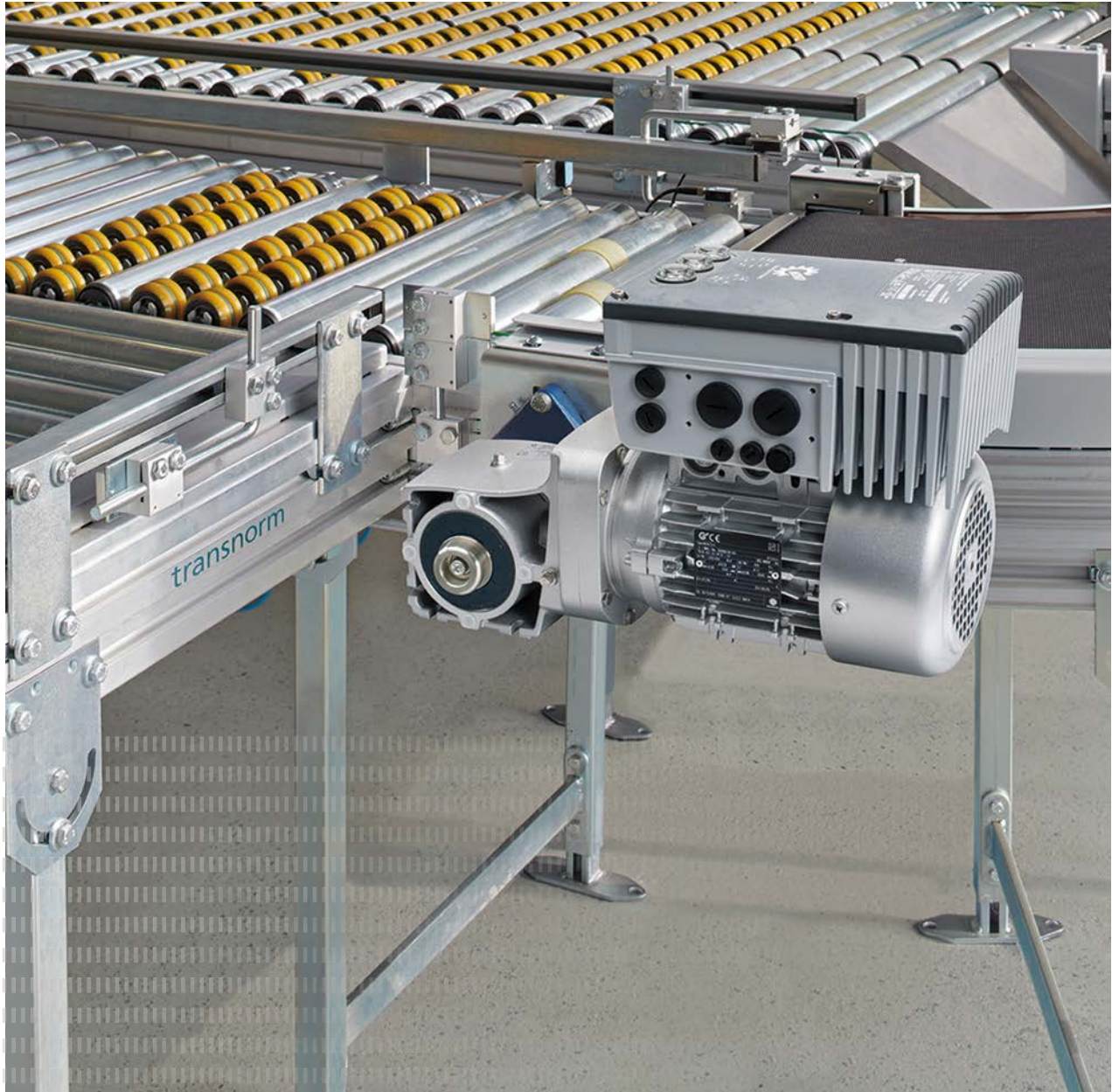
NORDAC *START*, SK 135E series
Motor starters up to 4 hp
for decentralized applications

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Accessories
for NORDAC *ON*, *LINK*, *FLEX*, *BASE*, and *START*

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Variable Frequency Drives for Control Cabinet Applications

NORDAC *PRO* SK 500P series



Top Class VFD Technology

NORDAC PRO, SK 500P Series



[NORDAC PRO - SK 500P](#)

NORDAC PRO SK 500P variable frequency drives are available for motors with rated powers of 0.33 – 30 hp (20/25/30 hp available for SK 530P and higher.) With their very compact design, the so-called book size format, they are perfect for space-saving installation in control cabinets.

Notable features across the entire product line include:

- ▶ Sensorless current vector control ensures constant speeds even with fluctuating loads and extremely high torques during startup
- ▶ 200% overload reserve, which provides greater operational safety in cranes and lifting gear applications
- ▶ Operation of asynchronous and synchronous motors
- ▶ Integrated brake chopper for 4-quadrant operation
- ▶ Integrated line filter as the basis for optimal EMC performance
- ▶ Integrated PLC, which enables convenient free programming of drive-related functions according to IEC 61131-3.

These features are as much a part of the basic configuration as the separately configurable PID or the process controller.

Functional safety is increasingly becoming the focus of attention in drive technology. To meet the various safety requirements, the NORDAC PRO also offers functional extensions to implement single or dual channel solutions for Safe Torque Switch-off and Safe Stop.

An optional removable operating display provides an extensive selection of operational and status information. It also allows direct access to parameterization.

As a standard, the SK 500P VFDs are equipped with an integrated mains unit that supplies power to the control board. The USB port, which is standard for configured version SK 530P and higher, also provides access to the VFD control board without connection to the mains voltage.

Devices with configuration level SK 530P and higher are equipped with a separate 24 V DC connection. These devices can also be parameterized when the power is switched off. Restricted diagnosis and communication with the bus is also retained.

Optional SK CU5 extensions, which can be combined with all SK 530P devices and above round off the range of functions. These include the encoder extension or the universal encoder interface for connection of a wide range of encoders (e.g. SSI, EnDat), which in combination with the installed POSICON are the ideal solution for all types of positioning (relative and absolute).

A multi-protocol Ethernet interface is integrated in the SK 550P variant. During commissioning, the protocol can simply be set by switching a parameter to the required dialect (Ethernet/IP®, EtherCAT®, PROFINET IO® or POWERLINK). Flexibility for system planning is enhanced due to the comparatively small variance in hardware.



Introduction
NORDAC PRO SK 500P
NORDAC PRO SK 500E
NORDAC LINK
NORDAC ON
NORDAC FLEX
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NORDAC START
Accessories

Basic Configuration

- Sensorless current vector control (ISD control) for high precision control and fast response times
- Brake management, electromechanical holding brake
- Brake chopper to divert generated energy to a brake resistor
- CANopen® including drive profile DS402
- POSICON variants with positioning function (relative and absolute)
- RS-485/RS-232 diagnostic interface
- 4 switchable parameter sets for flexible use of parameter settings (e.g. switching between drive units with different motor data)
- All common drive functions such as acceleration/braking on a ramp, S curves
- Parameters pre-set with standard values, immediately ready for use
- Scalable display values
- Stator resistance measurement to ensure optimal control characteristics
- Integrated PLC functionality
- Plug-in connection terminals

Available for all devices up to 3 hp



Optional

- Interfaces for many Industrial Ethernet-based bus systems
 - Removable operating display with extensive operating and status indicators, and access to parameters
 - Variants for implementation of safe drive functions (e.g. STO, SS1)
 - Interface extensions for connection of encoders and IOs
- Available for SK 530P and higher
- USB-C interface for parameterization via PC using the NORDCON software, without additional connection of a mains or control voltage



EtherNet/IP™

EtherCAT®

ETHERNET POWERLINK



Top Class VFD Technology

NORDAC *PRO*, SK 500P Series

NORD Provides the New SK 500P with Features for Streamlined Use:



Electrical Connection Power Terminals

In addition to the control terminals on the front, which are always pluggable, for the two small sizes of frequency drives with rated powers up to 3 hp, all other power terminals (e.g. line and motor connections, connections to multi-function relays, etc.) can be removed for maintenance. In this way, wiring of the compact devices can be carried out easily and safely even in confined control cabinet spaces.

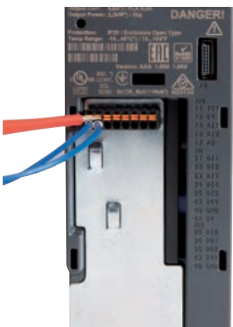


The architecture of Size 3 (VFDs with rated powers of 4 hp and above) allows enough space that a plug-in design of the power terminals is not necessary.



Control Terminals

The NORDAC *PRO* is equipped with an integrated "3rd hand", which holds the spring terminals in place for easy wiring.



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Parameter Setup

To view operating values, error messages, or access and modify variable frequency drive parameter settings use one of these methods:

- ▶ Direct access with the snap-on SK TU5-CTR technology unit (optional)
- ▶ Separate SK PAR-3E or SK CSX-3E (optional) control and parameterization units which can be mounted in the control cabinet doors
- ▶ NORDCON software (free) – by connecting a Windows computer via USB-C ¹ or RJ12
- ▶ NORDCON APP (free) for connection to a mobile terminal device via NORDCON ACCESS BT (optional)
- ▶ Removable data carrier (microSD) for backup and transfer of parameter data sets (optional)



Available for SK 530P and higher

¹ No additional connection of a mains or control voltage required



Standards and Approvals

All devices of the entire series comply with the standards and directives listed below.

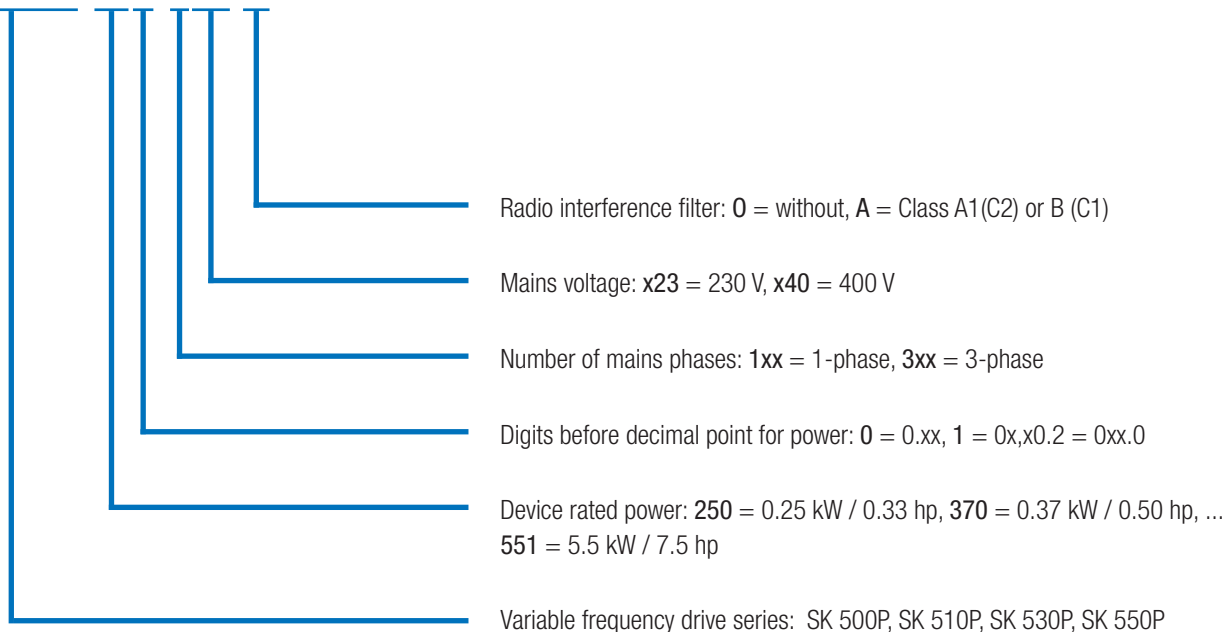
Approval	Directive	Applied Standards	Certificates	Code
CE (European Union)	Low Voltage Directive 2014/35/EU	EN 61800-5-1 EN 60529	C310601	
	EMC 2014/30/EU	EN 61800-3 EN 63000		
	RoHS 2011/65/EU	EN 61800-9-1 EN 61800-9-2		
	Delegated directive (EU) 2015/863			
	Ecodesign 2009/125/EG			
	Regulation (EU) Ecodesign 2019/1781			
UL (USA)		UL 61800-5-1	E171342	
CSA (Canada)		C22.2 No.274-13	E171342	
RCM (Australia)	F2018L00028	EN 61800-3		
EAC (Eurasia)	TR CU 004/2011, TR CU 020/2011	IEC 61800-5-1 IEC 61800-3	EA3C N RU Д- DE.HB27.B02718/20	
UkrSEPRO (Ukraine)	F2018L00028	EN 61800-5-1 EN 60529 EN 61800-3 EN 63000 EN 60947-1 EN 60947-4 EN 61558-1 EN 50581	C311900	
UKCA (United Kingdom)		EN 61800-5-1 EN 60529 EN 61800-3 EN 63000 EN 61800-9-1 EN 61800-9-2	C350601	

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NORDAC PRO SK 500P
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Type Code

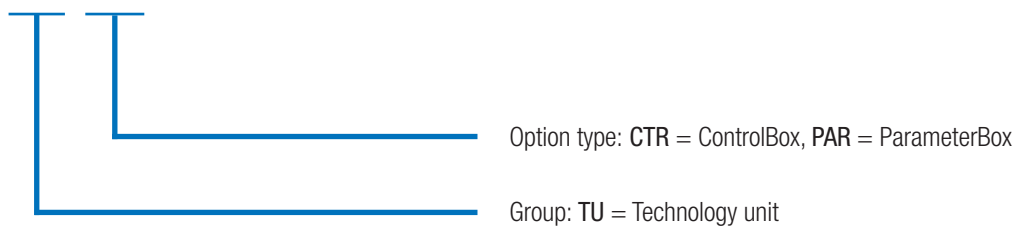
Variable Frequency Drives

SK 530P-370-340-A



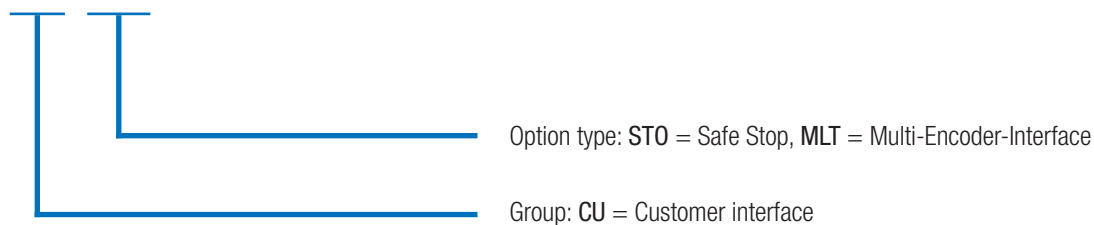
Technology Units

SK TU5-CTR



Customer Units

SK CU5-STO



NORDAC PRO

All Versions at a Glance

	Basic Drive SK 500P SK 510P	Advanced Drive SK 530P SK 540P SK 550P
	Size 1 – 4	Size 1 – 5
Sensorless current vector control (ISD control)	●	●
Brake management for mechanical holding brake	●	●
Brake chopper (brake resistor optional)	●	●
RS-232 diagnostic interface	●	●
4 switchable parameter sets	●	●
All normal drive functions	●	●
Parameters pre-set with standard values	●	●
Stator resistance measurement	●	●
Energy-saving function, optimized efficiency in partial load operation	●	●
Integrated EMC line filter according to EN 61800-3, Category C2 up to 20 m motor cable, Category C1 up to 5 m motor cable (devices above 1.0 HP)	●	●
Shielding plate for connection of shielded control cables for EMC-compliant wiring	●	●
Extensive monitoring functions	●	●
Load monitor	●	●
Link circuit coupling	●	●
Lifting gear functionality	●	●
PID controller	●	●
Process controller / compensator control	●	●
Synchronous motor operation (PMSM)	●	●
Incremental encoder input (HTL / TTL) for speed feedback - servo mode	● ¹	●
POSICON	●	●
PLC functionality	●	●
USS, Modbus RTU (RJ12)	●	●
CANopen® (connection terminals)	●	●
EtherCAT®, Ethernet IP®, PROFINET IO®, POWERLINK	○	● ²
"Safe Torque Switch-off" and "Safe Stop" (STO, SS1) functions	● ³	● ⁴
USB port (Parameterization of the FI by means of NORDCON without mains or control voltage connection)	○	●
Internal 24 V power supply unit to supply the control board	●	●
External 24 V DC supply for the control board voltage supply with automatic switch-over between the internal and external 24 V DC control voltage	○	●
Universal encoder interface	○	●
MicroSD slot, port for removable data carrier	○	●
Removable data carrier (microSD) for backup and transfer of parameter data sets	○	●
Operating display, removable for display of status and operating information and for control	●	●
Communication interface, removable, for wireless communication between the variable frequency drive and mobile terminal devices (tablet, smartphone)	●	●

¹ HTL only
² SK 550P only

³ SK 510P only, single channel
⁴ SK 540P as standard, single channel

● Available as standard
 ● Optional
 ○ Not available

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 NORDAC PRO SK 500P
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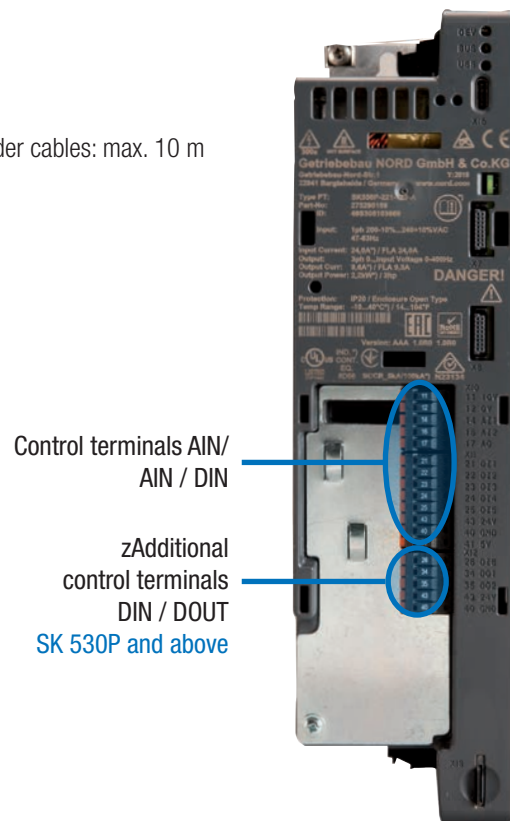
		Basic Drive SK 530P SK 510P	Advanced Drive SK 530P SK 540P SK 550P
		Size 1 – 4	Size 1 – 5
Control Terminals	DIN	5	6 ¹
	DOUT	0	2
	Signal relay ² (... 230 V AC, 2 A)	2	2
	AIN ³	2	2
	AOUT ³	1	1
Temperature sensor (PTC)		1 ⁴	1
Encoder interfaces	TTL RS422	○	●
	HTL ⁴	●	●
	CANopen®	●	●
	SIN / COS	○	● ⁵
	SSI	○	● ⁵
	BISS	○	● ⁵
	Hiperface	○	● ⁵
	Endat 2.1	○	● ⁵
	Communication		● ⁶
CAN / CANopen®		● ⁶	●
RS-485 / RS-232		●	●
Modbus RTU		●	●

- 1 Extendable with the optional SK CU5-... customer interface
- 2 Parameterizable with DOUT functions
- 3 AIN/AOUT can also be used for digital signals.
AIN: 0(2) – 10 V, 0(4) – 20 mA,
AOUT: 0 – 10 V, 0 – 20 mA
- 4 Function can only be implemented through a digital input, permissible length of encoder cables: max. 10 m
- 5 Available via optional customer interface
- 6 System bus functions can only be used with restrictions.



Temperature sensor (PTC)
SK 530P and above

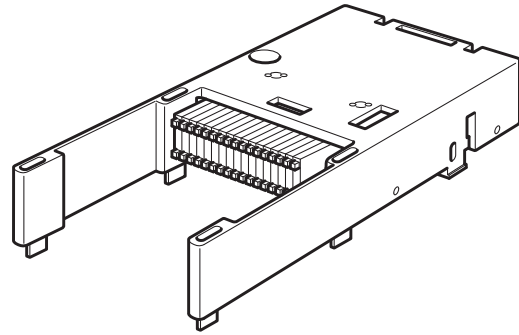
TTL encoder interface
SK 530P and above



Optional Modules for Function Extension

Variable frequency drives with configuration versions SK 530P and SK 550P can be extended with a plug-in option module. This increases the installation depth by 23 mm.

One of the following variants can be selected.



Type	Material No.	Functions	I/Os	Remarks
SK CU5-MLT	275 298 200	Encoder interface: TTL, SIN/COS, HIPERFACE, EnDat 2.1, BiSS, SSI Functional safety: STO - PLe / SIL 3 SS1-t - PLd / SIL 2	4 I/O (usable as DIN or DO/DT)	Functional safety: 2-channel connection
SK CU5-STO	275 298 000	Functional safety: STO - PLe / SIL 3 SS1-t - PLd / SIL 2	1 Safe DIN	Functional safety: 2-channel connection

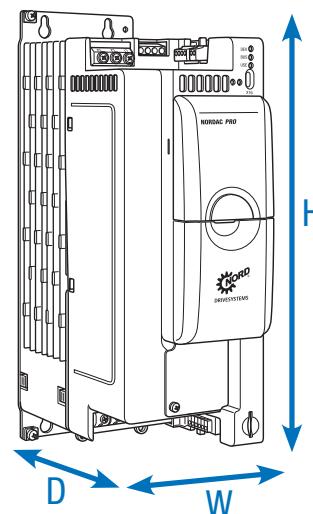
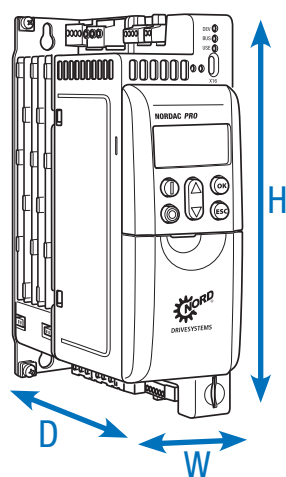


NORDAC *PRO* SK 500P Variable Frequency Drive

1 ~ 200 ... 240 V,

Output Frequency	0.0 ... 400.0 Hz	Regulation and Control	Sensorless current vector control (ISD), linear V/f characteristic curve
Pulse Frequency	3.0 ... 16.0 kHz	Motor Temperature Monitoring	I ² t Motor PTC / bi-metal switch
Typical Overload Capacity	150% for 60 s, 200% for 3.5 s	Leakage Current	<30 mA, may be considerably less depending on the size and configuration of the VFD (refer to the manual for details)
Energy Efficiency Class	IE2		
Efficiency	Size 1-3 approx. 95% Size 4+5 approx. 97%		
Ambient Temperature	-10°C ... +40°C (S1) -10°C ... +50°C (S3, 70% ED)		
Protection Class	IP20		

VFDs SK 5xxP ...	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
	230 V [kW]	240 V [hp]			
-250-123-A	0.25	0.33	1.7	1~ 200 ... 240 V, +/- 10%, 47 ... 63 Hz	3~ 0 up to mains voltage
-370-123-A	0.37	0.50	2.4		
-550-123-A	0.55	0.75	3.2		
-750-123-A	0.75	1.0	4.2		
-111-123-A	1.1	1.5	5.7		
-151-123-A	1.5	2.0	7.3		
-221-123-A	2.2	3.0	9.6		



Overall Dimensions
H x W x D

VFDs SK 5xxP ...	Weight		Overall Dimensions H x W x D		
	[kg]	[lbs]	[mm]	[in]	Size
-250-123-A	1.2	2.6	200 x 66 x 141	7.87 x 2.59 x 5.55	1
-370-123-A	1.2	2.6	200 x 66 x 141	7.87 x 2.59 x 5.55	1
-550-123-A	1.2	2.6	200 x 66 x 141	7.87 x 2.59 x 5.55	1
-750-123-A	1.2	2.6	200 x 66 x 141	7.87 x 2.59 x 5.55	1
-111-123-A	1.6	3.5	240 ¹ x 66 x 141	9.44 x 2.59 x 5.55	2
-151-123-A	1.6	3.5	240 ¹ x 66 x 141	9.44 x 2.59 x 5.55	2
-221-123-A	1.6	3.5	240 ¹ x 66 x 141	9.44 x 2.59 x 5.55	2

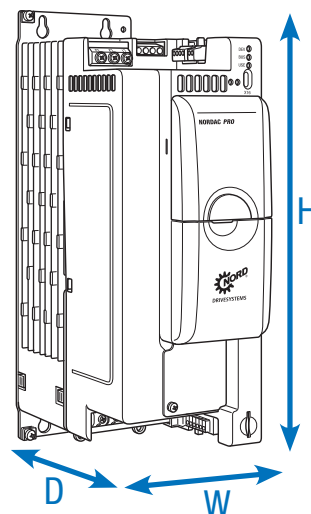
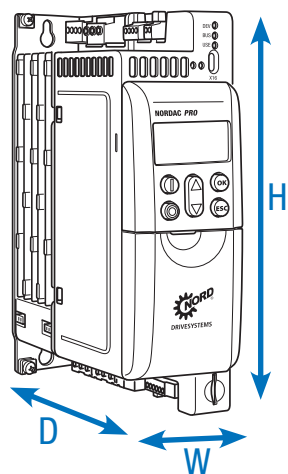
¹ SK 5xxP-221-123: Connection terminal protrudes beyond the stated overall dimension H about 15 mm.

NORDAC *PRO* SK 500P Variable Frequency Drive

3~ 380 ... 480 V

Output Frequency	0.0 ... 400.0 Hz	Protection Class	IP20
Pulse Frequency	3.0 ... 16.0 kHz	Regulation and Control	Sensorless current vector control (ISD), linear V/f characteristic curve
Typical Overload Capacity	150% for 60 s, 200% for 3.5 s	Motor Temperature Monitoring	I ² t Motor PTC / bi-metal switch
Energy Efficiency Class	IE2	Leakage Current	<30 mA, may be considerably less depending on the size and configuration of the VFD (refer to the manual for details)
Efficiency	Size 1-3 approx. 95% Size 4+5 approx. 97%		
Ambient Temperature	-10°C ... +40°C (S1) -10°C ... +50°C (S3, 70% ED)		

VFDs SK 5xxP ...	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
	400 V [kW]	480 V [hp]			
-250-340-A	0.25	0.33	1.0	3~ 380 ... 480 V, -20% / +10%, 47 ... 63 Hz	3~ 0 up to mains voltage
-370-340-A	0.37	0.50	1.3		
-550-340-A	0.55	0.75	1.8		
-750-340-A	0.75	1.0	2.4		
-111-340-A	1.1	1.5	3.1		
-151-340-A	1.5	2.0	4.0		
-221-340-A	2.2	3.0	5.6		
-301-340-A	3.0	4.0	7.5		
-401-340-A	4.0	5.0	9.5		
-551-340-A	5.5	7.5	12.5		
-751-340-A	7.5	10	16.0		
-112-340-A	11	15	24.0		
-152-340-A	15	20	31.0		
-182-340-A	18.5	25	38.0		
-222-340-A	22	30	46.0		






Overall Dimensions

VFDs SK 5xxP ...	Weight		H x W x D		Size
	[kg]	[lbs]	[mm]	[in]	
-250-340-A	1.2	2.6	200 x 66 x 141	7.87 x 2.59 x 5.55	1
-370-340-A	1.2	2.6	200 x 66 x 141	7.87 x 2.59 x 5.55	1
-550-340-A	1.2	2.6	200 x 66 x 141	7.87 x 2.59 x 5.55	1
-750-340-A	1.2	2.6	200 x 66 x 141	7.87 x 2.59 x 5.55	1
-111-340-A	1.6	3.5	240 x 66 x 141	9.44 x 2.59 x 5.55	2
-151-340-A	1.6	3.5	240 x 66 x 141	9.44 x 2.59 x 5.55	2
-221-340-A	1.6	3.5	240 x 66 x 141	9.44 x 2.59 x 5.55	2
-301-340-A	2.6	5.7	286 x 91 x 175	11.25 x 3.58 x 6.88	3
-401-340-A	2.6	5.7	286 x 91 x 175	11.25 x 3.58 x 6.88	3
-551-340-A	2.6	5.7	286 x 91 x 175	11.25 x 3.58 x 6.88	3
-751-340-A	3.8	8.3	331 x 91 x 175	13.03 x 3.58 x 6.88	4
-112-340-A	3.8	8.3	331 x 91 x 175	13.03 x 3.58 x 6.88	4
-152-340-A	7.1	15.6	371 x 126 x 232	14.60 x 4.96 x 9.13	5
-182-340-A	7.1	15.6	371 x 126 x 232	14.60 x 4.96 x 9.13	5
-222-340-A	7.1	15.6	371 x 126 x 232	14.60 x 4.96 x 9.13	5



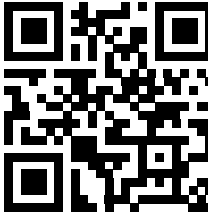
Interfaces for Operation, Parameterization, and Communication

Operation and Parameterization

Optional modules are available with up to 14 languages for displaying status, operational indicators, parameterization, and operation of the variable frequency drive. There are variants for direct mounting on the device, installation in a control cabinet door, and hand held versions. See also Accessories starting on page 161.

	Type Designation Material No.	Description	Remarks
	ControlBox SK TU5-CTR 275 297 000	Suitable for operation and parameterization, LCD screen (illuminated), 5-digit, 7-segment display, display of measurement unit, various status and operating displays, display of utilization level, convenient keypad.	Installation in the SK TU5 slot on the device
	ParameterBox SK PAR-3E 275 281 414	Suitable for control and parameterization, LCD screen (illuminated), plain text display in 14 languages, direct control of up to 5 devices, memory for 5 device data sets, convenient control keypad, for installation in a control cabinet door.	Electrical data: 4.5 ... 30 V DC / 1.3 W, supply e.g. directly via the VFD, control cabinet installation
	SimpleControlBox SK CSX-3E 275 281 413	Suitable for control and parameterization, 4-digit, 7-segment display, direct control of a device, convenient control keypad, for installation in control cabinet doors.	Electrical data: 4.5 ... 30 V DC / 1.3 W, Supply e. g. directly via the VFD, control cabinet installation

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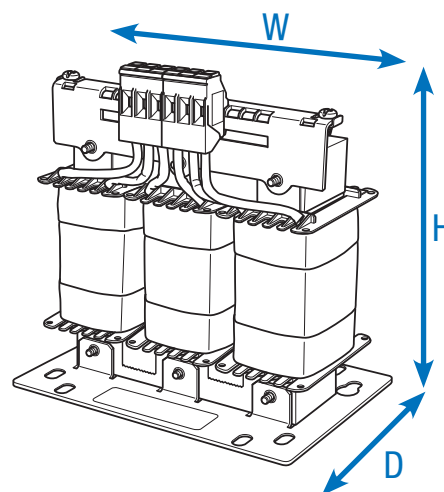
Type Designation Material No.	Description	Remarks	
	<p>Control and parameterization software NORDCON</p>	<p>Software for control and parameterization as well as support for commissioning and fault analysis of NORD electronic drive technology. Available in 14 languages.</p>	<p>Free download at: www.nord.com</p>
	<p>Bluetooth stick NORDAC <i>ACCESS BT</i> SK TIE5-BT-STICK 275 900 120</p>	<p>Interface for wireless connection to a mobile terminal device (e.g. tablet or smartphone) via Bluetooth. The NORDCON <i>APP</i>, the NORDCON software for mobile terminal devices, enables smart operation and parameterization as well as commissioning assistance and fault analysis of NORD electronic drive technology.</p>	<p>Available free of charge for Android and iOS:</p> 

Mains Chokes

Reduction of Mains Feedback

General

It may be necessary for some drive systems to use mains chokes to reduce dangerous mains current peaks. They considerably reduce external mains feedback effects, keep the proportion of current harmonics to a minimum, and reduce the input current to approximately the value of the output current. This provides additional positive effects on device protection and EMC characteristics. All chokes have protection class IP00 and are UL certified.



	VFDs SK 5xxP ...	Choke Type Material No.	Continuous Current [A]	Inductance [mH]	Overall Dimensions H x W x D
1 ~ 230 V	0.25 ... 0.37 kW 0.33 ... 0.5 hp	SK CI5-230/006-C 276 993 005	6	4.88	68 x 66 x 60 mm 2.67 x 2.6 x 2.36 in
	0.55 ... 0.75 kW 0.75 ... 1.0 hp	SK CI5-230/010-C 276 993 009	10	2.93	96 x 78 x 84 mm 3.78 x 3.07 x 3.31 in
	1.1 ... 2.2 kW 1.5 ... 3.0 hp	SK CI5-230/025-C 276 993 024	25	1.17	96 x 87 x 84 mm 3.78 x 3.43 x 3.31 in
3 ~ 400 V	0.25 ... 0.75 kW 0.33 ... 1.0 hp	SK CI5-500/004-C 276 993 004	4	3 x 7.35	116 x 80 x 60 mm 4.57 x 3.15 x 2.36 in
	1.1 ... 2.2 kW 1.5 ... 3.0 hp	SK CI5-500/008-C 276 993 008	8	3 x 3.68	135 x 120 x 86 mm 5.31 x 4.72 x 3.39 in
	3.0 ... 5.5 kW 4 ... 7.5 hp	SK CI5-500/016-C 276 993 016	16	3 x 1.84	135 x 120 x 95 mm 5.31 x 4.72 x 3.74 in
	7.5 ... 11 kW 10 ... 15 hp	SK CI5-500/035-C 276 993 035	35	3 x 0.84	167 x 155 x 110 mm 6.57 x 6.10 x 4.33 in
	15 ... 22 kW 20 ... 30 hp	SK CI5-500/063-C 276 993 063	63	3 x 0.47	241 x 210 x 117 mm 9.48 x 8.26 x 4.60 in

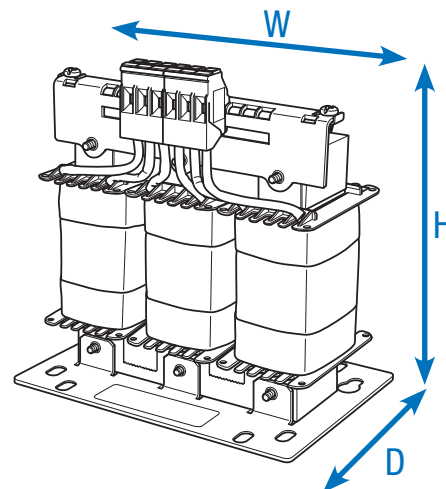
Motor Chokes

Compensation of Cable Capacities

General

Long motor cable lengths (cable capacity) often require the use of additional motor chokes on the VFD output. The use of motor chokes has a positive effect on device protection and EMC characteristics.

The specified motor chokes are rated for a pulse frequency of 3 to 6 kHz and an output frequency of 0 to 120 Hz. All chokes have protection class IP20 and are UL certified.

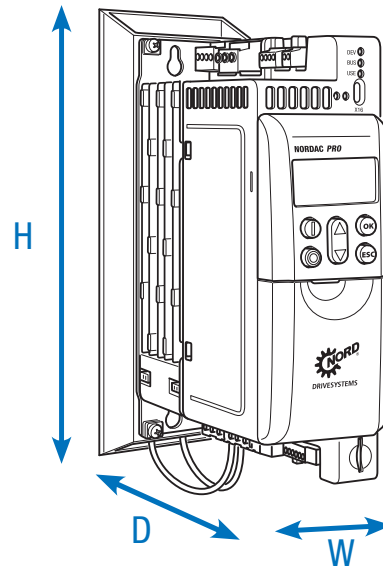


VFDs SK 5xxP ...	Choke Type Material No.	Continuous Current [A]	Inductance [mH]	Overall Dimensions H x W x D
1~ 230 V	0.25 ... 0.37 kW 0.33 ... 0.5 hp SK C05-500/002-C 276 992 002	2.5	3 x 3.68	140 x 120 x 85 mm 5.51 x 4.72 x 3.34 in
	0.55 ... 0.75 kW 0.75 ... 1.0 hp SK C05-500/006-C 276 992 006	6	3 x 1.54	140 x 120 x 95 mm 5.51 x 4.72 x 3.74 in
	1.1 ... 2.2 kW 1.5 ... 3.0 hp SK C05-500/012-C 276 992 012	12.5	3 x 0.74	165 x 155 x 95 mm 6.49 x 6.10 x 3.74 in
3~ 400 V	0.25 ... 0.75 kW 0.33 ... 1.0 hp SK C05-500/002-C 276 992 002	2.5	3 x 3.68	140 x 120 x 85 mm 5.51 x 4.72 x 3.34 in
	1.1 ... 2.2 kW 1.5 ... 3.0 hp SK C05-500/006-C 276 992 006	6	3 x 1.54	140 x 120 x 95 mm 5.51 x 4.72 x 3.74 in
	3.0 ... 5.5 kW 4.0 ... 7.5 hp SK C05-500/012-C 276 992 012	12.5	3 x 0.74	165 x 155 x 95 mm 6.49 x 6.10 x 3.74 in
	7.5 ... 11 kW 10 ... 15 hp SK C05-500/024-C 276 992 024	24	3 x 0.383	197 x 185 x 112 mm 7.75 x 7.28 x 4.40 in
	15.0 ... 22.0 kW 20 ... 30 hp SK C05-500/046-C 276 992 046	46	3 x 0.200	240 x 210 x 125 mm 9.44 x 8.26 x 4.92 in

Braking Resistors for Dynamic Drive Characteristics

Bottom-Mounted Braking Resistors SK BRU5

Available in four sizes, brake resistors can be mounted flat underneath the variable frequency drive. Although this increases the installation length and depth by a few centimeters, the basic installation surface in the control cabinet is considerably reduced. The specified resistance values are electrically matched to standard applications. Brake resistors have protection class IP40 and are UL certified.



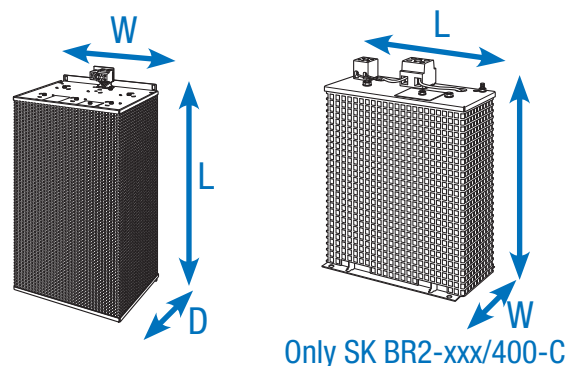
VFDs SK 5xxP ...	Resistor Type Material No.	Resistance [Ω]	Continuous Output [W]	Short-Term Power [kW] ¹	Overall Dimensions L x W x D
230 V	0.25 ... 0.75 kW 0.33 ... 1.0 hp	240	50	0.75	240 x 66 x 181 mm 9.49 x 2.59 x 7.13 in
	SK BRU5-1-240-050 275 299 004				
400 V	1.1 ... 2.2 kW 1.5 ... 3.0 hp	75	200	3.0	280 x 66 x 181 mm 11.02 x 2.59 x 7.13 in
	SK BRU5-2-075-200 275 299 210				
400 V	0.25 ... 0.75 kW 0.33 ... 1.0 hp	400	100	1.5	240 x 66 x 181 mm 9.49 x 2.59 x 7.13 in
	SK BRU5-1-400-100 275 299 101				
400 V	1.1 ... 2.2 kW 1.5 ... 3.0 hp	220	200	3.0	280 x 66 x 181 mm 11.02 x 2.59 x 7.13 in
	SK BRU5-2-220-200 275 299 205				
400 V	3.0 ... 5.5 kW 4.0 ... 7.5 hp	100	300	4.5	340 x 91 x 225 mm 13.38 x 3.58 x 8.85 in
	SK BRU5-3-100-300 275 299 309				
400 V	7.5 ... 11.0 kW 10 ... 15 hp	44	400	7.5	385 x 91 x 210 mm 15.15 x 3.58 x 8.26 in
	SK BRU5-4-44-400 275 299 512				
Temperature monitoring for SK BR5 resistors with installation close to the VFD 275 991 100			Bimetallic switch as opener Nominal switching temperature: 180°C		Broad brake resistor + 10 mm (on one side) dimensions apply to the VFD, including the braking resistor
Temperature monitoring for SK BR5 resistors with direct installation under the VFD 275 991 200			Bimetallic switch as opener Nominal switching temperature: 100°C		

¹ Once within 120 s,
for a maximum duration of 1.2 s

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Chassis Braking Resistors SK BR2

Chassis braking resistor elements are integrated into a housing cage and connected to the VFD via a separate connecting cable. These brake resistors need to be mounted horizontally (apart from SK BR2-xxx/400-C) and should use a shielded cable that is as short as possible. The chassis brake resistors have protection class IP20.



VFDs SK 5xxP ...	Resistor Type Material No.	Resistance [Ω]	Continuous Output [W]	Short-Term Power [kW] ¹	Overall Dimensions L x W x D	
400 V	3.0 ... 4.0 kW 4.0 ... 5.5 hp	SK BR2-100/400-C ¹ 278 282 040	100	400	12	178 x 100 x 252 mm 7 x 3.93 x 9.92 in
	5.5 ... 7.5 kW 7.5 ... 10 hp	SK BR2-60/600-C 278 282 060	60	600	18	385 x 110 x 120 mm 15.15 x 4.33 x 4.72 in
	11.0 ... 15.0 kW 15 ... 20 hp	SK BR2-30/1500-C 278 282 150	30	1500	45	585 x 185 x 120 mm 23.03 x 7.28 x 4.72 in
	18.5 ... 22.0 kW 25 ... 30 HP	SK BR2-22/2200-C 278 282 220	22	2200	66	485 x 275 x 120 mm 19.09 x 10.82 x 4.72 in
Temperature monitoring for SK BR2 resistors integrated (2 terminals 4 mm ²)		Bimetallic switch as opener. Nominal switching temperature: 180°C.				

¹ Type of assembly: vertical

² Once within 120 s,
for a maximum duration of 1.2 s

NORDAC *PRO* Variable Frequency Drive Accessories

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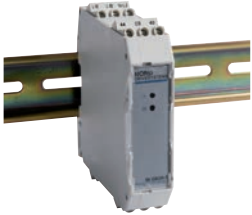
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Signal Converter +/- 10 V

For connection of a bipolar analog signal to the unipolar analog input of a VFD, top-hat rail mounting.

Material No.: 278910320



Electronic Brake Rectifier SK EBGR-1

For direct control and supply of an electromagnetic holding brake.

Material No.: 19140990



IO Expansion SK EBIOE-2

The standard number of inputs and outputs on the device can be supplemented using an extension provided that is top-hat rail mounted.

Material No.: 275900210

Available for SK 530P and higher



NORDAC *ACCESS BT*

Bluetooth adapter SK TIE5-BT-STICK that establishes a wireless connection between the VFD and mobile terminal devices (e.g. smartphone, tablet). Together with the free NORDCON APP for Android or iOS, NORD provides a smart aid for control, parameterization, and troubleshooting of variable frequency drives.

Material No.: 275900120



MicroSD Card, 128 MB

Removable data carrier for archiving and transfer of parameter data sets for the variable frequency drive.

Material No.: 275292200

Available for SK 530P and higher



EMV-Kit

Available for EMC-compliant connection of shielded cables and to produce strain relief. Depending on size and configuration level, various EMC kits are available.

VFD Size	Shield Motor Connection ①	Shield IO ports ②	Shield Control Terminals (SK CU5-...) ¹ ③
1	SK HE5-EMC-MS-HS12 275 292 300	SK HE5-EMC-IS-HS1 275 292 304	SK HE5-EMC-CS-HS1 275 292 310
2	SK HE5-EMC-MS-HS12 275 292 300	SK HE5-EMC-IS-HS2 275 292 305	SK HE5-EMC-CS-HS23 275 292 311
3	SK HE5-EMC-MS-HS34 ² 275 292 301	SK HE5-EMC-IS-HS3 275 292 306	SK HE5-EMC-CS-HS23 275 292 311
4	SK HE5-EMC-MS-HS34 ² 275 292 301	SK HE5-EMC-IS-HS4 275 292 307	SK HE5-EMC-CS-HS4 275 292 312
5	SK HE5-EMC-MS-HS5 ² 275 292 302	SK HE5-EMC-IS-HS5 275 292 308	SK HE5-EMC-CS-HS5 275 292 313

¹ Available for SK 530P and higher only in combination with (1) "motor connection shield"

² Two-part



CANopen® Connection

The CANopen® interface is equipped with a 4-pole screw terminal as standard.

The following alternatives are optionally available.



Designation	Material No.	Description
SK TIE5-CAO-WIRE-2X4P	275 292 201	CANopen® double terminal (screw terminal, 2x4-pole)
SK TIE5-CAO-2X-RJ45	275 292 202	CANopen® RJ45 adapter

Optional:
RJ45 adapter for
CANopen



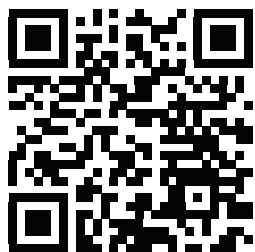


Variable Frequency Drives for Control Cabinet Applications

NORDAC *PRO* SK 500E series



Powerful and Versatile NORDAC PRO, SK 500E Series



[NORDAC PRO - SK500E](#)

NORDAC PRO SK 500E variable frequency drives are available for motors with rated powers of 0.33 – 200 hp. Their compact design makes them perfect for space-saving installation in control cabinets.

Notable features across the entire product line include:

- ▶ Sensorless current vector control ensures constant speeds even with fluctuating loads and extremely high torques during startup
- ▶ 200% overload reserve, which provides greater operational safety in cranes and lifting gear applications
- ▶ Operation of asynchronous and synchronous motors
- ▶ Integrated brake chopper for 4-quadrant operation
- ▶ Integrated line filter as the basis for optimal EMC performance

Along with the separately configurable PID or process controller, these features are a part of the basic configuration and independently carry out the control tasks. The range is supplied with either an integrated 24 V power supply unit or a separate connection for the control board supply.

The advantage of externally powered frequency drives is that access to parameter data and communication via bus interfaces is possible even when the power is switched off. Moreover, an evacuation run controlled by the VFD can be performed, resulting in an enormous boost in safety for lifting gear and similar safety-critical drive applications.

The SK 51xE and SK 530E and SK 535E models support the Safe Stop function according to EN 13849-1 (up to the maximum safety category 4, stop category 0 and 1). In addition, the SK 53xE version is equipped with the built-in POSICON function, making it suitable for all types of positioning tasks (relative and absolute).

Integrated PLC on all SK 520E models and higher allows simple and free programming of drive-related functions in accordance with IEC 61131-3. In addition, the top model SK 540E/SK 545E features a universal encoder interface which allows connection of SSI or EnDat encoders. The VFDs maintain uniform dimensions even with different functional configurations.



Basic Configuration

- Sensorless current vector control (ISD control) for high precision control and fast response times
- Brake management, electromechanical holding brake
- Brake chopper to divert generated energy to a brake resistor
- RS-232 diagnostic interface
- 4 switchable parameter sets for flexible use of parameter settings (e.g. switching between drive units with different motor data)
- All common drive functions such as acceleration/braking on a ramp
- Parameters pre-set with standard values, immediately ready for use
- Scalable display values
- Stator resistance measurement to ensure optimal control characteristics








Optional

- Interfaces for many bus systems
- Various control options (switches, potentiometers or parameterization units)
- Variants with functional safety (Safe Stop (STO, SS1))
[Available for SK 510E and above](#)
(except for frequency drives with mains voltages <230 V AC)
- Variants with incremental encoder interface for speed feedback (servo mode)
[Available for SK 520E and higher](#)
- Variants with PLC functionality
[Available for SK 520E and higher](#)
- POSICON variants with positioning function (relative and absolute)
[Available for SK 530E and higher](#)
- Universal encoder interface
[Available for SK 540E and higher](#)



Standards and Approvals

All drives of the series comply with the standards and directives listed below.

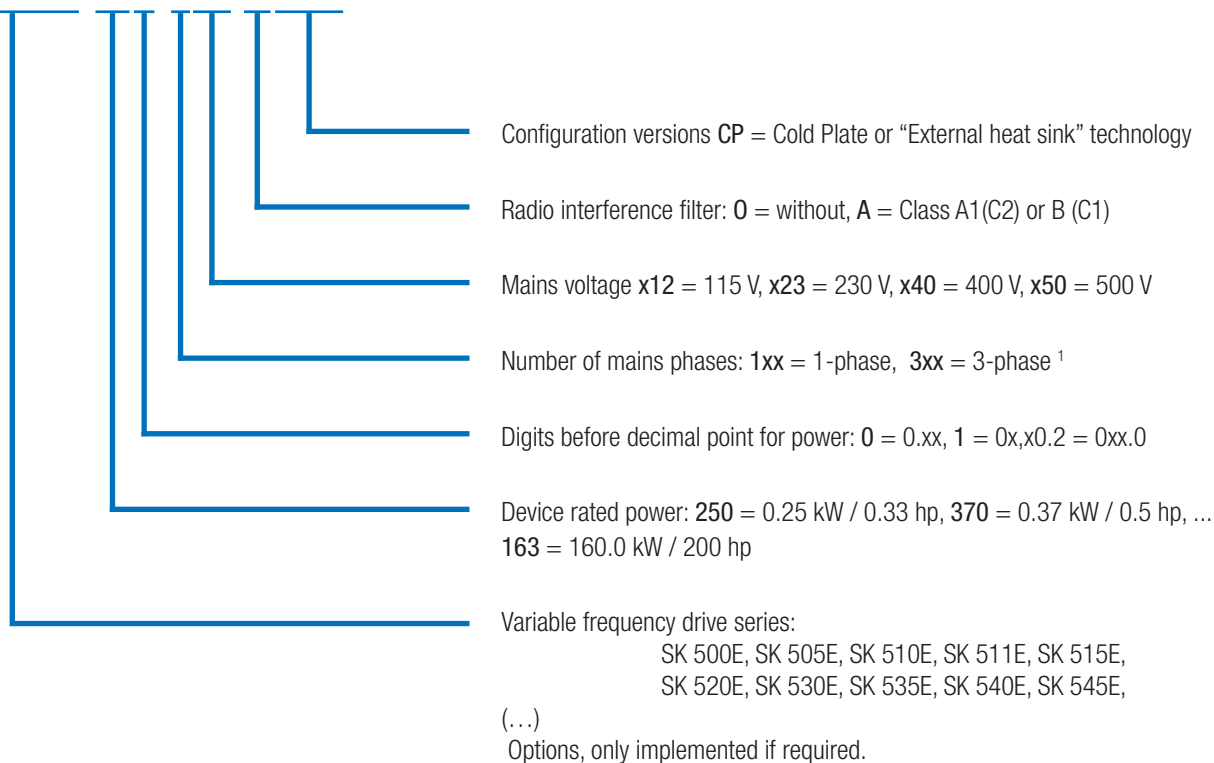
Approval	Directive	Applied Standards	Certificates	Code
CE (European Union)	Low Voltage Directive 2014/35/EU	EN 61800-5-1 EN 60529	C310600	
	EMC 2014/30/EU	EN 61800-3 EN 63000		
	RoHS 2011/65/EU	EN 61800-9-1 EN 61800-9-2		
	Delegated directive (EU) 2015/863			
	Ecodesign 2009/125/EG			
	Regulation (EU) Ecodesign 2019/1781			
	UL (USA)			
CSA (Canada)		C22.2 No.274-13	E171342	
RCM (Australia)	F2018L00028	EN 61800-3	133520966	
EAC (Eurasia)	TR CU 004/2011, TR CU 020/201	IEC 61800-5-1 IEC 61800-3	N RU Д-DE. HB27.B.02721/ 20	
UkrSEPRO (Ukraine)		EN 61800-5-1 EN 60529 EN 61800-3 EN 63000 EN 60947-1 EN 60947-4 EN 61558-1 EN 50581	C311900	
UKCA (United Kingdom)		EN 61800-5-1 EN 60529 EN 61800-3 EN 63000 EN 61800-9-1 EN 61800-9-2	C350600	

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Type Code

Variable Frequency Drives

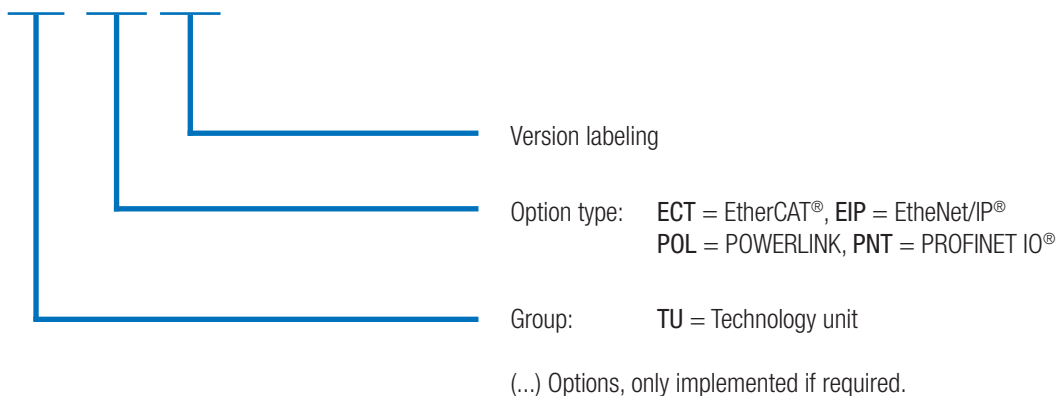
SK 530E-370-323-A(-CP)



¹ Designation -3 also includes combined devices which are intended for single and three-phase operation (please refer to the technical data)

Technology Units

SK TU3-PNT(-...)



NORDAC PRO SK 500E

All Versions at a Glance

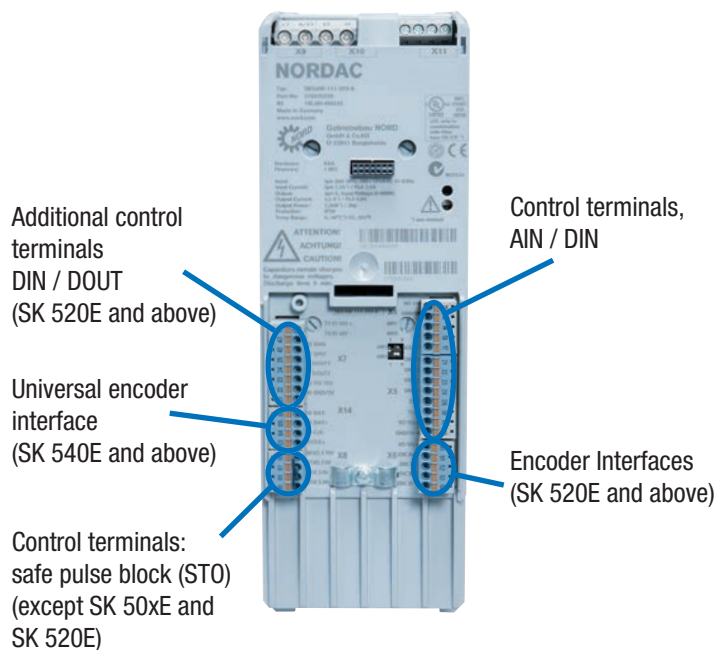
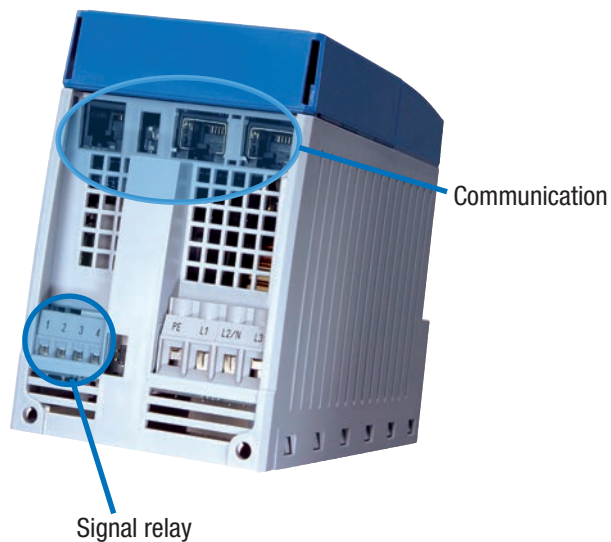
	SK 500E	SK 510E	SK 511E	SK 520E	SK 530E	SK 535E	SK 540E	SK 545E	SK 515E	SK 535E	SK 545E
	Size 1-4								Size 5-11		
Sensorless current vector control (ISD control)	●	●	●	●	●	●	●	●	●	●	●
Brake management for mechanical holding brake	●	●	●	●	●	●	●	●	●	●	●
Brake chopper (brake resistor optional)	●	●	●	●	●	●	●	●	●	●	●
RS-232 diagnostic interface	●	●	●	●	●	●	●	●	●	●	●
4 switchable parameter sets	●	●	●	●	●	●	●	●	●	●	●
All normal drive functions	●	●	●	●	●	●	●	●	●	●	●
Parameters pre-set with standard values	●	●	●	●	●	●	●	●	●	●	●
Stator resistance measurement	●	●	●	●	●	●	●	●	●	●	●
Energy-saving function, optimized efficiency in partial load operation	●	●	●	●	●	●	●	●	●	●	●
Integrated EMC line filter according to EN 61800-3, Category C2 up to 20 m motor cable, Category C1 up to 5 m motor cable (devices up to Size 4)	●	●	●	●	●	●	●	●	●	●	●
Monitoring functions	●	●	●	●	●	●	●	●	●	●	●
Load monitor	●	●	●	●	●	●	●	●	●	●	●
Link circuit coupling	●	●	●	●	●	●	●	●	●	●	●
Lifting gear functionality	●	●	●	●	●	●	●	●	●	●	●
PID controller	●	●	●	●	●	●	●	●	●	●	●
Process controller / compensator control	●	●	●	●	●	●	●	●	●	●	●
Synchronous motor operation (PMSM)	●	●	●	●	●	●	●	●	●	●	●
Cold plate up to Size 4, External heat sink technology up to Size 2	●	●	●	●	●	●	●	●	○	○	○
All common field bus systems	●	●	●	●	●	●	●	●	●	●	●
Safe Stop function (STO, SS1) (not for 115 V devices)	○	●	●	○	●	●	●	●	●	●	●
CANopen® on board	○	○	●	●	●	●	●	●	●	●	●
Evacuation run	○	○	○	○	○	●	●	●	●	●	●
Incremental encoder input (servo mode)	○	○	○	●	●	●	●	●	○	●	●
POSICON	○	○	○	○	●	●	●	●	○	●	●
Internal 24 V power supply unit to supply the control board	●	●	●	●	●	○	●	○	●	●	●
External 24 V power supply for the control board	○	○	○	○	○	●	○	●	●	●	●
Automatic switching between external and internal 24 V control voltage	○	○	○	○	○	○	○	○	●	●	●
PLC functionality	○	○	○	●	●	●	●	●	○	●	●
Universal encoder interface	○	○	○	○	○	○	●	●	○	○	●

- Available as standard
- Optional
- Not available

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	SK 500E	SK 510E	SK 511E	SK 520E	SK 530E	SK 535E	SK 540E	SK 545E	SK 515E	SK 535E	SK 545E	
	Size 1-4								Size 5-11			
Control Terminals	DIN	5	5	5	7	7	7	5-7 ¹	5-7 ¹	5	7	6-8 ¹
	DOUT	0	0	0	2	2	2	3-1 ¹	3-1 ¹	0	2	3-1 ¹
	Signal relay ² (... 230 V AC, 2 A)	2	2	2	2	2	2	2	2	2	2	2
	AIN ³	2	2	2	2	2	2	2	2	2	2	2
	AOUT ³	1	1	1	1	1	1	1	1	1	1	1
	TF (PTC)	1 ⁴	1 ⁴	1 ⁴	1 ⁴	1 ⁴	1 ⁴	1	1	1	1	1
Encoder Interfaces	TTL RS422	○	○	○	●	●	●	●	●	○	●	●
	HTL ^{4,5}	●	●	●	●	●	●	●	●	●	●	●
	CANopen®	○	○	○	○	●	●	●	●	○	●	●
	SIN / COS	○	○	○	○	○	○	●	●	○	○	●
	SSI	○	○	○	○	○	○	●	●	○	○	●
	BISS	○	○	○	○	○	○	●	●	○	○	●
	Hiperface	○	○	○	○	○	○	●	●	○	○	●
	Endat 2.1	○	○	○	○	○	○	●	●	○	○	●
Communication	CAN / CANopen®	○	○	2	2	2	2	2	2	2	2	2
	RS-485 / RS-232	1	1	1	1	1	1	1	1	1	1	1
	RS-485	○	○	○	1	1	1	1	1		1	1
	Modbus RTU	●	●	●	●	●	●	●	●	●	●	●

- ¹ 2 digital IOs optionally parameterizable as DIN or DOUT
- ² Parameterizable with DOUT functions
- ³ AIN/AOUT can also be used for digital signals.
AIN: 0(2) – 10 V, 0(4) – 20 mA, size 5 and above additionally ± 10 V
- ⁴ Function can only be implemented through a digital input,
- ⁵ Speed control only available with SK 520E or higher.



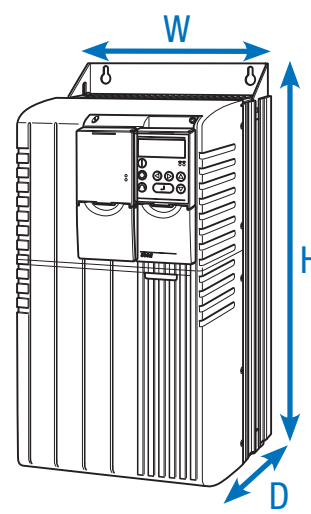
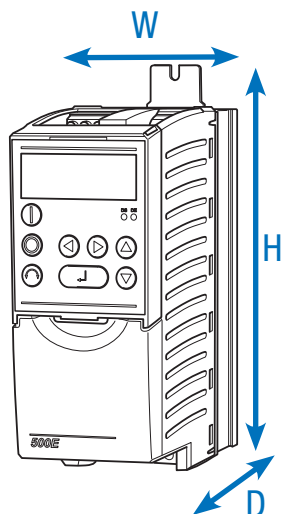
NORDAC *PRO* SK 500E Variable Frequency Drive

1~ 110 ... 120 V und 1 / 3~ 200 ... 240 V

Output Frequency	0.0 ... 400.0 Hz	Protection Class	IP20
Pulse Frequency	3.0 ... 16.0 kHz	Regulation and Control	Sensorless current vector control (ISD), linear V/f characteristic curve
Typical Overload Capacity	150% for 60 s, 200% for 3.5 s	Motor Temperature Monitoring	I ² t Motor PTC / bi-metal switch
Energy Efficiency Class	IE2	Leakage Current	<30 mA, may be considerably less depending on the size and configuration of the VFD (refer to the manual for details)
VFD Efficiency	Size 1 -4 approx. 95% Size 5 -7 approx. 97% Size 8 -11 approx. 98%		
Ambient Temperature	0°C ... +40°C (S1) 0°C ... +50°C (S3, -70% ED)		

VFDs SK 5xxE ...	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
	230 V [kW]	240 V [hp]			
-250-112-0	0.25	0.33	1.7	1~ 110 ... 120 V. +/- 10%. 47 ... 63 Hz	3~ 0 - 2x mains voltage
-370-112-0	0.37	0.50	2.2		
-550-112-0	0.55	0.75	3.0		
-750-112-0	0.75	1.0	4.0		
-111-112-0	1.1	1.8	5.3		

VFDs SK 5xxE ...	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
	230 V [kW]	240 V [hp]			
-250-323-A	0.25	0.33	1.7	1 / 3~ 200 ... 240 V, +/- 10%, 47 ... 63 Hz	3~ 0 up to mains voltage
-370-323-A	0.37	0.5	2.2		
-550-323-A	0.55	0.75	3.0		
-750-323-A	0.75	1.0	4.0		
-111-323-A	1.1	1.5	5.5		
-151-323-A	1.5	2.0	7.0		
-221-323-A	2.2	3.0	9.5		
-301-323-A	3.0	4.0	12.5		
-401-323-A	4.0	5.0	16.0		
-551-323-A	5.5	7.5	22		
-751-323-A	7.5	10	28	3~ 200 ... 240 V, +/- 10%, 47 ... 63 Hz	
-112-323-A	11	15	46		
-152-323-A	15	20	60		
-182-323-A	18.5	25	73		



Overall Dimensions
H x W x D

VFDs SK 5xxE ...	Weight		Overall Dimensions H x W x D		Size
	[kg]	[lbs]	[mm]	[in]	
-250-112-0	1.4	3.1	220 x 74 x 153	8.66 x 2.91 x 6.02	1
-370-112-0	1.4	3.1	220 x 74 x 153	8.66 x 2.91 x 6.02	1
-550-112-0	1.4	3.1	220 x 74 x 153	8.66 x 2.91 x 6.02	1
-750-112-0	1.4	3.1	220 x 74 x 153	8.66 x 2.91 x 6.02	1
-111-112-0	1.8	4	220 x 74 x 153	8.66 x 2.91 x 6.02	1

Overall Dimensions
H x W x D

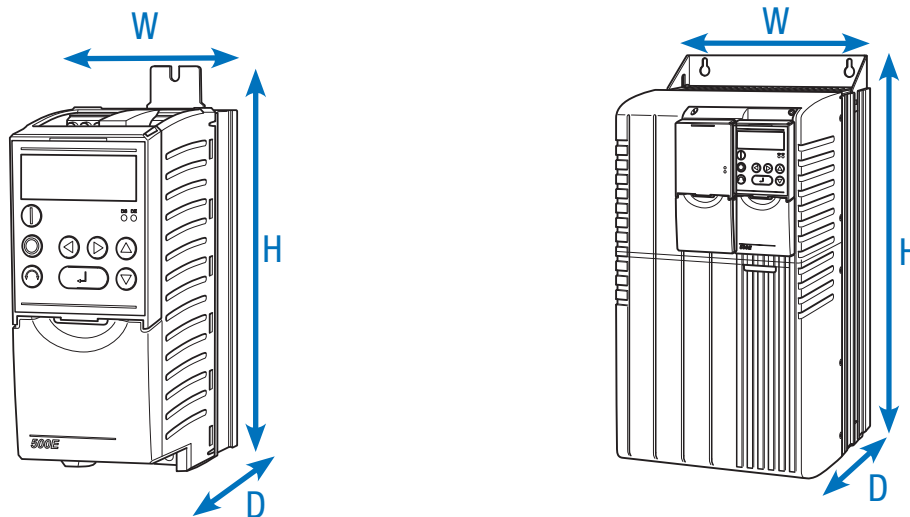
VFDs SK 5xxE ...	Weight		Overall Dimensions H x W x D		Size
	[kg]	[lbs]	[mm]	[in]	
-250-323-A	1.6	3.5	220 x 74 x 153	8.66 x 2.91 x 6.02	1
-370-323-A	1.6	3.5	220 x 74 x 153	8.66 x 2.91 x 6.02	1
-550-323-A	1.6	3.5	220 x 74 x 153	8.66 x 2.91 x 6.02	1
-750-323-A	1.6	3.5	220 x 74 x 153	8.66 x 2.91 x 6.02	1
-111-323-A	2.0	4.4	260 x 74 x 153	8.66 x 2.91 x 6.02	2
-151-323-A	2.0	4.4	260 x 74 x 153	8.66 x 2.91 x 6.02	2
-221-323-A	2.0	4.4	260 x 74 x 153	8.66 x 2.91 x 6.02	2
-301-323-A	2.7	6	275 x 98 x 181	10.83 x 3.89 x 7.13	3
-401-323-A	2.7	6	275 x 98 x 181	10.83 x 3.89 x 7.13	3
-551-323-A	8.0	17.6	357 x 162 x 224	14.06 x 6.38 x 8.82	5
-751-323-A	8.0	17.6	357 x 162 x 224	14.06 x 6.38 x 8.82	5
-112-323-A	10.3	22.7	397 x 180 x 234	15.63 x 7.09 x 9.21	6
-152-323-A	15.0	33	485 x 210 x 236	19.09 x 8.27 x 9.29	7
-182-323-A	15.0	33	485 x 210 x 236	19.09 x 8.27 x 9.29	7

NORDAC *PRO* SK 500E Variable Frequency Drive

3~ 380 ... 480 V

Output Frequency	0.0 ... 400.0 Hz	Protection Class	IP20
Pulse Frequency	3.0 ... 16.0 kHz	Regulation and Control	Sensorless current vector control (ISD), linear V/f characteristic curve
Typical Overload Capacity	150% for 60 s, 200% for 3.5 s	Motor Temperature Monitoring	I ² t Motor PTC / bi-metal switch
Energy Efficiency Class	IE2	Leakage Current	<30 mA, may be considerably less depending on the size and configuration of the VFD (refer to the manual for details)
VFD Efficiency	Size 1 -4 approx. 95% Size 5 -7 approx. 97% Size 8 -11 approx. 98%		
Ambient Temperature	0°C ... +40°C (S1) 0°C ... +50°C (S3, -70% ED)		

VFDs SK 5xxE ...	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
	400 V [kW]	480 V [hp]			
-550-340-A	0.55	0.75	1.7	3~ 380 ... 480 V, -20% / +10%, 47 ... 63 Hz	3~ 0 up to mains voltage
-750-340-A	0.75	1.0	2.3		
-111-340-A	1.1	1.5	3.1		
-151-340-A	1.5	2.0	4.0		
-221-340-A	2.2	3.0	5.5		
-301-340-A	3.0	4.0	7.5		
-401-340-A	4.0	5.0	9.5		
-551-340-A	5.5	7.5	12.5		
-751-340-A	7.5	10	16.0		
-112-340-A	11	15	24.0		
-152-340-A	15	20	31.0		
-182-340-A	18.5	25	38.0		
-222-340-A	22	30	46.0		
-302-340-A	30	40	60.0		
-372-340-A	37	50	75.0		
-452-340-A	45	60	90.0		
-552-340-A	55	75	110.0		
-752-340-A	75	100	150.0		
-902-340-A	90	125	180.0		
-113-340-A	110	150	220.0		
-133-340-A	132	180	260.0		
-163-340-A	160	220	320.0		



VFDs SK 5xxE ...	Weight		Overall Dimensions H x W x D		Size
	[kg]	[lbs]	[mm]	[in]	
-550-340-A	1.4	3.1	220 x 74 x 153	8.66 x 2.91 x 6.02	1
-750-340-A	1.4	3.1	220 x 74 x 153	8.66 x 2.91 x 6.02	1
-111-340-A	1.8	4	260 x 74 x 153	10.24 x 2.91 x 6.02	2
-151-340-A	1.8	4	260 x 74 x 153	10.24 x 2.91 x 6.02	2
-221-340-A	1.8	4	260 x 74 x 153	10.24 x 2.91 x 6.02	2
-301-340-A	2.7	6	275 x 98 x 181	10.83 x 3.86 x 7.13	3
-401-340-A	2.7	6	275 x 98 x 181	10.83 x 3.86 x 7.13	3
-551-340-A	3.1	6.8	320 x 98 x 181	12.59 x 3.86 x 7.13	4
-751-340-A	3.1	6.8	320 x 98 x 181	12.59 x 3.86 x 7.13	4
-112-340-A	8.0	17.6	357 x 162 x 224	14.06 x 6.38 x 8.82	5
-152-340-A	8.0	17.6	357 x 162 x 224	14.06 x 6.38 x 8.82	5
-182-340-A	10.3	22.7	397 x 180 x 234	15.63 x 7.09 x 9.21	6
-222-340-A	10.3	22.7	397 x 180 x 234	15.63 x 7.09 x 9.21	6
-302-340-A	16.0	35.3	485 x 210 x 236	19.09 x 8.27 x 9.29	7
-372-340-A	16.0	35.3	485 x 210 x 236	19.09 x 8.27 x 9.29	7
-452-340-A	20.0	44.1	598 x 265 x 286	23.54 x 10.43 x 11.26	8
-552-340-A	20.0	44.1	598 x 265 x 286	23.54 x 10.43 x 11.26	8
-752-340-A	25.0	55.1	636 x 265 x 286	25.04 x 10.43 x 11.26	9
-902-340-A	25.0	55.1	636 x 265 x 286	25.04 x 10.43 x 11.26	9
-113-340-A	46.0	101.4	720 x 395 x 292	28.35 x 15.55 x 11.50	10
-133-340-A	49.0	108	720 x 395 x 292	28.35 x 15.55 x 11.50	10
-163-340-A	52.0	114.6	799 x 395 x 292	31.46 x 15.55 x 11.50	11







Interfaces for Operation, Parameterization, and Communication

Optional modules are available with up to 14 languages for displaying status, operational indicators, parameterization, and operation of the variable frequency drive. Variants are available for direct mounting on the device, installation in a control cabinet door, and handheld versions.

Type	Designation	Description	Remarks
	PotentiometerBox SK TU3-POT 275 900 110	Suitable for control, potentiometer 0 ... 100% .	Installation in the SK TU3 slot on the FI. ¹
	ParameterBox SK TU3-PAR 275 900 100	Suitable for control and parameterization, LCD screen (illuminated), plain text display in 14 languages, memory for 5 device data sets, convenient control keypad.	Installation in the SK TU3 slot on the VFD. ¹
	ControlBox SK TU3-CTR 275 900 090	Suitable for control and parameterization, 4-digit, 7-segment display, convenient control keypad.	Installation in the SK TU3 slot on the FI. ¹
	SimpleBox SK CSX-0 275 900 095	Suitable for control and parameterization, 4-digit, 7-segment display, direct control of a device, one-button operation.	The module is connected to the RJ 12 interface of the VFD and does not occupy the option slot for SK TU3 modules. Simultaneous control of a bus interface is therefore possible. Mounted on the VFD.
	ParameterBox SK PAR-3E 275 281 414	Suitable for control and parameterization, LCD screen (illuminated), plain text display in 14 languages, direct control of up to 5 devices, memory for 5 device data sets, convenient control keypad, for installation in a control cabinet door.	Electrical data: 4.5 ... 30 V DC / 1.3 W, supply e.g. directly via the VFD. Control cabinet installation.
	SimpleControlBox SK CSX-3E 275 281 413	Suitable for control and parameterization, 4-digit, 7-segment display, direct control of a VFD, convenient control keypad.	Electrical data: 4.5 ... 30 V DC / 1.3 W, Supply e. g. directly via the VFD. Control cabinet installation.
	Control and parameterization software NORDCON	Software for control and parameterization as well as support for commissioning and fault analysis of NORD electronic drive technology. Parameter names in 14 languages.	Free download at: www.nord.com
	Bluetooth stick NORDAC ACCESS BT SK TIE5-BT-STICK 275 900 120	Interface for wireless connection to a mobile terminal device (e.g. tablet or smartphone) via Bluetooth. The NORDCON APP, the NORDCON software for mobile terminal devices, enables smart operation and parameterization as well as commissioning assistance and fault analysis of NORD electronic drive technology.	Available free of charge for Android and iOS: 

¹ Cannot be combined with other SK TU3 modules as only one slot is available on the device.

Industrial Ethernet, Field Bus and IO Extensions

Variant	Designation Material No.	Description Connection	Remarks
PROFIBUS DP®	 SK TU3-PBR 275 900 030	Field bus interface Type PROFIBUS DP®. SUB-D9	Baud rate: maximum 1.5 MBaud Protocol: DPV 0 Addressing: via parameter
	 SK TU3-PBR-24V 275 900 160		Baud rate: maximum 12 MBd Protocol: DPV 0 Addressing: Addressing: via rotary coding switch or parameter 24 V DC connection: via connection terminals
EtherCAT®	 SK TU3-ECT 275 900 180	Ethernet-based bus interface Type EtherCAT®. 2 x RJ45	Baud rate: maximum 100 MBaud 24 V DC connection: via terminal Usable as a gateway to control up to a total of four variable frequency drives.
EtherNet/IP®	 SK TU3-EIP 275 900 150	Ethernet-based bus interface Type EtherNet / IP® 2 x RJ45	Baud rate: maximum 100 MBaud 24 V DC connection: via terminal Usable as a gateway to control up to a total of four variable frequency drives.
POWERLINK	 SK TU3-POL 275 900 140	Ethernet-based bus interface Type POWERLINK 2 x RJ45	Baud rate: maximum 100 MBaud 24 V DC connection: via terminal Usable as a gateway to control up to a total of four variable frequency drives.
PROFINET IO®	 SK TU3-PNT 275 900 190	Ethernet-based bus interface Type PROFINET IO®. 2 x RJ45	Baud rate: maximum 100 MBaud 24 V DC connection: via terminal Usable as a gateway to control up to a total of four variable frequency drives.

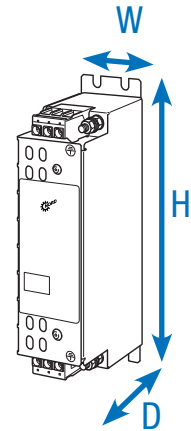
Line Filter Improvement of EMC

General

Line filters are used to reduce the emission of electromagnetic interference. SK 500E series VFDs are equipped with an integrated class C2 (max. 20 m shielded motor cable) or class C1 (size 1-4, max. 5 m shielded motor cable) line filter. Various adaptive line filters are available for longer cable lengths or to improve interference suppression.

Chassis Line Filter, SK HLD

The line filter meets protection class IP20 and enables interference suppression Class C1 with max. 25 m shielded motor cable and Class C2 with max. 50 m cable. The line filters are installed separately from the variable frequency drive.



VFDs SK 5xxE ...	Line Filter Type Material No.	Continuous Current [A]	Leakage Current ¹ [mA]	Overall Dimensions H x W x D	
3~ 230 V	0.25 ... 1.1 kW 0.33 ... 1.5 hp	SK HLD 110-500/8 278 272 008	8	20 / 190	190 x 45 x 75 mm 7.48 x 1.77 x 2.95 in
	1.5 ... 2.2 kW 2.0 ... 3.0 hp	SK HLD 110-500/16 278 272 016	16	21 / 205	250 x 45 x 75 mm 9.84 x 1.77 x 2.95 in
	3.0 ... 5.5 kW 4.0 ... 7.5 hp	SK HLD 110-500/30 278 272 030	30	29 / 280	270 x 55 x 95 mm 10.62 x 2.16 x 3.74 in
	7.5 kW 10 hp	SK HLD 110-500/42 278 272 042	42	30 / 290	310 x 55 x 95 mm 12.20 x 2.16 x 3.74 in
	11 kW 15 hp	SK HLD 110-500/75 278 272 075	75	22 / 210	310 x 85 x 135 mm 12.20 x 3.34 x 5.31 in
	15 ... 18.5 kW 20 ... 25 hp	SK HLD 110-500/100 278 272 100	100	30 / 290	325 x 95 x 150 mm 12.79 x 3.74 x 5.90 in
	3~ 400 V	0.55 ... 2.2 kW 0.75 ... 3.0 hp	SK HLD 110-500/8 278 272 008	8	20 / 190
3.0 ... 5.5 kW 4.0 ... 7.5 hp		SK HLD 110-500/16 278 272 016	16	21 / 205	250 x 45 x 75 mm 9.84 x 1.77 x 2.95 in
7.5 kW 10 hp		SK HLD 110-500/30 278 272 030	30	29 / 280	270 x 55 x 95 mm 10.62 x 2.16 x 3.74 in
11 kW 15 hp		SK HLD 110-500/42 278 272 042	42	30 / 290	310 x 55 x 95 mm 12.20 x 2.16 x 3.74 in
15 ... 18.5 kW 20 ... 25 hp		SK HLD 110-500/55 278 272 055	55	30 / 290	255 x 85 x 95 mm 10.03 x 3.34 x 3.74 in
22 kW 30 hp		SK HLD 110-500/75 278 272 075	75	22 / 210	310 x 85 x 135 mm 12.20 x 3.34 x 5.31 in
30 kW 40 hp		SK HLD 110-500/100 278 272 100	100	30 / 290	325 x 95 x 150 mm 12.79 x 3.74 x 5.90 in
37 ... 45 kW 50 ... 60 hp		SK HLD 110-500/130 278 272 130	130	22 / 210	325 x 95 x 150 mm 12.79 x 3.74 x 5.90 in
55 kW 75 hp		SK HLD 110-500/180 278 272 180	180	31 / 300	440 x 130 x 181 mm 17.32 x 5.11 x 7.12 in
75 ... 90 kW 100 ... 125 hp		SK HLD 110-500/250 278 272 250	250	37 / 355	525 x 155 x 220 mm 20.66 x 6.10 x 8.66 in

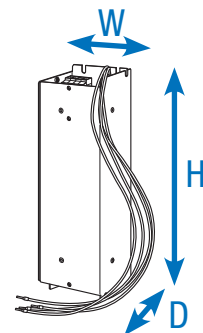
¹ Leakage current 1st value: rated for the maximum permissible input voltage fluctuation according to IEC 38 + 10%

Leakage current 2nd value: calculated at maximum input voltage and failure of 2 phases (typically at 50 Hz)

Bottom-Mounted Line Filter, Combination Filter SK NHD

The line filter offers protection class IP20 and is available for variable frequency drive powers of 10 hp (400 V). The line filter is able to be mounted flat underneath the VFD, reducing the space required.

These combination filters combine the advantages of a line filter and a line choke in a single housing and provide class C1 interference suppression with max. 50 m shielded motor cable and class C2 with max. 100 m cable.



VFDs SK 5xxE ...	Line Filter Type Material No.	Continuous Current [A]	Inductance [mH]	Leakage Current ¹ [mA]	Overall Dimensions H x W x D
3~ 230 V	0.25 ... 0.75 kW 0.33 ... 1.0 hp SK NHD-480/6-F 278 273 006	5.5	3 x 6.4	7.7 / 74.4	290 x 88 x 74 mm 11.41 x 3.46 x 2.91 in
	1.1 ... 2.2 kW 1.5 ... 3.0 hp SK NHD-480/10-F 278 273 010	9.5	3 x 3.7	15.0 / 144.0	305 x 115 x 98 mm 12.00 x 4.52 x 3.85 in
	3.0 ... 4.0 kW 4.0 ... 5.5 hp SK NHD-480/16-F 278 273 016	16	3 x 2.2	21.5 / 206.5	350 x 140 x 98 mm 13.77 x 5.51 x 3.85 in
3~ 400 V	0.55 ... 0.75 kW 0.75 ... 1.0 hp SK NHD-480/3-F 278 273 003	2.3	3 x 15.3	4.3 / 40.0	250 x 75 x 60 mm 9.84 x 2.95 x 2.36 in
	1.1 ... 2.2 kW 1.5 ... 3.0 hp SK NHD-480/6-F 278 273 006	5.5	3 x 6.4	7.7 / 74.4	290 x 88 x 74 mm 11.41 x 3.46 x 2.91 in
	3.0 ... 4.0 kW 4.0 ... 5.5 hp SK NHD-480/10-F 278 273 010	9.5	3 x 3.7	15.0 / 144.0	305 x 115 x 98 mm 12.00 x 4.52 x 3.85 in
	5.5 ... 7.5 kW 7.5 ... 10 hp SK NHD-480/16-F 278 273 016	16	3 x 2.2	21.5 / 206.5	350 x 140 x 98 mm 13.77 x 5.51 x 3.85 in

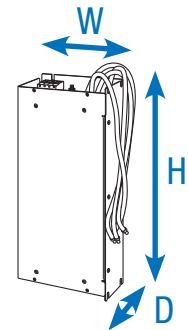
¹ Leakage current 1st value: rated for the maximum permissible input voltage fluctuation according to IEC 38 + 10%

Leakage current 2nd value: calculated at maximum input voltage and failure of 2 phases (typically at 50 Hz)

Line Filter Improvement of EMC

Bottom-Mounted Line Filter, SK LF2

The line filter meets protection class IP00 and is available for variable frequency drive powers of 50 hp (400 V). The line filter can be mounted flat underneath the VFD, reducing the space requirement. These line filters enable class C1 interference suppression with max. 50 m shielded motor cable and class C2 with max. 100 m cable.



	VFDs SK 5xxE ...	Line Filter Type Material No.	Continuous Current [A]	Leakage Current ¹ [mA]	Overall Dimensions H x W x D
3~ 230 V	5.5 ... 7.5 kW 7.5 ... 10 hp	SK LF2-480/45-F 278 273 045	45	12 / 120	388 x 164 x 75 mm 15.27 x 6.45 x 2.95 in
	11 kW 15 hp	SK LF2-480/66-F 278 273 066	66	12 / 120	428 x 182 x 75 mm 16.85 x 7.16 x 2.95 in
	15 ... 18.5 kW 20 ... 25 hp	SK LF2-480/105-F 278 273 105	105	22 / 210	527 x 210 x 95 mm 20.74 x 8.26 x 3.74 in
3~ 400 V	0.55 ... 0.75 kW 0.75 ... 1.0 hp	SK LF2-480/2-F 278 273 002	2.3	6,4 / 61,5	250 x 75 x 48 mm 9.84 x 2.95 x 1.88 in
	1.1 ... 2.2 kW 1.5 ... 3.0 hp	SK LF2-480/5-F 278 273 005	5.5	7.7 / 74.3	290 x 88 x 48 mm 11.41 x 3.46 x 1.88 in
	3.0 ... 4.0 kW 4.0 ... 5.0 hp	SK LF2-480/9-F 278 273 009	9.5	19.5 / 187	305 x 115 x 54 mm 12.00 x 4.52 x 2.12 in
	5.5 ... 7.5 kW 7.5 ... 10 hp	SK LF2-480/15-F 278 273 015	16	20.2 / 193	350 x 115 x 54 mm 13.77 x 4.52 x 2.12 in
	11 ... 15 kW 15 ... 20 hp	SK LF2-480/45-F 278 273 045	45	12 / 120	388 x 164 x 75 mm 15.27 x 6.45 x 2.95 in
	18.5 ... 22 kW 25 ... 30 hp	SK LF2-480/66-F 278 273 066	66	12 / 120	428 x 182 x 75 mm 16.85 x 7.16 x 2.95 in
	30 ... 37 kW 40 ... 50 hp	SK LF2-480/105-F 278 273 105	105	22 / 210	527 x 210 x 95 mm 20.74 x 8.26 x 3.74 in

¹ Leakage current 1st value: rated for the maximum permissible input voltage fluctuation according to IEC 38 + 10%

Leakage current 2nd value: calculated at maximum input voltage and failure of 2 phases (typically at 50 Hz)

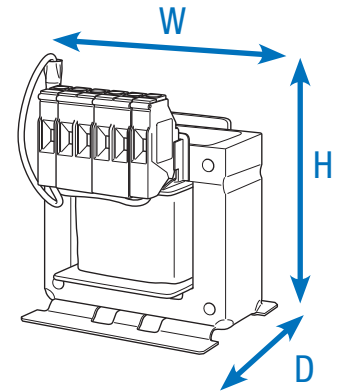
Mains Chokes

Reduction of Mains Feedback

General

It may be necessary for some drive systems to use mains chokes to reduce dangerous mains current peaks. They considerably reduce external mains feedback effects, the proportion of current harmonics is reduced to a minimum, and the input current is reduced to approximately the value of the output current.

It is recommended that a mains choke be used at all times for a VFD capacity of 60 hp and above. This will have an additional positive effect on device protection and EMC characteristics. All chokes have protection class IP00 and are UL certified.



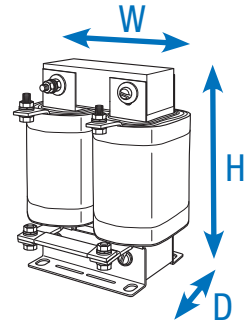
	VFDs SK 5xxE ...	Choke Type Material No.	Continuous Current [A]	Inductance [mH]	Overall Dimensions H x W x D
1 ~ 230V	0.25 ... 0.75 kW 0.33 ... 1.0 hp	SK CI1-230/8-C 278 999 030	8	2 x 1.0	89 x 65 x 78 mm 3.50 x 2.56 x 3.07 in
	1.1 ... 2.2 kW 1.5 ... 3.0 hp	SK CI1-230/20-C 278 999 040	20	2 x 0.4	106 x 90 x 96 mm 4.17 x 3.54 x 3.78 in
3 ~ 230V	0.25 ... 0.75 kW 0.33 ... 1.0 hp	SK CI1-480/6-C 276 993 006	6	3 x 4.88	117 x 96 x 60 mm 4.60 x 3.78 x 2.36 in
	1.1 ... 1.5 kW 1.5 ... 2.0 hp	SK CI1-480/11-C 276 993 011	11	3 x 2.93	140 x 120 x 85 mm 5.51 x 4.72 x 3.35 in
	2.2 ... 3.0 kW 3.0 ... 4.0 hp	SK CI1-480/20-C 276 993 020	20	3 x 1.47	177 x 155 x 110 mm 6.97 x 6.10 x 4.33 in
	4.0 ... 7.5 kW 5.0 ... 10 hp	SK CI1-480/40-C 276 993 040	40	3 x 0.73	172 x 155 x 115 mm 6.77 x 6.10 x 4.53 in
	11 ... 15 kW 15 ... 20 hp	SK CI1-480/70-C 276 993 070	70	3 x 0.47	220 x 185 x 122 mm 8.66 x 7.28 x 4.80 in
	18.5 kW 25 hp	SK CI1-480/100-C 276 993 100	100	3 x 0.29	263 x 240 x 148 mm 10.35 x 9.45 x 5.83 in
	0.55 ... 2.2 kW 0.75 ... 3.0 hp	SK CI1-480/6-C 276 993 006	6	3 x 4.88	117 x 96 x 60 mm 4.60 x 3.78 x 2.36 in
	3.0 ... 4.0 kW 4.0 ... 5.0 hp	SK CI1-480/11-C 276 993 011	11	3 x 2.93	140 x 120 x 85 mm 5.51 x 4.72 x 3.35 in
	5.5 ... 7.5 kW 7.5 ... 10 hp	SK CI1-480/20-C 276 993 020	20	3 x 1.47	177 x 155 x 110 mm 6.97 x 6.10 x 4.33 in
	11 ... 15 kW 15 ... 20 hp	SK CI1-480/40-C 276 993 040	40	3 x 0.73	172 x 155 x 115 mm 6.77 x 6.10 x 4.53 in
3 ~ 400V	18.5 ... 30 kW 25 ... 40 hp	SK CI1-480/70-C 276 993 070	70	3 x 0.47	220 x 185 x 122 mm 8.66 x 7.28 x 4.80 in
	37 ... 45 kW 50 ... 60 hp	SK CI1-480/100-C 276 993 100	100	3 x 0.29	263 x 240 x 148 mm 10.35 x 9.45 x 5.83 in
	55 ... 75 kW 75 ... 100 hp	SK CI1-480/160-C 276 993 160	160	3 x 0.18	268 x 352 x 140 mm 10.55 x 13.86 x 5.51 in
	90 kW 125 hp	SK CI1-480/280-C 276 993 280	280	3 x 0.10	268 x 352 x 169 mm 10.55 x 13.85 x 6.65 in
	110 ... 132 kW 150 ... 180 hp	SK CI1-480/350-C 276 993 350	350	3 x 0.08	268 x 352 x 169 mm 10.55 x 13.85 x 6.65 in

Link Circuit Choke

Reduction of Mains Feedback

Link Circuit Choke SK DCL

Similar to a mains choke, a link circuit choke reduces the network loads of a variable frequency drive that are inherent to its functional principle. It is connected to accessible contacts in the VFD's intermediate circuit and is available for 60 hp and above. All chokes have protection class IP00 and are UL certified.



VFDs SK 5xxE ...	Choke Type Material No.	Continuous Current [A]	Inductance [mH]	Overall Dimensions H x W x D
45 ... 55 kW 60 ... 75 hp	SK DCL-950/120-C 276 997 120	120	0.50	230 x 148 x 147 mm 9.06 x 5.83 x 5.79 in
75 ... 90 kW 100 ... 125 hp	SK DCL-950/200-C 276 997 200	200	0.30	260 x 170 x 153 mm 10.24 x 6.69 x 6.02 in
110 kW 150 hp	SK DCL-950/260-C 276 997 260	260	0.25	284 x 180 x 174 mm 11.18 x 7.09 x 6.85 in
132 kW 180 hp	SK DCL-950/320-C 276 997 320	320	0.20	282 x 180 x 189 mm 11.10 x 7.09 x 7.44 in
160 kW 215 hp	SK DCL-950/380-C 276 997 380	200	0.17	282 x 180 x 189 mm 11.10 x 7.09 x 7.44 in

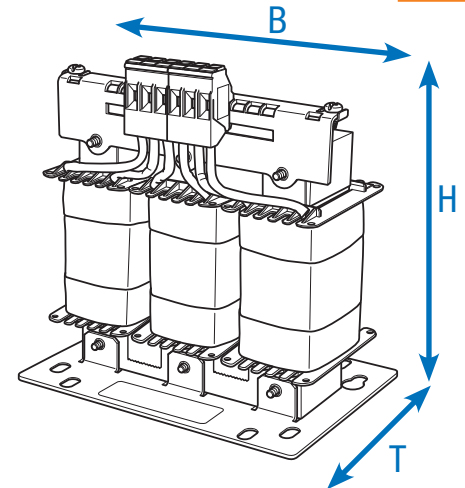
Motor Chokes

Compensation of Cable Capacities

General

Long motor cable lengths (cable capacity) often require the use of additional motor chokes (output chokes) on the VFD output. The use of motor chokes positively effects device protection and EMC characteristics.

The specified motor chokes are rated for a pulse frequency of 3 to 6 kHz and an output frequency of 0 to 120 Hz. All chokes have protection class IP00 and are UL certified.



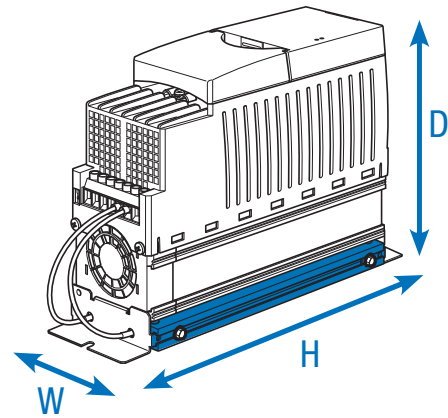
VFDs SK 5xxE ...	Choke Type Material No.	Continuous Current [A]	Inductance [mH]	Overall Dimensions H x W x D
3~ 230 V	0.25 ... 0.75 kW 0.33 ... 1.0 hp SK C01-460/4-C 276 996 004	4	3 x 3.5	140 x 120 x 104 mm 5.51 x 4.72 x 4.09 in
	1.1 ... 1.5 kW 1.5 ... 2.0 hp SK C01-460/9-C 276 996 009	9	3 x 2.5	160 x 155 x 110 mm 6.30 x 6.10 x 4.33 in
	2.2 ... 4.0 kW 3.0 ... 5.0 hp SK C01-460/17-C 276 996 017	17	3 x 1.2	201 x 185 x 102 mm 7.91 x 7.28 x 4.02 in
	5.5 ... 7.5 kW 7.5 ... 10 hp SK C01-460/33-C 276 996 033	33	3 x 0.6	201 x 185 x 122 mm 7.91 x 7.28 x 4.80 in
	11 ... 15 kW 15 ... 20 hp SK C01-480/60-C 276 992 060	60	3 x 0.33	210 x 185 x 112 mm 8.27 x 7.28 x 4.41 in
	18.5 kW 25 hp SK C01-460/90-C 276 996 090	90	3 x 0.22	325 x 352 x 144 mm 12.80 x 13.86 x 5.67 in
3~ 400 V	0.55 ... 1.5 kW 0.75 ... 2.0 hp SK C01-460/4-C 276 996 004	4	3 x 3.5	140 x 120 x 104 mm 5.51 x 4.72 x 4.09 in
	2.2 ... 4.0 kW 3.0 ... 5.0 hp SK C01-460/9-C 276 996 009	9	3 x 2.5	160 x 155 x 110 mm 6.30 x 6.10 x 4.33 in
	5.5 ... 7.5 kW 7.5 ... 10 hp SK C01-460/17-C 276 996 017	17	3 x 1.2	201 x 185 x 102 mm 7.91 x 7.28 x 4.02 in
	11 ... 15 kW 15 ... 20 hp SK C01-460/33-C 276 996 033	33	3 x 0.6	201 x 185 x 122 mm 7.91 x 7.28 x 4.80 in
	18.5 ... 30 kW 25 ... 40 hp SK C01-480/60-C 276 992 060	60	3 x 0.33	210 x 185 x 112 mm 8.27 x 7.28 x 4.41 in
	37 ... 45 kW 50 ... 60 hp SK C01-460/90-C 276 996 090	90	3 x 0.22	352 x 144 x 325 mm 13.86 x 5.67 x 12.80 in
	55 ... 75 kW 75 ... 100 hp SK C01-460/170-C 276 996 170	170	3 x 0.13	320 x 412 x 200 mm 12.60 x 16.22 x 7.87 in
	90 ... 110 kW 125 ... 150 hp SK C01-460/240-C 276 996 240	240	3 x 0.07	320 x 412 x 225 mm 12.60 x 16.22 x 8.86 in
	132 ... 160 kW 180 ... 215 hp SK C01-460/330-C 276 996 330	330	3 x 0.03	268 x 352 x 188 mm 10.55 x 13.86 x 7.40 in

Braking Resistors for Dynamic Drive Characteristics

Bottom-Mounted Braking Resistors SK BR4

Available in four sizes for variable frequency drives of up to 10 hp (400 V), this brake resistor can be mounted flat or vertically next to the VFD, reducing the space requirement.

The specified resistance values are electrically matched to standard applications and all brake resistors have protection class IP40 and are UL certified.



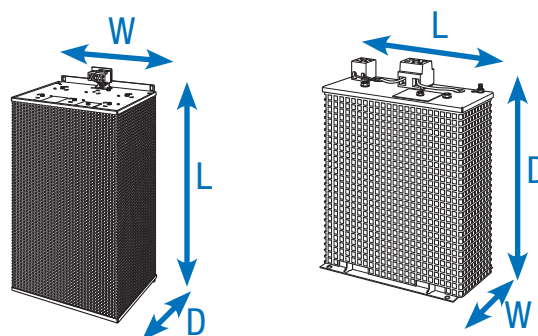
VFDs SK 5xxE ...	Resistor Type Material No.	Resistance [Ω]	Continuous Output [W]	Short-Term Power [kW] ¹	Overall Dimensions H x W x D	
230 V / 115 V	0.25 ... 0.37 kW 0.33 ... 0.5 hp	SK BR4-240/100 275 991 110	240	100	2.2	230 x 88 x 175 mm 9.05 x 3.46 x 6.88 in
	0.55 ... 0.75 kW 0.75 ... 1.0 hp	SK BR4-150/100 275 991 115	150	100	2.2	230 x 88 x 175 mm 9.05 x 3.46 x 6.88 in
	1.1 ... 2.2 kW 1.5 ... 3.0 hp	SK BR4-75/200 275 991 120	75	200	4.4	270 x 88 x 175 mm 10.62 x 3.46 x 6.88 in
	3.0 ... 4.0 kW 4.0 ... 5.0 hp	SK BR4-35/400 275 991 140	35	400	8.8	285 x 98 x 239 mm 11.22 x 3.85 x 9.40 in
400 V	0.55 ... 0.75 kW 0.75 ... 1.0 hp	SK BR4-400/100 275 991 210	400	100	2.2	230 x 88 x 175 mm 9.05 x 3.46 x 6.88 in
	1.1 ... 2.2 kW 1.5 ... 3.0 hp	SK BR4-220/200 275 991 220	220	200	4.4	270 x 88 x 175 mm 10.62 x 3.46 x 6.88 in
	3.0 ... 4.0 kW 4.0 ... 5.0 hp	SK BR4-100/400 275 991 240	100	400	8.8	285 x 98 x 239 mm 11.22 x 3.85 x 9.40 in
	5.5 ... 7.5 kW 7.5 ... 10 hp	SK BR4-60/600 275 991 260	60	600	13.0	330 x 98 x 239 mm 12.99 x 3.85 x 9.40 in
Temperature monitoring for SK BR4 resistors with installation close to the VFD 275 991 100		Bimetallic switch as opener Nominal switching temperature: 180°C		Broad brake resistor + 10 mm (on one side) the dimensions apply to the VFD, including the braking resistor		
Temperature monitoring for SK BR4 resistors with direct installation under the VFD 275 991 200		Bimetallic switch as opener Nominal switching temperature: 100°C				

¹ Once within 120 s, for a maximum duration of 1.2 s

Chassis Braking Resistors, SK BR2

Chassis braking resistor elements are integrated into a housing cage and connected to the VFD via a separate connecting cable. These brake resistors need to be mounted horizontally (apart from SK BR2-xxx/400-C) using a shielded cable as short as possible.

All brake resistors have protection class IP20.



only SK BR2-xxx/400-C

	VFDs SK 5xxE ...	Resistor Type Material No.	Resistance [Ω]	Continuous	Short-Term Power [kW] ²	Overall Dimensions L x W x D
				Output [W]		
230 V	3.0 ... 4.0 kW	SK BR2-35/400-C ¹	35	400	12	178 x 100 x 252 mm
	4.0 ... 5.0 hp	278 282 045				7.00 x 3.93 x 9.92 in
	5.5 ... 7.5 kW	SK BR2-22/600-C	22	600	18	385 x 92 x 120 mm
	7.5 ... 10 hp	278 282 065				15.15 x 3.62 x 4.72 in
	11 kW	SK BR2-12/1500-C	12	1500	45	585 x 185 x 120 mm
15 hp	278 282 015	23.03 x 7.28 x 4.72 in				
400 V	15 ... 18.5 kW	SK BR2-9/2200-C	9	2200	66	485 x 275 x 120 mm
	20 ... 25 hp	278 282 122				19.09 x 10.82 x 4.72 in
	3.0 ... 4.0 kW	SK BR2-100/400-C ¹	100	400	12	178 x 100 x 252 mm
	4.0 ... 5.0 hp	278 282 040				7.00 x 3.93 x 9.92 in
	5.5 ... 7.5 kW	SK BR2-60/600-C	60	600	18	385 x 110 x 120 mm
	7.5 ... 10 hp	278 282 060				15.15 x 3.62 x 4.72 in
	11 ... 15 kW	SK BR2-30/1500-C	30	1500	45	585 x 185 x 120 mm
	15 ... 20 hp	278 282 150				23.03 x 7.28 x 4.72 in
	18.5 ... 22 kW	SK BR2-22/2200-C	22	2200	66	485 x 275 x 120 mm
	25 ... 30 hp	278 282 220				19.09 x 10.82 x 4.72 in
	30 ... 37 kW	SK BR2-12/4000-C	12	4000	120	585 x 266 x 210 mm
	40 ... 50 hp	278 282 400				23.03 x 10.47 x 8.26 in
	45 ... 55 kW	SK BR2-8/6000-C	8	6000	180	395 x 490 x 260 mm
	60 ... 75 hp	278 282 600				15.55 x 19.29 x 10.23 in
	75 ... 110 kW	SK BR2-6/7500-C	6	7500	225	595 x 490 x 260 mm
100 ... 150 hp	278 282 750	23.42 x 19.29 x 10.23 in				
132 ... 160 kW	SK BR2-3/7500-C	3	7500	225	595 x 490 x 260 mm	
180 ... 215 hp	278 282 753				23.42 x 19.29 x 10.23 in	
132 ... 160 kW	SK BR2-3/17000-C	3	17 000	510	795 x 490 x 260 mm	
180 ... 215 hp	278 282 754				31.29 x 19.29 x 10.23 in	
Temperature monitoring for SK BR2 resistors integrated (2 terminals 4 mm ²)			Bimetallic switch as opener. Nominal switching temperature: 180°C.			

¹ Type of assembly: vertical

² Once within 120 s, for a maximum duration of 1.2 s

NORDAC *PRO* Variable Frequency Drive Accessories

Introduction

NORDAC PRO SK 500P

NORDAC PRO SK 500E

NORDAC LINK

NORDAC ON

NORDAC FLEX

NORDAC BASE

NORDAC START

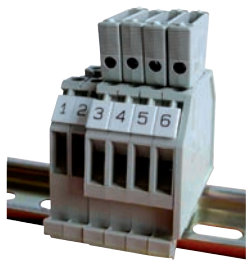
Accessories



EMV-Kit

For EMC-compliant connection of shielded cables and to produce strain relief.

Size of VFD	EMV-Kit	Material No.
Size 1 and size 2	SK EMC 2-1	275 999 011
Size 3 and size 4	SK EMC 2-2	275 999 021
Size 5	SK EMC 2-3	275 999 031
Size 6	SK EMC 2-4	275 999 041
Size 7	SK EMC 2-5	275 999 051
Size 8 and size 9	SK EMC 2-6	275 999 061
Size 10 and size 11	SK EMC 2-7	275 999 071



Connection Kit HTL Encoder WK 4/2/4*680 OHM

For connection of an HTL encoder to the TTL encoder input of the frequency drive, top-hat rail mounting.

Material No.: 278 910 340



RJ45 WAGO Connection Module

Connects a CANopen® encoder to one of the two RJ45 connection sockets of the frequency drive.

Material No.: 278 910 300



Signal Converter +/- 10 V

Connects a bipolar analog signal to the unipolar analog input of a VFD (up to size 4), top-hat rail mounting.

Material No.: 278 910 320



IO Expansion SK EBIOE-2

The standard number of inputs and outputs on the device can be supplemented using an extension that is top-hat rail mounting.

Material No.: 275 900 210

Available for SK 540E and higher



Electronic Brake Rectifier SK EBGR-1

Used for direct control and supply of an electromagnetic holding brake.

Material No.: 19 140 990



Adapter Module V/I CONVERTER 10 V/20 mA

The module serves the conversion of analog (0–10 V) signals into equivalent current signals (0–20 mA).

Material no.: 278910315

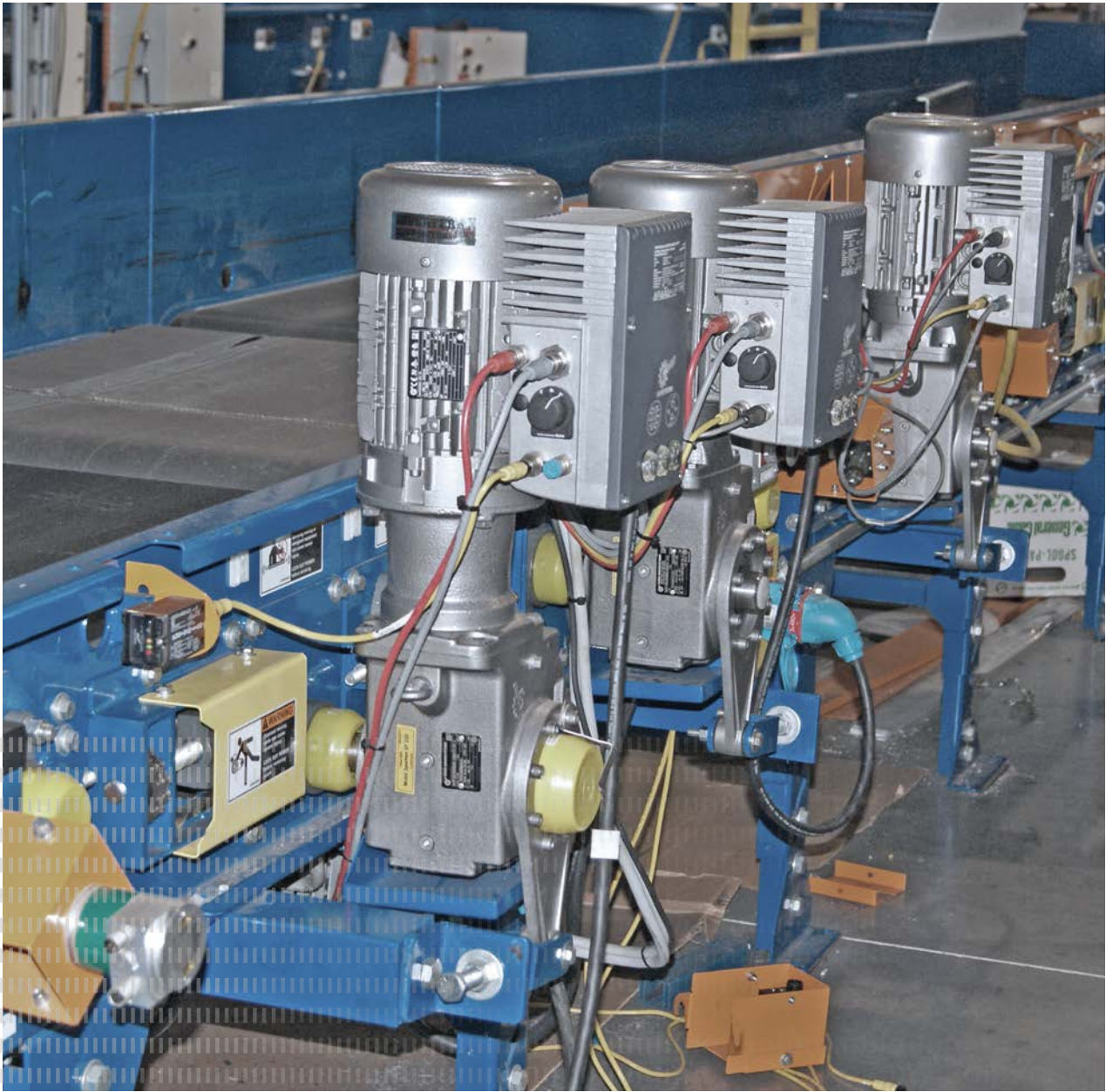


Adapter Module Level Adapter HTL – RS422

The module serves the conversion of HTL or TTL signals into complementary signals with RS422 levels, top-hat rail mounting.

Material no.: 278910360







NORDAC *LINK* Field Distributor for Decentralized Applications

Variable Frequency Drive SK 250E-FDS,
Motor Starter SK 155E-FDS



Easy Connection

NORDAC LINK, SK 250E-FDS and SK 155E-FDS Series



[NORDAC LINK](#)
[Variable frequency drive](#)



[NORDAC LINK](#)
[Motor starter](#)



General conveyor technology and intralogistics require drive control systems that can be installed quickly and easy to access during operation or if maintenance is required. The NORDAC LINK field distribution system supplements the NORD DRIVESYSTEMS range of products and provides drive control that can be installed close to the motor. System costs can be significantly reduced thanks to the decentralized drive technology.

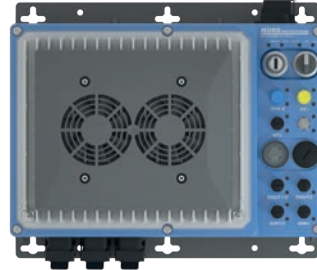
- ▶ Flexible configuration and function – freely configurable according to requirements and the application
- ▶ Available as frequency drives (up to 10 HP) and motor starters (up to 4 hp)
- ▶ Fast commissioning due to simple operation
- ▶ Simple and reliable plug-in capability
- ▶ Simplified system maintenance due to integrated maintenance switch and local manual control facility
- ▶ Can be integrated into all common bus systems



Motor Starters
Size 0 – up to 1 hp
Size 1 – up to 4 hp



Variable Frequency Drive
Size 0 – up to 1 hp
Size 1 – up to 4 hp



Variable Frequency Drive
Size 2 – up to 10 hp

Introduction
 NORDAC PRO SK 500P
 NORDAC PRO SK 500E
 NORDAC LINK
 NORDAC ON
 NORDAC FLEX
 NORDAC BASE
 NORDAC START
 Accessories

NORDAC LINK

Extensive Basic Equipment



<ul style="list-style-type: none"> ▶ Monitoring of load torque depending on the output frequency ▶ Individual adaptation of load monitoring to protect the system from overload <p>Available in all VFDs from SK 250E and higher</p>	Load monitor
<ul style="list-style-type: none"> ▶ High efficiency in partial load operation ▶ Reduced operating costs due to energy savings of up to 60% ▶ Simple setting <p>Available in all VFDs from SK 250E and higher</p>	Energy-saving function
<ul style="list-style-type: none"> ▶ High-precision current vector control for rapid and precise load take-up ▶ Integrated brake chopper to divert generated energy to a brake resistor (braking resistor optional) ▶ Brake management for optimum control of an electro-mechanical holding brake <p>Available in all VFDs from SK 250E and higher</p>	Lifting gear functions
<ul style="list-style-type: none"> ▶ Feedback and evaluation of actual values for implementation of closed circuit control e.g. flow or compensator control ▶ P and I components can be set separately <p>Available in all VFDs from SK 250E and higher</p>	Process controller, PI controller
<ul style="list-style-type: none"> ▶ Control of one or more follower VFD by a master VFD ▶ Communication via USS or CANopen® with control word and setpoint values <p>Available in all VFDs from SK 250E and higher</p>	Master / Follower operation
<ul style="list-style-type: none"> ▶ High-precision speed regulation ▶ Direct feedback of the actual speed characteristics to the VFD allows: <ul style="list-style-type: none"> ▶ Highest possible acceleration ▶ Full torque down to standstill (speed 0) ▶ Digital speed controller with wide range of settings <p>Available in all VFDs from SK 250E and higher</p>	Encoder feedback (Servo Mode)
<ul style="list-style-type: none"> ▶ Simple adaptation to control systems through optional interfaces ▶ Quick and simple diagnosis via easily visible LED indicators ▶ Various control boxes available for display, operation, and parameterization ▶ Simple operation, parameterization through parameter structure and intuitive layout of control elements <p>Available in all VFDs from SK 250E and higher</p>	Handling and communication
<ul style="list-style-type: none"> ▶ Bus systems – NORD supports all common bus systems to enable simple installation in the system design 	Bus systems
<ul style="list-style-type: none"> ▶ Functional safety - STO, SS1: Integrated, TÜV-certified safety functions simplify system design <p>Available for SK 260E and SK 280E VFDs</p>	Functional safety
<ul style="list-style-type: none"> ▶ Functional safety in bus communication with PROFIsafe, integrated, and TÜV-certified safety functions (SLS, SSR, SDI, SOS, SSM), connection and evaluation of a fail-safe SIN/COS encoder possible, 2 safe digital inputs (SI) and outputs (SO), max. 100 Mbaud, conformance class B and C, this option cannot be integrated later and must be specified during ordering <p>Available for SK 260E and SK 280E VFDs in combination with SK CU4-PNS</p>	Functional safety in bus communication

Introduction

NORDAC PRO SK 500P

NORDAC PRO SK 500E

NORDAC LINK

NORDAC ON

NORDAC FLEX

NORDAC BASE

NORDAC START

Accessories

Standards and Approvals

Type Code

Motor Starter Field Distributor

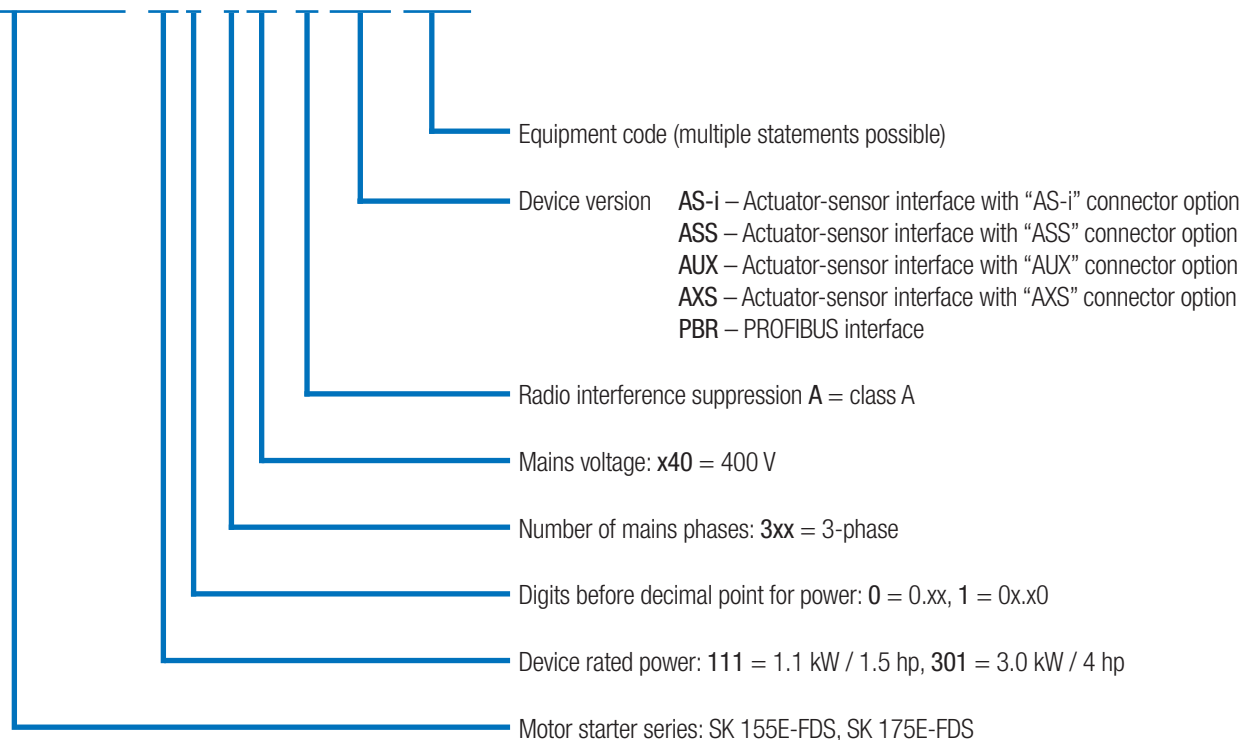
All drives of the series comply with the standards and directives listed below.

Approval	Directive	Applied Standards	Certificates	Code
CE (European Union)	Low Voltage Directive	EN 60947-1	C310801	
	2014/35/EU	EN 60529		
	EMC	EN 60947-4-2		
	2014/30/EU	EN 630001		
	RoHS	2011/65/EU		
	Delegated directive (EU)	2015/863		
UL (USA)		UL 60947-1 UL 60947-4-2	E365221	
CSA (Canada)		C22.2 No.60947-1-13 C22.2 No.60947-4-2-14	E365221	
RCM (Australia)	F2018L00028	EN 60947-1 EN 60947-4-2	133520966	
EAC (Eurasia)	TR CU 004/2011, TR CU 020/2011	IEC 60947-1 IEC 60947-4-2	EAЭC N RU Д-DE. HB27.B. 02731/20	
UkrSEPRO (Ukraine)		EN 60947-1 EN 60529 EN 60947-4-2 EN 63000 EN 60947-1 EN 60947-4 EN 61558-1 EN 50581	C311900	
UKCA (United Kingdom)		EN 60947-1 EN 60529 EN 60947-4-2 EN 63000 EN 61800-9-1 EN 61800-9-2	C350801	

Type Code

Variable Frequency Drives

SK 175E-FDS-301-340-A-AXS(-xxx)



Standards and Approvals

Type Code

Field Distributor Variable Frequency Drive

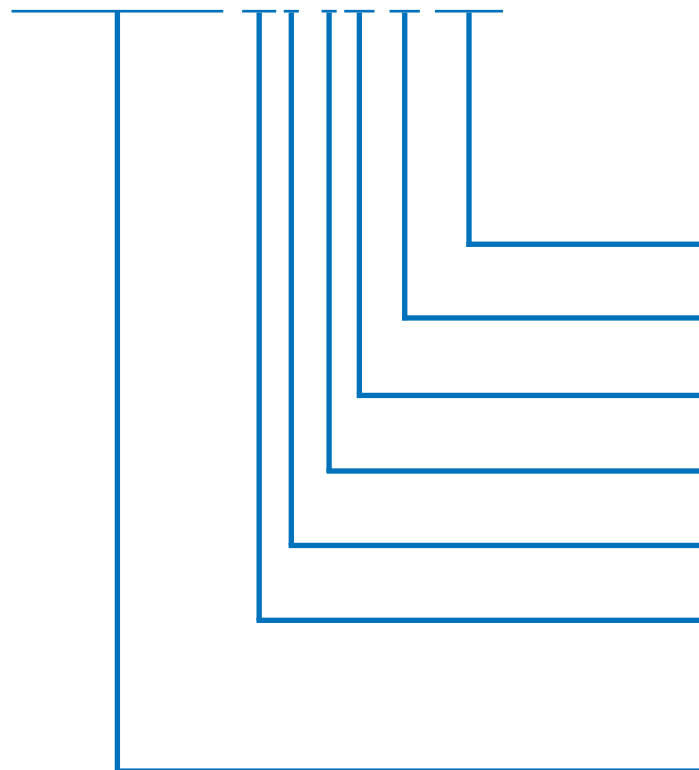
All drives of the series comply with the standards and directives listed below.

Approval	Directive	Applied Standards	Certificates	Code
CE (European Union)	Low Voltage Directive	EN 61800-5-1	C310701	
	2014/35/EU	EN 60529		
	EMC	EN 61800-3		
	2014/30/EU	EN 63000		
	RoHS	EN 61800-9-1		
	2011/65/EU	EN 61800-9-2		
	2015/863	EN 61800-9-2		
	Delegated directive (EU)			
	2015/863			
	Ecodesign			
	2009/125/EG			
	Regulation (EU)			
	2019/1781			
	Ecodesign			
UL (USA)		UL 61800-5-1	E171342	
CSA (Canada)		C22.2 No274-13	E171342	
RCM (Australia)	F2018L00028	EN 61800-3	133520966	
EAC (Eurasia)	TR CU 004/2011, TR CU 020/2011	IEC 61800-5-1 IEC 61800-3	EAЭC N RU Д-DE. HB27.B.02725/20	
UkrSEPRO (Ukraine)		EN 61800-5-1 EN 60529 EN 61800-3 EN 63000 EN 60947-1 EN 60947-4 EN 61558-1 EN 50581	C311900	
UKCA (United Kingdom)		EN 61800-5-1 EN 60529 EN 61800-3 EN 63000 EN 61800-9-1 EN 61800-9-2	C350900	

Type Code

Variable Frequency Drives

SK 250E-FDS-301-340-A (-xxx)



Equipment code (multiple statements possible)

Radio interference suppression 0 = without, A = class A1 (C2)

Mains voltage: x40 = 400 V

Number of mains phases: 3xx = 3-phase

Digits before decimal point for power: 0 = 0.xx, 1 = 0x.x0

Device rated power: 370 = 0.37 kW / 0.5 hp,
301 = 3.0 kW / 4 hp,
751 = 7.50 kW / 10 hp

Variable frequency drive series:
SK 250E-FDS, SK 260E-FDS, SK 270E-FDS, SK 280E-FDS

AS-Interface

Modern Automation Systems

Modern automation systems have a wide range of requirements and in order to ensure efficient operation, require a specific bus system and drive components.

AS-Interface

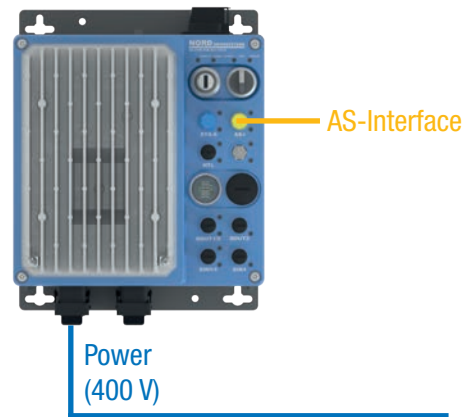
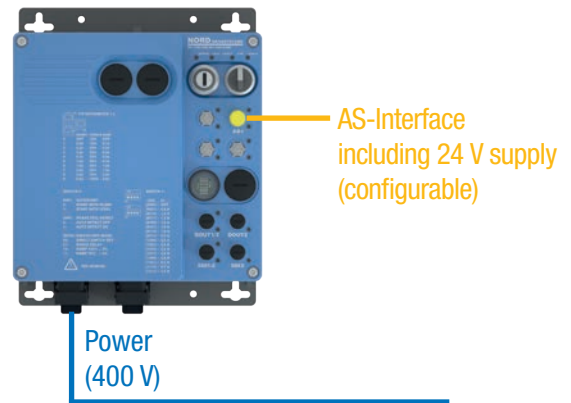
The AS-Interface is a cost-effective solution that enables the networking of binary sensors and actuators for the lower field level. NORDAC *LINK* can be configured with an AS-Interface to provide special versions for this price-sensitive area.

The VFDs supply voltage is connected separately via corresponding plugs and the control voltage, depending on the version of the drive, is generated either via an integrated power supply unit or supplied separately with the yellow AS-Interface cable. This eliminates the need for an additional AUX cable (black).

The type of addressing possible (standard or A/B follower) also depends on the version of the device. The "ASI" and "AUX" variants are designed as double follower with the VFD. With the double followers, there are two physical A/B followers in the device which can be configured for extended data transfer according to the CTT2 protocol. Additional IO bits (1 x BUS IN + 2 x BUS OUT) are available for the extended data transfer.

Available in the following devices:

- SK 155E-FDS-...-ASI,
- SK 175E-FDS-...-ASI,
- SK 270E-FDS,
- SK 280E-FDS



PROFIBUS DP®

This bus system allows for cyclic exchange of 4 control or 4 status bits via a process data object (with up to 12 Mbps). Addressing is performed via a rotary encoding switch. The PROFIBUS® termination resistor can be set via a standard M12 termination resistor. Connection is made with M12 plug connectors.

Available in all
SK 175E ... ASI devices

Variant	Follower Profile	Follower Type	Control Voltage	Inputs/Outputs	Configuration via Parameters
-ASI	S-7.A	A/B-Follower	Yellow AS-I cableg	4I/40 + 1I/20 ¹	●
-AUX	S-7.A	A/B-Follower	Black AS-I cable	4I/40 + 1I/20 ¹	●
-AXS	S-7.0	Standard	Black AS-I cabl	4I/40	●

¹⁾ additionally available I/Os for configuration of CTT2 protocol (only available with variable frequency drives)

The Entire Team

All Device Versions at a Glance

Introduction

NORDAC PRO SK 500P

NORDAC PRO SK 500E

NORDAC LINK

NORDAC ON

NORDAC FLEX

NORDAC BASE

NORDAC START

Accessories

	SK 155E-FDS	SK 175E-FDS	SK 250E-FDS	SK 260E-FDS	SK 270E-FDS	SK 280E-FDS
	Motor Starters 0.10 - 4.0 hp			VFDs 0.5 - 10 hp		
Plug connection of mains, motor, and control cables	●	●	●	●	●	●
Energy bus - loop-through of mains supply cables	●	●	●	●	●	●
Repair/maintenance switch	●	●	●	●	●	●
Sensorless current vector control (ISD control)	○	○	●	●	●	●
Brake chopper (brake resistor optional)	○	○	●	●	●	●
RS-232/ RS-485 parameterization and diagnostic interface (optional USB)	●	●	●	●	●	●
4 parameter sets, which can be switched over during operation	○	○	●	●	●	●
Parameters pre-set with standard values	●	●	●	●	●	●
Automatic determination of motor data	○	○	●	●	●	●
Energy-saving function, optimized efficiency in partial load operation	○	○	●	●	●	●
Integrated EMC line filters	according to EN 55011: Class A up to 20 m motor cable		according to EN 61800-3: Category C2 up to 10 m ¹ motor cable			
Drive unit monitoring function, including motor monitoring, motor thermistor evaluation	●	●	●	●	●	●
Reversing function	○	●	●	●	●	●
PI controller	○	○	●	●	●	●
Process controller / compensator control	○	○	●	●	●	●
Speed control (closed loop) with incremental encoder (HTL)	○	○	●	●	●	●
POSICon positioning with incremental encoder (HTL) or absolute encoder (CANopen [®])	○	○	●	●	●	●
PLC functionality	●	●	●	●	●	●
Synchronous motor operation (PMSM)	○	○	●	●	●	●
Modification for operation in IT network ²	●	●	●	●	●	●
Plug-in parameter storage (EEPROM) for additional data backup	○	○	●	●	●	●
All common field bus systems	○	○	●	●	●	●
Brake management for mechanical holding brake	●	●	●	●	●	●
Lifting gear functionality	○	○	●	●	●	●
Safe Stop function (STO, SS1)	○	○	○	●	○	●
Torque control and limitation	○	○	●	●	●	●
AS-Interface on board	○	● ³	○	○	●	●
PROFIBUS DP [®] on board	○	● ³	○	○	○	○
Internal 24 V power supply unit to supply the control board	●	●	●	●	●	●
Internal / external braking resistors	○	○	●	●	●	●
Local control elements (e.g switches, key switches)	●	●	●	●	●	●

¹ Cable-bound transmission only

² Must be taken into account for the order

³ Either AS-Interface or PROFIBUS[®] DP

● Available as standard

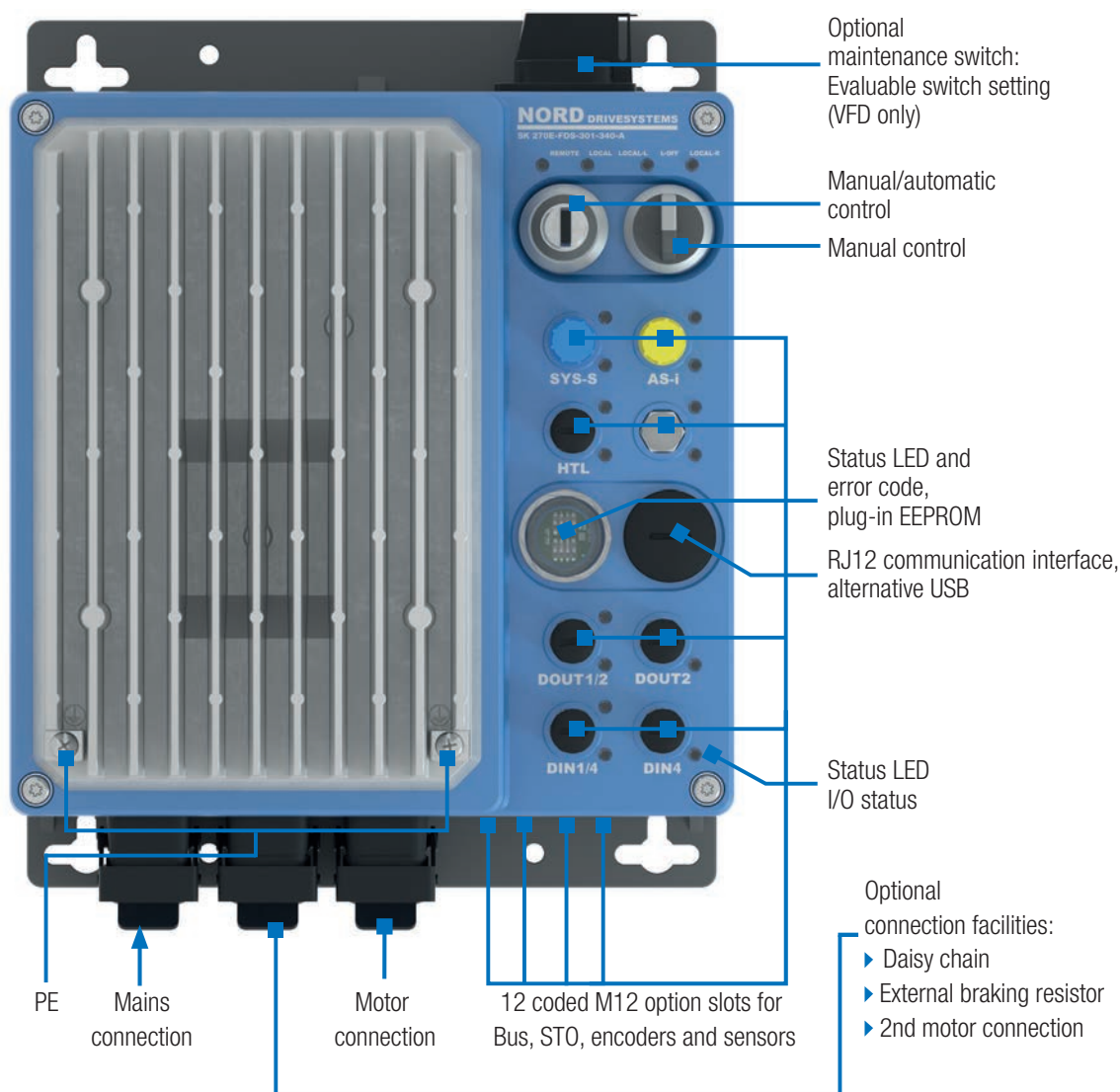
● Optional

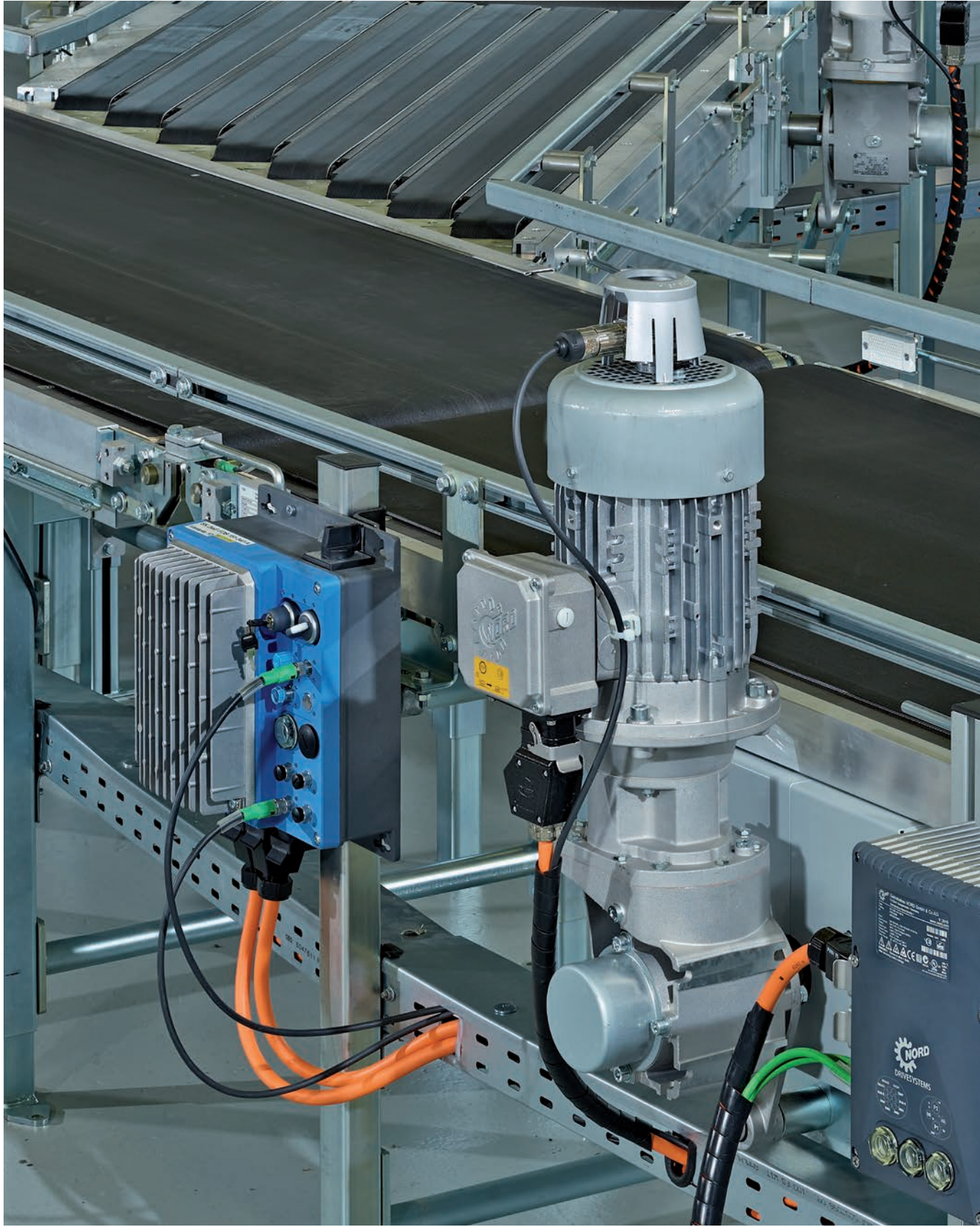
○ Not available

	SK 155E-FDS	SK 175E-FDS	SK 250E-FDS	SK 260E-FDS	SK 270E-FDS	SK 280E-FDS
	Motor Starters 0.10 - 4.0 hp			VFDs 0.5 - 10 hp		
Number of digital inputs	3 (+2 sensor inputs for bus) ²			5+2 ^{1,2}		
Number of analog inputs	○	○	2 ¹	2 ¹	2 ¹	2 ¹
Number of digital outputs	2	2	2	2	2	2
Temperature sensor (PTC)	1	1	1	1	1	1
CANopen®	○	○	●	●	●	●
HTL	○	○	●	●	●	●

¹ Alternatively, the analog inputs can also be used as digital inputs (not PLC-compatible).

² If necessary, individual inputs can be defined at the factory by the use of certain optional modules.

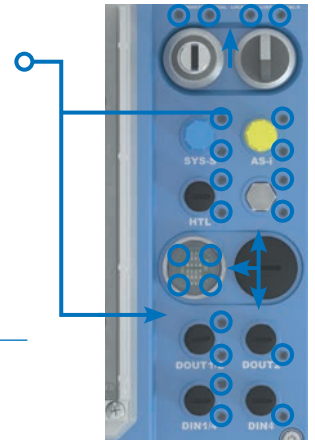




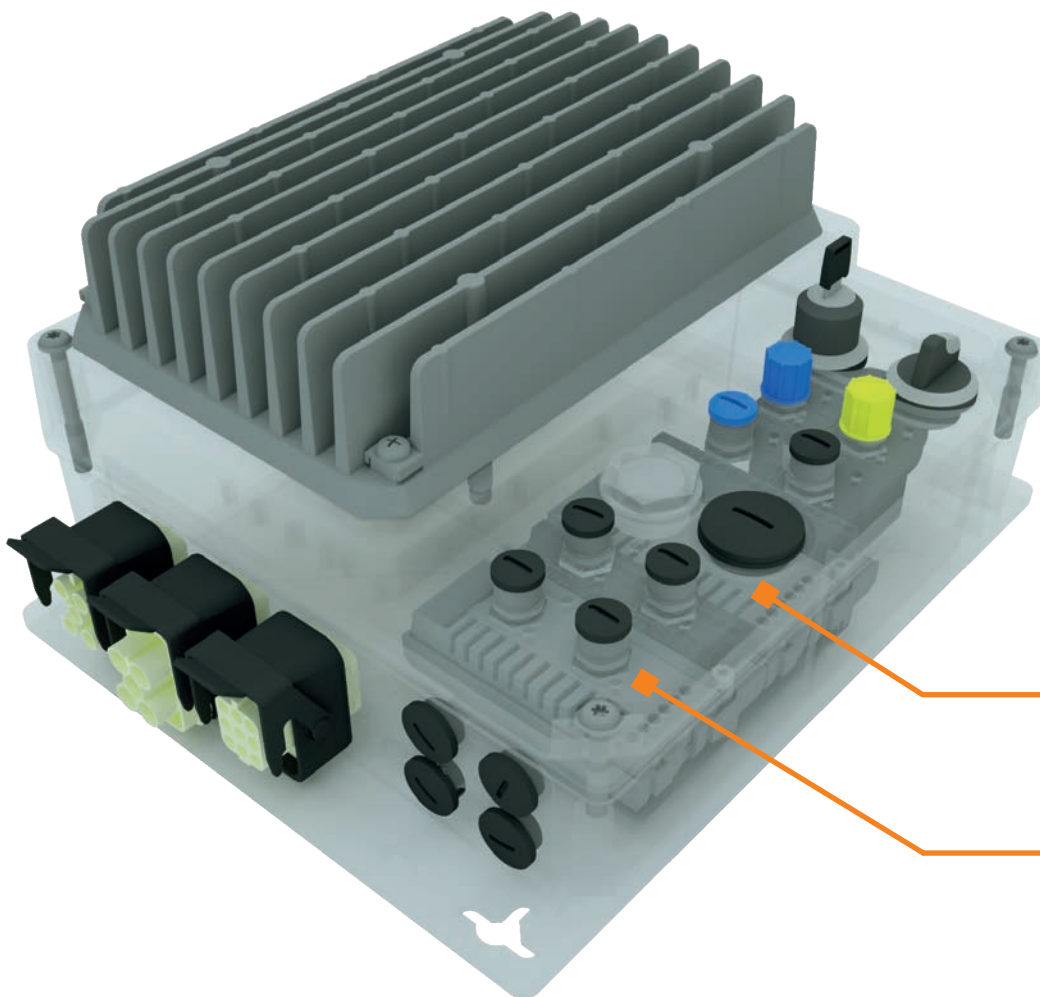
LED Status Indicators Use / Meaning

The variable frequency drive is equipped with LED indicator lights. These are used to indicate the signal statuses of the relevant option slot.

One option slot is closed with a transparent screw cap. The LED status indicator lights, which are installed in this option slot act as diagnostic LEDs and are always visible.



LED Indicators	Use/Meaning
Yellow - Single color - Static	Indication of the signal status (ON / OFF) or the associated function of the IOs.
Red/Green - Single or dual color - Static or dynamic	Indication of the operating statuses on the VFD or communication level.



Can be extended with a maximum of two further option modules (SK CU4)

NORDAC LINK Motor Starter

3~ 380 ... 500 V

Typical Overload Capacity	150% for 9 s up to 170 s (adjustable (shut-down class 5, 10 A, 10))
Energy Efficiency Class	IE2
Motor Starter Efficiency	> 98%
Ambient Temperature	-25°C...+50°C (S1)
Protection Class	IP65 NEMA Type 1

Protective Measures Against

- ▶ Mains phase failure
- ▶ Motor phase failure
- ▶ Flux monitoring
- ▶ Motor over temperature (PTC)
- ▶ Motor overload
- ▶ Mains over/under voltage

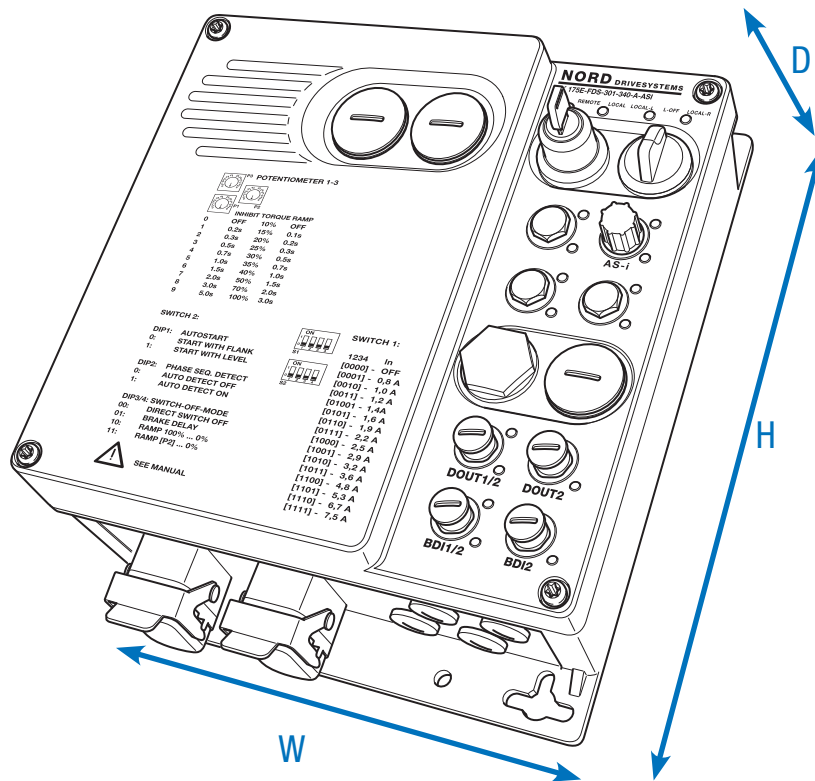
Motor Temperature Monitoring Leakage Current

1[†] Motor
PTC / bi-metal switch
< 20 mA

Motor Starter SK 155E-FDS... / SK 175E-FDS...	Nominal Motor Power [kW]	Nominal Motor Power [hp]	Nominal Output Current rms [A]	Line Voltage/ Output Voltage	Weight	Size	Overall Dimensions H x W x D
-111-340-B	up to 1.1	up to 1.5	3.2	3~ 380 V ... 500 V, -20% / +10%, 47 ... 63 Hz	approx. 3 kg / 6.6 lbs	0	312 ¹ x 243 x 104 ² mm 12.28 ¹ x 9.56 x 4.09 ² in
-301-340-B	up to 3.0	up to 4.0	7.5		approx. 3 kg / 6.6 lbs	1	312 ¹ x 243 x 104 ² mm 12.28 ¹ x 9.56 x 4.09 ² in

¹ Without maintenance switch H=307 mm / 12.09 in

² With key switch and key inserted D=125 mm / 4.92 in



Introduction
NORDAC PRO SK 500P
NORDAC PRO SK 500E
NORDAC LINK
NORDAC ON
NORDAC FLEX
NORDAC BASE
NORDAC START
Accessories

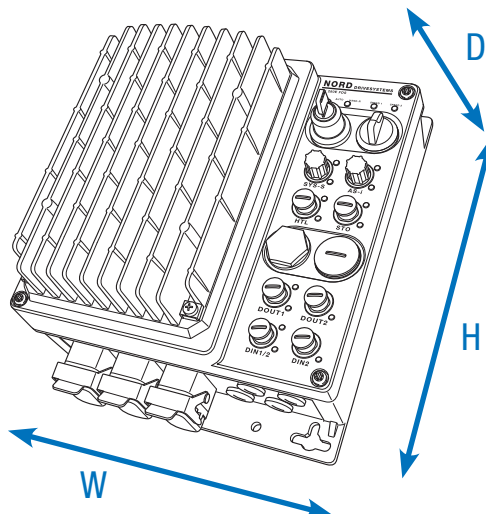
NORDAC LINK Variable Frequency Drive

3~ 380 ... 500 V

Output Frequency	0.0 ... 400.0 Hz
Pulse Frequency	3.0 ... 16.0 kHz
Typical Overload Capacity	150% for 60 s, 200% for 3.5 s
Energy Efficiency Class	IE2
VFD Efficiency	> 95%
Ambient Temperature	-25°C ... +40°C (S1)

Protection Class	IP65 devices up to 2 hp, not with option -FANO (heat sink with mounted fan) IP55 devices of 3 hp and higher as well as devices <3 hp, with option -FANO ¹
Regulation and Control	Sensorless current vector control (ISD), linear V/f characteristic curve
Motor Temperature Monitoring	I ² t Motor PTC / bi-metal switch
Leakage Current	< 30 mA

VFDs SK 2xxE-FDS...	Nominal Motor Power		Nominal Output Current rms [A]	Line Voltage/ Output Voltage	Weight		Overall Dimensions H x W x D	Size	
	400 V [kW]	480 V [hp]			[kg]	[lbs]			
-370-340-A	0.37	0.5	1.1	3 ~ 380...500 V, -20% / +10%, 47 ... 63 Hz	3.8	8.4		0	
-550-340-A	0.55	0.75	1.7		4.6	10.1	312 x 243 x 130 mm 12.28 x 9.56 x 5.11 in	0	
-750-340-A	0.75	1.0	2.3		4.6	10.1		0	
-111-340-A	1.1	1.5	3.1		4.6	10.1		1	
-151-340-A	1.5	2.0	4.0		4.6	10.1	312 x 243 x 175 ¹ mm 12.28 x 9.56 x 6.88 in	1	
-221-340-A	2.2	3.0	5.5		4.8	10.6		1	
-301-340-A	3.0	4.0	7.0		3 ~ AC 0 V up to mains voltage	4.8	10.6		1
-401-340-A	4.0	5.0	8.9			6.8	15		2
-551-340-A	5.5	7.0	11.7		6.8	15	312 x 358 x 184 mm 12.28 x 14.09 x 7.24 in	2	
-751-340-A	7.5	10	15		6.8	15		2	



¹ Devices up to 1.5 kW / 2 hp power, without -FANO option (fan on heat sink) D=155

Interfaces for Operation, Parameterization, and Communication

Operation and Parameterization

Optional modules are available with up to 14 languages for displaying status, operational indicators, parameterization, and operation of the variable frequency drive. Variants are available for direct mounting on the device, installation in a control cabinet door, and handheld versions.

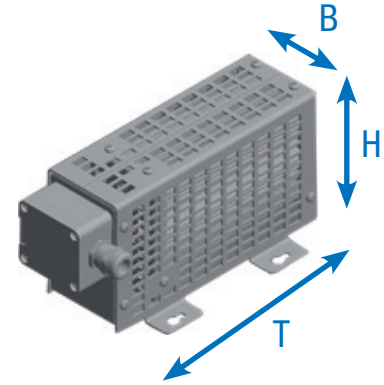
	Type Designation Material No.	Description	Remarks
	ParameterBox SK PAR-3H 275 281 014	Control and parameterization, LCD screen (illuminated), plain text display in 14 languages, direct control of up to five devices, memory for five device data sets, convenient control keypad, communication via RS-485, including 2 m connection cable. Handheld, IP54.	Connection for data exchange with NORDCON on a PC (USB 2.0), including 1 m connection cable, 4.5 ... 30 V DC/1.3 W Supply e.g. directly via the VFD
	SimpleControlBox SK CSX-3H 275 281 013	Control and parameterization, 4-digit, 7-segment display, direct control of a device, convenient control keypad, including 2 m connection cable. Handheld, IP54.	Electrical data: 4.5 ... 30 V DC / 1.3 W, supply e.g. directly via the VFD
	Control and parameterization software NORDCON	Software for control and parameterization as well as support for commissioning and fault analysis of NORD electronic drive technology. Parameter names in 14 languages.	Free download at: www.nord.com
	Bluetooth-Stick NORDAC <i>ACCESS BT</i> SK TIE5-BT-STICK 275 900 120	Interface for wireless connection to a mobile terminal device (e.g. tablet or smartphone) via Bluetooth. With the aid of the NORDCON APP, the NORDCON software for mobile terminal devices, enables smart operation and parameterization as well as commissioning assistance and fault analysis of NORD electronic drive technology.	Available free of charge for Android and iOS: 

Brake Resistors for Dynamic Drive Characteristics

Chassis Braking Resistors, SK BRW5

The chassis braking resistor elements are integrated into a housing cage and must be connected to the VFD via a separate connecting cable. They must be mounted horizontally using a shielded cable that is as short as possible.

Chassis brake resistors have protection class IP65.



VFDs SK 2xE-FDS ...	Resistor Type Material No.	Resistance [Ω]	Continuous Output [W]	Short-Term Power [kW] ¹	Overall Dimensions L x W x H
0.55 ... 2.2 kW 0.75 ... 3.0 hp	SK BRW5-1-300-225 278 281 070	300	225	4	245 x 120 x 123 mm 9.64 x 4.72 x 4.84 in
3.0 ... 7.5 kW 4.0 ... 10 hp	SK BRW5-2-150-450 278 281 071	150	450	8	405 x 120 x 123 mm 4.13 x 4.72 x 4.84 in

Temperature monitoring for SK BRW5 resistors integrated (2 terminals 4 mm)

Bimetallic switch as opener.
Nominal switching temperature: 180°C.

External Braking Resistors

External braking resistors are intended for applications with low braking energy and offer full availability of nominal continuous power. External braking resistors cannot be retrofitted and must be taken into account when ordering. The attachment increases the frequency drive's width by 44 mm.

[Available on request](#)



¹ Once within 120 s, or a maximum duration of 1.2 s

Internal Braking Resistors

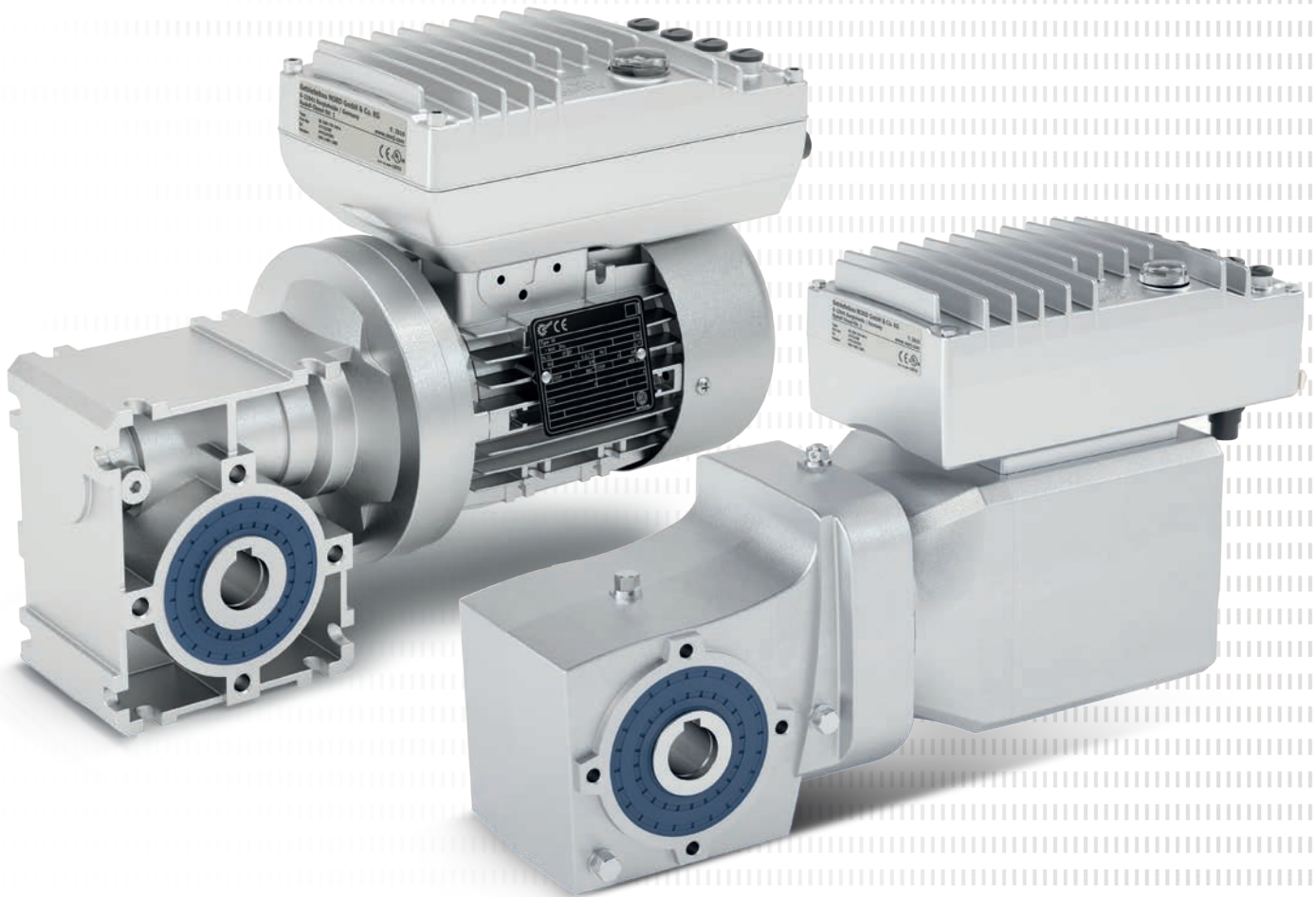
Internal brake resistors are intended for applications in which slight or brief braking (e.g. continuous conveyor equipment, mixing equipment) is to be expected. They effectively enable the use of the VFD in very confined spaces or in explosive atmospheres

Internal brake resistors cannot be retrofitted and must be taken into account when ordering. For thermal reasons, the rated continuous output is limited to 25%.

VFDs SK 2xE-FDS-...	Resistance [Ω]	Continuous Power P _n [W]	Power Consumption ¹ P _{max} [kWs]
... 750-340-	400 Ω	100 W	1.0 kWs
... 151-340- bis ... 301-340-	400 Ω	100 W	1.0 kWs
... 401-340- bis ... 751-340-	200 Ω	200 W	2.0 kWs

¹ Maximum once within 10s





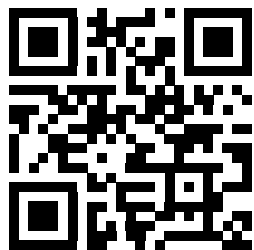
Variable Frequency Drives for horizontal Conveyor Applications

NORDAC *ON* and *ON+* SK 300P Series



Top Class VFD Technology

NORDAC *ON*, SK 300P Series



[NORDAC *ON*](#)

The NORDAC *ON* is a compact, smart variable frequency drive for decentralized use that has been developed to meet the special requirements of horizontal conveyor technology, as well as for the interaction with the new IE5+ synchronous motor (NORDAC *ON+*).

Focused

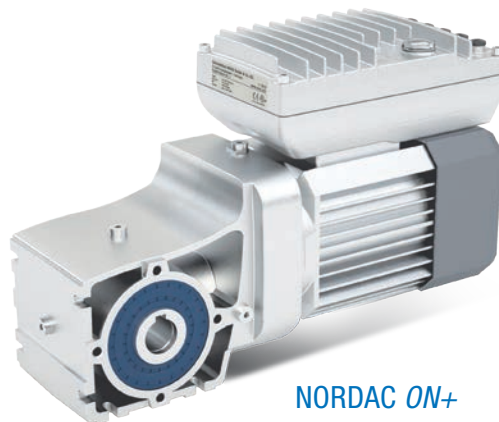
The NORDAC *ON* / *ON+* is optimized for the common range of functions in horizontal conveyor technology. The following functions are included as standard:

- ▶ Integration of sensors via digital inputs
- ▶ If required, an integrated brake chopper dissipates regenerative energy to an optional braking resistor
- ▶ Brake management for optimum control of an electromagnetic holding brake for wear-free brake actuation
- ▶ Quick and simple diagnostics via easily visible LED indicators
- ▶ The Safe Torque Off (STO) function can be optionally integrated into the VFD and is controlled via two STO inputs

Compact

Three frame sizes are available for the power range from 0.50 to 4.0 hp (NORDAC *ON/ON+*). The compact designs are able to be motor or wall mounted based on the application and space requirements.

NORDAC *ON* was designed for use with asynchronous motors whereas NORDAC *ON+* is intended to be used with synchronous motors and supplements the NORD high-efficiency portfolio around the new IE5+ motor generation.

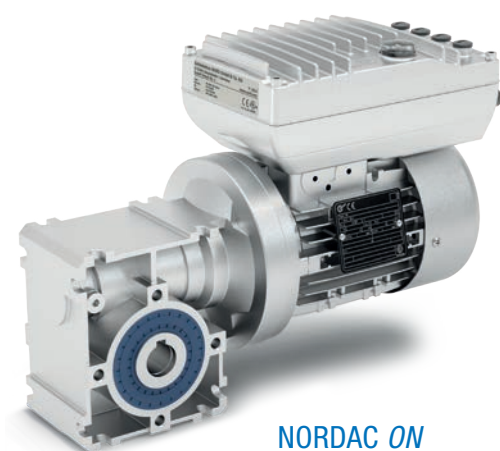


NORDAC *ON+*

Digitalization

As with all NORD variable frequency drives, this member of the NORDAC family is equipped with a powerful PLC for functionality close to the drive. It can process the data from connected sensors and actuators, autonomously initiate control sequences, and communicate drive and application data to the control center, networked components, or to cloud storage.

For this purpose, both VFD versions have an integrated multi-protocol Ethernet interface for easy integration into modern automation systems. Whether for ProfiNet, EtherNet/IP, or EtherCAT – the required protocol can be easily set via parameters.



NORDAC ON

100% Plug-and-Play

All connections are pluggable and ensure quick, easy, error-minimized commissioning, and maintenance on site. The 24 V DC supply for control and communication is also integrated in the 3-phase 400 V supply and interfaces to the drive via a 6-pole plug connector. The daisy chain connector can be used to supply power to several drives in the series in order to optimize the required cable length.

Robust


The NORDAC ON / ON+ housing is made entirely from aluminium and with an IP protection class up to IP66, making it suitable for harsh environmental conditions. These VFDs can be operated in temperature ranges from -30 to +40°C, making them ideal for both deep-freeze and high-heat applications.



NORDAC ON
Wall-mounted version

Standards and Approvals

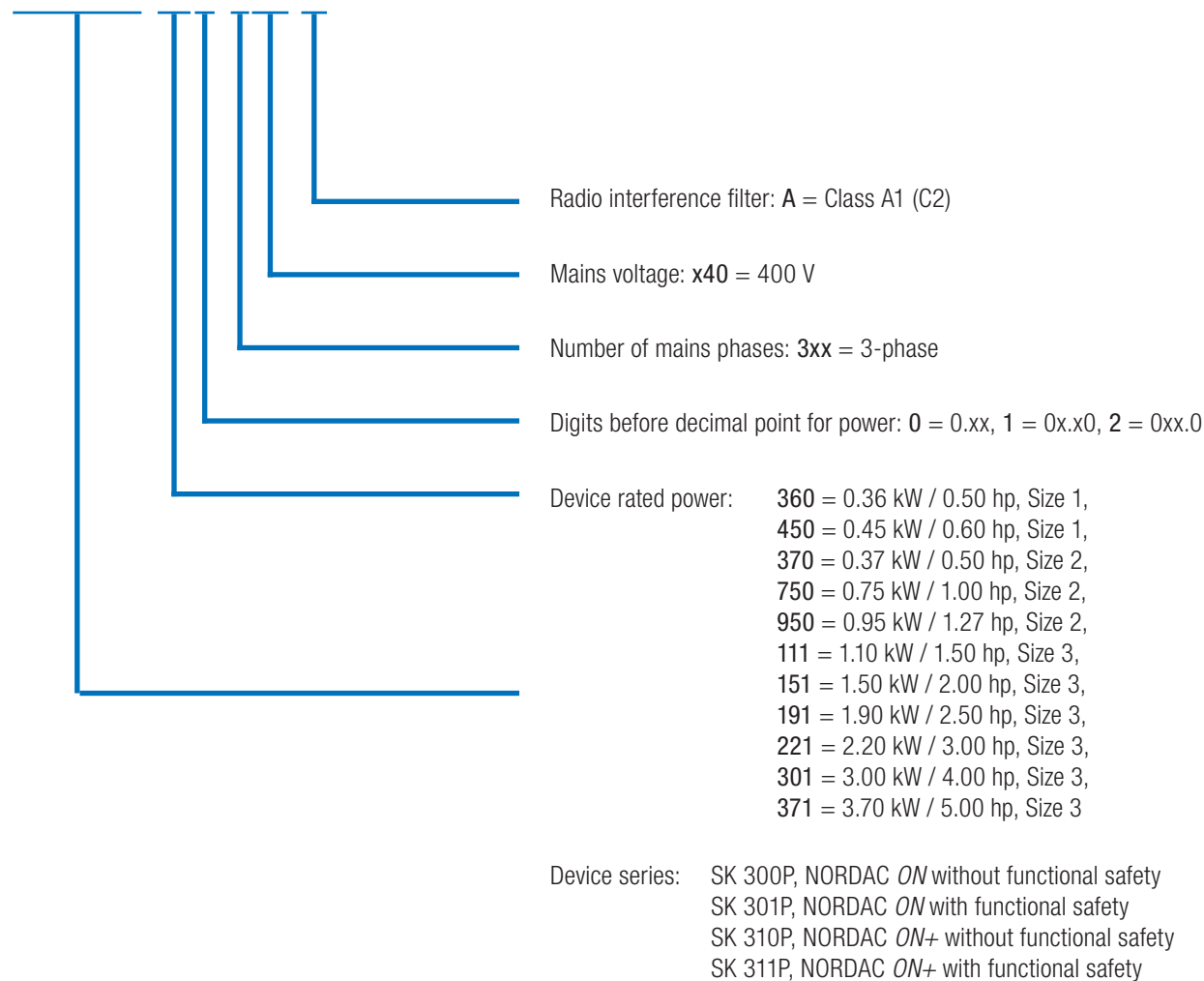
All drives comply with the standards and directives listed below.

Approval	Directive	Applied Standards	Certificates	Label
CE (European Union)	Low Voltage Directive 2014/35/EU	EN 61800-5-1 EN 60529	C310001	
	EMC 2014/30/EU	EN 61800-3 EN 63000		
	RoHS 2011/65/EU	EN 61800-9-1 EN 61800-9-2		
	Delegated directive (EU) 2015/863			
	Ecodesign 2009/125/EG			
	Regulation (EU) Ecodesign 2019/1781			
UL (USA)		UL 61800-5-1	E171342	
CSA (Canada)		C22.2 No.274-13	E171342	
RCM (Australien)	F2018L00028	EN 61800-3	C310001	
EAC (Eurasia)	TR CU 004/2011, TR CU 020/2011	IEC 61800-5-1 IEC 61800-3	in preparation	
UkrSEPRO (Ukraine)		EN 61800-5-1 EN 60529 EN 61800-3 EN 63000 EN 60947-1 EN 60947-4 EN 61558-1 EN 50581	C311900	
UKCA (United Kingdom)		EN 61800-5-1 EN 60529 EN 61800-3 EN 63000 EN 61800-9-1 EN 61800-9-2	C352000	

Type Code

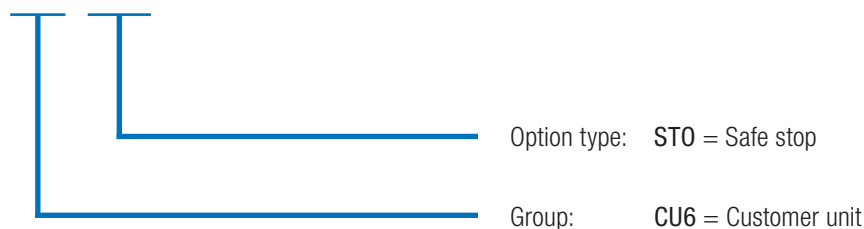
Variable Frequency Drive

SK 300P-360-340-A



Customer Units

SK CU6-STO



NORDAC *ON* and NORDAC *ON+* All Versions at a Glance

	NORDAC <i>ON</i> SK 30xP	NORDAC <i>ON</i> SK 30xP	NORDAC <i>ON+</i> SK 31xP
Power	0.25 - 1.00 hp	0.25 - 1.00 hp	0.50 - 1.27 hp
Size	1	2	2
Sensorless current vector control (ISD control)	●	●	●
RS-485/RS-232 diagnostic interface via RJ12	●	●	●
4 switchable parameter sets	●	●	●
All normal drive functions	●	●	●
Parameters pre-set with standard values	●	●	●
Stator resistance measurement	●	●	●
Energy-saving function, optimized efficiency in partial load operation	●	●	●
Class C2 line filter, motor-mounted or up to 5 m motor cable for wall-mounting	●	●	●
Monitoring functions	●	●	●
Load monitor	●	●	●
POSICON	○	○	●
PLC functionality	●	●	●
Ethernet communication: EtherCAT, Ethernet IP, ProfiNet IO	●	●	●
External 24 V DC power supply for the control board	●	●	●
Brake management for mechanical Holding brake	○	●	●
Brake chopper (braking resistor optional)	○	●	●
"Safe Torque Off" and "Safe Stop" (STO, SS1-t) functions	○	●	●
Internal braking resistors	○	●	●

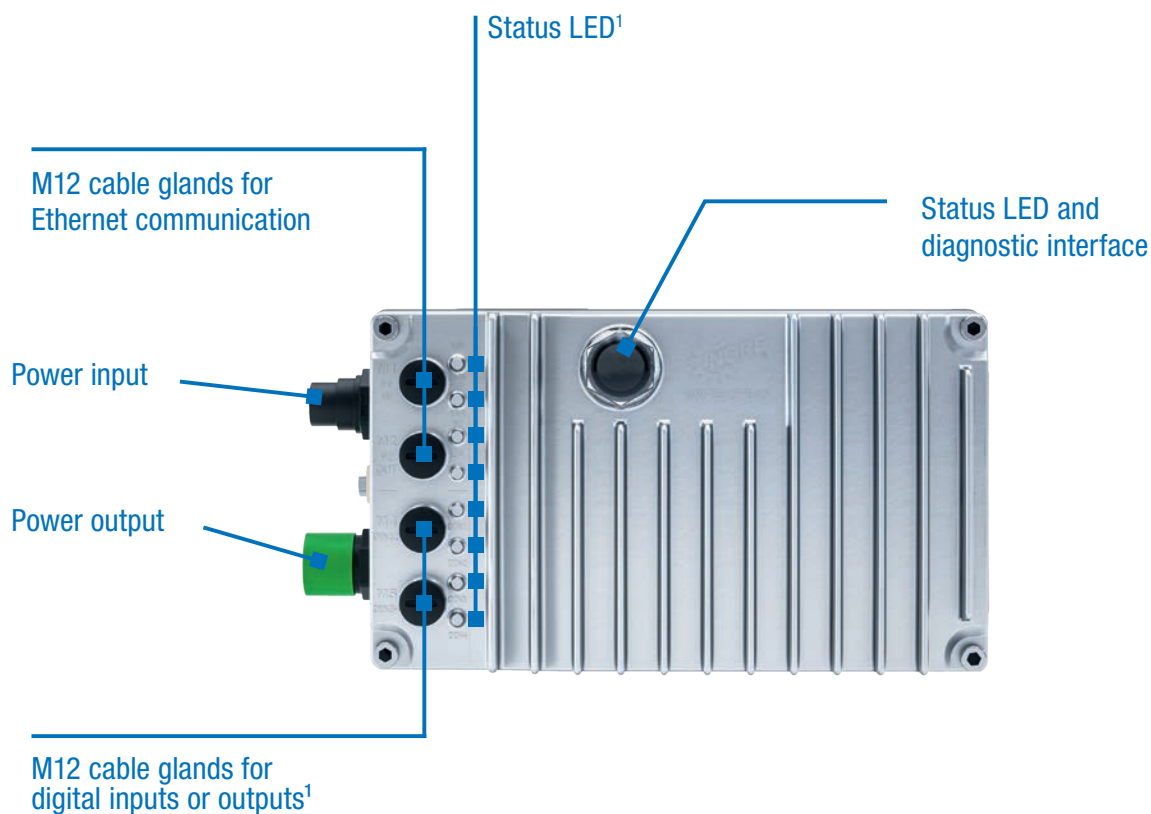
¹ With integrated optional module SK CU6-STO, connection via M12 plug connectors

- Available as standard
- Optional
- Not available

	NORDAC ON SK 30xP	NORDAC ON SK 30xP	NORDAC ON+ SK 31xP
Power	0.25 - 1.00 hp	0.25 - 1.00 hp	0.50 - 1.27 hp
Size	1	2	2
Mountable on IE3 motor	●	●	○
Mountable on IE5+ motor	○	○	●
RS-485 encoder interface	○	○	●
DIN via M12 plug connector	4-2 ¹	4-4 ² -2 ²	4-4 ² -2 ²
DOUT via M12 plug connector	0-2 ¹	2-0 ² -2 ²	2-0 ² -2 ²
Optional: SK CU6-STO via M12 plug connector	○	●	●
Mains input (3-phase 400 V) with integrated 24 V DC via plug connector	●	●	●
Mains output / daisy chain (3-phase 400 V) with integrated 24 V DC via plug connector	●	●	●
Thermostats (PTC)	●	●	●

¹ 2 digital IOs optionally parameterizable as DIN or DOUT

² Version SK 3x1P and higher has 4 DINs, 2 of which are optionally parameterizable as DIN or DOUT.

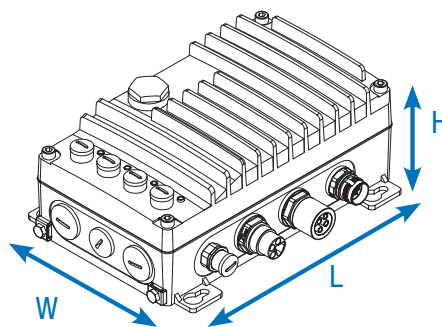
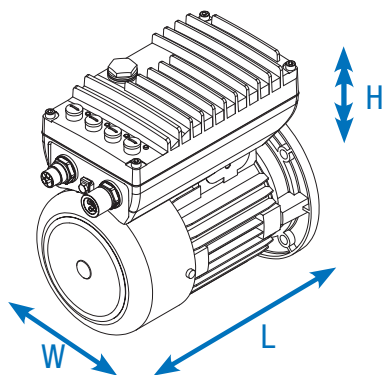


NORDAC ON SK 300P Variable Frequency Drive 3~400 ... 480 V

Output Frequency	0.0 ... 400.0 Hz	Protection Class	IP55, optional IP66 NEMA type 1 (higher NEMA classifications on request)
Pulse Frequency	3.0 ... 16.0 kHz	Regulation and Control	Sensorless current vector control (ISD), linear V/f characteristic curve
Typical Overload Capacity	150% for 60 s 200% for 3.5 s 250% for 1 s, only for asynchronous motors	Motor Temperature Monitoring	I ² t motor PTC / bimetallic switch
VFD Efficiency	approx. 95%	Leakage Current	< 30 mA
Ambient Temperature	-30°C ... +40°C (S1) -30°C ... +50°C (S3, 70% ED)		

VFD	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage	Size
	400 V [kW]	480 V [hp]				
SK 300P-360-340-A	0.37	0.5	1.3	3~ 400 ... 480 V, -20% / +10%, 47 ... 63 Hz	3~ 0 up to mains voltage	1
SK 3XXP-370-340-A	0.37	0.5	1.3			2
SK 300P-450-340-A	0.45	0.6	1.5			1
SK 3XXP-750-340-A	0.75	1.0	2.2			2
SK 3XXP-950-340-A	0.95	1.25	2.7			2
SK 3XXP-111-340-A	1.1	1.5	3.0			3
SK 3XXP-151-340-A	1.5	2.0	3.8			3
SK 3XXP-191-340-A	1.9	2.5	4.3			3
SK 3XXP-221-340-A	2.2	3.0	5.2			3
SK 3XXP-301-340-A	3.0	4.0	7.2			3
SK 3XXP-371-340-A	3.7	5.0	8.1			3





VFD SK 3xxP ...	Motor	Size	Weight		Dimensions for Motor Mounting excl. Motor		Size
			[kg]	[lbs]	L x W x H		
SK 30XP	-360-340-A BIS -450-340-A	IE3	63 – 71	1.5	3.30	230 x 121 x 79 mm 9.06 x 4.76 x 3.11 in	1
	-370-340-A BIS -950-340-A	IE3	63 – 80	1.9	4.19	260 x 130 x 83 mm 10.24 x 5.12 x 3.27 in	2
	-111-340-A bis -151-340-A	IE3	80 – 90	3.3	7.28	296 x 160 x 104 mm 11.65 x 6.30 x 4.09 in	3
	-191-340-A bis -301-340-A	IE3	90	3.5	7.72	296 x 160 x 123 11.65 x 6.30 x 4.84 in	3
SK 31xP	-370-340-A bis -950-340-A	IE5+	71	1.9	4.19	251 x 130 x 97 9.88 x 5.12 x 3.82 in	2
	-111-340-A bis -151-340-A	IE5+	90	3.4	7.50	285 x 160 x 124 11.22 x 6.30 x 4.88 in	3
	-221-340-A bis -371-340-A	IE5+	90	3.6	7.94	304 x 160 x 144 11.97 x 6.30 x 5.67 in	3
SK 35xP	-370-340-A bis -750-340-A	IE5+	71			277 x 133 x 122 10.91 x 5.24 x 4.80 in	2
	-111-340-A bis -151-340-A	IE5+	90			307 x 160 x 146 12.09 x 6.30 x 5.75 in	3

VFD SK 3xxP ...	Weight		Dimensions for wall mounting		Size
	[kg]	[lbs]	L x W x H		
SK 30XP/ SK 31XP	-360-340-A BIS -450-340-A	1.7	3.75	211 x 161 x 84 mm 8.31 x 6.34 x 3.31 in	1
	-370-340-A BIS -950-340-A	2.1	4.63	244 x 171 x 99 mm 9.61 x 6.73 x 3.90 in	2
	-111-340-A BIS -151-340-A	3.5	7.72	272 x 201 x 117 mm 10.71 x 7.91 x 4.61 in	3
	-191-340-A BIS -371-340-A	3.7	8.16	272 x 201 x 137 mm 10.71 x 7.91 x 5.39 in	3
SK 35XP	-370-340-A BIS -750-340-A			260 x 184 x 111 mm 10.24 x 7.24 x 4.37 in	2
	-111-340-A BIS -151-340-A			290 x 214 x 134 mm 11.42 x 8.42 x 5.28 in	3

NORDAC *ON* / *ON+* Options

Functional Safety

NORDAC *ON* and NORDAC *ON+* VFDs in sizes 2 and 3 can be configured with the functional safety option.

Available in the following devices:
SK 301P, SK 311P

Functions	IOs	Remarks
Functional safety: STO - PLe / SIL 3 SS1-t - PLd / SIL 2	2 safe DIN	Functional safety: 2-channel connection

Internal braking resistors

Internal braking resistors are intended for applications in which slight, very brief braking is to be expected.

Internal braking resistors cannot be retrofitted and must therefore be taken into account in the order. For thermal reasons, the rated continuous output is limited to 25%.

	VFD	Wall Mounting	Motor Assembly	Resistance [Ω]	Continuous Output ¹	Power Consumption ¹	Size
					[W]	E _{max} [kW]	
SK 30xP	-360-340-A to -950-340-A	●	●	400	70	0.9	2
	-111-340-A to -301-340-A	●	●	300	100	1.3	3
SK 31xP	-370-340-A to -950-340-A	●	●	400	70	0.9	2
	-111-340-A to -371-340-A	●		300	100	1.3	3
	-111-340-A to -371-340-A		●	200	200	2.0	3
SK 35xP	-370-340-A to -750-340-A	●	●	400	70	0.9	2
	-111-340-A to -151-340-A	●		300	100	1.3	3
	-111-340-A to -151-340-A		●	200	200	2.0	3

¹ Reduction of the continuous output of the braking resistor to 25% of the rated output

² Once within 10 s

Interfaces for Operation, Parameterization and Communication

Operation and Parameterization

Optional modules with up to 14 languages for displaying status and operational indicators, parameterization and operation of the variable frequency drive. In addition two variants for direct mounting on the device or installation in a control cabinet door are available, as well as handheld versions.

	Type Designation Part Number	Description	Remarks
	SimpleControlBox SK CSX-3H 275 281 013	Control and parameterization, 4-digit 7-segment display, direct control of a device, convenient control keypad, including 2 m connection cable. Handheld, IP54.	Electrical data: 4.5 ... 30 V DC / 1.3 W Supply e.g. directly via the VFD.
	Control and parameterization software NORDCON	Software for control and parameterization as well as support for commissioning and fault analysis of NORD electronic drive technology. Parameter names in 14 languages.	Free download at: www.nord.com
	Bluetooth-Stick NORDAC <i>ACCESS BT</i> SK TIE5-BT-STICK 275 900 120	Interface for wireless connection to a mobile terminal device (e.g. tablet or smartphone) via Bluetooth. The NORDCON <i>APP</i> , the NORDCON software for mobile terminal devices, enables smart operation and parameterization as well as commissioning assistance and fault analysis of NORD electronic drive technology.	Available free of charge for Android and iOS: 





Variable Frequency Drives for Decentralized Applications

NORDAC *FLEX* SK 200E Series



Master of Adaptation

NORDAC FLEX, SK 200E Series



[NORDAC FLEX](#)

Variable frequency drives are now essential components of electrical drive technology. They are used for a wide range of automation tasks in many industry fields.

Universal

The NORDAC FLEX is an all-around control solution among decentralized VFDs and has established itself across many industries in almost all areas of engineering.

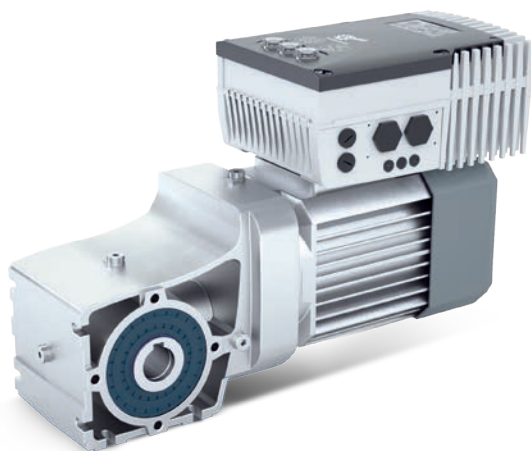
This is due not only to the wide power range (up to 30 hp), but also because of the wide selection of functions and the flexibility offered by its comprehensive range of accessories.

Economical

The NORDAC FLEX has been structured with various function levels in order to take efficiency and application-specific requirements into consideration. The series has been arranged into two equipment groups which cover typical conveyor, pump, and fan applications.

Energy-saving

Even for applications in which a frequency drive is not strictly necessary from a technical point of view (constant speed with 60 Hz), the NORDAC FLEX beats unregulated drive units with its energy-saving characteristics, particularly in partial load operation.



Basic Configuration

- Sensorless **current vector control** and **V/f characteristic curve**
- 4 switchable **parameter sets** for flexible use of parameter settings
- All common **drive functions** e.g. acceleration / braking on a ramp, PI controller
- **Parameters** with pre-set standard values
- **POSICON** for relative and absolute positioning
- **Incremental encoder interface** for speed feedback
- **Stator resistance measurement**
- **PLC functionality** for drive-related functions
- Operation of **three-phase asynchronous motors (ASM)** and **permanent magnet synchronous motors (PMSM)**

Optional

- Interfaces for **8 field bus systems**
- **Various control options** (Potentiometer, control, and parameterization units)
- Versions with **functional safety** (Safe Stop)
- **IO modules** for additional analog and digital inputs and outputs
- **System plug connectors** for power connection of mains and motor cables (industrial plug connectors) as well as for control and signal cables (M12 plug connectors)
- **ATEX versions** for operation in zone 22-3D

Pump/fan Applications with the SK 2x0E

- 1~ 230 V 0.25 - 0.55 kW / 0.33 - 0.50 hp
- 3~ 230 V 0.25 - 11 kW / 0.33 - 15 hp
- 3~ 400 V 0.55 - 22 kW / 0.50 - 30 hp

Typical Requirements

- ▶ Speed setpoints/process signals via analog input, e.g. pressure sensors
- ▶ Stand-alone operation of individual drive units or mobile systems, thanks to integrated control voltage
- ▶ No motor or brake control necessary



Conveyor Applications with SK 2x5E (SK 2x0E, Size 4)

- 1~ 115 V 0.25 - 0.75 kW / 0.33 - 1.0 hp
- 1~ 230 V 0.25 - 1.1 kW / 0.33 - 1.5 hp
- 3~ 230 V 0.25 - 4 kW / 0.33 - 5.5 hp
(11 kW / 15 hp)
- 3~ 400 V 0.55 - 7.5 kW / 0.5 - 10 hp
(22 kW / 30 hp)

Typical Requirements

- ▶ Separate voltage levels 400 V / 24 V, e.g. for separate start-up of bus system / control level and power
- ▶ Adjustable brake control with integrated rectifier
- ▶ No processing of analog values required as bus control is frequently used

Basic Configuration SK 2x0E Series



4 digital inputs

e.g. for left/right enabling, fixed frequencies or parameter set switchover



2 digital outputs

e.g. for reporting errors or various limit values



1 or 2 analog inputs

e.g. connection for speed setpoint or process signals



Integrated 24 V power supply

24 V control voltage for stand-alone operation

Basic Configuration SK 2x5E Series



4 digital inputs

e.g. for left/right enabling, fixed frequencies or parameter set switchover



1 digital output

e.g. for reporting errors or various limit values



Connection for external 24 V power supply

Separate voltage levels for power and control, e.g. for separate start-up or online availability when the power is switched off



BRE

Integrated brake rectifier

Application and release time optimally adjustable via parameter

If You Are Looking for A Controlled Drive Unit

If you are looking for a drive unit with which your machine can perform specific functions

We can supply the optimum device. A drive unit consisting of a combination of series production units that is perfectly tailored to your requirements. A drive unit which can be easily retrofitted with a wide range of accessories to adapt it to changed conditions.

If You Have:

Limited Space

- ▶ Restricted installation space in the machine

High Performance Requirements

- ▶ High-performance drive units
- ▶ High breakaway torques

A Need for High-Precision Speed Control

- ▶ Speed fluctuations are not permissible
- ▶ Perfect load take-up (lifting equipment) is required
- ▶ Compensation for fluctuating loads (conveyor belts/conveying equipment)

A Need for High-Precision Positioning

- ▶ Master/follower synchronization
- ▶ Movement to fixed positions (storage and retrieval machines)
- ▶ Movement to relative positions (endless belts in bottling plants)
- ▶ Movement of a drive unit to a changing position of a moving drive system (flying saw)

A Need for High Flexibility

- ▶ Short time frame in case service is required
- ▶ Frequent changes of machine use
- ▶ Existing motor and gear unit

A Need for Plug and Play

- ▶ For large projects or series production machinery
- ▶ Replacement devices for 1:1 exchange in case of service

A Need for Sustainability

- ▶ Resource-saving operation
- ▶ Use of products with low levels of hazardous substances



Our Solution:

Space-Saving

- ▶ A compact device designed with small overall dimensions
- ▶ Integrable optional modules (e.g. interfaces for field bus connection)
- ▶ Wall mounting kits for installation close to the motor

Powerful

- ▶ Unbeatable power range from 0.33 hp to 30 hp
- ▶ Optimized for continuous operation in 4 matching sizes
- ▶ Usable overload reserves of up to 200% of the rated power

Fast

- ▶ Comprehensive measuring methods for recording the actual electrical data as the basis for excellent control of the drive unit
- ▶ Integrated, precise, and fast-acting current vector control for immediate adaptation to actual load conditions
- ▶ Integrated interface for connection of an incremental encoder to detect the actual motor speed (prerequisite for precise control)

Precise

- ▶ Integrated, precise, fast, and completely autonomous positioning function (POSICON)
- ▶ Integrated interface for connection of an absolute encoder to detect the actual position

Adaptable

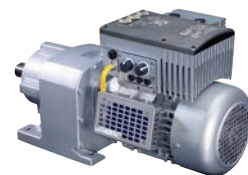
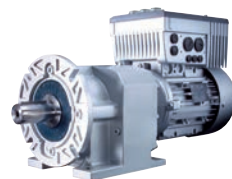
- ▶ Integrated DIP switches for basic configuration without the need for software modification
- ▶ Comprehensive selection of plug connectors for control and power cable connections
- ▶ Easily accessible exchangeable data carrier (EEPROM) for simple exchange of parameter settings between identical devices
- ▶ Devices can also be configured individually

Configurable

- ▶ Mounted on the geared motor
- ▶ Equipped with the necessary accessories (braking resistor, bus interface, encoders, etc.)
- ▶ Pre-parameterized for specific drive applications
- ▶ Equipped with the necessary system plug connectors







Environmentally Friendly

- ▶ Low-loss use of energy
- ▶ Energy-saving function to match the power output to the actual demand in partial load operation
- ▶ Consideration of environmental protection even during manufacture, RoHS compliant




Standards and Approvals

All devices of the entire series comply with the standards and directives listed below.

Approval	Directive	Applied standards	Certificates	Code
CE (European Union)	Low Voltage Directive 2014/35/EU	EN 61800-5-1	C310700	
	EMC 2014/30/EU	EN 60529	C310401	
	RoHS 2011/65/EU	EN 61800-3 EN 63000		
	Delegated directive (EU) 2015/863	EN 61800-9-1 EN 61800-9-2		
	Ecodesign 2009/125/EG			
	Regulation (EU) 2019/1781 Ecodesign			
UL (USA)		UL 61800-5-1	E171342	
CSA (Canada)		C22.2 No. 274-13	E171342	
RCM (Australia)	F2018L00028	EN 61800-3	133520966	
EAC (Eurasia)	TR CU 004/2011, TR CU 020/2011	IEC 61800-5-1 IEC 61800-3	EAЭС N RU Д-DE. HB27.B.02727/20	
UkrSEPRO (Ukraine)		EN 61800-5-1 EN 60529 EN 61800-3 EN 63000 EN 60947-1 EN 60947-4 EN 61558-1 EN 50581	C311900	
UKCA (United Kingdom)		EN 61800-5-1 EN 60529 EN 61800-3 EN 63000 EN 61800-9-1 EN 61800-9-2	C350700, C350401	

Devices which are configured and approved for use in explosion hazard environments comply with the following directives and standards.

Approval	Directive		Applied standards	Certificates	Code
CE (European Union)	LATEX	2014/34/EU	EN 60079-0	C432410	
	Low Voltage Directive	2014/35/EU	EN 60079-31		
	EMC	2014/30/EU	EN 61800-5-1 EN 60529		
	RoHS	2011/65/EU	EN 61800-3		
	Delegated Directive (EU)	2015/863	EN 63000 EN 61800-9-1 EN 61800-9-2		
	Ecodesign	2009/125/EG			
	Regulation (EU) Ecodesign	2019/1781			

Type Code

Variable Frequency Drive - Basic Device

SK 205E-370-323-A (-C) (xxx)

Special Version

IP protection class Standard = IP55, C = IP66

Radio interference filter: 0 = without, A = Class A1 (C2)

Mains voltage: x12 = 115 V, x23 = 230 V, x40 = 400 V

Number of mains phases: 1xx = 1-phase, 3xx = 3-phase

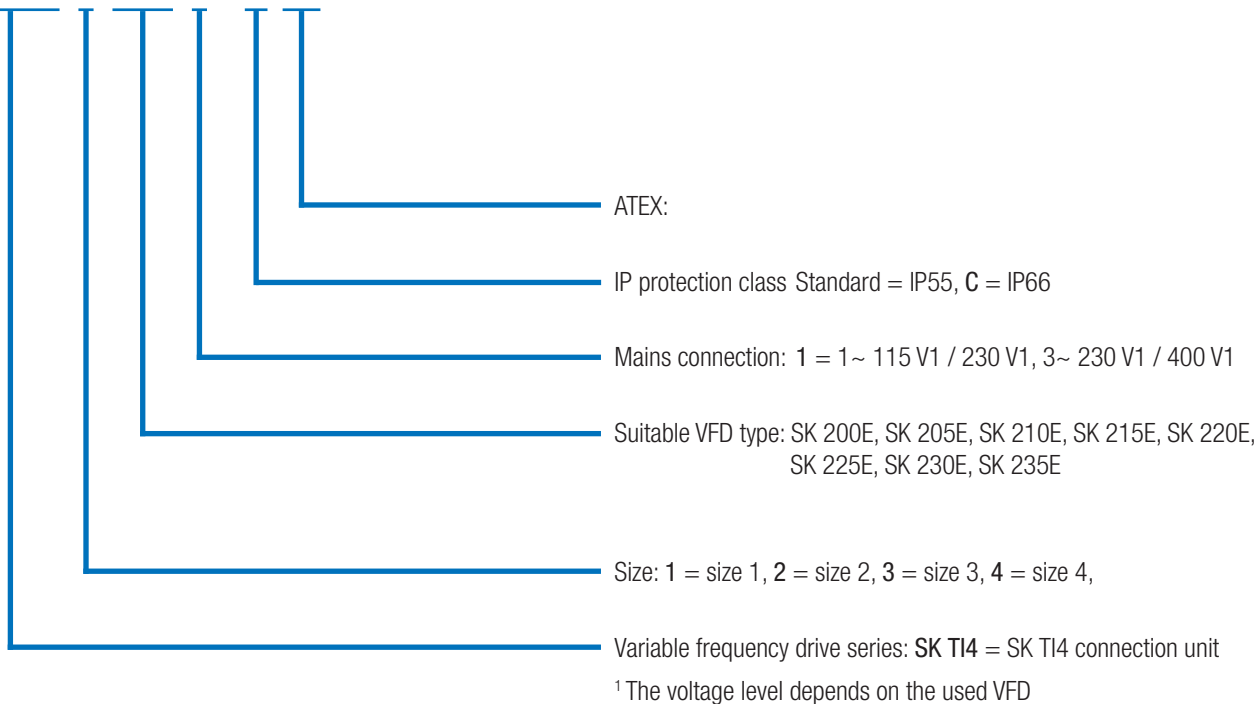
Device rated power: 250 = 0.25 kW / 0.33 hp, 370 = 0.37 kW / 0.5 hp,
...222 = 22.0 kW / 30 hp

Variable frequency drive series: SK 200E, SK 205E, SK 210E, SK 215E,
SK 220E, SK 225E, SK 230E, SK 235E

(...) Options, only implemented if required.

Variable Frequency Drive - Connection Unit

SK TI4-1-205-1 (-C-EX)



Versatile and Sustainable The VFD with Servo Genes

CANopen®



Standard Encoder Interfaces

The variable frequency drives' speed control is extremely precise thanks to sophisticated, fast measuring methods and calculation algorithms in combination with integrated high-precision current vector control.

However, there are applications where precision of a thousandth of a motor revolution and very high dynamics (maximum acceleration, cyclic operation, synchronous rotation relative to other drive units) are needed. In such cases, precise feedback from the mechanical momentary values of the motor or the drive unit is required. This feedback is provided by **incremental encoders**, which are normally mounted on the motor shaft and provide information about its actual position. These values enable the motor to be precisely controlled by the frequency drive so that even with large load fluctuations, an asynchronous motor can be operated with a performance similar to that of a servo motor.

Absolute encoders are used when high precision is required in drive applications such as:

- ▶ Synchronization of multiple drive units
- ▶ Dynamic synchronization of a drive unit to a different drive unit (flying saw)
- ▶ Relative positioning tasks (cyclical drives)
- ▶ Absolute positioning tasks (automatic warehouse equipment / high-bay storage, lifting equipment with defined positions)

Each VFD is equipped with a corresponding interface.

- ▶ HTL incremental encoder interface (connection via 2 digital inputs) - primarily for speed control
- ▶ CANopen absolute encoder interface (connection via system bus) - primarily for positioning

Available in all sizes

Modern Automation Systems



Power
(115 V / 230 V / 400 V)

AS-Interface
including 24 V supply SK 2xxE

Because modern automation systems have a wide range of requirements, a suitable bus system and drive components must be selected to ensure efficient implementation.

The AS-Interface is a cost-effective solution which enables the networking of binary sensors and actuators and is included in certain versions of the NORDAC *FLEX*.

The supply voltage (power) is connected separately via the corresponding terminals. Depending on the version of the device, the control voltage of the VFD is generated either via an integrated power supply unit or separately via the yellow AS-Interface cable. This eliminates the need for an additional AUX cable (black). The type of addressing possible (standard or A/B followers) also depends on the version of the device.

Device SK ...	220E/230E	225E/235E
Follower profile	S-7.A.	S-7.0.
Follower type	A/B-Follower	Standard
Control voltage	Internal power supply	Yellow AS-I cable
Inputs/Outputs	4/4	4/4
Configuration via DIP switch	●	●
Configuration via parameters	●	●

ATEX-Compliant Drive Systems, Zone 22 3D

Size 1-3 devices can be modified for operation in explosive atmospheres. This allows the operation of the variable frequency drive directly in a hazardous area (ATEX 22-3D). The advantages include:

- ▶ Compact drive unit
- ▶ No complex protective devices
- ▶ No motor cables
- ▶ Optimum EMC
- ▶ Permissible characteristic curves 50 Hz / 87 Hz
- ▶ Control range up to 100 Hz or 3000 rpm

Depending on the area of application (conductive or non-conductive dust) the modification includes, among others, replacement of the transparent diagnostic caps with a version made of aluminium and glass.

Operation of the device within the hazard area is only permitted with integrable modules (SK CU4 modules, internal brake resistors) or specially approved accessories (ATEX potentiometer SK ATX-POT).

There are exceptions for SK TU4 modules, which are described in detail in the manual for the device. Other accessories (e.g. external brake resistors, plug connectors) are not approved for use within a hazardous area.



Approval

- ▶ According to 2014/34/EU
- ▶ ATEX Zone 22 - 3D
 - ▶ Version for non-conducting dust: IP55
 - ▶ Version for conducting dust: IP66

Available in all size 1-3 devices



The Entire Team

All Device Versions at a Glance

	SK 200E	SK 210E	SK 220E	SK 230E	SK 205E	SK 215E	SK 225E	SK 235E
	Size 1-4, 0.33 - 30 hp				Size 1-3, 0.33 - 10 hp			
Motor and wall mounting possible ¹	●	●	●	●	●	●	●	●
Energy bus - loop-through of mains supply cables ²	●	●	●	●	●	●	●	●
Communication bus for various devices ²	●	●	●	●	●	●	●	●
Sensorless current vector control (ISD control)	●	●	●	●	●	●	●	●
Brake chopper (brake resistor optional)	●	●	●	●	●	●	●	●
RS-232 diagnostic interface	●	●	●	●	●	●	●	●
4 switchable parameter sets	●	●	●	●	●	●	●	●
Parameters pre-set with standard values	●	●	●	●	●	●	●	●
Automatic determination of motor data	●	●	●	●	●	●	●	●
Energy-saving function, optimized efficiency in partial load operation	●	●	●	●	●	●	●	●
Integrated EMC line filter according to EN 61800-3, Category C2 up to 5 m motor cable and for motor assembly	●	●	●	●	●	●	●	●
Extensive monitoring functions	●	●	●	●	●	●	●	●
Load monitor	●	●	●	●	●	●	●	●
PI controller	●	●	●	●	●	●	●	●
Process controller / compensator control	●	●	●	●	●	●	●	●
Plug-in memory module (EEPROM)	●	●	●	●	●	●	●	●
Incremental encoder evaluation (speed control)	●	●	●	●	●	●	●	●
POSICON positioning control	●	●	●	●	●	●	●	●
PLC functionality	●	●	●	●	●	●	●	●
Synchronous motor operation (PMSM)	●	●	●	●	●	●	●	●
Modification for operation in an IT network by means of jumpers	●	●	●	●	●	●	●	●
All common field bus systems	●	●	●	●	●	●	●	●
Brake management for mechanical holding brake	●	●	●	● ³	●	●	●	●
Lifting gear functionality	●	●	●	● ³	●	●	●	●
Safe Stop function (STO, SS1)	○	●	○	●	○	●	○	●
AS-Interface on board	○	○	●	●	○	○	●	●
Evacuation run	○ ³	○ ³	○ ³	○ ³	●	●	●	●
Internal 24 V power supply unit to supply the control board	●	●	●	●	●	●	●	●
External 24 V power supply for the control board	● ⁴	● ⁴	● ⁴	● ⁴	●	●	●	●
Internal / external braking resistors	●	●	●	●	●	●	●	●
Switch and potentiometer versions	●	●	●	●	●	●	●	●
Plug connectors for connection of control, motor and mains cables	●	●	●	●	●	●	●	●

¹ Wall mounting: wall mounting kit required
 Motor mounting: an adapter for connection to the motor terminal box may be necessary.

² Direct connection to the terminal bar or via system plug connectors

³ Size 4: standard

⁴ Size 1 -3: no, Size 4: optional

● Available as standard
 ● Optional
 ○ Not available

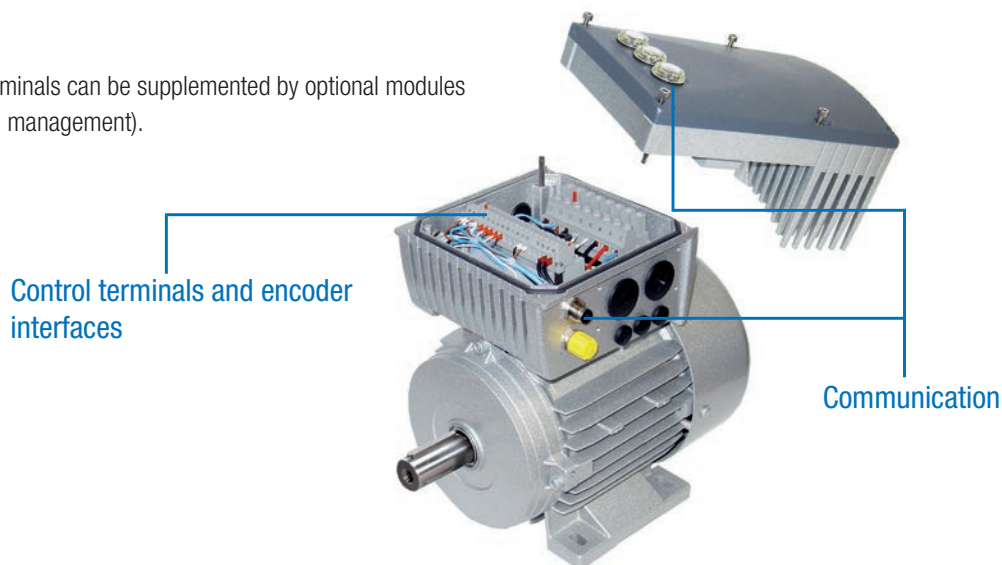
The Senses Control Connections on the VFD

	SK 200E	SK 210E	SK 220E	SK 230E	SK 200E	SK 210E	SK 220E	SK 230E	SK 205E	SK 215E	SK 225E	SK 235E	
	Size 1-3, 0.33 - 10 hp				Size 4, 15 - 30 hp				Size 1-3, 0.33 - 10 hp				
Control Terminals	Number of digital inputs (DIN)	4	3	4	3	4	3	4	3	4	3	4	3
	Fail-safe digital input	○	●	○	●	○	●	○	●	○	●	○	●
	Number of digital outputs (DOUT)	2	2	2	2	2	2	2	2	1	1	1	1
	Number of analog inputs (AIN) ¹	2	2	1	1	2	2	2	2	○	○	○	○
	Integrated brake rectifier	○	○	○	○	●	●	●	●	●	●	●	●
	Temperature sensor (PTC)	●	●	●	●	●	●	●	●	●	●	●	●
Encoder Interfaces	HTL	●	●	●	●	●	●	●	●	●	●	●	●
	CANopen ^{®2}	●	●	●	●	●	●	●	●	●	●	●	●
Communication	RS 485 / RS232	●	●	●	●	●	●	●	●	●	●	●	●
	AS-I	○	○	●	●	○	○	●	●	○	○	●	●

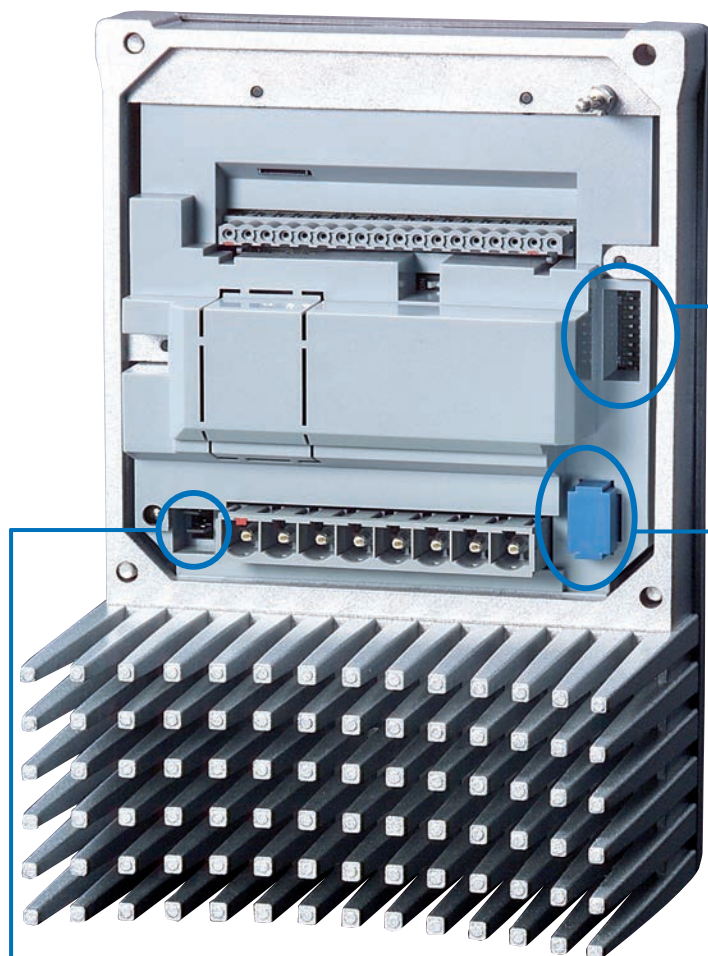
¹ 0(2) - 10 V, 0(4) - 20 mA
² via system bus

Note

Control terminals can be supplemented by optional modules (IOs, brake management).



Configuration and Monitoring Integrated Aids for Safe Operation



Jumpers for Mains Adaptation

It is possible to adapt the variable frequency drive for operation in an IT network by plugging in a jumper. However, this adaptation has a negative effect on the emission of electromagnetic interference and compliance with the specified degree of radio interference suppression can no longer be guaranteed in this case.

Commissioning with a Screwdriver

Various basic functions can be simply set via easily accessible DIP switches so that commissioning is possible without parameterization software. Even when an EEPROM is plugged in, the DIP switch settings have priority over the relevant parameters.



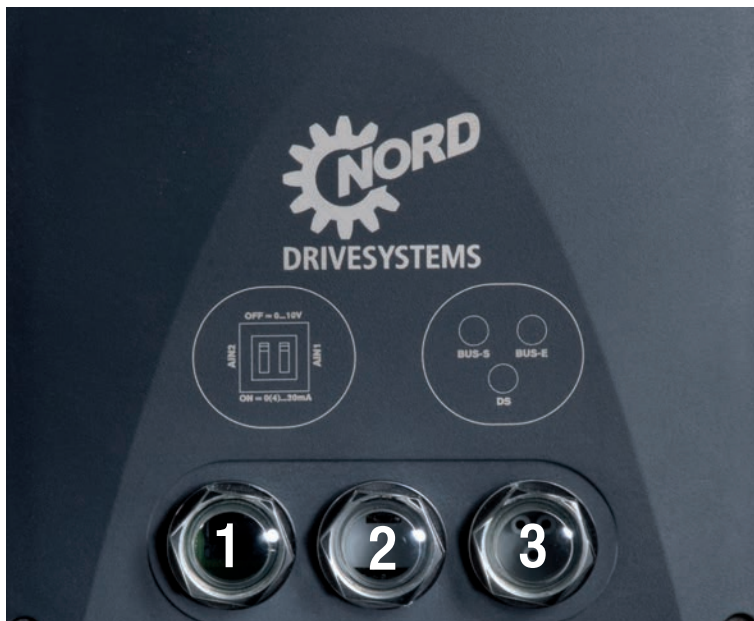
Plug-in EEPROM

The frequency drive is equipped with two EEPROMs for saving individual parameter sets of the device. The primary EEPROM is integrated into the device and the secondary EEPROM is pluggable, allowing for it to be removed/swapped.

All parameter settings are managed by the internal EEPROM and mirrored to the external EEPROM. The easy access enables data sets to be exchanged between identical drive units via the plug-in EEPROM. Optional parameterization adapter (SK EPG-3H) devices can be parameterized "in the laboratory" so that only the plug-in EEPROM needs to be transferred between the system and the "laboratory".

Status and Diagnostic Cockpit

Depending on the version, various aids for monitoring the device or diagnostics in case of faults, are located behind 3 transparent cover caps. Additional elements (e.g. DIP switches or similar) are useful for screwdriver-assisted commissioning.



Example: SK 2x0E

SK 2x0E in Sizes 1-3

(Size 4 as for SK 2x5E)

1 Diagnostic interface, RS-232 and RS-485

RJ12 interface for connection of a diagnostic and parameterization tool (e.g. PC with NORDCON *STUDIO*, ParameterBox). Analysis, diagnostics, parameterization, and monitoring of the drive unit via software is possible during commissioning or service.

2 DIP switches for analog inputs

The integrated analog inputs of the device can be configured to the signal form of set point values (current or voltage) via the DIP switches.

3 Status LED for frequency drive and system bus

In addition to status and readiness indicators, the current overload level, warnings, and error messages are indicated in coded form by the LEDs.

SK 2x5E and SK 2x0E in Size 4

1 Diagnostic interface, RS-232 and RS-485

RJ12 interface for connection of a diagnostic and parameterization tool (e.g. PC with NORDCON software, ParameterBox). Analysis, diagnostics, parameterization, and monitoring of the drive unit via software is possible during commissioning or service.

2 Status and diagnostic LEDs

In addition to the operating status of the system bus, various signal statuses (e.g. of the digital IOs) can be read here.

3 Potentiometer and status LEDs

The two potentiometers are used for the fixed setting of various dynamic factors (set point frequency, frequency band, acceleration time). The two diagnostic LEDs indicate the operating statuses and error messages of the device or the AS-Interface (if present).

NORDAC FLEX Variable Frequency Drive

1~ 110 ... 120 V and 1/3~ 200 ... 240 V

Output Frequency 0.0 ... 400.0 Hz

Pulse Frequency 3.0 ... 16.0 kHz

Typical Overload Capacity 150% for 60 s,
200% for 3.5 s

Energy Efficiency Class IE2

Efficiency > 95%

Ambient Temperature -25°C ... +50°C
(depending on type of operation)

Protection Class IP55, optionally IP66, NEMA1
(higher NEMA classifications on request)

Regulation and Control Sensorless current vector control (ISD),
linear V/f characteristic curve

Motor Temperature Monitoring I²t Motor
PTC / bi-metal switch

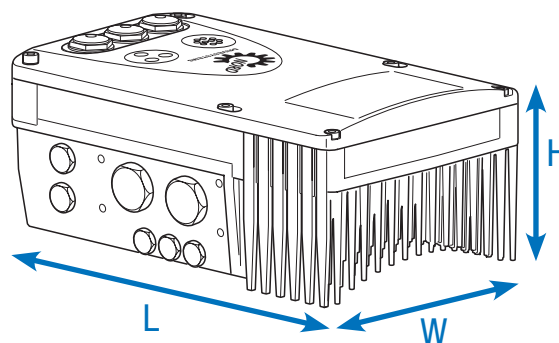
Leakage Current <40 mA for standard configuration of
integrated line filter
<20 mA for configuration for "operation
on IT network"

VFDs SK 2xxE ...	SK 2x0E	SK 2x5E	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
			230 V [kW]	240 V [hp]			
-250-112-0 (-C)	○	●	0.25	0.33	1.7	1~ 110 ... 120 V, +/- 10%, 47 ... 63 Hz	3~ 0 up to double the mains voltage
-370-112-0 (-C)	○	●	0.37	0.5	2.2		
-550-112-0 (-C)	○	●	0.55	0.75	3.0		
-750-112-0 (-C)	○	●	0.75	1.0	4.0		
VFDs SK 2xxE ...	SK 2x0E	SK 2x5E	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
			230 V [kW]	240 V [hp]			
-250-123-A (-C)	●	●	0.25	0.33	1.7	1~ 200 ... 240 V +/-10% 47 ... 63 Hz	3 AC 0 – 200 ... 240 V
-370-123-A (-C)	●	●	0.37	0.5	2.2		
-550-123-A (-C)	●	●	0.55	0.75	3.0		
-750-123-A (-C)	○	●	0.75	1.0	4.0		
-111-123-A (-C)	○	●	1.1	1.5	5.5		
VFDs SK 2xxE ...	SK 2x0E	SK 2x5E	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
			230 V [kW]	240 V [hp]			
-250-323-A (-C)	●	●	0.25	0.33	1.7	3~ 200 ... 240 V, +/- 10%, 47 ... 63 Hz	3~ 0 up to mains voltage
-370-323-A (-C)	●	●	0.37	0.5	2.2		
-550-323-A (-C)	●	●	0.55	0.75	3.0		
-750-323-A (-C)	●	●	0.75	1.0	4.0		
-111-323-A (-C)	●	●	1.1	1.5	5.5		
-151-323-A (-C)	●	●	1.5	2.0	7.0		
-221-323-A (-C)	●	●	2.2	3.0	9.5		
-301-323-A (-C)	●	●	3.0	4.0	12.5		
-401-323-A (-C)	●	●	4.0	5.0	16.0		
-551-323-A (-C)	●	○	5.5	7.5	23.0		
-751-323-A (-C)	●	○	7.5	10	29.0		
-112-323-A (-C)	●	○	11	15	40.0		

● Available as standard
○ Not available

IP66 Measures

- ▶ Coated aluminium components
- ▶ Coated circuit boards
- ▶ Low-pressure test
- ▶ Diaphragm valve



VFDs SK 2xxE ...	SK 2x0E	SK 2x5E	Weight		Overall Dimensions L x W x H	Size
			[kg]	[lbs]		
-250-112-0 (-C)	○	●	3.0	6.6	236 x 156 x 127 mm 9.29 x 6.22 x 5 in	1
-370-112-0 (-C)	○	●	3.0	6.6		1
-550-112-0 (-C)	○	●	4.1	9	266 x 176 x 134 mm	2
-750-112-0 (-C)	○	●	4.1	9	10.47 x 6.93 x 5.28 in	2

VFDs SK 2xxE ...	SK 2x0E	SK 2x5E	Weight		Overall Dimensions L x W x H	Size
			[kg]	[lbs]		
-250-123-A (-C)	●	●	3.0	6.6	236 x 156 x 127 mm 9.29 x 6.14 x 5 in	1
-370-123-A (-C)	●	●	3.0	6.6		1
-550-123-A (-C)	●	●	3.0	6.6		1
-750-123-A (-C)	○	●	4.1	9	266 x 176 x 134 mm	2
-111-123-A (-C)	○	●	4.1	9	10.47 x 6.92 x 5.27 in	2

VFDs SK 2xxE ...	SK 2x0E	SK 2x5E	Weight		Overall dimensions L x W x H	Size
			[kg]	[lbs]		
-250-323-A (-C)	●	●	3.0	6.6	236 x 156 x 127 mm 9.29 x 6.14 x 5 in	1
-370-323-A (-C)	●	●	3.0	6.6		1
-550-323-A (-C)	●	●	3.0	6.6		1
-750-323-A (-C)	●	●	3.0	6.6		1
-111-323-A (-C)	●	●	3.0	6.6		1
-151-323-A (-C)	●	●	4.1	9	266 x 176 x 134 mm	2
-221-323-A (-C)	●	●	4.1	9	10.47 x 6.92 x 5.27 in	2
-301-323-A (-C)	●	●	6.9	15.2	330 x 218 x 144 mm	3
-401-323-A (-C)	●	●	6.9	15.2	12.99 x 8.58 x 5.66 in	3
-551-323-A (-C)	●	○	17.0	37.5		4
-751-323-A (-C)	●	○	17.0	37.5	480 x 305 x 160 mm 18.89 x 12 x 6.29 in	4
-112-323-A (-C)	●	○	17.0	37.5		4

- Available as standard
- Not available

NORDAC *FLEX* Variable Frequency Drive

3~ 380 ... 500 V

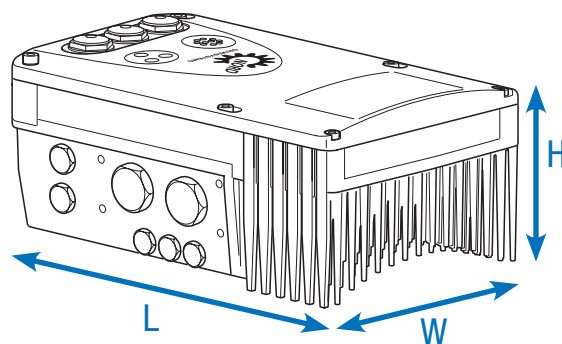
Output Frequency	0.0 ... 400.0 Hz	Protection Class	IP55, optionally IP66, NEMA type 1 (higher NEMA classifications on request)
Pulse Frequency	3.0 ... 16.0 kHz	Regulation and Control	Sensorless current vector control (ISD), linear V/f characteristic curve
Typical Overload Capacity	150% for 60 s, 200% for 3.5 s	Motor Temperature Monitoring	I ² t Motor PTC / bi-metal switch
Efficiency	> 95%	Leakage Current	<40 mA for standard configuration of integrated line filter <20 mA for configuration for "operation on IT network"
Ambient Temperature	-25°C ... +50°C (depending on type of operation)		

VFDs SK 2xxE ...	SK 2x0E	SK 2x5E	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
			400 V [kW]	480 V [hp]			
-550-340-A	●	●	0.55	0.75	1.7	3~ 380 ... 500 V, -20% / +10%, 47 ... 63 Hz	3~ 0 up to mains voltage
-750-340-A	●	●	0.75	1.0	2.3		
-111-340-A	●	●	1.1	1.5	3.1		
-151-340-A	●	●	1.5	2.0	4.0		
-221-340-A	●	●	2.2	3.0	5.5		
-301-340-A	●	●	3.0	4.0	7.5		
-401-340-A	●	●	4.0	5.0	9.5		
-551-340-A	●	●	5.5	7.5	12.5		
-751-340-A	●	●	7.5	10	16.0		
-112-340-A	●	○	11	15	23.0		
-152-340-A	●	○	15	20	32.0		
-182-340-A	●	○	18.5	25	40.0		
-222-340-A	●	○	22	30	46.0		

- Available as standard
- Not available

IP66 Measures

- ▶ Coated aluminium components
- ▶ Coated circuit boards
- ▶ Low-pressure test
- ▶ Diaphragm valve



VFDs SK 2xxE ...	SK 2x0E	SK 2x5E	Weight		Overall Dimensions L x W x H	Size
			[kg]	[lbs]		
-550-340-A	●	●	3.0	6.6	236 x 156 x 127 mm 9.29 x 6.14 x 5 in	1
-750-340-A	●	●	3.0	6.6		1
-111-340-A	●	●	3.0	6.6		1
-151-340-A	●	●	3.0	6.6		1
-221-340-A	●	●	3.0	6.6		1
-301-340-A	●	●	4.1	9	266 x 176 x 134 mm	2
-401-340-A	●	●	4.1	9	10.47 x 6.92 x 5.27 in	2
-551-340-A	●	●	6.9	15.2	330 x 218 x 144 mm 12.99 x 8.58 x 5.66 in	3
-751-340-A	●	●	6.9	15.2		3
-112-340-A	●	○	17.0	37.5	480 x 305 x 160 mm 18.89 x 12 x 6.29 in	4
-152-340-A	●	○	17.0	37.5		4
-182-340-A	●	○	17.0	37.5		4
-222-340-A	●	○	17.0	37.5		4

- Available as standard
- Not available

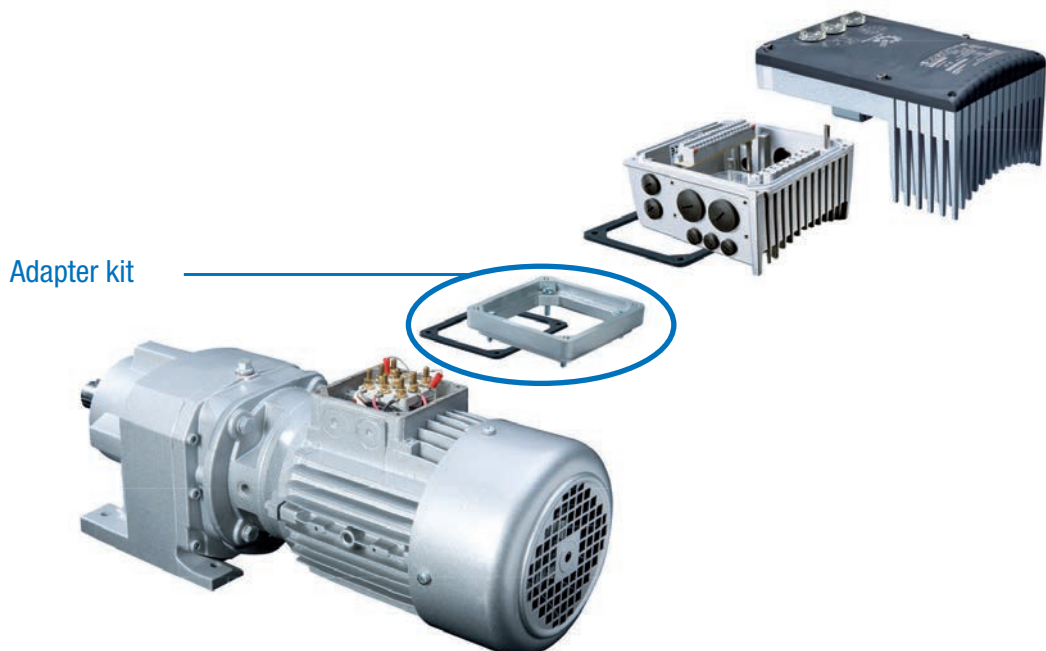
We Bring Together What Belongs Together

The NORDAC FLEX

Consists of 2 elements – the actual frequency drive and a suitable connection unit. The connection unit contains all device-specific connection terminals and a space for an optional SK CU4-... module (internal control terminal).



The NORDAC FLEX is typically directly mounted on a motor and can be combined with motors from various power and efficiency classes. Depending on the motor and the size and orientation of the VFD, the terminal box may require an additional mounting adapter.



Adjustments for Motor Mounting

Due to the differences in motors sizes, a terminal box adapter may be necessary. To ensure the device's maximum IPxx protection class for the entire unit, all elements of the drive unit (e.g. motor) must comply with the same protection class. NORDAC *FLEX* can also be combined with IE5+ motors as the VFD output matches the motor power.

Motor Size	Attachment SK 2xxE BG 1	Attachment SK 2xxE BG 2	Attachment SK 2xxE BG 3	Attachment SK 2xxE BG 4
63 – 71	With Adapter Kit I	With Adapter Kit I	Not possible	Not possible
80 – 112	Direct mounting	Direct mounting	With Adapter Kit II	Not possible
132	Not possible	Not possible	Direct mounting	With Adapter Kit III
160-180	Not possible	Not possible	Not possible	Direct mounting

Adapter kit Designation	Protection Class	Designation	Components	Material No.
Adapter Kit I	IP55	TI4-12-Adapterkit_63-71	Adapter plate, terminal box frame seal, and screws	275 119 050
Adapter Kit I	IP66	SK TI4-12-Adapterkit_63-71-C		275 274 324
Adapter Kit II	IP55	SK TI4-3-Adapterkit_80-112	Adapter plate, terminal box frame seal, and screws	275 274 321
Adapter Kit II	IP66	SK TI4-3-Adapterkit_80-112-C		275 274 325
Adapter Kit III	IP55	SK TI4-4-Adapterkit_132	Adapter plate, terminal box frame seal, and screws	275 274 320
Adapter Kit III	IP66	SK TI4-4-Adapterkit_132-C		275 274 326

Various Installation Possibilities

Motor Assembly

The VFD can be mounted directly on the terminal box of the (geared) motor, forming an optimized complete unit. This motor-mounted format provides numerous advantages: compact overall dimensions of the drive unit, quick readiness for use after connection to the mains supply due to pre-configuration of the drive unit at the factory, and optimum EMC due to short cable lengths or elimination of a motor cable.

Wall Mounting

As an alternative to motor mounting, the device can be mounted close to the motor with the aid of a wall mounting kit. Different versions are available depending on the application.

1. Standard Version

SK TIE4-WMK-1-K (-2-K or -3)

Note: If the VFD is wall mounted, the cooling air flow from the motor is not present. This can result in power restrictions (derating) for the frequency drive.

2. Version with Fan

SK TIE4-WMK-L-1 (or -L-2)

This version differs from the standard version and includes a fan - ensuring a continuous flow of cooling air over the VFD and avoiding derating due to wall mounting. As a standard, Size 4 variable frequency drives are equipped with fans and do not require a corresponding wall mounting kit.

3. ATEX Version

SK TIE4-WMK-1-EX (up to -2-EX)

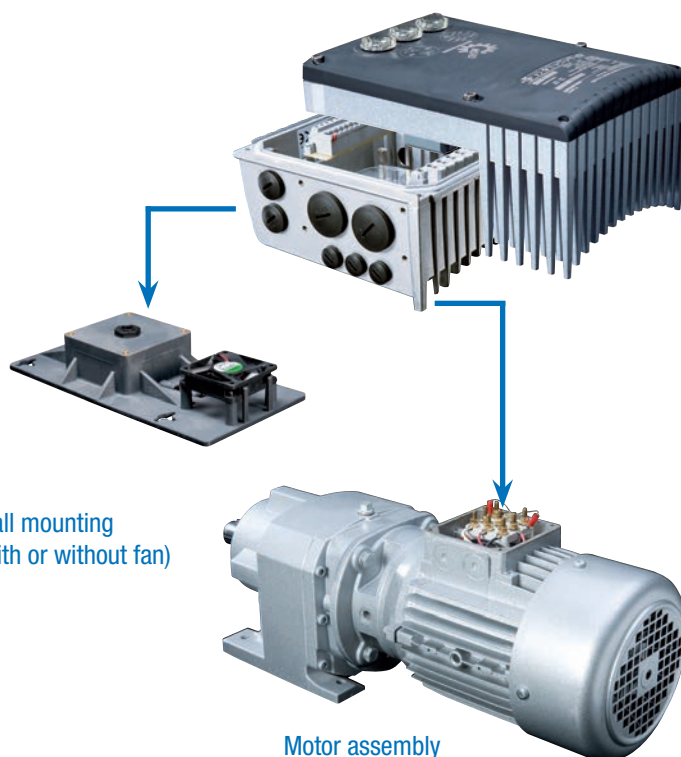
This version is functionally comparable to the standard version and suitable for use in explosion hazard environments (ATEX Zone 22 3D).

Designation	Material No.	VFDs ¹ for size FI
SK TIE4-WMK-1-K	275 274 004	1, 2
SK TIE4-WMK-2-K	275 274 015	3
SK TIE4-WMK-L-1	275 274 005	1, 2
SK TIE4-WMK-L-1-C	275 274 016	1, 2
SK TIE4-WMK-L-2	275 274 006	3
SK TIE4-WMK-1-EX	275 175 053	1, 2
SK TIE4-WMK-2-EX	275 175 054	3
SK TIE4-WMK-3	275 274 003	4
SK TIE4-WMK-TU ²	275 274 002	Type: SK TU4-

¹ Mounting of the WMK on the connection unit of the variable frequency drive

² Mounting of the WMK on the connection unit of the technology unit

Motor-Mounted or Wall-mounted Variable Frequency Drives

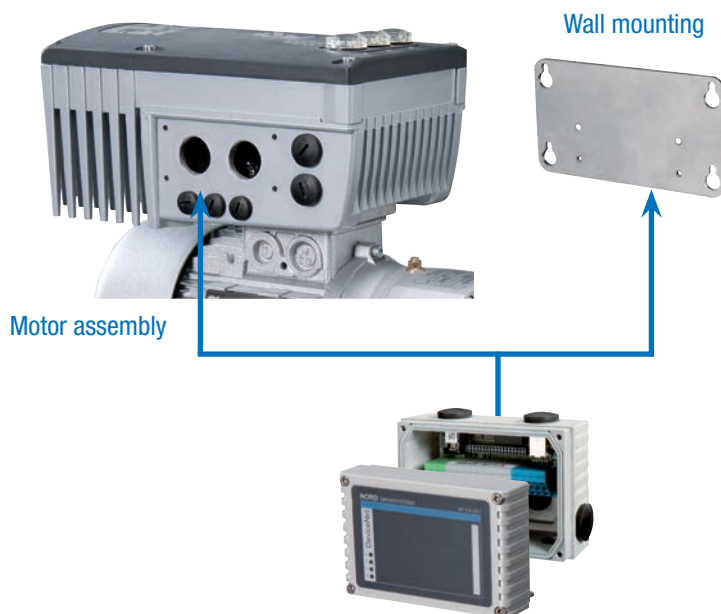
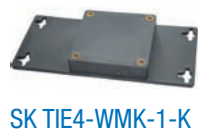
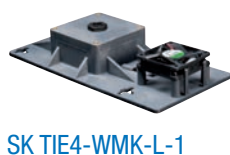
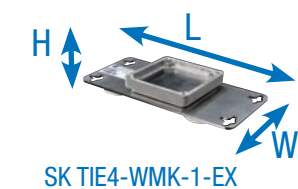


Designation	Material	Integrated Fan	Achievable Protection Class	Weight	Overall Dimensions L x W x H	Remarks
SK TIE4-WMK-1-K	Plastic	○	IP66	0.2 kg 0.44 lbs	205 x 95 x 5 mm 8.07 x 3.74 x 0.19 in	Note: derating as necessary
SK TIE4-WMK-2-K	Plastic	○	IP66	0.3 kg 0.66 lbs	235 x 105 x 5 mm 9.25 x 4.13 x 0.19 in	Note: derating as necessary
SK TIE4-WMK-L-1	Plastic	●	IP55	0.4 kg 0.88 lbs	255 x 130 x 24 mm 10.03 x 5.11 x 0.94 in	Fan power: 24 V DC, 1.3 W
SK TIE4-WMK-L-1-C	Plastic	●	IP66	0.4 kg 0.88 lbs	255 x 130 x 24 mm 10.03 x 5.11 x 0.94 in	Fan power: 24 V DC, 1.3 W
SK TIE4-WMK-L-2	Plastic	●	IP55	0.5 kg 1.1 lbs	300 x 150 x 30 mm 11.8 x 5.9 x 1.18 in	Note: derating as necessary
SK TIE4-WMK-1-EX	Stainless steel	○	IP66	0.6 kg 1.32 lbs	205 x 95 x 4 mm 8.07 x 3.74 x 0.15 in	Note: derating as necessary
SK TIE4-WMK-2-EX	Stainless steel	○	IP66	0.8 kg 1.76 lbs	235 x 105 x 10 mm 9.25 x 4.13 x 0.39 in	Note: derating as necessary
SK TIE4-WMK-3	Stainless steel	○	IP66	2.4 kg 5.29 lbs	295 x 255 x 8 mm 11.6 x 10 x 0.31 in	
SK TIE4-WMK-TU	Stainless steel	○	IP66	0.4 kg 0.88 lbs	155 x 85 x 3 mm 6.10 x 3.35 x 0.12 in	

¹ H = increase in the total height of the device if mounted on the wall mounting kit

● Available as standard
○ Not available

Technology Unit on NORDAC FLEX or Wall Mounting

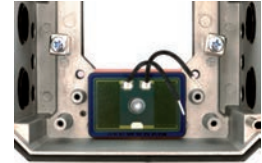


Brake Resistors Internal Version

Internal Braking Resistors SK BRI4

Internal braking resistors are intended for applications in which slight or only sporadic, brief braking is to be expected (e.g. continuous conveyor equipment, mixing equipment). They also enable the use of the variable frequency drive in very confined spaces or in an explosive atmosphere.

Internal brake resistors are intended for installation in the connection unit of the VFD. The devices provide space for the integration of one brake resistor or a set of 2 brake resistors (SK 2x0E, size 4). For thermal reasons, the rated continuous output is limited to 25%. A respective overload protection can be configured via DIP switch.



VFDs SK 2xxE ...	Resistor Type	Material No.	Resistance [Ω]	Continuous Output [W]	Power Consumption ² [kW]	
1 ~ 115 V 0.25 ... 0.75 kW 0.33 ... 1.0 hp	SK BRI4-1-100-100	275 272 005	100	100 / 25 %	1.0	
1 ~ 230 V 0.25 ... 1.1 kW 0.33 ... 1.5 hp	SK BRI4-1-100-100	275 272 005	100	100 / 25 %	1.0	
3 ~ 230 V	0.25 ... 2.2 kW 0.33 ... 3.0 hp	SK BRI4-1-200-100	275 272 008	200	100 / 25 %	1.0
	3.0 ... 4.0 kW 4.0 ... 5.5 hp	SK BRI4-2-100-200	275 272 105	100	200 / 25 %	2.0
	5.5 ... 7.5 kW 7.0 ... 10 hp	SK BRI4-3-047-300	275 272 201	47	300 / 25 %	3.0
3 ~ 400 V	11 kW 15 hp	SK BRI4-3-023-600	275 272 800	23	600 / 25 %	6.0
	0.55 ... 4.0 kW 0.75 ... 5.5 hp	SK BRI4-1-400-100	275 272 012	400	100 / 25 %	1.0
	5.5 ... 7.5 kW 7.5 ... 10 hp	SK BRI4-2-200-200	275 272 108	200	200 / 25 %	2.0
	11 ... 15 kW 15 ... 20 hp	SK BRI4-3-100-300	275 272 205	100	300 / 25 %	3.0
8.5 ... 22 kW 25 ... 30 hp	SK BRI4-3-050-600	275 272 801	50	600 / 25 %	6.0	

¹ Reduction of the continuous output of the braking resistor to 25% of the rated output

² Permissible max. once within 10 s

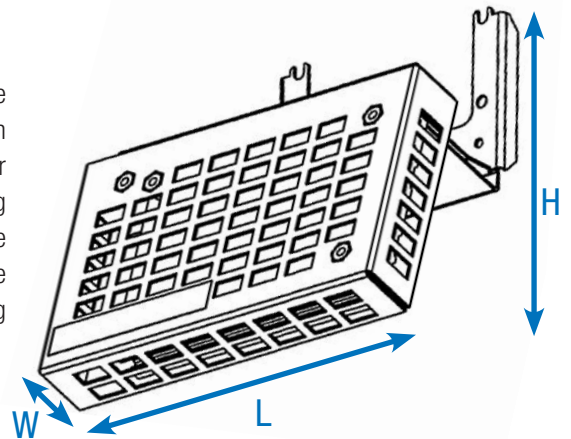
Braking Resistors External Version

External Braking Resistors SK BRE4

External braking resistors (IP67) are intended for applications in which longer, frequent or intensive braking is to be expected (cyclic operation/high dynamic positioning applications). They are mounted directly on the VFD and can develop high surface temperatures (>70°C), which exclude their use in an explosive atmosphere.

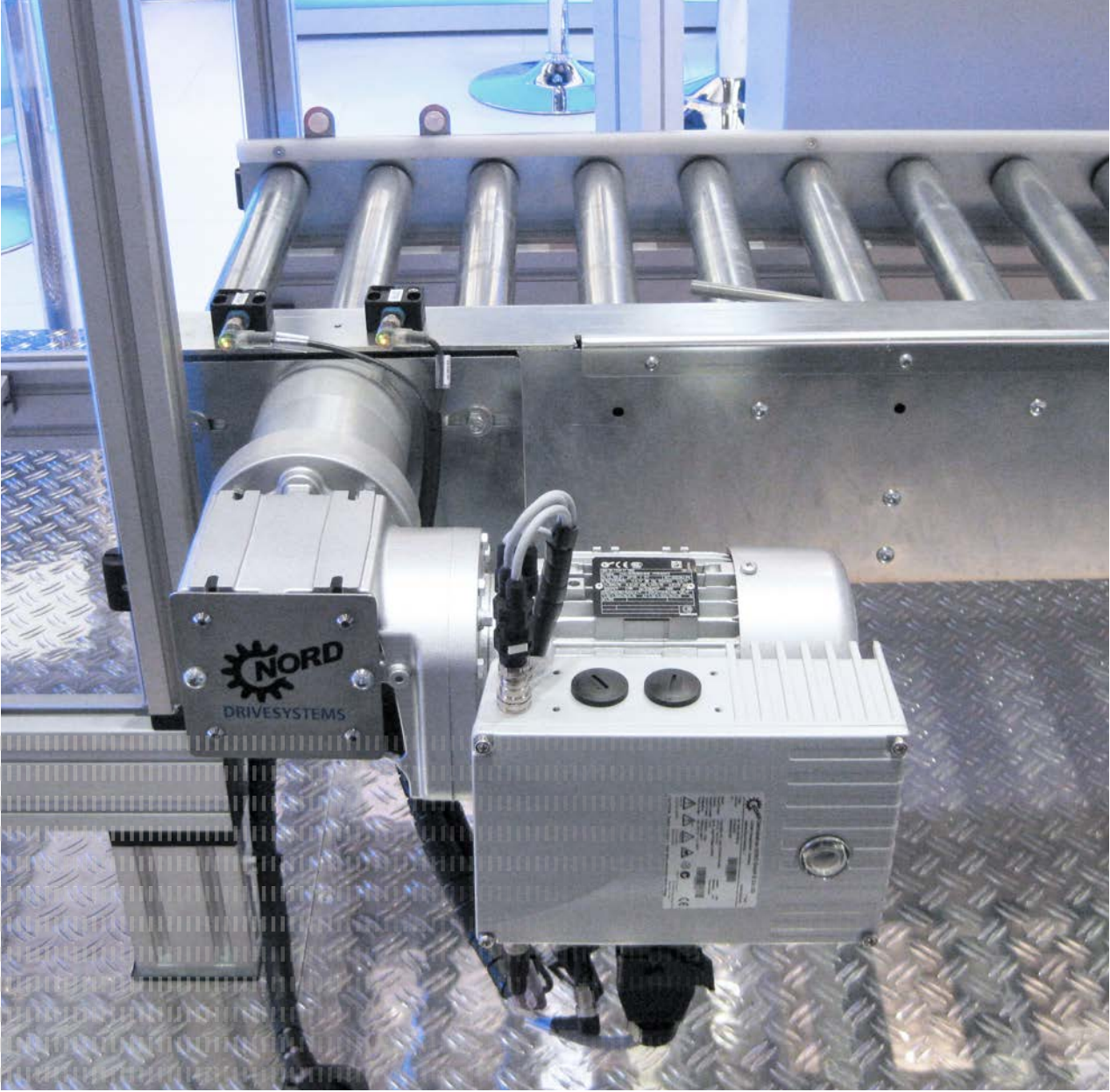
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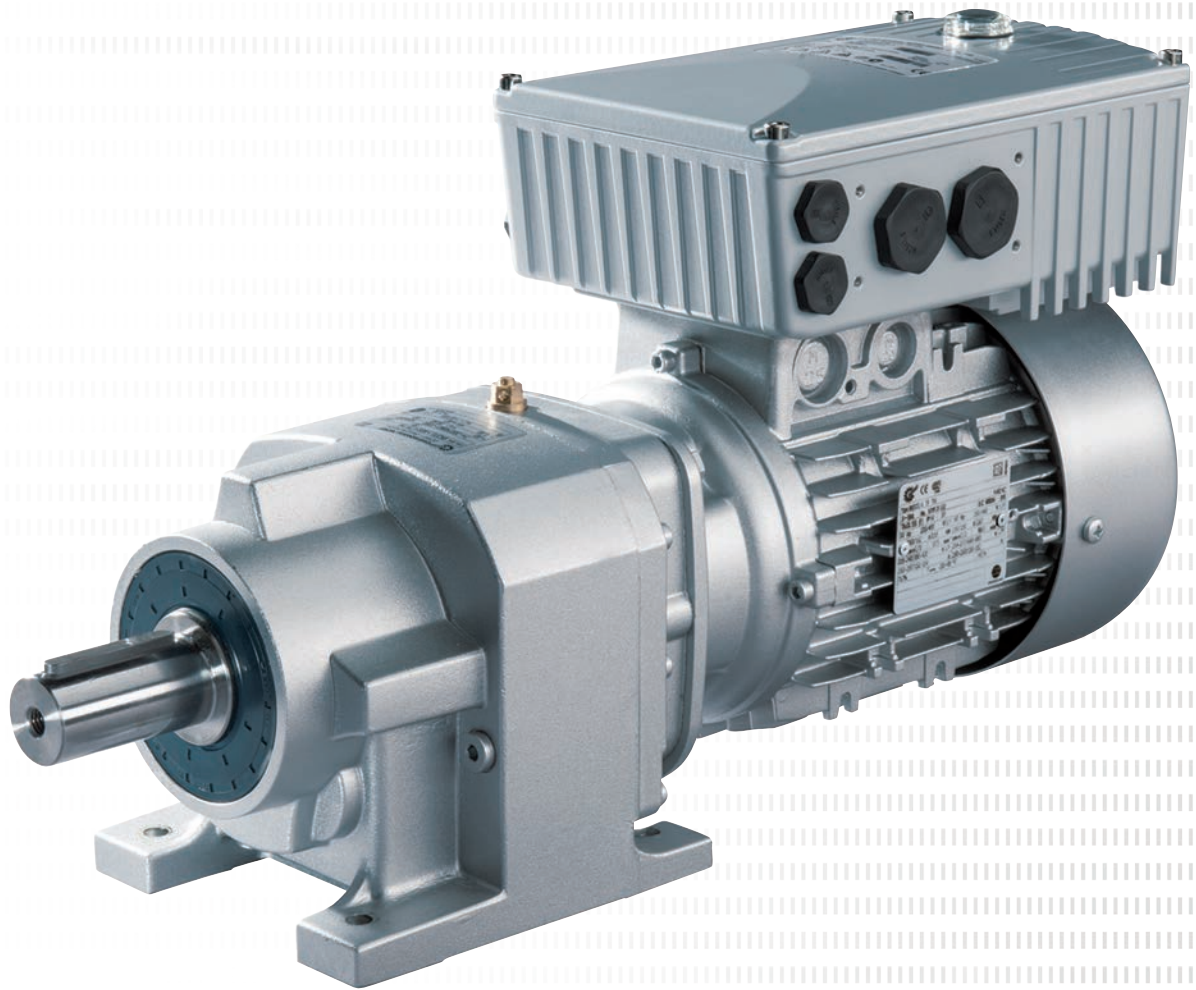
The braking resistors listed here are designed for typical applications with occasional braking. In case of doubt or for applications with higher braking power such as lifting equipment, we recommend specific planning of the necessary brake resistor and contacting NORD DRIVESYSTEMS directly.



VFDs SK 2xxE ...	Resistor Type Material No.	Resistance [Ω]	Continuous Output [W]	Power Consumption ² [kW]	Overall Dimensions L x W x H
1 ~ 115 V 0.25 ... 0.75 kW 0.33 ... 1.0 hp	SK BRE4-1-100-100 275 273 005	100	100	2.2	150 x 61 x 178 mm 5.90 x 2.40 x 7 in
	Alternatively: SK BRE4-2-100-200 275 273 105	100	200	4.4	255 x 61 x 178 mm 10.03 x 2.40 x 7 in
1 ~ 230 V 0.25 ... 1.1 kW 0.33 ... 1.5 hp	SK BRE4-1-100-100 275 273 005	100	100	2.2	150 x 61 x 178 mm 5.90 x 2.40 x 7 in
	Alternatively: SK BRE4-2-100-200 275 273 105	100	200	4.4	255 x 61 x 178 mm 10.03 x 2.40 x 7 in
3 ~ 230 V 0.25 ... 2.2 kW 0.33 ... 3.0 hp 3.0 ... 4.0 kW 4.0 ... 5.5 hp 5.5 ... 11 kW 7.5 ... 15 hp	SK BRE4-1-200-100 275 273 008	200	100	2.2	150 x 61 x 178 mm 5.90 x 2.40 x 7 in
	Alternatively: SK BRE4-2-200-200 275 273 108	200	200	4.4	255 x 61 x 178 mm 10.03 x 2.40 x 7 in
	SK BRE4-2-100-200 275 273 105	100	200	4.4	255 x 61 x 178 mm 10.03 x 2.40 x 7 in
	SK BRE4-3-050-450 275 273 201	50	450	3.0	355 x 245 x 318 mm 13.97 x 9.6 x 12.5 in
3 ~ 400 V 0.55 ... 4.0 kW 0.75 ... 5.5 hp 5.5 ... 7.5 kW 7.5 ... 10 hp 11 ... 22 kW 15 ... 30 hp	SK BRE4-1-400-100 275 273 012	400	100	2.2	150 x 61 x 178 mm 5.90 x 2.40 x 7 in
	Alternatively: SK BRE4-2-200-200 275 273 108	200	200	4.4	255 x 61 x 178 mm 10.03 x 2.40 x 7 in
	SK BRE4-2-200-200 275 273 108	200	200	4.4	255 x 61 x 178 mm 10.03 x 2.40 x 7 in
	SK BRE4-3-100-450 275 273 205	100	450	3.0	355 x 245 x 318 mm 13.97 x 9.6 x 12.5 in

¹ Permissible max. once within 120 s





Variable Frequency Drive for Decentralized Applications

NORDAC *BASE* SK 180E Series



For Standard Requirements NORDAC *BASE*, SK 180E Series



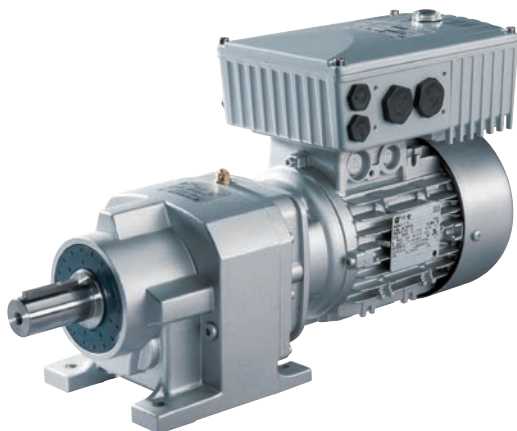
[NORDAC *BASE*](#)

NORDAC *BASE*

The advantages of using a variable frequency drive to control an electric motor are numerous. Modern VFDs offer typical basic functions such as speed control, communication with control units, precise positioning, and safety functions. However, many applications do not fully utilize the immense scope of functions of modern frequency drives.

To fill the gap which has resulted between simple motor starters and full featured VFDs, NORD has developed a compact model. The NORDAC *BASE* focuses on the essential functions for pumps and conveyor technology (PI / speed control, energy savings, communication with peripherals) and results in significant savings.

- ▶ All common drive functions
- ▶ Leakage current <16 mA
- ▶ Consistent parameter structure
- ▶ Stand-alone operation (integrated 24 V power supply)
- ▶ 3 digital inputs and 2 digital outputs
- ▶ 2 analog inputs (can optionally be used for current or voltage set points, or configured as digital inputs e.g. for sensors)
- ▶ 4 parameter sets which can be switched online
- ▶ Process controller / PI controller
- ▶ Energy saving function: Automatic flux optimization



Optional

- ▶ AS-Interface on board
- ▶ Common bus modules
- ▶ I/O modules
- ▶ System plug connectors (e.g. Harting HAN 10E)
- ▶ Variant for ATEX Zone 22 - 3D
- ▶ Various control options (switches, potentiometer or ParameterBoxes)

Energy-Saving Functions

- ▶ Automatic flux optimization for pump/fan applications
- ▶ Large energy savings
- ▶ Simple setting via parameters

EMC Line Filter

Category C1 (Class B)

- ▶ All 230 V / 400 V devices have an integrated line filter
- ▶ Ideal for applications in a domestic environment, due to compliance with Category C1 (for motor-mounting), or Category C2 (for wall mounting with motor cable up to 5 m long)
- ▶ Suitable for personal protection due to low leakage current (< 16 mA) for operation with universal fault current FI circuit breakers

Process Controller, PI Controller

- ▶ All NORDAC *BASE* devices feature integrated analog inputs
- ▶ P and I components can be set separately
- ▶ High precision regulation

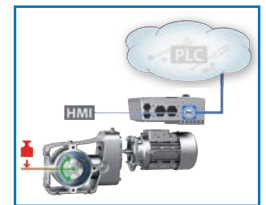
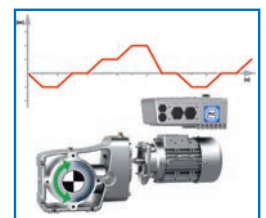
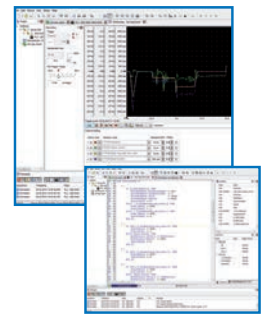
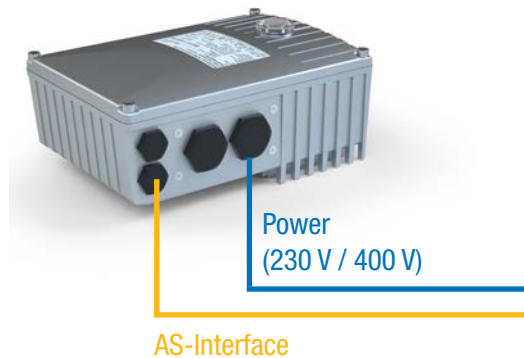
Versatile and Sustainable For Modern Automation Systems

Modern automation systems have a wide range of requirements and a suitable bus system and drive components must be selected in order to ensure efficient operation.

The **AS-Interface** is a cost-effective solution which enables the networking of binary sensors and actuators. It is included in certain versions of the **NORDAC BASE**.

The supply voltage (power) is connected separately via the corresponding terminals. An integrated mains unit generates the control voltage for the frequency drive, eliminating the need for an additional AUX cable (black).





Available in SK 190E




Device SK ...	190E
Follower profile	S-7.A.
Follower type	A/B-Follower
Control voltage	Internal power supply
Inputs/Outputs	4/4
Configuration via parameters	●

Standards and Approvals

All devices of the entire series comply with the standards and directives listed below.

Approval	Directive	Applied Standards	Certificates	Code
CE (European Union)	Low Voltage Directive 2014/35/EU	EN 61800-5-1	C310400	
	EMC 2014/30/EU	EN 60529	C310401	
	RoHS 2011/65/EU	EN 61800-3 EN 63000		
	Delegated directive (EU) 2015/863	EN 61800-9-1 EN 61800-9-2		
	Ecodesign 2009/125/EG			
	Regulation (EU) 2019/1781 Ecodesign			
UL (USA)		UL 61800-5-1	E171342	
CSA (Canada)		C22.2 No. 274-13	E171342	
EAC (Eurasia)	F2018L00028	EN 61800-3	133520966	
EAC (Eurasia)	TR CU 004/2011, TR CU 020/2011	IEC 61800-5-1 IEC 61800-3	EAЭC N RU Д-DE. HB27.B.02730/20	

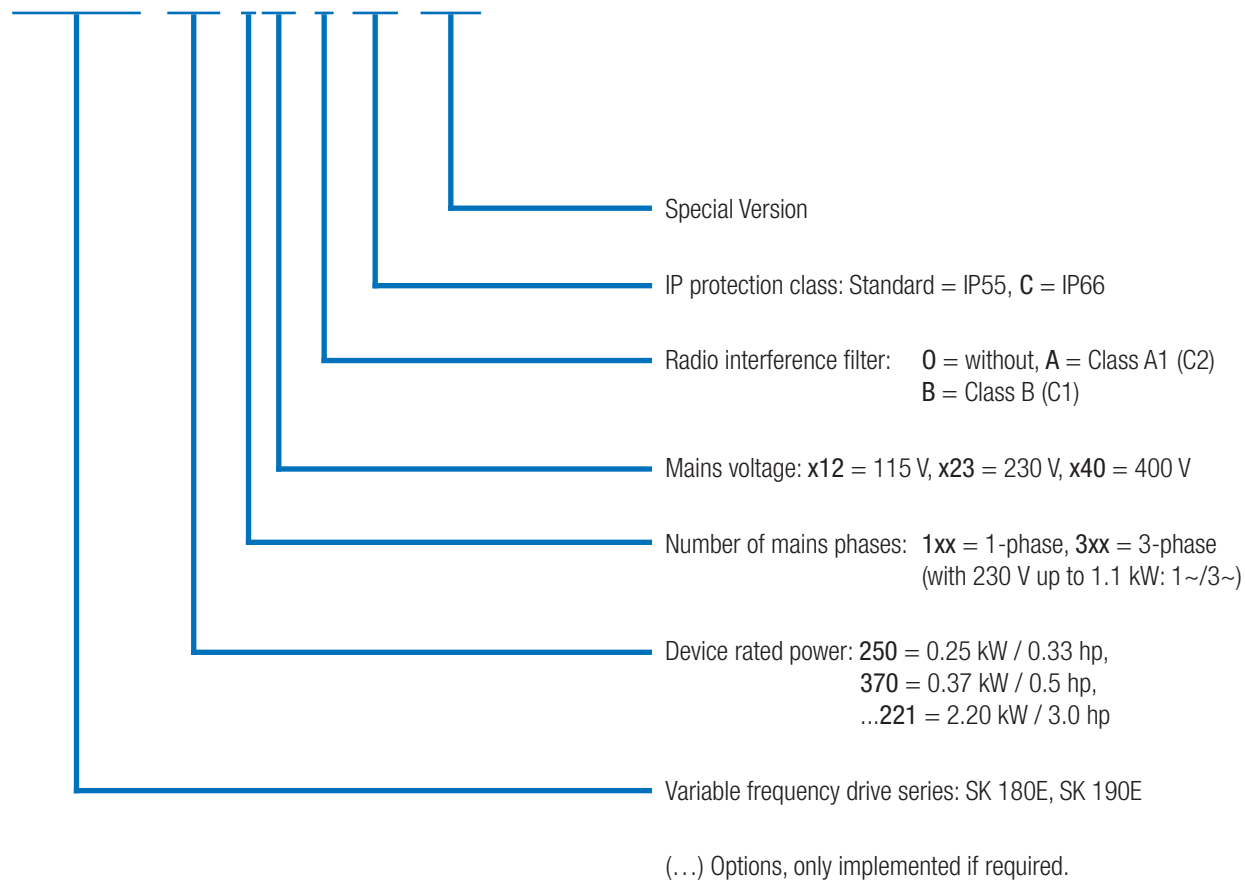
Devices which are configured and approved for use in explosion hazard environments comply with the following directives and standards.

Approval	Directive	Applied Standards	Certificates	Code
CE (European Union)	Low Voltage Directive 2014/35/EU	EN 60079-0	C432410	
	EMV 2014/30/EU	EN 60079-31		
	RoHS 2011/65/EU	EN 61800-5-1 EN 60529		
	Delegated directive (EU) 2015/863	EN 61800-3 EN 63000		
	Ecodesign 2009/125/EG	EN 61800-9-1 EN 61800-9-2		
	Regulation (EU) 2019/1781 Ecodesign			

Type Code

Variable Frequency Drive

SK 180E-370-323-B (-C) (xxx)



Explosive Environment Protection



ATEX-Compliant Drive Systems, Zone 22 3D

The NORDAC *BASE* can be modified for operation in explosive environments. This allows the operation of the frequency drive directly in a hazardous area (ATEX 22-3D). The advantages include:

- ▶ Compact drive unit
- ▶ No complex protective devices
- ▶ No motor cables
- ▶ Optimum EMC
- ▶ Permissible characteristic curves 50 Hz / 87 Hz
- ▶ Control range up to 100 Hz or 3000 rpm

Depending on the area of application (conductive or non-conductive dust) the modification also includes the replacement of the transparent diagnostic caps with a version made of aluminium and glass.

Please note that operation of the device within the hazardous area is only permitted with integrable modules (SK CU4 modules, internal braking resistors) or specially approved accessories (ATEX potentiometer SK ATX-POT).

There are exceptions for SK TU4 modules, which are described in detail in the manual for the device. Other accessories (e.g. external brake resistors, plug connectors) are not approved for use within a hazardous area.

Approval

- ▶ According to 2014/34/EU
- ▶ ATEX Zone 22 - 3D
 - ▶ Version for non-conducting dust: IP55
 - ▶ Version for conducting dust: IP66

Available in all versions



Class I - Gas Groups A, B, C, and D

- ▶ Gases, vapors, or aerosols
- ▶ NEC 500
- ▶ Division 1 - Areas in which hazardous concentrations of flammable gases or vapors
 - ▶ Can be present under normal operating conditions
 - ▶ Can frequently occur during repair and maintenance work
 - ▶ Can occur throughout malfunctions concerning operation during which errors occurring in electrical equipment may result in a source of ignition
- ▶ Division 2
 - ▶ Areas in which hazardous concentration of flammable gases or vapors are kept in closed containers or systems and can only be released under fault conditions

Class II - Dust Groups E, F and G

- ▶ Dusts
- ▶ NEC 500
- ▶ Division 1 - Areas in which hazardous concentration of explosive dust atmospheres
 - ▶ Can be present under normal operating conditions
 - ▶ Can occur throughout malfunctions concerning operation during which errors occurring in electrical equipment may result in a source of ignition
 - ▶ Areas with hazardous quantities of conductive dust (Group E)
- ▶ Division 2
 - ▶ Areas in which hazardous concentrations of explosive dust atmospheres can only be released under fault conditions

Class III

- ▶ Ignitable fibers and flyings
- ▶ NEC 500
- ▶ Division 1
 - ▶ Areas in which flammable fibers and lint occur or are processed
- ▶ Division 2
 - ▶ Areas in which flammable fibers are stored or handled in a different manner to that in the production process

The Entire Team

All Device Versions at a Glance

	SK 180E Size 1+2 0.33 - 3.0 hp	SK 190E Size 1+2 0.33 - 3.0 hp
Motor and wall mounting possible ¹	●	●
Energy bus - loop-through of mains supply cables ²	●	●
Communication bus for various devices ²	●	●
Sensorless current vector control (ISD control)	●	●
Brake chopper (braking resistor optional) (Size 2 and above)	●	●
RS-232, RS-485 diagnostic interface	●	●
4 switchable parameter sets	●	●
Parameters pre-set with standard values	●	●
Automatic determination of motor data	●	●
Energy-saving function, optimized efficiency in partial load operation	●	●
Integrated EMC line filter according to EN 61800-3, Category C2 up to 5 m motor cable Category C1 for motor assembly	●	●
Extensive monitoring functions	●	●
Load monitor	●	●
PI controller	●	●
Process controller / compensator control	●	●
PLC functionality	●	●
Synchronous motor operation (PMSM)	●	●
Modification for operation in an IT network by means of jumpers	●	●
All common field bus systems	●	●
Brake management for mechanical holding brake	●	●
Lifting gear functionality	●	●
AS-Interface on board	○	●
Internal 24 V power supply unit to supply the control board	●	●
Internal / external brake resistors (Size 2)	●	●
Switch and potentiometer versions	●	●
Plug connectors for connection of control, motor and mains cables	●	●

¹ Wall mounting: wall mounting kit required

Motor mounting: an adapter for connection to the motor terminal box may be necessary

² Direct connection to the terminal bar or via system plug connectors

● Available as standard

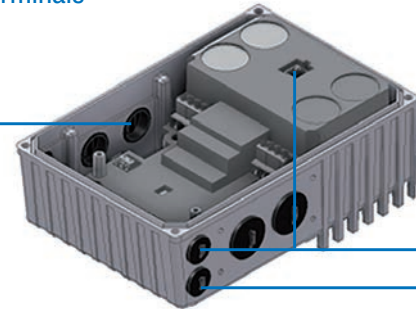
● Optional

○ Not available

Control Connections on the Variable Frequency Drive

	SK 180E	SK 190E
	Size 1 + 2 0.33 - 3.0 hp	
Control Terminals	Number of digital inputs (DIN)	3
	Number of digital outputs (DOUT)	2
	Number of analog inputs (AIN) ¹	2
	Temperature sensor (PTC)	●
Communication	RS-485 / RS-232	●
	RJ12	●
	AS-I terminal connection	○

Connection and control terminals



Communication

¹ 0(2) - 10 V, 0(4) - 20 mA

Note

Control terminals can be supplemented by optional modules (IOs, brake management).

Status and Diagnostic Cockpit

The RJ12 interface for connection of a diagnostic and parameterization tool (e.g. PC with NORD CON software, ParameterBox) is located behind the transparent cover cap. Analysis, diagnostics, parameterization, and monitoring of the drive unit via software is possible during commissioning or service.

In addition to status and readiness indicators, the current overload level, warnings and error messages are indicated in coded form by the LEDs.



NORDAC *BASE* Variable Frequency Drive

1 ~ 110 ... 120 V , 1 / 3 ~ 200 ... 240 V and 3 ~ 380 ... 400 V

Output Frequency	0.0 ... 400.0 Hz	Protection Class	IP55, optional IP66, NEMA1 (higher NEMA classifications on request)
Pulse Frequency	3.0 ... 16.0 kHz	Regulation and Control	Sensorless current vector control (ISD), linear V/f characteristic curve
Typical Overload Capacity	150% for 60 s, 200% for 3.5 s	Motor Temperature Monitoring	I ² t Motor PTC / bi-metal switch
Energy Efficiency Class	IE2	Leakage Current	< 16 mA
Efficiency	> 95%		
Ambient Temperature	-25°C ... +40°C (S1) -25°C ... +50°C (S3, - 70% ED)		

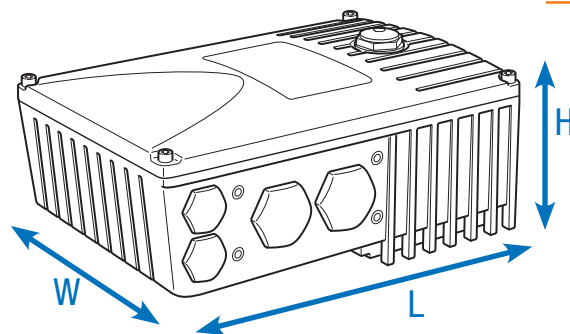
VFDs SK 180E...	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
	230 V [kW]	240 V [hp]			
-250-112-0 (-C)	0.25	0.33	1.7	1 ~ 110...120 V -/+10% 47 ... 63 Hz	3 ~ AC 0 V up to double the mains voltage
-370-112-0 (-C)	0.37	0.5	2.1		
-550-112-0 (-C)	0.55	0.75	3.0		
-750-112-0 (-C)	0.75	1.0	3.7		

VFDs SK 180E...	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
	230 V [kW]	240 V [hp]			
-250-323-B (-C)	0.25	0.33	1.7	1/3 ~ 200 ... 240 V, -/+ 10% 47 ... 63 Hz	3 ~ AC 0 V up to mains voltage
-370-323-B (-C)	0.37	0.5	2.2		
-550-323-B (-C)	0.55	0.75	3.0		
-750-323-B (-C)	0.75	1.0	4.0		
-111-323-B (-C)	1.1	1.5	5.5		
-151-323-B (-C)	1.5	2.0	7.0	3 ~ 200 ... 240 V, -/+ 10% 47 ... 63 Hz	3 ~ AC 0 V up to mains voltage

VFDs SK 180E...	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage	Output Voltage
	400 V [kW]	480 V [hp]			
-250-340-B (-C)	0.25	0.33	1.2	3 ~ 380...480 V, -20% / +10%, 47 ... 63 Hz	3 ~ AC 0 V up to mains voltage
-370-340-B (-C)	0.37	0.5	1.5		
-550-340-B (-C)	0.55	0.75	1.7		
-750-340-B (-C)	0.75	1.0	2.3		
-111-340-B (-C)	1.1	1.5	3.1		
-151-340-B (-C)	1.5	2.0	4.0		
-221-340-B (-C)	2.2	3.0	5.5		

IP66 Measures

- ▶ Coated aluminium components
- ▶ Coated circuit boards
- ▶ Low-pressure test
- ▶ Diaphragm valve



VFDs SK180E ...	Weight		Overall Dimensions L x W x H	Size
	[kg]	[lbs]		
-250-112-0 (-C)	2.9	6.4	221 x 154 x 101 mm 8.7 x 6.06 x 3.98 in	1
-370-112-0 (-C)	2.9	6.4		1
-550-112-0 (-C)	2.9	6.4		1
-750-112-0 (-C)	2.9	6.4		1

VFDs SK180E ...	Weight		Overall Dimensions L x W x H	Size
	[kg]	[lbs]		
-250-323-B (-C)	2.9	6.4	221 x 154 x 101 mm 8.7 x 6.06 x 3.98 in	1
-370-323-B (-C)	2.9	6.4		1
-550-323-B (-C)	2.9	6.4		1
-750-323-B (-C)	4.1	9.04	254 x 165 x 123 mm 10 x 6.5 x 4.84 in	2
-111-323-B (-C)	4.1	9.04		2
-151-323-B (-C)	4.1	9.04		2

VFDs SK180E ...	Weight		Overall Dimensions L x W x H	Size
	[kg]	[lbs]		
-250-340-B (-C)	2.9	6.4	221 x 154 x 101mm 8.7 x 6.06 x 3.98 in	1
-370-340-B (-C)	2.9	6.4		1
-550-340-B (-C)	2.9	6.4		1
-750-340-B (-C)	2.9	6.4		1
-111-340-B (-C)	2.9	6.4		1
-151-340-B (-C)	4.1	9.04		254 x 165 x 123 mm 10 x 6.5 x 4.84 in
-221-340-B (-C)	4.1	9.04	2	

Varied Installation Possibilities

Motor Assembly

The VFD can be mounted directly on the terminal box of the (geared) motor, forming an optimized complete unit. This motor-mounted format provides numerous advantages: compact overall dimensions of the drive unit, quick readiness for use after connection to the mains supply due to pre-configuration of the drive unit at the factory, and optimum EMC due to short cable lengths or elimination of a motor cable.

Wall Mounting

As an alternative to motor mounting, the device can be mounted close to the motor with the aid of a wall mounting kit. Different versions are available depending on the application.

1. Standard Version SK TIE4-WMK-1-K

Note: If the VFD is wall mounted, the cooling air flow from the motor is not present. This can result in power restrictions (derating) for the frequency drive.

2. ATEX Version SK TIE4-WMK-1-EX

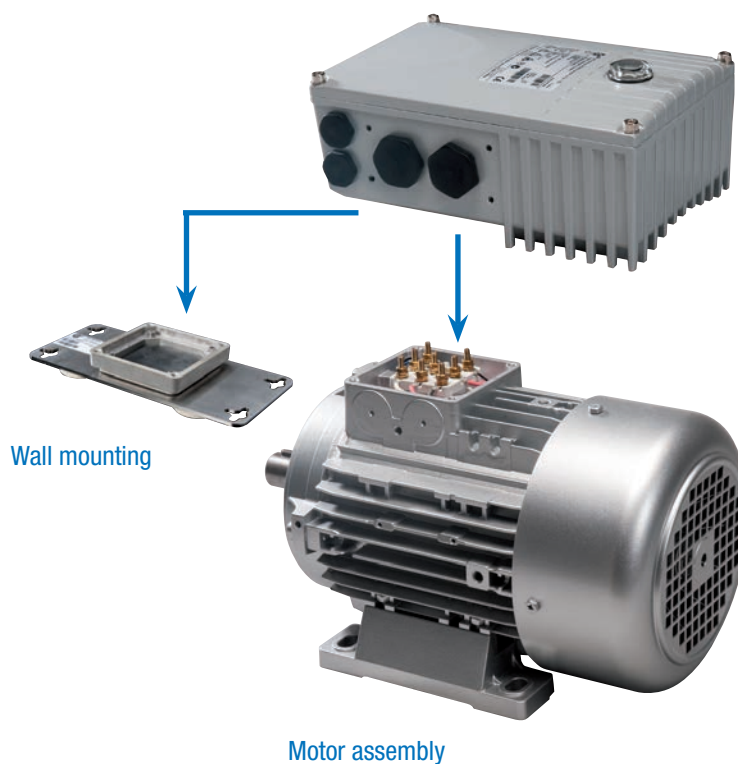
This version is functionally comparable to the standard version and suitable for use in explosion hazard environments (ATEX Zone 22 3D).

Designation	Material No.	VFDs ¹ for size FI
SK TIE4-WMK-1-K	275 274 004	Size 1, 2
SK TIE4-WMK-1-EX	275 175 053	Size 1, 2
SK TIE4-WMK-TU ²	275 274 002	Type: SK TU4-

¹ Mounting of the WMK underneath the motor starter

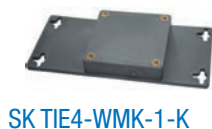
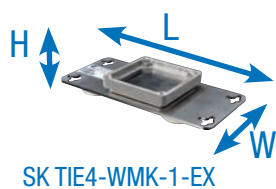
² Mounting of the WMK on the connection unit of the technology unit

Motor-Mounted or Wall-Mounted VFDs



Designation	Material	Integrated fan	Achievable protection class	Weight	Overall dimensions L x W x H	Remarks
SK TIE4-WMK-1-K	Plastic	○	IP66	0.2 kg 0.44 lbs	205 x 95 x 5 mm 8.07 x 3.74 x 0.2 in	Note: derating as necessary
SK TIE4-WMK-1-EX	Stainless steel	○	IP66	0.6 kg 0.97 lbs	205 x 95 x 4 mm 8.04 x 3.74 x 0.16 in	Note: derating as necessary
SK TIE4-WMK-TU	Stainless steel	○	IP66	0.4 kg 0.88 lbs	155 x 85 x 3 mm 6.10 x 3.35 x 0.12 in	

¹ H = Increase in the total height of the device if mounted on the wall mounting kit



Technology unit on NORDAC BASE or wall mounting



Introduction
NORDAC PRO SK 500P
NORDAC PRO SK 500E
NORDAC LINK
NORDAC ON
NORDAC FLEX
NORDAC BASE
NORDAC START
Accessories

Brake Resistors (only for Size 2 devices)

Internal Versions

Internal Braking Resistors SK BRI4

Internal brake resistors are intended for applications in which slight or only sporadic and brief braking (e.g. continuous conveyor equipment, mixing equipment) is to be expected. They enable the use of the variable frequency drive in very confined spaces or in an explosive atmosphere.

Internal brake resistors are intended for installation in the connection unit of the VFD. The units offer space for implementing one brake resistor each. For thermal reasons, the rated continuous output is limited to 25%.

Equipment with a brake resistor has to be specified when ordering as retrofitting is not possible.



VFDs SK 180E / SK190E	Resistor Type	Material No.	Resistance [Ω]	Continuous Output ¹ [W]	Power Consumption ² [kW]
1/3~ 230 V 0.75 ... 1.5 kW 1.0 ... 2.0 hp	SK BRI4-1-200-100	275 272 008	200	100 / 25 %	1.0
3~ 400 V 1.5 ... 2.2 kW 2.0 ... 3.0 hp	SK BRI4-1-400-100	275 272 012	400	100 / 25 %	1.0

¹ Reduction of the continuous output of the braking resistor to 25% of the rated output

² Permissible max. once within 10 s

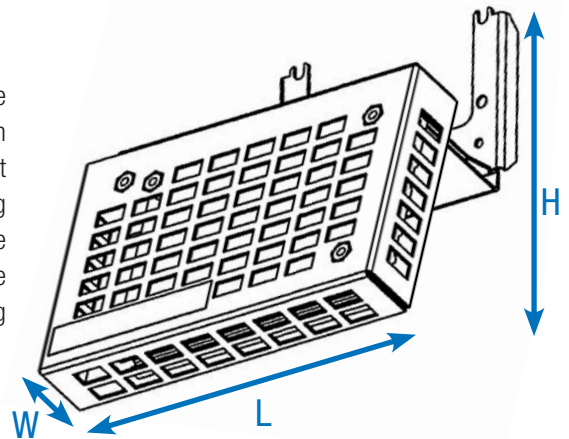
Brake Resistors (ONLY FOR SIZE 2 DEVICES) External Versions

External Braking Resistors SK BRE4

External braking resistors (IP67) are intended for applications in which longer, frequent or intensive braking is to be expected (cyclic operation / highly dynamic positioning applications). They are mounted directly on the VFD and can develop high surface temperatures (>70°C), which exclude their use in an explosive atmosphere.

Note

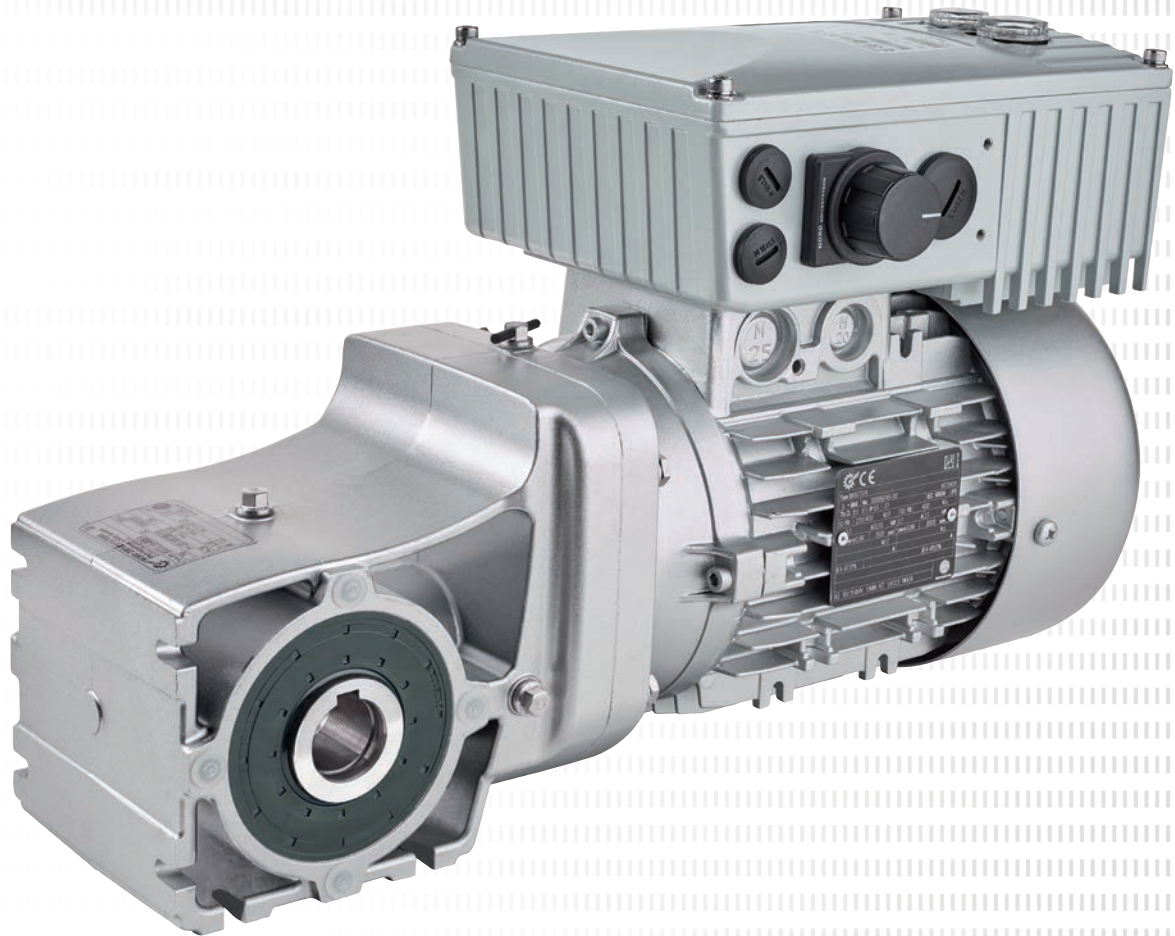
The brake resistors listed here are designed for typical applications with occasional braking. In case of doubt or for applications with higher braking power such as lifting equipment, we recommend targeted planning of the necessary brake resistor and contacting NORD DRIVESYSTEMS directly.



VFDs SK 180E / SK190E	Resistor Type Material No.	Resistance [Ω]	Continuous Output [W]	Power Consumption ¹ [kW]	Overall Dimensions L x W x H
1/3~230V 0.75 ... 1.5 kW 1.0 ... 2.0 hp	SK BRE4-1-100-100 275 273 005	100	100	2.2	150 x 61 x 178 mm 5.9 x 2.4 x 7 in
	Alternatively: SK BRE4-2-100-200 275 273 105	100	200	4.4	255 x 61 x 178 mm 10.03 x 2.4 x 7 in
3~400V 1.5 ... 2.2 kW 2.0 ... 3.0 hp	SK BRE4-1-200-100 275 273 008	200	100	2.2	150 x 61 x 178 mm 5.9 x 2.4 x 7 in
	Alternatively: SK BRE4-2-200-200 275 273 108	200	200	4.4	255 x 61 x 178 mm 10.03 x 2.4 x 7 in

¹ Permissible max. once within 120 s





Motor Starter for Decentralized Applications

NORDAC *START* SK 135E Series



Switch On and Start Working!

NORDAC *START*, SK 135E Series



[NORDAC *START*](#)

NORDAC *START*

Mains-powered electric motors are very widespread and require low installation and commissioning effort. However, disadvantages include high power consumption due to starting torque (up to 7 times the rated current for the motor), excessive mechanical loads on the gear unit, and uncontrolled starting and stopping behavior. The NORD *START* is an economical solution that provides more than simple current limiting starting for electric motors.

Functionality in a Compact Design

The NORDAC *START* combines the 3 functions of a typical electronic motor starter: starter, reversing starter, and soft starter. It includes comprehensive monitoring and protective functions (mains/motor/self-monitoring) and also eliminates the need for a motor protection switch. It also enables individual adaptations to the operating characteristics (starting / shut-down behavior) and provides optional communication interfaces. A special feature is the variable mounting options of the device in confined spaces, easily allowing the compact device to be used close to the motor.

Versatility and Protection

The NORDAC *START* is ideally suited for applications that require electronic starting and stopping of the drive units, such as those in material handling. Its versatility makes both motor starting functions and soft starting/reversing mode possible. Extensive monitoring functions provide protection from overheating and due to the I²t triggering characteristic, a motor protection switch is not required. Through the integrated line filter, the NORDAC *START* complies with even the most stringent EMC requirements when mounted on the motor.

Standard

- ▶ Configuration via DIP switches and potentiometers
- ▶ Integrated electronic brake rectifier
- ▶ Choice of different shut-down modes
- ▶ Leakage current <20 mA
- ▶ Consistent parameter structure
- ▶ 2 digital inputs and outputs

Optional

- ▶ Bus interface on board
 - ▶ AS-Interface (implemented as SK 175E-ASI)
 - ▶ PROFIBUS® DP (implemented as SK 175E-PBR)
- ▶ System plug connectors (e.g. Harting HAN 10E)
- ▶ Variant for ATEX Zone 22 - 3D
- ▶ Various control options (switches, ParameterBox)
- ▶ 24V mains unit

Variable Operating Characteristics

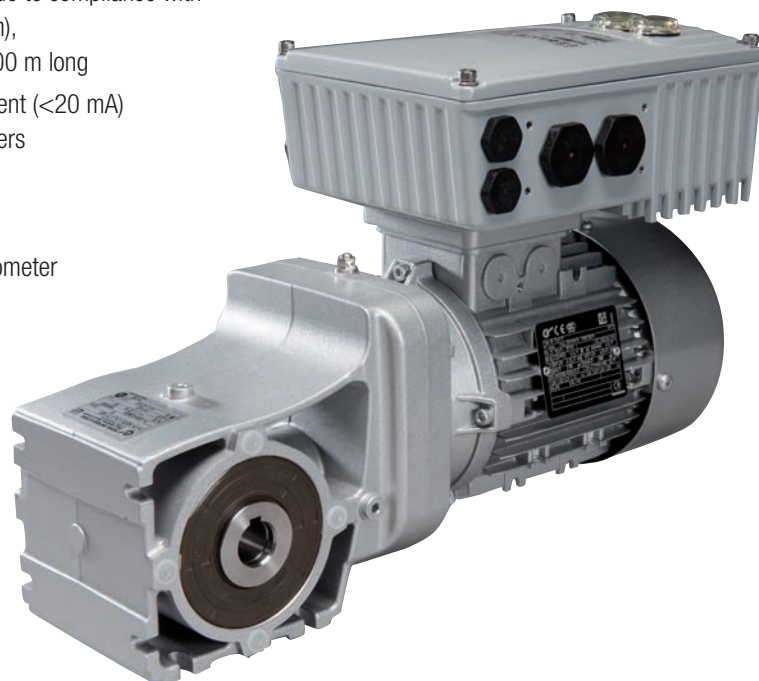
- ▶ Pre-defined shut-down modes
- ▶ Variable starting and shut-down ramps
- ▶ Boost function

EMC Line Filter Class B

- ▶ Integrated line filter
- ▶ Also ideal for applications in a domestic environment, due to compliance with Class B (for motor-mounting or motor cables up to 10 m), or Class A, for wall mounting with motor cables up to 100 m long
- ▶ Suitable for personal protection due to low leakage current (<20 mA) for operation with universal fault current FI circuit breakers

Commissioning

- ▶ Commissioning via integrated DIP switches and potentiometer
- ▶ No programming skills required




Standards and Approvals

All devices of the entire series comply with the standards and directives listed below.

Approval	Directive	Applied Standards	Certificates	Code
CE (European Union)	Low Voltage Directive 2014/35/EU	EN 60947-1 EN 60529	C310800	
	EMV 2014/30/EU	EN 60947-4-2 EN 63000		
	RoHS Delegated directive (EU) 2015/863	2011/65/EU		
UL (USA)		UL 60947-1 UL 60947-4-2	E365221	
CSA (Canada)		C22.2 No. 60947-1-13 C22.2 No. 60947-4-2-14	E365221	
RCM (Australia)	F2018L00028	EN 60947-1 EN 60947-4-2	133520966	
EAC (Eurasia)	TR CU 004/2011, TR CU 020/2011	IEC 60947-1 IEC 60947-4-2	EAЭC N RU Д-DE. HB27.B.02732/20	
UkrSEPRO (Ukraine)		EN 60947-1 EN 60529 EN 60947-4-2 EN 63000 EN 60947-1 EN 60947-4 EN 61558-1 EN 50581	C311900	
UKCA (United Kingdom)		EN 60947-1 EN 60529 EN 60947-4-2 EN 63000 EN 61800-9-1 EN 61800-9-2	C350800	

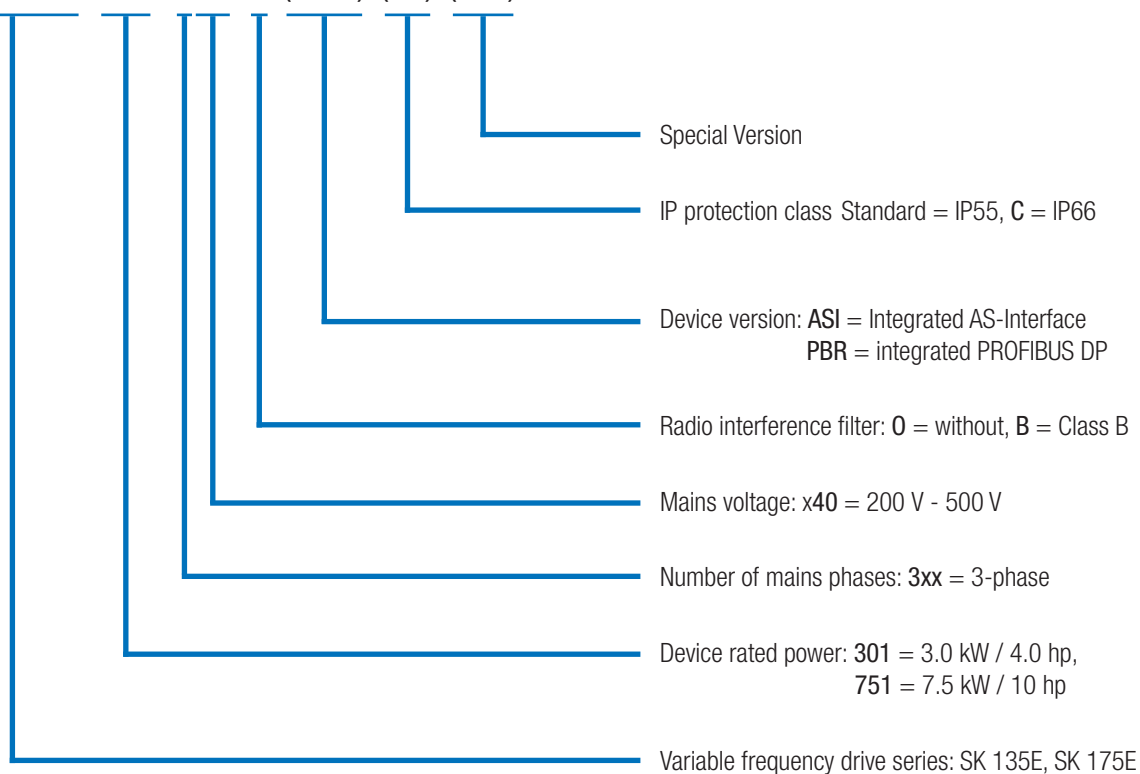
Devices which are configured and approved for use in explosion hazard environments comply with the following directives and standards.

Approval	Directive	Applied standards	Certificates	Code
CE (European Union)	ATEX	2014/34/EU	EN 60079-0 EN 60079-31	C432810 
	EMV	2014/30/EU	EN 63000 EN 60529	
	RoHS Delegated directive (EU)	2011/65/EU 2015/863	EN 60947-1 EN 60947-4-2	

Type Code

Motor starters

SK 175E-751-340-B (-ASI) (-C) (xxx)



(...) Options, only implemented if required.

Versatile and Sustainable Communication and More

Modern automation systems have a wide range of requirements, so that a suitable bus system and drive components must be selected in order to ensure efficient implementation.

AS-Interface

The AS-Interface is a cost-effective solution for the lower field level which enables the networking of binary sensors and actuators and is included in certain versions of the NORDAC *START*.

The supply voltage (power) is connected separately via the corresponding terminals. Depending on the device configuration (with jumpers), the control voltage of the motor starter is supplied via the yellow AS-Interface cable or separately via the black (AUX) cable.

Available in all SK 175E ... ASI devices

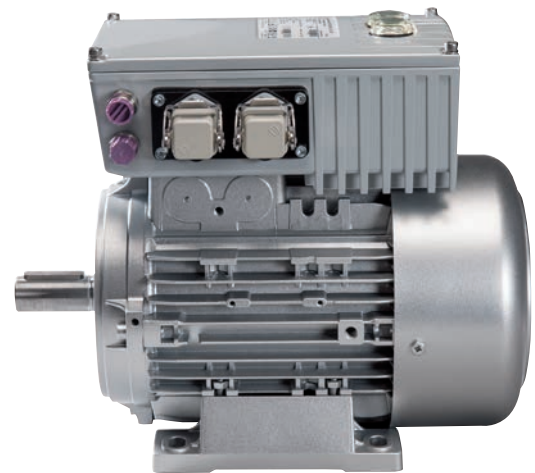


AS-Interface including 24 V supply (configurable)

PROFIBUS DP®

This bus system allows for cyclic exchange of 4 control or 4 status bits via a process data object (with up to 12 Mbps). Addressing is performed via a rotary encoding switch and the PROFIBUS terminator can be enabled with a jumper. Connection is possible with terminal strips or M12 plug connectors.

Available in all SK 175E ... ASI devices



Jumper Position	AUX	ASI
Follower profile	S-7.A.	S-7.A.
Follower type	A/B-follower	A/B-follower
Control voltage	Black AS-I cable	Yellow AS-I cable
Inputs/Outputs	4/4	4/4
Configuration via DIP-switch	●	●
Configuration via parameters	●	●

Motor Starter NORDAC *START*

3~ 200 ... 500 V

Typical Overload Capacity 150% for 120 s
up to 360 s (adjustable)

Motor Starter Efficiency > 98%

Ambient Temperature -25°C...+50°C (S1),
-25°C +60°C (S3 - 70% ED)

Protection Class IP55
optional IP66
optional IP69K

IP66 Measures

- ▶ Coated aluminium components
- ▶ Coated circuit boards
- ▶ Low-pressure test

Protective Measures Against

- ▶ Mains phase failure
- ▶ Motor phase failure
- ▶ Flux monitoring
- ▶ Motor over temperature (PTC)
- ▶ Motor overload
- ▶ Mains over/under voltage

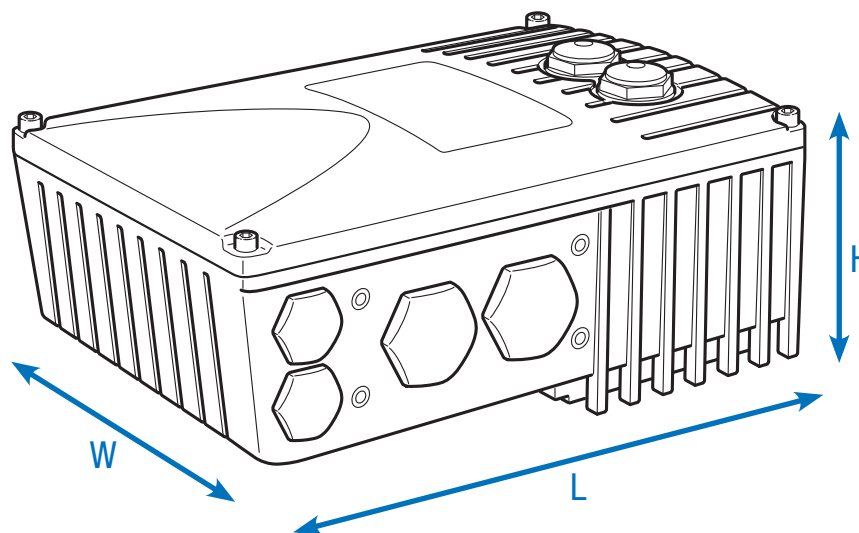
Motor Temperature Monitoring

I²t Motor
PTC / bi-metal switch

Leakage Current

< 20 mA

Motor Starters SK 135 E... / SK 175 E...	Nominal Motor Power		Nominal Output Current rms [A]	Mains Voltage / Output Voltage	Weight	Overall Dimensions L x W x H
	[kW]	[hp]				
-301-340-B	up to 3.0	up to 4.0	7.5	3~ 200 V ... 500 V, -10% / +10%, 47 ... 63 Hz	2.1 kg	221 x 154 x 101 mm
-751-340-B	up to 7.5	up to 10	16		4.63 lbs	8.7 x 6.06 x 3.98 in



Explosive Environment Protection



ATEX-Compliant Drive Systems, Zone 22 3D

The NORDAC *START* can be modified for operation in explosive environments – allowing the operation of the motor starter directly in a hazardous area (ATEX 22-3D). Advantages include:

- ▶ Compact drive unit
- ▶ No complex protective devices
- ▶ No motor cables
- ▶ Optimum EMC

Depending on the area of application (conductive or non-conductive dust) the modification also includes the replacement of the transparent diagnostic caps with a version made of aluminium and glass.

Please note that operation of the device within the hazardous area is only permitted with integrable modules (SK CU4 modules, internal braking resistors) or specially approved accessories.

There are exceptions for SK TU4 modules which are described in detail in the manual for the device. Other accessories (e.g. external brake resistors, plug connectors) are not approved for use within a hazardous area.

Approval

- ▶ According to 2014/34/EU
- ▶ ATEX Zone 22 - 3D
 - ▶ Version for non-conducting dust: IP55
 - ▶ Version for conducting dust: IP66

Available in all versions



Class I - Gas Groups A, B, C, and D

- ▶ Gases, vapors, or aerosols
- ▶ NEC 500
- ▶ Division 1 - Areas in which hazardous concentrations of flammable gases or vapors
 - ▶ Can be present under normal operating conditions
 - ▶ Can frequently occur during repair and maintenance work
 - ▶ Can occur throughout malfunctions concerning operation during which errors occurring in electrical equipment may result in a source of ignition
- ▶ Division 2
 - ▶ Areas in which hazardous concentration of flammable gases or vapors are kept in closed containers or systems and can only be released under fault conditions

Class II - Dust Groups E, F and G

- ▶ Dusts
- ▶ NEC 500
- ▶ Division 1 - Areas in which hazardous concentration of explosive dust atmospheres
 - ▶ Can be present under normal operating conditions
 - ▶ Can occur throughout malfunctions concerning operation during which errors occurring in electrical equipment may result in a source of ignition
 - ▶ Areas with hazardous quantities of conductive dust (Group E)
- ▶ Division 2
 - ▶ Areas in which hazardous concentrations of explosive dust atmospheres can only be released under fault conditions

Class III

- ▶ Ignitable fibers and flyings
- ▶ NEC 500
- ▶ Division 1
 - ▶ Areas in which flammable fibers and lint occur or are processed
- ▶ Division 2
 - ▶ Areas in which flammable fibers are stored or handled in a different manner to that in the production process

The Entire Team

All Device Versions at a Glance

	SK 135E 0.33 - 10 hp	SK 175E - ASI 0.33 - 10 hp	SK 175E - PBR 0.33 - 10 hp
Soft start function	●	●	●
Reversing function	●	●	●
Motor and wall mounting possible ¹	●	●	●
Energy bus - loop-through of mains supply cables ²	●	●	●
RS-232 diagnostic interface	●	●	●
Parameters pre-set with standard values	●	●	●
Integrated EMC line filter according to EN 60947-4-2, Class B up to 10 m motor cable and for motor assembly	●	●	●
Integrated EMC line filter according to EN 60947-4-2, Class A up to 100 m motor cable and for motor assembly	●	●	●
Extensive monitoring functions	●	●	●
Brake management for mechanical holding brake	●	●	●
AS-Interface on board	○	●	○
PROFIBUS DP® on board	○	○	●
External 24 V power supply for the control board	●	●	●
Switch variants	●	●	●
Plug connectors for connection of control, motor and mains cables	●	●	●

¹ Wall mounting: wall mounting kit required
 Motor mounting: an adapter for connection to the motor terminal box may be necessary.

² Direct connection to the terminal bar or via system plug connectors

● Available as standard
 ● Optional
 ○ Not available

Introduction
 NORDAC PRO SK 500P
 NORDAC PRO SK 500E
 NORDAC LINK
 NORDAC ON
 NORDAC FLEX
 NORDAC BASE
 NORDAC START
 Accessories

The Senses Control Connections on the Motor Starter

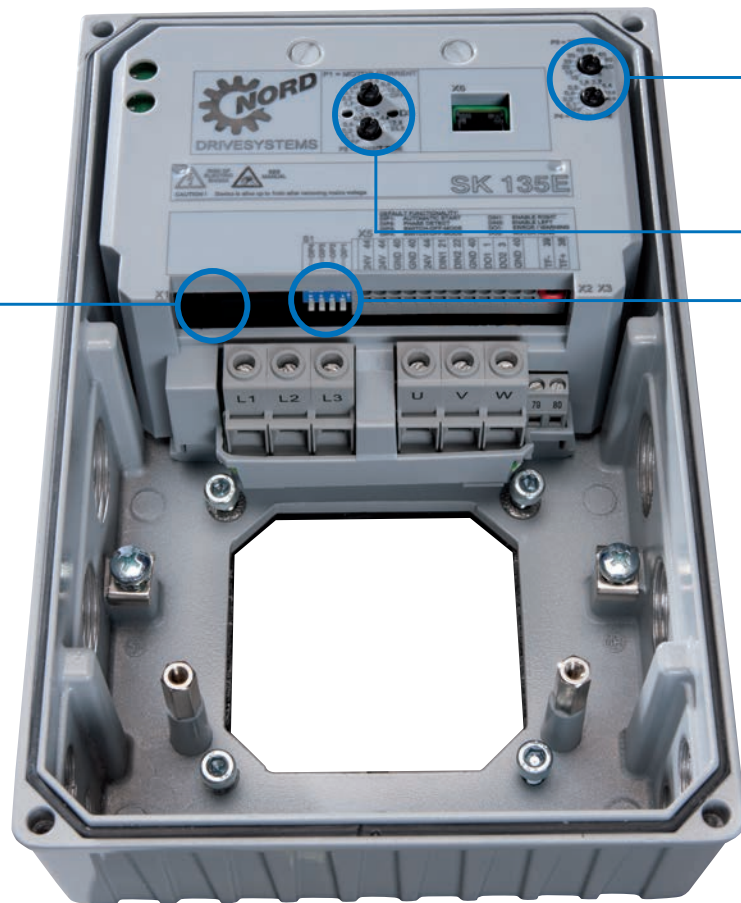
	SK 135E 0.33 - 10 hp	SK 175E - ASI 0.33 - 10 hp	SK 175E - PBR 0.33 - 10 hp
Control Terminals	Number of digital inputs (DIN)	2	2 (+2 sensor inputs for Bus)
	Number of digital outputs (DOUT)	2	2
	Brake control	●	●
	Temperature sensor (PTC)	●	●
Communication	RS-232 RJ12	●	●
	AS-I terminal connection	○	●
	PROFIBUS DP® terminal connection	○	●

Note

Control terminals can be added with optional modules (IOs, device protection).



Configuration and Monitoring Integrated Aids for Safe Operation



Commissioning with a Screwdriver

Commissioning of the device is possible without parameter adaptation, i.e. without programming aids. For this purpose, DIP switches and several 10 step potentiometers are available. These are accessible via the diagnostic opening in the center or by removing the cover. The status LEDs of the device are also located behind this diagnostic opening.

The following parameters can be adjusted:

- ▶ Rated motor current
- ▶ Locking time
- ▶ Start-up torque
- ▶ Start-up and run-down time
- ▶ Switch-off mode
- ▶ Phase sequence detection
- ▶ Automatic start
- ▶ PROFIBUS DP® addressing (only SK 175E-...-PBR)

Jumpers for Configuration

The communication interface can be configured by changing the jumper position.

- ▶ SK 175E-...-ASI: Communication mode
 - ▶ ASI (supply for interface and device via yellow cable) or
 - ▶ AUX (supply for interface via yellow cable and for device via black cable)
- ▶ SK 175E-...-PBR: Interface terminator

Available in all SK 175E devices

Status and Diagnostic Cockpit

Depending on the type of device, various aids for monitoring the device or for diagnosis in case of faults, are located behind two transparent cover caps. There are further elements (e.g. potentiometers or similar) which are useful for “screwdriver-assisted commissioning.”



1. Status LEDs and Potentiometers

In addition to status and readiness indicators, the actual overload level, warnings, and error messages of the integrated bus system (SK 175E) are indicated in coded form by the LEDs.

Operational settings of the motor starter can be set with the potentiometers.

2. Diagnostic Interface, RS-232

RJ12 interface for connection of a diagnostic and parameterization tool (e.g. PC with NORDCON software and ParameterBox1). Analysis, diagnostics, parameterization, and monitoring of the drive unit via software is possible during commissioning or service.

¹ Use of a parameterization unit also requires the use of a signal converter. (SK TIE4-RS-485-RS-232, material no. 275 274 603)

Various Installation Possibilities

Motor Assembly

The motor starter can be mounted directly on the terminal box base of the (geared) motor, forming a complete unit consisting of the drive and control technology. This motor-mounted format makes full use of its numerous advantages: compact overall dimensions of the drive unit, quick readiness for use after connection to the mains supply due to the pre-configuration of the drive unit at the factory, and optimum EMC due to short cable lengths - or elimination of a motor cable.

Wall Mounting

As an alternative to motor mounting, the device can be mounted close to the motor with the aid of an optional wall mounting kit. Different versions can be selected depending on the application.

1. Standard Version SK TIE4-WMK-1-K

2. ATEX Version SK TIE4-WMK-1-EX

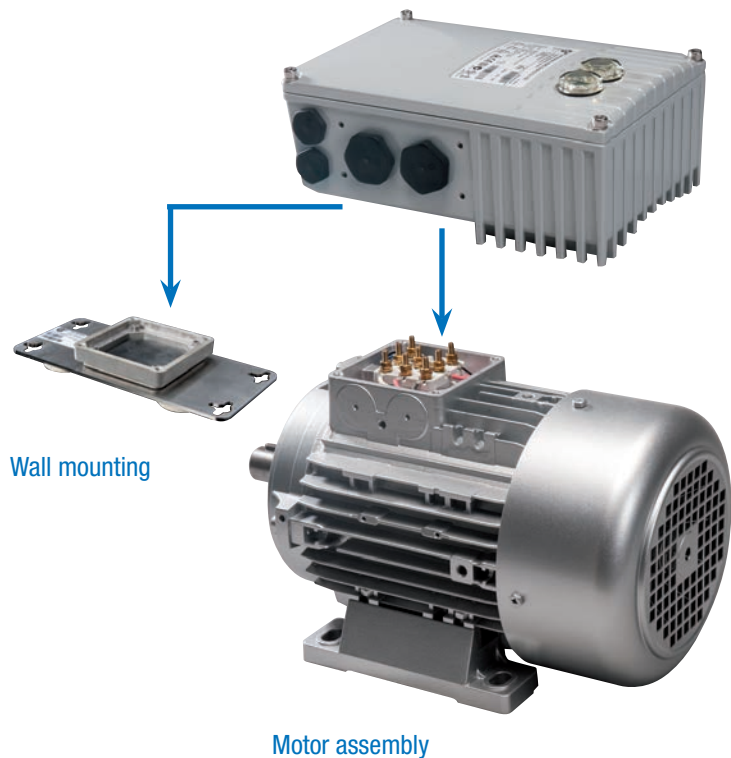
This version is functionally comparable to the standard version and suitable for use in explosion hazard environments (ATEX Zone 22 3D).

Designation	Material No.	VFDs ¹ for Size FI
SK TIE4-WMK-1-K	275 274 004	Size 1
SK TIE4-WMK-2-K	275 274 015	Size 2
SK TIE4-WMK-1-EX	275 175 053	Size 1
SK TIE4-WMK-2-EX	275 175 054	Size 2
SK TIE4-WMK-TU ²	275 274 002	Type: SK TU4-

¹ Mounting of the WMK underneath the motor starter

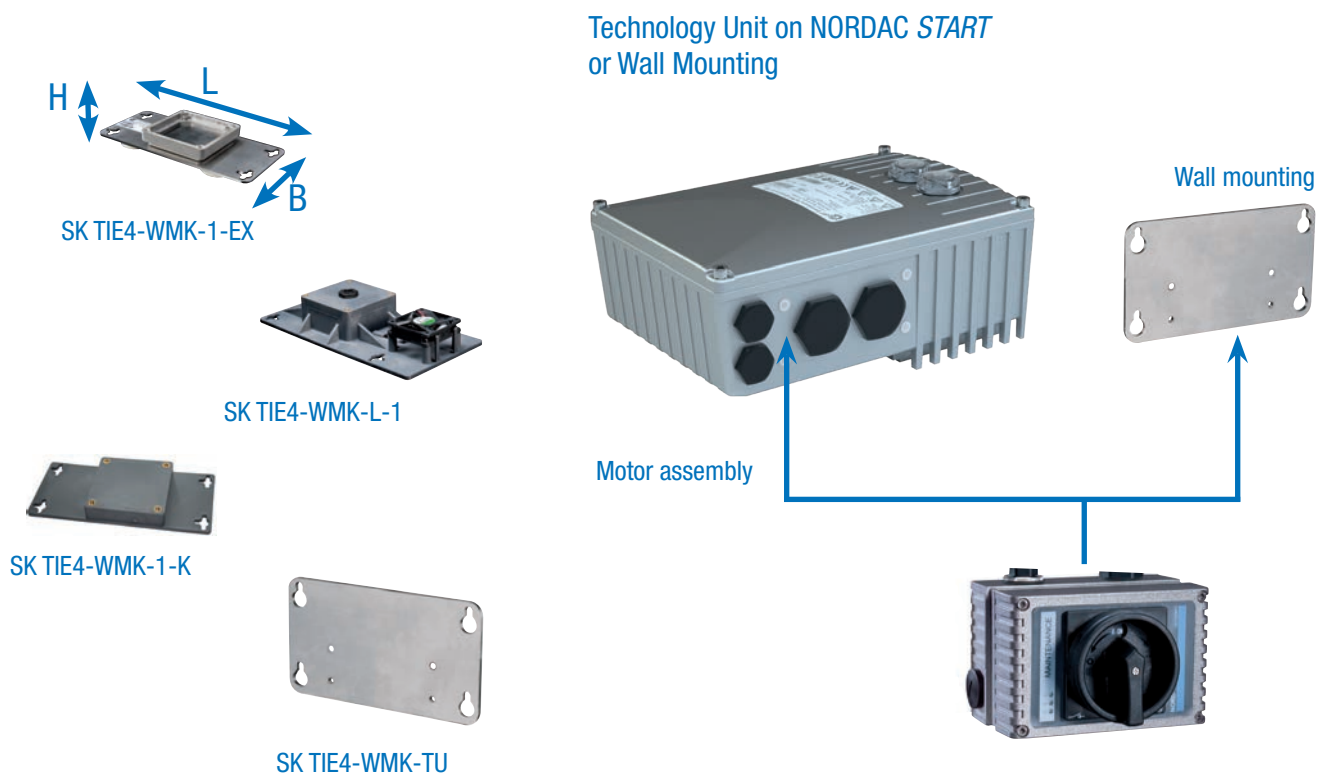
² Mounting of the WMK on the connection unit of the technology unit

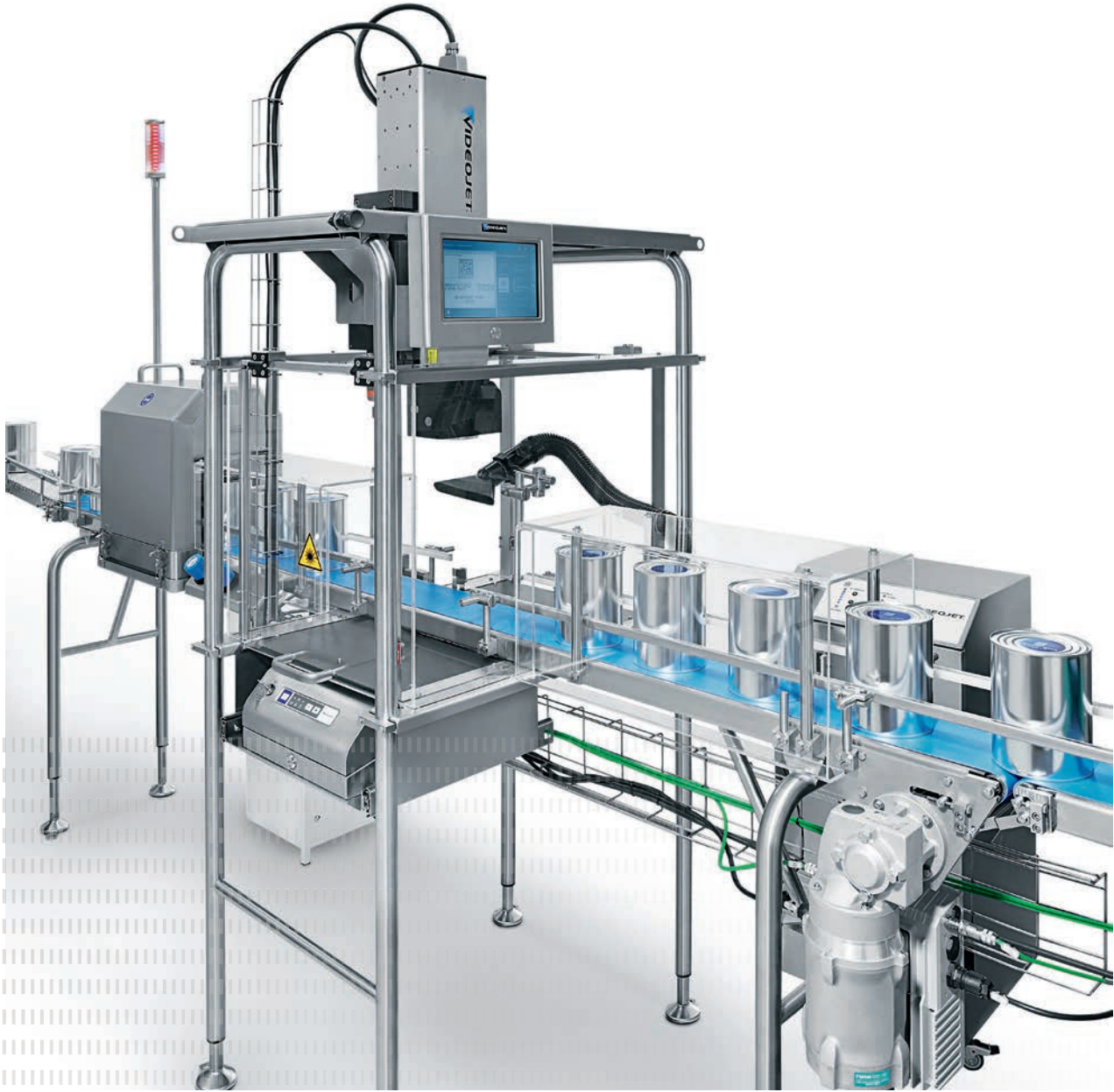
Motor-Mounted or Wall-Mounted Motor Starters



Designation	Material	Integrated fan	Achievable protection class	Weight	Overall dimensions L x W x H	Remarks
SK TIE4-WMK-1-K	Plastic	-	IP66	0.2 kg 0.44 lbs	205 x 95 x 5 mm 8.07 x 3.7 x 0.19 in	
SK TIE4-WMK-2-K	Plastic	-	IP66	0.3 kg 0.66 lbs	235 x 105 x 5 mm 9.25 x 4.13 x 0.19 in	
SK TIE4-WMK-1-EX	Stainless steel	-	IP66	0.6 kg 1.32 lbs	205 x 95 x 4 mm 8.07 x 3.7 x 0.15 in	
SK TIE4-WMK-2-EX	Stainless steel	-	IP66	0.8 kg 1.76 lbs	235 x 105 x 10 mm 9.25 x 4.13 x 0.39 in	
SK TIE4-WMK-TU	Stainless steel	-	IP66	0.4 kg 0.88 lbs	155 x 85 x 3 mm 6.1 x 3.34 x 0.11 in	

¹ H = Increase in the total height of the device if mounted on the wall mounting kit







Accessories for VFDs and Motor Starters



The full range of accessories below that can be used for various series. This primarily applies to our decentralized devices of the NORDAC *LINK*, NORDAC *ON*, NORDAC *FLEX*, NORDAC *BASE*, and NORDAC *START* series.

Operation
and parameterization

Page 164



Interfaces
for communication

Page 168



24 V power supply units,
potentiometers, switches, signal
converters, and more

Page 176



System connectors for
power and control connections

Page 182



Connection technology
Cables

Page 186



Operation and Parameterization

Control and Parameterization Units / Software

	Designation Material No.	Description
	Parameter box SK PAR-5H 275281614	Control and parameterization, LCD screen (illuminated), plain text display in 14 languages, direct control of up to five devices, memory for five device data sets, convenient control keypad, communication via RS-485, including 1.5 m connection cable. Handheld, suitable for installation in a control cabinet door. IP54.
	ParameterBox SK PAR-5A 275281714	Suitable for control and parameterization, LCD screen (illuminated), plain text display in 14 languages, direct control of up to 5 devices, memory for 5 device data sets, convenient control keypad, for mounting to a variable frequency drive.
	Simple control box SK CSX-3H 275 281 013	Control and parameterization, 4-digit, 7-segment display, direct control of a device, convenient control keypad, including 2 m connection cable. Handheld, IP54.
	Simple control box SK CSX-3E 275 281 413	Suitable for control and parameterization, 4-digit, 7-segment display, direct control of a device, convenient control keypad, for installation in control cabinet doors.
	Control box SK POT1-1 278 910 120	Potentiometer 0 ... 100% (0 ... 10 V), switch Left/Right, including 3 m connection cable. Handheld, wall mounting, IP66.
	Control box SK POT1-2 278 910 140	Suitable for control, potentiometer 0 ... 100% (0 ... 10 V), switch Left/Right, including 20 m connection cable. Handheld, wall mounting, IP66.
	Simple setpoint box SK SSX-3A 271 281 513	Suitable for control and parameterization, 4-digit, 7-segment display, direct control of a device, 3 operating modes, convenient control keypad. Handheld, wall mounting, IP54.
	SK TIE4-SSX-3A 275 274 910	Adapter for fitting the SK SSX-3A to the NORDAC FLEX.
	Programming adapter SK EPG-3H 275 281 026	Suitable for parameterization of the external EEPROM (memory module) of an SK 2xxE, independent of the presence of a variable frequency drive. Handheld, IP20.

Remarks	NORDAC					
	PRO	LINK	ON	FLEX	BASE	START
Connection for data exchange with NORDCON <i>STUDIO</i> to a PC (USB 2.0), (standard USB-C connection cable required, e.g. material number: 275292100) Power supply, e.g. directly via the variable frequency drive or PC	●	●	●	●	●	●
Power supply, e.g. directly via variable frequency drive or PC mounting to variable frequency drive	○	○	○	●	○	○
Electrical data: 4.5 ... 30 V DC / 1.3 W, supply e. g. directly via the variable frequency drive	○	○	○	●	○	○
Electrical data: 4.5 ... 30 V DC / 1.3 W, supply e. g. directly via the variable frequency drive, control cabinet installation	●	○	○	○	○	○
	●	○	○	●	●	○
	●	○	○	●	●	○
Electrical data: 19.2 ... 28.8 V DC, 35 mA, supply e.g. directly via the variable frequency drive, communication via RS -485 or IO link	●	○	○	●	●	○
	○	○	○	●	○	○
	○	○	○	●	○	○

● Available as standard
○ Not available

Operation and Parameterization Control and Parameterization Units / Software

Designation	Description
Material No.	



Adapter cable
RJ12-SUB-D9
278 910 240

To connect the variable frequency drive to the serial interface of a PC via SUB-D9



Connection set
SK TIE4-RS232-USB
275 274 604

To connect the variable frequency drive to the serial interface of a PC via USB 2.0



Adapter cable
SK CE-USB-C-
USB-PC-USB-3M
275 292 100

To connect the variable frequency drive to a PC via USB



Control and
parameterization
software NORDCON

Software for control and parameterization as well as commissioning assistance and fault analysis of NORD electronic drive technology. Parameter names in 14 languages.



NORDAC
ACCESS BT
Bluetooth-Stick
SK TIE5-BT-STICK
275 900 120

Interface for wireless connection to a mobile terminal device (e.g. tablet or smartphone) via Bluetooth. With the aid of the NORDCON APP, the NORDCON software for mobile terminal devices, enables smart operation and parameterization as well as commissioning assistance and fault analysis of NORD electronic drive technology.

¹ Only for NORDAC PRO, SK 530P + SK 550P series

Remarks	NORDAC					
	PRO	LINK	ON	FLEX	BASE	START
Length: approx. 3 m	●	●	●	●	●	●
Consisting of adapter cable RJ12-SUB-D9 and RS -232 to USB VFD, Length: approx. 3 m + 0.5 m	●	●	●	●	●	●
Length: approx. 3 m	● ¹	○	○	○	○	○
Free download at: www.nord.com	●	●	●	●	●	●
NORDCON APP available free of charge for Android and iOS.	●	●	●	●	●	●

● Available as standard
○ Not available

Communication Interfaces Field Bus Extensions

Designation Material No.	Installation			Number of Inputs / Outputs	Description	Remarks	NORDAC					
	Attached / Separate	Protection Class	Class				LINK	FLEX	BASE			
SK CU4-PBR 275 271 000	●	○	IP20	2 digital inputs			●	●	●			
SK CU4-PBR-C ¹ 275 271 500	●	○	IP20							●	●	●
PROFIBUS DP® SK TU4-PBR 275 281 100	○	●	IP55	4 digital inputs	Interface as gateway for direct connection of up to four devices to a PROFIBUS DP® field bus. Digital signals can alternatively be connected via the front M12 round plug connector (only M12 modules)	Baud rate: maximum 12 MBd Protocol: DPV 0 and DPV 1	○	●	●			
SK TU4-PBR-C 275 281 150	○	●	IP66							○	●	●
SK TU4-PBR-M12 275 281 200	○	●	IP55				2 digital outputs			○	●	●
SK TU4-PBR-M12-C 275 281 250	○	●	IP66				○	●	●			
SK CU4-CAO 275 271 001	●	○	IP20	2 digital inputs			●	●	●			
SK CU4-CAO-C ¹ 275 271 501	●	○	IP20							●	●	●
CANopen® SK TU4-CAO 275 281 101	○	●	IP55	4 digital inputs	Interface as gateway for direct connection of up to four devices to a CANopen® field bus. Digital signals can alternatively be connected via the front M12 round plug connector (only M12 modules)	Baud rate: maximum 1 MBaud Protocol: DS 301 and DS 402	○	●	●			
SK TU4-CAO-C 275 281 151	○	●	IP66							○	●	●
SK TU4-CAO-M12 275 281 201	○	●	IP55				2 digital outputs			○	●	●
SK TU4-CAO-M12-C 275 281 251	○	●	IP66				○	●	●			

¹ Version with varnished circuit boards for applications in IP6X devices

- Available as standard
- Not available



Variant	Designation Material No.	Installation			Number of Inputs / Outputs	Description	Remarks	NORDAC		
		Attached / Sseparate	Protection Class					LINK	FLEX	BASE
DeviceNet®	SK CU4-DEV 275 271 002	●	○	IP20	2 digital inputs	Interface as gateway for direct connection of up to four devices to a DeviceNet® field bus. Digital signals can alternatively be connected via the front M12 round plug connector (only M12 modules)	Baud rate: maximum 500 kBaud Profile: AC-Drive and NORD-AC SK TU4 modules plus matching SK T14-TU- BUS / SK T14-TU-BUS-C connection unit	●	●	●
	SK CU4-DEV-C ¹ 275 271 502	●	○	IP20				●	●	●
	SK TU4-DEV 275 281 102	○	●	IP55	4 digital inputs			○	●	●
	SK TU4-DEV-C 275 281 152	○	●	IP66				○	●	●
	SK TU4-DEV-M12 275 281 202	○	●	IP55				○	●	●
	SK TU4-DEV-M12-C 275 281 252	○	●	IP66	○			●	●	











¹ Version with varnished circuit boards for applications in IP6X devices

● Available as standard
○ Not available



Communication Interfaces

Industrial Ethernet Extensions










Variant	Designation Material No.	Installation	Attached / Separate	Protection Class	Number of Inputs / Outputs
Industrial Ethernet	 SK CU4-ETH 275271027	●	○	IP20	2 digital inputs
	 SK CU4-ETH-C 275271527	●	○	IP20	
	 SK TU4-ETH 275281132	○	●	IP55	8 digital inputs 2 digital outputs
	 SK TU4-ETH-C 275281182	○	●	IP66	
 SK TU4-ETH-M12 275281233	○	●	IP55		
 SK TU4-ETH-M12-C 275281283	○	●	IP66		
PROFIsafe	 SK TU4-PNS 275 281 116	○	●	IP55	2 safe digital inputs (SI), 3 safe digital outputs (SO)
	 SK TU4-PNS-C 275 281 166	○	●	IP66	
	 SK TU4-PNS-M12 275 281 216	○	●	IP55	
	 SK TU4-PNS-M12-C 275 281 266	○	●	IP66	

Description	Remarks	NORDAC		
		LINK	FLEX	BASE
Interface as gateway for direct connection of up to four devices to the Industrial Ethernet. Parameterization may be used with a choice between the following dialects: EtherCAT, EtherNet/IP, PROFINET IO Connection of the bus cable via the front RJ45 or M12 circular connectors (only TU4 modules).	Baud rate: max. 100 Mbaud, EtherCAT: CoE, PROFINET IO: Conformance class B and C	●	●	●
		●	●	●
		○	●	●
		○	●	●
		○	●	●
		○	●	●
Interface as gateway for direct connection of up to four devices to a PROFIsafe field bus. Connection of the bus cable via the front RJ45 or M12 round plug connector (only TU4 modules).	Baud rate: maximum 100 MBaud, Conformance class B and C, SK TU4 modules plus matching SK TI4-TU4-SAFE / SK TI4-TU4-SAFE-C connection unit	○	●	○
		○	●	○
		○	●	○
		○	●	○

● Available as standard
○ Not available

Communication Interfaces

Industrial Ethernet Extensions

		Designation Material No.	Installation	Attached / Separate	Protection Class	Number of Inputs / Outputs
EtherCAT®		SK CU4-ECT 275 271 017	●	○	IP20	2 digital inputs
		SK CU4-ECT-C¹ 275 271 517	●	○	IP20	
		SK TU4-ECT 275 281 117	○	●	IP55	8 digital inputs 2 digital outputs
		SK TU4-ECT-C 275 281 167	○	●	IP66	
EtherNet/IP®		SK CU4-EIP 275 271 019	●	○	IP20	2 digital inputs
		SK CU4-EIP-C¹ 275 271 519	●	○	IP20	
		SK TU4-EIP 275 281 119	○	●	IP55	8 digital inputs 2 digital outputs
		SK TU4-EIP-C 275 281 169	○	●	IP66	
POWERLINK		SK CU4-POL 275 271 018	●	○	IP20	2 digital inputs
		SK CU4-POL-C¹ 275 271 518	●	○	IP20	
		SK TU4-POL 275 281 118	○	●	IP55	8 digital inputs 2 digital outputs
		SK TU4-POL-C 275 281 168	○	●	IP66	
PROFINET IO®		SK CU4-PNT 275 271 015	●	○	IP20	2 digital inputs
		SK CU4-PNT-C¹ 275 271 515	●	○	IP20	
		SK TU4-PNT 275 281 115	○	●	IP55	8 digital inputs 2 digital outputs
		SK TU4-PNT-C 275 281 165	○	●	IP66	
		SK TU4-PNT-M12 275 281 122	○	●	IP55	
SK TU4-PNT-M12-C 275 281 172		○	●	IP66		

¹ Version with varnished circuit boards for applications in IP6X devices

Description	Remarks	NORDAC		
		LINK	FLEX	BASE
Interface as gateway for direct connection of up to four devices to an EtherCAT® field bus. Connection of the bus cable via the front M12 round plug connector (only TU4 modules).	Baud rate: maximum 100 MBaud, CoE (CAN over EtherCAT®),	●	●	●
	SK CU4 module: Derating (see data sheet)	●	●	●
	SK TU4 modules plus matching SK TI4-TU-BUS / SK TI4-TU-BUS-C connection unit	○	●	●
		○	●	●
Interface as gateway for direct connection of up to four devices to an EtherNet/IP® fieldbus. Connection of the bus cable via the front M12 round plug connector (only TU4 modules).	Baud rate: maximum 100 MBaud,	●	●	●
	SK CU4 module: Derating (see data sheet)	●	●	●
	SK TU4 modules plus matching SK TI4-TU-BUS / SK TI4-TU-BUS-C connection unit	○	●	●
		○	●	●
Interface as gateway for direct connection of up to four devices to a POWERLINK field bus. Connection of the bus cable via the front M12 round plug connector (only TU4 modules).	Baud rate: maximum 100 MBaud,	●	●	●
	SK CU4 module: Derating (see data sheet)	●	●	●
	SK TU4 modules plus matching SK TI4-TU-BUS / SK TI4-TU-BUS-C connection unit	○	●	●
		○	●	●
Interface as gateway for direct connection of up to four devices to a PROFINET IO® field bus. Connection of the bus cable via the front RJ45 or M12 round plug connector (only TU4 modules).	Baud rate: maximum 100 MBaud, Conformance class B and C,	●	●	●
	SK CU4 module: Derating (see data sheet)	○	●	●
	SK TU4 modules plus matching SK TI4-TU-BUS / SK TI4-TU-BUS-C connection unit	○	●	●
		○	●	●

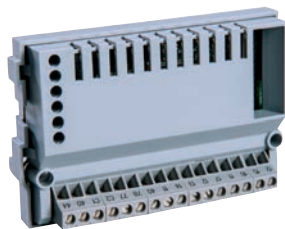
● Available as standard
○ Not available

Communication Interfaces and Connection Units

Variant	Designation Material No.	Installation	Attached / Separate	Protection Class	Number of Inputs / Outputs	Description	Remarks	NORDAC		
								LINK	FLEX	BASE
IO Extensions	SK CU4-IOE2 275 271 007	●	○	IP20	2 ² digital and 2 ³ analog inputs, 2 analog outputs	Sensor and actuator signal processing, connection via terminal bar	Analog signals: IN / OUT: 0(2) ... +10 V or 0(4) ... 20 mA	●	●	●
	SK CU4-IOE2-C ¹ 275 271 507	●	○	IP20				●	●	●
	SK CU4-IOE 275 271 006	●	○	IP20	2 digital and 2 ³ analog inputs, 1 analog output	Analog signals: IN: -10 V ... +10 V or 0(4) ... 20 mA	●	●	●	
	SK CU4-IOE-C ¹ 275 271 506	●	○	IP20			●	●	●	
	SK TU4-IOE 275 281 106	○	●	IP55	4 digital and 2 analog inputs, Alternative connection of digital signals via front M12 round plug connector (only M12 modules)	OUT: 0(2) ... +10 V or 0(4) ... 20 mA	○	●	●	
	SK TU4-IOE-C 275 281 156	○	●	IP66			○	●	●	
	SK TU4-IOE-M12 275 281 206	○	●	IP55			○	●	●	
SK TU4-IOE-M12-C 275 281 256	○	●	IP66	2 digital and 1 analog output	SK TU4 modules plus matching SK TI4-TU-BUS / SK TI4-TU-BUS-C connection unit	○	●	●		

- ¹ Version with varnished circuit boards for applications in IP6X devices
² Digital inputs can optionally be used as digital inputs or outputs
³ Analog inputs can optionally be used as analog or digital inputs

- Available as standard
○ Not available

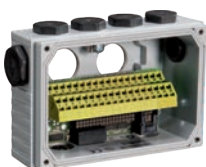


Variant	Designation Material No.	Installation Attached / Separate Protection Class	Description	NORDAC		
				LINK	FLEX	BASE
Connection Units	SK TI4-TU-BUS 275 280 000	○ ● IP55	Connection unit for SK TU4-.... bus interfaces or IO - extensions (IP55), including RS-232 diagnostic interface (RJ12 port)	○	●	●
	SK TI4-TU-BUS-C 275 280 500	○ ● IP66	Connection unit for SK TU4-.... bus interfaces or IO - extensions (IP66), including RS-232 diagnostic interface (RJ12 port)	○	●	●
	SK TI4-TU-SAFE 275 280 300	○ ● IP55	Connection unit for safe bus interface SK TU4-PNS-... (IP55), including RS-232 diagnostic interface (RJ12 port)	○	●	○
	SK TI4-TU-SAFE-C 275 280 800	○ ● IP66	Connection unit for safe bus interface SK TU4-PNS-...-C (IP66), including RS-232 diagnostic interface (RJ12 port)	○	●	○
	SK TIE4-WMK-TU 275 274 002	○ ● IP66	For separate mounting of SK TU4... modules with SK TI4-TU-...	○	●	●

● Available as standard
○ Not available



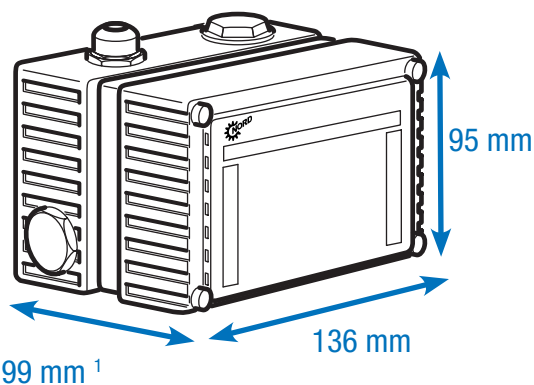
SK TI4-TU-BUS



SK TI4-TU-SAFE



SK TIE4-WMK-TU



¹ Depth varies for versions with connections on the front side.

Supply and Control

24 V Power Supply Units, Potentiometer and Switches

Introduction
NORDAC PRO SK 500P
NORDAC PRO SK 500E
NORDAC LINK
NORDAC ON
NORDAC FLEX
NORDAC BASE
NORDAC START
Accessories

Variant	Designation Material No.	Installation			Description	Remarks	NORDAC		
		Attached / Separate	Protection Class				FLEX	BASE	START
	SK CU4-24V-123-B 275 271 108	●	○	IP20	Output: 24 V DC, 420 mA	For connection to 115 V/230 V devices, including AD converter for evaluation of a 10 kΩ - potentiometer	●	●	●
	SK CU4-24V-123-B-C ¹ 275 271 608	●	○	IP20	Output: 24 V DC, 420 mA		●	●	●
	SK CU4-24V-140-B 275 271 109	●	○	IP20	Output: 24 V DC, 420 mA	For connection to 400 V/500 V devices, including AD converter for evaluation of a 10 kΩ - potentiometer	●	●	●
	SK CU4-24V-140-B-C ¹ 275 271 609	●	○	IP20	Output: 24 V DC, 420 mA		●	●	●
	SK TU4-24V-123-B 275 281 108	○	●	IP55	Output: 24 V DC, 420 mA	For connection to 115 V/230 V devices, including AD converter for evaluation of a 10 kΩ - potentiometer plus suitable connection unit SK TI4-TU-NET/ SK TI4-TU-NET-C	●	●	●
	SK TU4-24V-123-B-C 275 281 158	○	●	IP66	Output: 24 V DC, 420 mA		●	●	●
	SK TU4-24V-140-B 275 281 109	○	●	IP55	Output: 24 V DC, 420 mA	For connection to 400 V/500 V devices, including AD converter for evaluation of a 10 kΩ potentiometer plus suitable connection unit SK TI4-TU-NET/SK TI4-TU- NET-C	●	●	●
	SK TU4-24V-140-B- 275 281 159	○	●	IP66	Output: 24 V DC, 420 mA		●	●	●

¹ Version with varnished circuit boards for applications in IP6X devices




- Available as standard
- Not available

Variant	Designation Material No.	Installation	Attached / Separate	Protection Class	Description	Remarks	NORDAC			
							FLEX	BASE	START	
Power Supplies with Control Unit		SK TU4-POT-123-B 275 281 110	<input type="radio"/>	<input checked="" type="radio"/>	IP55	Output: 24 V DC, 420 mA	For connection to 115 V / 230 V devices, including setpoint adjuster 0% ... 100% and keys "ON R" - "OFF" - "ON L" plus suitable SK TI4-TU-NET/SK TI4-TU- NET-C connection unit	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
		SK TU4-POT-123-B-C 275 281 160	<input type="radio"/>	<input checked="" type="radio"/>	IP66	Output: 24 V DC, 420 mA		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
		SK TU4-POT-140-B 275 281 111	<input type="radio"/>	<input checked="" type="radio"/>	IP55	Output: 24 V DC, 420 mA	For connection to 400 V / 500 V devices, including setpoint adjuster 0% ... 100% and keys "ON R" - "OFF" - "ON L" plus suitable SK TI4-TU-NET/SK TI4-TU- NET-C connection unit	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
		SK TU4-POT-140-B-C 275 281 161	<input type="radio"/>	<input checked="" type="radio"/>	IP66	Output: 24 V DC, 420 mA		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Connection Units		SK TI4-TU-NET 275 280 100	<input type="radio"/>	<input checked="" type="radio"/>	IP55	SK TU4-... connection unit for power supply units (IP55)	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
		SK TI4-TU-NET-C 275 280 600	<input type="radio"/>	<input checked="" type="radio"/>	IP66	SK TU4-... connection unit for power supply units (IP66)	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
			SK TIE4-WMK-TU 275 274 002	<input type="radio"/>	<input type="radio"/>	IP66	For separate mounting of SK TU4... modules with SK TI4-TU-...	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

● Available as standard
○ Not available

Introduction
NORDAC PRO SK 500P
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Supply and Control Signal Converters and More






Variant	Designation Material No.	Installation	Attached / Separate	Protection Class	Description
Control Elements	 SK CU4-POT 275 271 207	○	●	IP66	Switches and potentiometers
	 SK TIE4-SWT 275 274 701	○	●	IP66	Switch
	 SK TIE4-POT 275 274 700	○	●	IP66	Potentiometer
	 SK ATX-POT 275 142 000	○	●	IP66	Potentiometer
Signal Converter and Relay	 SK CU4-REL 275 271 011	●	○	IP20	2x AIN / AOUT, 2 DIN / relay
	 SK CU4-REL-C ¹ 275 271 511	●	○	IP20	
	 SK CU4-REL-POW 275 271 012	●	○	IP20	2x AIN / AOUT, 2 DIN / relay
	 SK CU4-REL-POW-C ¹ 275 271 512	●	○	IP20	
	 SK CU4-MBR 275 271 010	●	○	IP20	230 V / 400 V, max. 0.5 A
	 SK CU4-MBR-C ¹ 275 271 510	●	○	IP20	
	 SK CU4-SSR 275 271 124	●	○	IP20	2x DIN / relay
	 SK CU4-SSR-C ¹ 275 271 624	●	○	IP20	
	 SK CU4-SSR -400 275 271 128	●	○	IP20	2x DIN / relay
	 SK CU4-SSR-400-C ¹ 275 271 628	●	○	IP20	

¹ Version with varnished circuit boards for applications in IP6X devices

Remarks	NORDAC		
	FLEX	BASE	START
Switches: "ON R" - "OFF" - "ON L", 10 - kΩ potentiometer	●	●	○
"ON R" - "OFF" - "ON L"	●	●	●
10 kΩ potentiometer	●	●	○
10 kΩ - potentiometer, approved for use in ATEX Zone 22 3D	●	●	○
Converter for analog signals -10 ... +10 V to 0 ... 10 V, 2 x changeover relay outputs 1 A (≤ 30 V), controlled via a digital input	●	●	○
	●	●	○
Converter for analogue signals -10 ... +10 V to 0 ... 10 V, 2 x changeover relay outputs 8 A (≤ 30 V), controlled via a digital input	●	●	○
	●	●	○
For direct control and supply of an electromagnetic holding brake	●	●	○
	●	●	○
Relay outputs (NO), suitable for AC / DC (max. 277 V AC, 850 mA / 24 V DC +/- 25%, 850 mA), control either synchronously via a digital input or individually via one digital input each	●	●	○
	●	●	○
Relay outputs (NO), suitable for AC (480 V AC +10%, max. 300 mA), control either synchronously via a digital input or individually via one digital input each	●	●	○
	●	●	○

● Available as standard
○ Not available

Supply and Control Signal Converters and More

Variant		Designation Material No.	Installation	Attached / Separate	Protection Class	Description
Residual Voltage Discharge		SK CU4-PD1 275 271 025	●	○	IP20	Module for residual voltage dissipation
		SK CU4-PD1-C ¹ 275 271 525	●	○	IP20	
		SK CU4-PD2 275 271 026	●	○	IP20	Module for residual voltage dissipation
		SK CU4-PD2-C ¹ 275 271 526	●	○	IP20	
Switch		SK TU4-MSW 275 281 123	○	●	IP55	1~ 100 - 240 V / 3~ 200 - 500 V, 16 A
		SK TU4-MSW-C 275 281 173	○	●	IP66	1~ 100 - 240 V / 3~ 200 - 500 V, 16 A
Connection Units		SK TI4-TU-MSW 275 280 200	○	●	IP55	
		SK TI4-TU-MSW-C 275 280 700	○	●	IP66	
		SK TIE4-WMK-TU 275 274 002	○	○	IP66	

¹ Version with varnished circuit boards for applications in IP6X devices

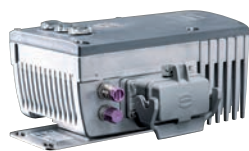
NORDAC

Remarks	FLEX	BASE	START
Load resistance 3 x 470 kOhm, ≤ 550 V AC/DC, ≤ 20 A	●	○	○
	●	○	○
Load resistance 3 x 160 kOhm, ≤ 550 V AC/DC, ≤ 20 A	○	●	○
	○	●	○
Switch to disconnect the device from the power supply, black twist grip plus suitable SK T14-TU-MSW/SK T14-TU-MSW-C connection unit	●	●	●
	●	●	●
SK TU4-... connection unit for maintenance switches (IP55)	●	●	●
SK TU4-... connection unit for maintenance switches (IP66)	●	●	●
For separate mounting of SK TU4... modules with SK T14-TU-...	●	●	●

● Available as standard
○ Not available

Perfect Connections with System Plug Connectors

Plug Connectors for Power Connections



Available plug connectors for power and control connections make it possible to replace the drive unit with minimal downtime if service is required and also reduce the danger of installation errors when connecting the device.

Plug connectors from various manufacturers are available for the motor or mains connection for rated currents of up to 20A.

Type	Data	Designation	Material No.	NORDAC		
				FLEX	BASE	START
Input (power and control voltage)	400 V, 16 A + 24 V, 4 A	SK TIE4-HANQ4-M-LE-MX	275 274 113	●	●	●
Input (power and control voltage)	400 V, 16 A + 24 V, 10 A	SK TIE4-NQ16-K-LE	275 274 133	●	●	○
Input and output (power and control voltage)	400 V, 32 A + 24 V, 4 A	SK TIE4-2HANQ4-M-LE-LA	275 274 112	●	●	●
Input and output (power and control voltage)	400 V, 40 A + 24 V, 6 A	SK TIE4-2HANQ4-M-LE-LA-6mm	275 274 119	●	●	●
Power input	500 V, 16 A	SK TIE4-HAN10E-M1B-LE	275 135 070	●	●	●
Power input	500 V, 16 A	SK TIE4-HAN10E-M2B-LE	275 135 000	●	●	●
Power input	500 V, 16 A	SK TIE4-HANQ8-K-LE-MX	275 135 030	●	●	●
Power input	690 V, 20 A	SK TIE4-QPD4SPM	275 274 185	●	●	●
Power output	500 V, 16 A	SK TIE4-HAN10E-M2B-LA	275 135 010	●	●	●
Power output	500 V, 16 A	SK TIE4-HANQ8-K-LA-MX	275 135 040	●	●	●
Motor output	500 V, 16 A	SK TIE4-HAN10E-M2B-MA	275 135 020	●	●	●
Motor output	500 V, 16 A	SK TIE4-HANQ8-K-MA-MX	275 135 050	●	●	●
Power input + motor or power output	400 V, 16 A	SK TIE4-2HANQ5-K-LE-LA	275 274 110	●	●	●

● Available as standard
○ Not available



Plug Connectors for Control Connections

Various M12 round plug connectors are available as flanged plugs or flanged sockets. The plug connectors are intended for installation in an M16 screw fitting on the device and can be oriented in any direction. The cover caps correspond to the color version as does the plastic body of the plug connector. Expansion and reducer adapters are available for installation in an M12 or M20 screw fitting.



Type	Version	Designation	Material No.	NORDAC		
				FLEX	BASE	START
System bus IN	Plug connectors	SK TIE4-M12-SYSS	275 274 506	●	●	○
System bus OUT	Bushing	SK TIE4-M12-SYSM	275 274 505	●	●	○
Power supply	Plug connectors	SK TIE4-M12-POW	275 274 507	●	●	●
Sensors/actuators	Bushing	SK TIE4-M12-INI	275 274 503	●	●	●
Sensors/actuators	Plug connectors	SK TIE4-M12-INP	275 274 516	●	●	●
Analog signal	Bushing	SK TIE4-M12-ANA	275 274 508	●	●	○
HTL encoder	Bushing	SK TIE4-M12-HTL	275 274 512	●	○	○
Safe stop	Plug connectors	SK TIE4-M12-SH-IN	275 274 519	●	○	○
Safe stop	Bushing	SK TIE4-M12-SH	275 274 509	●	○	○
AS-Interface	Plug connectors	SK TIE4-M12-ASI	275 274 502	●	●	●
AS-Interface – Aux	Plug connectors	SK TIE4-M12-ASI-AUX	275 274 513	●	●	●
CANopen® / DeviceNet® IN	Plug connectors	SK TIE4-M12-CAO	275 274 501	●	●	○
CANopen® / DeviceNet® OUT	Bushing	SK TIE4-M12-CAO-OUT	275 274 515	●	●	○
Ethernet	Bushing	SK TIE4-M12-ETH	275 274 514	●	●	○
PROFIBUS® (IN + OUT)	Connector + socket	SK TIE4-M12-PBR	275 274 500	●	●	●
Connection extension	M12 - M16	SK TIE4-M12-M16	275 274 510	●	●	●
Connection reduction	M20 – M16	SK TIE4-M20-M16	275 274 511	●	●	●

● Available as standard
○ Not available

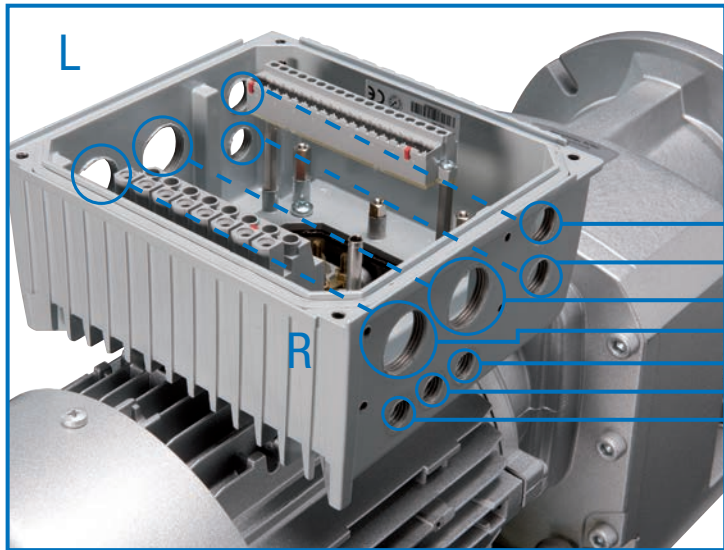


Installation Locations for System Connectors

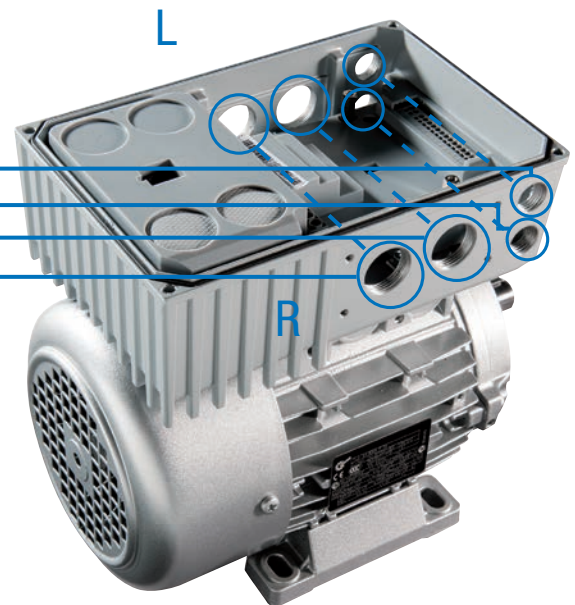
System Connectors

Various screw fittings are available that can be used for the installation of cable glands or system connections. Screw-in reduction or expansion adapters enable the connection of additional cable cross sections as required.

NORDAC FLEX (SK TI4-...)



NORDAC BASE and NORDAC START



Option Locations

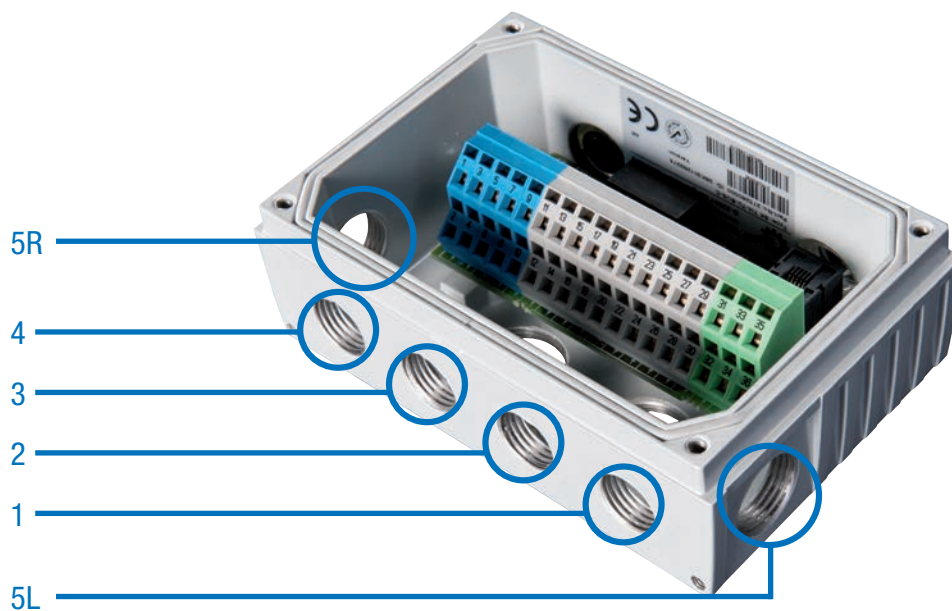
(R or L assignment, view towards the motor fan)

- | | | | |
|---|-----|-----|--|
| 3 | L/R | 2 x | M25 screw fitting (A/B) |
| 4 | L/R | | M16 screw fitting |
| 5 | L/R | | M16 screw fitting |
| 6 | L/R | | M12 screw fitting, BG 4 → M16 (only NORDAC FLEX) |
| 7 | L/R | | M12 screw fitting, BG 4 → M16 (only NORDAC FLEX) |
| 8 | L/R | | M12 screw fitting, BG 4 → M16 (only NORDAC FLEX) |

Size 4 Additional screw fitting L/R: M32 (only NORDAC FLEX)

The plug connectors for the power connection are installed at position 3 (R or L).

Connection Unit - Technology Unit



Optional Slots of the SK TI4-TU-...

- 1 M16 screw fitting
- 2 M16 screw fitting
- 3 M16 screw fitting
- 4 M16 screw fitting
- 5 L/R M20 screw fitting



Not to be Underestimated – the Correct Connection Method

With the NORDAC *LINK*, *FLEX*, *BASE*, and *START* VFDs and motor starters, NORD DRIVESYSTEMS provides the right products for motor control for all decentralized drive technology applications. Advantages include short motor cables, improved EMC filtering, and installation without the need of a control cabinet.

Connection of decentralized components (motor and electronics) can be made either with a hard-wired connection¹ or using quick disconnect plug connectors. However, the full advantages of decentralized drive technology are only achieved with the selection of plug-in connectors.

- ▶ Quick and simple electrical connection
- ▶ Minimization of connection errors
- ▶ Minimum installation time for installation, maintenance, and servicing
- ▶ Reduced downtime in case of replacement

NORD supplies an extensive range of connection and control cables.

- ▶ Depending on the version, connecting cables include power connection cables (mains and motor) and if necessary cables for thermistors and 24 V DC control voltage.
- ▶ Control cables are exclusively used for transmitting control signals (encoder, bus, IO signals).

Connection and control cables are supplied pre-assembled. They are available in various lengths and can optionally be provided with open ends or plug connectors. Connection cables are certified for global use according to the relevant IEC and UL standards. Typically, all cables² are shielded.

¹ Not for NORDAC *LINK* or NORDAC *ON*

² Except for mains connection/daisy chain cables

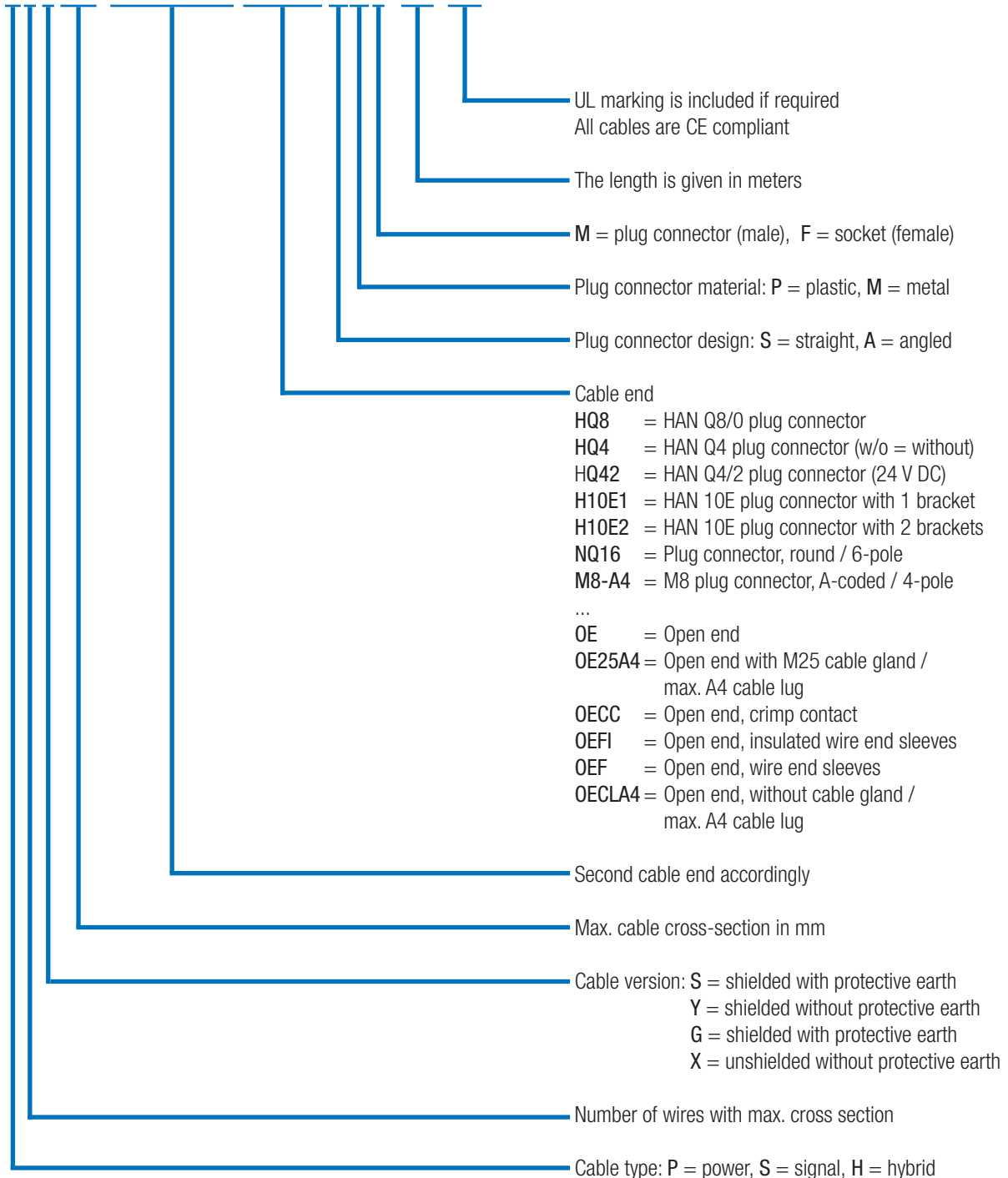


Designation of Pre-Assembled Cables

Pre-Assembled Cables

- ▶ Cables for motor and variable frequency drive connection
- ▶ Mains connection and signal cables
- ▶ Customized plug connectors and cable lengths

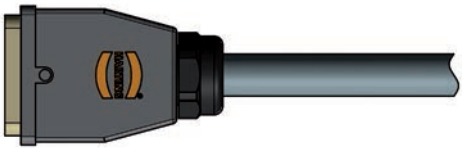
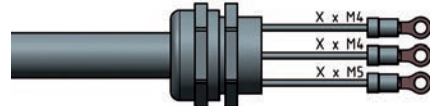
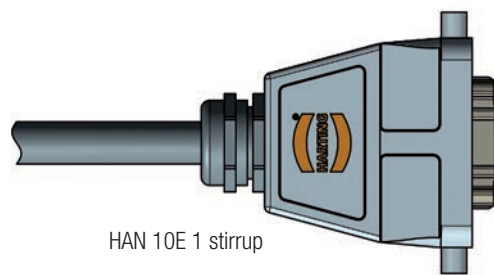
SC H4G2.5 HQ8SMM H10E1SMF 1.5 UL



Technical Data Cables

Cable design depends on the ambient conditions and the type of installation as specified by the customer. All options can be requested from NORD according to the specific project.

Feature	Standard	Options
Conductor material	Copper	-
Installation type	Permanent installation	-
Cable insulation	Polyvinyl chloride (PVC)	Polyurethane (PUR)
Protective sleeve	No	On request
Cable length	Motor cables: 1.5 m – 3.0 m – 5.0 m Mains cables: 1.5 m – 3.0 m – 5.0 m Daisy chain cables: 1.5 m – 3.0 m – 5.0 m Encoder cables: 1.5 m – 3.0 m – 5.0 m Brake resistor cables: 2.0 m – 3.0 m	On request

VFD/Motor Starter Connection	Motor Connection	Required Motor Option ¹
	 Open ends	ZKK
	 HAN 10E 1 stirrup	MS31 or MS31E

¹ For further information about motor options please refer to motor catalog M7000

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Motor Cables

Product Overview – Motor Cables

Depending on the motor, the following shielded motor connection cables are available.

NORDAC LINK, FLEX, BASE, and START

Designation	Motor Power	Certification	Part Number for Length [m]		
			1.5	3	5
SC H4S2.5 HQ8SPM OE20A4 UL	0.12 - 0.37 kW 0.16 - 0.5 hp	EU / UL	275 274 800	275 274 801	275 274 802
SC H4S2.5 HQ8SPM OE25A4 UL	0.55 - 1.5 kW 0.75 - 2.0 hp	EU / UL	275 274 805	275 274 806	275 274 807
SC H4S2.5 HQ8SPM OE32A4 UL	2.2 - 3.0 kW 3.0 - 4.0 hp	EU / UL	275 274 825	275 274 826	275 274 827
SC H4S2.5 HQ8SPM OE32A5 UL	4.0 kW 5.5 hp	EU / UL	275 274 830	275 274 831	275 274 832
SC H4S4 HQ8SPM OE32A6 UL	5.5 - 9.2 kW 7.5 - 12.5 hp	EU / UL	275 274 835	275 274 836	275 274 837
SC H4S2.5 HQ8SPM H10E1SMF	0.12 - 4.0 kW 0.16 - 5.5 hp	EU	275 274 810	275 274 811	275 274 812

NORDAC ON

Designation	Motor Size	Certification	Part Number for Length [m]		
			1.5	3	5
SC H4S1 ST8SMM OE20A4 UL	63 – 71, IE1 – IE3	EU / UL	275 274 690	275 274 691	275 274 692
SC H4S1 ST8SMM OE20A4 UL WOB ¹	63 – 71, IE1 – IE3	EU / UL	275 274 617	275 274 618	275 274 619
SC H4S1 ST8SMM OE25A4 UL	80 – 90, IE1 – IE3 71, IE5+	EU / UL	275 274 695	275 274 696	275 274 697
SC H4S1 ST8SMM OE25A4 UL WOB ¹	80 – 90, IE1 – IE3 71, IE5+	EU / UL	275 274 621	275 274 622	275 274 623
SC H4S1 ST8SMM HQ8SMF UL	NORD motor connector MS21	EU / UL	275 274 685	275 274 686	275 274 687
SC H4S1.5 TEH51SVM TEH51SVF MBE ²		EU / UL		in preparation	

Mains Cables / Daisy Chain Cables

Product Overview – Mains Cable

The following unshielded mains cables are available. A simple plug-in connection for VFDs can be achieved with the HQ4 variant. With a second variant (HQ42) a 24 V DC supply can also be implemented.

Designation	24 V DC Supply	Certification	Part Number for Length [m]		
			1.5	3	5
SC P4G2.5 HQ4SPF OE	no	EU	275 274 840	275 274 841	275 274 842
SC P4GA14 HQ4SPF OE UL	no	UL		275 274 241	275 274 242
SC H4G4 HQ42SPF OE	yes	EU	275 274 845	275 274 846	275 274 847
SC H4GA12 HQ42SPF OE UL	yes	UL		275 274 246	275 274 247
SC H6G2.5 NQ16SPF OE UL ¹	yes	UL	275 274 218	275 274 219	275 274 220

¹ NORDAC ON only

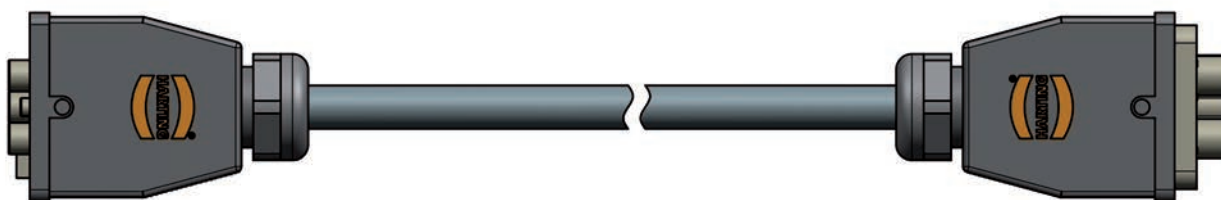


Product Overview – Daisy Chain Cables

A daisy chain cable is designed for looping the mains connection (plug connections on both sides) from one VFD to the next. The same variants used for mains cables are available. These cables are also unshielded.

Designation	24 V DC Supply	Certification	Part Number for Length [m]		
			1.5	3	5
SC P4G4 HQ4SPM HQ4SPF	no	EU	275 274 850	275 274 851	275 274 852
SC P4GA12 HQ4SPM HQ4SPF UL	no	UL		275 274 251	275 274 252
SC H4G4 HQ42SPM HQ42SPF	yes	EU	275 274 855	275 274 856	275 274 857
SC H4GA12 HQ42SPM HQ42SPF UL	yes	UL		275 274 256	275 274 257
SC H6G2.5 NQ16SPM NQ16SPF UL ¹	yes	UL	275 274 288	275 274 289	275 274 290

¹ NORDAC ON only

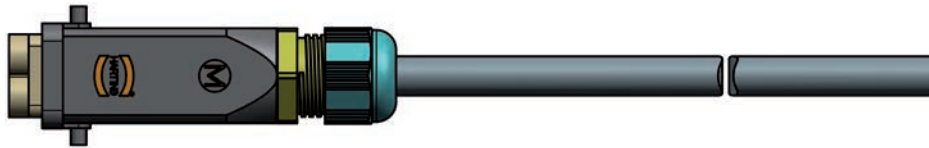


Brake Resistor Cable / Control Cables

Product Overview – Braking Resistor Cables

The following shielded cables are available for connecting an external brake resistor.

Designation	Certification	Part Number for Length [m]	
		2	3
SC P3S2.5 HQ2SPM OE	EU	275 274 881	275 274 899
SC P3SA14 HQ2SPM OE UL	UL	275 274 280	275 274 281



Product Overview – Control Cables

Control cables for connection to an encoder are typically connected with M12 plug connectors. The following system solutions are available for encoder connection.

Designation	Motors			Encoders ¹	Cable Type	Control Cable Length - Part No.
	IE1-3	IE4	IE5+			
AG4 cable set consisting of 1x each SK CE-A5F-AGC-A5F SK CE-B4M-IGC-B5F	●	●	○	AG4 - 19 551 886	AG4 cable set	1.5 m - 275 274 640 3.0 m - 275 274 641 5.0 m - 275 274 642
	●	○	○	IG12P - 19 651 501 IG22P - 19 651 511 IG42P - 19 651 521	HTL without zero track	1.5 m - 275 274 675 3.0 m - 275 274 676 5.0 m - 275 274 677
	○	●	○	IG22P5 - 19 651 910	HTL	1.5 m - 275 274 874
SC S4Y0.25 M12-B4MM M12-A8SMF	○	○	●	IG62P5 - 19 605 002	HTL with zero track	3.0 m - 275 274 876 5.0 m - 275 274 877
	○	○	○	IG22P8 - 19 651 911	HTL with zero track	1.5 m - 275 274 645 3.0 m - 275 274 646 5.0 m - 275 274 647

¹ Further information about encoders can be obtained from motor catalog M7000.

- Available as standard
- Not available

Notes

Gear Units



NORDBLOC.1® Helical Inline
Catalog: G1000



UNICASE™ Helical Inline
Catalog: G1000



UNICASE™ Parallel Shaft
Catalog: G1000



UNICASE™ Helical Bevel
Catalog: G1000



NORDBLOC.1® 2-Stage Helical Bevel
Catalog: G1000



DuoDrive Integrated Gear Motor
Catalog: G5010, Flyer: S5010



UNICASE™ Worm
Catalog: G1000



UNIVERSAL SI Worm
Catalog: G1000



SMI Worm
Catalog: G1000

Industrial Gear Units



MAXXDRIVE® Industrial Gear Units (Parallel, Right Angle)
Catalog: G1050, Flyer: F1050



MAXXDRIVE® XT Industrial Gear Units (Parallel with High Thermal Limit)
Catalog: TI60-0011, Flyer: S1055



MAXXDRIVE® XD Industrial Gear Units (Extended Center Distance)
Flyer: S1056



Endurance Package
Application Sheet: 106066000

Motors & Brakemotors



IE4/IE5+ Premium Efficiency Motors
Catalog: M5000, Flyer: S9012



VFD/AC Vector Duty Motors
Catalog: M7000



Smooth Body Motors
Catalog: Catalog: M7010, TI60-0002

Variable Frequency Drives



NORDAC® START Motor Starters
Catalog: E3000, Flyer: F3015



NORDAC® BASE VFDs
Catalog: E3000, Flyer: F3018



NORDAC® FLEX VFDs
Catalog: E3000, Flyer: F3020



NORDAC® LINK VFDs & Motor Starters
Catalog: E3000, Flyer: F3025



NORDAC® PRO VFDs
Catalog: E3000, Flyer: F3060

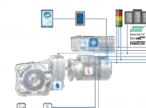


NORDAC® ON/ON+ VFDs
Catalog: E3000, Flyer: S9013

Systems



LogiDrive Complete Drive Solution
Flyer: S5210



Condition Monitoring for Predictive Maintenance
Flyer: S9091



Screw Conveyor Package (SCP)
Catalog: G1000

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