

Motor starter for decentralized applications

NORDAC *START* SK 135E series



Switch on and start working!

NORDAC *START*, SK 135E series



[NORDAC *START*](#)

NORDAC *START*

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

Functionality in a compact design

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

Versatility and protection

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

Standard

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

Optional

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

Variable operating characteristics

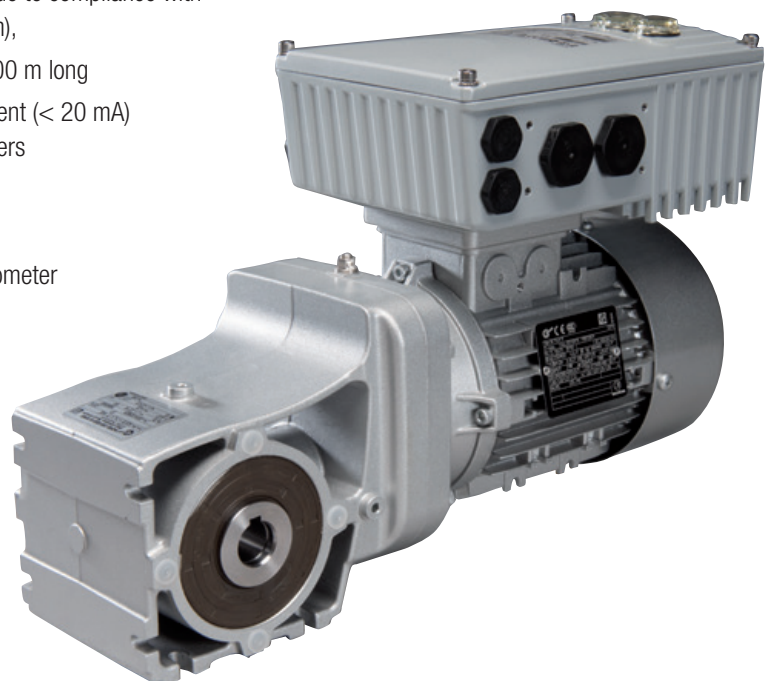
- ▶ Pre-defined shut-down modes
- ▶ Variable starting and shut-down ramps
- ▶ Boost function

EMC Line Filter Class B

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






Commissioning

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





Standards and approvals

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

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

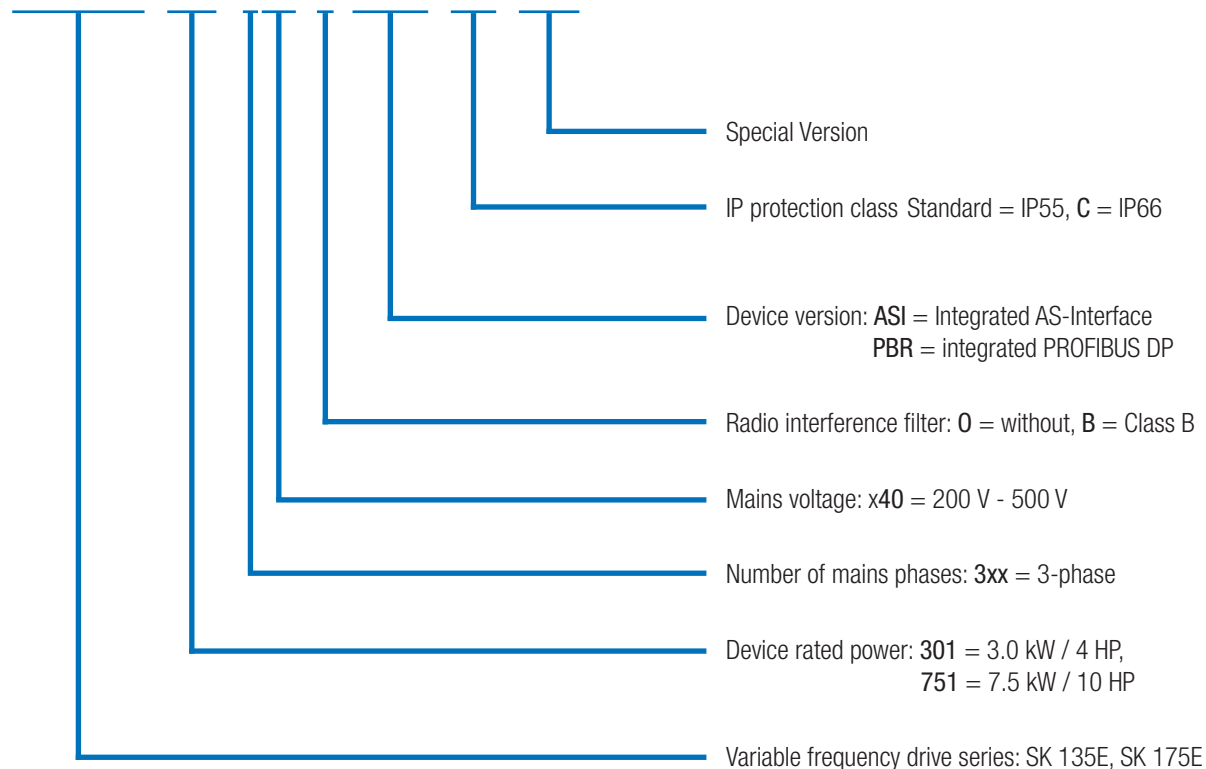
Devices which are configured and approved for use in explosion hazard environments comply with the following directives and standards.

Approval	Directive	Applied standards	Certificates	Code
CE (European Union)	ATEX 2014/34/EU	EN 60079-0 EN 60079-31	C432810	
	EMV 2014/30/EU	EN 63000 EN 60529		
	RoHS Delegated directive (EU) 2011/65/EU 2015/863	EN 60947-1 EN 60947-4-2		
EAC Ex (Eurasia)	TR CU 012/2011	IEC 60079-0 IEC 60079-31	TC RU C- DE AA87.B.01108	

Type code

Motor starters

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



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

Versatile and sustainable Communication and more

AS-Interface

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

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

Available in all SK 175E ... ASI devices

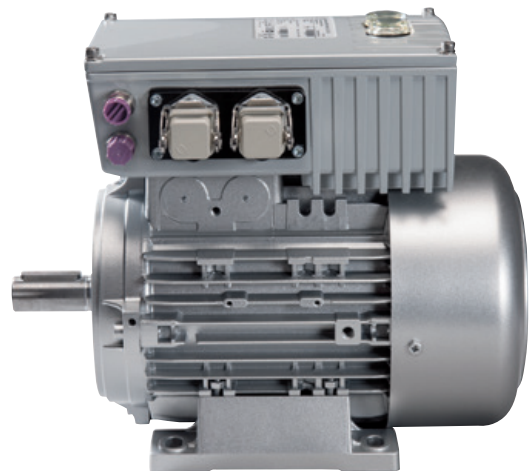


AS-Interface
including 24 V supply
(configurable)

PROFIBUS DP®

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

Available in all SK 175E ... ASI devices



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

Motor starter NORDAC *START*

3~ 200 ... 500 V

Typical overload capacity 150 % for 120 s
up to 360 s (adjustable)

Motor starter efficiency > 98 %

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

Protection class IP55
optional IP66
optional IP69K

IP66 measures

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

Protective measures against

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

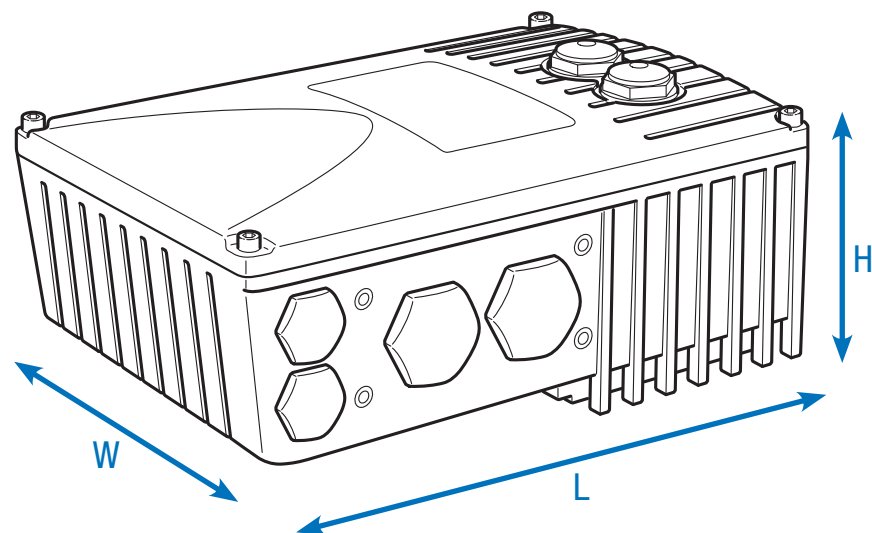
Motor temperature monitoring

I²t Motor
PTC / bi-metal switch

Leakage current

< 20 mA

Motor starters SK 135 E... / SK 175 E...	Nominal motor power		Nominal output current rms [A]	Mains voltage / output voltage	Weight	Overall dimensions L x W x H
	[kW]	[HP]				
-301-340-B	up to 3.0	up to 4	7.5	3~ 200 V ... 500 V, -10 % / +10 %, 47 ... 63 Hz	2.1 kg	221 x 154 x 101 mm
-751-340-B	up to 7.5	up to 10	16		4.63 lbs	8.7 x 6.06 x 3.98 in



Explosive environment protection



ATEX-compliant drive systems, zone 22 3D

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

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

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

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

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

Approval

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

Available in all versions



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

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

Class II - Dust groups E, F and G

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

Class III

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

The entire team

All device versions at a glance

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

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

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

● Available as standard
 ● Optional
 ○ Not available

The senses

Control connections on the motor starter

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

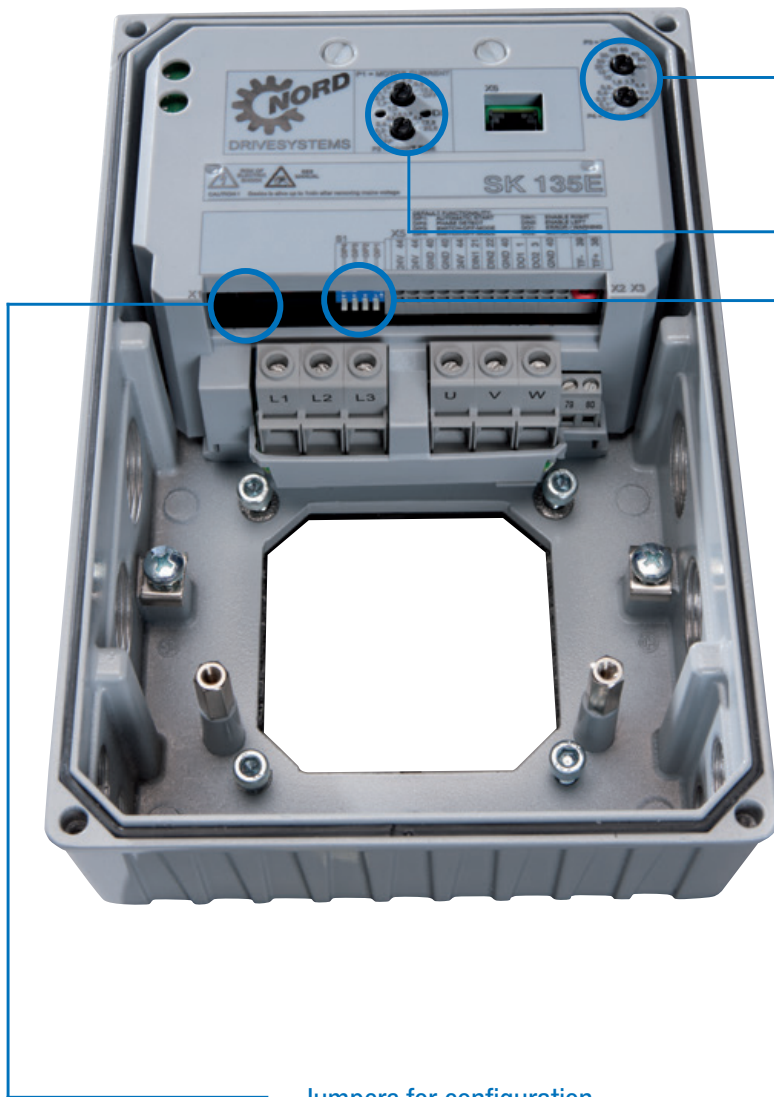
Note

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



Configuration and monitoring

Integrated aids for safe operation



Commissioning with a screwdriver

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

The following parameters can be adjusted:

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

Jumpers for configuration

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

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

Available in all SK 175E devices

Status and diagnostic cockpit

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



1. Status LEDs and potentiometers

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

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

2. Diagnostic interface, RS-232

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

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

Various installation possibilities

Motor assembly

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

Wall mounting

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

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

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

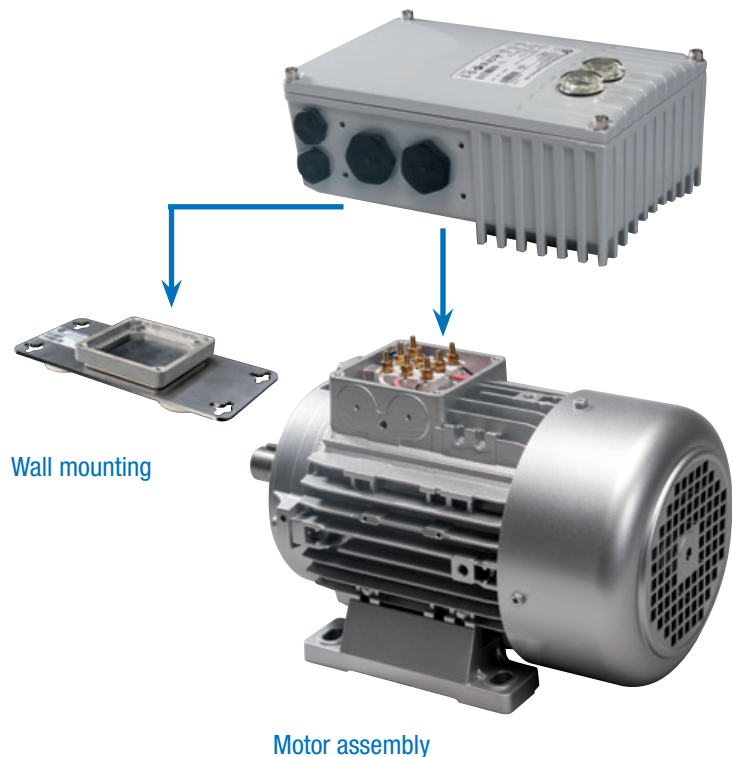
This version is functionally comparable to the standard version and suitable for use in explosion hazard environments (ATEX Zone 22 3D).

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

¹ Mounting of the WMK underneath the motor starter

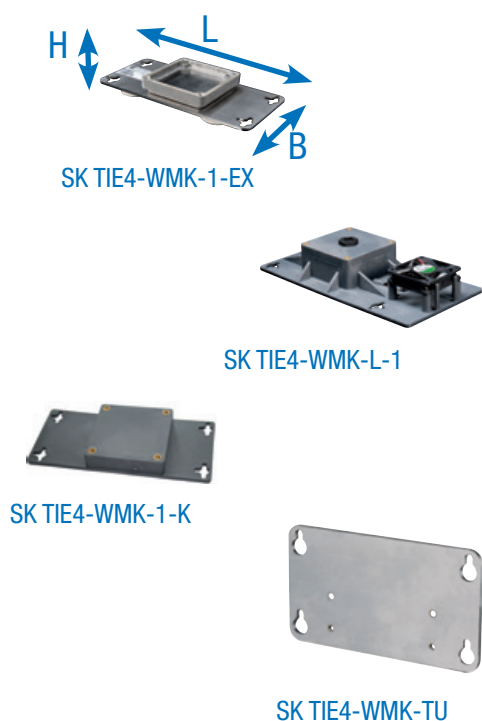
² Mounting of the WMK on the connection unit of the technology unit

Motor-mounted or wall-mounted motor starters

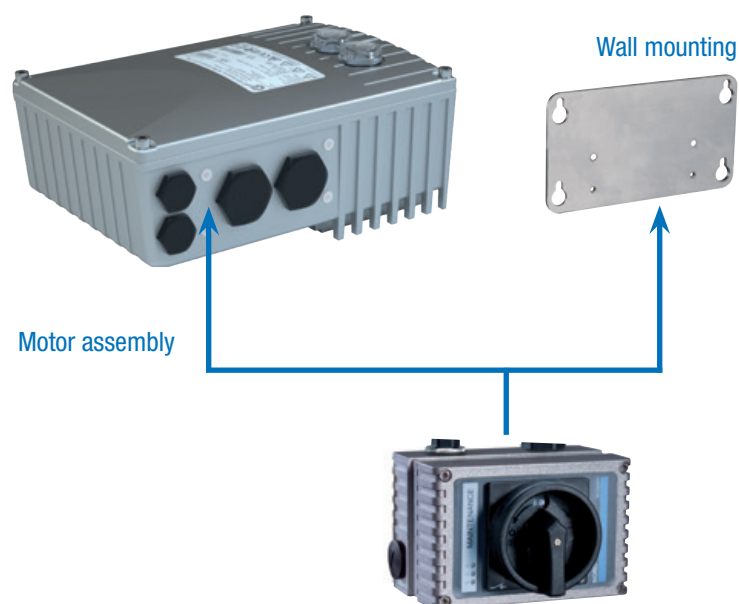


Designation	Material	Integrated fan	Achievable protection class	Weight	Overall dimensions L x W x H	Remarks
SK TIE4-WMK-1-K	Plastic	-	IP66	0.2 kg 0.44 lbs	205 x 95 x 5 mm 8.07 x 3.7 x 0.19 in	
SK TIE4-WMK-2-K	Plastic	-	IP66	0.3 kg 0.66 lbs	235 x 105 x 5 mm 9.25 x 4.13 x 0.19 in	
SK TIE4-WMK-1-EX	Stainless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

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



Technology unit on NORDAC START or wall mounting



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