Intelligent Drivesystems, Worldwide Services

CENTRALIZED AND DECENTRALIZED VARIABLE FREQUENCY DRIVES AND MOTOR STARTERS

US

NORDAC®

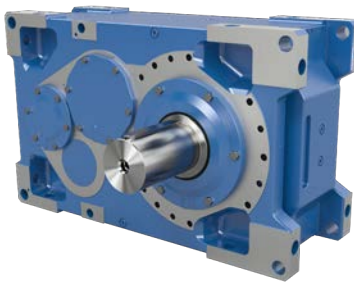
Electronic Drive Technology

NORD® DRIVESYSTEMS

NORD DELIVERS COMPLETE DRIVE SOLUTIONS
FROM A SINGLE SOURCE

NORD Delivers

NORD offers 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.

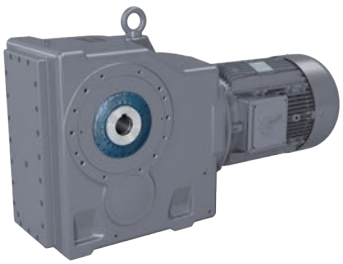


Reduce Lead Times and Decrease Inventory

- 25% of orders ship same day or next day with NO expedite fees
- 47% of orders ship within 5 working days
- 81% of orders ship in 2-3 weeks

Global Product Designs, Standards, and Support

- Innovative product range (one-stop shop)
- Global connected presence
- Mechanical and electrical application engineers ready to assist you
- Online resources



Increase Efficiency and Reduce Operation Costs

- First-class customer service and support, plus myNORD online tools
- Product flexibility through standard components and customizations
- 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!

NORD DRIVESYSTEMS

High-performance Solutions

NORD's extensive product portfolio is continuously evolving to meet the needs of today's fast-changing markets, but NORD does far more than manufacture the world's finest drive components. We provide our customers with optimum drive configurations for their specific purposes, providing each and every one of them with complete and efficient systems at a price/quality ratio that's unmatched.

By continuing to invest in the latest research, manufacturing, and automation technology, we are able to deliver innovative drive systems with the highest quality, reliability, and value found in the marketplace today. In short, we never stop improving.

On-time Delivery

NORD's linked global network of assembly and manufacturing operations gives you the best of both worlds – a world leader with local representatives. NORD has subsidiaries and sales partners in 98 countries on five continents, ensuring local inventory, assembly centers, technical support, and customer service.

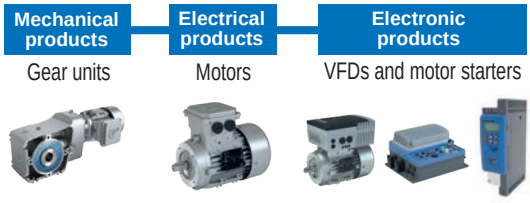
This approach also allows us to provide the shortest lead times in the industry. As a NORD customer, you can rest assured that your order will be delivered on time and on spec. We offer our customers:

- Fast, accurate, reliable service
- Unmatched product versatility and customizations
- Short lead times
- Technical guidance from experienced engineers
- MyNORD online tools (configure, price, quote, and track your order)
- 24/7/365 after hours emergency support via the NORD 911 hotline

Peace of Mind

NORD's customer-first approach means superior drive solutions and peace of mind are just a call or click away. Put NORD's global team of engineers, manufacturing, service and support technicians to work for you. Together, we'll build something great!

Headquarters and technology center in Bargteheide, near Hamburg



Innovative drive solutions for more than 100 branches of industry

Gear unit production

Motor production

VFD production

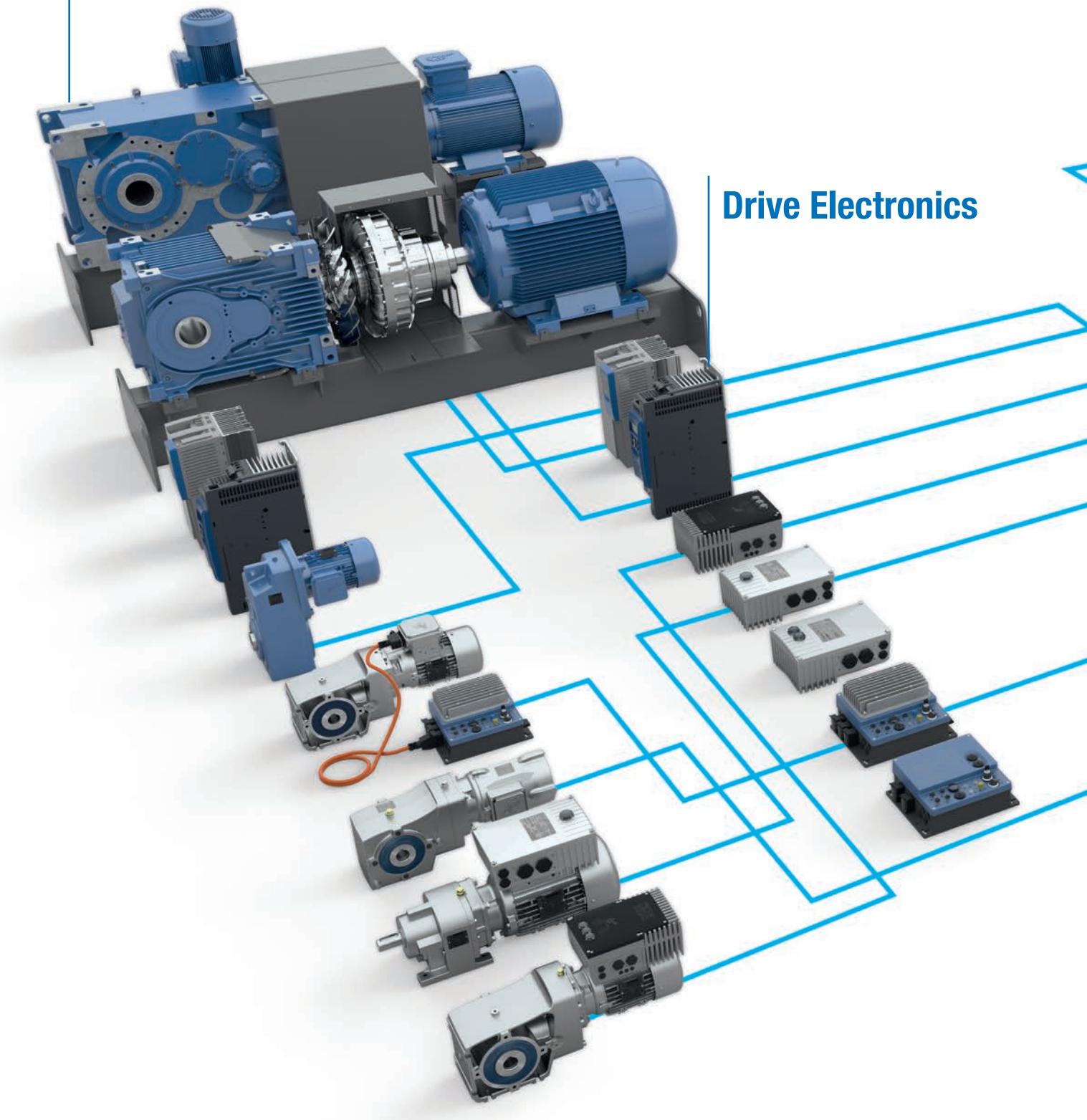
7 production locations with cutting-edge technology produce gear units, motors, VFDs, and more to provide complete drive systems from a single source.

The map shown above is for information only and does not claim to be created for or applicable to any legal purpose. For this reason, we do not assume any liability for legality, correctness and completeness.

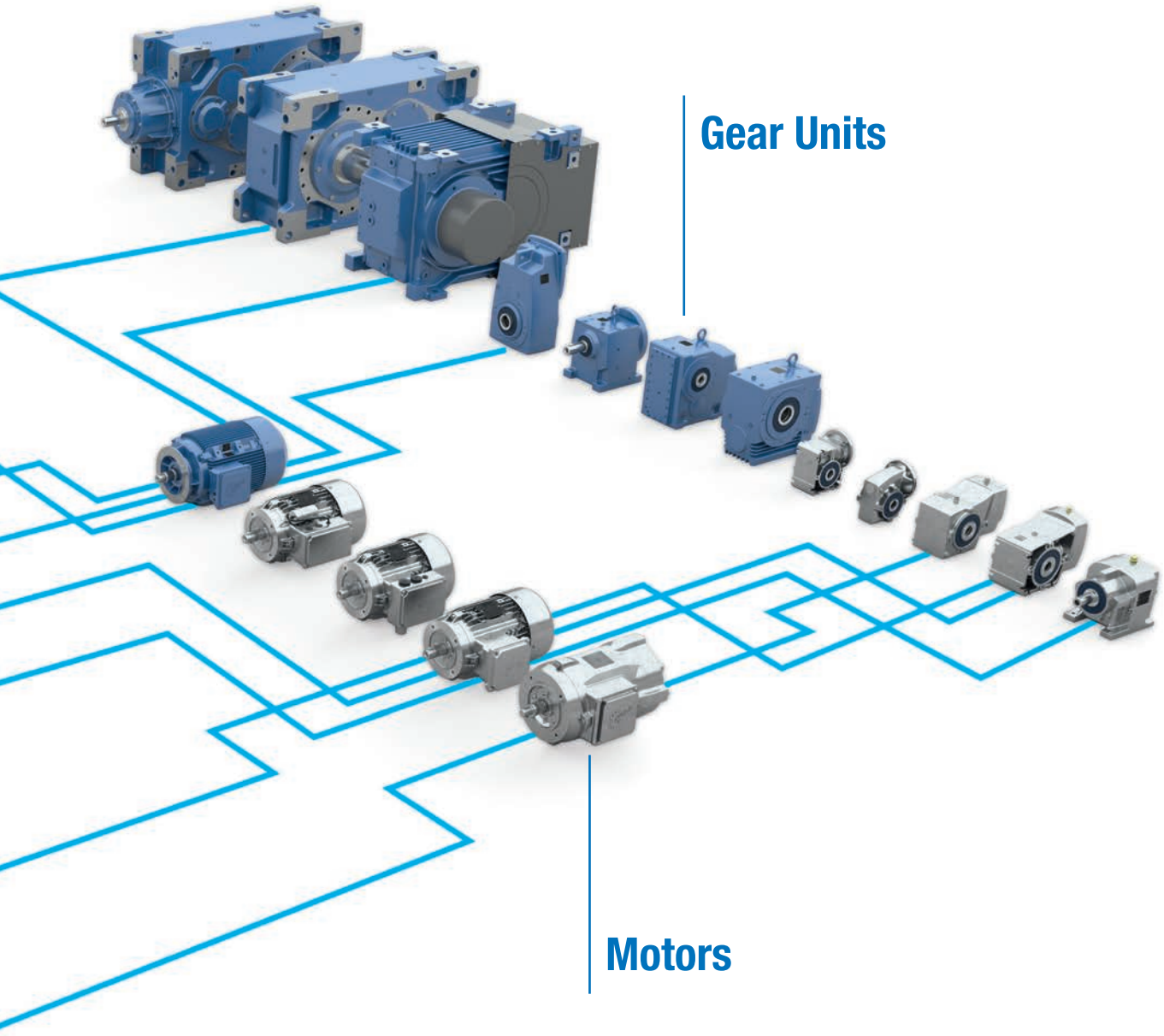
Subsidiaries and sales partners in 98 countries on 5 continents provide local inventory, assembly, technical support, and industry-leading customer service.

More than 4,000 employees throughout the world create customized solutions.

Drive Solutions



Drive Electronics

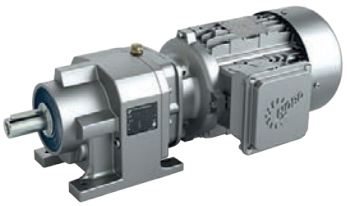


Our products are available in ATEX certified versions.

An optimum and individual drive solution can therefore be created using the modular NORD system consisting of the gear unit, motor and drive electronics. The modular products are perfectly matched and can be combined in many variants. 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, programmed and ready for use. Each modular NORD product combines: 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.

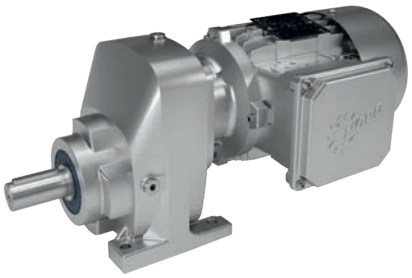
GEAR MOTORS



Helical Inline Gear Units

- Foot or flange mounted
- Long life, low maintenance
- Closely stepped ratios
- Versatile input designs

Sizes	11
Power	0.16 – 200 HP
Torque	Up to 205,000 lb-in
Ratio	1.35:1 – 14,340.31:1
Efficiency	Up to 98%



NORDBLOC®.1 Helical Gear Units

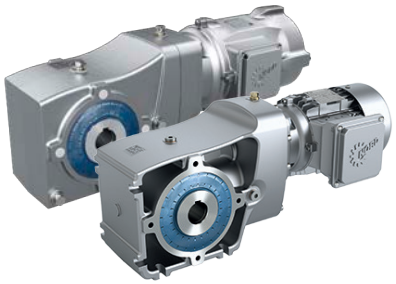
- Foot or flange mounted
- Long bearing life
- Smooth surface
- Industry standard dimensions

Sizes	13
Power	0.16 – 60 HP
Torque	Up to 29,205 lb-in
Ratio	1.07 – 456.77.131:1
Efficiency	Up to 97%

Clincher™ Parallel Shaft Gear Units

- Foot, flange or shaft mounted
- Hollow or solid shaft
- Compact design
- Long service life, low maintenance

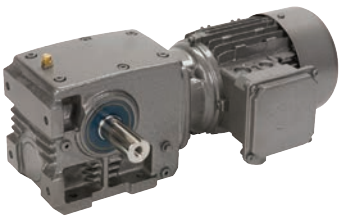
Sizes	15
Poiwer	0.16 – 200 HP
Torque	Up to 638,000 lb-in
Ratio	4.03:1 – 15,685.03:1
Efficiency	Up to 97%



Two-stage Bevel Gear Units

- Foot, flange or shaft mounted
- Hollow or solid shaft
- Compact design
- Aluminum alloy housing

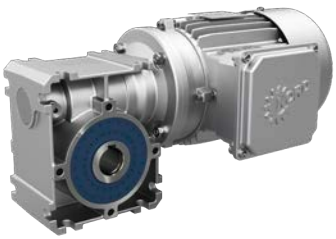
Sizes	6
Power	0.16 – 12 HP
Torque	Up to 5,800 lb-in
Ratio	3.03:1 – 70:1
Efficiency	Up to 97%



Helical Worm Gear Units

- Foot, flange or shaft mounted
- Hollow or solid shaft
- Cast iron housing
  (Size SK 02040.1 aluminum alloy)

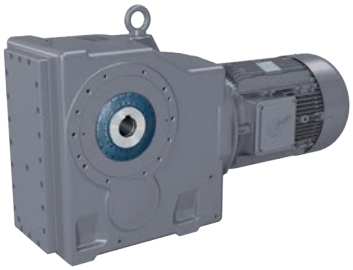
Sizes	6
Power	0.16 – 20 HP
Torque	407 – 27,350 lb-in
Ratio	4.40:1 – 7,095.12:1
Efficiency	Up to 94%



FLEXBLOC® Worm Gear Units

- Modular
- Universal mounting
- Lubricated for life
- NEMA and IEC versions

Sizes	5
Power	0.16 – 5.0 HP
Torque	186 – 4,683 lb-in
Ratio	5.00:1 – 3,000.00:1
Efficiency	Up to 94%



Helical Bevel Gear Units

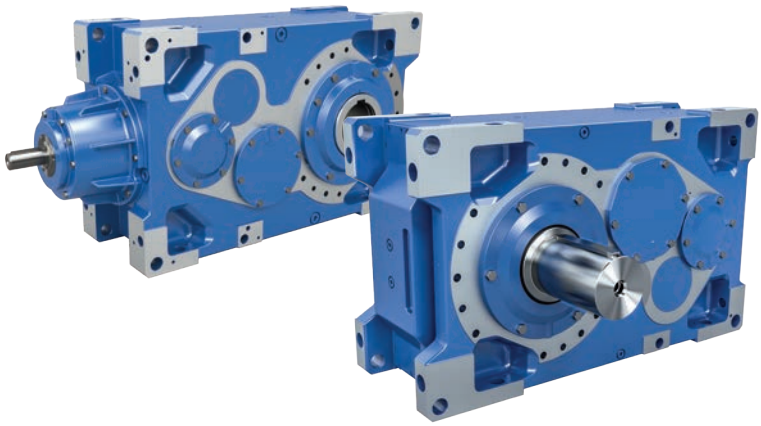
- Foot, flange or shaft mounted
- Hollow or solid shaft
- High efficiency
- Cast iron housing

Sizes	11
Power	0.16 – 200 HP
Torque	Up to 442,500 lb-in
Ratio	8.04:1 – 13,432.68:1
Efficiency	Up to 95%

MINICASE™ Worm Gear Units

- Smooth surfaces
- Lubricated for life
- NEMA and IEC versions
- nsd tupH™ (optional)

Sizes	5
Power	0.16 – 5.0 HP
Torque	186 – 4,683 lb-in
Ratio	5.00:1 – 3,000.00:1
Efficiency	Up to 94%

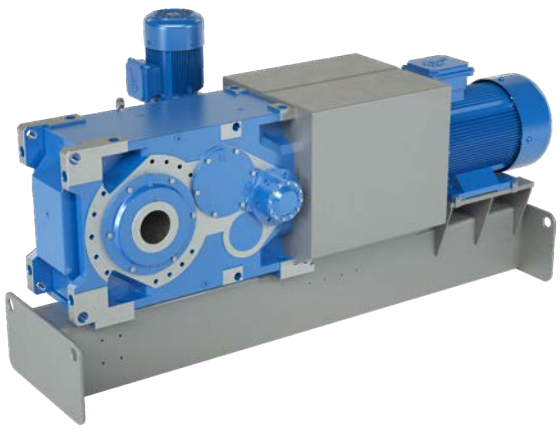


MAXXDRIVE® Industrial Gear Units

- All bearing points and sealing surfaces are machined in a single process (promoting quieter operation and long service life)
- No separating joints in the housing, no sealing surfaces subject to torque
- High-precision axis alignment
- Long life, low-maintenance
- Gear ratio range 5.54 to 400:1 with the same foot dimensions
- Parallel axis and right-angled gear units

Sizes	11
Power	50 – 2,000 HP
Torque	130,000 – 2,250,000* lb-in (* with combination gearbox)
Ratio	7 – 1,600:1

NORD is the only manufacturer that produces modular industrial gear units with an output torque of up to 2,150,000 lb-in in a one-piece UNICASE housing.



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
- Four-quadrant operation
- PLC functionality for drive-related functions
- Energy-saving function for partial load operation
- Control and parameterization tools and simple parameter structure
- Integrated line filter for compliance with EMC regulations
- Operation of asynchronous and synchronous 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

NORD drive electronics are available in ATEX certified versions.

Advantages

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

NORDAC® *PRO*: Control cabinet variable frequency drives SK 500E

The VFD 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 160 kW (200 HP)
- Control cabinet installation
- Protection class IP20

NORDAC® *PRO*: Control cabinet variable frequency drive SK 500P

The next generation of control cabinet VFD. Compact size, innovative and extremely flexible communication and interface concept, functional expansion with optional modules.

Nominal ratings:
- Power range up to 5.5 kW (7.5 HP)
- Control cabinet installation
- Protection class IP20

NORDAC® *FLEX*: Decentralized variable frequency drive SK 200E

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

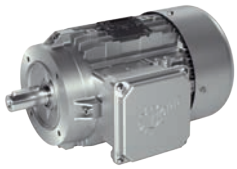
Nominal ratings:
- Power range up to 22 kW (30 HP)
- Wall or motor mounting
- IP55, IP66

NORDAC® *BASE*: Decentralized variable frequency drive SK 180E

Economical decentralized version 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 2.2 kW (3.0 HP)
- Wall or motor mounting
- IP55, IP66, IP69K

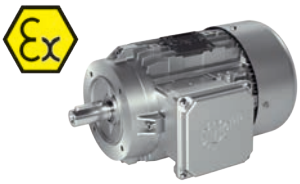
Motors



Energy-saving motors

Smooth body motors

Explosion-proof motors, gas atmospheres



Explosion-proof motors Dust atmospheres

Single-phase and 2-speed motors available by request.

IE2 IE3 IE4 IE5

NORD develops its own motors and supplies them to all major markets throughout the world.

NORDAC® *START*: Motor starter SK 135E

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

Nominal ratings:
- Power range up to 7.5 kW (4 HP)
- Wall or motor mounting
- IP55, IP66, IP69K

NORDAC® *LINK*: variable frequency drive SK 250E-FDS

The field distributor for flexible, decentralized installation. Flexibility of equipment and function – free configurability according to requirements and the application. Available as VFD and starter.

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 7.5 kW (10 HP)
- Wall mounting
- IP55, IP65

Motor starter SK 155E-FDS

Nominal ratings:
- Power range up to 3 kW (4 HP)
- Wall mounting
- IP65

WHY DRIVE SOLUTIONS FROM NORD DRIVESYSTEMS ARE YOUR BEST CHOICE

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

- NORD provides everything from a single source. All components – gear units, motors and drive electronics – are optimally matched.
- NORD provides specialized local expertise and support throughout the world for the planning, design and integration of suitable drive technology.
- NORD supplies pre-assembled drive systems which are simple and easy to install and maintain.
- Satisfied customers from all over the world give you confidence in your decision for NORD.

Experience, competence and innovation over more than 30 years

NORD Electronic DRIVESYSTEMS GmbH, a member of the **NORD DRIVESYSTEMS Group**

In addition to excellent quality and reliability, drive solutions from **NORD** DRIVESYSTEMS also feature a great depth of production. The drive specialist produces all quality-relevant 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 was continually expanded and now includes electronic drive technology up to 200 HP. The production facility has also been continually expanded. **NORD Electronic DRIVESYSTEMS GmbH** now employs 130 people and produces more than 100,000 units per year in an area of 54,000 sq. feet.

DRIVE UNITS: NETWORKED – AUTONOMOUS – SCALABLE

Intelligent drive units by NORD DRIVESYSTEMS now play an important role in highly networked systems to advance the so-called fourth industrial revolution, which is based on the extensive exchange of information at all levels.

“"NORD 4.0 READY!" means that NORD drive units are networked, autonomous, and scalable.

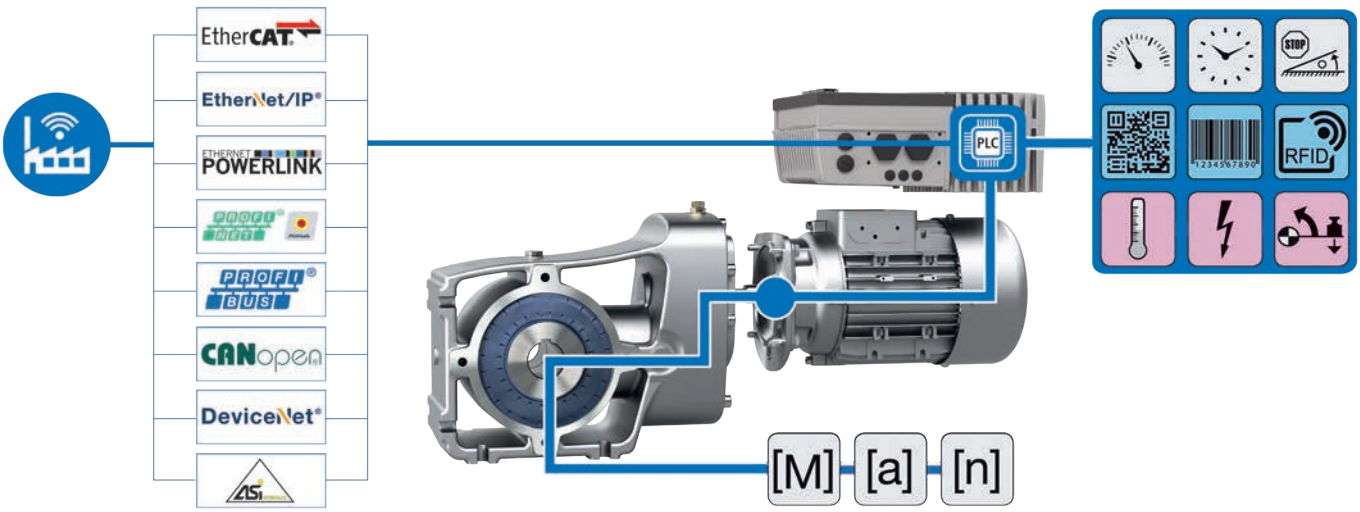
The key components are the VFD units with their powerful processors and comprehensive equipment, interfaces, and functions. They not only monitor themselves and the motor, but also the effect on the load situation in plant segments and beyond.

The integrated PLC processes data from sensors and actuators. If necessary, it initiates a control sequence and communicates high quality drive and application data to the control center and other networked components.

The drive units can also communicate with each other: “Attention, I am sending a package in your direction. Start your conveyor belt.” A follower drive can synchronize to a master for a particular task and then return to normal operation.

Hundreds of typical functions are saved as parameter sets and can be simply adopted.

As a result, the VFD can coordinate both simple and complex applications independently from the plant control system, and can respond to changes to the process or remedy many process faults independently without external intervention.



STANDARD
FUNCTIONS

Load monitor

- 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%
- Easy program adjustments

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 follower drives by a master drive
- Communication via USS or CANopen with control word and setpoint values

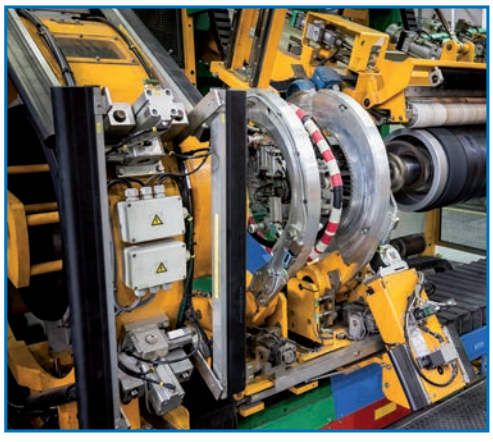
Evacuation run

- Evacuation run possible if the main power 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 and therefore also:
  - Full torque down to standstill (speed 0)
  - Digital speed controller with wide range of setting



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)

STANDARD
FUNCTIONS

User friendly

- Easy adaptation to bus communication systems with optional hardware/software options.
- Quick and simple diagnostics via LED indicator lights
- 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

- VFD protected through
  - Overvoltage monitoring
  - Temperature monitoring
  - High current monitoring
- Communication monitoring
  - Timeout functions
- System protection through
  - Overload monitoring
  - Thermistor evaluation
  - Motor temperature monitoring
- Functional safety
  - Safe torque switch-off STO
  - Safe stop SS1, SS2
  - Safe speed SLS, SOS
  - Secure bus communication

(not available in all series)

WHEN EXTREME PRECISION IS NEEDED
POSICON AND PLC

POSICON

Variable frequency drives with integrated POSICON functionality are able to determine the actual position of the drive unit via appropriate interfaces. Incremental encoder inputs (TTL/HTL) or connections for absolute encoders are available as interfaces via CANopen (NORDAC® *PRO* from SK 540E and above and 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 the facility for relative positioning of endless axes as well as various technology functions (rotating platform with travel optimization, synchronous operation, and flying saw).

By means of the standard POSICON position memory and features such as teach in, approach reference point, reset position, offset position, target window positioning and S-ramp, the variable frequency drive can carry out fully independent positioning control.

The tasks for the external control system are therefore reduced to the enable command 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 with precise approach positions
- Running material conveyors or portal cranes with synchronous function 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

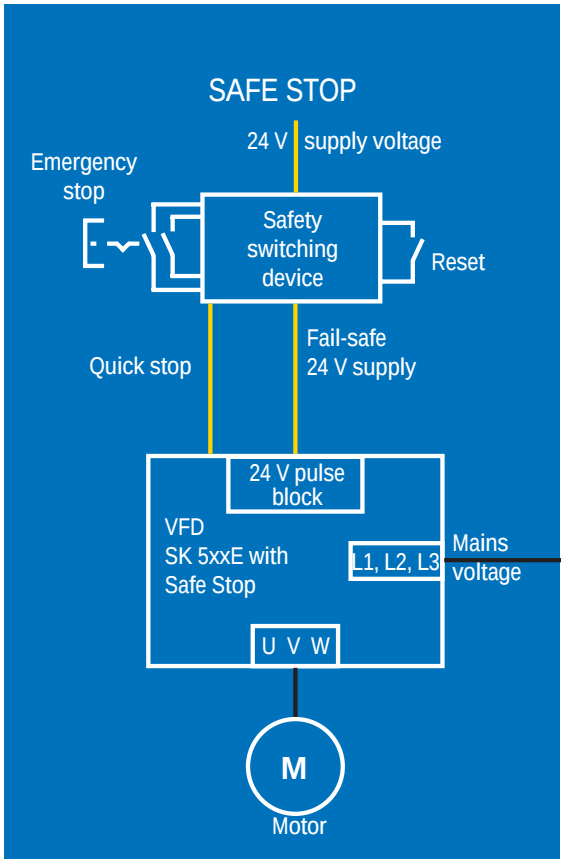
The intelligent drive electronics with integrated PLC functionality reduces the load on the higher level system control unit. This enables a modular system design. Application data can be evaluated in real time by the decentralized PLC, for example for the optimization of diagnostic facilities. The PLC functionality enables the application to respond according to the situation.

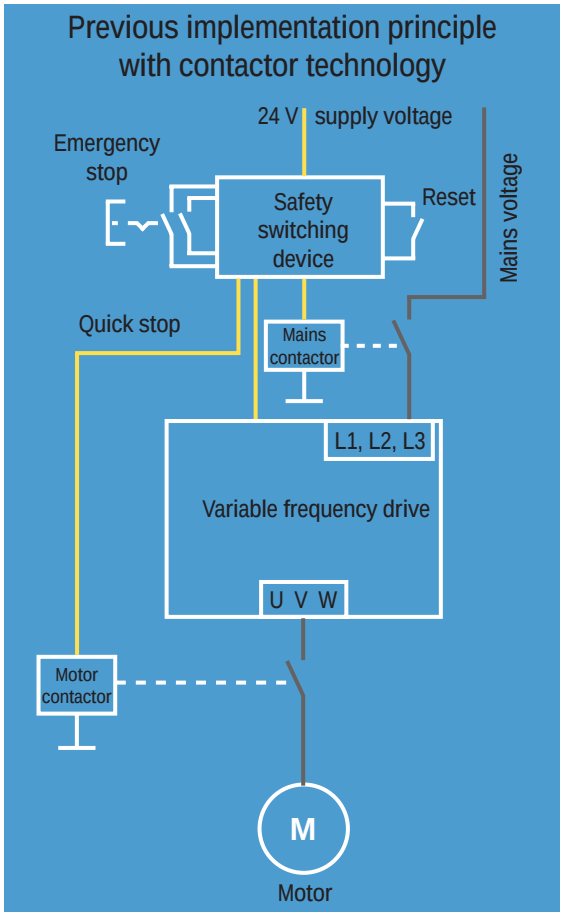
- The PLC can be programmed with the NORDCON software (IEC 61131-3, Structured Text ST and Instruction List IL). There are no license fees or other runtime costs.
- Customer-specific control functions can be simply integrated with the PLC. Evaluation of sensor data and control of actuators replaces the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

Applications

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

PUTTING SAFETY FIRST
SAFE STOP STO AND SS1





Safe Stop

Worker safety and high 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 system components can result in accidents.

With a motor controlled by a NORD variable frequency drive, this is implemented by a safe pulse block which provides protection against the motor generating torque, in compliance with the standard.

This safe block includes the voltage supply to the circuit breaker by means of a safety switching device. The VFD is 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

- Safe Torque Switch-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 compact device

NORDCON

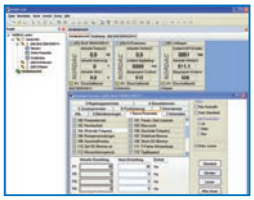
NORDCON is the operating software for control, parameterization and diagnostics of all NORD variable frequency drives and motor starters.

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.

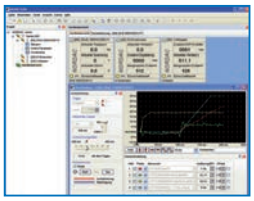
Parameterization

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



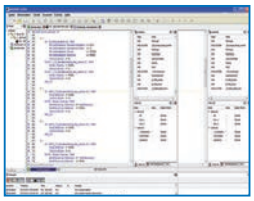
Diagnosis

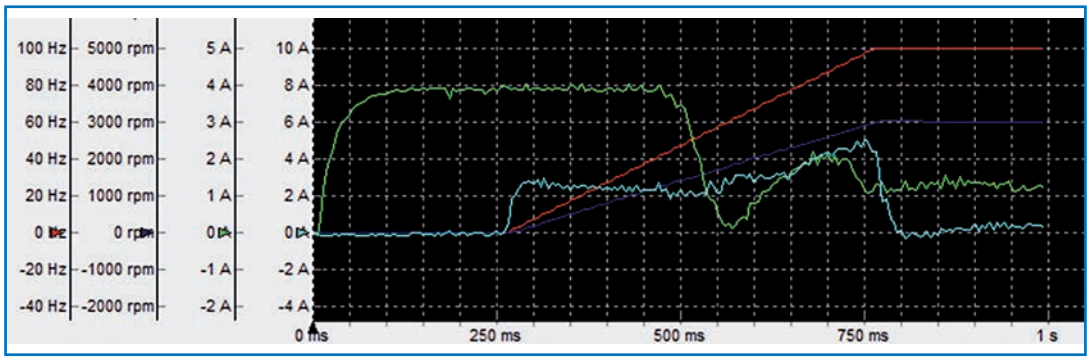
The NORDCON oscilloscope function is an extremely useful instrument for optimum adjustment of drive systems. By means of line graphs, all drive characteristics (current, torque, etc.) can be recorded and analyzed. On the basis of the results, fine tuning of the ideal parameter settings of the relevant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

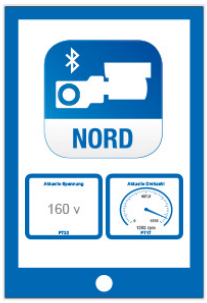


PLC programming

A PLC editor is available for creating, editing and managing a PLC program. The PLC programs can also be tested (debugged) with this editor and communicated to the variable frequency drive.







.... AND WIRELESS IS ALSO POSSIBLE

NORD goes mobile with new Bluetooth stick

With the NORDAC® *ACCESS BT* Bluetooth stick you can now make 1:1 connections to your smart phone or other Bluetooth-enabled device. Together with the free NORDCON *APP*, available for free download through the App Store for iOS and Google Play for Android users, you have a practical, smart tool with which you can conveniently access your variable frequency drive. The available functions (operation, parameterization and oscilloscope) are familiar from the Windows-based NORDCON software, but are now a little smarter.

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
- The ability to send service requests to the local NORD support team directly from the app

Key Benefits

- Speeds up commissioning, simplifies maintenance and enables problems to be resolved quicker, thus reducing downtime.
- Because you can communicate with a device inside a safety area without having to enter hazardous areas.

CONTENTS

Intelligent Drivesystems, Worldwide Services

VARIABLE FREQUENCY DRIVE FOR CONTROL CABINET APPLICATIONS

US

NORDAC® *PRO*

VFD SK 500P

NORD® DRIVESYSTEMS

NORDAC® *PRO*, SK 500P SERIES

NORDAC *PRO* SK 500P variable frequency drives are available for motors with rated powers of 0.25 – 5.5 kW (0.33-7.5 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 in case of fluctuating loads and very high torques during start-up
- 200% overload capacity provides greater operational safety in cranes and lifting gear applications
- Flexibility to operate asynchronous and synchronous motors
- Integrated brake chopper for 4-quadrant operation
- Integrated line filter serving as the basis for optimal EMC performance
- Integrated PLC enables convenient 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 latest 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 displays and status information. Naturally, it also allows direct access to parameterization.

As standard, the variable frequency drives are equipped with an integrated AC voltage unit to supply the control board. The USB port, which is provided as standard for SK 530P and higher, also provides the ability to access the VFD's control board without connection of the AC voltage.

VFDs that are SK 530P and higher are equipped with a separate 24 V DC connection. With these devices, access to parameter data is possible when the power is switched off and communication with the bus is retained. Optional SK CU5 extensions, which can be combined with all SK 530P devices and above, round off the range of functions.

These functions 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). Only one SK CU5 extension can be connected between the variable frequency drive and the operating display.

An Ethernet interface is integrated in configuration levels SK 550P and above. During commissioning this can be simply set by switching a parameter to the required dialect (Ethernet IP, EtherCAT, PROFINET IO or POWERLINK). The great flexibility for system planning is enhanced by the comparatively small variance in hardware.

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 and ready for immediate use
- Scalable display values
- Stator resistance measurement to ensure optimal control characteristics
- Integrated PLC functionality
- Plug-in power connection terminals
  Available for all devices up to 2.2 kW (3 HP)

Optional

- Interfaces for many Industrial Ethernet-based bus systems
- Removable operating display with extensive operating and status indicators. Parameter editing facility.
- 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

NORD provides the new SK 500P with features for easier working:

Electrical connection

Power terminals

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

The architecture of Size 3 (VFDs with rated powers of 3 kW or 4 HP and above) allows so much space that a plugin design of the power terminals would not provide any further advantage.

Control terminals

Pluggable control terminals are not unique, however most technicians will gladly welcome the fact that the NORDAC *PRO* is equipped with an integrated "3rd hand" which simplifies wiring of the terminals.

Parameter setup

Do you want to view operating values or error messages or access and modify variable frequency drive parameter settings?

Use the right method for you:

- 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) for connection to a Windows computer
- NORDCON *APP* (free) for connection to a mobile device via NORDAC® *ACCESS BT* (optional)

STANDARDS
AND APPROVALS

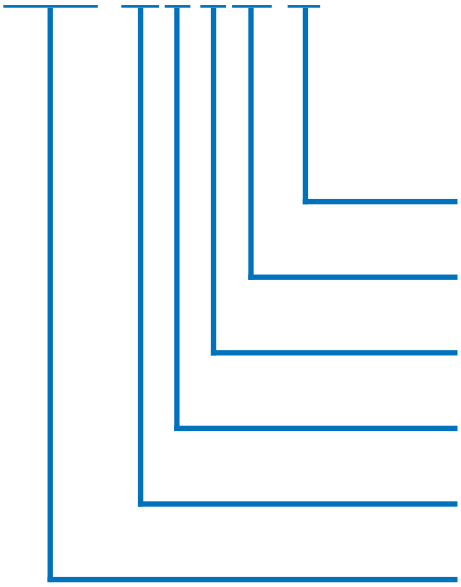
All devices of the entire series comply with the standards and directives listed below.

Approval	Directive	Applied standards	Certificates	Code
CE (European Union)	Low Voltage Directive 2014/35/EU	EN 61800-5-1 EN 60529 EN 61800-3 EN 50581	C310601	CE
	EMC 2014/30/EU			
	RoHS 2011/65/EU			

VARIABLE FREQUENCY DRIVE DESIGNATIONS AND TECHNOLOGY UNITS

Variable Frequency Drives

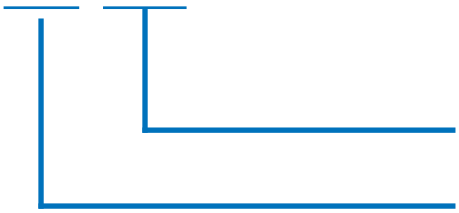
SK 530P-370-340-A



- Radio interference filter: **O** = without, **A** = Class A1(C2) or B (C1)
- AC voltage: **x23** = 230 V, **x40** = 400 V
- Number of AC voltage phases: **1xx** = 1-phase, **3xx** = 3-phase
- Digits before decimal point for power: **0** = 0.xx, **1** = x.x0, **2** = xx.0
- Device rated power: **250** = 0.25 kW, **370** = 0.37 kW, ... **551** = 5.5 kW
- VFD series: SK 500P, SK 510P, SK 530P, SK 550P

Technology Units

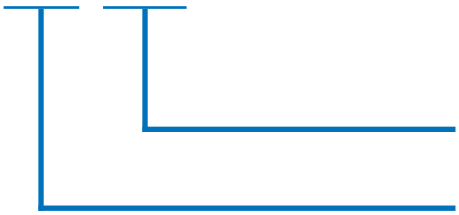
SK TU5-CTR



- Option type: **CTR** = Control Box
- Group: **TU** = Technology Unit

Customer Units

SK CU5-STO



- Option type: **STO** = Safe Stop, ENC = Encoder, MLT = Multi IO
- Group: **CU** = Customer interface

NORDAC® *PRO*

ALL VERSIONS AT A GLANCE

		SK 500P	SK 510P	SK 530P	SK 550P
Basic functions	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	✓	✓	✓	✓
	Parameters pre-set with standard values	✓	✓	✓	✓
	Scalable display values	✓	✓	✓	✓
	Stator resistance measurement	✓	✓	✓	✓
	Energy-saving function, optimized efficiency in partial load operation	✓	✓	✓	✓
	Line filter class C2, up to 20 m motor cable Class C1 up to 5 m motor cable (devices above 0.75 kW)	✓	✓	✓	✓
	Shielding plate for connection of shielded control cables for EMC-compliant wiring.	✓	✓	✓	✓
	Monitoring functions	✓	✓	✓	✓
	Load monitor	✓	✓	✓	✓
	Link circuit coupling	✓	✓	✓	✓
	Lifting gear functionality	✓	✓	✓	✓
	Process controller / PID controller	✓	✓	✓	✓
	Synchronous motor operation (PMSM)	✓	✓	✓	✓
	Incremental encoder input (HTL / TTL) for speed feedback - servo mode	✓[1]	✓[1]	✓	✓
	POSICON	✓	✓	✓	✓
	PLC functionality	✓	✓	✓	✓
Bus systems	USS, Modbus RTU (RJ12)	✓	✓	✓	✓
	CANopen (connection terminals)	✓	✓	✓	✓
	EtherCAT, Ethernet IP, PROFINET IO, POWERLINK				✓
Options	"Safe Torque Switch-off" and "Safe Stop" (STO, SS1) functions		✓[2]	❍	❍
	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			❍	❍
	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 VFD and mobile devices (tablet, smartphone)	❍	❍	❍	❍

[1] Only HTL
[2] Single channel

✓ Available as standard
❍ Optional

		SK 500P	SK 510P	SK 530P	SK 550P
Control terminals	DIN	5	5	6[1]	6[1]
	DOUT	0	0	2	2
	Signal relay[2] (… 230 V AC, 2 A)	2	2	2	2
	AIN[3]	2	2	2	2
	AOUT[3]	1	1	1	1
	Temperature sensor (PTC)	1[4]	1[4]	1	1
Encoder interfaces	TTL RS422			✓	✓
	HTL[4]	✓	✓	✓	✓
	SIN/COS			❍[5]	❍[5]
	SSI			❍[5]	❍[5]
	BISS			❍[5]	❍[5]
	Hiperface			❍[5]	❍[5]
	Endat 2.1			❍[5]	❍[5]
	CANopen	✓	✓	✓	✓
Communication	CAN / CANopen	✓	✓	✓	✓
	RS-485 / RS-232	✓	✓	✓	✓
	Modbus RTU	✓	✓	✓	✓

1 Extendable with the optional SK CU5-... customer interface
2 with parameterizable 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
5 Available via optional customer interface

Temperature sensor (PTC)
SK 530P and above

TTL encoder interface
SK 530P and above

Signal relay

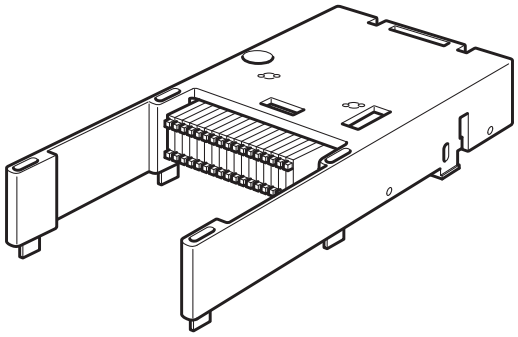
Communication

Control terminals AIN/ AIN / DIN

Additional control terminals DIN / DOUT
SK 530P and above

OPTIONAL MODULES
FOR FUNCTION EXTENSION

Variable frequency drives with configuration versions SK 530P and higher 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	IOs	Remarks
SK CU5-ENC	275 298 100	Encoder interface: TTL, SIN/COS, Hiperface, Endat, Biss, SSI	-	-
SK CU5-MLT	275 298 200	Encoder interface: TTL, SIN/COS, Hiperface, Endat, Biss, SSI Functional safety: STO, SS1	4 IO (usable as DIN or DOUT)	Functional safety: 2-channel connection
SK CU5-STO	275 298 000	Functional safety: STO, SS1	1 Safe DIN	Functional safety: 2-channel connection


NORDAC PRO
OK
ESC
DRIVESYSTEMS
Getriebebau NORD GmbH & Co.KG
DANGER!

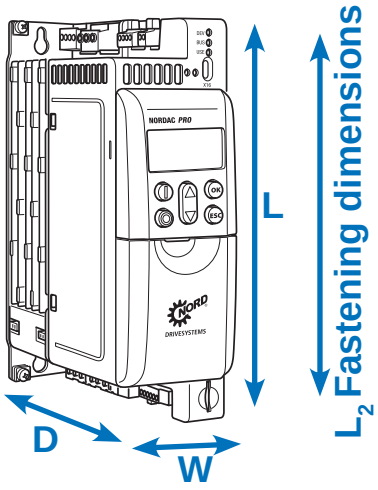
NORDAC® *PRO* SK 500P

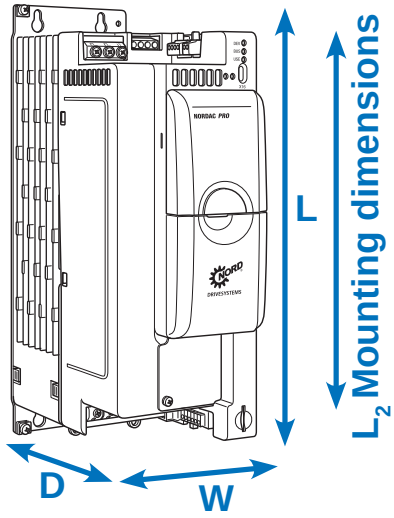
1~ 200 ... 240 V, 3~ 380 ... 480 V

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
Efficiency	approx. 95 %
Ambient temperature	-10 °C ... +40 °C (S1) -10 °C ... +50 °C (S3, 70 % ED)
Protection class	IP20
Regulation and control	Sensorless current vector control (ISD), linear V/f characteristic
Motor temperature monitoring	I^2t Motor PTC / bi-metal switch
Leakage current	<30 mA, may be considerably less depending on the size and configuration of the VFD (refer to the manual for details)

Variable frequency drives SK 5xxP ...	Nominal motor power		Nominal output current rms [A]	AC voltage	Output voltage
	230 V [kW]	240 V [hp]			
-250-123-A	0.25	1/3	1.7	1~ 200 ... 240 V, +/- 10 %, 47 ... 63 Hz	3~ 0 up to AC line voltage
-370-123-A	0.37	1/2	2.4		
-550-123-A	0.55	3/4	3.2		
-750-123-A	0.75	1	4.2		
-111-123-A	1.1	1 1/2	5.7		
-151-123-A	1.5	2	7.3		
-221-123-A	2.2	3	9.6		

Variable frequency drives SK 5xxP ...	Nominal motor power		Nominal output current rms [A]	AC voltage	Output voltage
	400 V [kW]	480 V [hp]			
-250-340-A	0.25	1/3	1.0	3~ 380 ... 480 V, -20 % / +10 %, 47 ... 63 Hz	3~ 0 up to AC line voltage
-370-340-A	0.37	1/2	1.3		
-550-340-A	0.55	3/4	1.8		
-750-340-A	0.75	1	2.4		
-111-340-A	1.1	1 1/2	3.1		
-151-340-A	1.5	2	4.0		
-221-340-A	2.2	3	5.6		
-301-340-A	3.0	4	7.5		
-401-340-A	4.0	5	9.5		
-551-340-A	5.5	7 1/2	12.5		





Variable frequency drives SK 5xxP ...	Weight	Dimensions L (L_2) x W (W_2) x D	Size
-250-123-A	1.2 kg / 2.6 lbs	200 (186) x 66 (22) x 141 [mm] 7.87 (7.32) x 2.59 (.86) x 5.55 [in]	1
-370-123-A	1.2 kg / 2.6 lbs		
-550-123-A	1.2 kg / 2.6 lbs		
-750-123-A	1.2 kg / 2.6 lbs		
-111-123-A	1.6 kg / 3.5 lbs	240 (226) x 66 (22) x 141 [mm] 9.44 (8.89) x 2.59 (.86) x 5.55 [in]	2
-151-123-A	1.6 kg / 3.5 lbs		
-221-123-A	1.6 kg / 3.5 lbs		

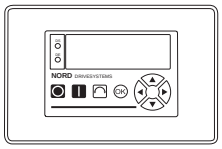
Variable frequency drives SK 5xxP ...	Weight	Dimensions L (L_2) x W x D	Size
-250-340-A	1.2 kg / 2.6 lbs	200 (186) x 66 (22) x 141 [mm] 7.87 (7.32) x 2.59 (.86) x 5.55 [in]	1
-370-340-A	1.2 kg / 2.6 lbs		
-550-340-A	1.2 kg / 2.6 lbs		
-750-340-A	1.2 kg / 2.6 lbs		
-111-340-A	1.6 kg / 3.5 lbs	240 (226) x 66 (22) x 141 [mm] 9.44 (8.89) x 2.59 (.86) x 5.55 [in]	2
-151-340-A	1.6 kg / 3.5 lbs		
-221-340-A	1.6 kg / 3.5 lbs		
-301-340-A	2.6 kg / 5.7 lbs	286 (266) x 90 (50) x 175 [mm] 11.25 (10.47) x 3.54(1.96)x.6.88 [in]	3
-401-340-A	2.6 kg / 5.7 lbs		
-551-340-A	2.6 kg / 5.7 lbs		

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 to variants for direct mounting on the device or installation in a control cabinet door, hand-held versions are also available.

SK TU5-CTR



SK PAR-3E

Type Designation Material No.	Description	Remarks
Control Box 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.
Parameter Box 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.	Connection for data exchange with NORDCON on a PC via RS-232 (USB 2.0), including 1 m connection cable, 4.5 … 30 V DC/1.3 W Supply e.g. directly via the VFD Control cabinet installation
Simple Control Box SK CSX-3E 275 281 413	Suitable for control and parameterization, 4-digit, 7-segment display, direct control of a variable frequency drive, 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
NORDCON Control and parameterization software	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
NORDAC® *ACCESS BT* Bluetooth stick SK TIE5-BT-STICK 275 900 120	The NORDCON *APP* and NORDAC® *ACCESS BT*—a mobile app and Bluetooth stick—work together to provide a wireless solution for commissioning, drive optimization, and service requests for all NORD electronic drive systems	The app is available for free download through the App Store for iOS and Google Play for Android users. The Bluetooth stick can be purchased directly from any authorized NORD distributor.

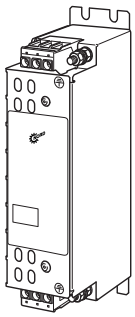
LINE FILTER
IMPROVEMENT OF EMC

General

Line filters are used to reduce the emission of electromagnetic interference. NORDAC® *PRO* SK 5xxP series variable frequency drives are equipped with an integrated class C2 (max. 20 m shielded motor cable) or class C1 (devices above 0.75 kW, max. 5 m shielded motor cable) line filter.

For longer cable lengths or to improve radio interference suppression an optional chassis line filter (SK HLD) is available.

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 VFD



Variable frequency drives SK 5xxP ...		Line filter type Material No.	Continuous current [A]	Leakage current[1] [mA]	L x W x D
3~ 400 V	0.25 ... 2.2 kW 1/3 ... 3 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
	3.0 ... 5.5 kW 4 ...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

[1] Leakage current 1. 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)

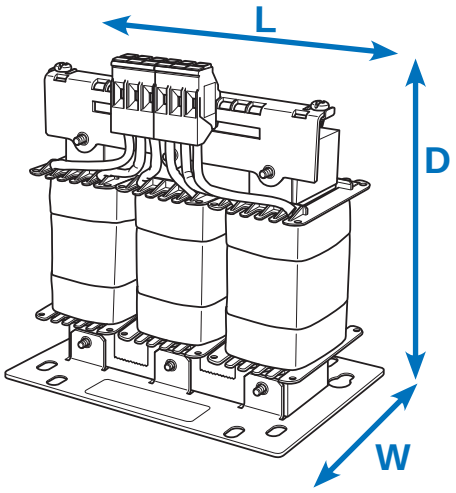
AC VOLTAGE-SIDE INPUT CHOKES
REDUCTION OF AC VOLTAGE FEEDBACK

General

It may be necessary for some drive systems to use AC line chokes to reduce dangerous AC voltage current peaks.

With their use, external feedback effects are considerably reduced and the proportion of current harmonics is reduced to a minimum. The input current is reduced to approximately the value of the output current. This will have an additional positive effect on device protection and EMC characteristics.

All chokes have protection class IP00 and are UL certified.



Variable frequency drives SK 5xxP ...		Choke type Material No.	Continuous current [A]	Inductance [mH]	L x W x D
1~ 230 V	0.25 ... 0.75 kW 1/3 ... 1 HP	SK CI1-230/8-C 278 999 030	8	2 x 1.0	65 x 78 x 89 mm 2.55 x 3.07 x 3.50 in
	1.1 ... 2.2 kW 1.5 ...3 HP	SK CI1-230/20-C 278 999 040	20	2 x 0.4	90 x 96 x 106 mm 3.54 x 3.77 x 4.17 in
3~ 480 V	0.25 ... 2.2 kW 1/3 ... 3 HP	SK CI1-480/6-C 276 993 006	6	3 x 4.88	96 x 60 x 117 mm 3.77 x 2.36 x 4.60 in
	3.0 ... 4.0 kW 4 ... 5 HP	SK CI1-480/11-C 276 993 011	11	3 x 2.93	120 x 85 x 140 mm 4.72 x 3.34 x 5.51 in
	5.5 kW 7.5 HP	SK CI1-480/20-C 276 993 020	20	3 x 1.47	155 x 110 x 177 mm 6.10 x 4.33 x 6.96 in

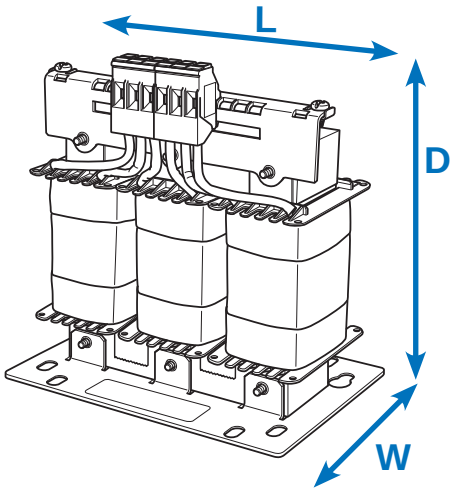
MOTOR-SIDE CHOKES
COMPENSATION FOR CABLE CAPACITANCES

General

Long motor cable lengths (cable capacity) often require the use of additional motor chokes (output chokes) on the VFD output.

In addition, 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 IP00 and are UL certified.



Variable frequency drives SK 5xxP ...		Choke type Material No.	Continuous current [A]	Inductance [mH]	L x W x D
1~ 230 V	0.25 ... 0.75 kW 1/3 ... 1 HP	SK CO1-460/4-C 276 996 004	4	3 x 3.5	120 x 104 x 140 mm 4.72 x 4.09 x 5.51 in
	1.1 ... 1.5 kW 1.5 ... 2 HP	SK CO1-460/9-C 276 996 009	9	3 x 2.5	155 x 110 x 160 mm 6.10 x 4.33 x 6.29 in
	2.2 kW 3 HP	SK CO1-460/17-C 276 996 017	17	3 x 1.2	185 x 102 x 201 mm 7.28 x 4.01 x 7.91 in
3~ 480 V	0.25 ... 1.5 kW 1/3 ... 2 HP	SK CO1-460/4-C 276 996 004	4	3 x 3.5	120 x 104 x 140 mm 4.72 x 4.09 x 5.51 in
	2.2 ... 4.0 kW 3 ... 5 HP	SK CO1-460/9-C 276 996 009	9	3 x 2.5	155 x 110 x 160 mm 6.10 x 4.33 x 6.29 in
	5.5 kW 7.5 HP	SK CO1-460/17-C 276 996 017	17	3 x 1.2	185 x 102 x 201 mm 7.28 x 4.01 x 7.91 in

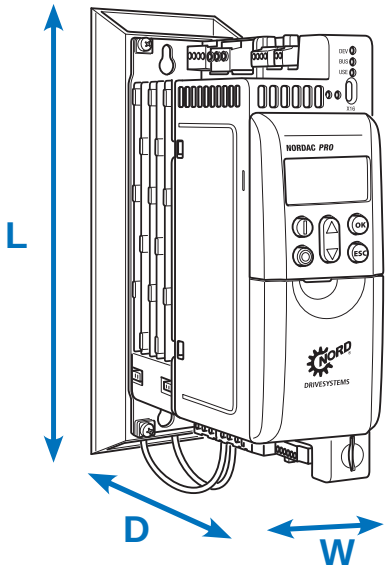
BRAKE RESISTORS
FOR DYNAMIC DRIVE CHARACTERISTICS

Bottom-mounted brake resistors SK BRU5

Available in three sizes, the brake resistor can be mounted flat underneath the VFD. 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.



Variable frequency drives SK 5xxP ...		Resistor type Material No.	Resistance [Ω]	Continuous output [W]	Short-term power [kW][1]	L x W x D
230 V	0.25 ... 0.37 kW 1/3 ... 1/2 HP	SK BRU5-1-240-050 275 299 004	240	50	0.75	240 x 66 x 181 mm 9.44 x 2.59 x 7.12 in
	0.55 ... 0.75 kW 3/4 ... 1 HP	SK BRU5-1-150/100 275 299 107	150	100	1.5	240 x 66 x 181 mm 9.44 x 2.59 x 7.12 in
	1.1 ... 2.2 kW 1.5 ...3 HP	SK BRU5-2-075-200 275 299 210	75	200	3.0	280 x 66 x 181 mm 11.02 x 2.59 x 7.12 in
480 V	0.25 ... 0.75 kW 1/3 ... 1 HP	SK BRU5-1-400-100 275 299 101	400	100	1.5	240 x 66 x 181 mm 9.44 x 2.59 x 7.12 in
	1.1 ... 2.2 kW 1.5 ...3 HP	SK BRU5-2-220-200 275 299 205	220	200	3.0	280 x 66 x 181 mm 11.02 x 2.59 x 7.12 in
	3.0 ... 4.0 kW 4 ... 5 HP	SK BRU5-3-100-300 275 299 309	100	300	4.5	340 x 91 x 225 mm 13.38 x 3.58 x 8.85 in
	5.5 kW 7.5 HP	SK BRU5-3-060-400 275 299 411	60	400	6.0	340 x 91 x 225 mm 13.38 x 3.58 x 8.85 in

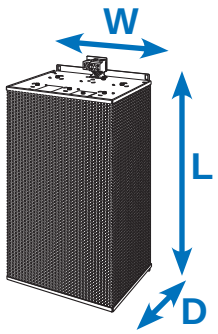
[1] Once within 120 s,
for a maximum duration of 1.2 s

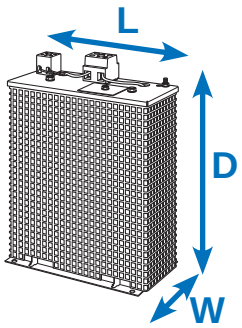
Chassis brake resistors, SK BR2

The resistor elements are integrated into a housing cage and must be connected to the particular variable frequency drive via a separate connecting cable.

The brake resistors must be mounted horizontally (except SK BR2-xxx/400-C). A shielded cable, kept as short as possible, should be used for this purpose.

Brake resistors have protection class IP20.





only SK BR2-xxx/400-C

Variable frequency drives SK 5xxP ...		Resistor type Material No.	Resistance [Ω]	Continuous output [W]	Short-term power [kW]²	L x W x D
480 V	3.0 ... 4.0 kW 4 ... 5 HP	SK BR2-100/400-C[1] 278 282 040	100	400	12	178 x 100 x 252 mm 7.00 x 3.93 x 9.92 in
	5.5 kW 7.5 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
	Temperature monitoring for SK BR2 resistors integrated (2 terminals 4 mm²)		Bimetallic switch as opener			

[1] Type of assembly: vertical

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

RJ45 WAGO connection module

Adapter to implement a plug-in connection solution for CANopen via RJ45, snap-on rail mounting.
Material No.: 278 910 300

Signal converter +/- 10 V

For connection of a bipolar analog signal to the unipolar analog input of a variable frequency drive, snap-on rail mounting.
Material No.: 278 910 320

Electronic brake rectifier SK EBGR-1

For direct control and supply of an electromagnetic holding brake.
Material No.: 19 140 990

NORDAC® *ACCESS BT*

Bluetooth adapter SK TIE5-BT-STICK to establish wireless connection between the VFD and mobile devices. Together with the free NORDCON *APP* for Android or iOS, NORD provides a convenient tool for control, parameterization and troubleshooting.
Material No.: 275 900 120

MicroSD card, 128 MB

Removable data carrier for archiving and transfer of parameter data sets for the variable frequency drive.
Material No.: 201 130 300

Intelligent Drivesystems, Worldwide Services

VARIABLE FREQUENCY DRIVE FOR CONTROL CABINET APPLICATIONS

US

NORDAC® *PRO*

SK 500E

NORD®
DRIVESYSTEMS

NORDAC® *PRO*, SK 500E SERIES

NORDAC® *PRO* SK 500E variable frequency drives are available for motors with rated powers of 0.25 - 160 kW (0.33 - 200 HP). Their compact design is perfect for space-saving installation in control cabinets.

Notable features across the entire product line include:

- Sensorless current vector control ensures constant speeds in case of fluctuating loads and very high torques during start-up
- 200% overload capacity 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

These features are as much a part of the basic configuration as the separately configurable PID or the process controller. These controllers independently carry out the control tasks in your application.

The range is supplied with either an integrated 24 V power supply unit or a separate connection for the control board supply.

With externally powered variable frequency drives, access to parameter data and communication through any bus interfaces is possible even when the power is off. Moreover, an evacuation run controlled by the VFD can be performed, which improves safety for lifting gear and similar safety-critical drive applications.

The SK 51xE and SK 53xE 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 equipped with the built-in POSICON function makes it ideally suitable for all types of positioning tasks (relative and absolute).

As standard, an integrated PLC on all SK 520E models and higher greatly simplifies 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 variable frequency drives maintain uniform dimensions even with the 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 are pre-set with standard values and available for immediate 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 drives with AC 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

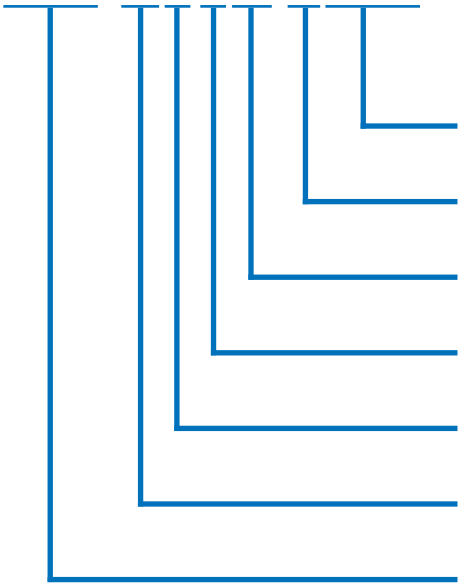
All devices of the entire series comply with the standards and directives listed below.

Approval	Directive	Applied standards	Certificates	Code
CE (European Union)	Low Voltage Directive 2014/35/EU	EN 61800-5-1 EN 60529 EN 61800-3 EN 50581	C310600	CE
	EMC 2014/30/EU			
	RoHS 2011/65/EU			
UL (USA)		UL 61800-5-1	E171342	c UL us LISTED
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	TC RU C DE.АЛ32.В.00000	EAC

VARIABLE FREQUENCY DRIVE DESIGNATIONS AND TECHNOLOGY UNITS

Variable Frequency Drives

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



Configuration versions **CP =** Cold Plate or External heat sink technology

Radio interference filter: **O** = without, **A** = Class A1(C2) or B (C1)

AC voltage **x12** = 115 V, **x23** = 230 V, **x40** = 400 V, **x50** = 500 V

Number of AC voltage phases: **1xx** = 1-phase, **3xx** = 3-phase [1]

Digits before decimal point for power: **0** = 0.xx, **1** = x.x0, **2** = xx.0

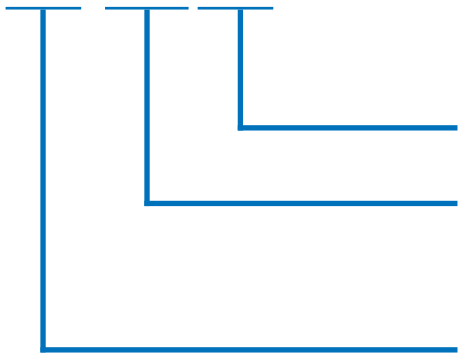
Device rated power: **250** = 0.25 kW, **370** = 0.37 kW, ... **163** = 160.0 kW

Variable frequency drive series:
SK 500E, SK 505E, SK 510E, SK 511E, SK 515E,
SK 520E, SK 530E, SK 535E, SK 540E, SK 545E,
(…)
Options, only implemented if required.

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

Technology Units

SK TU3-CAO(-…)



Version labeling

Option type: **CAO** = CANopen, PBR = PROFIBUS DP,
ECT = EtherCAT®, DEV = DeviceNet,
IOE= I/O extension

Group: **TU** = Technology unit
(...)
Options, only implemented if required.

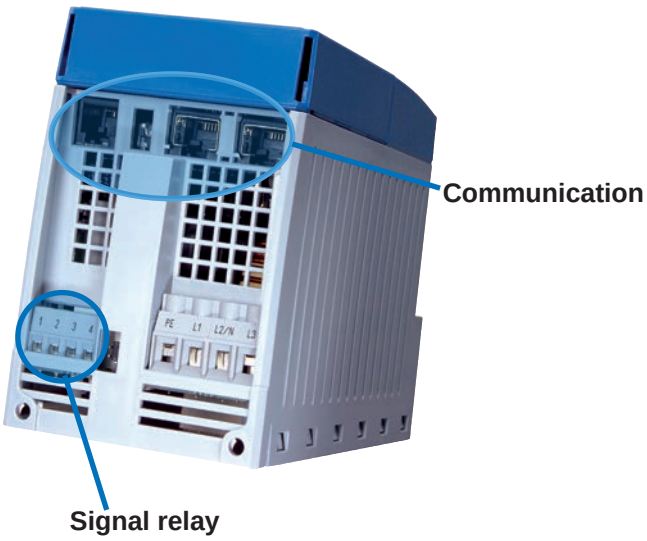
NORDAC® *PRO* SK 500E
ALL VERSIONS AT A GLANCE

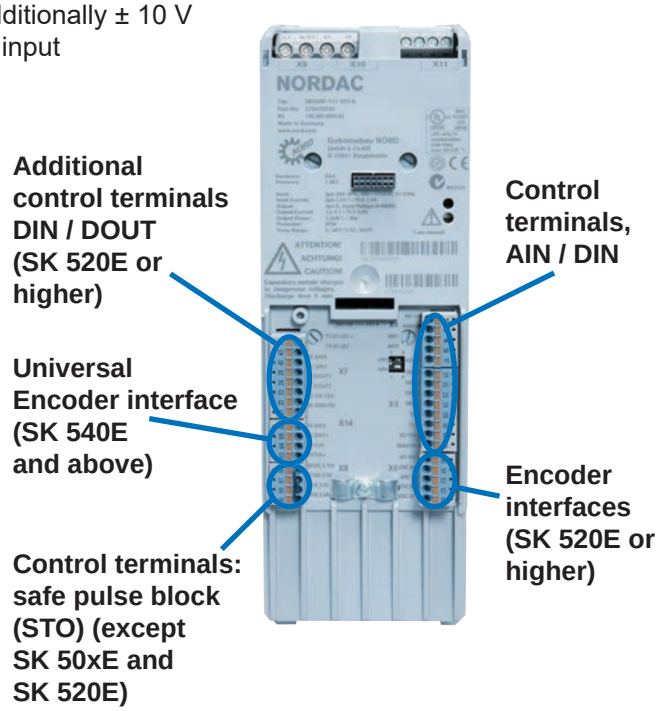
		SK 500E	SK 510E	SK 511E	SK 520E	SK 530E	SK 535E	SK 540E	SK 545E	SK 515E	SK 535E	SK 545E
		Size 1-4								Size 5-11		
Basic functions	Sensorless current vector control (ISD control)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Brake management for mechanical holding brake	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Brake chopper (brake resistor optional)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	RS-232 diagnostic interface	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4 switchable parameter sets	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Parameters pre-set with standard values	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Scalable display values	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Stator resistance measurement	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Energy-saving function, optimized efficiency in partial load operation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Line filter class C2, up to 5 m motor cable class C1 up to Size 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Monitoring functions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Load monitor	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Link circuit coupling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Lifting gear functionality	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Process controller / PID controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Synchronous motor operation (PMSM)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Options	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

		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
	Temperature sensor (PTC)	1 [4]	1 [4]	1 [4]	1 [4]	1 [4]	1 [4]	1	1	1	1	1
Encoder interfaces	TTL RS422				✓	✓	✓	✓	✓		✓	✓
	HTL [4]				✓	✓	✓	✓	✓		✓	✓
	SIN/COS							✓	✓			✓
	SSI							✓	✓			✓
	BISS							✓	✓			✓
	Hiperface							✓	✓			✓
	Endat 2.1							✓	✓			✓
	CANopen					✓	✓	✓	✓		✓	✓
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 with parameterizable 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





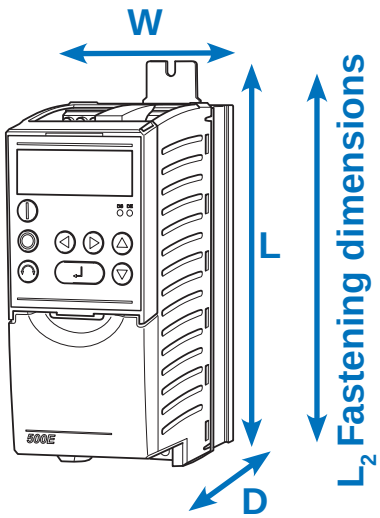
NORDAC® *PRO* SK 500E

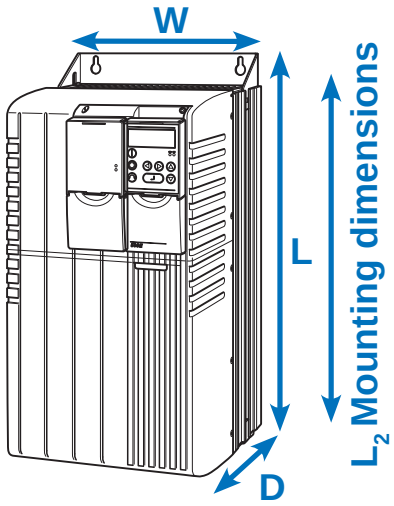
1~ 110 ... 120 V AND 1/3~ 200 ... 240 V

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
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)
Protection class	IP20
Regulation and control	Sensorless current vector control (ISD), linear V/f characteristic
Motor temperature monitoring	I^2t Motor PTC / bi-metal switch
Leakage current	<30 mA, may be considerably less depending on the size and configuration (refer to the manual for details)

Variable frequency drives SK 5xxE ...	Nominal motor power		Nominal output current rms [A]	AC voltage	Output voltage
	230 V [kW]	240 V [hp]			
-250-112-O	0.25	1/3	1.7	1~ 110 ... 120 V, +/- 10 %, 47 ... 63 Hz	3~ 0 - 2x AC line voltage
-370-112-O	0.37	1/2	2.2		
-550-112-O	0.55	3/4	3.0		
-750-112-O	0.75	1	4.0		
-111-112-O	1.1	1 1/2	5.3		

Variable frequency drives SK 5xxE ...	Nominal motor power		Nominal output current rms [A]	AC voltage	Output voltage
	230 V [kW]	240 V [hp]			
-250-323-A	0.25	1/3	1.7	1/3~ 200 ... 240 V, +/- 10 %, 47 ... 63 Hz	3~ 0 up to AC line voltage
-370-323-A	0.37	1/2	2.2		
-550-323-A	0.55	3/4	3.0		
-750-323-A	0.75	1	4.0		
-111-323-A	1.1	1 1/2	5.5		
-151-323-A	1.5	2	7.0		
-221-323-A	2.2	3	9.5		
-301-323-A	3.0	4	12.5	3~ 200 ... 240 V, +/- 10 %, 47 ... 63 Hz	
-401-323-A	4.0	5	16.0		
-551-323-A	5.5	7 1/2	22		
-751-323-A	7.5	10	28		
-112-323-A	11	15	46		
-152-323-A	15	20	60		





Variable frequency drives SK 5xxE ...	Weight [kg / lbs]	Dimensions L (L_2) x W x D	Size
-250-112-O	1.4 kg / 3.1 lbs	186 (220) x 74 x 153 mm 7.32 (8.66) x 2.91 x 6.02 in	1
-370-112-O	1.4 kg / 3.1 lbs		
-550-112-O	1.4 kg / 3.1 lbs		
-750-112-O	1.4 kg / 3.1 lbs		
-111-112-O	1.4 kg / 3.1 lbs		

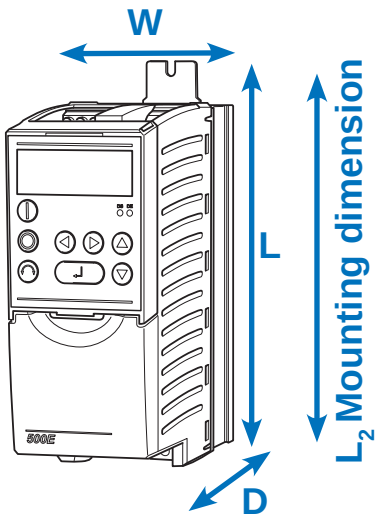
Variable frequency drives SK 5xxE ...	Weight [kg / lbs]	Dimensions L (L_2) x W x D	Size
-250-323-A	1.4 kg / 3.1 lbs	186 (220) x 74 x 153 mm 7.32 (8.66) x 2.91 x 6.02 in	1
-370-323-A	1.4 kg / 3.1 lbs		
-550-323-A	1.4 kg / 3.1 lbs		
-750-323-A	1.4 kg / 3.1 lbs		
-111-323-A	1.8 kg / 3.9 lbs	226 (260) x 74 x 153 mm 8.89 (10.23) x 2.91 x 6.02 in	2
-151-323-A	1.8 kg / 3.9lbs		
-221-323-A	1.8 kg / 3.9 lbs		
-301-323-A	2.7 kg / 5.9 lbs	241 (275) x 98 x 181 mm 9.48 (10.8) x 3.85 x 7.12 in	3
-401-323-A	2.7 kg / 5.9 lbs		
-551-323-A	8.0 kg / 17.6 lbs	327 (357) x 162 x 224 mm 12.87 (14.05) x 6.37 x 8.81 in	5
-751-323-A	8.0 kg / 17.6 lbs		
-112-323-A	10.3 kg / 22.7 lbs	367 (397) x 180 x 234 mm 14.44 (15.62) x 7.08 x 9.21 in	6
-152-323-A	15.0 kg / 33 lbs	456 (485) x 210 x 236 mm 17.95 (19.09) x 8.26 x 9.29 in	7

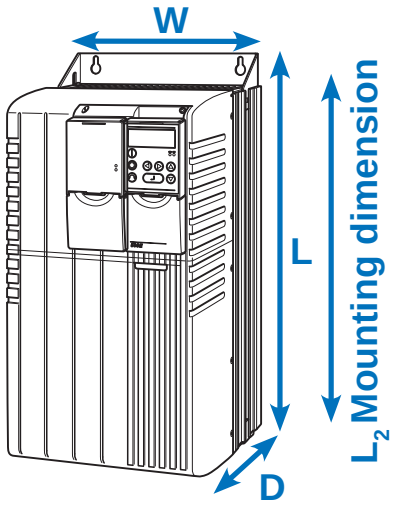
NORDAC® *PRO* SK 500E

3~ 380 ... 480 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
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)
Protection class	IP20
Regulation and control	Sensorless current vector control (ISD), linear V/f characteristic
Motor temperature monitoring	I^2t Motor PTC / bi-metal switch
Leakage current	<30 mA, may be considerably less depending on the size and configuration of the variable frequency drive (refer to the manual for details)

Variable frequency drives SK 5xxE ...	Nominal motor power		Nominal output current rms [A]	AC voltage	Output voltage
	400 V [kW]	480 V [hp]			
-550-340-A	0.55	3/4	1.7	3~ 380 ... 480 V, -20 % / +10 %, 47 ... 63 Hz	3~0 up to AC line voltage
-750-340-A	0.75	1	2.3		
-111-340-A	1.1	1 1/2	3.1		
-151-340-A	1.5	2	4.0		
-221-340-A	2.2	3	5.5		
-301-340-A	3.0	4	7.5		
-401-340-A	4.0	5	9.5		
-551-340-A	5.5	7 1/2	12.5		
-751-340-A	7.5	10	16.0		
-112-340-A	11.0	15	24.0		
-152-340-A	15.0	20	31.0		
-182-340-A	18.5	25	38.0		
-222-340-A	22.0	30	46.0		
-302-340-A	30.0	40	60.0		
-372-340-A	37.0	50	75.0		
-452-340-A	45.0	60	90.0		
-552-340-A	55.0	75	110.0		
-752-340-A	75.0	100	150.0		
-902-340-A	90.0	125	180.0		
-113-340-A	110.0	150	220.0		
-133-340-A	132.0	180	260.0		
-163-340-A	160.0	220	320.0		



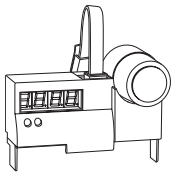


Variable frequency drives SK 5xxE ...	Weight [kg / lbs]	Dimensions L (L_2) x W x D	Size
-550-340-A	1.4 kg / 3.1 lbs	186 (220) x 74 x 153 mm 7.32 (8.66) x 2.91 x 6.02 in	1
-750-340-A	1.4 kg / 3.1 lbs		
-111-340-A	1.8 kg / 3.9 lbs	226 (260) x 74 x 153 mm 8.89 (10.23) x 2.91 x6.02 in	2
-151-340-A	1.8 kg / 3.9 lbs		
-221-340-A	1.8 kg / 3.9 lbs		
-301-340-A	2.7 kg / 5.9 lbs	241 (275) x 98 x 181 mm 9.48 (10.82) x 3.85 x 7.12 in	3
-401-340-A	2.7 kg / 5.9 lbs		
-551-340-A	3.1 kg / 6.8 lbs	286 (320) x 98 x 181 mm 11.25 (12.59) x 3.85 x 7.12 in	4
-751-340-A	3.1 kg / 6.8 lbs		
-112-340-A	8.0 kg / 17.6 lbs	327 (357) x 162 x 224 mm 12.87 (14.05) x 6.37 x 8.81 in	5
-152-340-A	8.0 kg / 17.6 lbs		
-182-340-A	10.3 kg / 22.7 lbs	367 (397) x 180 x 234 mm 14.44 (15.62) x 7.08 x 9.21 in	6
-222-340-A	10.3 kg / 22.7 lbs		
-302-340-A	16.0 kg / 35.2 lbs	456 (485) x 210 x 236 mm 17.95 (19.09) x 8.26 x 9.29 in	7
-372-340-A	16.0 kg / 35.2 lbs		
-452-340-A	20.0 kg / 44.0 lbs	598 (582) x 265 x 286 mm 23.54 (22.91) x 10.43 x 11.25 in	8
-552-340-A	20.0 kg / 44.0 lbs		
-752-340-A	25.0 kg / 55.1 lbs	636 (620) x 265 x 286 mm 25.03 (24.40) x 10.43 x 11.25 in	9
-902-340-A	25.0 kg / 55.1 lbs		
-113-340-A	46.0 kg / 101.4 lbs	720 (704) x 395 x 292 mm 28.34 (27.71) x 15.55 x 11.49 in	10
-133-340-A	49.0 kg / 108.0 lbs		
-163-340-A	52.0 kg / 114.6 lbs	799 (783) x 395 x 292 mm 31.45 (30.82) x 15.55 x 11.49 in	11

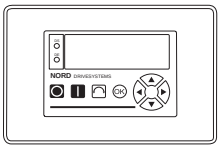
INTERFACES FOR
OPERATION, PARAMETERIZATION AND COMMUNICATION

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 to options for direct mounting on the device or installation in a control cabinet door, handheld versions are also available.



SK CSX-0



SK PAR-3E

Type Designation Material No.	Description	Remarks
Potentiometer Box SK TU3-POT 275 900 110	Suitable for control, potentiometer 0 … 100% .	Installation in the SK TU3 slot on the VFD.[1]
Parameter Box 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 variable frequency drive.[1]
Control Box 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 VFD.[1]
Simple Box 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
Parameter Box 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.	Connection for data exchange with NORDCON on a PC via RS-232 (USB 2.0), including 1 m connection cable, 4.5 … 30 V DC/1.3 W Supply e.g. directly via the VFD. Control cabinet installation
Simple Control Box SK CSX-3E 275 281 413	Suitable for control and parameterization, 4-digit, 7-segment display, direct control of a variable frequency drive, convenient control keypad.	Electrical data: 4.5 … 30 V DC / 1.3 W, Supply e.g. directly via the VFD. Control cabinet installation
NORDCON Control and parameterization software	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: www.nord.com
NORDAC® *ACCESS BT* Bluetooth stick SK TIE5-BT-STICK 275 900 120	The NORDCON APP and NORDAC® ACCESS BT—a mobile app and Bluetooth stick—work together to provide a wireless solution for commissioning, drive optimization, and service requests for all NORD electronic drive systems	The app is available for free download through the App Store for iOS and Google Play for Android users. The Bluetooth stick can be purchased directly from any authorized NORD distributor.

[1] Cannot be combined with other SK TU3 modules as only one slot is available on VFD.

Designation Material No.	Description Connection	Remarks
SK TU3-IBS 275 900 065	Field bus interface INTERBUS 2 x Sub-D9	Baud rate: 500 kBit/s (2 Mbit/s)
SK TU3-PBR 275 900 030	Field bus interface 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 MBaud Protocol: DPV 0 Addressing: via rotary coding switch or parameter 24 V DC connection: via connection terminals
SK TU3-CAO 275 900 075	Field bus interface CANopen Sub-D9	Baud rate: maximum 1 MBaud Protocol: DS 301 and DS 402
SK TU3-DEV 275 900 085	Field bus interface DeviceNet 5-pole screw terminals	Baud rate: maximum 500 kBaud Profile: AC-Drive and NORD-AC
SK TU3-AS1 275 900 170	Field bus interface AS-Interface 5-pole and 8-pole screw terminals	4 sensors/2 actuators
SK TU3-ECT 275 900 180	Ethernet-based bus interface 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.
SK TU3-EIP 275 900 150	Ethernet-based bus interface 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 eight variable frequency drives.
SK TU3-POL 275 900 140	Ethernet-based bus interface POWERLINK 2 x RJ45	
SK TU3-PNT 275 900 190	Ethernet-based bus interface PROFINET IO. 2 x RJ45	

LINE FILTER
IMPROVEMENT OF EMC

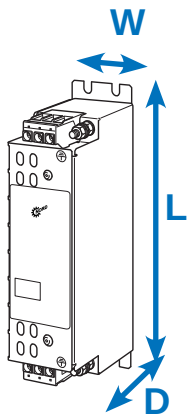
General

Line filters are used to reduce the emission of electromagnetic interference. SK 500E series variable frequency drives 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 VFD.



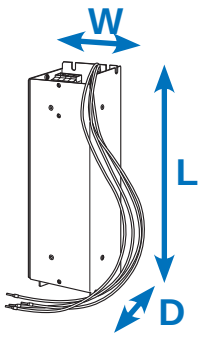
Variable frequency drives SK 5xxE ...		Line filter type Material No.	Continuous current [A]	Leakage current[1] [mA]	L x W x D
3~ 230 V	0.25 ... 1.1 kW 1/3 ... 1.5 HP	SK HLD 110-500/8 278 272 008	8	20 / 190	190 x 45 x 75 mm 7.48 x 1.77 x 2.95 in
	1.5 ... 2.2 kW 2.0 ... 3 HP	SK HLD 110-500/16 278 272 016	16	21 / 205	250 x 45 x 75 mm 9.84 x 1.77 x 2.95 in
	3.0 ... 5.5 kW 4 ... 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 / 10.1 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 kW / 20 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~ 480 V	0.55 ... 2.2 kW 3/4 ... 3 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
	3.0 ... 5.5 kW 4 ... 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 / 15HP	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
	110 ... 160 kW 150 ... 200 HP	Currently in preparation			

[1] Leakage current 1. 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 meets protection class IP20 and is available for VFD powers of up to 10 HP (7.5 kW). The line filter can be mounted flat underneath the drive. This reduces the space requirement. These combination filters combine the advantages of a line filter and a line choke in a single housing and enable class C1 interference suppression with max. 50 m shielded motor cable and class C2 with max. 100 m cable.



Variable frequency drives SK 5xxE ...		Line filter type Material No.	Continuous current [A]	Inductance [mH]	Leakage current[1] [mA]	L x W x D
3~ 230 V	0.25 ... 0.75 kW 1/3 ...1 HP	SK NHD-480/6-F 278 273 006	5.5	3 x 6.4	1 / 10	290 x 88 x 74 mm 11.41 x 3.46 x 2.91 in
	1.1 ... 2.2 kW 1.5 ... 3 HP	SK NHD-480/10-F 278 273 010	9.5	3 x 3.7	12 / 120	305 x 115 x 98 mm 12.00 x 4.52 x 3.85 in
	3.0 ... 4.0 kW 4 ... 5 HP	SK NHD-480/16-F 278 273 016	16	3 x 2.2	12 / 120	350 x 140 x 98 mm 13.77 x 5.51 x 3.85 in
3~ 480 V	0.55 ... 0.75 kW 3/4 ... 1 HP	SK NHD-480/3-F 278 273 003	2.3	3 x 15.3	1 / 10	250 x 75 x 60 mm 9.84 x 2.95 x 2.36 in
	1.1 ... 2.2 kW 1.5 ... 3 HP	SK NHD-480/6-F 278 273 006	5.5	3 x 6.4	1 / 10	290 x 88 x 74 mm 11.41 x 3.46 x 2.91 in
	3.0 ... 4.0 kW 4 ... 5 HP	SK NHD-480/10-F 278 273 010	9.5	3 x 3.7	12 / 120	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	12 / 120	350 x 140 x 98 mm 13.77 x 5.51 x 3.85 in

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

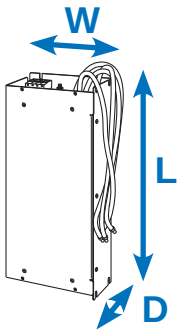
Leakage current 2nd value: calculated at maximum input voltage and failure of 2 phases (typically at 50 Hz)

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 up to 50 HP (37 kW). The line filter can be mounted flat underneath the VFD, which reduces 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.



Variable frequency drives SK 5xxE ...		Line filter type Material No.	Continuous current [A]	Leakage current[1] [mA]	L 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 kW / 20 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~ 480 V	0.55 ... 0.75 kW 3/4 ... 1 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 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 ... 5 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 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 20 ... 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)

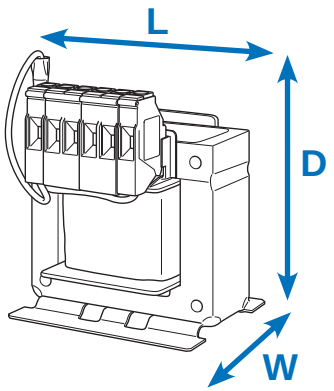
AC LINE VOLTAGE-SIDE INPUT CHOKES
REDUCTION OF FEEDBACK

General

It may be necessary for some drive systems to use AC line voltage chokes to reduce dangerous current peaks.

With their use, external feedback effects are considerably reduced and the proportion of current harmonics is cut to a minimum. The input current is reduced to approximately the value of the output current.

It is recommended that a line choke be used at all times for a VFD capacity of 60 HP (45 kW) 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.

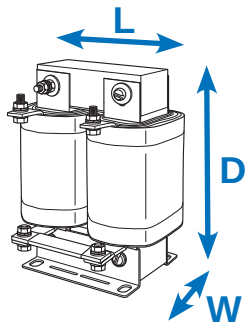


Variable frequency drives SK 5xxE ...		Choke type Material No.	Continuous current [A]	Inductance [mH]	L x W x D
1~ 230 V	0.25 ... 0.75 kW 1/3 ... 1 HP	SK CI1-230/8-C 278 999 030	8	2 x 1.0	65 x 78 x 89 mm 2.55 x 3.07 x 3.50 in
	1.1 ... 2.2 kW 1.5 ... 3 HP	SK CI1-230/20-C 278 999 040	20	2 x 0.4	90 x 96 x 106 mm 3.54 x 3.77 x 4.17 in
3~ 230 V	0.25 ... 0.75 kW 1/3 ... 1 HP	SK CI1-480/6-C 276 993 006	6	3 x 4.88	96 x 60 x 117 mm 3.54 x 2.36 x 4.60 in
	1.1 ... 1.5 kW 1.5 ... 2 HP	SK CI1-480/11-C 276 993 011	11	3 x 2.93	120 x 85 x 140 mm 4.72 x 3.34 x 5.5 in
	2.2 ... 3.0 kW 3 ... 4 HP	SK CI1-480/20-C 276 993 020	20	3 x 1.47	155 x 110 x 177 mm 6.10 x 4.33 x 6.96 in
	4.0 ... 7.5 kW 5 ... 10 HP	SK CI1-480/40-C 276 993 040	40	3 x 0.73	155 x 115 x 172 mm 6.10 x 4.52 x 6.77 in
	11 ... 15 kW 15 ... 20 HP	SK CI1-480/70-C 276 993 070	70	3 x 0.47	185 x 122 x 220 mm 7.28 x 4.80 x 8.66 in
3~ 480 V	0.55 ... 2.2 kW 3/4 ... 3 HP	SK CI1-480/6-C 276 993 006	6	3 x 4.88	96 x 60 x 117 mm 3.54 x 2.36 x 4.60 in
	3.0 ... 4.0 kW 4 ... 5 HP	SK CI1-480/11-C 276 993 011	11	3 x 2.93	120 x 85 x 140 mm 4.72 x 3.34 x 5.5 in
	5.5 ... 7.5 kW 7.5 ... 10 HP	SK CI1-480/20-C 276 993 020	20	3 x 1.47	155 x 110 x 177 mm 6.10 x 4.33 x 6.96 in
	11 ... 15 kW 15 ... 20 HP	SK CI1-480/40-C 276 993 040	40	3 x 0.73	155 x 115 x 172 mm 6.10 x 4.52 x 6.77 in
	18.5 ... 30 kW 25 ... 40 HP	SK CI1-480/70-C 276 993 070	70	3 x 0.47	185 x 122 x 220 mm 7.28 x 4.80 x 8.66 in
	37 ... 45 kW 50 ... 60 HP	SK CI1-480/100-C 276 993 100	100	3 x 0.29	240 x 148 x 263 mm 9.44 x 5.82 x 10.35 in
	55 ... 75 kW 75 ... 100 HP	SK CI1-480/160-C 276 993 160	160	3 x 0.18	352 x 140 x 268 mm 13.85 x 5.51 x 10.55 in
	90 kW / 125 HP	SK CI1-480/280-C 276 993 280	280	3 x 0.10	352 x 169 x 268 mm 13.85 x 5.51 x 10.55 in
	110 ... 132 kW 150 ... 180 HP	SK CI1-480/350-C 276 993 350	350	3 x 0.08	352 x 169 x 268 mm 13.85 x 5.51 x 10.55 in
	160 kW / 200 HP	not available			

LINK CIRCUIT CHOKE
REDUCTION OF SYSTEM FEEDBACK

Link circuit choke, SK DCL

Similar to a line choke, the link circuit choke reduces the inherent network loads of a variable frequency drive. It is connected to easily accessible contacts in the VFD's intermediate circuit and is available for 45 kW and above. All chokes have protection class IP00 and are UL certified.



Variable frequency drives SK 5xxE ...	Choke type Material No.	Continuous current [A]	Inductance [mH]	L x W x D
45 ... 55 kW 60 ... 75 HP	SK DCL-950/120-C 276 997 120	120	0.50	148 x 147 x 230 mm 5.82 x 5.78 x 9.05 in
75 ... 90 kW 100 ... 125 HP	SK DCL-950/200-C 276 997 200	200	0.30	170 x 153 x 260 mm 6.69 x 6.02 x 10.23 in
110 kW / 150 HP	SK DCL-950/260-C 276 997 260	260	0.25	180 x 174 x 284 mm 7.08 x 6.85 x 11.18 in
132 kW / 180 HP	SK DCL-950/320-C 276 997 320	320	0.20	180 x 189 x 282 mm 7.08 x 7.44 x 11.10 in
160 kW / 200 HP	SK DCL-950/380-C 276 997 380	300	0.17	180 x 189 x 282 mm 7.08 x 7.44 x 11.10 in

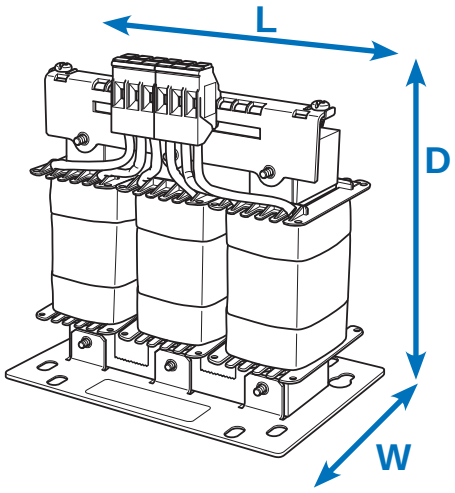
MOTOR-SIDE CHOKES
COMPENSATION FOR CABLE CAPACITANCES

General

Long motor cable lengths (cable capacity) often require the use of additional motor chokes (output chokes) on the VFD output.

In addition, 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 IP00 and are UL certified.



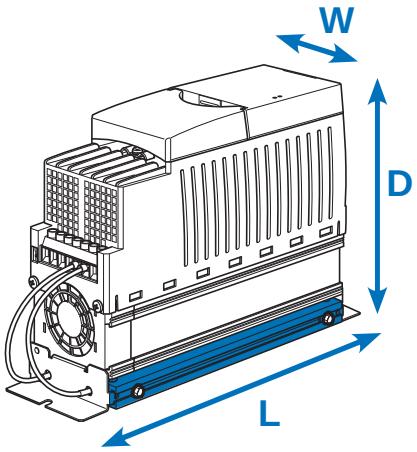
Variable frequency drives SK 5xxE ...		Choke type Material No.	Continuous current [A]	Inductance [mH]	L x W x D
3~ 230 V	0.25 ... 0.75 kW 1/3 ... 1 HP	SK CO1-460/4-C 276 996 004	4	3 x 3.5	120 x 104 x 140 mm 4.72 x 4.09 x 5.51 in
	1.1 ... 1.5 kW 1.5 ... 2 HP	SK CO1-460/9-C 276 996 009	9	3 x 2.5	155 x 110 x 160 mm 6.10 x 4.33 x 6.29 in
	2.2 ... 4.0 kW 3 ... 5 HP	SK CO1-460/17-C 276 996 017	17	3 x 1.2	185 x 102 x 201 mm 7.28 x 4.01 x 7.91 in
	5.5 ... 7.5 kW 7.5 ... 10 HP	SK CO1-460/33-C 276 996 033	33	3 x 0.6	185 x 122 x 201 mm 7.28 x 4.80 x 7.91 in
	11 ... 15 kW 15 ... 20HP	SK CO1-480/60-C 276 992 060	60	3 x 0.33	185 x 112 x 210 mm 7.28 x 4.40 x 8.26 in
3~ 480 V	0.55 ... 1.5 kW 3/4 ...2 HP	SK CO1-460/4-C 276 996 004	4	3 x 3.5	120 x 104 x 140 mm 4.72 x 4.09 x 5.51 in
	2.2 ... 4.0 kW 3 ... 5 HP	SK CO1-460/9-C 276 996 009	9	3 x 2.5	155 x 110 x 160 mm 6.10 x 4.33 x 6.29 in
	5.5 ... 7.5 kW 7.5 ... 10 HP	SK CO1-460/17-C 276 996 017	17	3 x 1.2	185 x 102 x 201 mm 7.28 x 4.01 x 7.91 in
	11 ... 15 kW 15 ... 20 HP	SK CO1-460/33-C 276 996 033	33	3 x 0.6	185 x 122 x 201 mm 7.28 x 4.80 x 7.91 in
	18.5 ... 30 kW 25 ... 40 HP	SK CO1-480/60-C 276 992 060	60	3 x 0.33	185 x 112 x 210 mm 7.28 x 4.40 x 8.26 in
	37 ... 45 kW 50 ... 60 HP	SK CO1-460/90-C 276 996 090	90	3 x 0.22	352 x 144 x 325 mm 13.85 x 5.66 x 12.79 in
	55 ... 75 kW 75 ... 100 HP	SK CO1-460/170-C 276 996 170	170	3 x 0.13	412 x 200 x 320 mm 16.22 x 7.87 12.59 in
	90 ... 110 kW 125... 150 HP	SK CO1-460/240-C 276 996 240	240	3 x 0.07	412 x 225 x 320 mm 16.22 x 8.85 x 12.59 in
	132 ... 160 kW 180 ... 200 HP	SK CO1-460/330-C 276 996 330	330	3 x 0.03	352 x 188 x 268 mm 13.85 x 7.40 x 10.55 in

BRAKE RESISTORS
FOR DYNAMIC DRIVE CHARACTERISTICS

Bottom-mounted brake resistors SK BR4

These resistors are available in four sizes for variable frequency drives of up to 10 HP (7.5 kW). 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. All brake resistors have protection class IP40 and are UL certified.



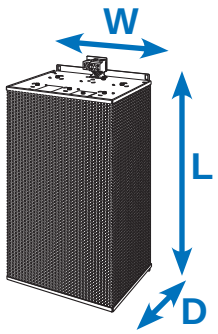
Variable frequency drives SK 5xxE ...		Resistor type Material No.	Resistance [Ω]	Continuous output [W]	Short-term power [kW][1]	L x W x D
230 V/115 V	0.25 ... 0.37 kW 1/3 ...1/2 HP	SK BR4-240/100 275 991 110	240	100	2.2	230 x 88 x 175 mm 9.05 x 3.46 x 6.88 in
	0.55 ... 0.75 kW 3/4 ...1 HP	SK BR4-150/100 275 991 115	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 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 ... 5 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
480 V	0.55 ... 0.75 kW 3/4 ...1 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 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 ... 5 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 BR4 resistors with installation close to the VFD 275 991 100		Bimetallic switch as contactor			Broad brake resistor + 10 mm (on one side) The dimensions apply to the VFD, including the brake resistor
	Temperature monitoring for BR4 resistors with direct installation under the variable frequncy drive 275 991 200		Bimetallic switch as contactor			

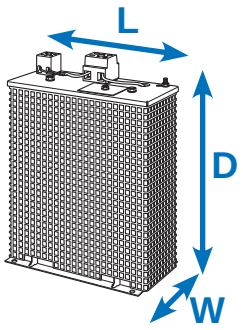
[1] Once within 120 s, for a maximum duration of 1.2 s

Chassis brake resistors, SK BR2

The resistor elements are integrated into a housing cage and must be connected to the particular variable frequency drive via a separate connecting cable.

The brake resistors must be mounted horizontally (except SK BR2-xxx/400-C) using a short shielded cable. All brake resistors have protection class IP20.





only SK BR2-xxx/400-C

Variable frequency drives SK 5xxE ...		Resistor type Material No.	Resistance [Ω]	Continuous output [W]	Short-term power [kW][2]	L x W x D
230 V	3.0 ... 4.0 kW 4 ... 5 HP	SK BR2-35/400-C[1] 278 282 045	35	400	12	178 x 100 x 252 mm 7.00 x 3.93 x 9.92 in
	5.5 ... 7.5 kW 7.5 ... 10 HP	SK BR2-22/600-C 278 282 065	22	600	18	385 x 92 x 120 mm 15.15 x 3.62 x 4.72 in
	11 kW / 15 HP	SK BR2-12/1500-C 278 282 015	12	1500	45	585 x 185 x 120 mm 23.03 x 7.28 x 4.72 in
	15 kW / 20 HP	SK BR2-9/2200-C 278 282 122	9	2200	66	485 x 275 x 120 mm 19.09 x 10.82 x 4.72 in
480 V	3.0 ... 4.0 kW 4 ... 5 HP	SK BR2-100/400-C[1] 278 282 040	100	400	12	178 x 100 x 252 mm 7.00 x 3.93 x 9.92 in
	5.5 ... 7.5 kW 7.4 ... 10 HP	SK BR2-60/600-C 278 282 060	60	600	18	385 x 110 x 120 mm 15.15 x 3.62 x 4.72 in
	11 ... 15 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 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
	30 ... 37 kW 40 ... 50 HP	SK BR2-12/4000-C 278 282 400	12	4000	120	585 x 266 x 210 mm 23.03 x 10.47 x 8.26 in
	45 ... 55 kW 60 ... 75 HP	SK BR2-8/6000-C 278 282 600	8	6000	180	395 x 490 x 260 mm 15.55 x 19.29 x 10.23 in
	75 ... 110 kW 100 ... 150 HP	SK BR2-6/7500-C 278 282 750	6	7500	225	595 x 490 x 260 mm 23.42 x 19.29 x 10.23 in
	132 ... 160 kW 180 ... 218 HP	SK BR2-3/7500-C 278 282 753	3	7500	225	595 x 490 x 260 mm 23.42 x 19.29 x 10.23 in
	132 ... 160 kW 180 ... 200 HP	SK BR2-3/17000-C 278 282 754	3	17 000	510	795 x 490 x 260 mm 31.29 x 19.29 x 10.23 in
	Temperature monitoring For BR2 resistors integrated (Terminals 4 mm²)		Bimetallic switch as contactor			

[1] Type of assembly: vertical

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

EMC Kit

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

NORDAC® *PRO* Size	EMC 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 variable frequency drive, snap-on rail mounting.
Material No.: 278 910 340

RJ45 WAGO connection module

For example to connect a CANopen encoder to one of the two RJ45 - connection sockets of the variable frequency drive.
Material No.: 278 910 300

Signal converter +/- 10 V

For connection of a bipolar analog signal to the unipolar analog input of a NORDAC® *PRO* (up to size 4), snap-on rail mounting.
Material No.: 278 910 320

IO expansion SK EBIOE-2

The generous number of standard inputs and outputs on the device can be supplemented using an extension provided for snap-on rail mounting.
Material No.: 275 900 210
Available for SK 540E and higher

Electronic brake rectifier SK EBGR-1

For direct control and supply of an electromagnetic holding brake.
Material No.: 19 140 990

Intelligent Drivesystems, Worldwide Services

THE VARIABLE SOLUTION FOR HIGH-VOLUME APPLICATIONS

US

NORDAC® *LINK* FIELD DISTRIBUTOR

VFDs and MOTOR STARTERS

NORD® DRIVESYSTEMS

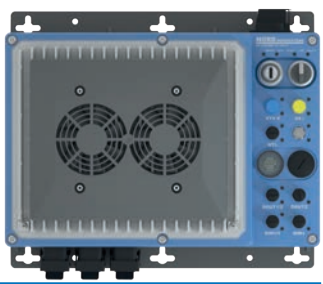
NORDAC® *LINK*
FIELD DISTRIBUTOR

Conveyor technology and intralogistics require drive control systems that are easy to install, access, and maintain. The NORDAC *LINK* field distribution system supplements the NORD DRIVESYSTEMS product range and provides customers with a drive control that can be conveniently installed close to the motor. System costs can be significantly reduced thanks to decentralized drive technology.

- Flexible configuration and function – freely configurable according to requirements and the application
- Available as VFDs (up to 7.5 kW or 10 HP) and motor starters (up to 3 kW or 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 1
up to 3.0 kW

VFDs
Size 0
up to 0.75 kW (1 HP)
Size 1
up to 3.0 kW (4 HP)



VFDs
Size 2
up to 7.5 kW (10 HP)

EXTENSIVE BASIC EQUIPMENT

■ Monitoring of calculated load torque depending on the output frequency ■ Individual adaptation of load monitoring to protect the system from overload **Available with SK 250E and higher**	**Load monitor**
■ High efficiency in partial load operation ■ Simple setting **Available with SK 250E and higher**	**Energy-saving function**
■ 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 electro-mechanical holding brake for wear-free brake actuation **Available with SK 250E and higher**	**Lifting gear functions**
■ 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 **Available with SK 250E and higher**	**Process controller, PI controller**
■ Control of one or more follower drives by a master drive ■ Communication via USS or CANopen with control word and setpoint values **Available with SK 250E and higher**	**Master / Follower operation**

■ High-precision speed regulation
■ Highest possible acceleration due to direct feedback of the actual speed characteristics to the variable frequency drive. Also includes:
  ■ Full torque down to standstill (speed 0)
  ■ Digital speed controller with wide range of settings
Available with SK 250E and higher
	Encoder feedback (Servo Mode)

■ Simple adaptation to control systems through optional interfaces ■ Quick and simple diagnosis via LED indicators ■ Various control boxes available for display, operation and parameterization ■ Simple operation and parameterization through logical parameter structure and intuitive layout of control elements **Available with SK 250E and higher**	**Handling and communication**
■ Bus systems – NORD supports all common bus systems to enable simple installation in the system design	**Bus systems**
■ Functional safety - STO, SS1: Integrated, TÜV-certified safety functions simplify system design. **Available with SK 260E and SK 280E**	**Functional safety**

THE ENTIRE TEAM
NORDAC® *LINK* VERSIONS AT A GLANCE

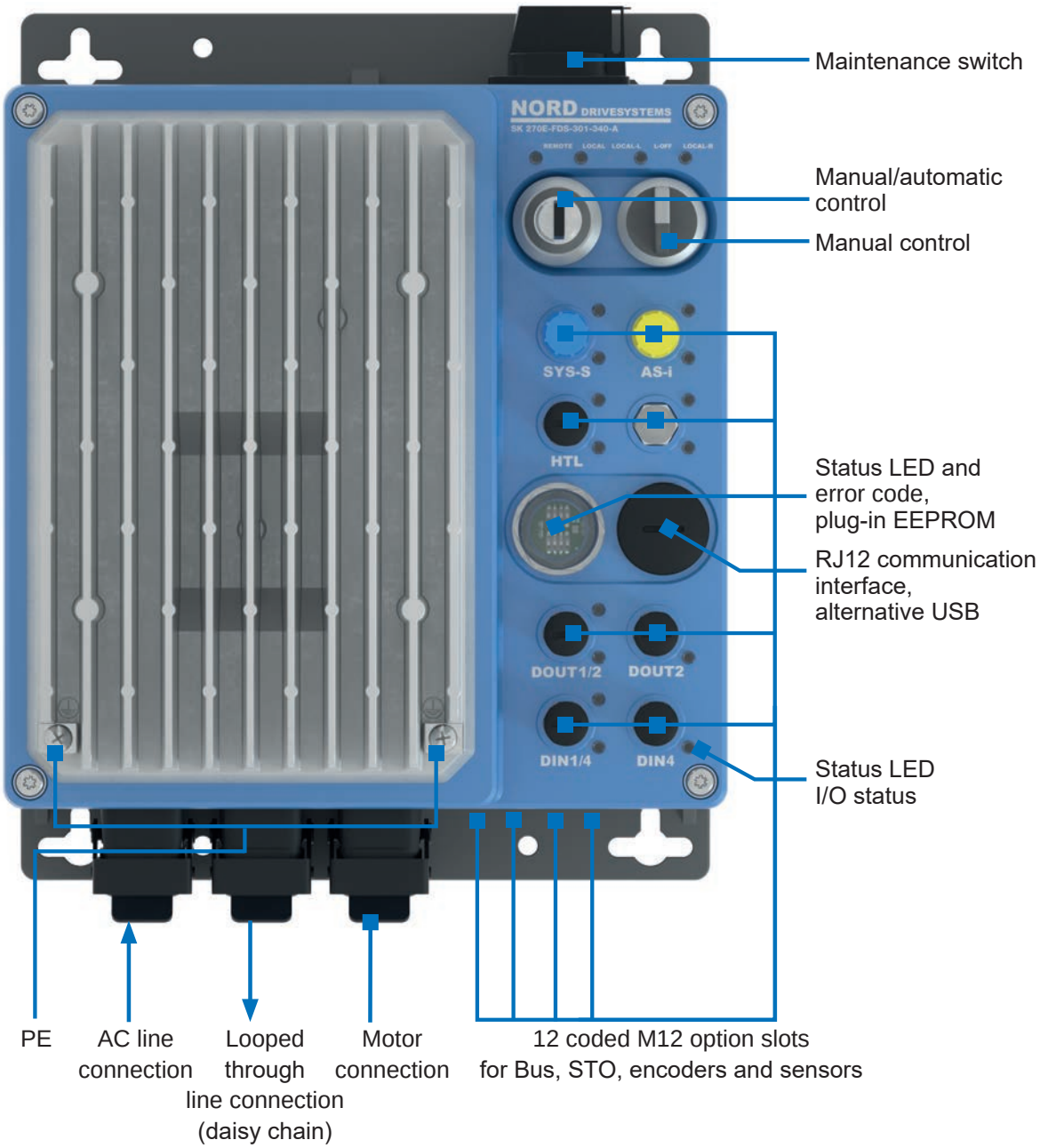
		SK 155E-FDS	SK 175E-FDS	SK 250E-FDS	SK 260E-FDS	SK 270E-FDS	SK 280E-FDS
		Motor starters 0.55 - 3.0 kW		VFDs 0.37 - 7.5 kW			
Basic functions	Plug connection of AC line, motor and control cables	✓		✓			
	Energy bus - loop-through of AC line supply cables	❍		❍			
	Repair/maintenance switch	❍		❍			
	Sensorless 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			✓			
	EMC performance	Class A up to max. motor cable length 20 m		C2 up to max. motor cable length 10 m [1]			
	Drive unit monitoring function, including motor monitoring, motor thermistor evaluation	✓		✓			
	Reversing function		✓	✓			
	Process controller / PI controller			✓			
	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]	✓		✓			
Options	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)	❍		❍			

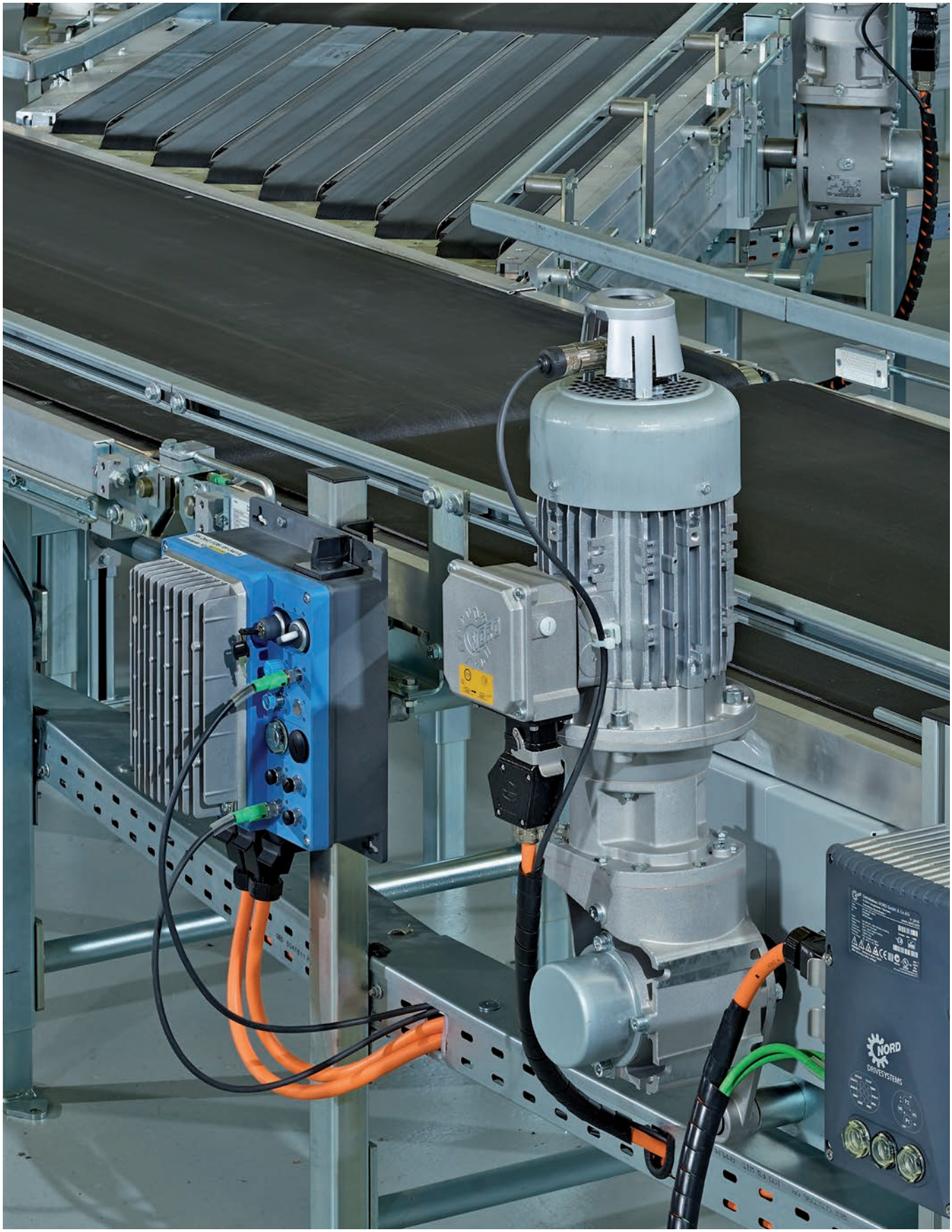
[1] Cable-bound transmission only
[2] Must be taken into account for the order
[3] Either AS-Interface or PROFIBUS DP

✓ 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 0.55 - 3.0 kW		VFDs 0.37 - 7.5 kW			
Number of digital inputs	3 (+2 sensor inputs for Bus)[2]		5+2[1,2]			
Number of analog inputs			2[1]			
Number of digital outputs	2		2			
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.

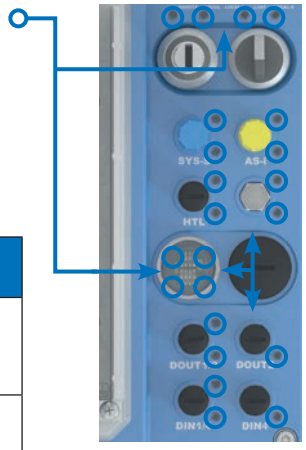



NORD
DRIVESYSTEMS

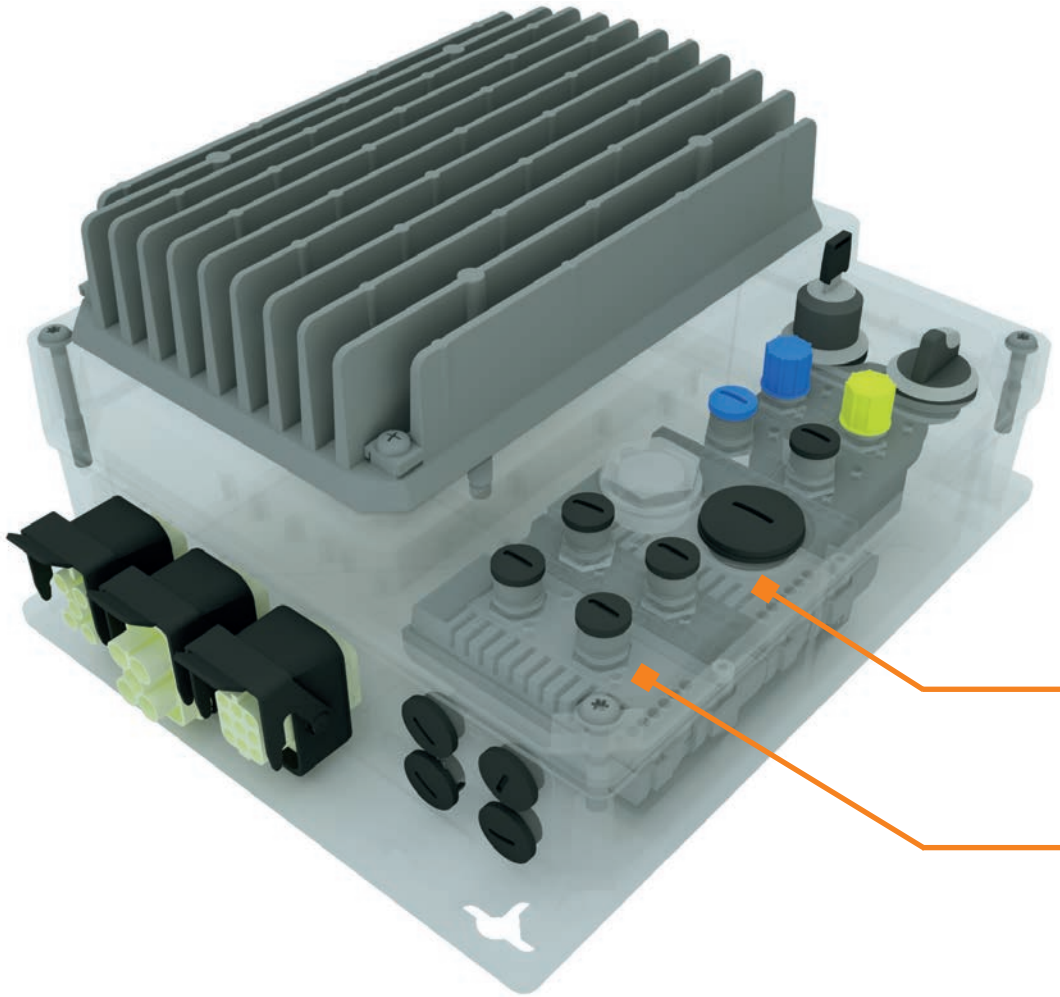
LED- STATUS INDICATORS
USE/MEANING

The variable frequency drive is equipped with LED indicator lights 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 act as diagnostic LEDs and are therefore 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 variable frequency drive or communication level.



Can be extended with a maximum of two additional 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))

Motor starter efficiency
> 98 %

Ambient temperature
-25 °C...+50 °C (S1)

Protection class
IP65

Protective measures against
- AC line phase failure
- Motor phase failure
- Flux monitoring
- Motor over temperature (PTC)
- Motor overload
- AC line over/under voltage

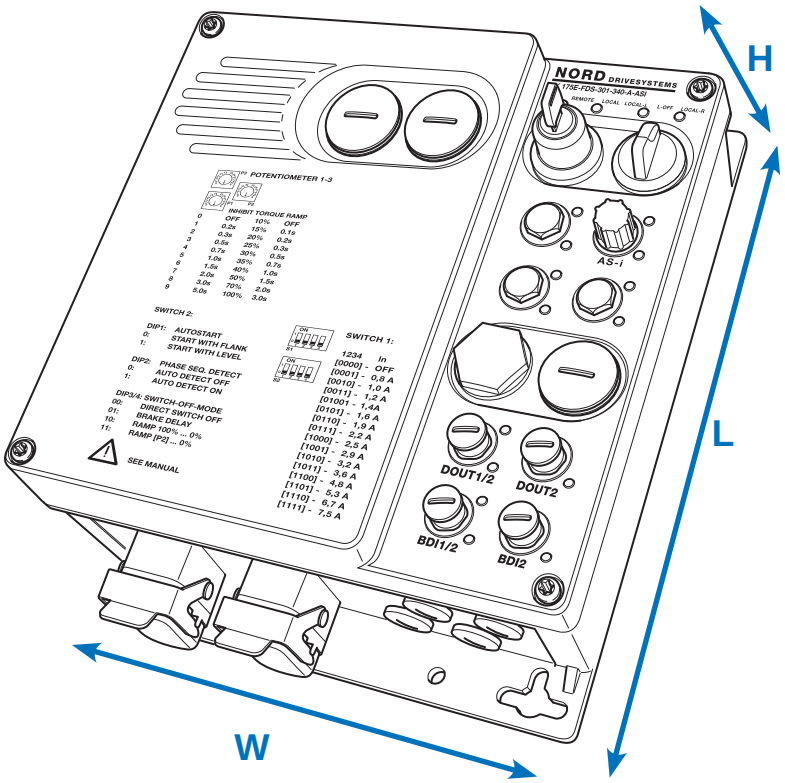
Motor temperature monitoring
I^2t Motor
PTC / bi-metal switch

Integrated Class A line filter
For motor mounting or wall mounting with motor cable length up to 20 m

Leakage current
< 20 mA

Motor starters SK 155E-FDS... / SK 175E-FDS...	Nominal motor power		Nominal output current rms [A]	AC line voltage / output voltage	Weight [kg]	Dimensions L x W x H
	[kW]	[hp]				
-301-340-B	up to 3.0	up to 4	7.5	3~ 380 V … 500 V, -20 % / +10 %, 47 ... 63 Hz	approx. 3	312[1] x 243 x 104[2] mm 12.28 x 9.56 x 4.09 in

[1] Without maintenance switch L=307 mm
[2] With key switch and key inserted H=125 mm



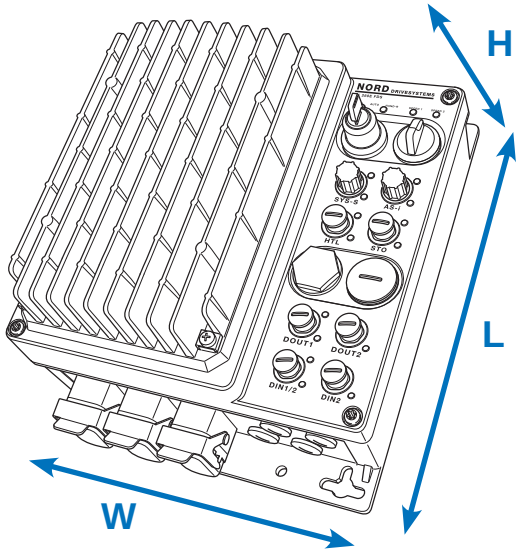
NORDAC® *LINK* VFD

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
Efficiency	> 95%
Ambient temperature	-25 °C ... +40 °C (S1)
Protection class	IP65 devices up to 2 HP however not with option -FANO[1] 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
Motor temperature monitoring	I^2t Motor PTC / bi-metal switch
Leakage current	< 30 mA

[1] (heat sink with mounted fan)

Variable frequency drives SK 2xxE-FDS...	Nominal motor power		Nominal output current rms [A]	Line voltage/ Output voltage	Weight [kg / lbs]	Dimensions L x W x H	Size
	400 V [kW]	480 V [hp]					
-370-340-A	0.37	1/2	1.1	3 ~ 380...500 V, -20 % / +10 %, 47 ... 63 Hz 3 ~ AC 0 V up to AC line voltage	3.8 / 8.3	312 x 243 x 130 mm 12.28 x 9.56 x 5.11 in	0
-550-340-A	0.55	3/4	1.7		4.6 / 10.1		
-750-340-A	0.75	1	2.3		4.6 / 10.1		
-111-340-A	1.1	1 1/2	3.1		4.6 / 10.1	312 x 243 x 175[2] mm 12.28 x 9.56 x 6.88 in	1
-151-340-A	1.5	2	4.0		4.6 / 10.1		
-221-340-A	2.2	3	5.5		4.8 / 10.5		
-301-340-A	3.0	4	7.0		4.8 / 10.5		
-401-340-A	4.0	5	8.9		6.8 / 14.9	312 x 358 x 184 mm 12.28 x 14.09 x 7.24 in	2
-551-340-A	5.5	7	11.7		6.8 / 14.9		
-751-340-A	7.5	10	15		6.8 / 14.9		



[2] VFDs up to 2 HP (1.5 kW), without -FANO option (optional fan on heat sink) H=155

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 to variants for direct mounting on the device or installation in a control cabinet door, handheld versions are also available.

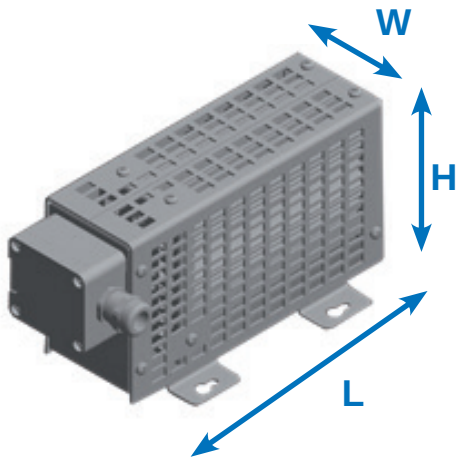
Type Designation Material No.	Description	Remarks
Parameter Box SK PAR-3E 275 281 414	Suitable for control and parameterization, includes LCD screen, plain text display in 14 languages, direct control of up to 5 devices, memory for 5 device data sets, and convenient control keypad.	Connection for data exchange with NORDCON on a PC via RS-232 (USB 2.0), including 1 m connection cable, 4.5 … 30 V DC/1.3 W Supply e.g. directly via the VFD. Control cabinet installation
Simple Control Box SK CSX-3E 275 281 413	Suitable for control and parameterization, 4-digit, 7-segment display, direct control of a VFD, and 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: www.nord.com
Bluetooth stick NORDAC® *ACCESS BT* SK TIE5-BT-STICK 275 900 120	Interface for wireless connection to a mobile device via Bluetooth. With the aid of the NORDCON *APP*, the NORDCON software enables smart operation and parameterization as well as commissioning assistance and fault analysis of NORD electronic drive technology.	Free download via App Store for iOS and Google Play for Android users

Chassis brake resistors, SK BRW5

The resistor elements are integrated into a housing cage and must be connectedto the VFD via a separate connecting cable.

The brake resistors must be mounted horizontally. A shielded cable, kept as short as possible, should be used for this purpose.

The brake resistors have protection class IP65.



Variable frequency drives SK 2xxE-FDS ...	Resistor type Material No.	Resistance [Ω]	Continuous output [W]	Short-term power [kW][1]	L x W x H
...1.1kW ...1.5 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
1.5 kW ... 7.5 kW 2.0 ... 10 HP	SK BRW5-2-150-450 278 281 071	450	150	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 contractor			

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

Internal brake resistors

Internal brake resistors are intended for applications with instances of slight, sporadic and brief braking, such as continuous conveyor equipment or mixing equipment. In addition, they enable the use of the VFD in very confined spaces or in an explosive atmosphere.

NOTE: Internal brake 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%.

Variable frequency drives SK 2xxE-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- to … 301-340-	400 Ω	100 W	1.0 kWs
… 401-340- to … 751-340-	200 Ω	200 W	2.0 kWs

[1] maximum once within 10s

Intelligent Drivesystems, Worldwide Services

FLEXIBLE VARIABLE FREQUENCY DRIVE FOR DECENTRALIZED APPLICATIONS

US

NORDAC® *FLEX*

SK 200E

NORD® DRIVESYSTEMS

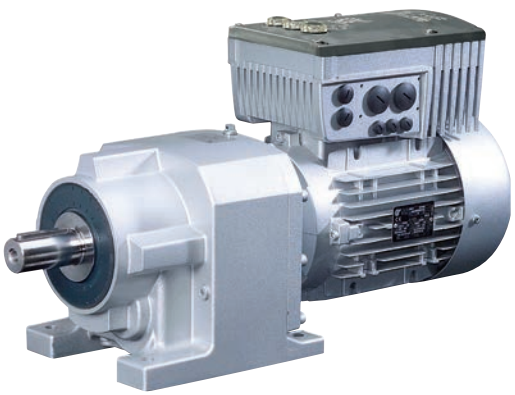
THE ALL-ROUNDER
PRODUCT FAMILY NORDAC® *FLEX*

Variable frequency drives are essential components of electrical drive technology and are used for a wide range of automation tasks in almost all fields of application.

Universal
The highly versatile NORDAC® *FLEX* has established itself in almost all areas of engineering and industry. This is due not only to the wide range of available powers (up to 22 kW or 30 HP) but also the broad selection of functions and the flexibility offered by its comprehensive range of accessories.

Economical
The series has been structured with various function levels to take into consideration efficiency and customers' application-specific requirements. In addition, we have arranged the series into two equipment groups which optimally cater to typical customer applications for conveyors, pumps and fans.

Energy-saving
Even in applications where a VFD is not technically necessary (constant speed with 60 Hz), the NORDAC *FLEX* beats every unregulated drive unit with its substantial energy-saving characteristics, particularly in partial load operation (exact amount of savings is dependent on various factors).



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** (switch, potentiometer or 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 AC line 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 .33-.75 HP (0.25-0.55 kW)
3~ 230 V .33 - 15 HP (0.25-11 kW)
3~ 400 V .75 - 30 HP (0.55- 22 kW)

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

Basic equipment of the 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

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

1~ 115 V .33 - 1 HP / 0.25- 0.75 kW
1~ 230 V .33-1.5HP / 0.25-1.1 kW
3~ 230 V .33 - 5 HP / 0.25-4 kW
(15 HP / 11 kW)
3~ 480 V .75-10 HP / 0.55-7.5 kW
(30 HP / 22 kW)

Typical requirements

- Separate voltage levels 480 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 equipment of the 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

Integrated brake rectifier
Application and release time optimally adjustable via parameter

BRE

DELIVERING FLEXIBILITY
IN A CONTROLLED DRIVE UNIT

If you are looking for a drive unit that enables your machine to perform specific functions, NORDAC *FLEX* can be perfectly tailored to your requirements and be easily retrofitted with a wide range of options to adapt to the changing 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 uptake (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 timeframe in case of service
- Frequent changes of use of your machine
- Existing motor and gear unit

A need for plug-and-play
- Large projects or series production machinery
- Replacement devices for 1:1 exchange in case of service

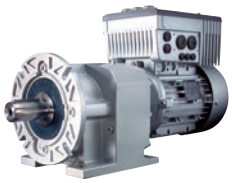
A need for sustainability
- Resource-saving operation
- Use of products with low levels of hazardous substances

The NORDAC® *FLEX* solution:

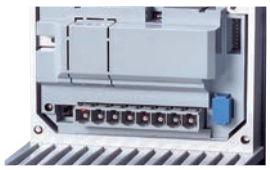
Space-saving
- A compact device designed for the smallest possible overall dimensions
- Integrable optional modules (e.g. interfaces for field bus connection)
- Wall mounting kits for installation close to the motor

Powerful
- Unbeatable power range from 0.25 kW to 22 kW (0.33-30 HP)
- Optimized for continuous operation in 4 matching sizes
- Genuinely 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 modification of the software
- 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 supplied individually

Configurable
- Mounted on the geared motor
- Equipped with the necessary accessories (brake resistor, bus interface, encoders, etc.)
- Pre-parameterized for the specified drive application
- Equipped with the necessary system plug connectors

Environmentally friendly
- Energy efficient
- Energy-saving function to match the power output to the actual demand in partial load operation
- Consideration of environmental factors even during manufacture

VERSATILE AND SUSTAINABLE
VARIABLE FREQUENCY DRIVE WITH "SERVO GENES"

Standard encoder interfaces

Speed control in the NORDAC® *FLEX* is extremely precise thanks to sophisticated and fast measuring methods and calculation algorithms in combination with integrated high-precision current vector control.

For applications where even greater precision is needed in concert with very high dynamics (maximum acceleration, cyclic operation, synchronous rotation relative to other drive units) detailed accurate 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 VFD 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 round off the concept so that high-precision 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) are possible.

Every variable frequency drive 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 devices

Modern automation systems

Power (115 V/230 V/400 V)

AS-Interface including 24 V supply SK 2xxE

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

For the lower field level, the **AS-Interface** is a cost-effective solution that enables the networking of binary sensors and actuators. Special versions of the SK 200E series with an on-board AS-Interface are available.

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

Device SK ...	220E/230E	225E/235E
ASI profile	S-7.A.	S-7.0.
ASI type	A/B	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 VFD directly in a hazardous area (ATEX 22-3D).

The advantages of this 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 replacement of the transparent diagnostic caps with a version made of aluminum and glass.

It must be noted that 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
NORDAC® *FLEX* VERSIONS AT A GLANCE

		SK 200E	SK 210E	SK 220E	SK 230E	SK 205E	SK 215E	SK 225E	SK 235E
		Size 1-4 0.25 - 22 kW 1/3-29.9 HP				Size 1-3 0.25 - 7.5 kW 1/3 -10.1 HP			
Basic functions	Motor and wall mounting possible [1]	✓				✓			
	Energy bus - loop-through of AC line 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	✓				✓			
	Complete range of functions, as with a control cabinet VFD	✓				✓			
	Parameters pre-set with standard values	✓				✓			
	Scalable display values	✓				✓			
	Automatic determination of motor data	✓				✓			
	Energy-saving function, optimized efficiency in partial load operation	✓				✓			
	Class C2 line filter, for wall mounting with motor cable length up to 5 m and for motor mounting	✓				✓			
	Extensive monitoring functions	✓				✓			
	Load monitor	✓				✓			
	Process controller / PI controller	✓				✓			
	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	✓				✓			
Options	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 control, motor and AC line 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

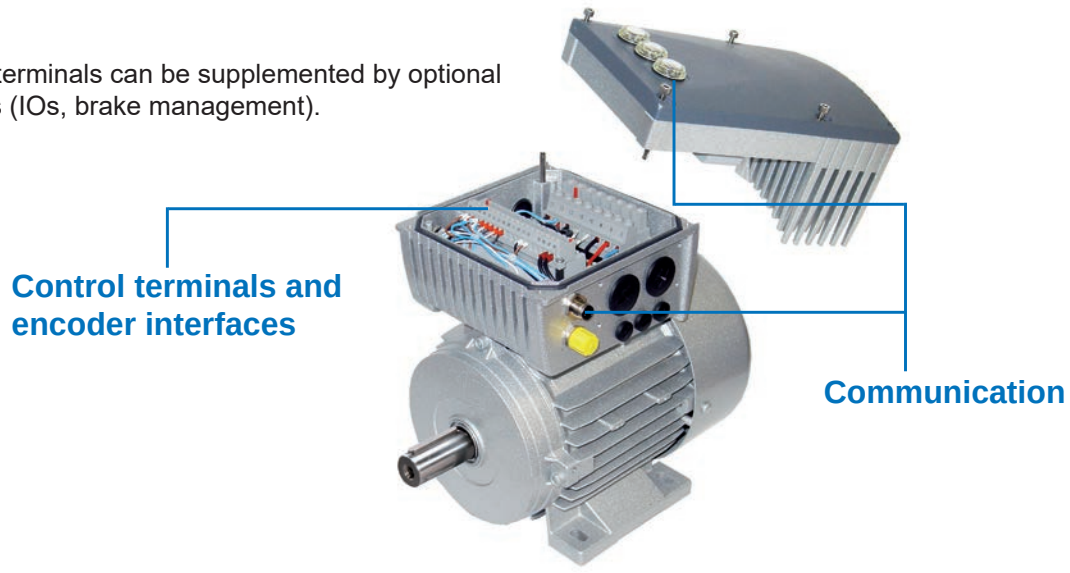
✓ Available as standard
❍ Optional
– Not available

THE SENSES
CONTROL CONNECTIONS

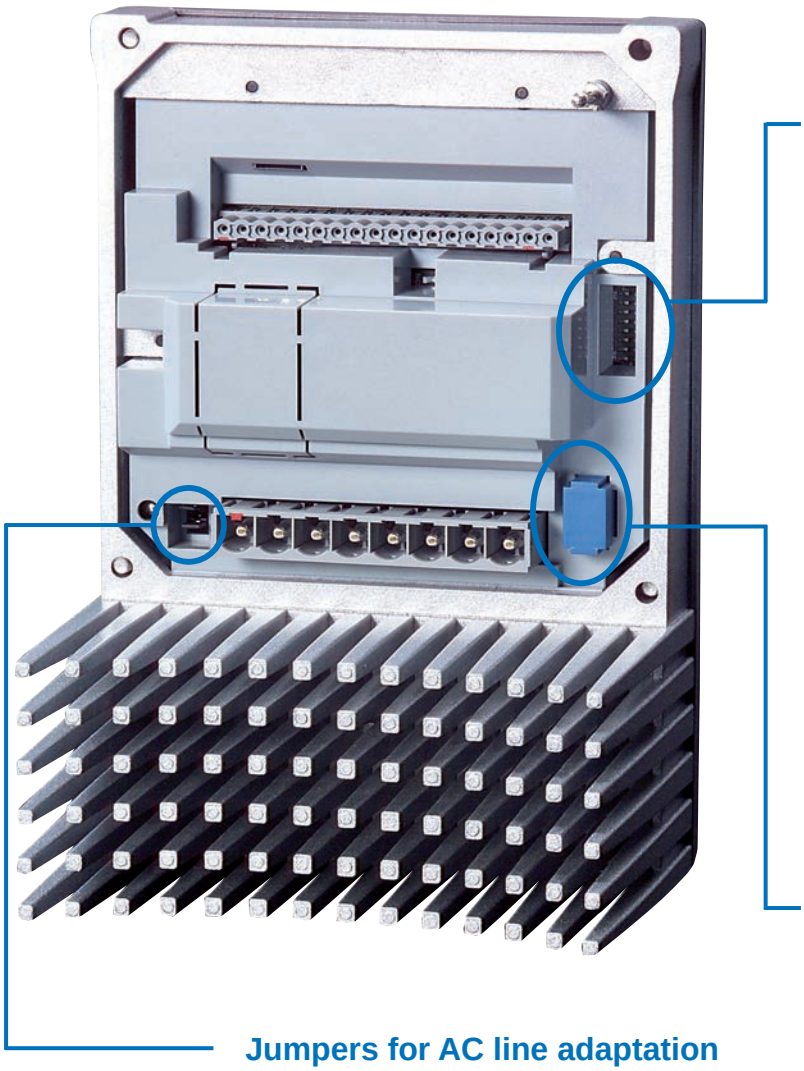
		SK 200E	SK 210E	SK 220E	SK 230E	SK 200E	SK 210E	SK 220E	SK 230E	SK 205E	SK 215E	SK 225E	SK 235E
		Size 1-3 0.25 - 7.5 kW 1/3 -10 HP				Size 4 11 - 22 kW 15-30 HP				Size 1-3 0.25 - 7.5 kW 1/3 -10 HP			
Control terminals	Number of digital inputs (DIN)	4	3	4	3	4	3	4	3	4	3	4	3
	Safe torque off input	–	✓	–	✓	–	✓	–	✓	–	✓	–	✓
	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	–	–	–	–
	Brake control	–	–	–	–	✓				✓			
	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



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 variable frequency drive is equipped with two EEPROMS for saving the individual parameter settings of the device.

One EEPROM is integrated into the device and another EEPROM can be plugged in and is easily accessible. All parameter settings are managed by the internal EEPROM. The data is mirrored to the external EEPROM. Because of the easy access, data sets can be exchanged between identical drive units via the plug-in EEPROM. Via an 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.

Jumpers for AC line 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. Compliance with the specified degree of radio interference suppression can no longer be guaranteed in this case.

Status and diagnostic cockpit

Depending on the type of device, various aids for monitoring and diagnostics are located behind three transparent cover caps. In addition, there are other elements (e.g. DIP switches or similar) which 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 software, Parameter Box). 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 setpoint values (current or voltage) via the DIP switches.

3 Status LED for VFD 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, Parameter Box). 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 out here.

3 Potentiometer and status LEDs

The two potentiometers are used for the fixed setting of various dynamic factors (setpoint 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*

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
Efficiency	> 95%
Ambient temperature	-25 °C ... +50 °C (depending on type of operation)
Protection class	IP55, optional IP66
Regulation and control	Sensorless current vector control (ISD), linear V/f characteristic
Motor temperature monitoring	I^2t 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”

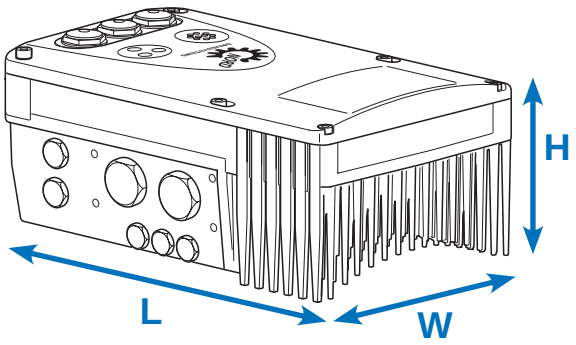
Variable frequency drives SK 2xxE ...	SK 2x0E	SK 2x5E	Nominal motor power 230 V [kW]	Nominal motor power 240 V [hp]	Nominal output current rms [A]	AC line voltage	Output voltage
-250-112-O (-C)	–	✓	0.25	1/3	1.7	1~ 110 ... 120 V, +/- 10 %, 47 ... 63 Hz	3~ 0 up to double the AC line voltage
-370-112-O (-C)	–	✓	0.37	1/2	2.2		
-550-112-O (-C)	–	✓	0.55	3/4	3.0		
-750-112-O (-C)	–	✓	0.75	1	4.0		

Variable frequency drives SK 2xxE ...	SK 2x0E	SK 2x5E	Nominal motor power 230 V [kW]	Nominal motor power 240 V [hp]	Nominal output current rms [A]	AC line voltage	Output voltage
-250-123-A (-C)	✓	✓	0.25	1/3	1.7	1~ 200 ... 240 V +/-10% 47 ... 63 Hz	3 AC 0 – 200 ... 240 V
-370-123-A (-C)	✓	✓	0.37	1/2	2.2		
-550-123-A (-C)	✓	✓	0.55	3/4	3.0		
-750-123-A (-C)	–	✓	0.75	1	4.0		
-111-123-A (-C)	–	✓	1.1	1 1/2	5.5		

Variable frequency drives SK 2xxE ...	SK 2x0E	SK 2x5E	Nominal motor power 230 V [kW]	Nominal motor power 240 V [hp]	Nominal output current rms [A]	AC line voltage	Output voltage
-250-323-A (-C)	✓	✓	0.25	1/3	1.7	3~ 200 ... 240 V, +/- 10%, 47 ... 63 Hz	3~ 0 up to AC line voltage
-370-323-A (-C)	✓	✓	0.37	1/2	2.2		
-550-323-A (-C)	✓	✓	0.55	3/4	3.0		
-750-323-A (-C)	✓	✓	0.75	1	4.0		
-111-323-A (-C)	✓	✓	1.1	1 1/2	5.5		
-151-323-A (-C)	✓	✓	1.5	2	7.0		
-221-323-A (-C)	✓	✓	2.2	3	9.5		
-301-323-A (-C)	✓	✓	3	4	12.5		
-401-323-A (-C)	✓	✓	4	5	16.0		
-551-323-A (-C)	✓	–	5.5	7 1/2	23.0		
-751-323-A (-C)	✓	–	7.5	10	29.0		
-112-323-A (-C)	✓	–	11	15	40.0		

IP66 measures

- Coated aluminum components
- Coated circuit boards
- Low-pressure test
- Diaphragm valve



Variable frequency drives SK 2xxE ...	SK 2x0E	SK 2x5E	Weight [kg / lbs]	Dimensions L x W x H	Size
-250-112-O (-C)	–	✓	3.0 kg / 6.6 lbs	236 x 156 x 127 mm 9.29 x 6.14 x 5.00 in	1
-370-112-O (-C)	–	✓			
-550-112-O (-C)	–	✓	4.1 kg / 9.0 lbs	266 x 176 x 134 mm 10.47 x 6.92 x 5.27 in	2
-750-112-O (-C)	–	✓			

Variable frequency drives SK 2xxE ...	SK 2x0E	SK 2x5E	Weight [kg]	Dimensions L x W x H	Size
-250-123-A (-C)	✓	✓	3.0 kg / 6.6 lbs	236 x 156 x 127 mm 9.29 x 6.14 x 5.00 in	1
-370-123-A (-C)	✓	✓			
-550-123-A (-C)	✓	✓			
-750-123-A (-C)	–	✓	4.1 kg / 9.0 lbs	266 x 176 x 134 mm 10.47 x 6.92 x 5.27 in	2
-111-123-A (-C)	–	✓			

Variable frequency drives SK 2xxE ...	SK 2x0E	SK 2x5E	Weight [kg]	Dimensions L x W x H	Size
-250-323-A (-C)	✓	✓	3.0 kg / 6.6 lbs	236 x 156 x 127 mm 9.29 x 6.14 x 5.00 in	1
-370-323-A (-C)	✓	✓			
-550-323-A (-C)	✓	✓			
-750-323-A (-C)	✓	✓			
-111-323-A (-C)	✓	✓			
-151-323-A (-C)	✓	✓	4.1 kg / 9.0 lbs	266 x 176 x 134 mm 10.47 x 6.92 x 5.27 in	2
-221-323-A (-C)	✓	✓			
-301-323-A (-C)	✓	✓	6.9 kg / 15.2 lbs	330 x 218 x 144 mm 12.99 x 8.58 x 5.66 in	3
-401-323-A (-C)	✓	✓			
-551-323-A (-C)	✓	–	17.0 kg / 37.4 lbs	480 x 305 x 160 mm 18.89 x 12.00 x 6.29 in	4
-751-323-A (-C)	✓	–			
-112-323-A (-C)	✓	–			

NORDAC® *FLEX*

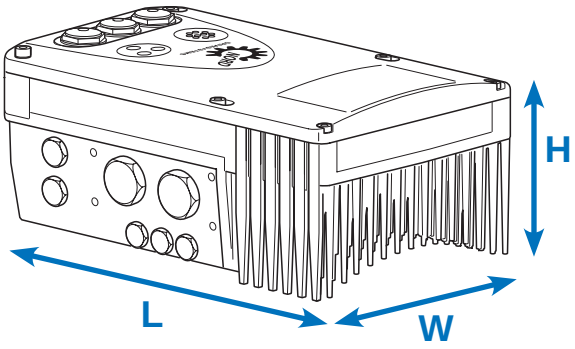
3~ 380 ... 500 V

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
Efficiency	> 95%
Ambient temperature	-25 °C ... +50 °C (depending on type of operation)
Protection class	IP55, optional IP66
Regulation and control	Sensorless current vector control (ISD), linear V/f characteristic
Motor temperature monitoring	I^2t 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”

Variable frequency drives SK 2xxE ...	SK 2x0E	SK 2x5E	Nominal motor power		Nominal output current rms [A]	AC line voltage	Output voltage
			400 V [kW]	480 V [hp]			
-550-340-A	✓	✓	0.55	3/4	1.7	3~ 380 ... 500 V, -20% / +10%, 47 ... 63 Hz	3~ 0 up to AC line voltage
-750-340-A	✓	✓	0.75	1	2.3		
-111-340-A	✓	✓	1.1	1 1/2	3.1		
-151-340-A	✓	✓	1.5	2	4.0		
-221-340-A	✓	✓	2.2	3	5.5		
-301-340-A	✓	✓	3.0	4	7.5		
-401-340-A	✓	✓	4.0	5	9.5		
-551-340-A	✓	✓	5.5	7 1/2	12.5		
-751-340-A	✓	✓	7.5	10	16.0		
-112-340-A	✓	–	11.0	15	23.0		
-152-340-A	✓	–	15.0	20	32.0		
-182-340-A	✓	–	18.5	25	40.0		
-222-340-A	✓	–	22.0	30	46.0		

IP66 measures

- Coated aluminum components
- Coated circuit boards
- Low-pressure test
- Diaphragm valve



Variable frequency drives SK 2xxE ...	SK 2x0E	SK 2x5E	Weight [kg / lbs]	Dimensions L x W x H	Size
-550-340-A	✓	✓	3.0 kg / 6.6 lbs	236 x 156 x 127 mm 9.29 x 6.14 x 5.00 in	1
-750-340-A	✓	✓			
-111-340-A	✓	✓			
-151-340-A	✓	✓			
-221-340-A	✓	✓			
-301-340-A	✓	✓	4.1 kg / 9.0 lbs	266 x 176 x 134 mm 10.47 x 6.92 x 5.27 in	2
-401-340-A	✓	✓			
-551-340-A	✓	✓	6.9 kg / 15.2 lbs	330 x 218 x 144 mm 12.99 x 8.58 x 5.66 im	3
-751-340-A	✓	✓			
-112-340-A	✓	–	17.0 kg / 37.4 lbs	480 x 305 x 160 mm 18.89 x 12.00 x 6.29 in	4
-152-340-A	✓	–			
-182-340-A	✓	–			
-222-340-A	✓	–			

VARIED INSTALLATION POSSIBILITIES
MOTOR AND WALL MOUNTING

Motor assembly

The variable frequency drive can be mounted directly on the terminal box of the gear motor, thus forming a perfect unit consisting of the drive and the control technology. This motor-mounted format makes full use of its unbeatable advantages: compact overall dimensions of the drive unit; near immediate readiness for use after connection to the AC line supply thanks to the pre-configuration of the drive unit at the factory; 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 a wall mounting kit. You can select from different versions depending on the prevalent ambient conditions.

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 ultimately result in power restrictions (derating) for the drive.

2. Versions with fan

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

This version differs from the standard version due to an extra fan. The fan ensures a continuous flow of cooling air over the VFD, which avoids derating due to wall mounting. Size 4 variable frequency drives come equipped with fans. A corresponding wall mounting kit is therefore not necessary and is not available.

3. ATEX version

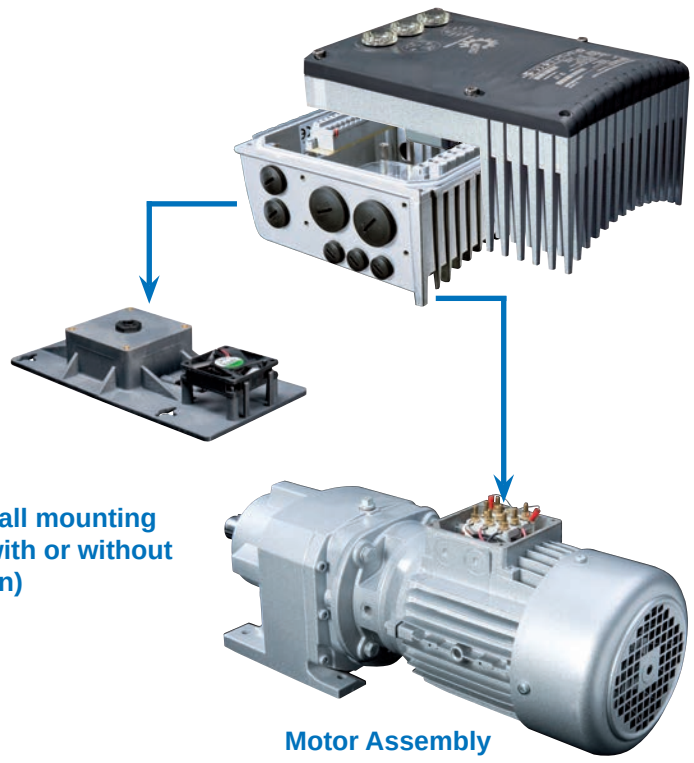
SK TIE4-WMK-1-EX (up to -2-EX)

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

Designation	Material No.	VFD Frame Size
SK TIE4-WMK-1-K	275 274 004	Size 1, 2
SK TIE4-WMK-2-K	275 274 015	Size 3
SK TIE4-WMK-L-1	275 274 005	Size 1, 2
SK TIE4-WMK-L-2	275 274 006	Size 3
SK TIE4-WMK-1-EX	275 175 053	Size 1, 2
SK TIE4-WMK-2-EX	275 175 054	Size 3
SK TIE4-WMK-3	275 274 003	Size 4
SK TIE4-WMK-3-C	275 274 009	Size 4
SK TIE4-WMK-TU	275 274 002	Type: SK TU4-

[1] Mounting of the WMK on the connection unit of the VFD
[2] H = Increase in the total height of the device if use the wall mounting kit
[3] Mounting of the WMK on the connection unit of the technology unit

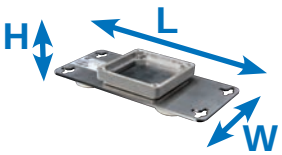
Motor-mounted or wall-mounted variable frequency drives



Wall mounting (with or without fan)

Motor Assembly

Designation	Version Material	Inte-grated fan	Achievable protection class	Weight [Kg]	Dimensions L x W x H	Remarks
SK TIE4-WMK-1-K	Plastic	-	IP66	0.2	205 x 95 x 5 mm 8.07 x 3.74 x 0.19 in	Derating as necessary
SK TIE4-WMK-2-K	Plastic	-	IP66	0.3	235 x 105 x 5 mm 9.25 x 4.13 x 0.19 in	Derating as necessary
SK TIE4-WMK-L-1	Plastic	✓	IP55	0.4	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	300 x 150 x 30 mm 11.81 x 5.90 x 1.18 in	Fan power: 24 V DC, 1.3 W
SK TIE4-WMK-1-EX	Stainless steel	-	IP66	0.6	205 x 95 x 4 mm 8.07 x 3.74 x 0.15 in	Derating as necessary
SK TIE4-WMK-2-EX	Stainless steel	-	IP66	0.8	235 x 105 x 10 mm 9.25 x 4.13 x 0.39 in	Derating as necessary
SK TIE4-WMK-3	Stainless steel	-	IP55	2.4	295 x 255 x 8 mm 11.61 x 10.03 x 0.31 in	
SK TIE4-WMK-3-C	Stainless steel	-	IP66	2.4	295 x 255 x 8 mm 11.61 x 10.03 x 0.31 in	



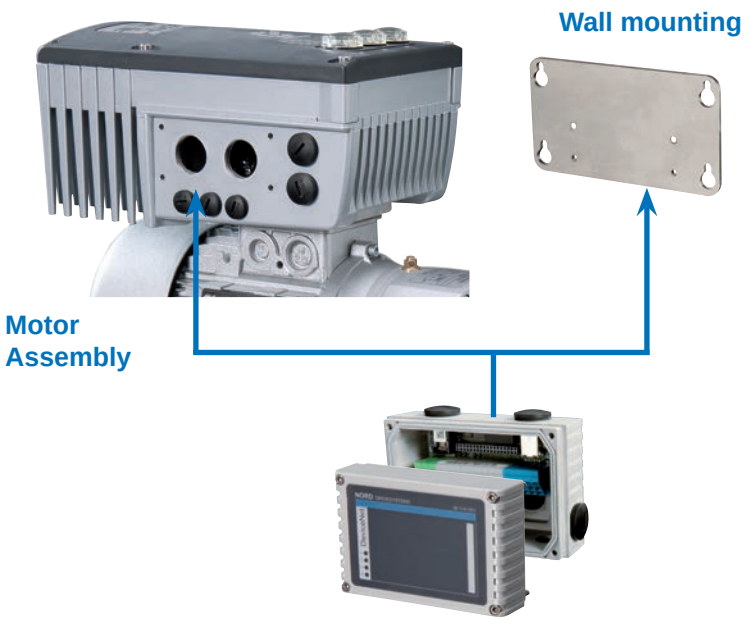
SK TIE4-WMK-1-EX

SK TIE4-WMK-L-1

SK TIE4-WMK-1-K

SK TIE4-WMK-TU

Technology unit on NORDAC® *FLEX* or wall mounting

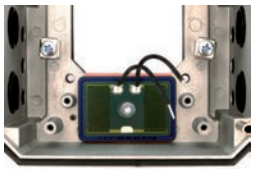


BRAKE RESISTORS
INTERNAL VERSION

Internal brake resistor SK BRI4

Internal brake resistors are intended for applications where slight, sporadic or brief braking is expected (e.g. continuous conveyor equipment, mixing equipment). In addition, 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 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%.



Variable frequency drive SK 2xxE ...		Resistor type	Material No.	Resistance [Ω]	Continuous output [W]	Power consumption[2] [kWs]
1~ 115 V	… -250-112-O up to … -750-112-O	SK BRI4-1-100-100	275 272 005	100	100/25%	1.0
1~ 230 V	… -250-123-A up to … -111-123-A	SK BRI4-1-100-100	275 272 005	100	100/25%	1.0
3~ 230 V	… -250-323-A up to … -221-323-A	SK BRI4-1-200-100	275 272 008	200	100/25%	1.0
	… -301-323-A up to … -401-323-A	SK BRI4-2-100-200	275 272 105	100	200/25%	2.0
	... -551-323-A up to ... -751-323-A	SK BRI4-3-047-300	275 272 201	47	300/25%	3.0
	... -112-323-A	SK BRI4-3-023-600	275 272 800	23	600/25%	6.0
3~ 480 V	… -550-340-A up to … -401-340-A	SK BRI4-1-400-100	275 272 012	400	100/25%	1.0
	… -551-340-A up to … -751-340-A	SK BRI4-2-200-200	275 272 108	200	200/25%	2.0
	... -112-340-A up to ... -152-340-A	SK BRI4-3-100-300	275 272 205	100	300/25%	3.0
	... -182-340-A up to ... -222-340-A	SK BRI4-3-050-600	275 272 801	50	600/25%	6.0

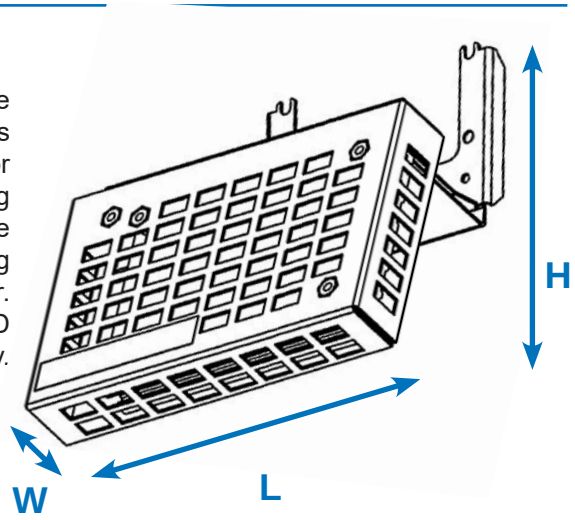
[1] Reduction of the continuous output of the brake resistor to 25% of the rated output
[2] Permissible max. once within 10 s

External brake resistors SK BRE4

External brake resistors (IP67) are intended for applications in which longer (lifting equipment), frequent (cyclic operation) or intensive (highly dynamic positioning applications) braking is expected. They are mounted directly on the VFD. Typically, they 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. For applications with higher braking power (lifting equipment), we recommend targeted planning of the necessary brake resistor. Please contact the NORD DRIVESYSTEMS Group directly.

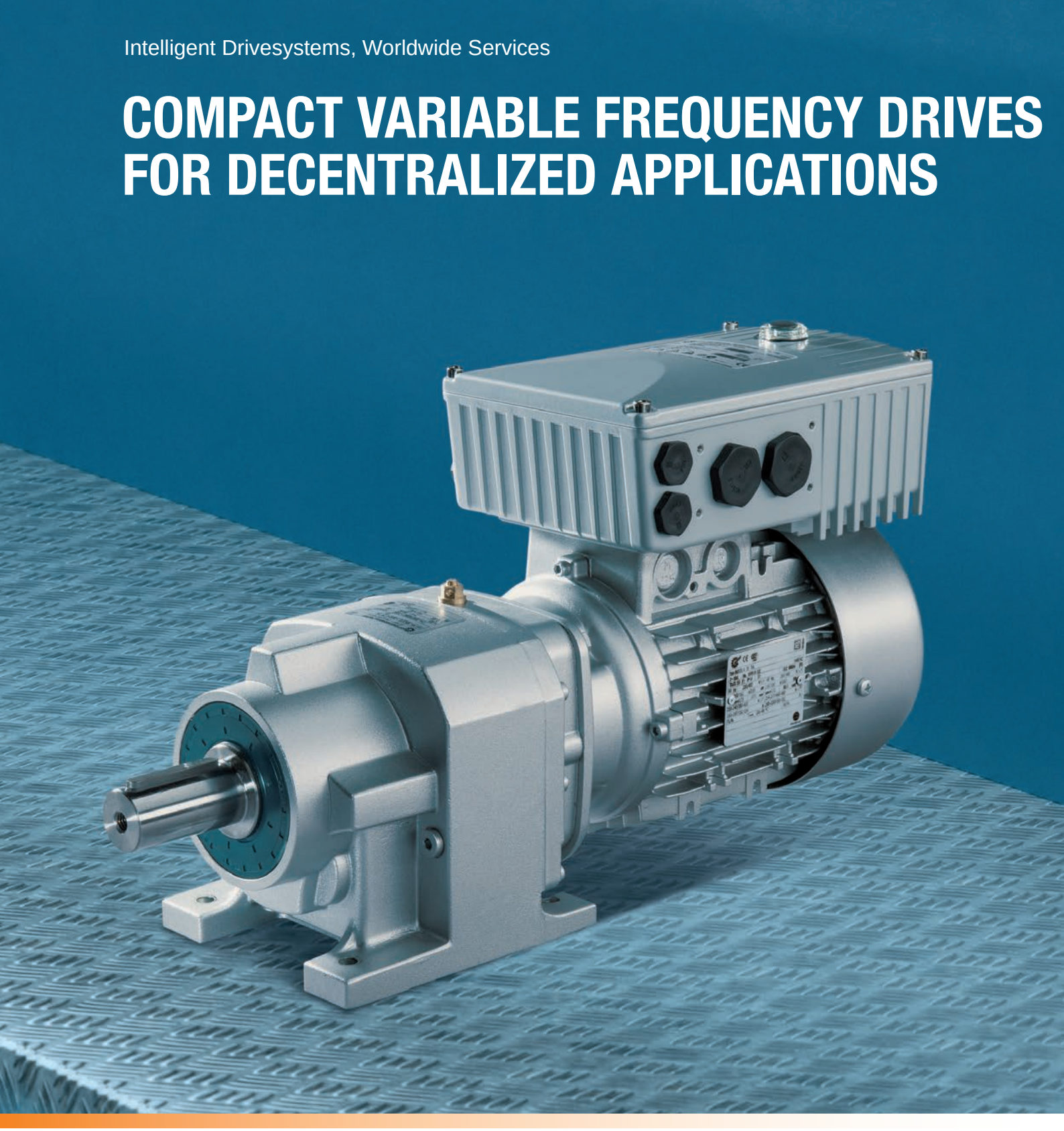


Variable frequency drives SK 2xxE ...		Resistor type Material No.	Resistance [Ω]	Continuous output [W]	Power Consumption[1] [kWs]	L x W x H
1~ 115 V	… -250-112-O up to … -750-112-O	SK BRE4-1-100-100 275 273 005	100	100	2.2	150 x 61 x 178 mm 5.90 x 2.40 x 7.00 in
		Alternatively: SK BRE4-2-100-200 275 273 105	100	200	4.4	255 x 61 x 178 mm 10.03 x 2.40 x 7.00 in
1~ 230 V	… -250-123-A up to … -111-123-A	SK BRE4-1-100-100 275 273 005	100	100	2.2	150 x 61 x 178 mm 5.90 x 2.40 x 7.00 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 7.00 in
3~ 230 V	… -250-323-A up to … -221-323-A	SK BRE4-1-200-100 275 273 008	200	100	2.2	150 x 61 x 178 mm 5.90 x 2.40 x 7.00 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 7.00 in
	… -301-323-A up to … -401-323-A	SK BRE4-2-100-200 275 273 105	100	200	4.4	255 x 61 x 178 mm 10.03 x 2.40 x 7.00 in
	… -551-323-A up to … -112-323-A	SK BRE4-3-050-450 275 273 201	50	450	3.0	355 x 245 x 318 mm 13.97 x 9.64 x 12.51 in
3~ 480 V	550-340-A up to … -401-340-A	SK BRE4-1-400-100 275 273 012	400	100	2.2	150 x 61 x 178 mm
		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 7.00 in
	… -551-340-A up to … -751-340-A	SK BRE4-2-200-200 275 273 108	200	200	4.4	255 x 61 x 178 mm 10.03 x 2.40 x 7.00 in
	... -112-340-A up to … -222-340-A	SK BRE4-3-100-450 275 273 205	100	450	3.0	355 x 245 x 318 mm 13.97 x 9.64 x 12.51 in

[1] Permissible max. once within 120 s

Intelligent Drivesystems, Worldwide Services

COMPACT VARIABLE FREQUENCY DRIVES FOR DECENTRALIZED APPLICATIONS



US

NORDAC® *BASE*

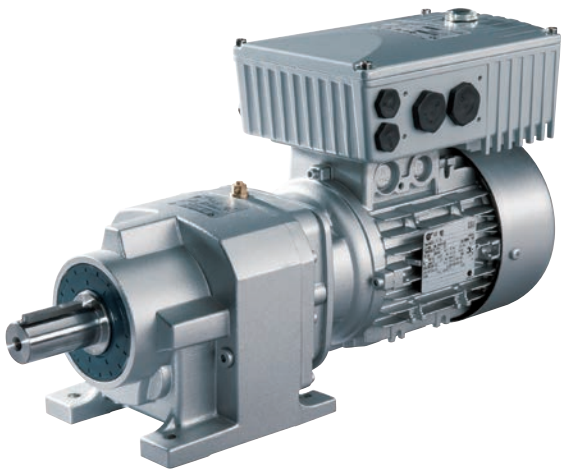
SK 180E

NORD® DRIVESYSTEMS

THE ENTRY LEVEL
NORDAC® *BASE* PRODUCT FAMILY

The advantages of using a variable frequency drive to control an electric motor are obvious. Modern VFDs offer the typical basic functions such as speed control and communication with control units as well as more advanced features, such as the ability to automatically provide positioning and safety functions.

However, many applications do not fully utilize the immense scope of functions available with today's VFDs. To fill the gap between simple motor starters and full-featured variable frequency drives, NORD has developed a compact model. The NORDAC® *BASE* concentrates on the essential functions needed for pumps and conveyor technology (PI/speed control, energy saving, communication with peripherals) and delivers significant savings in both price and performance.



- 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 setpoints, or can also be 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, potentiometers or Parameter Boxes)

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

AC line EMC filter Class C1 (B)
- All 230 V / 400 V devices have an integrated line filter.
- Also ideal for applications in a domestic environment, due to compliance with Class C1 (for motor-mounting), or Class 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 speed regulation.

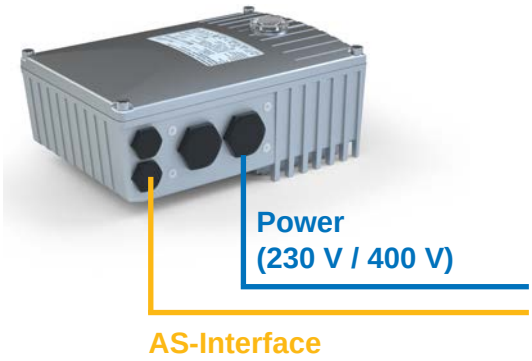
VERSATILE AND SUSTAINABLE
FOR MODERN AUTOMATION SYSTEMS

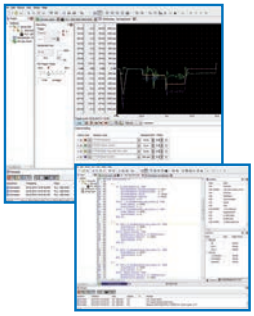
Modern automation systems have a wide range of requirements. A suitable bus system and drive components are needed to ensure efficient implementation.

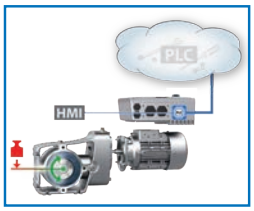
For the lower field level, the addition of an **AS-Interface** is a cost-effective solution that enables the networking of binary sensors and actuators.

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

Available in SK 190E







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

PERFECT PROTECTION
PROTECTION CLASS IP69K

nsd tupH
Sealed Surface Conversion System

With **nsd tupH™**, NORD provides an alternative to stainless steel at a fraction of the price. Our special molecular conversion process ensures aluminum alloy drive equipment has all the surface protection that heavy wash-down applications require.

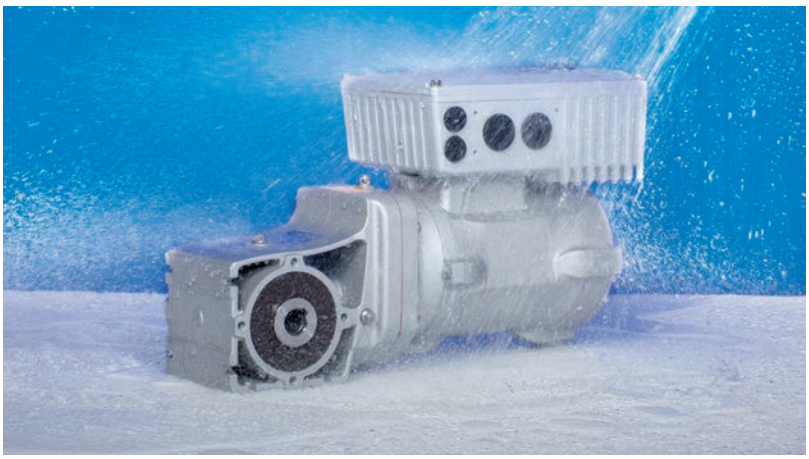
- Corrision-resistant and won't blister or flake
- Easy-to-clean surfaces
- Resistant to acids and alkalis (wide pH range)
- Cost-effective alternative to stainless steel
- Dissipates heat more effectively than stainless steel
- Free of chromates
- Conforms to FDA Title 21 CFR 175.300

nsd tupH™ provides the perfect solution for extreme conditions:

- Surface-treated housing components
- DIN and standard stainless steel components
- Wash-down housing (gear unit and motor)
- Stainless steel shafts; special shaft sealing rings

Products available with nsd tupH™:

- NORDAC® *START* and NORDAC® *BASE*
- Helical inline, helical bevel nd FLEXBLOC® gear units
- Smooth body motors



ATEX-compliant drive systems, zone 22 3D

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

The advantages:

- 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 aluminum and glass.

It must be noted that operation of the device within the hazardous 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 devices

THE ENTIRE TEAM
ALL DEVICE VERSIONS AT A GLANCE

		SK 180E	SK 190E
		Size 1+2 .33 – 3 HP 0.25 – 2.2 kW	Size 1+2 .33 – 3 HP 0.25 – 2.2 kW
Basic functions	Motor and wall mounting possible [1]	✓	✓
	Energy bus - loop-through of AC line supply cables [2]	✓	✓
	Communication bus for various devices [2]	✓	✓
	Sensorless current vector control (ISD control)	✓	✓
	Brake chopper (Brake resistor optional) (Size 2 and above)	✓	✓
	RS-232, RS-485 diagnostic interface	✓	✓
	4 switchable parameter sets	✓	✓
	Complete range of functions, as with a control cabinet VFD	✓	✓
	Parameters pre-set with standard values	✓	✓
	Scalable display values	✓	✓
	Automatic determination of motor data	✓	✓
	Energy-saving function, optimized efficiency in partial load operation	✓	✓
	Class C1 line filter in case of motor mounting	✓	✓
	Class C2 line filter in case of wall mounting	✓	✓
	Extensive monitoring functions	✓	✓
	Load monitor	✓	✓
	Process controller / PI controller	✓	✓
	PLC functionality	✓	✓
	Synchronous motor operation (PMSM)	✓	✓
	Modification for operation in an IT network by means of jumpers	✓	✓
Options	All common field bus systems	❍	❍
	Brake management for mechanical holding brake	❍	❍
	Lifting gear functionality	❍	❍
	AS-Interface on board	–	✓
	Internal / external brake resistors (Size 2)	❍	❍
	Switch and potentiometer versions	❍	❍
	Plug connectors for control, motor and AC line cables	❍	❍

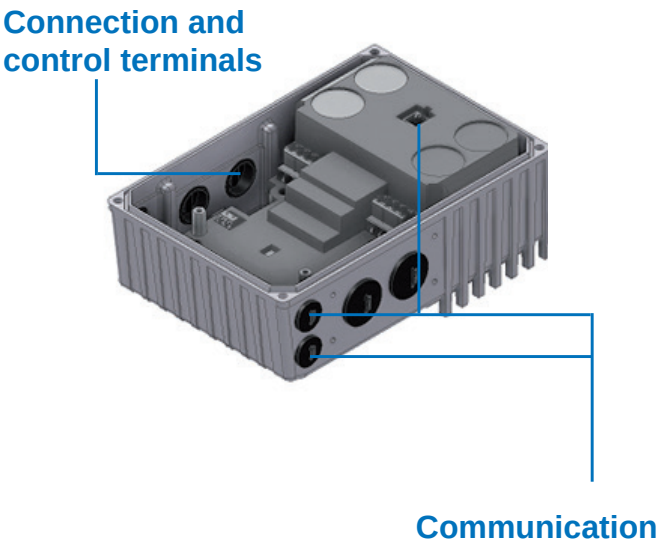
[1] Wall mounting: wall mounting kit required
Motor mounting: an adapter for connection to the motor terminal box may be necessary.
[2] Direct connection to the terminal bar or via system plug connectors

✓ Standard
❍ Optional
– Not available

CONTROL CONNECTIONS

		SK 180E	SK 190E
		Sizes 1 + 2 .33 – 3 HP 0.25 – 2.2 kW	
Control terminals	Number of digital inputs (DIN)	3	3
	Number of digital outputs (DOUT)	2	2
	Number of analog inputs (AIN) [1]	2	2
	Temperature sensor (PTC)	✓	✓
Communication	RS-485 / RS-232 RJ12	✓	✓
	AS-I Terminal connection	–	✓

[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 NORDCON software, Parameter Box) 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*

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, optional IP69K
Pulse frequency	3.0 ... 16.0 kHz	**Regulation and control**	Sensorless current vector control (ISD), linear V/f characteristic
Typical overload capacity	150% for 60 s, 200% for 3.5 s	**Motor temperature monitoring**	I^2t Motor PTC / bi-metal switch
Efficiency	> 95%	**Leakage current**	< 16 mA
Ambient temperature	-25 °C ... +40 °C (S1) -25 °C ... +50 °C (S3, - 70 % ED)		

Variable frequency drives SK 180E...	Nominal motor power		Nominal output current rms [A]	AC line voltage	Output voltage
	230 V [kW]	240 V [hp]			
-250-112-O (-C)	0.25	1/3	1.7	1 ~ 110...120 V -/+10% 47 ... 63 Hz	3 ~ AC 0 V up to double the AC line voltage
-370-112-O (-C)	0.37	1/2	2.1		
-550-112-O (-C)	0.55	3/4	3.0		
-750-112-O (-C)	0.75	1	3.7		

Variable frequency drives SK 180E...	Nominal motor power		Nominal output current rms [A]	AC line voltage	Output voltage
	230 V [kW]	240 V [hp]			
-250-323-B (-C)	0.25	1/3	1.7	1/3 ~ 200 ... 240 V, -/+ 10% 47 ... 63 Hz	3 ~ AC 0 V up to AC line voltage
-370-323-B (-C)	0.37	1/2	2.2		
-550-323-B (-C)	0.55	3/4	3.0		
-750-323-B (-C)	0.75	1	4.0		
-111-323-B (-C)	1.1	1 1/2	5.5		
-151-323-B (-C)	1.5	2	7.0	3 ~ 200 ... 240 V, -/+ 10% 47 ... 63 Hz	3 ~ AC 0 V up to AC line voltage

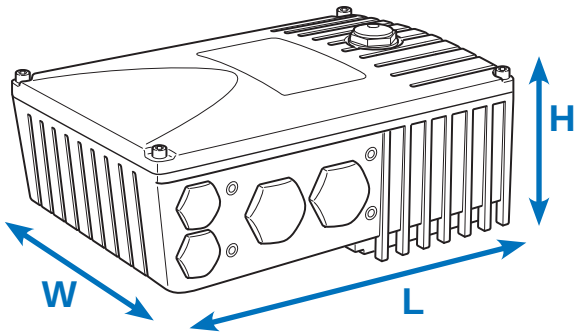
Variable frequency drives SK 180E...	Nominal motor power		Nominal output current rms [A]	AC line voltage	Output voltage
	400 V [kW]	480 V [hp]			
-250-340-B (-C)	0.25	1/3	1.2	3 ~ 380...480 V, -20 % / +10%, 47 ... 63 Hz	3 ~ AC 0 V up to AC line voltage
-370-340-B (-C)	0.37	1/2	1.5		
-550-340-B (-C)	0.55	3/4	1.7		
-750-340-B (-C)	0.75	1	2.3		
-111-340-B (-C)	1.1	1 1/2	3.1		
-151-340-B (-C)	1.5	2	4.0		
-221-340-B (-C)	2.2	3	5.5		

IP66 measures

- Coated aluminum components
- Coated circuit boards
- Low-pressure test
- Diaphragm valve

IP69K measures

- As for IP66
- **nsd tupH**-surface treatment



Variable frequency drives SK180E ...	Weight	Dimensions L x W x H	Size
-250-112-O (-C)	2.9 kg / 6.3 lbs	221 x 154 x approx. 101 mm 8.70 x 6.06 x approx. 3.97 in	1
-370-112-O (-C)			
-550-112-O (-C)			
-750-112-O (-C)			

Variable frequency drives SK180E ...	Weight [kg]	Dimensions L x W x H	Size
-250-323-B (-C)	2.9 kg / 6.3 lbs	221 x 154 x approx. 101 mm 8.70 x 6.06 x approx. 3.97 in	1
-370-323-B (-C)			
-550-323-B (-C)			
-750-323-B (-C)	4.1 kg / 9.0 lbs	254 x 165 x approx. 123 mm 10.00 x 6.49 x approx. 4.84 in	2
-111-323-B (-C)			
-151-323-B (-C)			

Variable frequency drives SK180E ...	Weight [kg]	Dimensions L x W x H	Size
-250-340-B (-C)	2.9 kg / 6.3 lbs	221 x 154 x approx. 101 mm 8.70 x 6.06 x approx. 3.97 in	1
-370-340-B (-C)			
-550-340-B (-C)			
-750-340-B (-C)			
-111-340-B (-C)			
-151-340-B (-C)	4.1 kg / 9.0 lbs	254 x 165 x approx. 123 mm 10.00 x 6.49 x approx. 4.84 in	2
-221-340-B (-C)			

VARIED INSTALLATION POSSIBILITIES
MOTOR AND WALL MOUNTING

Motor assembly

The variable frequency drive can be mounted directly on the terminal box of the gear motor, thus forming a perfect unit consisting of the drive and the control technology. This motor-mounted format makes full use of its unbeatable advantages: compact overall dimensions of the drive unit; near immediate readiness for use after connection to the AC line supply thanks to the pre-configuration of the drive unit at the factory; 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 using an optional wall mounting kit. You can select from different versions depending on the prevalent ambient conditions.

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 ultimately result in power restrictions (derating) for the variable frequency drive.

2. Version with **nsd tupH™** surface treatment **SK TIE4-WMK-1-NSD**
This version differs from the standard version due to the different material and **nsd tupH** surface treatment. It is intended for applications in which protection class IP69K is required.

3. ATEX version **SK TIE4-WMK-1-EX**
This version is functionally comparable to the standard version, however it is suitable for use in explosion hazard environments (ATEX Zone 22 3D).

Designation	Material No.	VFD Frame Size
SK TIE4-WMK-1-K	275 274 004	Size 1, 2
SK TIE4-WMK-1-NSD	275 274 014	Size 1, 2
SK TIE4-WMK-1-EX	275 175 053	Size 1, 2
SK TIE4-WMK-TU	275 274 002	Type: SK TU4-

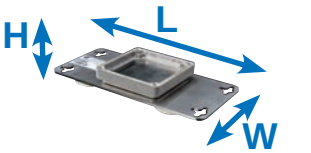
[1] Mounting of the WMK underneath the motor starter
[2] H = Increase in the total height of the device if mounted on the wall mounting kit
[3] Mounting of the WMK on the connection unit of the technology unit

Motor-mounted or wall-mounted motor starters

Wall Mounting

Motor Assembly

Designation	Version Material	Inte-grated fan	Achievable protection class	Weight	Dimensions L x W x H	Remarks
SK TIE4-WMK-1-K	Plastic	-	IP66	0.2 kg .44 lb	205 x 95 x 5 mm 8.07 x 3.74 x .19 in	Derating as necessary
SK TIE4-WMK-1-NSD	Stainless steel	-	IP69K	0.6 kg 1.32 lb	205 x 95 x 4 mm 8.07 x 3.74 x .15 in	**nsd tupH** on terminal box cover. Derating as necessary
SK TIE4-WMK-1-EX	Stainless steel	-	IP66	0.6 kg 1.32 lb	205 x 95 x 4 mm 8.07 x 3.74 x .15 in	Derating as necessary
SK TIE4-WMK-TU	Stainless steel	-	IP66	0.4 kg .88 lb	155 x 85 x 3 mm 610 x 3.34 x .11 in	

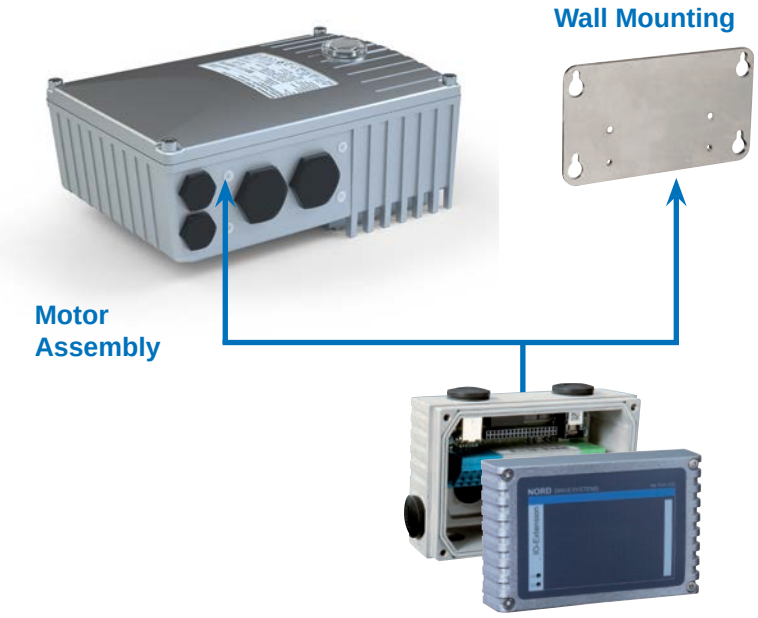


SK TIE4-WMK-1-EX

SK TIE4-WMK-1-K

SK TIE4-WMK-TU

Technology unit on NORDAC® *BASE* or wall mounting



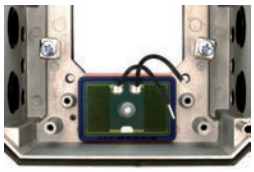
BRAKE RESISTORS (ONLY FOR SIZE 2 DEVICES)

INTERNAL VERSIONS

Internal brake resistor SK BRI4

Internal brake resistors are intended for applications where slight, sporadic or brief braking is expected (e.g. continuous conveyor equipment, mixing equipment). In addition, 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 must be specified during ordering. Retrofitting is not possible.



Variable frequency drives SK 180E / SK190E		Resistor type	Material No.	Resistance [Ω]	Continuous power [W]	Power consumption[2] [kWs]
1/3~ 230 V	… -750-323-B up to … -151-323-B	SK BRI4-1-200-100	275 272 008	200	100/25%	1.0
3~ 480 V	… -151-340-B up to … -221-340-B	SK BRI4-1-400-100	275 272 012	400	100/25%	1.0

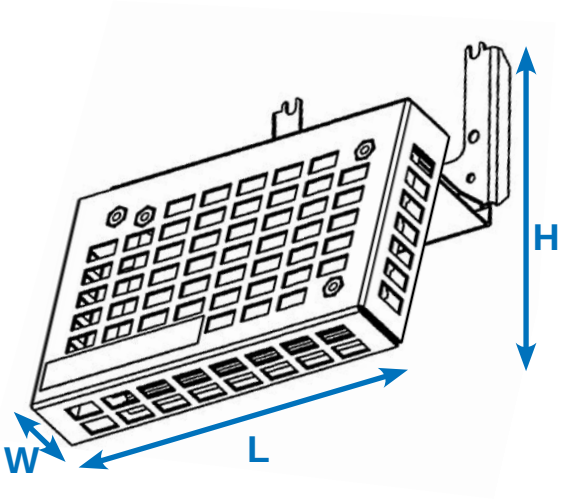
[1] Reduction of the continuous output of the brake resistor to 25% of the rated output
[2] Permissible max. once within 10 s

External brake resistors SK BRE4

External brake resistors (IP67) are intended for applications in which longer (lifting equipment), frequent (cyclic operation) or intensive (highly dynamic positioning applications) braking is expected. They are mounted directly on the VFD. Typically, they 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. For applications with higher braking power (lifting equipment), we recommend specific planning of the necessary brake resistor. Please contact the NORD DRIVESYSTEMS Group directly.



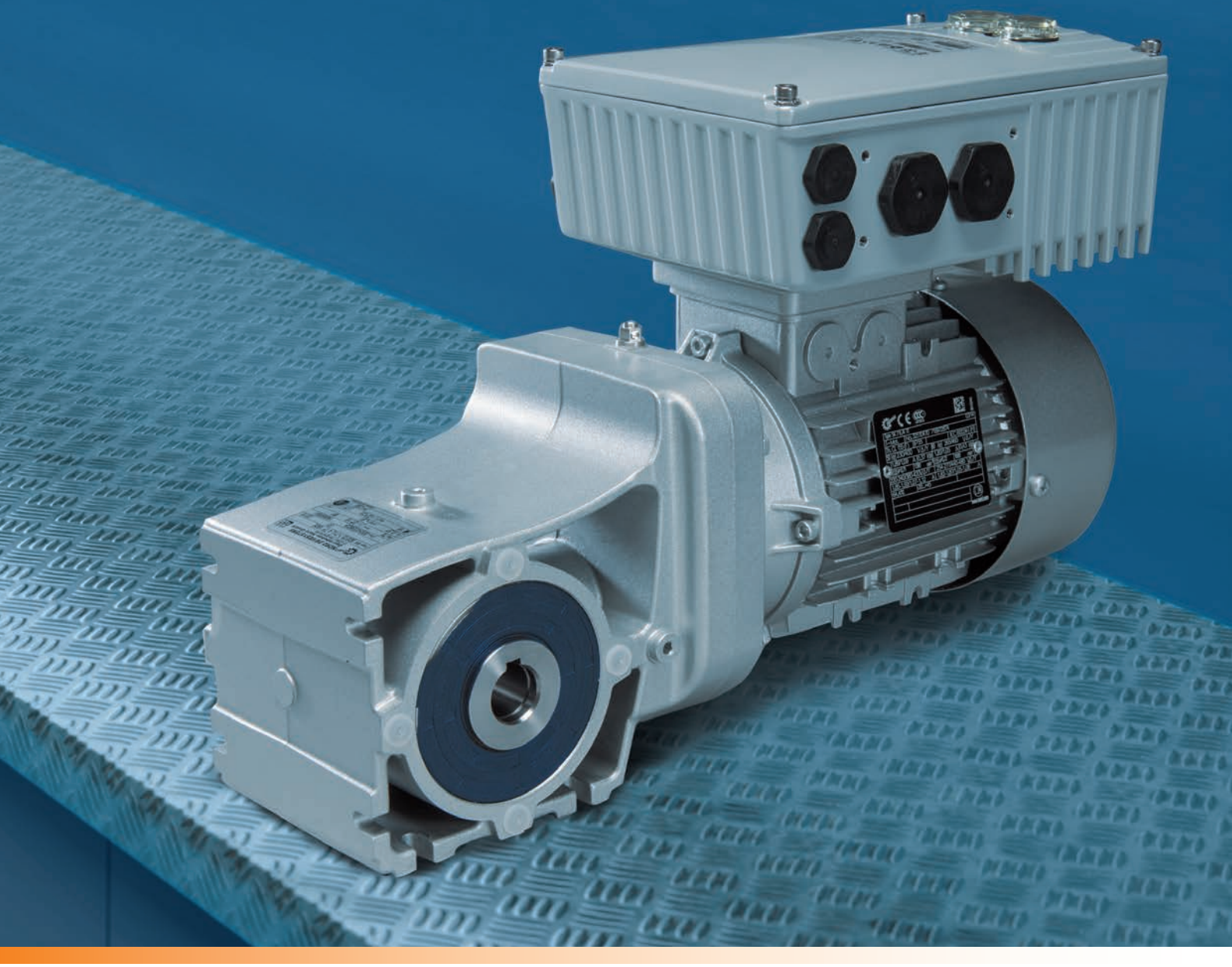
Variable frequency drives SK 180E / SK190E		Resistor type Material No.	Resistance [Ω]	Continuous output [W]	Power consumption[1] [kWs]	L x W x H
1/3~ 230 V	… -750-323-B up to … -151-323-B	SK BRE4-1-100-100 275 273 005	100	100	2.2	150 x 61 x 178 mm 5.9 x 2.40 x 7.00 in
		Alternatively: SK BRE4-2-100-200 275 273 105	100	200	4.4	255 x 61 x 178 mm 10.03 x 2.40 x 7.00 in
3~ 480 V	… -151-340-B up to … -211-340-B	SK BRE4-1-200-100 275 273 008	200	100	2.2	150 x 61 x 178 mm 5.9 x 2.40 x 7.00 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 7.00 in

[1] Permissible max. once within 120 s


Platz 7700
Express
BR.9500
Gruppe 9500
Versand
Spenwagen
Platz 7

Intelligent Drivesystems, Worldwide Services

MOTOR STARTER WITH REVERSING FUNCTION



US

NORDAC® *START*

MOTOR STARTER SK 135E

NORD® DRIVESYSTEMS

MOTOR STARTER WITH REVERSING FUNCTION
NORDAC® *START*

Electric motors are common, in part because they are easy to install and commission. On the other hand, they also come with a set of disadvantages including the high power consumption for the starting torque (up to 7 times the rated current for the motor), excessive mechanical loads on the gear unit and the system as well as the frequently uncontrolled starting and stopping behavior. Electronic starters are a simple and economical solution to these problems. However, NORD devices are far more than simple current limiting “starters” for electric motors.

NORDAC® *START* combines the three functions of a typical electronic motor starter —starter, reversing starter and soft starter. In doing so, it:

- provides comprehensive monitoring and protective functions (AC line, motor, self-monitoring)
- eliminates the need for a motor protection switch
- enables adaptations to the operating characteristics (starting and shut-down behavior) and
- provides optional communication interfaces.

A special feature is the variable mounting of the device. In confined spaces the compact device can be easily used for operation close to the motor.

Many applications, including those in material handling, require electronic starting and stopping of the drive units. The NORDAC® *START* is ideally suited for this. Its versatility makes motor starting and soft starting or reversing mode possible.

Extensive monitoring functions provide protection from overheating. Due to the I^2t 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.

- 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, Parameter Box)
- 24V AC line unit

Variable operating characteristics

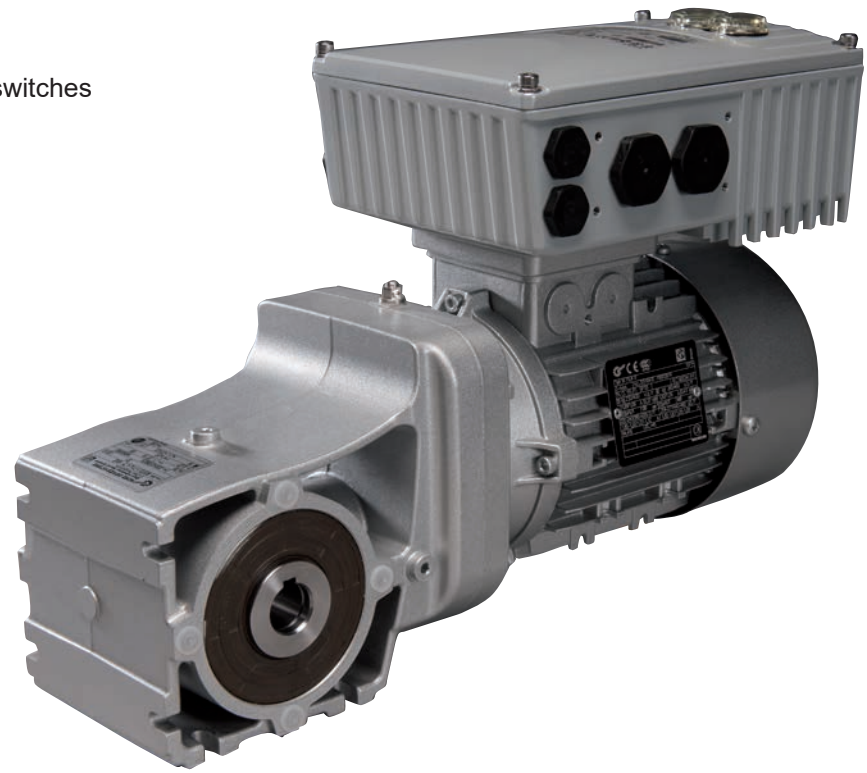
- Pre-defined shut-down modes
- Variable starting and shut-down ramps
- Boost function

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 cable 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



VERSATILE AND SUSTAINABLE
COMMUNICATION AND MORE

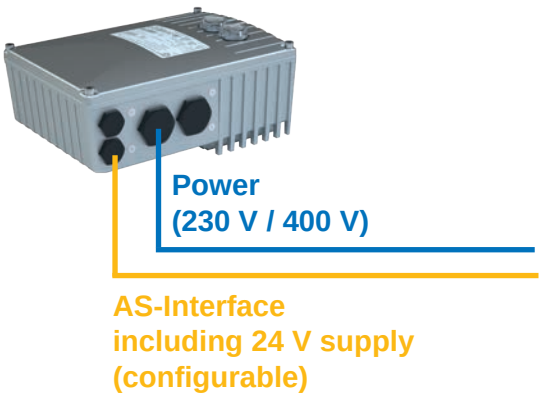
Modern automation systems have a wide range of requirements, so that a suitable bus system and drive components must be selected in order to ensure efficient implementation.

AS-Interface

For the lower field level, the **AS-Interface** is a cost-effective solution that enables the networking of binary sensors and actuators. Special versions of the NORDAC *START* product series, which provide an appropriate solution by means of an AS-Interface, are available for this price-sensitive area.

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.

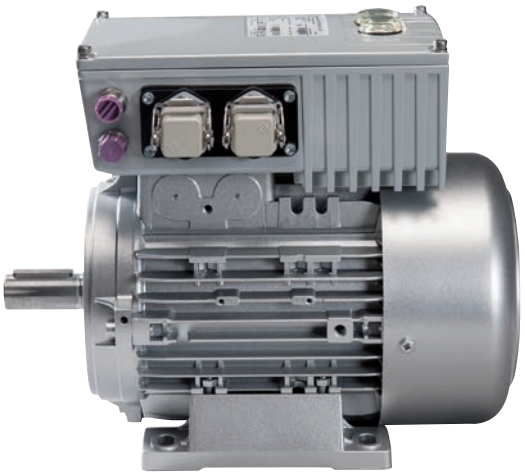
Available in all SK 175E ... ASI devices



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 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
ASI profile	S-7.A.	S-7.A.
ASI type	A/B	A/B
Control voltage	Black AS-I cable	Yellow AS-I cable
Inputs/ Outputs	4/4	4/4
Configuration via DIP switch	✔	✔
Configuration via parameters	✔	✔

ATEX-compliant drive systems, zone 22 3D

The NORDAC® *START* can be modified for operation in explosive environments. This allows the operation of the motor starter directly in a hazardous area (ATEX 22-3D).

The advantages:

- 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 aluminum and glass.

It must be noted that operation of the device within the hazardous 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 devices

PERFECT PROTECTION
PROTECTION CLASS IP69K

nsd tupH
Sealed Surface Conversion System

With **nsd tupH™**, NORD provides an alternative to stainless steel at a fraction of the price. Our special molecular conversion process ensures aluminum alloy drive equipment has all the surface protection that heavy wash-down applications require.

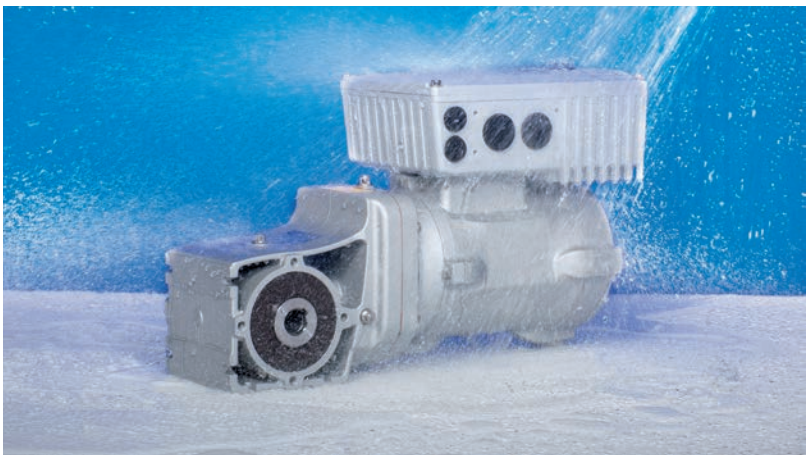
- Corrision-resistant and won't blister or flake
- Easy-to-clean surfaces
- Resistant to acids and alkalis (wide pH range)
- Cost-effective alternative to stainless steel
- Dissipates heat more effectively than stainless steel
- Free of chromates
- Conforms to FDA Title 21 CFR 175.300

nsd tupH™ provides the perfect solution for extreme conditions:

- Surface-treated housing components
- DIN and standard stainless steel components
- Wash-down housing (gear unit and motor)
- Stainless steel shafts; special shaft sealing rings

Products available with nsd tupH™:

- NORDAC® *START* and NORDAC® *BASE*
- Helical inline, helical bevel nd FLEXBLOC® gear units
- Smooth body motors

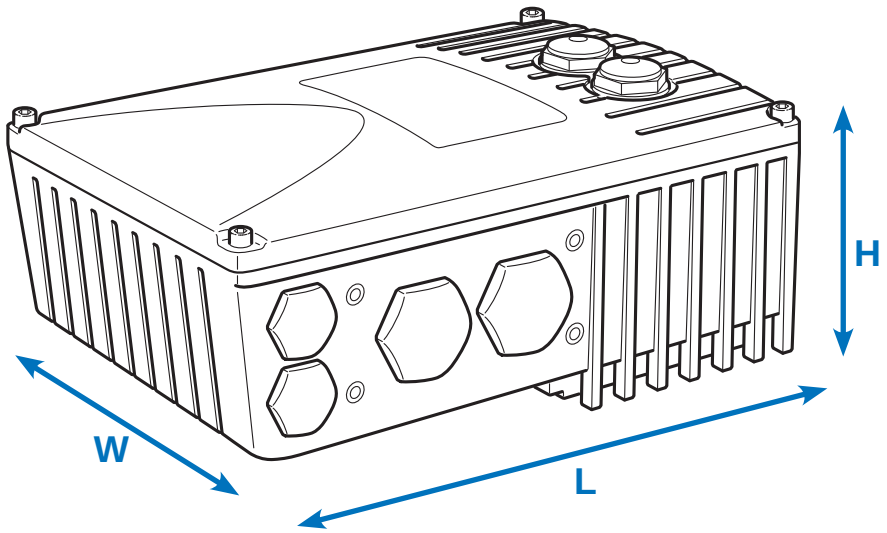


NORDAC® *START* MOTOR STARTER

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 aluminum components ■ Coated circuit boards ■ Low-pressure test
IP69K measures	■ Like IP66 ■ **nsd tupH™** surface treatment
Protective measures against	■ AC line phase failure ■ Motor phase failure ■ Flux monitoring ■ Motor over temperature (PTC) ■ Motor overload ■ AC line over/under voltage
Motor temperature monitoring	I^2t Motor PTC / bi-metal switch
Integrated line filter	
Class B	for motor mounting or 10 m cable length for wall mounting
Class A	for wall mounting with motor cable length up to 100 m
Leakage current	< 20 mA

Motor starters SK 135 E... / SK 175 E...	Nominal motor power		Nominal output current rms [A]	AC line voltage / output voltage	Weight [kg / lbs]	Dimensions L x W x H
	[kW]	[hp]				
-301-340-B	up to 3.0	up to 4	7.5	3~ 200 V … 500 V, -10% / +10%, 47 ... 63 Hz	2.1 kg / 4.6 lbs	221 x 154 x approx. 101 mm 8.70 x 6.06 x approx 3.97 in
-751-340-B	up to 7.5	up to 10	16			



THE ENTIRE TEAM
ALL DEVICE VERSIONS AT A GLANCE

		SK 135E	SK 175E - ASI	SK 175E - PBR
		.33 – 10 HP / 0.25 –7.5 kW		
Basic functions	Soft start function	✓	✓	✓
	Reversing function	✓	✓	✓
	Motor and wall mounting possible [1]	✓	✓	✓
	Energy bus - loop-through of AC line supply cables [2]	✓	✓	✓
	RS-232 diagnostic interface	✓	✓	✓
	Parameters pre-set with standard values	✓	✓	✓
	Scalable display values	✓	✓	✓
	Line filter for limit curve B, for wall mounting with motor cable length up to 10 m and for motor mounting	✓	✓	✓
	Line filter for limit curve A, for wall-mounting with motor cable length up to 100 m	✓	✓	✓
	Extensive monitoring functions	✓	✓	✓
Options	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 control, motor and AC line cables	❍	❍	❍

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

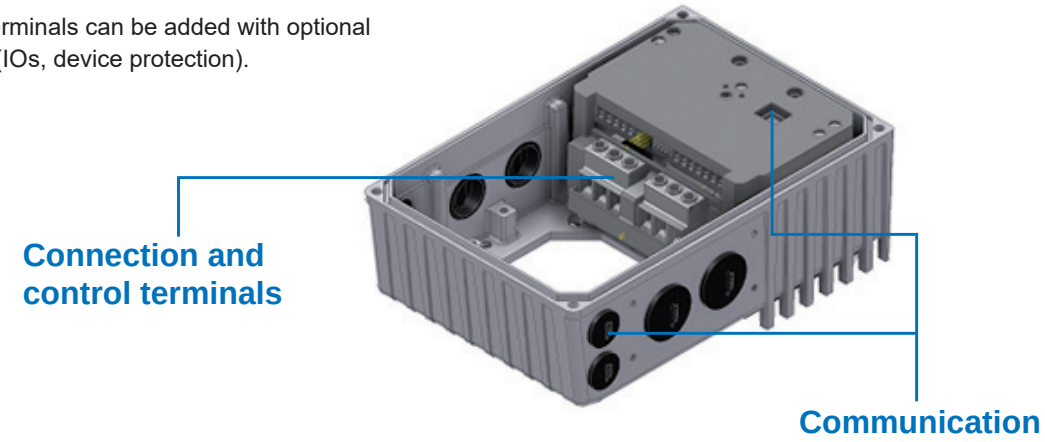
[2] Direct connection to the terminal bar or via system plug connectors

✓ Standard
❍ Optional
– Not available

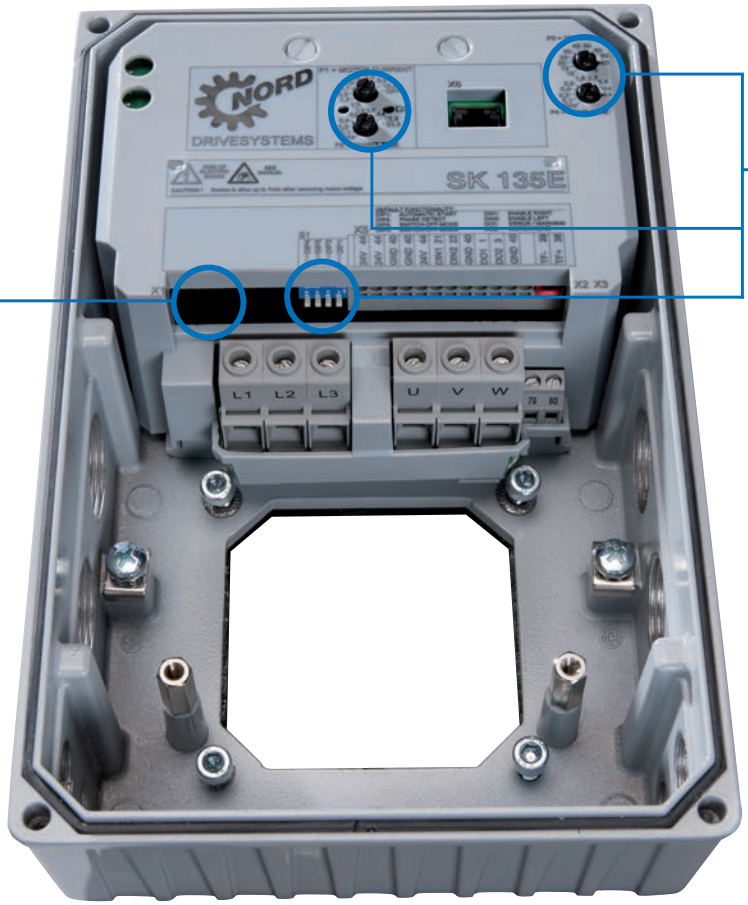
MOTOR STARTER CONTROL CONNECTIONS

		SK 135E	SK 175E - ASI	SK 175E - PBR
		.33 – 10 HP / 0.25 –7.5 kW		
Control terminals	Number of digital inputs (DIN)	4	3	4
	Number of digital outputs (DOUT)	2	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 are also located behind this diagnostic opening.

The following parameters can be adjusted in this way:

- Rated motor current
- Dwell 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 and diagnostics are located behind two transparent cover caps. In addition, there are other 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 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, ParameterBox[1]). 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, Part No. 275 274 603)

VARIED INSTALLATION POSSIBILITIES
MOTOR AND WALL MOUNTING

Motor Assembly

The motor starter can be mounted directly on the terminal box base of the gear motor, thus forming a perfect unit consisting of the drive and the control technology. This motor-mounted format makes full use of its unbeatable advantages: compact overall dimensions of the drive unit; near immediate readiness for use after connection to the AC line thanks to the pre-configuration of the drive unit at the factory; optimum EMC due to short cable lengths, or elimination of a motor cable.

Wall mounting

Alternatively, the device also can be mounted close to the motor using an optional wall mounting kit. You can select from different versions depending on the prevalent ambient conditions.

1. Standard version **SK TIE4-WMK-1-K**

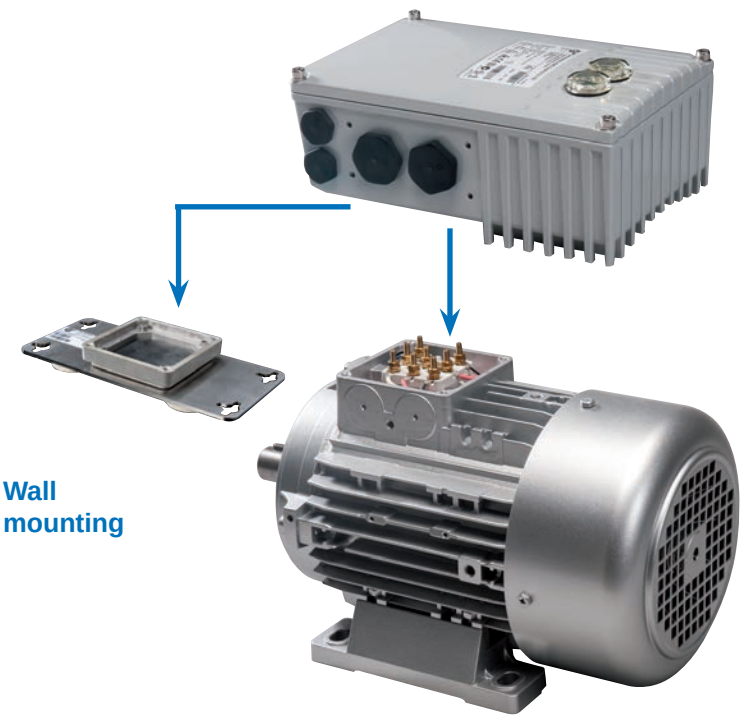
2. Version with **nsd tupH™** surface treatment **SK TIE4-WMK-1-NSD**
This version differs from the standard version due to the different material and **nsd tupH™** surface treatment. It is intended for heavy wash-down applications in which protection class IP69K is required.

3. ATEX version **SK TIE4-WMK-1-EX**
This version is functionally comparable to the standard version, however it is suitable for use in explosion hazard environments (ATEX Zone 22 3D).

Designation	Material No.	Starter Frame Size
SK TIE4-WMK-1-K	275 274 004	Size 1
SK TIE4-WMK-2-K	275 274 015	Size 2
SK TIE4-WMK-1-NSD	275 274 014	Size 1
SK TIE4-WMK-2-NSD	on request	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	275 274 002	Type: SK TU4-

[1] Mounting of the WMK underneath the motor starter
[2] H = Increase in the total height of the device if mounted on the wall mounting kit
[3] Mounting of the WMK on the connection unit of the technology unit

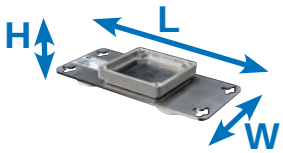
Motor-mounted or wall-mounted motor starters



Wall mounting

Motor Assembly

Designation	Version Material	Inte-grated fan	Achievable protection class	Weight	Dimensions L x W x H	Remarks
SK TIE4-WMK-1-K	Plastic	-	IP66	0.2 kg .44 lbs	205 x 95 x 5 mm 8.07 x 3.7 x .19 in	
SK TIE4-WMK-2-K	Plastic	-	IP66	0.3 kg .66 lbs	235 x 105 x 5 mm 9.25 x 4.13 x .19 in	
SK TIE4-WMK-1-NSD	Stainless steel	-	IP69K	0.6 kg 1.32 lbs	205 x 95 x 4 mm 8.07 x 3.7 x .15 in	**nsd tupH™** - Surface treatment of terminal box cover
SK TIE4-WMK-2-NSD	Stainless steel	-	IP69K	0.8 kg 1.76 lbs	235 x 105 x 10 mm 9.25 x 4.13 x .39 in	**nsd tupH™** - Surface treatment of terminal box cover
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 .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 .39 in	
SK TIE4-WMK-TU	Stainless steel	-	IP66	0.4 kg .88 lbs	155 x 85 x 3 mm 6.10 x 3.34 x .11	



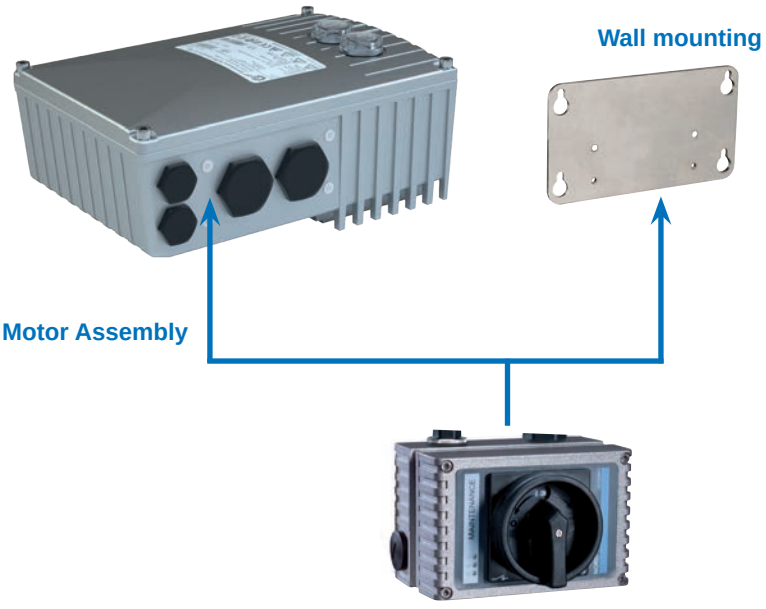
SK TIE4-WMK-1-EX

SK TIE4-WMK-L-1

SK TIE4-WMK-1-K

SK TIE4-WMK-TU

Technology unit on NORDAC® *START* or wall mounting



OPERATION AND CONTROL
PARAMETERIZATION UNITS AND SOFTWARE

Designation Material No.	Handheld	Control cabinet installation	Wall mounting	Protection class	Description	Remarks
Parameter Box SK PAR-3H 275 281 014	✓	–	–	IP54	Suitable for 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.	Connection for data exchange with NORDCON on a PC via RS-232 (USB 2.0), including 1 m connection cable, 4.5 … 30 V DC/1.3 W supply e.g. directly via the VFD
Simple Control Box SK CSX-3H 275 281 013	✓	–	–	IP54	Suitable for control and parameterization, 4-digit, 7-segment display, direct control of a device, convenient control keypad, including 2 m connection cable.	Electrical data: 4.5 … 30 V DC / 1.3 W, supply e. g. directly via the VFD
Control Box SK POT1-1 278 910 120	✓	–	✓	IP66	Suitable for control, potentiometer 0% … 100% (0 … 10 V), switch Left|OFF|Right, including 3 m connection cable.	
Control Box SK POT1-2 278 910 140	✓	–	✓	IP66	Suitable for control, potentiometer 0% … 100% (0 … 10 V), switch Left|OFF|Right, including 20 m connection cable.	
Simple Setpoint Box SK SSX-3A 275 281 513	✓	–	✓	IP54	Suitable for control and parameterization, 4-digit, 7-segment display, direct control of a device, 3 operating modes, convenient control keypad.	Electrical data: 19.2 … 28.8 V DC, 35 mA, supply e.g. directly via the VFD communication via RS-485 or IO link
Programming adapter SK EPG-3H 275 281 026	✓	–	–	IP20	Suitable for parameterization of the external EEPROM (memory module) of an SK 2xxE, independent of the presence of a VFD.	
Adapter cable RJ12-SUB-D9 278 910 240					To connect the VFD to the serial interface of a PC via SUB-D9	Length: approx. 3 m
Connection set SK TIE4-RS232-USB 275 274 604					To connect the VFD to the serial interface of a PC via USB 1.0	Consisting of adapter cable RJ12-SUB-D9 and RS-232 to USB inverter Length: approx. 3 m + 0.5 m
NORDCON control and parameterization software	–	–	–	–	Software for control, parameterization, commissioning assistance and fault analysis of NORD electronic drive technology. Parameter names in 14 languages	Free download: www.nord.com
NORDAC® *ACCESS BT* (Bluetooth stick) SK TIE5-BT-STICK 275 900 120					The NORDCON *APP* and NORDAC® *ACCESS BT*—a mobile app and Bluetooth stick—work together to provide a wireless solution for commissioning, drive optimization, and service requests for all NORD electronic drive systems	The app is available for free download through the App Store for iOS and Google Play for Android users. The Bluetooth stick can be purchased directly from any authorized NORD distributor.

Designation Material No.	Installation	Attached / separate	Protection class	Number of inputs / outputs	Description	Remarks
SK CU4-PBR 275 271 000	✓	–	IP20	2 digital inputs	Interface as gateway for direct connection of up to 4 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 modules plus matching SK TI4-TU-BUS / SK TI4-TU-BUS-C connection unit
SK CU4-PBR-C[1] 275 271 500						
SK TU4-PBR 275 281 100	–	✓	IP55	4 digital inputs 2 digital outputs		
SK TU4-PBR-C 275 281 150	–	✓	IP66			
SK TU4-PBR-M12 275 281 200	–	✓	IP55			
SK TU4-PBR-M12-C 275 281 250	–	✓	IP66			
SK CU4-CAO 275 271 001	✓	–	IP20	2 digital inputs	Interface as gateway for direct connection of up to four devices to a CANopen field bus. Alternatively, digital signals can be connected via front M12 plug connector (only M12 modules)	Baud rate: maximum 1 MBaud Protocol: DS 301 and DS 402 SK TU4 modules plus matching SK TI4-TU-BUS / SK TI4-TU-BUS-C connection unit
SK CU4-CAO-C[1] 275 271 501						
SK TU4-CAO 275 281 101	–	✓	IP55	4 digital inputs 2 digital outputs		
SK TU4-CAO-C 275 281 151	–	✓	IP66			
SK TU4-CAO-M12 275 281 201	–	✓	IP55			
SK TU4-CAO-M12-C 275 281 251	–	✓	IP66			
SK CU4-DEV 275 271 002	✓	–	–	2 digital inputs	Interface as gateway for direct connection of up to 4 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 TI4-TU-BUS / SK TI4-TU-BUS-C connection unit
SK CU4-DEV-C[1] 275 271 502						
SK TU4-DEV 275 281 102	–	✓	IP55	4 digital inputs 2 digital outputs		
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

COMMUNICATION INTERFACES
INDUSTRIAL ETHERNET EXTENSIONS

Designation Material No.	Installation	Attached / separate	Protection class	Number of inputs / outputs	Description	Remarks
SK CU4-ECT 275 271 017	✓	–	IP20	2 digital inputs	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
SK CU4-ECT-C[1] 275 271 517						
SK TU4-ECT 275 281 117	–	✓	IP55	8 digital inputs 2 digital outputs		
SK TU4-ECT-C 275 281 167	–	✓	IP66			
SK CU4-EIP 275 271 019	✓	–	IP20	2 digital inputs	Interface as gateway for direct connection of up to four devices to an EtherNet/IP 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
SK CU4-EIP-C[1] 275 271 519						
SK TU4-EIP 275 281 119	–	✓	IP55	8 digital inputs 2 digital outputs		
SK TU4-EIP-C 275 281 169	–	✓	IP66			
SK CU4-POL 275 271 018	✓	–	IP20	2 digital inputs	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
SK CU4-POL-C[1] 275 271 518						
SK TU4-POL 275 281 118	–	✓	IP55	8 digital inputs 2 digital outputs		
SK TU4-POL-C 275 281 168	–	✓	IP66			
SK CU4-PNT 275 271 015	✓	–	IP20	2 digital inputs	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
SK CU4-PNT-C[1] 275 271 515						
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			
SK TU4-PNS 275 281 116	–	✓	IP55	2 safe digital inputs(SI) 3 safe digital outputs(SO)	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.	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
SK TU4-PNS-C 275 281 166	–	✓	IP66			
SK TU4-PNT-M12 275 281 216	–	✓	IP55			
SK TU4-PNS-M12-C 275 281 266	–	✓	IP66			

[1] Version with varnished circuit boards for applications in IP6X devices

Designation Material No.	Installation	Attached / separate	Protection class	Number of inputs / outputs	Description	Remarks
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. Alternative connection of digital signals via front M12 round plug connector (only M12 modules)	Analog signals: IN / OUT: 0(2) ... +10 V or 0(4) ... 20 mA
SK CU4-IOE2-C[1] 275 271 507						
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 OUT: 0(2) ... +10 V or 0(4) ... 20 mA SK TU4 modules plus matching SK TI4-TU-BUS / SK TI4-TU-BUS-C connection unit
SK CU4-IOE-C[1] 275 271 506						
SK TU4-IOE 275 281 106	–	✓	IP55	4 digital and 2 analog inputs 2 digital and 1 analog output		
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			
SK TI4-TU-BUS 275 280 000	–	✓	IP55	–	Connection unit for SK TU4-.... bus interfaces or IO - extensions (IP55)	
SK TI4-TU-BUS-C 275 280 500	–	✓	IP66	–	Connection unit for SK TU4-.... bus interfaces or IO - extensions (IP66)	
SK TI4-TU-SAFE 275 280 300	–	✓	IP55	–	Connection unit for safe bus interface SK TU4-PNS-… (IP55)	
SK TI4-TU-SAFE-C 275 280 800	–	✓	IP66	–	Connection unit for safe bus interface SK TU4-PNS-…-C (IP66)	
SK TIE4-WMK-TU 275 274 002	–	✓	IP66	–	For separate mounting of SK TU4... modules with SK TI4-TU-…	

[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

SUPPLY AND CONTROL

POWER SUPPLY UNITS, POTENTIOMETERS AND SWITCHES

Designation Material No.	Installation	Attached / separate	Protection class	Description	Remarks
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					
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					
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	
SK TU4-POT-123-B 275 281 110	–	✓	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
SK TU4-POT-123-B-C 275 281 160	–	✓	IP66	Output: 24 V DC 420 mA	
SK TU4-POT-140-B 275 281 111	–	✓	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
SK TU4-POT-140-B-C 275 281 161	–	✓	IP66	Output: 24 V DC 420 mA	
SK TI4-TU-NET 275 280 100	–	✓	IP55		SK TU4-... connection unit for power supply units (IP55)
SK TI4-TU-NET-C 275 280 600	–	✓	IP66		SK TU4-... connection unit for power supply units (IP66)
SK TIE4-WMK-TU 275 274 002	–	–	IP66		For separate mounting of SK TU4... modules with SK TI4-TU-…

[1] Version with varnished circuit boards for applications in IP6X devices

POWER SUPPLY UNITS, POTENTIOMETERS AND SWITCHES

Designation Material No.	Installation	Attached / separate	Protection class	Description	Remarks
SK CU4-POT 275 271 207	–	✓	IP66	Switches and potentiometers	Switches: "ON R" - "OFF" - "ON L", 10 - kΩ potentiometer
SK TIE4-SWT 275 274 701	–	✓	IP66	Switch	"ON R" - "OFF" - "ON L"
SK TIE4-POT 275 274 700	–	✓	IP66	Potentiometer	10 kΩ potentiometer
SK ATX-POT 275 142 000	–	✓	IP66	Potentiometer	10 kΩ - potentiometer, approved for use in ATEX Zone 22 3D
SK CU4-REL 275 271 011	✓	–	IP20	2x AIN / AOUT 2 DIN / relay	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
SK CU4-REL-C[1] 275 271 511					
SK CU4-MBR 275 271 010	✓	–	IP20	230 V / 400 V, max. 0.5 A	For direct control and supply of an electromagnetic holding brake
SK CU4-MBR-C[1] 275 271 510					
SK TU4-MSW 275 281 123	–	✓	IP55	1~ 100 - 240 V / 3~ 200 - 500 V, 16 A	Switch to disconnect the device from the power supply, black twist grip plus suitable SK TI4-TU-MSW/SK TI4-TU-MSW-C connection unit
SK TU4-MSW-C 275 281 173	–	✓	IP66	1~ 100 - 240 V / 3~ 200 - 500 V, 16 A	
SK TI4-TU-MSW 275 280 200	–	✓	IP55		SK TU4-... connection unit for maintenance switches (IP55)
SK TI4-TU-MSW-C 275 280 700	–	✓	IP66		SK TU4-... connection unit for maintenance switches (IP66)
SK TIE4-WMK-TU 275 274 002	–	–	IP66		For separate mounting of SK TU4... modules with SK TI4-TU-…

[1] Version with varnished circuit boards for applications in IP6X devices

PERFECT CONNECTIONS WITH
SYSTEM PLUG CONNECTORS

The use of optionally available plug connectors for power and control connections not only makes it possible to replace the drive unit with almost no loss of time in case of servicing, but also minimizes the danger of installation errors when connecting the device. This enables the perfect construction of an energy or communication bus. Typical plug connector versions are summarized below.

Plug connectors for power connections

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

Type	Data	Designation	Material No.
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	500 V, 20 A	SK TIE4-QPD_3PE-K-LE	275 274 125
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

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 protection class (IP67) of the plug connector only applies in the screwed state. 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.

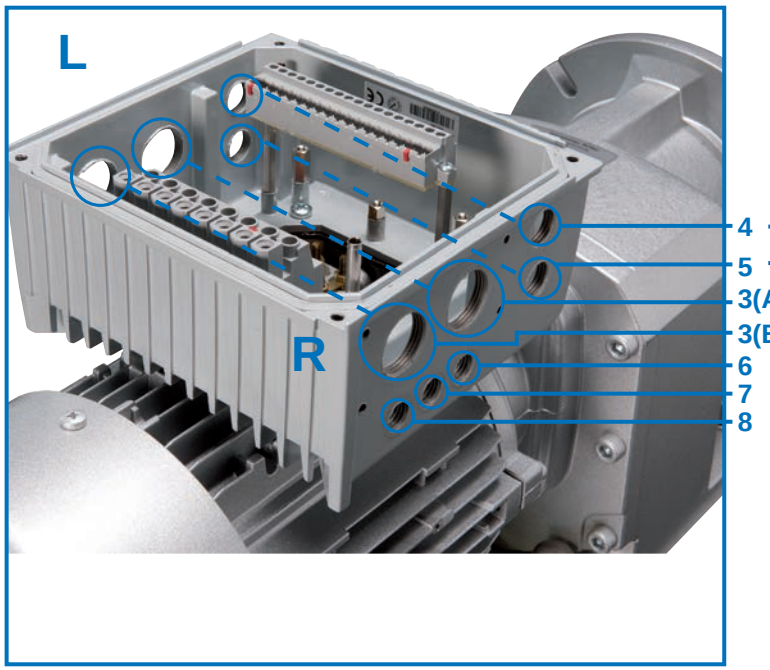
Type	Version	Designation	Material No.
System bus IN	Plug connectors	SK TIE4-M12-SYSS	275 274 506
System bus OUT	Bushing	SK TIE4-M12-SYSM	275 274 505
Power supply	Plug connectors	SK TIE4-M12-POW	275 274 507
Sensors/actuators	Bushing	SK TIE4-M12-INI	275 274 503
Sensors/actuators	Plug connectors	SK TIE4-M12-INP	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

INSTALLATION LOCATIONS
FOR SYSTEM CONNECTORS

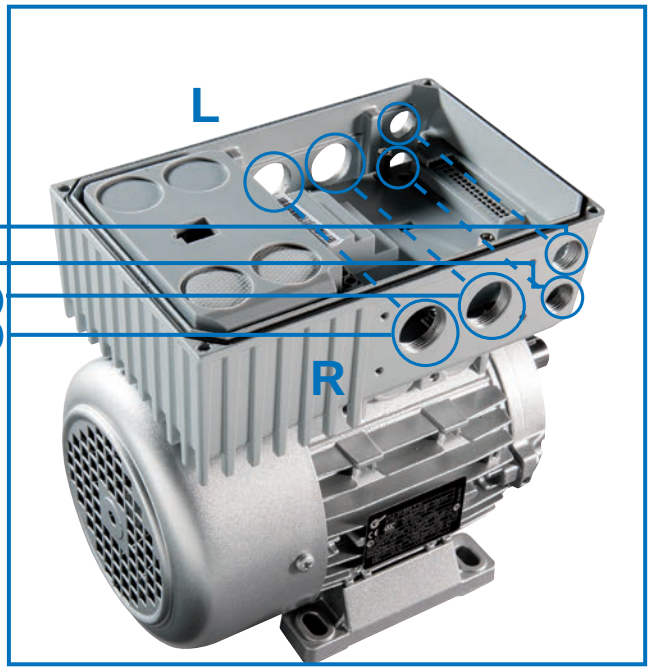
System connectors

The devices provide various screw fittings which can be used to install cable glands or system connectors. 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*



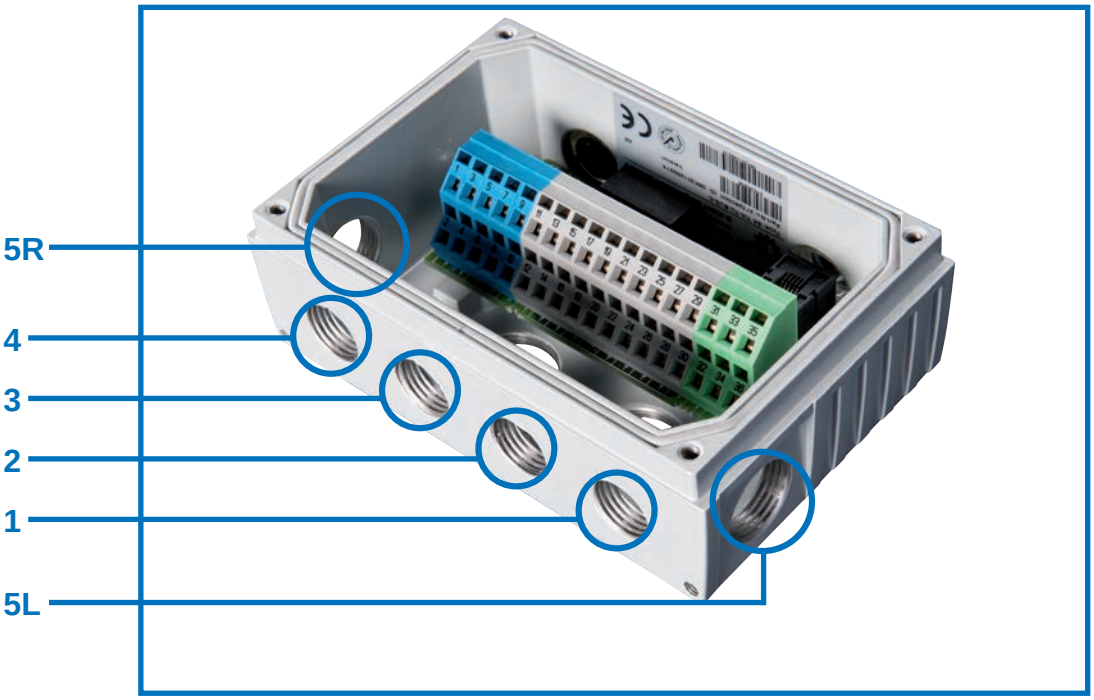
Option locations
(R or L assignment, view towards the motor fan)

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, Size 4 ➔ M16 (only NORDAC *FLEX*)
7 L/R M12 screw fitting, Size 4 ➔ M16 (only NORDAC *FLEX*)
8 L/R M12 screw fitting, Size 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





CONNECTION ADVANTAGES
SIMPLIFIED INSTALLATION AND MAINTENANCE

With the NORDAC® *LINK*, *FLEX*, *BASE* and *START* variable frequency drives and motor starters, the NORD DRIVESYSTEMS Group provides the right product for motor control for all decentralized drive technology applications. The advantages, such as short motor cables, improved EMC and installation without control cabinets are important.

Connection of the decentralized components (motor and electronics) is made either with a permanent connection with cable glands[1] or can be in the form of 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 effort 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 (AC line and motor) and, if necessary, cables for thermistors as well as 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 cables[2] are shielded.

[1] Not for NORDAC *LINK*
[2] Except for AC line connection/daisy chain cables

DESIGNATION OF PRE-ASSEMBLED CABLES

Pre-assembled cables

- Cables for motor and variable frequency drive connection
- AC line connection and signal cables
- Customized plugs and cable lengths

SK CE-HQ8-K-MA-H10E-M1B-3_0M

Labeling for various combinations
3_0 is length 3m
M stands for IEC (EU) certified cable,
Note: only permissible for plug connectors

Motor / Encoder / Brake resistor cable ends
Version and material labeling
H10E = HAN 10E plug connector
M1B = Metal lock, otherwise identical to variable frequency drive / motor starter cable end
Note: Material labeling is only permissible for plug connectors

Cable category
LE = Line connection
LA = Daisy chain line connection
MA = Motor connection
BRW5 = Brake resistor
AG = Absolute encoder
IG = Incremental encoder
...C = Combination encoder (AG/IG)
IG0 = Encoder with zero track

VFD/motor starter cable ends:
Version and material labeling
HQ8 = HAN Q8/0 plug connector
HQ4 = HAN Q4 plug connector(w/o = without)
HQ42 = HAN Q4/2 plug connector (24 V DC)
OE = Open ends
A5F = M12 A-coded 5-pin female
B4M = M12 B-coded 4-pin male
K = Plug connector with plastic housing
M = Plug connector with metal housing

Cable extension

TECHNICAL DATA
CABLES

The design depends on the ambient conditions and the type of installation and must be decided by the customer.

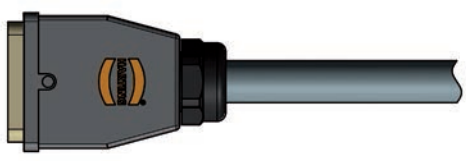
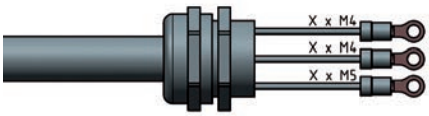
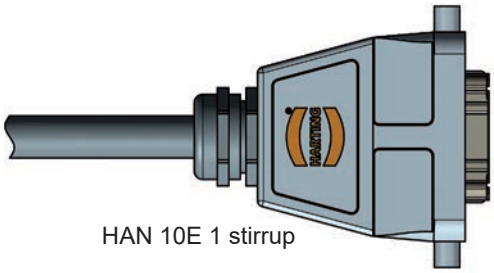
All options can be requested from NORD according to the specific project.

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 AC line 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

Product Overview – Motor cables

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

Designation	Motor power	Certification	Part number for length [m]		
			1.5	3	5
SK CE-HQ8-K-MA-OE20-M4	.16 – .5 HP 0.12 – 0.37 kW	EU	275 274 800	275 274 801	275 274 802
		UL		275 274 211	275 274 212
SK CE-HQ8-K-MA-OE25-M4	.75 – 2 HP 0.55 – 1.5 kW	EU	275 274 805	275 274 806	275 274 807
		UL		275 274 216	275 274 217
SK CE-HQ8-K-MA-OE32-M4	3 – 4 HP 2.2 – 3.0 kW	EU	275 274 825	275 274 826	275 274 827
		UL		275 274 226	275 274 227
SK CE-HQ8-K-MA-OE32-M5	5 HP 4.0 kW	EU	275 274 830	275 274 831	275 274 832
		UL		275 274 231	275 274 232
SK CE-HQ8-K-MA-OE32-M6	7.5 – 10 HP 5.5 – 7.5 kW	EU	275 274 835	275 274 836	275 274 837
		UL		275 274 236	275 274 237
SK CE-HQ8-K-MA-H10E-M1B	.16 – 5 HP 0.12 – 4.0 kW	EU	275 274 810	275 274 811	275 274 812

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

AC LINE CABLES
DAISY CHAIN CABLES

Product Overview – AC line cables

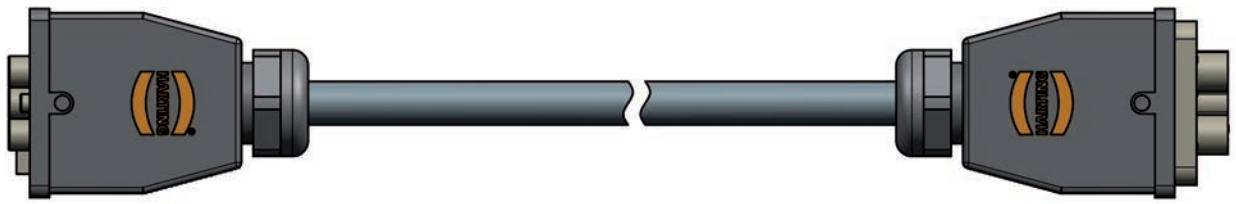
The following unshielded AC line cables are available. A simple plug-in connection for variable frequency drives can be achieved with the HQ4 variant. With a further variant (HQ42) a 24 V DC supply can also be implemented

Designation	24 V DC supply	Certification	Part number for length [m]		
			1.5	3	5
SK CE-HQ4-K-LE-OE	No	EU	275 274 840	275 274 841	275 274 842
		UL		275 274 241	275 274 242
SK CE-HQ42-K-LE-OE	Yes	EU	275 274 845	275 274 846	275 274 847
		UL		275 274 246	275 274 247

Product Overview – Daisy chain cables

A daisy chain cable is designed for looping the AC line connection (plug connections on both sides) from one variable frequency drive to the next. The variants as for AC line cables are available. These cables are also unshielded.

Designation	24 V DC supply	Certification	Part number for length [m]		
			1.5	3	5
SK CE-HQ4-K-LA-HQ4	No	EU	275 274 850	275 274 851	275 274 852
		UL		275 274 251	275 274 252
SK CE-HQ42-K-LA-HQ42	Yes	EU	275 274 855	275 274 856	275 274 857
		UL		275 274 256	275 274 257



Product overview – Brake resistor cables

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

Designation	Certification	Part No. for length [m]	
		2	3
SK CE-HQ2-K-BRW5-OE	EU	275 274 881	275 274 899

Product overview – Control cables

Control cables for connection to an encoder are typically connected with so-called “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			
AG4 cable set consisting of 1x each SK CE-A5F-AGC-A5F SK CE-B4M-IGC-B4F	✓	✓	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
SK CE-B4M-IG-A8F	✓		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
SK CE-A5M-IG0-A5F		✓	IG22P5 - 19 651 910	HTL with zero track	1.5 m - 275 274 874 3.0 m - 275 274 876 5.0 m - 275 274 877
SK CE-A5M-IG0-A8F		✓	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.

NORD DRIVESYSTEMS IS
INDUSTRY 4.0 READY!

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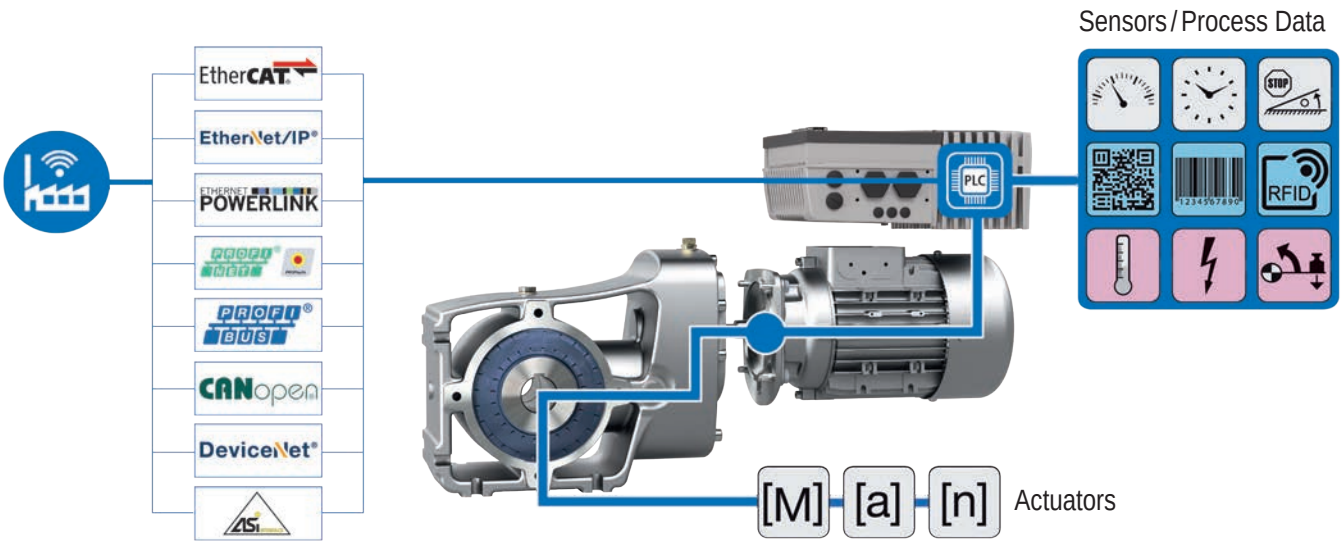
We have the drive units for intelligent processes: Networked – Autonomous – Scalable. Intelligent drives from NORD DRIVESYSTEMS play an important role in highly networked systems to advance the so-called fourth industrial revolution, which is based on the extensive exchange of information on all levels.

"NORD 4.0 READY!" means that NORD drive units are networked, autonomous, and scalable. The key components are the VFD units with their powerful processors and comprehensive equipment, interfaces, and functions. They not only monitor themselves and the motor, but also the effect on the load situation in plant segments and beyond.

The integrated PLC processes data from sensors and actuators. If necessary, it initiates a control sequence and communicates high-quality drive and application data to the control center and other networked components.

For example, intelligent sequence controls can enable the drive unit to independently decide on a branch position and act accordingly. The drive units can also communicate with each other: “Attention, I am sending a package in your direction. Start your conveyor belt.” A follower drive can synchronize to a master for a particular task and then return to normal operation. Hundreds of typical functions are saved as parameter sets and can be simply adopted.

As a result, the VFD can coordinate both simple and complex applications independently from the plant control system, and it can respond to changes to the process or remedy many process faults independently without external intervention.



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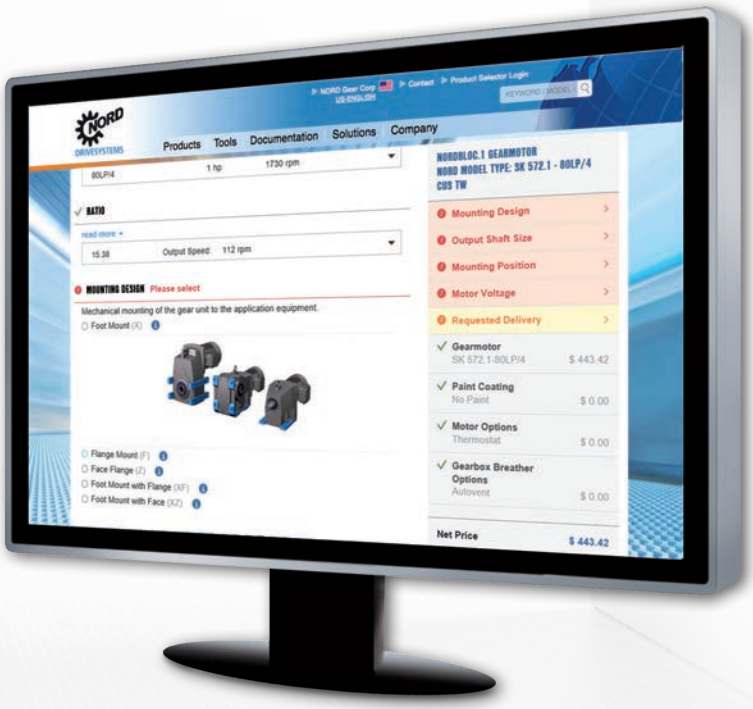

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NORD Gear Corporation - US
MEMBER OF THE NORD DRIVESYSTEMS GROUP
info.us@nord.com

Waunakee, WI
800 NORD Drive
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Tel. 888.314.6673

Corona, CA
1180 Railroad St.
Corona, CA 92882
Tel. 888.314.6673

Charlotte, NC
300E Forsyth Hall Dr.
Charlotte, NC 28273
Tel. 888.314.6673

NORD Gear Limited - Canada
MEMBER OF THE NORD DRIVESYSTEMS GROUP
info.ca@nord.com

Brampton, ON
41 West Drive
Brampton, ON L6T4A1
Tel. 800.668.4378

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