

Intelligent Drivesystems



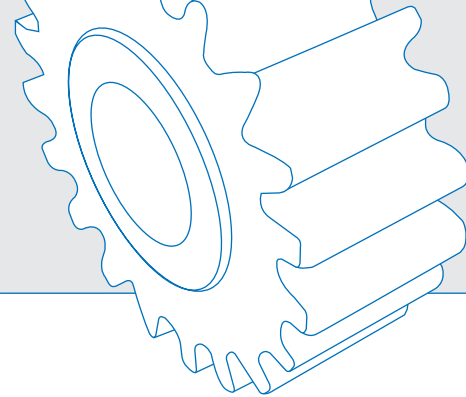
## SK 200E

High Performance AC Vector Drives  
Innovative Distributed Design

F3020

  
DRIVESYSTEMS

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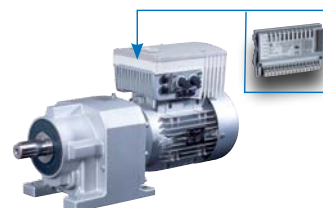
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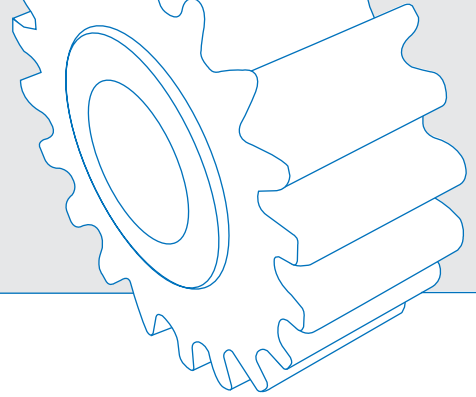
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# High Performance AC Vector Drives



## AC Vector Drive Series SK 200E

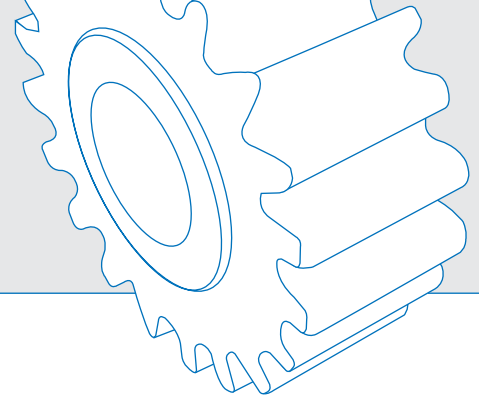
NORD, the drive technology specialist, has been developing and producing distributed control AC vector drives for more than 10 years. In 2009, we introduced the very popular SK 200E AC vector drive series, which was designed to mount directly in place of the motor terminal box to create a combined, fully integrated unit for use in the field. The SK 200E line is a distributed control companion to our successful SK 500E series cabinet mount drive. Together, our products offer a continuous range of performance along with optional features to simplify the drive selection process in order to serve a wide variety of applications.

Although the original SK 200E series served the full range of drive applications from simple speed control in stand alone units to complex multi drive systems controlled via field bus networks or requiring position control, our customers have encouraged us to expand our product offering even further.

NORD now offers two distinct families within the SK 200E distributed AC vector drive line. This expansion allows users to select a compact device with exactly the features that are required for a particular application.

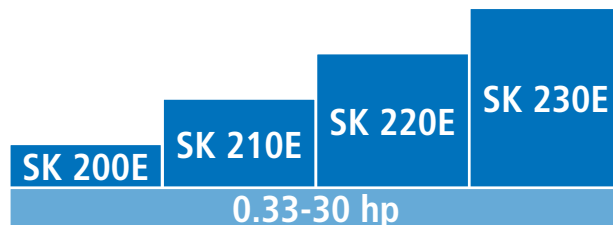


# High Performance AC Vector Drives



## SK 2X0E: Component Class Family

The drives included in this family are best suited for stand alone drives such as mixers, extruders, pumps and fans.



### SK 2X0E Family Members

- SK200E** - Basic functions suitable for many applications
- SK210E** - Basic functions plus "Safe Stop" feature
- SK220E** - Basic functions plus integrated ASi interface
- SK230E** - Basic functions plus "Safe Stop" & ASi Interface

## SK 2X0E Power Range

240V ~ 1 phase 0.33 - 0.75 hp (0.25 - 0.55 kW)  
240V ~ 3 phase 0.33 - 15 hp (0.25 - 11 kW)  
480V ~ 3 phase 0.75 - 30 hp (0.55 - 22 kW)

## SK 2X5E: System Class Family

The drives included in this family are best suited for coordinated drives and lifts, hoists and material handling.



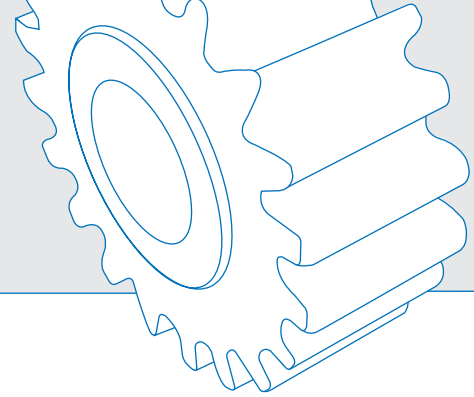
### SK 2X5E Family Members

- SK205E** - Basic functions suitable for many applications
- SK215E** - Basic functions plus "Safe Stop" feature
- SK225E** - Basic functions plus integrated ASi interface
- SK235E** - Basic functions plus "Safe Stop" & ASi Interface

## SK 2X5E Power Range

115V ~ 1 phase 0.33 - 1.0 hp (0.25 - 0.75 kW)  
240V ~ 1 phase 0.33 - 1.5 hp (0.25 - 1.1 kW)  
240V ~ 3 phase 0.33 - 5 hp (0.25 - 4 kW)  
480V ~ 3 phase 0.75 - 10 hp (0.55 - 7.5 kW)





## General Application Guidelines

### SK 2X0E Family (Component Class)

Mixers/agitators, extruders, pumps, fans, stand alone applications

- Do not want to supply separate control power – derive all required power from power input
- Do not need to coordinate with an electromechanical motor brake as standard
- Interface is normally analog signals for reference/feedback and discrete I/O
- Want flexibility without adding modules later

### SK 2X5E Family (System Class)

Conveyors, lifts/hoists/elevators, general material handling, coordinated drives over field bus

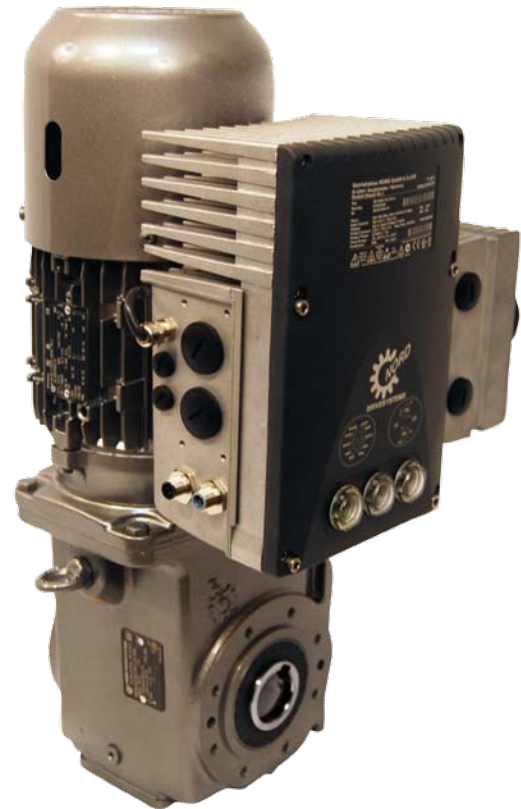
- Separate control power available or desirable
- Are using an electro-mechanical motor brake
- Interface is normally Bus system or discrete I/O
- Need cover mounted potentiometers for set up
- Like added diagnostic LEDs
- Input power is 115 VAC 1 phase or 230 VAC 1 phase above ¾ HP

### Special considerations for Size 4 AC Drives (SK 2X0E)

The largest frame size (size 4) of the SK200E series covers 240V 3-phase input ratings from 7.5hp through 15hp & 480V 3-phase input ratings from 15hp through 30hp.

These drives are only available in the SK 2X0E family. However, these drives have a combination of the features of the SK 2X0E and SK 2X5E families that make them suitable for both component and system applications.

- Control power is derived from the AC input or can be separately supplied
- Electro-mechanical motor brake power supply is included (integral rectifier)
- Cover mounted trim potentiometers are included
- Additional diagnostic LEDs are included
- One or two analog inputs included as standard
- Integral cooling fan provides full drive output rating independent of motor speed or mounting (motor thermal requirements must still be satisfied)

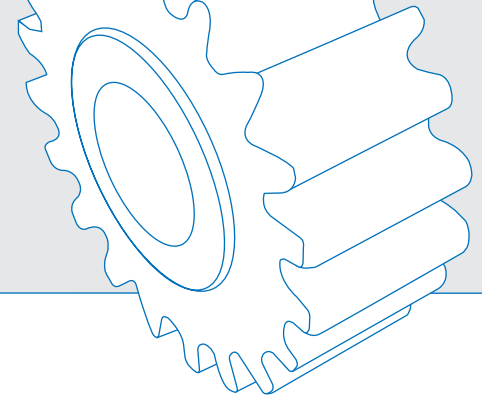


## Input Power/Frame Size Matrix

Voltage	HP Rating	Frame Size
115V ~ 1	0.33-0.5	1
	0.75-1.0	2
240V ~ 1	0.33-0.75	1
	1.0-1.5	2
240V ~ 3	0.33-1.5	1
	2.0-3.0	2
	4.0-5.0	3
	7.5-15	4
480V ~ 3	0.75-3.0	1
	4.0-5.0	2
	7.5-10	3
	15-30	4

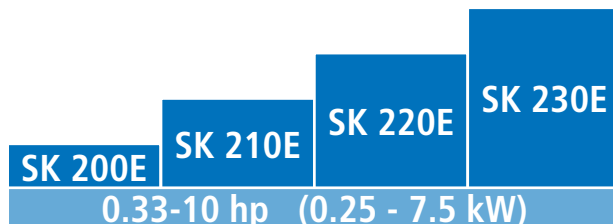
Size details on page 56.

# Technical Configuration of 2XOE Component Class Family - Sizes 1-3



## SK 2XOE: Component Class Family

The drives included in this family are best suited for stand alone drives as well as mixers, extruders, pumps and fans.



## SK2XOE Size 1-3 Basic Functions

### Control Signals

#### 3 or 4 Digital Inputs

E.G. For left/right release, fixed frequencies or the switching over of parameters.

#### 2 Digital Outputs

E.G. Reporting of errors or various limit values.

#### 1 or 2 Analog Inputs

Connection, E.G. For speed setpoint and/or process signals.

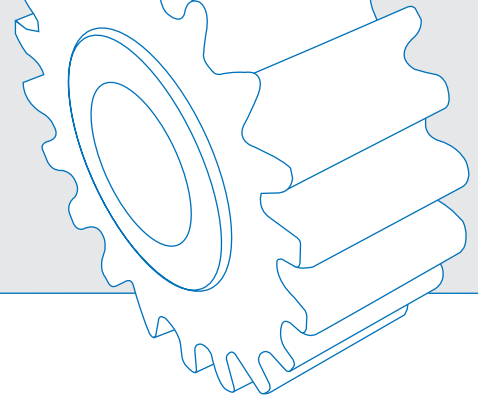
### Integrated 24V Power Supply

#### Internal Control Voltage

Added without additional connection.  
"Stand Alone" operation.

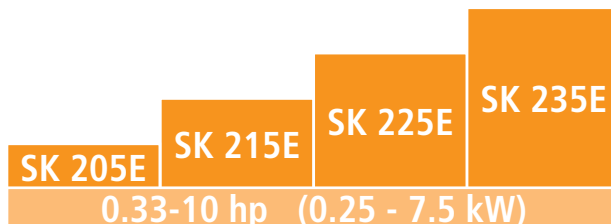


# Technical Configuration of **2X5E** System Class Family - Sizes 1-3



## SK **2X5E**: System Class Family

The drives included in this family are best suited for coordinated drives as well as lifts, hoists and material handling.



**For Powers > 5hp @ 240V  
or 10hp @ 480V use SK2x0E, Size 4**

## SK2X5E Size 1-3 Basic Functions

### Control Signals

#### 3 or 4 Digital Inputs

E.G. For left/right release, fixed frequencies or the switching over of parameters.

#### 1 Digital Output

E.G. Reporting of errors or various limit values.

### External 24V Power Supply

#### External 24V Control Voltage

Connection for an external 24V power supply. Separate voltage levels for power and control, E.G. for separate start-up or online availability with the power switched off.

### Integrated Control of Electro-Mechanical Brake

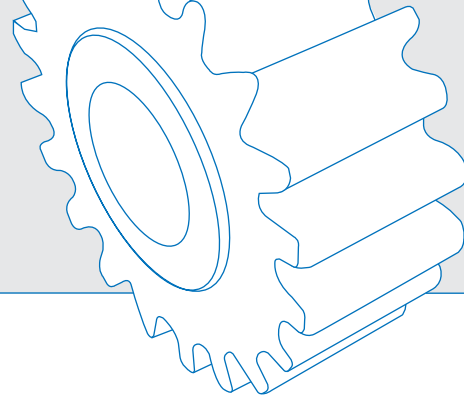
#### Integrated Half-wave Rectifier

Application and release time that is optimally adjustable with a parameter setting.



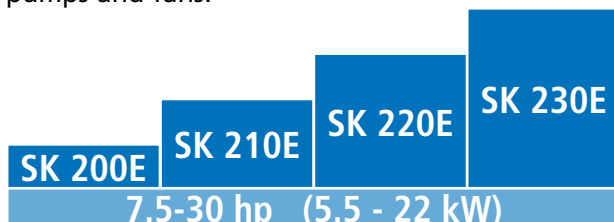
Line Voltage (AC)	Brake Coil Voltage (DC)
100-120	105
200-240	105
380-420	180
440-480	205

# Technical Configuration of 2XOE Component/System Class Family - Size 4



## SK 2XOE: Component Class Family

The drives included in this family are best suited for stand alone drives as well as mixers, extruders, pumps and fans.



### SK2XOE Size 4 Basic Functions

#### Control Signals

##### 3 or 4 Digital Inputs

E.G. For left/right release, fixed frequencies or the switching over of parameters.

##### 2 Digital Outputs

E.G. Reporting of errors or various limit values.

##### 1 or 2 Analog Inputs

E.G. Reporting of errors or various limit values.

#### Integrated 24V Power Supply

##### Internal Control Voltage

Added without additional connection. "Stand Alone" operation. Use of external 24VDC power supply is also possible for startup or online availability with line power switched off.

#### Integrated Fixed Speed Cooling Fan

##### Incorporated Cooling Fan

A fan used for cooling purposes.

#### Integrated Control of Electro-Mechanical Brake

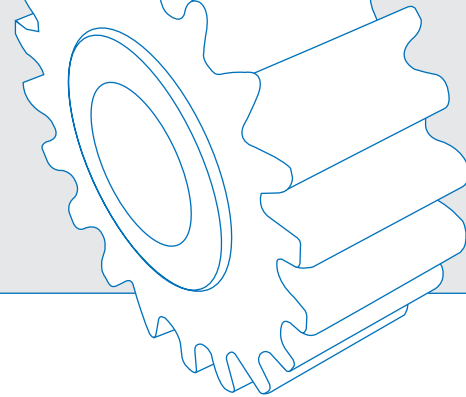
##### Integrated Half-wave Rectifier

Application and release time that is optimally adjustable with a parameter setting.



Line Voltage (AC)	Brake Coil Voltage (DC)
100-120	105
200-240	105
380-415	180
440-480	205

# SK 200E Overview



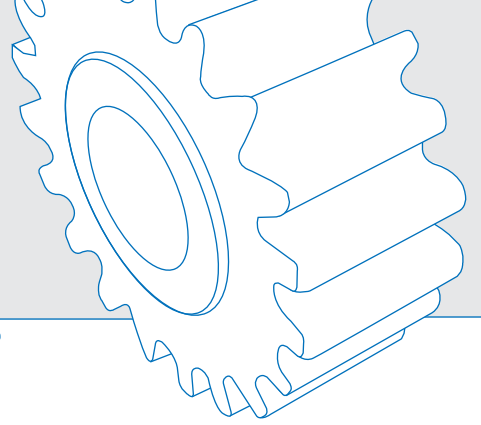
		SK 200E	SK 205E	SK 210E	SK 215E	SK 220E	SK 225E	SK 230E	SK 235E
	Power range 0.33 - 30hp (0.25 kW - 22 kW) (IP55/IP66)	☑	☑	☑	☑	☑	☑	☑	☑
Design	Same Design	☑	☑	☑	☑	☑	☑	☑	☑
	Motor and Wall mounting Available	☑	☑	☑	☑	☑	☑	☑	☑
Characteristics	All standard drive functions	☑	☑	☑	☑	☑	☑	☑	☑
	Consistent parameter structure	☑	☑	☑	☑	☑	☑	☑	☑
	Multiple field bus systems available	☑	☑	☑	☑	☑	☑	☑	☑
Basic functions	Integrated 24V power supply	☑	○	☑	○	☑	○	☑	○
	24V Control voltage required		☑		☑		☑*		☑*
	Brake Management, mechanical motor brake	○**	☑	○**	☑	○**	☑	○**	☑
	Brake chopper (brake resistor optional)	☑	☑	☑	☑	☑	☑	☑	☑
	DC Braking	☑	☑	☑	☑	☑	☑	☑	☑
	Flying Start (catching a spinning motor)	☑	☑	☑	☑	☑	☑	☑	☑
	Sensorless current vector control (ISD control)	☑	☑	☑	☑	☑	☑	☑	☑
	Plug-in storage module (EEPROM)	☑	☑	☑	☑	☑	☑	☑	☑
	Line filter Class C2	☑	☑	☑	☑	☑	☑	☑	☑
	Switchable parameter sets	☑	☑	☑	☑	☑	☑	☑	☑
	Process controller / PID controller	☑	○	☑	○	☑	○	☑	○
	Incremental encoder evaluation ❶	☑	☑	☑	☑	☑	☑	☑	☑
	POSICON (positioning control) ❷	☑	☑	☑	☑	☑	☑	☑	☑
	Automatic flux adaptation (energy saving function)	☑	☑	☑	☑	☑	☑	☑	☑
Special functions	"Safe stop" function			☑	☑			☑	☑
	AS interface on board					☑	☑	☑	☑
Options	Bus modules with/without M12 plug connectors for I/Os	○	○	○	○	○	○	○	○
	I/O Modules	○	○	○	○	○	○	○	○
	Stand-alone operation (24V control power supply)	☑	○	☑	○	☑	○*	☑	○*
	System connectors (e.g. Harting HAN 10E)	○	○	○	○	○	○	○	○
	Internal/external brake resistors	○	○	○	○	○	○	○	○
	Potentiometer versions	○	○	○	○	○	○	○	○

☑ Standard Functions    ○ Optional Functions    \* 24V Supply via AS-i    ○\*\* Size 4 Includes brake management

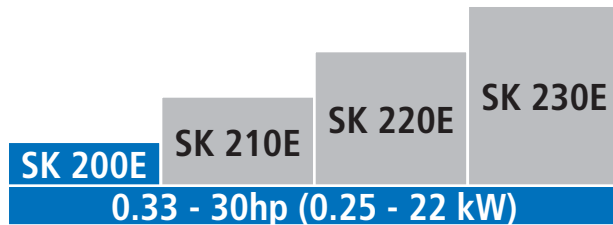
❶ Requires HTL output encoder on motor for closed loop vector.

❷ With HTL output incremental encoder or CAN output absolute encoder.





# SK 2X0E - Component Class Features



## SK 200E

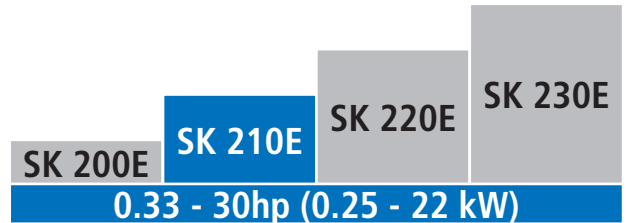
With its comprehensive standard features, the SK 200E can be used for a wide variety of applications. All functions are available throughout the entire product range. Operation and handling are designed to be very simple and easy to understand, to enable quick and easy commissioning.

### SK 200E Size 1-3 Basic Functions:

- ☒ Integrated 24V power supply
- ☒ Sensorless current vector control (ISD)
- ☒ Plug-in storage module (EEPROM)
- ☒ 3x (210E & 230E) or 4x (200E & 220E) digital input, PTC input
- ☒ 1x (220E & 230E) or 2x (200E & 210E) analog input
- ☒ 2x digital output
- ☒ Immediate-access RS 232 diagnostic interface
- ☒ Energy saving function
- ☒ Simple field wiring
- ☒ Variable mounting possibilities for system connectors
- ☒ Incremental encoder evaluation
- ☒ POSICON Positioning control

### SK 200E Size 4 Basic Functions:

- ☒ All Size 1-3 basic functions listed above.
- ☒ Integrated Internal 24V power supply. (Use of External supply also available)
- ☒ Motor brake control (integrated rectifier)
- ☒ Digital input status LEDs.
- ☒ Immediate access setpoint potentiometers.



## SK 210E

### SK 210E Additional Functions:

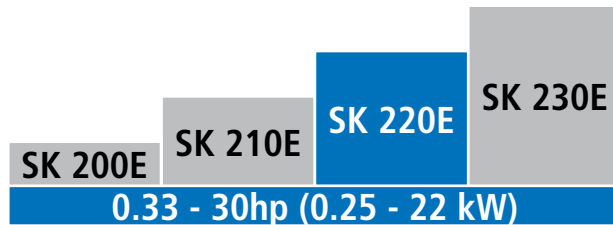
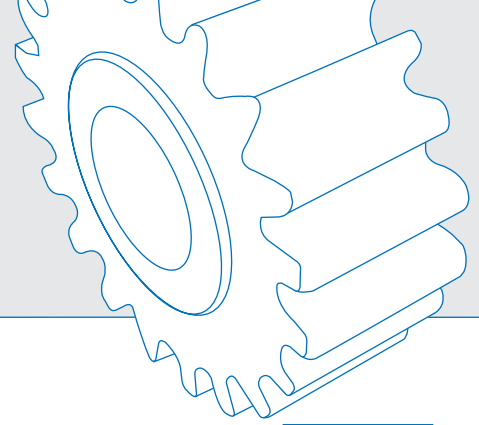
- ☒ Safety function "Safe stop" as per EN 13849-1
- ☒ SK 200E basic functions (listed in table to the left)

The safety function "Safe stop" is a very practical and efficient method of preventing a motor from restarting, as required by the relevant standards. This helps to prevent injury to personnel working in the vicinity of the rotating drive. ("Safe stop" see page 14)

Integrated function "Safe stop" as per EN 13849-1  
Up to maximum Safety category 4  
Stop category 0 and 1

- "Safe pulse block" with ext. 24V supply
- Customer supplied external safety switching device required
- Safe protection against motor restart
- No need for disconnection of supply voltage

# SK 2X0E - Component Class Features



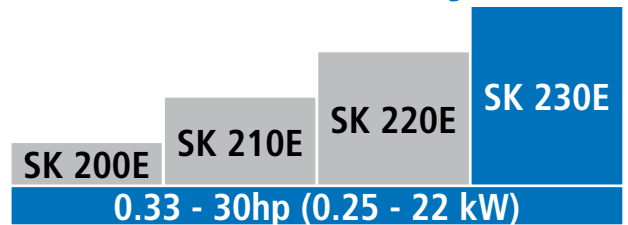
## SK 220E

The SK 220E is equipped with an AS interface. The simplicity and low cost of this sensor/actuator bus system is especially valuable in large plant facilities.

- AS interface protocol 2.4 with cyclical 4E/4A data exchange
- Status LED on device

### SK 220E Additional Functions:

- ☒ AS interface on board
- ☒ SK 200E basic functions (listed in table to the left)



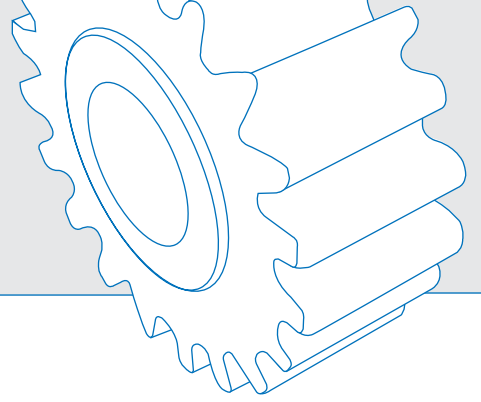
## SK 230E

This performance level combines the safety function "Safe stop" with the bus system AS interface. The SK 230E provides the greatest range of functions within the SK 200E series.

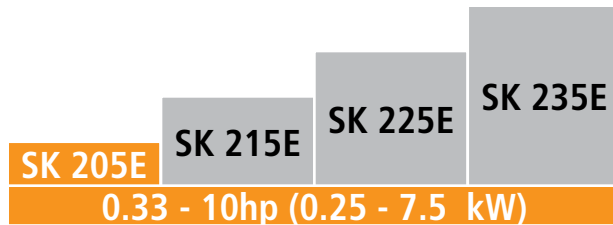
### SK 230E Additional Functions:

- ☒ Safety function "Safe stop" as per EN 13849-1
- ☒ AS interface on board
- ☒ SK 200E basic functions (listed in table to the left)





# SK 2X5E - System Class Features

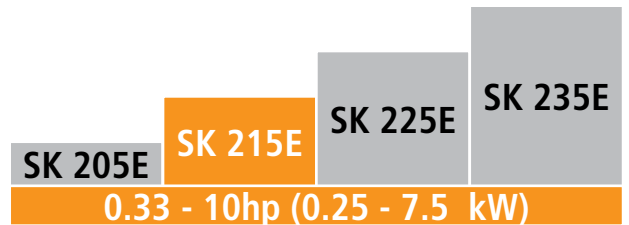


## SK 205E

With its comprehensive standard features, the SK 205E can be used for a wide variety of applications. All functions are available throughout the entire product range. Operation and handling are designed to be very simple and easy to understand, to enable quick and easy commissioning.

### SK 205E Basic Functions:

- ☒ Sensorless current vector control (ISD)
- ☒ Plug-in storage module (EEPROM)
- ☒ 3x (215E & 235E) or 4x (205E & 225E) digital input, PTC input
- ☒ 1x digital output
- ☒ Brake control (integrated rectifier)
- ☒ Immediate-access RS 232 diagnostic interface
- ☒ Energy saving function
- ☒ Digital input status LEDs
- ☒ Immediate-access setpoint potentiometer
- ☒ Simple field wiring
- ☒ Variable mounting possibilities for system connectors
- ☒ 24V external control voltage
- ☒ Incremental encoder evaluation
- ☒ POSICON Positioning control
- ☒ 2 setpoint potentiometers



## SK 215E

### SK 215E Additional Functions:

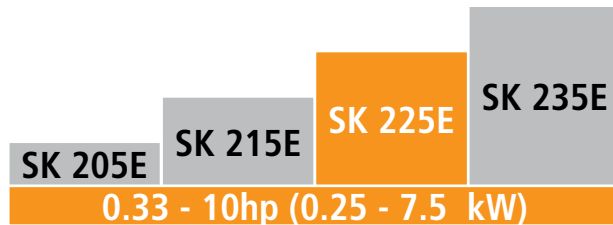
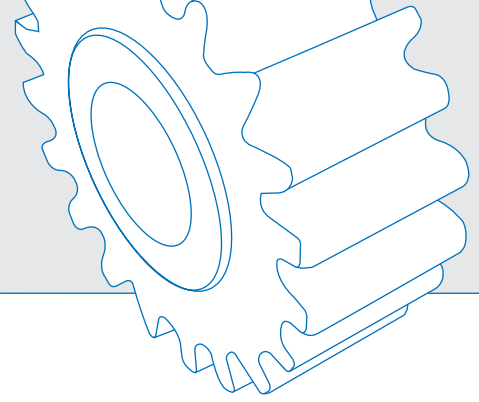
- ☒ Safety function "Safe stop" as per EN 13849-1
- ☒ SK 205E basic functions (listed in table to the left)

The safety function "Safe stop" is a very practical and efficient method of preventing a motor from restarting, as required by the relevant standards. This helps to prevent injury to personnel working in the vicinity of the rotating drive. ("Safe stop" see page 14)

Integrated function "Safe stop" as per EN 13849-1  
Up to maximum Safety category 4  
Stop category 0 and 1

- "Safe pulse block" with ext. 24V supply
- Customer supplied external safety switching device required
- Safe protection against motor restart
- No need for disconnection of supply voltage

# SK 2X5E - System Class Features



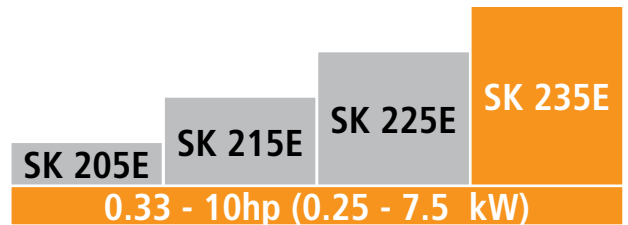
## SK 225E

The SK 225E is equipped with an AS interface. The simplicity and low cost of this sensor/actuator bus system is especially valuable in large plant facilities.

- AS interface protocol 2.4 with cyclical 4E/4A data exchange
- Status LED on device

### SK 225E Additional Functions:

- ☒ AS interface on board
- ☒ SK 205E basic functions (listed in table to the left)



## SK 235E

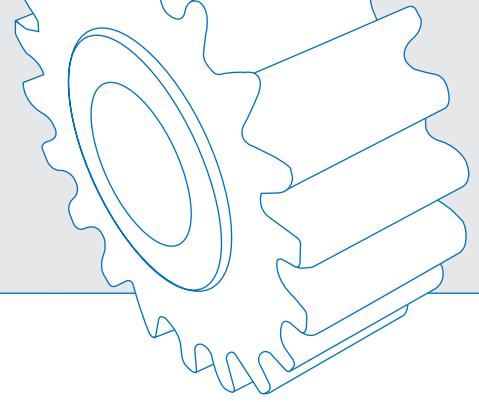
This performance level combines the safety function "Safe stop" with the bus system AS interface. The SK 235E provides the greatest range of functions within the SK 200E series.

### SK 235E Additional Functions:

- ☒ Safety function "Safe stop" as per EN 13849-1
- ☒ AS interface on board
- ☒ SK 205E basic functions (listed in table to the left)



# Safety Function "Safe Stop"



## "Safe stop" Safety function

Safety of personnel and high machine availability are essential for plant operation. After a safety circuit is actuated by opening a safety cover or door, it must be ensured that no rotating system components can lead to accidents. With asynchronous motors, this is triggered by a safe pulse block which prevents the motor from restarting. During the safe pulse block the AC input voltage remains applied to the AC Vector drive. The AC vector drive is therefore immediately ready to be switched on without re-initialization after the safety circuit is closed. Details of the safety function can be found in manual BU0230 available at [www.nord.com](http://www.nord.com).

## Standards

- EN 13849-1: Performance Level e
- EN 61508: SIL3
- EN 60204-1: Stop function
- pr EN 61800-5-2: Safety functions

## Applications

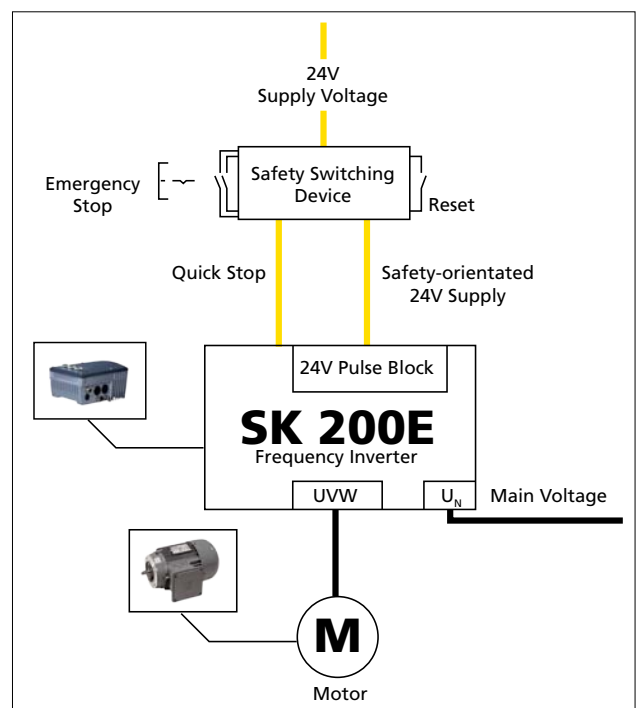
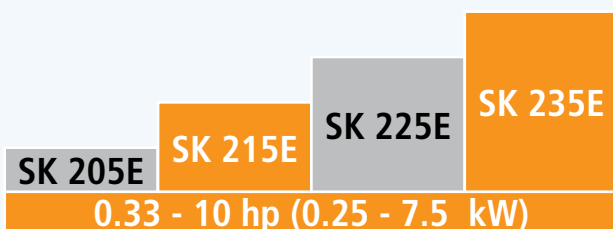
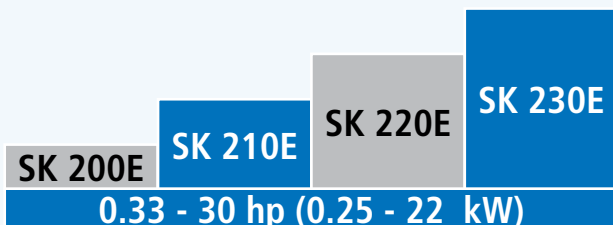
- Rotating machine tools (e.g. milling machines)
- Closed moving systems with safety doors
- Other applications where machine safety is critical

## Advantages at a glance

- High machine availability through continuous online operation
- Reduction in safety components
- No initialization delays
- Long service life due to electronic switching (no electromechanical contacts)
- Low cost solution with compact device

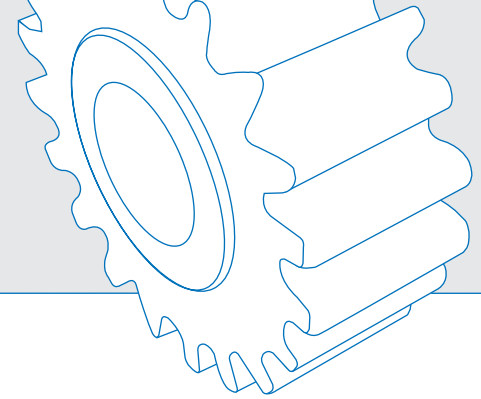
## Versions with Integrated Safe Stop:

- ☒ Safe Stop Safety Function
- ☒ SK 200E / SK 205E basic functions



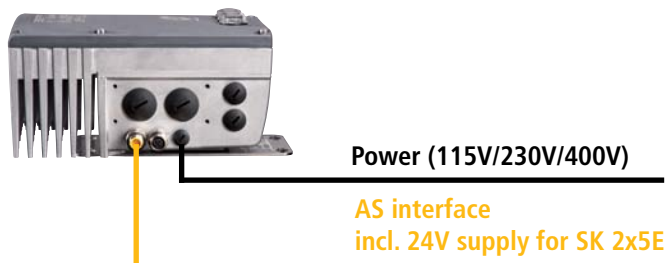


# AS Interface Connection with M12 Plug Connectors



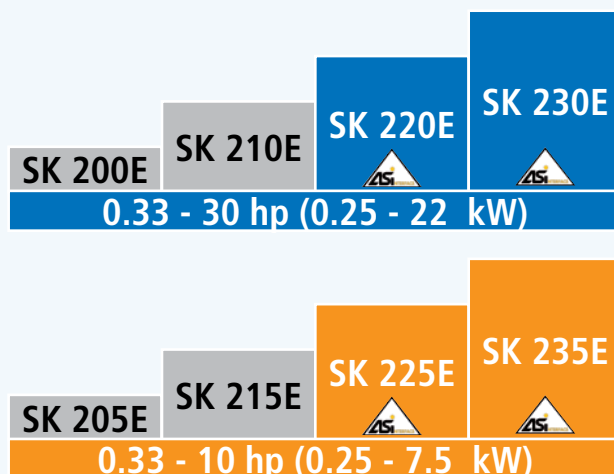
Modern automation systems have a wide range of requirements, so that a suitable bus system and drive components must be selected in order to ensure efficient implementation. For the lower field level, the AS interface is a cost-effective solution which enables the networking of binary sensors and actuators. Special versions of the SK 200E, which provide an appropriate solution by means of an AS interface, are available for this price-sensitive area.

The supply voltage (power) is via appropriate terminals according to the rating (1~/3~, 115/230/460V). The control voltage of the AC Vector Drive is supplied separately. For the control unit of the AC Vector Drive and the AS interface, the supply is via the (yellow) AS interface cable. This eliminates the need for an additional AUX cable (black).



## Versions with AS-i on board:

- ☒ AS interface on board
- ☒ SK 200E / SK 205E basic functions



To connect the AS-i cable and any initiators, appropriate M12 plug connectors can be provided ex-works. These are color-coded in order to provide a definite assignment of functionalities in the field. The following versions can be selected as options.



## AS interface connection

- AS interface  
(24V power supply for the SK225E & SK235E via AS interface)
- Optional M12- plug connector (yellow) for AS-i:  
SK TIE4-M12-AS1 (Part No. 275274502)

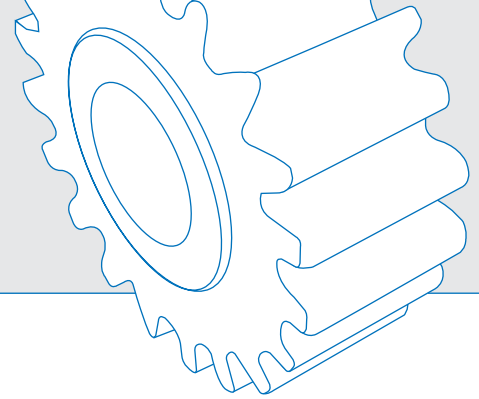


## Connection for AS interface and initiators

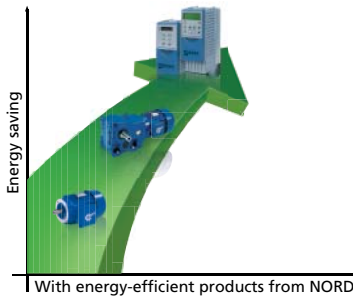
- AS interface  
(24V power supply for the SK225E & SK235E via AS interface)
- Initiators (max. 4 x M12 connections possible, 2 with each digital input that is provided [2])
- Optional M12- plug connector (yellow) for AS-i:  
SK TIE4-M12-AS1 (Part No. 275274502)
- Optional M12 plug connector (black) for I/O:  
SK TIE4-M12-INI (Part No. 275274503)

# SK 200E

## Application Functions

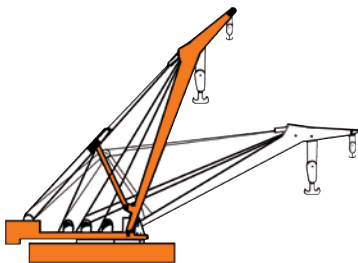


### Application functions of the SK 200E



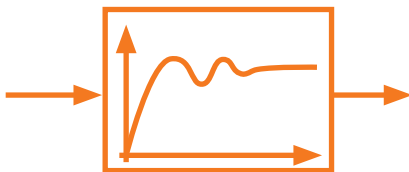
#### Energy-saving function

- Automatic flux optimisation for many applications
- Large energy savings possible
- Simple setting via inverter parameters



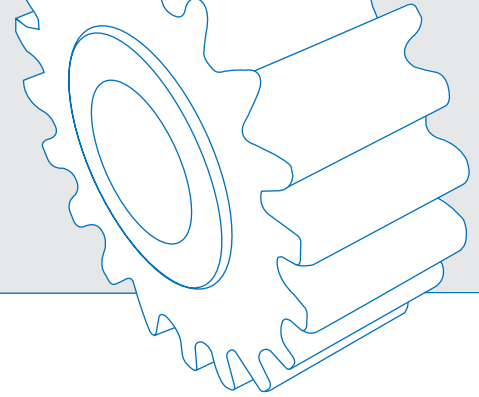
#### Lift drive functions

- High precision sensorless current vector control (ISD control)
- Integrated brake chopper to divert generated energy to an optional brake resistor
- Optimised operation with only a few parameter settings
- High performance brake rectifier that converts AC voltage to DC voltage in order to supply power to the mechanical brake.  
(Included on all available sizes of the SK2x5E and size 4 of the SK2x0E.)



#### PID process controller

- The basic SK2x5E units do not include an analog input. This is available as an option with the mains unit module or I/O extension (CU4 or TU4 resp.)
- P, I and D component can be set separately
- High precision regulation of application variables (pressure, flow, temperature, etc)



## Application functions of the SK 200E



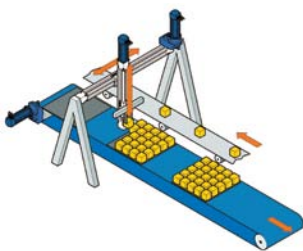
### Safety function "Safe stop"

- Switches-off of the 24V DC power supply to the IGBT module
- Mechanical wear free solution (less mechanical parts - increased reliability)
- Component cost savings compared with contactor version



### Servo mode

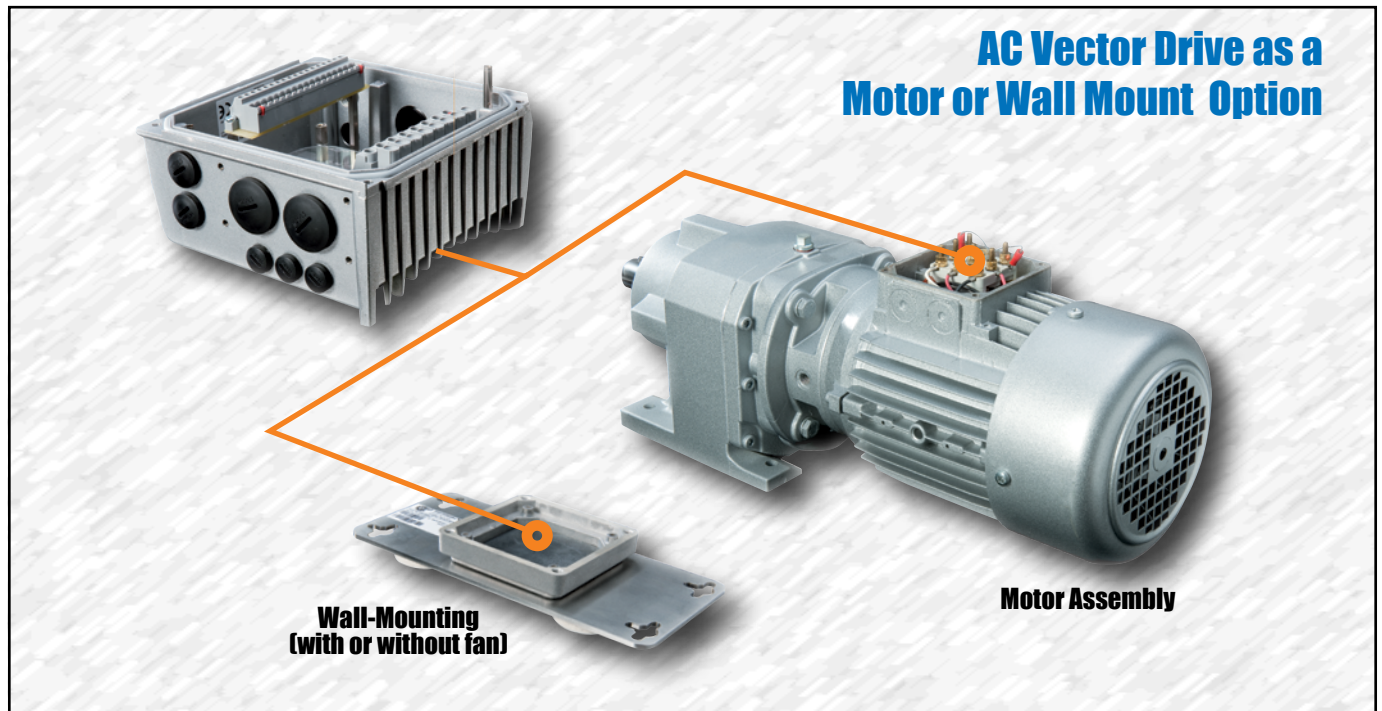
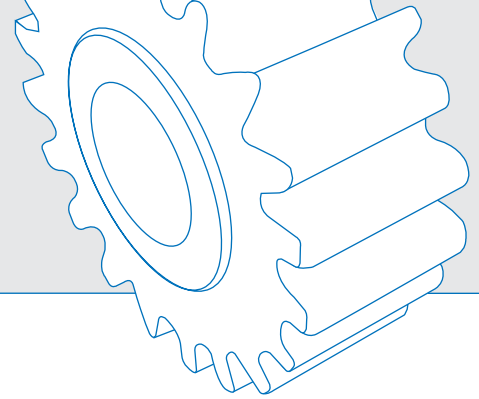
- High precision speed control
- Full torque down to zero speed
- Excellent dynamic response to load fluctuations
- Requires the use of an optional incremental encoder on the supplied motor



### Absolute and relative positioning with POSICON

- Absolute positioning to move to fixed values, e.g. on a finite axis
- Relative positioning for stepped operation
- Easy implementation by setting only a few parameters
- Requires the use of an external encoder

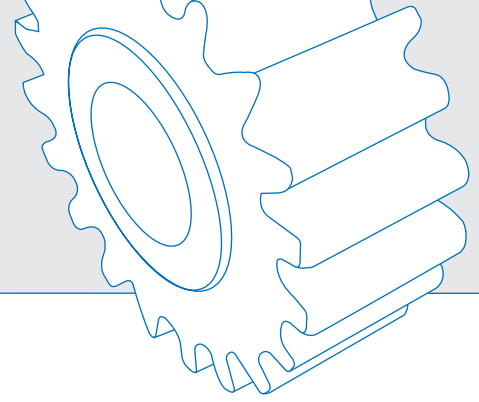
# Flexible Mounting Possibilities



## Technology Box on the SK 2XXE or Wall Mounted



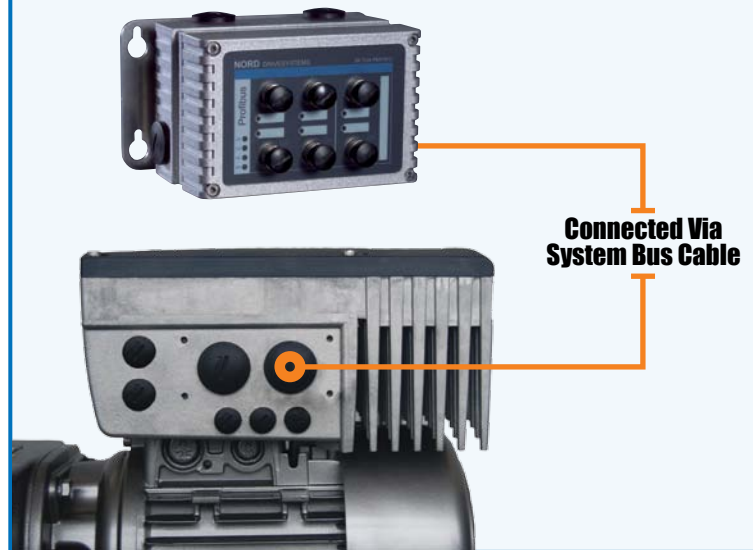




## Motor-integrated SK 2XXE With Technology Unit



## Motor-integrated SK 2XXE With Wall Mounted Technology Unit



## Wall Mounted Variant of an SK 2XXE and a Technology Unit

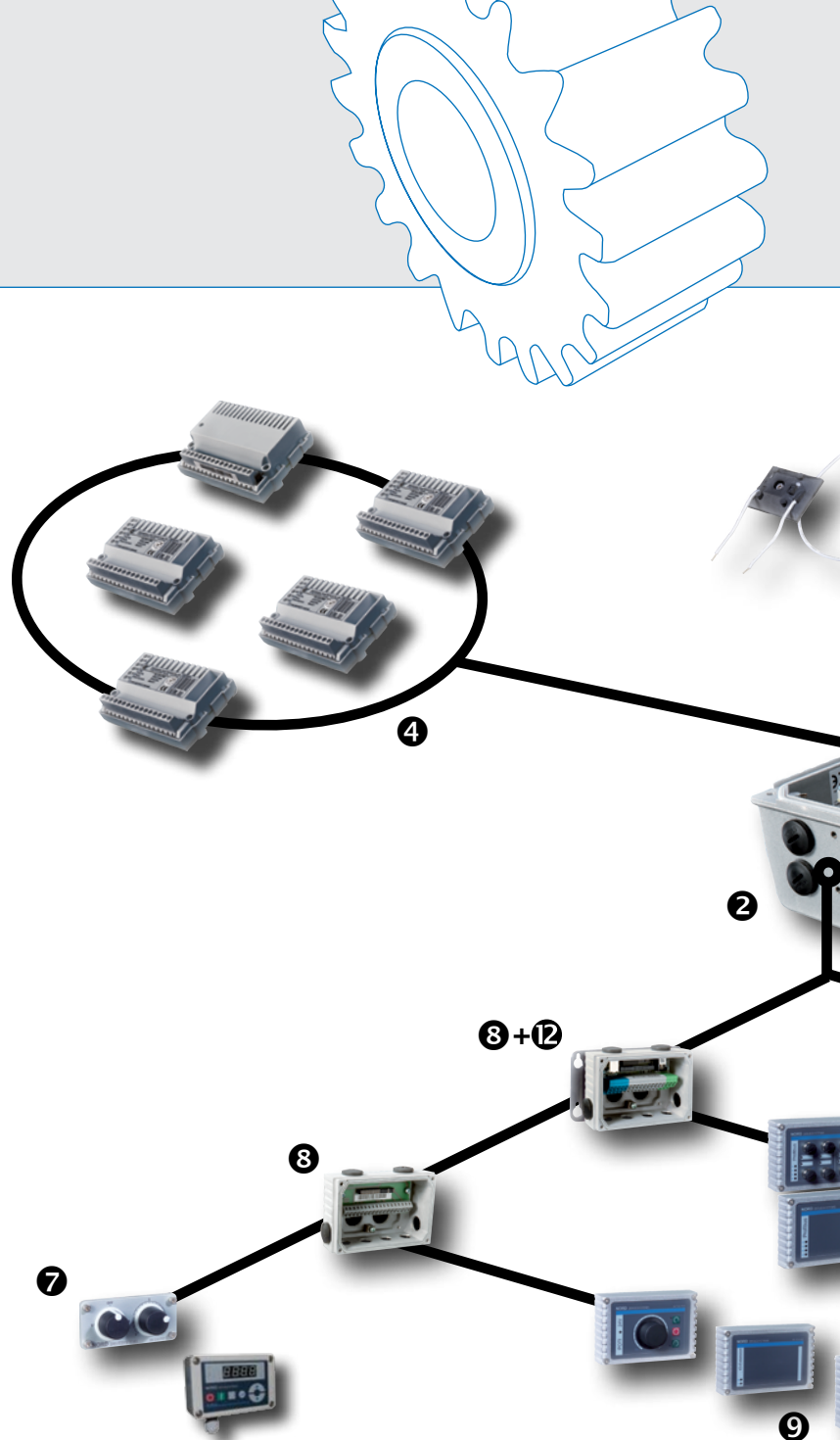




# High Performance AC Vector Drives

## SK 2XXE Component Overview:

- ❶ Gearmotor
- ❷ SK 2XXE motor adapter unit
- ❸ SK 2XXE AC vector drive
- ❹ Customer unit (internal)
- ❺ Internal braking resistor
- ❻ External braking resistor
- ❼ Potentiometer option
- ❽ Technology unit adapter
- ❾ Technology units
- ❿ Programming tools
- ⓫ SK 2XXE Wall-Mount (bracket)
- ⓬ Technology unit wall-mount

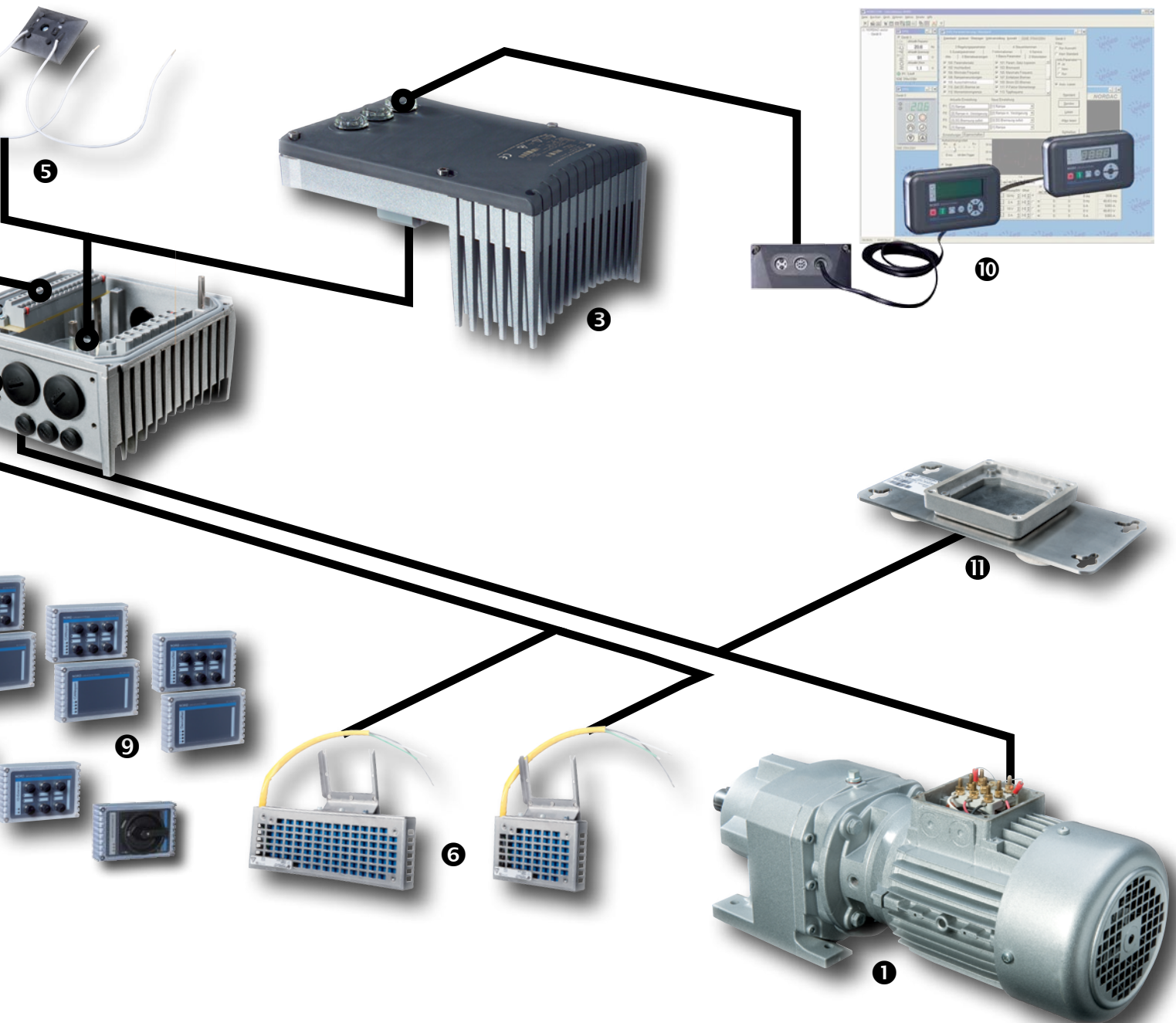
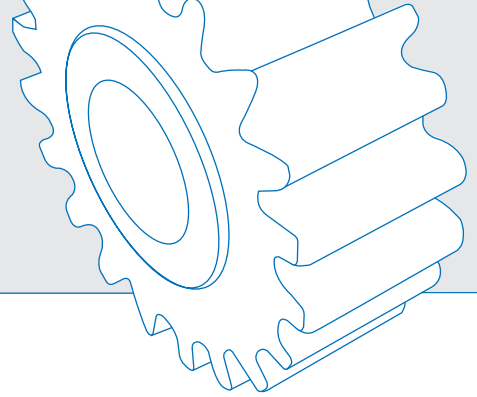


## SK 200E Characteristics:

	Units can be operated with all standard asynchronous motors
	4 sizes with consistent design as motor/inverter units
	Generously dimensioned for easy assembly of various system connectors
	Motor or wall mounting

	External 24V power supply for control board specifically for safety shut down and control & power level commissioning (Versions with integral 24V also available)
	RoHS compliance "Lead free soldering"
	UL Certification / cUL / CE

# High Performance AC Vector Drives



2 + 8

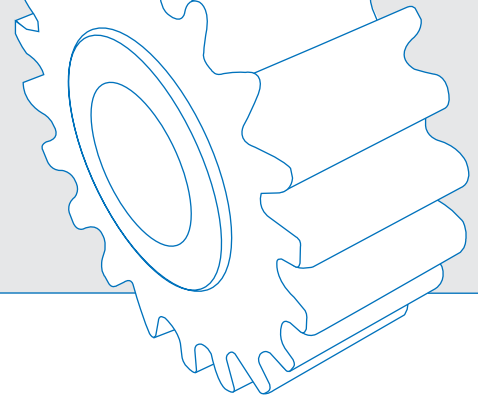


2 + 8 + 9



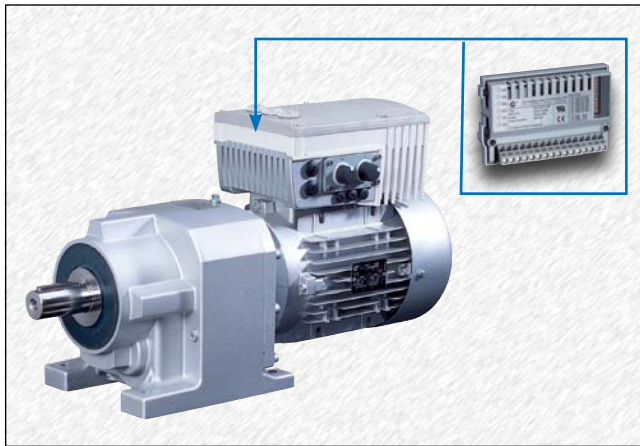
1 + 2 + 3 + 4 + 6 + 7 + 8 + 9

# Internal Customer Units



## Customer Units

Internal customer interfaces enable the expansion of the range of functions of SK 200E AC vector drive without changing the physical size. Users have access to both communication modules, an internal control power module or an I/O expansion.



## Communication

### Profibus

Bus module for the control, programming and diagnosis of the AC vector drive via the Profibus interface.



- Baud rate: Max. 12 Mbaud
- Protocol: DPV 0 and DPV 1
- 2x digital inputs
- Address and baud rate via dip-switch
- Automatic PPO detection
- Status LED: BG status, BG fault, DIN1, DIN2, Bus status, Bus fault

### CANopen

Bus module for the control, programming and diagnosis of the AC vector drive via the CANopen interface.



- Baud rate: Max. 1 Mbaud
- Protocol: DS301 and DS402
- 2x digital inputs
- Address and baud rate via dip-switch
- Status LED: BG status, BG fault, DIN1, DIN2, Bus status, bus fault

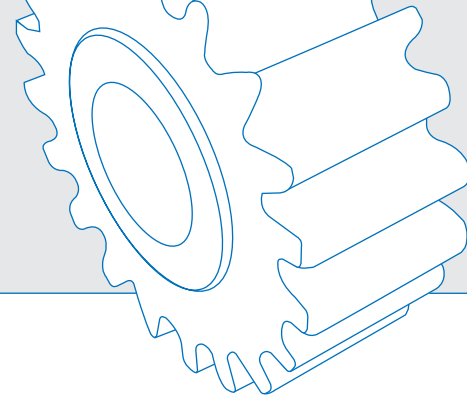
### DeviceNet

Bus module for the control, programming and diagnosis of the AC vector drive via the DeviceNet interface.



- Baud rate: Max. 500 kbaud
- Protocol: AC-Drive
- 2x digital inputs
- Address and baud rate via dip-switch
- Status LED: BG status, BG fault, DIN1, DIN2, Bus status, Bus fault





# Internal Customer Units

## Setpoint Converter

Bus module for the bipolar setpoint signals and relay changeover contacts. Only available for **SK 2x0E**.



- 2x digital inputs, 2x analog inputs
- 2x analog outputs
- 2x relay outputs (changeover)
- 100 mA Maximum permissible permanent relay current

## Electronic Brake Rectifier

Module for the electronic control of an electro-magnetic brake. Only available for SK **2x0E** sizes 1-3.



- Mains Voltage: 115V, 240V, 400V, or 480V.
- 1x digital input
- 1x digital output
- 0.5 A maximum permissible permanent relay current, suppression level C2

Line Voltage (AC)	Brake Coil Voltage (DC)
100-120	105
200-240	105
380-420	180
440-480	205

## I/O Extension

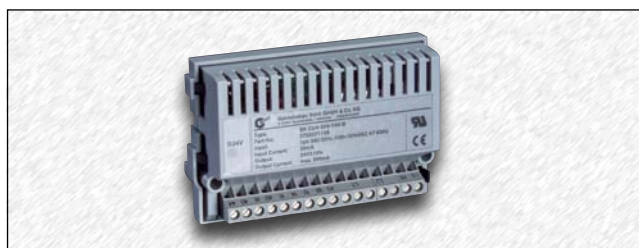
The internal I/O units can record sensor and actuator signals. These can be used for a drive function or forwarded to a host bus system (e.g. Profibus).



- 2x digital inputs
- 2x analog inputs
- 1x analog output
- Status LEDs: Bus status, Bus fault

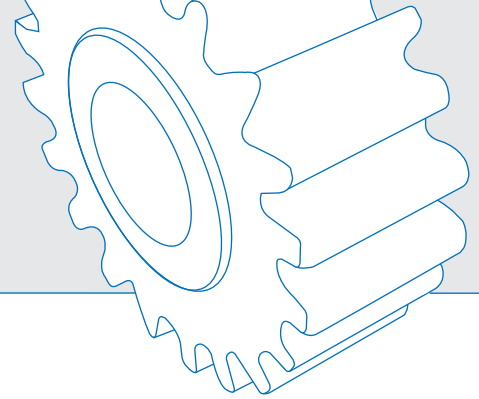
## 24V Control Power Module

This generates the internal control voltage (24V) from the available supply voltage (240V/480V). A separate control cable is not necessary. An analog input is available for connecting the Potentiometer Adapter. Only available for the **SK2x5E**.



- Models for 100V-240V and 380V-500V supply voltages
- 1x analog input (e.g. Potentiometer Adapter)
- 1x impulse output

# Internal Customer Units



## Operation

### Potentiometer Adapter

With the Potentiometer Adapter a robust unit with switching (right-off-left) and a potentiometer may be integrated. This only changes the physical size by the size of the control elements. Connection is achieved with the use of an internal 24V control power module.



- SK CU4-POT : Part Number - 275 271 207
- Additional option with analog input required for SK2x5E.










### Robust Switches and Potentiometers

This is an upgrade to the standard Potentiometer box. There are more durable dials that are utilized on our 2X5E units and are an available option for our 2X0E units as well. These switches are available for both digital and analog input.



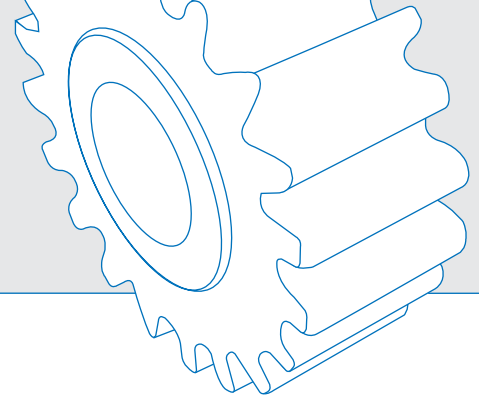
- SK TIE4-SWT : Part Number - 275 274 701
- Connection to digital inputs.
- SK TIE4-POT : Part Number - 275 274 700
- Additional option with analog input required for SK2x5E.

## Internal Customer Units Ordering Info

	<b>Profibus Interface</b>
	SK CU4-PBR (Part. No. 275 271 000)
	<b>CANopen Interface</b>
	SK CU4-CAO (Part. No. 275 271 001)
	<b>DeviceNET Interface</b>
	SK CU4-DEV (Part. No. 275 710 002)
	<b>Setpoint Converter</b>
	SK CU4-REL (Part. No. 275 271 011) <a href="#">Only Available for SK 2X0E</a>
	<b>Electronic Brake Rectifier</b>
	SK CU4-MBR (Part. No. 275 271 010) <a href="#">Only Available for SK 2X0E, sizes 1-3</a>
	<b>I/O Extension</b>
	SK CU4-IOE (Part. No. 275 271 006)
	<b>24V Power Supply</b>
	SK CU4-24V-123 (Part. No. 275 271 108) <a href="#">(115/230V)</a> SK CU4-24V-140 (Part. No. 275 271 109) <a href="#">(460V)</a>
	<b>Potentiometer Adapter</b>
	SK CU4-POT (Part. No. 275 271 207) <a href="#">Analog input option required for use with SK 2X5E</a>
	<b>Robust Switches / Potentiometer</b>
	SK TIE4-SWT (Part. No. 275 274 701) <a href="#">Connection to digital inputs</a> SK TIE4-POT (Part. No. 275 274 700) <a href="#">Analog input option required for use with SK 2X5E</a>

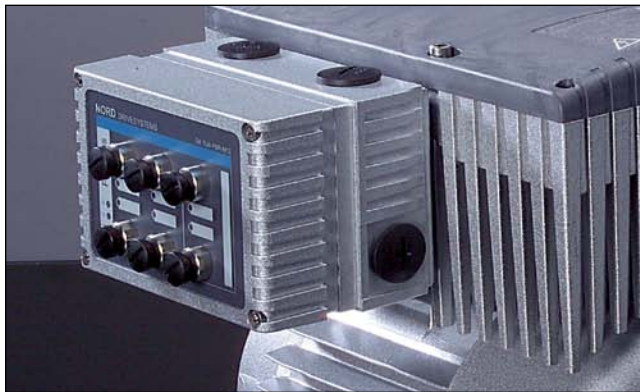


# External Customer Units



## Variable Mounting

For the distributed control SK 200E AC vector drives, optional technology units are available. These units may be mounted directly on the device or separately on the machine frame or plant component. Communication systems both with & without connection facilities for sensors, actuators and control modules are available for most current applications.



Technology unit mounted directly on the AC Vector Drive



Technology units for wall mounting

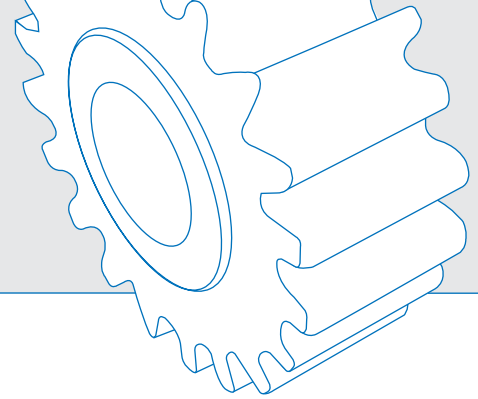
## Tunneling of Parameter Data Via the System BUS

The bus Technology Unit of the SK 200E provides economic and user-friendly configuration of the drive systems in the field. With the system bus, up to 4 AC vector drives and the bus technology unit can be linked via the system bus, which is integrated as standard. Therefore the connection to the host bus system is made at a single point. However, all data sets can be accessed by tunneling of the parameter data. Both the technology unit and the data sets of each of the connected SK 200E devices can be accessed via the RS 232 interface.

### Field bus (e.g. Profibus)



# External Technology Units



## Communication

External technology units are available for communication within an automation system and for recording sensor and actuator signals. Connection is either direct to a terminal or with M12 system connectors as required.

### Profibus



Bus module for the control, programming and diagnosis of the AC vector drive.



- Baud rate: Max. 12 MBaud
- Protocol: DPV 0 & DPV 1
- Access of up to 4 AC vector drives via system bus
- Provision of I/Os on the Profibus:  
-4x In / 2x Out
- Diagnosis via RS 232 (RJ12 Interface)
- Status LED: BG status, BG fault, DIN1, DIN2, Bus status, Bus fault

### CANopen

## CANopen

Bus module for the control, programming and diagnosis of the AC vector drive.



- Baud rate: Max. 1 MBaud
- Protocol: DS 301 and DS 402
- Access of up to 4 AC vector drives via system bus
- Electrically isolated
- Provision of I/Os on the CANbus:  
-4x In / 2x Out
- Diagnosis via RS 232
- Status LED: B6 status, B6 fault, DIN1, DIN2, Bus status, Bus fault

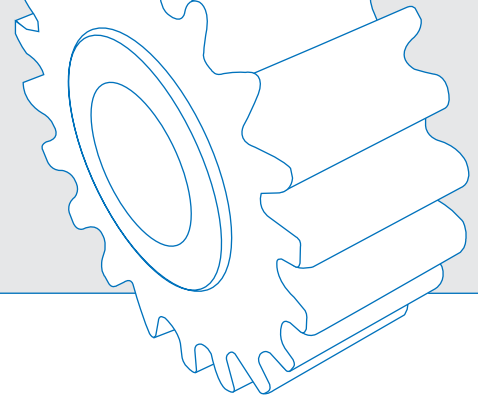
### DeviceNet

## DeviceNet

Bus module for the control, programming and diagnosis of the AC vector drive.



- Baud rate: Max. 500 kBaud
- Protocol: AC-Drive
- Access of up to 4 AC vector drives via system bus
- Electrically Isolated
- Provision of I/Os on the CANbus:  
-4x In / 2x Out
- Diagnosis via RS 232
- Status LED: B6 status, B6 fault, DIN1, DIN2, module status, module fault



## EtherCAT



An Ethernet based bus module for the control, programming and diagnosis of the AC vector drive.



- Baud rate: Max. 100 Mbaud
- Protocol: CoE
- Access of up to 8 AC vector drives via system bus
- Provision of I/Os on the Profibus: 8x In / 2x Out
- Diagnosis via RS 232
- Status LED: BG status, BG fault, DIN1, DIN2, Bus status, Bus fault

## ProfiNET



An Ethernet ProfiNET based bus module for the control, programming and diagnosis of the AC vector drive. Equipped with a RJ45 based connector that conforms to AIDA specification.



- Baud rate: Max. 100 Mbaud
- Protocol: ProfiNET IO Conformance class B
- Access of up to 8 AC vector drives via system bus
- Provision of I/Os on the Profibus: 8x In / 2x Out
- Diagnosis via RS 232
- Status LED: BG status, BG fault, DIN1, DIN2, Bus status, Bus fault

## I/O Extension

With the external I/O units sensor and actuator signals can be included in the distributed drive structures. These are transferred to the AC vector drive via the system bus. These can be used for a drive function or forwarded to a host bus system (e.g. Profibus).

One type of external I/O expansion provides a direct connection for four digital inputs (sensors) and two digital outputs (actuators). Because the design does not use connectors, the module is also suitable for harsh environments. With the other type of I/O extension module, the M12 version, there are M12 plug connectors in the front of the module. This enables the rapid replacement of connected sensors and actuators.

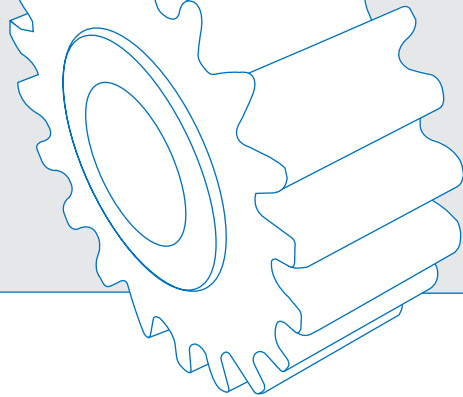


- Connection via system bus
- 4x digital inputs
- 2x digital outputs
- 2x analog inputs
- 1x analog output
- Status LEDs





# External Technology Units



## SK 200E as an Independent System

For independent applications, the SK 200E can be equipped with options which only require a power connection (e.g. 3~ 480V). For this, a 24VDC control module or a control element - the PotiBox - can be selected as an addition.

### 24V Control Power Module

This generates the internal control voltage (24V) from the available supply voltage (240V / 480V). A separate control power cable is not necessary. An analog input is available for the processing of setpoint values. Only available for the **SK2x5E**.



- 1x analog input
- Can be used for 2 SK200E AC vector drives

### Potentiometer Box

As an addition to the 24VDC control power module, the Potentiometer Box provides robust control elements for right-hand/ left-hand operation and a setpoint potentiometer. This version allows direct operation of the device.
















## Maintenance Switch

With this unit, you may switch off the supply of power or motor voltage to a drive and secure that drive against switching back on. This is very important when you are servicing or repairing a drive.

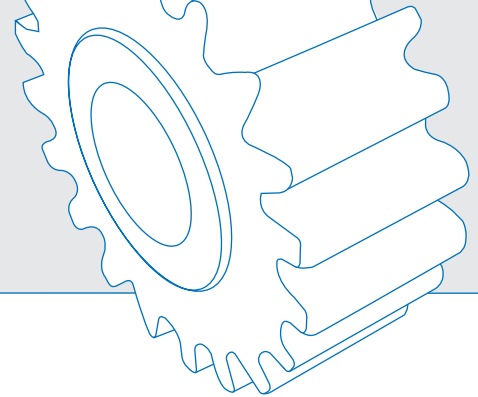


## External Customer Units Ordering Information

 	<b>Profibus Interface and Adapter</b>			
	<b>IP55 unit:</b> SK TU4-PBR (Part. No. 275 281 100) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit:</b> SK TU4-PBR-C (Part. No. 275 281 150) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
	<b>IP55 unit with M12 Connector:</b> SK TU4-PBR-M12 (Part. No. 275 281 200) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit with M12 Connector:</b> SK TU4-PBR-M12-C (Part. No. 275 281 250) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
 	<b>CANopen Interface and Adapter</b>			
	<b>IP55 unit:</b> SK TU4-CAO (Part. No. 275 281 101) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit:</b> SK TU4-CAO-C (Part. No. 275 281 151) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
	<b>IP55 unit with M12 Connector:</b> SK TU4-CAO-M12 (Part. No. 275 281 201) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit with M12 Connector:</b> SK TU4-CAO-M12-C (Part. No. 275 281 251) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
 	<b>DeviceNet Interface and Adapter</b>			
	<b>IP55 unit:</b> SK TU4-DEV (Part. No. 275 281 102) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit:</b> SK TU4-DEV-C (Part. No. 275 281 152) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
	<b>IP55 unit with M12 Connector:</b> SK TU4-DEV-M12 (Part. No. 275 281 202) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit with M12 Connector:</b> SK TU4-DEV-M12-C (Part. No. 275 281 252) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
	<b>EtherCAT Interface and Adapter</b>			
	<b>IP55 unit (M12):</b> SK TU4-ECT (Part. No. 275 281 117) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit (M12):</b> SK TU4-ECT-C (Part. No. 275 281 167) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
	<b>PROFINET Interface and Adapter</b>			
	<b>IP55 unit (RJ45):</b> SK TU4-PNT (Part. No. 275 281 115) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit (RJ45):</b> SK TU4-PNT-C (Part. No. 275 281 165) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
 	<b>I/O Extension Interface and Adapter</b>			
	<b>IP55 unit:</b> SK TU4-IOE (Part. No. 275 281 106) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit:</b> SK TU4-IOE-C (Part. No. 275 281 206) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
	<b>IP55 unit with M12 Connector:</b> SK TU4-DEV-M12 (Part. No. 275 281 202) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit with M12 Connector:</b> SK TU4-DEV-M12-C (Part. No. 275 281 252) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
	<b>24V Power Supply</b>			
	<b>IP55 unit 115/230V:</b> SK TU4-24V-123 (Part. No. 275 281 108) + SK TI4-TU-NET (Part. No. 275 280 100)		<b>IP66 unit 115/230V:</b> SK TU4-24V-123-C (Part. No. 275 281 158) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
	<b>IP55 unit 460V:</b> SK TU4-24V-140 (Part. No. 275 281 109) + SK TI4-TU-NET (Part. No. 275 280 100)		<b>IP66 unit 460V:</b> SK TU4-24V-140-C (Part. No. 275 281 159) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
	<b>Potentiometer Box</b>			
	<b>IP55 unit 115/230V:</b> SK TU4-POT-123 (Part. No. 275 281 110) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit 115/230V:</b> SK TU4-POT-123-C (Part. No. 275 281 160) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
	<b>IP55 unit 460V:</b> SK TU4-POT-140 (Part. No. 275 281 111) + SK TI4-TU-BUS (Part. No. 275 280 000)		<b>IP66 unit 460V:</b> SK TU4-POT-140-C (Part. No. 275 281 161) + SK TI4-TU-BUS-C (Part. No. 275 280 500)	
	<b>Maintenance Switch</b>			
	<b>IP55 unit:</b> SK TU4-MSW (Part. No. 275 281 123) + SK TI4-TU-BUS (Part. No. 275 280 200)		<b>IP66 unit:</b> SK TU4-MSW-C (Part. No. 275 281 173) + SK TI4-TU-BUS-C (Part. No. 275 280 700)	



# Control Units






## Operation, Display & Diagnostics

According to the application, there are various methods of controlling, programming or troubleshooting a SK 200E AC vector drive.

- Parameter Box
- Simple Box
- Setpoint Box
- Potentiometer Adapter
- PC/laptop with NORDCON software
- Dip-switches



## Control Units Ordering Info

	Parameter Box	
	SK PAR-3H (Handheld)	(275 281 014)
	SK PAR-3E (Cabinet Mount)	(275 281 414)
	Simple Box	
	SK CSX-3H (Handheld)	(275 281 013)
	SK CSX-3E (Cabinet Mount)	(275 281 413)
	Setpoint Box	
	SK SSX-3A	(275 281 513)



### Parameter Box

Control panel and plain text display for text-controlled commissioning, programming and control of the AC vector drive. 5 data sets can be stored. Direct connection to a PC is possible via USB. This option is available as a handheld or panel mount version.



### Simple Box

Control panel with 4-digit 7-segment display for rapid and direct programming and diagnosis.



### Setpoint Box

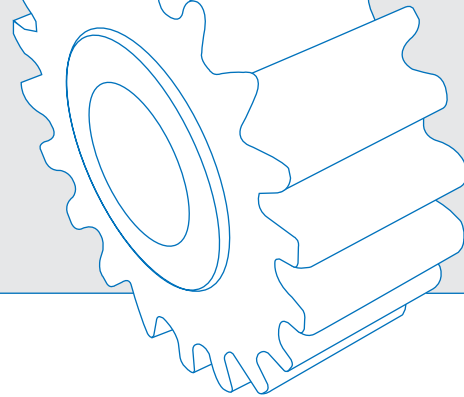
Control panel with 4-digit 7-segment display for rapid and direct programming and diagnosis. Used for local operation and may be installed permanently.







### Potentiometer Adapter

As an addition to the main unit, the Potentiometer Box provides robust control elements for right-hand/left-hand operation & a setpoint potentiometer. This version allows direct operation of the device.

# Direct Control

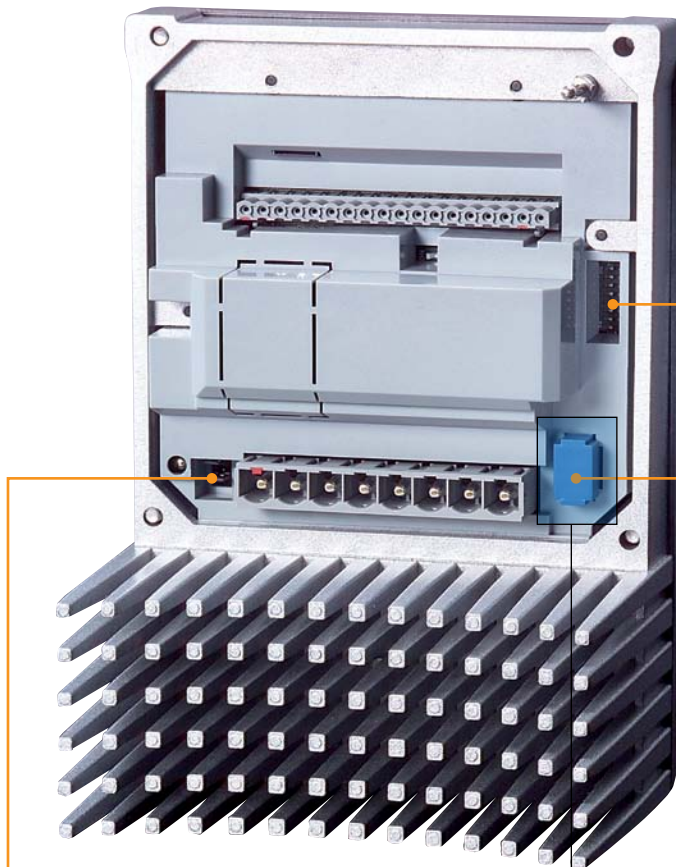
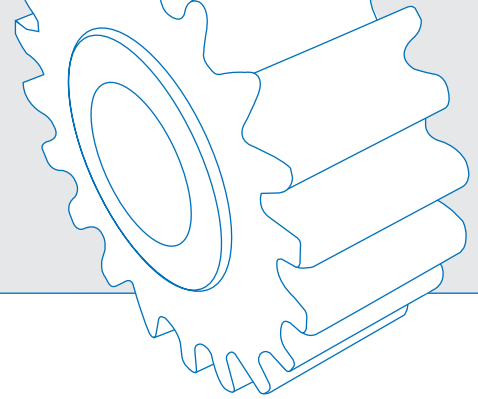


## Direct control via right/left switch and potentiometer

Potentiometer Option (Standard IP66)	
	<b>115/230V unit:</b> SK CU4-24V-123-B (Part. No. 275 271 108) + SK CU4-POT (Part. No. 275 271 207)
	<b>460V unit:</b> SK CU4-24V-140-B (Part. No. 275 271 109) + SK CU4-POT (Part. No. 752 71 207)
Potentiometer Technology Unit (Standard IP55, optionally IP66)	
	<b>115/230V unit:</b> SK TU4-POT-123-B (Part. No. 275 281 110) + SK TI4-TU-NET (Part. No. 275 280 100)
	<b>460V unit:</b> SK TU4-POT-140-B (Part. No. 275 281 111) + SK TI4-TU-NET (Part. No. 275 280 100)
External Potentiometer Unit (Standard IP66)	
	<b>115/230V unit:</b> SK CU4-24V-123-B (Part. No. 275 271 108) + SK POT1-1 (Part. No. 278 910 120)
	<b>460V unit:</b> SK CU4-24V-140-B (Part. No. 275 271 109) + SK POT1-1 (Part. No. 278 910 120)
Side Mounted Switches / Potentiometers (Standard IP66)	
	<b>115/230V unit:</b> SK TIE4-SWT (Part. No. 278 274 701) + SK TIE4-POT (Part. No. 278 274 700) + SK CU4-24V-123-B (Part. No. 275 271 108)
	<b>460V unit:</b> SK TIE4-SWT (Part. No. 278 274 701) + SK TIE4-POT (Part. No. 278 274 700) + SK CU4-24V-140-B (Part. No. 275 271 109)



# Selectable Configuration of Drive Functions



## Configuring Your Drive Functions

The SK 200E provides the possibility of setting the required drive functions from parameters stored in a plug-in EEPROM, or by means of dip-switches.

### Programming with dip-switches

The direct access to dip-switches for setting the functions provides two advantages. If the storage module for the device is not available on site, the AC vector drive can also be operated with reduced functionality by means of the dip-switch setting.

If only a low level of functionality with simple handling is required, there is no need for a storage module. The settings can be made directly, without programming accessories/tools.

### Plug-in EEPROM

All parameters, which can be changed with the Control Box or the NORDCON software, are stored in a plug-in EEPROM. If this module is plugged in, the settings which it contains are active. This module can be easily transferred to different devices to enable rapid commissioning or quick replacement.

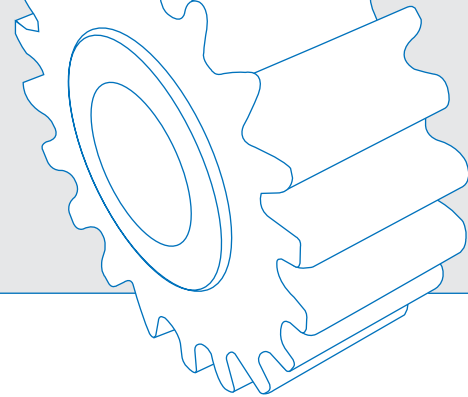
### Power network setting

The filtering of the AC vector drive may be selected with this jumper. This makes it possible to use the inverter in a non grounded voltage network, or under low leakage current operation (ground-fault circuit). This setting is for use on power sources that are not firmly referenced to ground potential.



**Plug-In EEPROM**





# Flexible Plug-in Systems

## System Connectors

The screw connections on the respective adapter unit may be fitted with system connectors for power, motor output, control as well as bus signals.

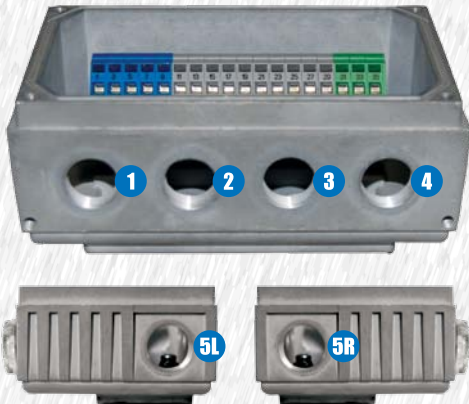
### Adapter Unit / AC Vector Drive



### Option Slots of the SK TI4-...-...

<b>3R or 3L</b>	2 x M25Screw Connections
<b>4R or 4L</b>	M16 Screw Connection
<b>5R or 5L</b>	M16 Screw Connection
<b>6R or 6L</b>	M16 Screw Connection
<b>7R or 7L</b>	M16 Screw Connection
<b>8R or 8L</b>	M16 Screw Connection

### Connection / Technology Unit



### Option Slots of the SK TI4-TU-...

<b>1</b>	M16 Screw Connection
<b>2</b>	M16 Screw Connection
<b>3</b>	M16 Screw Connection
<b>4</b>	M16 Screw Connection
<b>5R or 5L</b>	M20 Screw Connection

## System Connectors

#### Operation

SK TIE4-POT	Potentiometer	<b>3R or 3L</b>
SK TIE4-SWT	Switch L-O-R	

#### Bus System

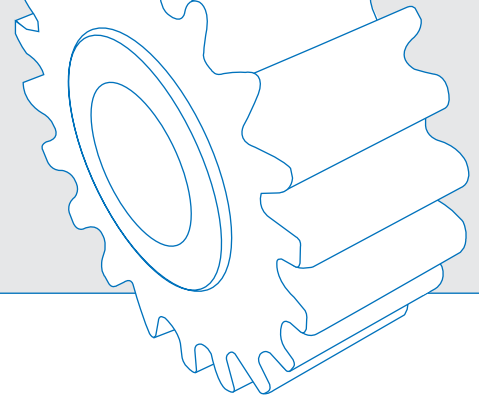
SK TIE4-M12-ASI	AS Interface	<b>4R or 4L</b> (Adapter Unit) or <b>1 - 4</b> (Connection Unit)
SK TIE4-M12-ASI-AUX	AS Interface	
SK TIE4-M12-CAO	CANopen	
SK TIE4-M12-PBR	Profibus	
SK TIE4-M12-SYSM	System Bus Master	
SK TIE4-M12-SYSS	System Bus Slave	

#### Control Signals

SK TIE4-M12-ANA	Analog Value	<b>5R or 5L</b> (Adapter Unit)
SK TIE4-M12-HTL	Incremental Encoder	
SK TIE4-M12-INI	Initiator	
SK TIE4-M12-POW	24V Supply	
SK TIE4-M12-SH	Safe Stop	

# SK 200E

## Status & Diagnostics



### Direct-access to diagnostic tools

A great advantage of a distributed control drive system is that the location of the AC vector drive is near the motor, which is extremely beneficial in large plant facilities. Therefore direct access to the drivesystem for monitoring and diagnosis is a great benefit. The diagnostic tools for the SK 200E are easily visible and accessible behind a transparent screw-on cover.



### SK 2X0E - Sizes 1-3

#### 1. RS 232 diagnostic interface

RJ 12 interface for connecting a cable to either a SimpleBox, ParameterBox or PC/laptop (NORDCON) for control, operation, programming and diagnosis.

#### 2. DIP Switches for Analog Inputs

2 DIP switches customized for optional voltage or current setpoint switching using the analog inputs.

#### 3. Status LED for Inverter and System bus

Diagnostic LEDs that are externally visible used to indicate attached device status.

### SK 2X5E & Size 4 of the SK 2X0E

#### 1. RS 232 diagnostic interface

RJ 12 interface for connecting a cable to either a SimpleBox, ParameterBox or PC/laptop (NORDCON) for control, operation, programming and diagnosis.

#### 2. Status-LEDs digital inputs and outputs

Externally visible LEDs to display the current status of the attached digital inputs and outputs. This considerably simplifies diagnosis of the drive status.

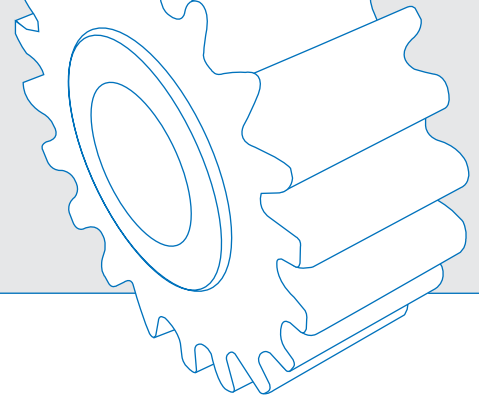
#### 3. Status-LEDs inverter/AS interface and Setpoint/Selection potentiometers

The status of the AC vector drive (ready for operation/fault) is visible from the outside of the unit by a series of LED signals. With the integrated AS interface option, an additional LED is used to display status. Additionally there are two potentiometers for immediate adjustment of a setpoint (e.g. speed setpoint and associated ramp).

#### \*. DIP Switches for Analog Inputs

DIP Switches on the size 4 of the SK2X0E are included and located internally.





## NORD CON

NORD CON is the free operating software for controlling, programming and diagnosis of all NORD AC vector drives.

### SK200E Interface Connection

Connecting a SK200E to a PC/laptop is the most effective way to control your AC Vector drive. Connection is accomplished via the RS232 diagnostic interface on top of the AC Drive. The cable does not come standard with the unit but is available. We can provide a 10 foot sub D to RJ12 connector cable but needs to be ordered separately. (Part Number 278 910 240)

### Control

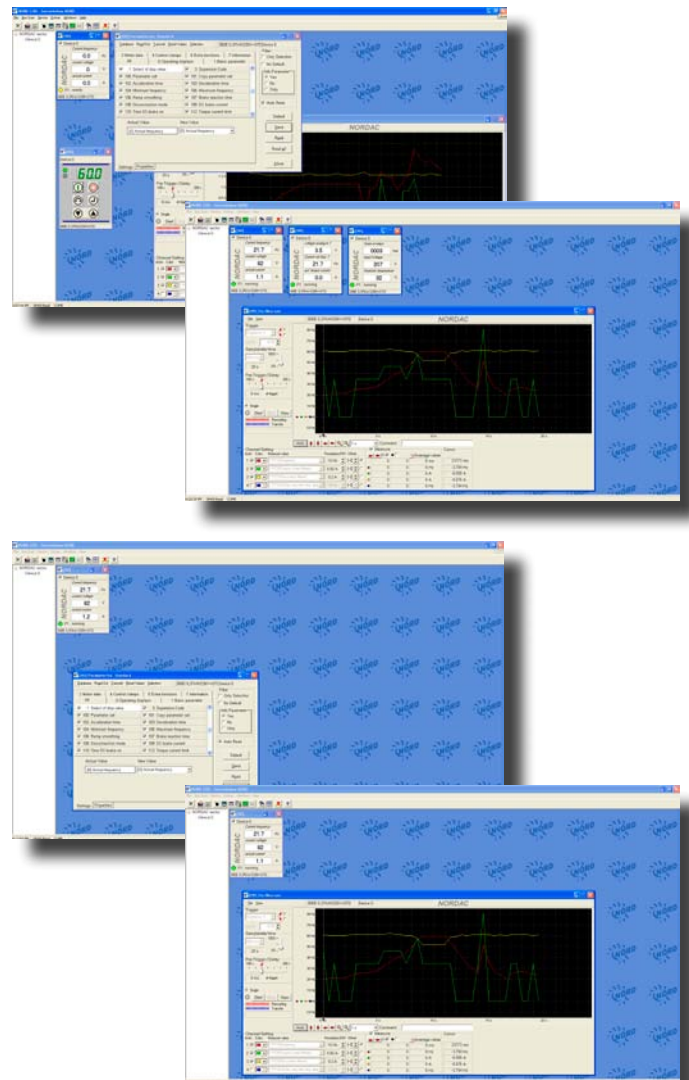
The AC vector drive can be manually operated by means of a software window with all of the operating elements of a Controlbox. An enable signal with specification of setpoint values can be given. The parameter settings can be adjusted and read. Parameters (information and error messages) can be viewed. Users therefore have a supporting aid for each commissioning.

### Programming

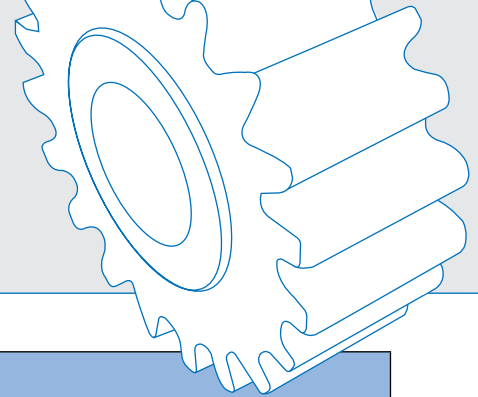
With a convenient overview, users can view and adjust each available parameter. By means of a print option complete parameter lists or lists of the changed values can be created. The finished data sets can be saved on the PC/laptop and archived for future use.

### Diagnosis

The NORD CON oscilloscope function is a simple but very useful instrument for the optimal adjustment of drive systems. By means of line graphs, all drive characteristics (current, torque, etc.) can be recorded and analysed. With these results, application-relevant settings can be fine-tuned to enable optimum operation. This is useful, e.g. for regulating the brake control or for lifting gear functions.



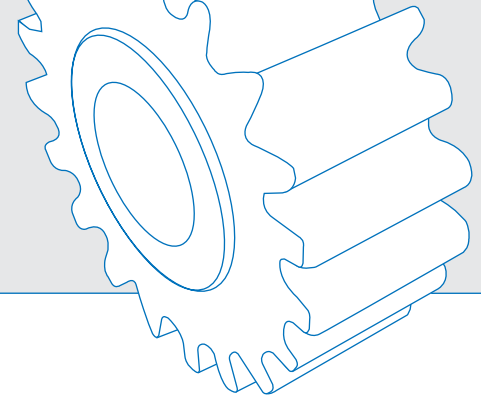
# General Specifications



Function		Specification		
Power / Voltage	SK2X0E	<ul style="list-style-type: none"> <li>1~100...120V -/+10%</li> <li>1~200...240V -/+10%</li> <li>3~200...240V -/+10%</li> <li>3~380...500V -20%/+10%</li> </ul>	0.33 - 1 hp 0.33 - 1.5 hp 0.33 - 15 hp 0.75 - 30 hp	(0.25 - 0.75 kW) (0.25 - 1.1 kW) (0.25 - 11 kW) (0.55 - 22 kW)
	SK2X5E	<ul style="list-style-type: none"> <li>1~200...240V -/+10%</li> <li>3~200...240V -/+10%</li> <li>3~380...500V -20%/+10%</li> </ul>	0.33 - 0.75 hp 0.33 - 5 hp 0.75 - 10 hp	(0.25 - 0.55 kW) (0.25 - 4 kW) (0.55 - 7.5 kW)
Input frequency rating tolerance		47 ... 63 Hz		
Output frequency		0.0 ... 400.0 Hz		
Pulse frequency		3.0 ... 16.0kHz, standard setting = 6kHz Power reduction > 8kHz for 115/230V device, > 6kHz for 400V device		
Rated overload capacity		150% for 60s, 200% for 3.5s		
Protective measures against		<ul style="list-style-type: none"> <li>Overheating of the frequency inverter</li> <li>Over/under-voltage</li> <li>Short circuit, earthing fault</li> <li>Over/underload, idling</li> </ul>		
Motor Turndown		<ul style="list-style-type: none"> <li>V/f Const Torque 10:1</li> <li>Sensorless Vector 30:1</li> <li>Closed Loop Vector 1000:1*</li> </ul>		
Motor temperature Monitoring		Temperature sensor (PTC), temperature monitor (bimetal), I <sup>2</sup> t- motor		
Digital input		4x, low 0-5V, high 14-30, R <sub>i</sub> = 9.5kΩ, C <sub>i</sub> = 10nF, cycle time = 4mc		
Electrical isolation		Control terminals		
Control Methods		<ul style="list-style-type: none"> <li>V/f Constant torque</li> <li>Energy saving mode</li> <li>Sensorless Vector (ISD)</li> <li>Closed-Loop Vector*</li> </ul>		
Control outputs		Digital output: 18-30V DC (according to VI 24V), maximum 200mA, maximum 100kΩ load Brake rectifier: maximum 0.5A voltage according to mains (1/2 Wave)		
Interfaces		Standard: RS 485 (USS), RS 232 (single slave), System Bus Optional: Profibus, CANopen, DeviceNet, AS Interface		
Energy Efficiency of AC drive		Approximately 95% according to size		
Ambient temperature		-25 ... +40°C (S1- 100% ED), -25 ... +50°C (S3 - 75% ED 15min)		
Storage & transport temp.		-25 ... +60 / 70°C		
Long term storage		<ul style="list-style-type: none"> <li>Connect the FI &amp; the 24V modules to the mains voltage for 60 min. before 1 storage year</li> <li>Connect the FI &amp; the 24V modules to the 24V control for 60 min. before 1 storage year</li> <li>Maintain this cycle throughout the storage period</li> </ul>		
Protection class		IP55, optional IP66		
Maximum mounting altitude above sea level		<ul style="list-style-type: none"> <li>Up to 1000m – No power reduction</li> <li>1000 - 4000m – 1% per 100m power reduction (up to 2000m overvoltage cat.3)</li> <li>2000 - 4000m – Overvoltage cat. 2 is maintained, external overvoltage protection at the mains input is necessary</li> </ul>		
Waiting period between power-up cycles		60 seconds for all devices in a normal operating cycle		
Accel / Decel Time		0.0 ... 320.0s		
Connection terminals		<ul style="list-style-type: none"> <li>Mains or motor / brake resistance - 4mm<sup>2</sup> with wiring sleeves, 6mm<sup>2</sup> with rigid cable</li> <li>Control unit / system bus - 2.5mm<sup>2</sup> with 1.5mm<sup>2</sup> wiring sleeves</li> <li>RS485 / RS232 - 1xRJ12 (6-pin)</li> </ul>		
Connection terminal screw tightening torque		1.2 - 10.5 Nm		
External 24V supply voltage**		18...30V DC, at least 200-800mA according to load		

\*Requires an HTL Output Encoder on the motor    \*\* Where Required

# Nomenclature Examples



## Frequency Inverter -Basic Device

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

IP protection Class:  
standard = IP55, C = "Coated" IP66

Radio Interference Filter:  
O = Without, A = Class A1, B = Class B1

Number of Mains Phases  
: 1xx = 1~phase, 3xx 3~phase

Mains Voltage:  
x12 = 115, x23 = 230V, x40 = 400/460V

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

Device nominal power:  
250 = 0.25kW, 370 = 0.37kW, 751 = 7.5kW

Device Series: SK200E, SK205E, SK210E, SK215E  
SK220E, SK225E, SK230E, SK235E



## Adapter Unit - Frequency Inverter

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

Wall Mounting Kit:  
-1 = SI + II, -2 = SIII

IP protection Class:  
standard = IP55, C = "Coated" IP66

Mains Connection:  
1 - 1~115/230V\*, 3 = 3~230/460V\*

Suitable device types:  
SK200E, SK205E, SK210E, SK215E  
SK220E, SK225E, SK230E, SK235E

Size: 1 = SI, 2 = SII, 3 = SIII

Device Series: SK TI4 = Adapter unit SK TI4

\* The voltage depends on the AC vector drive used.

## For Bus Module or I/O Extension

SK TU4 - CAO - (-C-M12)

M12 System Connector

IP protection Class  
standard = IP55, C = "Coated" IP66

Option Type: CAO = CANopen, PBR = Profibus,  
ECT = EtherCAT®, DEV = DeviceNET,  
IOE = I/O Erweiterung

Option Series: TU4 = External Technology Unit  
CU4 = Internal Customer Unit

## Adapter Unit - Technology Unit

SK TI4 - TU - BUS - (-C-WMK-TU)

Wall Mounting Kit:  
-1 = SI + II, -2 = SIII

IP protection Class:  
Standard = IP55, C = "Coated" IP66

Suitable Device Types:  
NET = Optional net module  
BUS = Optional bus module

Group: TU = Technology Unit

Device Series: SK TI4 = Adapter unit SK TI4

## For Mains Unit or Potentiometer Modules

SK TU4 - 24V - 123 - B - (-C)

IP protection Class:  
standard = IP55, C = "Coated" IP66

Radio Interference Filter: B = Class B1

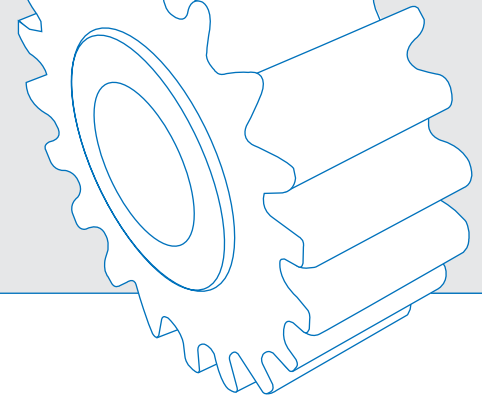
123 = 1~115/230V\*, 140 = 1~400/460V\*

Option Type 24V = 24V mains unit,  
POT = potentiometer/switch module

Option Series: TU4 = External Technology Unit  
CU4 = Internal Technology Unit

\* The voltage depends on the AC vector drive used.

# SK 2XOE Frame Size 1-3 Selection Guide

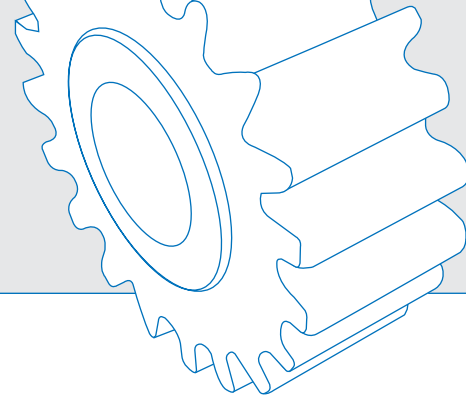


AC Vector Drive Selection			
Series	kW Ratings	Input Voltage	Protection Class
SK <b>1</b>	E- <b>2</b>	- <b>3</b>	<b>4</b>
<b>1 Series</b>			
200: Basic			
210: Basic + Safe Stop			
220: Basic + AS Interface			
230: Basic + Safe Stop + AS Interface			
<b>2 kW Rating</b>			
250: 0.25 kW (0.33 hp)			
370: 0.37 kW (0.50 hp)			
550: 0.55 kW (0.75 hp)			
750: 0.75 kW (1 hp)			
111: 1.11 kW (1.50 hp)			
151: 1.5 kW (2 hp)			
221: 2.2 kW (3 hp)			
301: 3.0 kW (4 hp)			
401: 4.0 kW (5 hp)			
551: 5.5 kW (7.5 hp)			
751: 7.5 kW (10.0 hp)			
<b>3 Input Voltage</b>			
123-A: 200-240V, 1-phase (0.25 - 1.1 kW)			
323-A: 200-240V, 3-phase (0.25 - 4.0 kW)			
340-A: 380-480V, 3-phase (0.75 - 7.5 kW)			
<b>4 Protection Class</b>			
Blank: IP55			
-C: IP66			

(if required)
<b>Programmer/Operation Device</b>
<input type="checkbox"/> SK CSX-3H: Simple Box (LED Display)
<input type="checkbox"/> SK PAR-3H: Parameter Box (LCD Plain Language Display)
<input type="checkbox"/> SK CSX-3E: Panel Mount Simple Box (LED Display)
<input type="checkbox"/> SK PAR-3E: Panel Mount Parameter Box (LCD Plain Lang Disp.)
<input type="checkbox"/> RJ12-SUB/D: PC Cable for NORDCON software

Motor Adapter Selection			
Frame Size	Series	# of Input Phases	Protection Class
SK T14 <b>5</b>	<b>1</b>	<b>6</b>	<b>4</b>
<b>5 Frame Size</b>			
Frame Size 1			
- 200-240V, 1-phase: 0.25 - 0.55 kW			
- 200-240V, 3-phase: 0.25 - 1.1 kW			
- 380-480V, 3-phase: 0.75 - 2.2 kW			
Frame Size 2			
- 200-240V, 3-phase: 1.5 - 2.2 kW			
- 380-480V, 3-phase: 3.0 - 4.0 kW			
Frame Size 3			
- 200-240V, 3-phase: 3.0 - 4.0 kW			
- 380-480V, 3-phase: 5.0 - 7.5 kW			
<b>6 # of Input Phases</b>			
1: 1-phase			
3: 3-phase			

(if required)			
Fieldbus/IO Extension Selection			
Module Type	Fieldbus/IO Option	M12 Connection Option	Protection Class
SK <b>7</b>	<b>8</b>	<b>9</b>	<b>4</b>
<b>7 Module Type (Internal External)</b>			
CU4: Internal Customer Unit			
TU4: External Customer Unit			
<b>8 Fieldbus, I/O Extension Module</b>			
PBR: Profibus Interface			
CAO: CANopen Interface			
DEV: DeviceNet Interface			
IOE: I/O Extension			
<b>9 M12 Connectors for Module I/O</b>			
Blank: Not Required			
CAO: CANopen Interface			



(if required)

### SK 2x0E-Specific Customer Unit Selection

200E-Specific Option

SK CU4 -

<b>10</b>	<b>200E-Specific Option</b>
<b>MBR:</b> Internal Brake Rectifier/Control (See note on brake coil volt.)	
<b>REL:</b> Bipolar Signal Conditioning (-10...+10V) and 2x Relay Outputs	

(if required)

### Technology Unit-Specific Option Selection

TU-Specific Option      Protection Class\*

SK TU4 -

\* Applies only to external "TU4" units

<b>11</b>	<b>Fieldbus, I/O Extension module</b>
<b>PNT:</b> ProfinNET Interface	
<b>ECT:</b> EtherCAT Interface	
<b>MSW:</b> Maintenance Switch	

(Required for all "SK TU-XXX" modules)

### Technology Unit Adapter Selection

Assembly Adapter for TU4\*      Protection Class\*

SK TI4-TU-

\* Applies only to external "TU4" units

<b>12</b>	<b>Assembly Adapter for TU4 Technology Units</b>
<b>BUS:</b> For all PBR, CAO, DEV, IOE, PNT & ECT Technology Units	
<b>MSW:</b> For the MSW Technology Unit	

(If required)

### Local Potentiometer Operator

☐ SK CU4-POT: Local Speed Pot and L/OFF/R Selector Switch

(If required)

### Dynamic Braking Resistor Selection

Assembly Adapter for TU4\*      Protection Class\*

SK

<b>13</b>	<b>Dynamic Braking Resistor Location</b>
<b>BRI4:</b> Internal	
<b>BRE4:</b> External	
<b>14</b>	<b>Dynamic Braking Resistor Rating</b>
<b>1-100-100:</b> 100-120V: 1-phase & 200-240V, 1-phase (all ratings)	
<b>1-200-100:</b> 200-240V: 3-phase (0.25-2.2 kW)	
<b>2-100-200:</b> 200-240V: 3-phase (3.0-4.0 kW)	
<b>1-400-100:</b> 380-480V: 3-phase (0.55-4.0 kW)	
<b>2-200-200:</b> 380-480V: 3-phase (5.5-7.5 kW)	

(If required)

### Wall Mount Adapter

Selection Code for Adapter

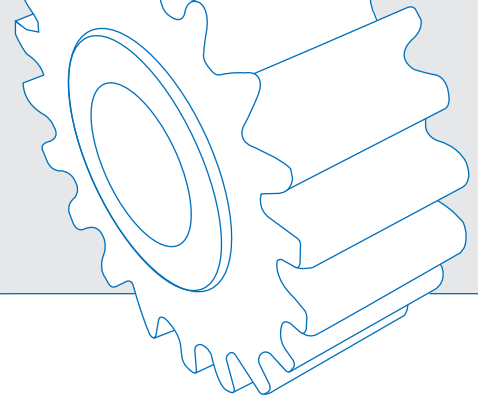
SK TIE4-WMK-

<b>15</b>	<b>Wall Mount Adapter Code</b>
<b>1:</b> For drive frame sizes 1 & 2**	
<b>2:</b> For drive frame sizes 3**	
<b>L-1:</b> Fan-cooled, For drive frame sizes 1-2**	
<b>L-2:</b> Fan-cooled, For drive frame sizes 3**	
<b>TU:</b> For external Technology Units	
<b>** See box 5 for frame sizes</b>	

Notes	
<ul style="list-style-type: none"> <li>• Motor Adapter is required for all drives.</li> <li>• Only 1 Internal CU4 customer unit may be installed per drive (with the exception of the SK CU4-POT).</li> <li>• Only one External TU4 technology unit (or SK CU4-POT) may be installed per drive.</li> <li>• Drive utilizes an internal 24Vdc power supply in order to operate. External 24dc power supplies must not be used with the SK2X0E series.</li> <li>• Required brake coil voltage if SKCU4-MBR is selected.</li> </ul>	
Line Voltage (AC)	Brake Coil Voltage (DC)
200-240	105
380-415	180
440-480	205

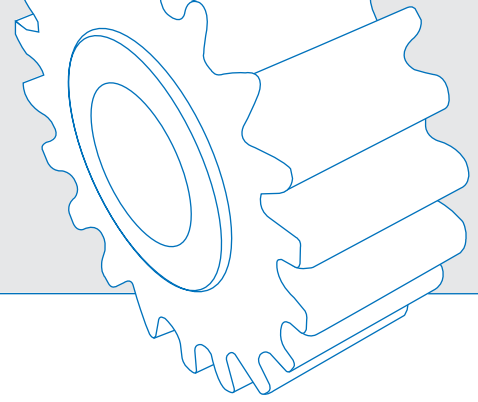


# SK 2X0E Frame Size 4 Selection Guide



AC Vector Drive Selection			
Series	kW Ratings	Input Voltage	Protection Class
SK <b>1</b>	E- <b>2</b>	- <b>3</b>	<b>4</b>
<b>1 Series</b>			
200: Basic			
210: Basic + Safe Stop			
220: Basic + AS Interface			
230: Basic + Safe Stop + AS Interface			
<b>2 kW Rating</b>			
551: 5.5 kW (7.5 hp)			
751: 7.5 kW (10.0 hp)			
112: 11.0 kW (15.0 hp)			
152: 15.0 kW (20 hp)			
182: 18.0 kW (25 hp)			
222: 22.0 kW (30 hp)			
<b>3 Input Voltage</b>			
323-A: 200-240V, 3-phase (5.5 - 11.0 kW)			
340-A: 380-480V, 3-phase (11.0 - 22.0 kW)			
<b>4 Protection Class</b>			
Blank: IP55			
-C: IP66			
<b>Motor Adapter Selection</b>			
Series	Input Voltage		
SK TI4 - 4 -			
<b>5 Input Voltage</b>			
323: 200-240V, 3-phase (5.5-11.0 kW)			
340: 380-480V, 3-phase (11.0 - 22.0 kW)			

(if required) Fieldbus/IO Extension Selection			
Module Type	Fieldbus/IOE Option	M12 Connection Option	Protection Class
SK <b>6</b>	<b>7</b>	<b>8</b>	<b>4</b>
<b>6 Module Type (Internal External)</b>			
CU4: Internal Customer Unit			
TU4: External Customer Unit			
<b>7 Fieldbus, I/O Extension Module</b>			
PBR: Profibus Interface			
CAO: CANopen Interface			
DEV: DeviceNet Interface			
IOE: I/O Extension			
<b>8 M12 Connectors for Module I/O</b>			
Blank: Not Required			
M12: M12 Connectors Included			
(if required) Programmer/Operation Device			
<input type="checkbox"/> SK CSX-3H: Simple Box (LED Display) <input type="checkbox"/> SK PAR-3H: Parameter Box (LCD Plain Language Display) <input type="checkbox"/> SK CSX-3E: Panel Mount Simple Box (LED Display) <input type="checkbox"/> SK PAR-3E: Panel Mount Parameter Box (LCD Plain Lang Disp.) <input type="checkbox"/> RJ12-SUB/D: PC Cable for NORDCON software			



(if required)

**SK 2x0E-Specific Customer Unit Selection**

200E-Specific Option

SK CU4 -

**9** 200E-Specific Option

REL: Bipolar Signal Conditioning (-10...+10V) and 2x Relay Outputs

(if required)

**Technology Unit-Specific Option Selection**

TU-Specific Option      Protection Class\*

SK TU4 -

\* Applies only to external "TU4" units

**10** Fieldbus, I/O Extension module

**PNT:** ProfinNET Interface

**ECT:** EtherCAT Interface

**MSW:** Maintenance Switch

(Required for all "SK TU-XXX" modules)

**Technology Unit Adapter Selection**

Assembly Adapter for TU4\*      Protection Class\*

SK TI4-TU-

\* Applies only to external "TU4" units

**1** Assembly Adapter for TU4 Technology Units

**BUS:** For all PBR, CAO, DEV, IOE, PNT & ECT Technology Units

**MSW:** For the MSW Technology Unit

(If required)

**Wall Mount Adapter**

Selection Code for Adapter

SK TIE4-WMK-

**12** Wall Mount Adapter Code

**3:** For drive frame sizes 4

**TU:** For external Technology Units

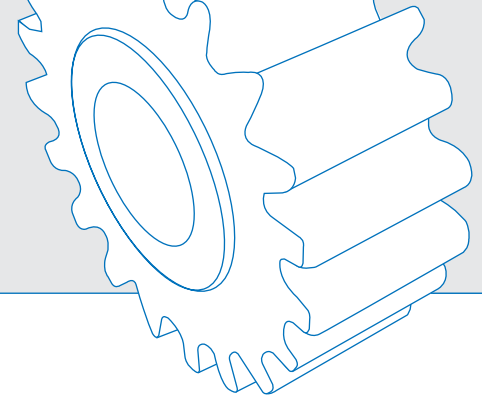
(If required)

**Local Potentiometer Operator**

☐ SK CU4-POT: Local Speed Pot and L/OFF/R Selector Switch

Notes	
<ul style="list-style-type: none"><li>• Motor Adapter is required for all drives.</li><li>• Only 1 Internal CU4 customer unit may be installed per drive (with the exception of the SK CU4-POT).</li><li>• Only one External TU4 technology unit (or SK CU4-POT) may be installed per drive.</li><li>• Drive utilizes an internal 24Vdc power supply in order to operate. External 24dc power supplies must not be used with the SK2X0E series.</li><li>• SK2x0E Frame size 4 Drives include a rectifier for DC motor brake applications. If a DC motor brake is used and controlled from the SK 2x0E rectifier the following coil voltages must be used:</li></ul>	
Line Voltage (AC)	Brake Coil Voltage (DC)
200-240	105
380-415	180
440-480	205

# SK 2X5E Selection Guide



## AC Vector Drive Selection

Series kW Ratings Input Voltage Protection Class  
SK ① E- ② - ③ ④

### ① Series

205: Basic

215: Basic + Safe Stop

225: Basic + AS Interface

235: Basic + Safe Stop + AS Interface

### ② kW Rating

250: 0.25 kW (0.33 hp)

370: 0.37 kW (0.50 hp)

550: 0.55 kW (0.75 hp)

750: 0.75 kW (1 hp)

111: 1.11 kW (1.50 hp)

151: 1.5 kW (2 hp)

221: 2.2 kW (3 hp)

301: 3.0 kW (4 hp)

401: 4.0 kW (5 hp)

551: 5.5 kW (7.5 hp)

751: 7.5 kW (10.0 hp)

### ③ Input Voltage

112-O: 100-120V, 1-phase (0.25 - 0.75 kW)

123-A: 200-240V, 1-phase (0.25 - 0.55 kW)

323-A: 200-240V, 3-phase (0.25 - 4.0 kW)

340-A: 380-480V, 3-phase (0.75 - 7.5 kW)

### ④ Protection Class

Blank: IP55

-C: IP66

(if required)

## Programmer/Operation Device

- ☐ SK CSX-3H: Simple Box (LED Display)
- ☐ SK PAR-3H: Parameter Box (LCD Plain Language Display)
- ☐ SK CSX-3E: Panel Mount Simple Box (LED Display)
- ☐ SK PAR-3E: Panel Mount Parameter Box (LCD Plain Lang Disp.)
- ☐ RJ12-SUB/D: PC Cable for NORDCON software

## Motor Adapter Selection

Frame Size Series # of Input Phases Protection Class  
SK T14 ⑤ ① ⑥ ④

### ⑤ Frame Size

#### Frame Size 1

- 100-120V, 1-phase: 0.25 - 0.37 kW
- 200-240V, 1-phase: 0.25 - 0.55 kW
- 200-240V, 3-phase: 0.25 - 1.1 kW
- 380-480V, 3-phase: 0.75 - 2.2 kW

#### Frame Size 2

- 100-120V, 1-phase: 0.55 - 0.75 kW
- 200-240V, 1-phase: 0.75 - 0.55 kW
- 200-240V, 3-phase: 1.5 - 2.2 kW
- 380-480V, 3-phase: 3.0 - 4.0 kW

#### Frame Size 3

- 200-240V, 3-phase: 3.0 - 4.0 kW
- 380-480V, 3-phase: 5.0 - 7.5 kW

### ⑥ # of Input Phases

1: 1-phase

3: 3-phase

(if required)

## 24Vdc Power Supply Selection

Module Type Module Input Voltage Protection Class\*  
SK ⑦ - 24V - ⑧ ④

\* Applies only to external "TU4" units

### ⑦ Module Type (Internal/External)

CU4: Internal Customer Unit

TU4: External Customer Unit

### ⑧ Module Input Voltage

123-B: All 100-120V & 200-240V Units

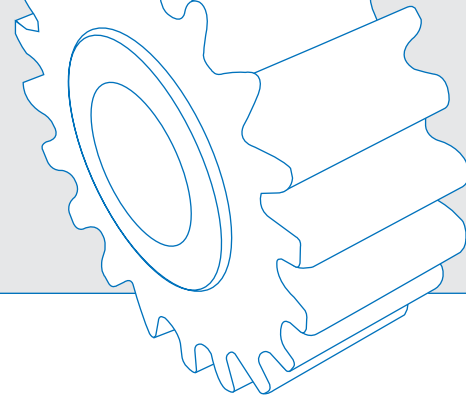
140-B: All 380-480V Units

(if required)

## Speed POT & L-O-R Switch

Module Type Module Input Voltage Protection Class\*  
SK ⑦ - POT - ⑧ ④

\* Applies only to external "TU4" units



(if required)

### Fieldbus/IO Extension Selection

Module Type	Fieldbus I/O Extension Module	M12 Connection Option*	Protection Class
SK <input style="width: 50px;" type="text" value="7"/>	<input style="width: 50px;" type="text" value="9"/>	<input style="width: 50px;" type="text" value="10"/>	<input style="width: 50px;" type="text" value="4"/>

\* Applies only to external "TU4" units

<b>9</b> <b>Fieldbus, I/O Extension Module</b>
<b>PBR:</b> Profibus Interface
<b>CAO:</b> CANopen Interface
<b>DEV:</b> DeviceNet Interface
<b>IOE:</b> I/O Extension
<b>10</b> <b>M12 Connectors for Module I/O</b>
<b>Blank:</b> Not Required
<b>M12:</b> M12 Connectors Included

(if required)

### Technology Unit-Specific Option Selection

TU-Specific Option	Protection Class*
SK TU4 - <input style="width: 50px;" type="text" value="11"/>	<input style="width: 50px;" type="text" value="4"/>

\* Applies only to external "TU4" units

<b>11</b> <b>Fieldbus, I/O Extension module</b>
<b>PNT:</b> ProfinNET Interface
<b>ECT:</b> EtherCAT Interface
<b>MSW:</b> Maintenance Switch

(Required for all "SK TU-XXX" modules)

### Technology Unit Adapter Selection

Assembly Adapter for TU4*	Protection Class*
SK TI4-TU- <input style="width: 50px;" type="text" value="12"/>	<input style="width: 50px;" type="text" value="4"/>

\* Applies only to external "TU4" units

<b>12</b> <b>Assembly Adapter for TU4 Technology Units</b>
<b>BUS:</b> For all PBR, CAO, DEV, IOE, PNT & ECT Technology Units
<b>NET:</b> For all 24V and POT Technology Units
<b>MSW:</b> For the MSW Technology Unit

(If required)

### Dynamic Braking Resistor Selection

Assembly Adapter for TU4*	Protection Class*
SK <input style="width: 50px;" type="text" value="13"/>	<input style="width: 50px;" type="text" value="14"/>

<b>13</b> <b>Dynamic Braking Resistor Location</b>
<b>BRI4:</b> Internal
<b>BRE4:</b> External
<b>14</b> <b>Dynamic Braking Resistor Rating</b>
<b>1-100-100: 100-120V:</b> 1-phase & 200-240V, 1-phase (all ratings)
<b>1-200-100: 200-240V:</b> 3-phase (0.25-2.2 kW)
<b>2-100-200: 200-240V:</b> 3-phase (3.0-4.0 kW)
<b>1-400-100: 380-480V:</b> 3-phase (0.55-4.0 kW)
<b>2-200-200: 380-480V:</b> 3-phase (5.5-7.5 kW)

(If required)

### Wall Mount Adapter

Selection Code for Adapter
SK TIE4-WMK- <input style="width: 50px;" type="text" value="15"/>

<b>15</b> <b>Wall Mount Adapter Code</b>
<b>1:</b> For drive frame sizes 1 & 2**
<b>2:</b> For drive frame sizes 3**
<b>L-1:</b> Fan-cooled, For drive frame sizes 1-2**
<b>L-2:</b> Fan-cooled, For drive frame sizes 3**
<b>TU:</b> For external Technology Units
** See box 5 for frame sizes

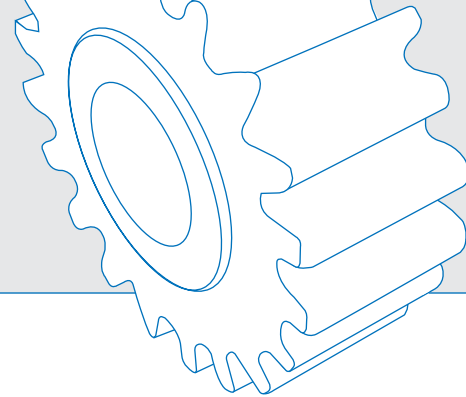
Notes	
<ul style="list-style-type: none"> <li>Motor Adapter is required for all drives.</li> <li>Only 1 Internal CU4 customer unit may be installed per drive (with the exception of the SK CU4-POT).</li> <li>Only one External TU4 technology unit (or SK CU4-POT) may be installed per drive.</li> <li>SK CU4-POT requires module with analog input. SK CU4-24V-1XX-B or SK CU4-IOE must be included.</li> <li>Drive requires 24Vdc control power in order to operate. The 24Vdc control power may be supplied from an external source or from one of the 24Vdc power supply option modules.</li> <li>If a DC motor brake is used and controlled from the SK 2x0E rectifier the following coil voltages must be used:</li> </ul>	
Line Voltage (AC)	Brake Coil Voltage (DC)
100-120	105
200-240	105
380-415	180
440-480	205



# AC Vector Drive Ratings

## SK 2XXE - 1 ~ 100...120V

## and 1 ~ 200...240V



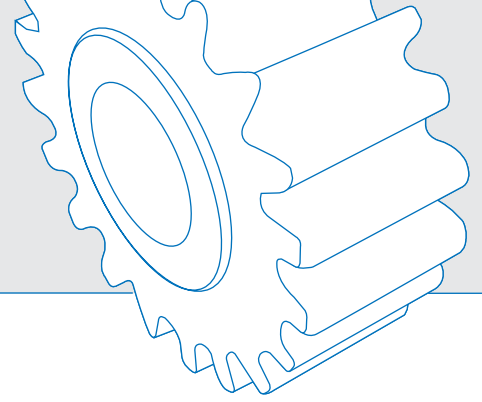
	AC Vector Drive type SK 2xxE...	SK 2X0E	SK 2X5E	Size	Input voltage	Output voltage	
<b>1 ~ 100 ... 120V</b>	-250-112-O (-C)		☑	1	1 ~ 100...120V -/+10% 47...63Hz	3 AC 0-200...240V	
	-370-112-O (-C)		☑	1			
	-550-112-O (-C)		☑	2			
	-750-112-O (-C)		☑	2			

	AC Vector Drive type SK 2xxE...	SK 2X0E	SK 2X5E	Size	Input voltage	Output voltage	Non
<b>1 ~ 200 ... 240V</b>	-250-123-A (-C)	☑	☑	1	1 ~ 200...240V -/+10% 47...63Hz	3 AC 0-200...240V	
	-370-123-A (-C)	☑	☑	1			
	-550-123-A (-C)	☑	☑	1			
	-750-123-A (-C)		☑	2			
	-111-123-A (-C)		☑	2			

Standard - IP55

(-C) - IP66

☑ - Available

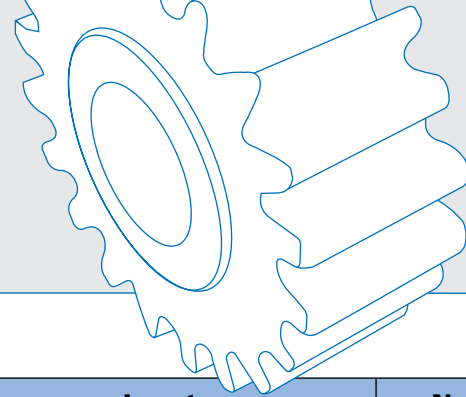


Nominal motor power 230V [kW]	Nominal motor power 230V [hp]	Nominal output current rms [A]	Typical input current rms [A]
0.25	$\frac{1}{3}$	1.7	8.9
0.37	$\frac{1}{2}$	2.2	11
0.55	$\frac{3}{4}$	3.0	13.1
0.75	1	4.0	20

Nominal motor power 230 V [kW]	Nominal motor power 230 V [hp]	Nominal output current rms [A]	Typical input current rms [A]
0.25	$\frac{1}{3}$	1.7	3.9
0.37	$\frac{1}{2}$	2.2	5.8
0.55	$\frac{3}{4}$	3.0	7.3
0.75	1	4.0	10.2
1.1	$1\frac{1}{2}$	5.5	14.7

# AC Vector Drive Ratings

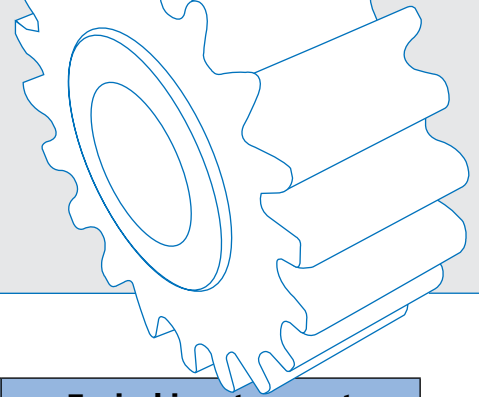
## SK 2XXE - 3 ~ 200...240V and 3 ~ 380...500V



	AC Vector Drive type SK 2xxE...	SK 2X0E	SK 2X5E	Size	Input voltage	Nominal 23
<b>3 ~ 200 ... 240V</b>	-250-323-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1	3 ~ 200...240V -/+10% 47...63Hz	
	-370-323-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1		
	-550-323-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1		
	-750-323-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1		
	-111-323-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1		
	-151-323-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2		
	-221-323-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2		
	-301-323-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3		
	-401-323-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3		
	-551-323-A (-C)	<input checked="" type="checkbox"/>		4		
	-751-323-A (-C)	<input checked="" type="checkbox"/>		4		
	-112-323-A (-C)	<input checked="" type="checkbox"/>		4		
	AC Vector Drive type SK 2xxE...	SK 2X0E	SK 2X5E	Size	Input voltage	Nominal 40
<b>3 ~ 380 ... 500V</b>	-550-340-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1	3 ~ 380...500V -20%/+10% 47...63Hz	
	-750-340-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1		
	-111-340-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1		
	-151-340-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1		
	-221-340-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1		
	-301-340-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2		
	-401-340-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2		
	-551-340-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3		
	-751-340-A (-C)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3		
	-112-340-A (-C)	<input checked="" type="checkbox"/>		4		
	-152-340-A (-C)	<input checked="" type="checkbox"/>		4		
	-182-340-A (-C)	<input checked="" type="checkbox"/>		4		
	-222-340-A (-C)	<input checked="" type="checkbox"/>		4		

Standard - IP55

(-C) - IP66 (On Size 4 Models the AC Vector drive is IP66 but the fan on



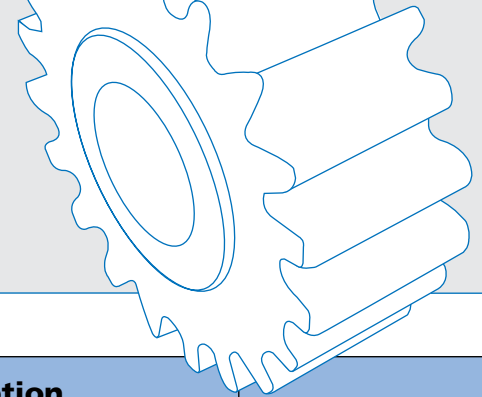
Nominal motor power 30V [kW]	Nominal motor power 230V [hp]	Nominal output current rms[A]	Typical input current rms[A]
0.25	$\frac{1}{3}$	1.7	1.4
0.37	$\frac{1}{2}$	2.2	1.9
0.55	$\frac{3}{4}$	3.0	2.6
0.75	1	4.0	3.5
1.1	$1\frac{1}{2}$	5.5	5.1
1.5	2	7.0	6.6
2.2	3	9.5	9.1
3.0	4	12.5	11.8
4.0	5	16.0	15.1
5.5	$7\frac{1}{2}$	23.0	23.5
7.5	10	29.0	29.5
11.0	15	40.0	40.5









Nominal motor power 300V [kW]	Nominal motor power 460V [hp]	Nominal output current rms[A]	Typical input current rms[A]
0.55	$\frac{3}{4}$	1.7	1.6
0.75	1	2.3	2.2
1.1	$1\frac{1}{2}$	3.1	2.9
1.5	2	4.0	3.7
2.2	3	5.5	5.7
3.0	4	7.5	7.0
4.0	5	9.5	8.3
5.5	$7\frac{1}{2}$	12.5	11.7
7.5	10	16	15.0
11.0	15	23.0	23.6
15.0	20	32.0	32.0
18.5	25	40.0	40.5
22.0	30	46.0	46.5




also offers IP55 ratings)

☒ - Available

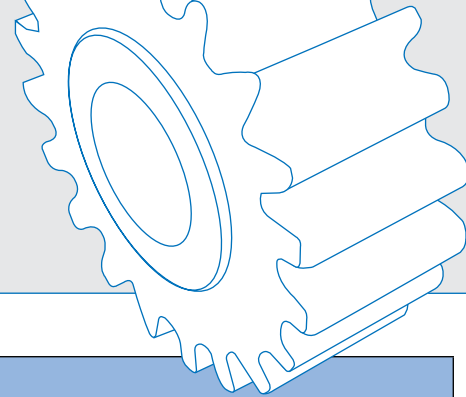
# Operator Interface Customer Units



	Customer Units	Option Type	Part Numbers
24V Control power		24V control power module SK CU4-24V-123 SK CU4-24V-140	275 271 108 (115/230V) 275 271 109 (460V)
Communication		ProfiBus SK CU4-PBR	275 271 000
		DeviceNET SK CU4-DEV	275 710 002
		CANopen SK CU4-CAO	275 271 001
		Setpoint Converter SK CU4-REL	275 271 011
		Electronic Brake Rectifier SK CU4-MBR	275 271 010
I/O extension		I/O extension SK CU4-IOE	275 271 006
Poti-Adapter		Potentiometer Adapter SK CU4-POT	275 271 207

Operator Interface	Option Type	Part Numbers
	ParameterBox SK PAR-3H SK PAR-3E	275 281 014 (Handheld) 275 281 414 (Panel Mount)
	SimpleBox SK CSX-3H SK CSX-3E	275 281 013 (Handheld) 275 281 413 (Panel Mount)
	Setpoint Box SK SSX-3A	275 281 513
	Adapter Kit SK TIE4-SSX-3A ADAPTERKIT	275 274 910

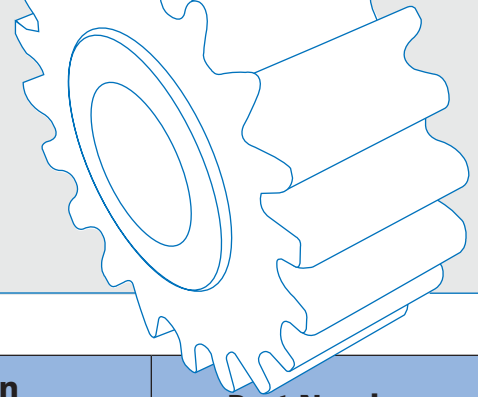

















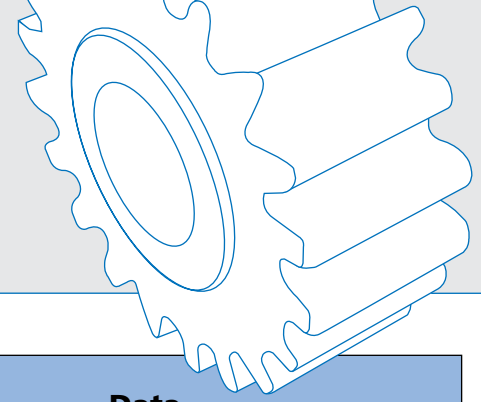
	Description	Data
	This generates the internal control voltage (24V) from the available supply voltage (240V / 480V).	Mains unit 1~ 115 / 240V → 24V, 1~ 480V → 24V, 1x analog input 1x pulse output
	Bus module for the control, programming and diagnosis of the AC vector drive via ProfiBus.	Baud rate: Max. 12 Mbaud Protocol: DPV 0 and DPV 1 2x digital inputs
	Bus module for the control, programming and diagnosis of the AC vector drive via DeviceNET.	Baud rate: Max. 500 kbaud Protocol: AC-Drive 2x digital inputs
	Bus module for the control, programming and diagnosis of the AC vector drive via CANopen.	Baud rate: Max. 1 Mbaud Protocol: DS 301 and DS 402 2x digital inputs
	Module for bipolar setpoint signals and relay changeover contacts.	2x analog inputs / 2x analog outputs 2x digital inputs, 2x relay outputs 100mA (≤30 VDC) Max permissible relay current
	Module for electronic control of an electromagnetic brake.	Mains Voltage 230V/460 1x Digital input, 1x Digital output 0.5A Max permissible relay current, suppression Lv. 2
	I/O module for the provision of digital inputs and outputs in the field.	2x digital inputs 2x analog inputs / 1x analog output
	For the inclusion of switching/potentiometer control elements directly to the SK 200E. Connection to internal 24V mains unit	1x switch, Left/Off/Right 1x continuously variable potentiometer 0-100%

	Description	Data
d) (int)	Control panel and plain text display for text-controlled commissioning, programming and control of the AC vector drive.	Plain text display 6 languages 5 data sets can be stored
d) (int)	Control panel with 4-digit 7-segment display for rapid and direct programming and diagnosis.	4-digit, 7-segment display No data sets can be stored
	Control panel with 4-digit 7 segment display for rapid and direct programming and diagnosis. Used for local operation and may be installed permanently.	4-digit, 7-segment display
	Mounting Bracket and cable for Installing the setpoint box on the side of the SK 200E.	N/A

# External Technology Units

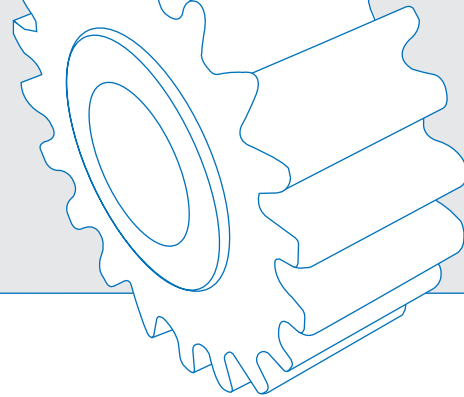


	Technology Units	Option Type	Part Numbers
Operation		<b>PotentiometerBox</b> SK TU4-POT-123 SK TU4-POT-140	275 281 110 (115/230V - IP55) 275 281 160 (115/230V - IP66) 275 281 111 (460V - IP55) 275 281 161 (460V - IP66)
24V Control power		<b>24V mains unit</b> SK TU4-24V-123-B SK TU4-24V-140-B	275 281 108 (115/230V - IP55) 275 281 158 (115/230V - IP66) 275 281 109 (460V - IP55) 275 281 159 (460V - IP66)
Communication		<b>Profibus</b> SK TU4-PBR SK TU4-PBR-C	275 281 100 (IP55) 275 281 150 (IP66)
		<b>ProfiBus M12</b> SK TU4-PBR-M12 SK TU4-PBR-M12-C	275 281 200 (IP55 - M12) 275 281 250 (IP66 - M12)
		<b>DeviceNET</b> SK TU4-DEV SK TU4-DEV-C	275 281 102 (IP55) 275 281 152 (IP66)
		<b>DeviceNET M12</b> SK TU4-DEV-M12 SK TU4-DEV-M12-C	275 281 202 (IP55 - M12) 275 281 252 (IP66 - M12)
		<b>CANopen</b> SK TU4-CAO SK TU4-CAO-C	275 281 101 (IP55) 275 281 151 (IP66)
		<b>CANopen M12</b> SK TU4-CAO-M12 SK TU4-CAO-M12-C	275 281 201 (IP55 - M12) 275 281 251 (IP66 - M12)
		<b>EtherCAT</b> SK TU4-ECT SK TU4-ECT-C	275 281 117 (IP55 - M12) 275 281 167 (IP66 - M12)
		<b>ProfiNET</b> SK TU4-PNT SK TU4-PNT-C	275 281 115 (IP55 - RJ45) 275 281 165 (IP66 - RJ45)
I/O Extension		<b>I/O Extension</b> SK TU4-IOE SK TU4-IOE-C	275 281 106 (IP55) 275 281 206 (IP66)
		<b>I/O extension with M12</b> SK TU4-IOE-M12 SK TU4-IOE-M12-C	275 281 202 (IP55 - M12) 275 281 252 (IP66 - M12)
Disconnect		<b>Disconnect (Maint. Switch)</b> SK TU4-MSW SK TU4-MSW-C	275 281 123 (IP55) 275 281 173 (IP66)



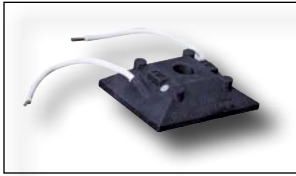
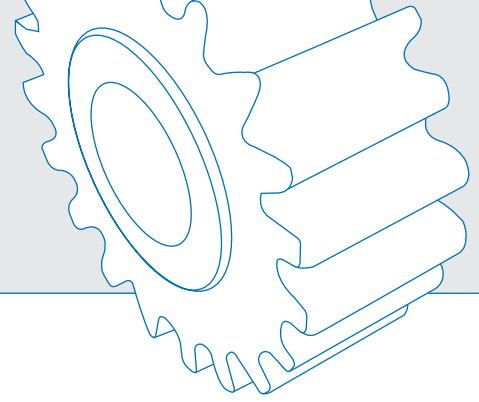
	Description	Data
P55) P66)	PotentiometerBox for direct control on the device. Robust control elements enable the drive to be switched on in both directions and speed control. This generates the internal control voltage (24V)	3 buttons, Right/Left/Off Potentiometer
P55) P66)	This generates the internal control voltage (24V) from the available supply voltage (115V / 240V / 480V).	Mains unit 1~ 115 / 240V → 24V, 1~ 480V → 24V, 1x analog input, 1x pulse output Can also be used for 2 devices
	Bus module for the control, programming and diagnosis of the AC vector drive via ProfiBus.	Baud rate: Max. 12 MBaud Protocol: DPV 0 and DPV 1 4x digital In, 2x digital Out
	Bus module for the control, programming and diagnosis of the AC vector drive via ProfiBus. M12 plug connector for connecting sensors and actuators.	Baud rate: Max. 12 MBaud Protocol: DPV 0 and DPV 1 4x digital In, 2x digital Out to M12
	Bus module for the control, programming and diagnosis of the AC vector drive via DeviceNET.	Baud rate: Max. 500 kBaud Protocol: AC-Drive 4x digital In, 2x digital Out
	Bus module for the control, programming and diagnosis of the AC vector drive via DeviceNET. M12 plug connector for connecting sensors and actuators.	Baud rate: Max. 500 kBaud Protocol: AC-Drive 4x digital In, 2x digital Out to M12
	Bus module for the control, programming and diagnosis of the AC vector drive via CANopen.	Baud rate: Max. 1 MBaud Protocol: DS 301 and DS 402 4x digital In, 2x digital Out
	Bus module for the control, programming and diagnosis of the AC vector drive via CANopen. M12 plug connector for connecting sensors and actuators.	Baud rate: Max. 1 MBaud Protocol: DS 301 and DS 402 4x digital In, 2x digital Out to M12
	Ethernet Based Bus module for the control, programming and diagnosis of the AC vector drive via EtherCAT	Baud Rate: Max 100MBaud Supported Profiles: CoE 8x digital in, 2x digital out
	Ethernet Based Bus module for the control, programming and diagnosis of the AC vector drive via ProfiNET. RJ45 connector to AIDA specifications.	Baud Rate: 100MBaud Protocol: ProfiNET IO conformance class B 8x digital in, 2x digital out
	I/O module for the provision of digital inputs and outputs in the field. Connection via system bus	4x digital inputs / 2x digital outputs 2x analog inputs / 1x analog output
	I/O module for the provision of digital inputs and outputs in the field. Connection via system bus M12 plug connector for connecting sensors and actuators.	4x digital inputs / 2x digital outputs 2x analog inputs / 1x analog output to M12
	Lockable Service/Repair Switch	3 LEDs for Active Phases 16Amps Max permissible current

# Internal Braking Resistors



## Internal brake resistors

Inverter type SK 2xxE...		Resistor type	Part number
1~ 115V	... -250-112-O to ... -750-112-O	SK BRI 4- 1-100-100	275 272 005
1~ 240V	... -250-123-A to ... -111-123-A	SK BRI 4- 1-100-100	275 272 005
3~240V	... -250-323-A to ... -221-323-A	SK BRI 4- 1-200-100	275 272 008
	... -301-323-A to ... -401-323-A	SK BRI 4- 2-100-200	275 272 105
	... -551-323-A to ... -751-323-A	SK BRI 4- 3-047-300	275 272 201
	... -112-323-A	SK BRI 4- 3-023-600	275 272 800
3~480V	... -550-340-A to ... -401-340-A	SK BRI 4- 1-400-100	275 272 012
	... -551-340-A to ... -751-340-A	SK BRI 4- 2-200-200	275 272 108
	... -112-340-A to ... -152-340-A	SK BRI 4- 3-100-300	275 272 205
	... -182-340-A to ... -222-340-A	SK BRI 4- 3-050-600	275 272 801



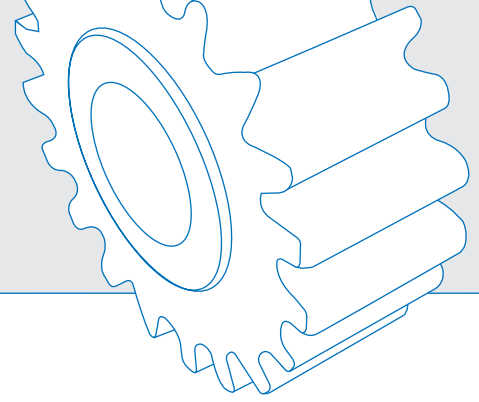
Internal brake resistor

	<b>Resistance [Ω]</b>	<b>Continuous rating [W]</b>	<b>Energy consumption*) [kWs]</b>
	100	100	1.0
	100	100	1.0
	200	100	1.0
	100	200	2.0
	47	300	3.0
	23	600	6.0
	400	100	1.0
	200	200	2.0
	100	300	3.0
	50	600	6.0

\*) Permissible max. once within 120 seconds

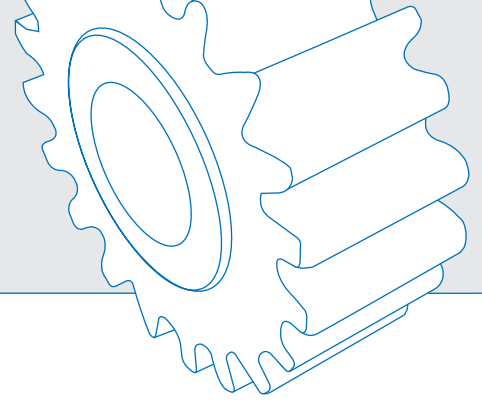


# External Braking Resistors



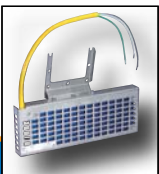
## External brake resistors

Inverter type SK 2xxE		Resistor type	Part number
1~ 115V	... -250-112-O to ... -750-112-O	SK BRE 4- 1-100-100	275 273 005
		Alternative: SK BRE 4- 2-100-200	275 273 105
1~ 240V	... -250-123-A to ... -111-123-A	SK BRE 4- 1-100-100	275 273 005
		Alternative: SK BRE 4- 2-100-200	275 273 105
3~240V	... -250-323-A to ... -221-323-A	SK BRE 4- 1-200-100	275 273 008
		Alternative: SK BRE 4- 2-200-200	275 273 108
	... -301-323-A to ... -401-323-A	SK BRE 4- 2-100-200	275 273 105
	... -551-323-A to ... -112-323-A	SK BRE 4- 3-050-450	275 273 201
3~480V	... -550-340-A to ... -401-340-A	SK BRE 4- 1-400-100	275 273 012
		Alternative: SK BRE 4- 2-200-200	275 273 108
	... -551-340-A to ... -751-340-A	SK BRE 4- 2-200-200	275 273 108
	... -112-340-A to ... -222-340-A	SK BRE 4- 3-050-450	275 273 201



	<b>Resistance [Ω]</b>	<b>Continuous rating [W]</b>	<b>Energy consumption*) [kW]</b>
	100	100	2.2
	100	200	4.4
	100	100	2.2
	100	200	4.4
	200	100	2.2
	200	200	4.4
	100	200	4.4
	50	450	9.0
	400	100	2.2
	200	200	4.4
	200	200	4.4
	50	450	9.0

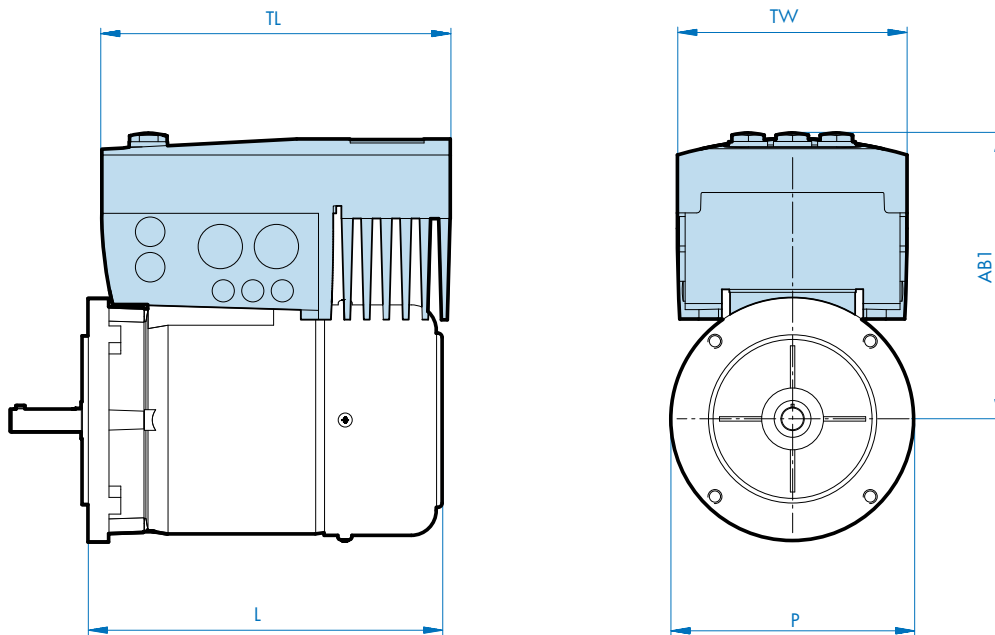
\*) Permissible max. once within 120 seconds



External brake resistor

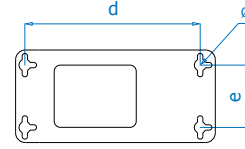
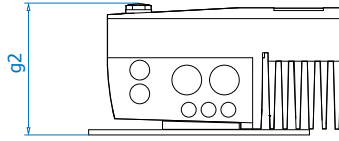
# Dimensions

## Motor Dimensions with SK 200E Motor Mounted AC Vector Drive



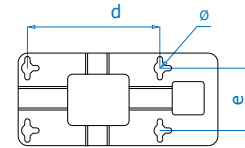
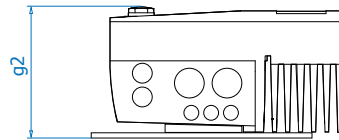
AC Vector Drive Size	Motor	Width		Length		AB1 [in]	Weight [lbs]
		P [in]	TW [in]	L [in]	TL [in]		
Size 1	71S/L	5.71	6.14	8.43	9.29	7.91	6.61
	80S/L	6.50		9.29		7.68	
	90S/L	7.20		10.87		7.87	
	100L/LA	7.91		12.05		8.23	
Size 2	80S/L	6.50	6.93	9.29	10.47	7.95	9.04
	90S/L	7.20		10.87		8.15	
	100L/LA	7.91		12.05		8.58	
	112M	8.98		12.83		8.98	
Size 3	100L/LA	7.91	8.58	12.05	12.99	9.88	15.21
	112M	8.98		12.83		10.28	
	132S/M	10.47		16.18		10.31	
Size 4	132S/M	10.47	12.01	16.18	18.90	12.32	37.48
	160M/L	12.60		19.37		12.52	
	180MX/LX	14.09		24.17		13.19	

## SK 200E Wall Mount Dimensions



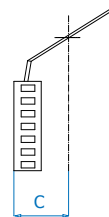
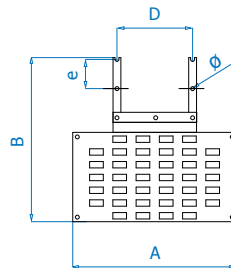
Device Type Size	Part Number	Wall Mounting SKTIE4 WMK-1 & SKTIE4 WMK-2			Total Weight Approx. [lb]
		d	e	Ø	
Size 1 → SK TIE4-WMK-1	275 274 000	7.087	2.52	0.217	7.7
Size 2 → SK TIE4-WMK-1	275 274 000	7.087	2.52	0.217	10.1
Size 3 → SK TIE4-WMK-2	275 274 001	8.287	2.41	0.217	16.5
Size 4 → SK TIE4-WMK-3	275 274 003	10.039	3.94	0.335	41.8

## SK 200E Wall Mount with Fan Dimensions



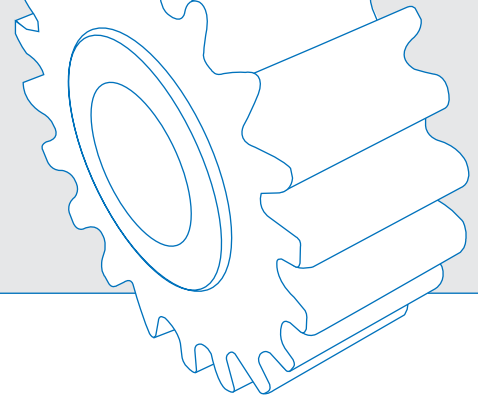
Device Type Size	Part Number	Wall Mounting SKTIE4 WMK-1 & SKTIE4 WMK-2			Total Weight Approx. [lb]
		d	e	Ø	
Size 1 → SK TIE4-WMK-L-1	275 274 000	7.283	3.94	0.217	7.3
Size 2 → SK TIE4-WMK-L-1	275 274 000	7.283	3.94	0.217	9.7
Size 3 → SK TIE4-WMK-2	275 274 001	8.268	4.72	0.217	16.1

## SK 200E External Brake Resistor Dimensions



Resistor Type	Size	Fixing Dimensions					
		A	B	C	D	e	Ø
SK BRE4-1-100-100 SK BRE4-1-200-100 SK BRE4-1-400-100	Size 1	5.91	7.09	2.36	3.27	1.26	0.17
SK BRE4-2-100-200 SK BRE4-2-200-200	Size 2	7.09	7.09	2.36	3.27	1.26	0.17
SK BRE4-3-050-450	Size 3	13.98	12.50	4.82	4.92	2.85	0.33

# NORD Electronic Drivesystems



## Drive electronics from Aurich

NORD Electronic Drivesystems, a subsidiary of Getriebebau NORD in Bargteheide, has had a production facility in Aurich since 1984. At the end of 2005 the new factory in Aurich / Schirum started operation. Here, 110 employees produce drive electronics such as AC vector drives, distributed control drive technology and servo controllers. The products are produced for sale throughout the world by Getriebebau NORD.



**High speed SMD assembly plant**

The production process is divided into two main sections. The first is the production of PCBs. Electronic components are mounted on a board/PCB, soldered and subjected to a functional inspection. With this the starting material for the second stage, the final assembly, is complete. The final assembly ends with the corresponding inspection of the device. Then the finished products are sent for shipping.

The strategy of great depth of production, coupled with modern and efficient production methods has a great influence on the delivery performance, which at present is 98%. Standard AC vector drives are supplied from stock.



**Automatic assembly of circuit boards**

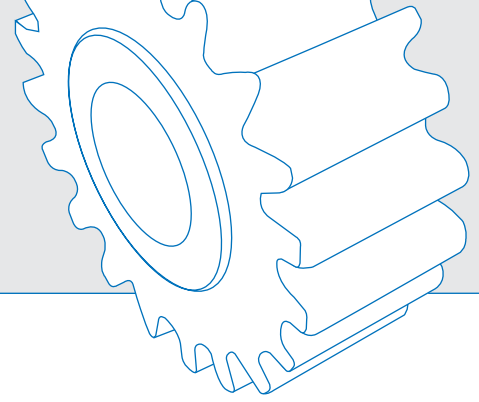


**"One Piece flow" in the modern assembly line**



**Automatic high voltage testing system**





1984 Start of in-house development and production of AC vector drives

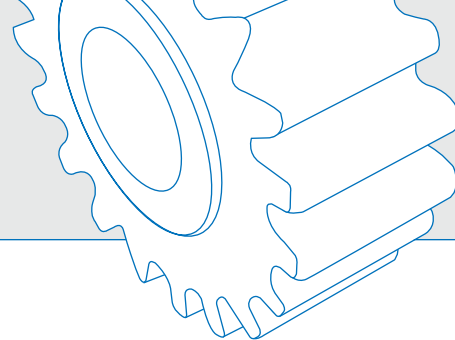
1992 Mixed product range based on cooperations and in-house production

1997 Philosophy: Only in-house products

2005 Opening of new plant for NORD Electronic DRIVESYSTEMS



# Product Overview



## UNICASE™ SPEED REDUCERS



### HELICAL IN-LINE

- Foot or Flange Mount
- Torque up to 205,000 lb-in
- Gear ratios – 1.82:1 to over 300,000:1



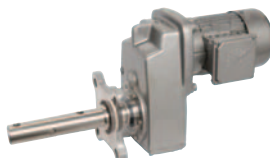
### NORDBLOC®.1 HELICAL IN-LINE

- Foot or Flange Mount
- Torque up to 26,550 lb-in
- Gear ratios – 1.88:1 to over 370:1



### PARALLEL HELICAL CLINCHER™

- Shaft, Flange or Foot Mount
- Torque up to 797,000 lb-in
- Gear ratios – 4.26:1 to over 300,000:1



### SCP SCREW CONVEYOR PACKAGE

- Shaft, or Flange Mount
- Torque up to 53,100 lb-in
- Gear ratios – 4.32:1 to over 1500:1



### RIGHT ANGLE HELICAL-BEVEL 2-STAGE

- Foot, Flange or Shaft Mount
- Torque up to 5,840 lb-in
- Gear ratios – 4.1:1 to 72:1



### RIGHT ANGLE HELICAL-BEVEL

- Foot, Flange or Shaft Mount
- Torque up to 283,000 lb-in
- Gear ratios – 8.04:1 to over 300,000:1



### RIGHT ANGLE HELICAL-WORM

- Foot, Flange or Shaft Mount
- Torque up to 27,585 lb-in
- Gear ratios – 4.40:1 to over 300,000:1

## HIGH PERFORMANCE MOTORS & BRAKEMOTORS



### INVERTER/VECTOR DUTY

- Standard or Energy Efficient
- Integral, NEMA or Metric IEC
- 1/6 to 250 hp

## UNICASE™ SPEED REDUCERS



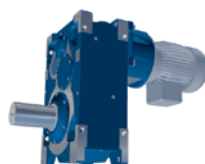
### MINICASE™ RIGHT ANGLE WORM

- Foot, Flange or Shaft Mount
- Torque up to 3,540 lb-in
- Gear ratios – 5:1 to 500:1



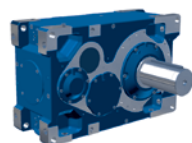
### FLEXBLOC™ WORM

- Modular bolt-on options
- Torque up to 4,683 lb-in
- Gear ratios – 5:1 to 3,000:1



### MAXXDRIVE™ LARGE INDUSTRIAL GEAR UNITS PARALLEL HELICAL

- Modular bolt-on options
- Torque up to 2,027,000 lb-in
- Gear ratios – 5:1 to 1,600:1



### MAXXDRIVE™ LARGE INDUSTRIAL GEAR UNITS HELICAL-BEVEL

- Modular bolt-on options
- Torque up to 2,027,000 lb-in
- Gear ratios – 5:1 to 1,600:1

## NORDAC AC VECTOR DRIVES



### SK200E FAMILY

- Distributed, high performance
- 380-480V, 3-phase to 30 hp
- 200-240V, 3-phase to 15 hp
- 200-240V, 1-phase to 1.5 hp
- 100-120V, 1-phase to 1 hp



### SK500E FAMILY

- Compact, cabinet mount, high performance
- 380-480V, 3-phase, to 50hp
- 200-240V, 3-phase, to 25hp
- 200-240V, 1-phase, to 3hp
- 100-120V, 1-phase, to 1.5hp



### SK700E FAMILY

- Flexible, cabinet mount, high performance
- 380-480V, 3-phase, to 200hp



DRIVESYSTEMS

[www.nord.com](http://www.nord.com)

#### WEST

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#### EAST

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