

SC005

Stainless steel servo motor Motor manual

V1.01, 02.2018



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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Safety Information



Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a DANGER safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety instructions that follow this symbol to avoid possible injury or death.

Hazard categories

Safety instructions to the user are highlighted by safety alert symbols in the manual. In addition, labels with symbols and/or instructions are attached to the product that alert you to potential hazards.

Four hazard categories exist depending on the criticality and nature of the hazard.

DANGER

DANGER indicates a hazardous situation, which, if not avoided, **will result** in death or serious injury.

WARNING

WARNING indicates a hazardous situation, which, if not avoided, **could result** in death, serious injury, or equipment damage.

CAUTION

CAUTION indicates a hazardous situation, which, if not avoided, **could result** in injury or equipment damage.

NOTICE

NOTICE indicates a hazardous situation, which, if not avoided, **can result** in equipment damage.

Please note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Qualification of personnel

Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation are authorized to work on and with this product.

In addition, these persons must have received safety training to recognize and avoid hazards involved.

The qualified person must be able to detect possible hazards that may arise from parameterization, modifying parameter values and generally from mechanical, electrical, or electronic equipment.

The qualified person must be familiar with the standards, provisions, and regulations for the prevention of industrial accidents, which they must observe when designing and implementing the system.

Intended use

This product is a motor and intended for industrial use according to this manual.

The product may only be used in compliance with all applicable safety regulations and directives, the specified requirements and the technical data.

Prior to using the product, you must perform a risk assessment in view of the planned application. Based on the results, the appropriate safety measures must be implemented.

Since the product is used as a component in an overall system, you must ensure the safety of persons by means of the design of this overall system (for example, machine design).

Operate the product only with the specified cables and accessories. Use only genuine accessories and spare parts.

Any use other than the use explicitly permitted is prohibited and can result in hazards.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.

Product Related Information

The use and application of the information contained herein require expertise in the design and programming of automated control systems.

Only you, the user, machine builder or integrator, can be aware of all the conditions and factors present during installation and setup, operation, repair and maintenance of the machine or process.

You must also consider any applicable standards and/or regulations with respect to grounding of all equipment. Verify compliance with any safety information, different electrical requirements, and normative standards that apply to your machine or process in the use of this equipment.

Many components of the equipment, including the printed circuit board, operate with mains voltage, or present transformed high currents, and/or high voltages.

The motor itself generates voltage when the motor shaft is rotated.

DANGER

HAZARD DUE TO ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Only qualified personnel may install, adjust, repair and maintain this equipment.
- Do not touch any connectors, contacts, terminals, unshielded components or printed circuit boards while the equipment is under power.
- Use only electrically insulated tools.
- Block the motor shaft to prevent rotation prior to performing any type of work on the drive system.
- Insulate both ends of unused conductors of the motor cable to help prevent AC voltage from coupling to unused conductors in the motor cable.
- Before performing work on the drive system:
 - Disconnect all power, including external control power that may be present.
 - Place a "Do Not Turn On" label on all power switches.
 - Lock all power switches in the open position.
 - Wait 15 minutes to allow the DC bus capacitors to discharge.
 - Do not assume that the DC bus is voltage-free when the DC bus LED is off.
- Refit/replace and secure all covers, accessories, hardware, cables, and wires and verify that a proper ground connection exists before applying power to the unit.

Failure to follow these instructions will result in death or serious injury.

This equipment has been designed to operate outside of any hazardous location. Only install this equipment in zones known to be free of a hazardous atmosphere.

| |
|---|
| ⚠ DANGER |
| POTENTIAL FOR EXPLOSION |
| Install and use this equipment in non-hazardous locations only. |
| Failure to follow these instructions will result in death or serious injury. |

NOTE: See the product manual of the servo drive for additional important safety information.

If the power stage is disabled unintentionally, for example as a result of power outage, errors or functions, the motor is no longer decelerated in a controlled way. Overload, errors or incorrect use may cause the holding brake to no longer operate properly and may result in premature wear.

| |
|--|
| ⚠ WARNING |
| UNINTENDED EQUIPMENT OPERATION |
| <ul style="list-style-type: none"> • Verify that movements without braking effect cannot cause injuries or equipment damage. • Verify the function of the holding brake at regular intervals. • Do not use the holding brake as a service brake. • Do not use the holding brake for safety-related purposes. |
| Failure to follow these instructions can result in death, serious injury, or equipment damage. |

| |
|---|
| ⚠ WARNING |
| LOSS OF CONTROL |
| <ul style="list-style-type: none"> • The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop, overtravel stop, power outage and restart. • Separate or redundant control paths must be provided for critical control functions. • System control paths may include communication links. Consideration must be given to the implication of unanticipated transmission delays or failures of the link. • Observe all accident prevention regulations and local safety guidelines. ¹⁾ • Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service. |
| Failure to follow these instructions can result in death, serious injury, or equipment damage. |

1) For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for

Selection, Installation and Operation of Adjustable-Speed Drive Systems” or their equivalent governing your particular location.

Terminology Derived from Standards

The products described in the present document are designed to specific standards and the technical terms, terminology, symbols and the corresponding descriptions in this manual are intended to use the terms or definitions of those pertinent standards.

In the area of functional safety systems, drives and general automation, this may include, but is not limited to, terms such as "safety", "safety function", "safe state", "fault", "fault reset", "malfunction", "failure", "error", "error message", "dangerous", etc.

Among others, these standards include:

| Standard | Description |
|--------------------------------|---|
| EN 61131-2:2007 | Programmable controllers, part 2: Equipment requirements and tests. |
| ISO 13849-1:2008 | Safety of machinery: Safety related parts of control systems. General principles for design. |
| EN 61496-1:2013 | Safety of machinery: Electro-sensitive protective equipment. Part 1: General requirements and tests. |
| ISO 12100:2010 | Safety of machinery - General principles for design - Risk assessment and risk reduction |
| EN 60204-1:2006 | Safety of machinery - Electrical equipment of machines - Part 1: General requirements |
| EN 1088:2008 ISO 14119:2013 | Safety of machinery - Interlocking devices associated with guards - Principles for design and selection |
| ISO 13850:2006 | Safety of machinery - Emergency stop - Principles for design |
| EN/IEC 62061:2005 | Safety of machinery - Functional safety of safety-related electrical, electronic, and electronic programmable control systems |
| IEC 61508-1:2010 | Functional safety of electrical/electronic/programmable electronic safety-related systems: General requirements. |
| IEC 61508-2:2010 | Functional safety of electrical/electronic/programmable electronic safety-related systems: Requirements for electrical/electronic/programmable electronic safety-related systems. |
| IEC 61508-3:2010 | Functional safety of electrical/electronic/programmable electronic safety-related systems: Software requirements. |
| IEC 61784-3:2008 | Digital data communication for measurement and control: Functional safety field buses. |
| 2006/42/EC | Machinery Directive |
| 2004/108/EC | Electromagnetic Compatibility Directive |
| 2006/95/EC | Low Voltage Directive |

In addition, terms used in the present document may tangentially be used as they are derived from other standards such as:

| Standard | Description |
|------------------|--|
| IEC 61800 series | Adjustable speed electrical power drive systems |
| IEC 60034 series | Rotating electrical machines |
| IEC 61158 series | Digital data communications for measurement and control – Fieldbus for use in industrial control systems |

Finally, the term "zone of operation" may be used in conjunction with the description of specific hazards, and is defined as it is for a "hazard zone" or "danger zone" in the EC Machinery Directive (EC/2006/42) and ISO 12100:2010.

About the book



This manual is valid for the standard products listed in the type code, see chapter "1.4 Type code".

Source manuals The latest versions of the manuals can be downloaded from the Internet at:

<http://www.schneider-electric.com>

Work steps If work steps must be performed consecutively, this sequence of steps is represented as follows:

- Special prerequisites for the following work steps
- ▶ Step 1
- ◁ Specific response to this work step
- ▶ Step 2

If a response to a work step is indicated, this allows you to verify that the work step has been performed correctly.

Unless otherwise stated, the individual steps must be performed in the specified sequence.

Making work easier Information on making work easier is highlighted by this symbol:



Sections highlighted this way provide supplementary information on making work easier.

SI units Technical data are specified in SI units. Converted units are shown in parentheses behind the SI unit; they may be rounded.

Example:

Minimum conductor cross section: 1.5 mm² (AWG 14)

Glossary Explanations of special technical terms and abbreviations.

Index List of keywords with references to the corresponding page numbers.

1 Introduction

1.1 Motor family

The stainless steel servo motors of the SC005 series are designed for high torque at comparably low input current.

The following table associates the reference numbers of the motors with the corresponding motor types:

| Reference number | Motor type (derived from type code) |
|---|-------------------------------------|
| FCE200519A200, FCE200519B200, FCE200519C200 | SC005/H13 |
| FCE200520A200, FCE200520B200 | SC005/H22 |
| FCE200521A200, FCE200521B200 | SC005/H23 (with holding brake) |
| FCE200522A200, FCE200522B200 | SC005/H32 (with holding brake) |
| FCE200523A200, FCE200523B200 | SC005/H33 (with holding brake) |
| FCE200524A200, FCE200524B200 | SC005/H23 |
| FCE200525A200, FCE200525B200 | SC005/H32 |

1.2 Options and accessories

For accessories see chapter "6 Accessories and spare parts".

1.3 Nameplate

The nameplate contains the following data:

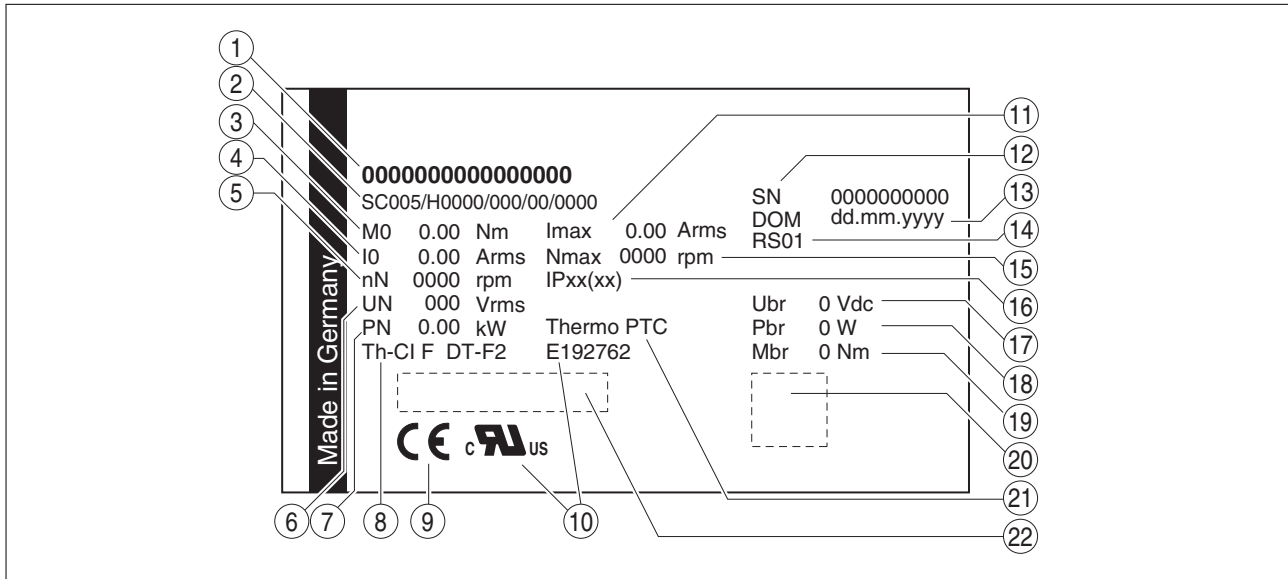


Figure 1: Nameplate

- (1) Reference number
- (2) Type code, see chapter "1.4 Type code"
- (3) Continuous stall torque
- (4) Continuous stall current
- (5) Nominal speed of rotation
- (6) Maximum nominal value of supply voltage
- (7) Nominal power
- (8) Thermal class
- (9) CE marking
- (10) UL marking and assigned UL number
- (11) Maximum Current
- (12) Serial number
- (13) Date of manufacture
- (14) Hardware version
- (15) Maximum speed of rotation
- (16) Degree of protection (housing without shaft bushing)
- (17) Nominal voltage holding brake
- (18) Nominal power (electrical pull-in power) holding brake
- (19) Holding torque holding brake
- (20) QR code
- (21) Temperature sensor
- (22) Barcode

1.4 Type code

| | | | | | | | | | | | | | | | |
|---|---|---|-----|--|----|---|-----|---|----|---|---|--|----|--|---|
| | SC005 | / | H13 | | 02 | / | 000 | / | 00 | / | 2 | | 01 | | C |
| Product family | SC005 = Stainless steel motor | | | | | | | | | | | | | | |
| Size of winding and number of stacks | H13 = 55 mm winding, 3 stacks H22 = 70 mm winding, 2 stacks H23 = 70 mm winding, 3 stacks H32 = 100 mm winding, 2 stacks H33 = 100 mm winding, 3 stacks | | | | | | | | | | | | | | |
| Type of winding | 01 = P winding 02 = M winding | | | | | | | | | | | | | | |
| Gearbox | 000 = No gearbox | | | | | | | | | | | | | | |
| Holding brake | 00 = Without holding brake B1 = With holding brake | | | | | | | | | | | | | | |
| Encoder system | 2 = Absolute multiturn 128 Sin/Cos periods per revolution (SKM36) | | | | | | | | | | | | | | |
| Shaft | 01 = Solid shaft | | | | | | | | | | | | | | |
| Version | A = Dedicated version A B = Standard product C = Dedicated version C | | | | | | | | | | | | | | |

If you have questions concerning the type code, contact your Schneider Electric sales office.

For more information about a customized version, contact the machine vendor.

2 Technical Data

This chapter contains information on the ambient conditions and on the mechanical and electrical properties of the product family and the accessories.

2.1 General characteristics

| | | |
|--|----------------------------|-------------------------------|
| Motor type | AC synchronous servo motor | |
| Degree of protection (shaft and housing) | IP67 / IP69k | As per IEC 60034-5 |
| Thermal class | F (155 °C) | As per IEC 60034-1 |
| Vibration grade | A | As per IEC 60034-14 |
| Test voltage | > 2400 Vac | As per IEC 60034-1 |
| Perpendicularity | normal class | As per IEC 60072-1, DIN 42955 |
| Overvoltage category | III | As per IEC 61800-5-1 |
| Protection class ¹⁾ | I | As per IEC 61140, EN 50178 |

1) The signals of the holding brake and the temperature sensor meet the PELV requirements.

Compatibility with foreign substances

The motor has been tested for compatibility with many known substances and with the latest available knowledge. Nonetheless, you must perform a compatibility test prior to using a foreign substance.

Climatic environmental conditions transportation and storage

The environment during transportation and storage must be dry and free from dust.

The storage time is primarily limited by the service life of the lubricants in the bearings. Do not store the product for more than 36 months and periodically operate the motor.

If the holding brake is not used for an extended period of time, parts of the holding brake may corrode. Corrosion reduces the holding torque. See "*Inspecting/breaking in the holding brake*" in chapter "*7 Service, maintenance and disposal*".

| | | |
|--|------------|-----------------------------|
| Temperature | °C (°F) | -40 ... 70 (-40 ... 158) |
| Relative humidity (non-condensing) | % | ≤75 |
| Set of class combinations as per IEC 60721-3-2 | | IE 21 |

Climatic environmental conditions operation

| | | |
|--|------------|----------------------------|
| Ambient temperature ¹⁾ (no icing, non-condensing) | °C (°F) | -20 ... 40 (-4 ... 104) |
| Ambient temperature with current derating of 1% per °C (per 1.8 °F ¹⁾) | °C (°F) | 40 ... 60 (104 ... 140) |
| Relative humidity (non-condensing) | % | 5 ... 85 |
| Class as per IEC 60721-3-3 | | 3K3, 3Z12, 3Z2 |
| Installation altitude ²⁾ | m (ft) | <1000 (<3281) |

1) Limit values with flanged motor (steel plate, height and width = 2.5 * motor flange, 10 mm thickness, centered hole).

2) The installation altitude is defined in terms of altitude above mean sea level.

Vibration and shock

| | |
|------------------------|--|
| Vibration, sinusoidal | Type test with 10 runs in each direction as per IEC 60068-2-6 10 mm / 30 m/s ² / 5 ... 150 Hz / 1 oct./min |
| Shock, semi-sinusoidal | Type test with 100 shocks in each direction as per IEC 60068-2-27 250 m/s ² (6 ms) |

Service life

| | | |
|---|---|-------|
| Nominal bearing service life L _{10h} ¹⁾ | h | 20000 |
|---|---|-------|

1) Operating hours at a probability of failure of 10%

The service life of the motors when operated correctly is limited primarily by the service life of the rolling bearing.

The following operating conditions significantly reduce the service life:

- Installation altitude >1000 m (3281 ft) above mean sea level
- Rotary movements exclusively within a fixed angle of <100°
- Operation under vibration load >20 m/s²
- Allowing sealing rings to run dry
- Contact of the seals with aggressive substances

Shaft sealing ring / degree of protection

The motors are equipped with a shaft sealing ring and a water jet deflector plate. With a shaft sealing ring, they have degree of protection IP67 / IP69k. The shaft sealing ring limits the maximum speed of rotation to 6000 rpm.

Note the following:

- The shaft sealing ring is factory-pre-lubricated.
- If the seals run dry, this increases friction and greatly reduces the service life of the sealing rings.

Tightening torque and property class of screws used

| | | |
|---|------------|------------|
| Tightening torque of housing screws M3 | Nm (lb·in) | 2 (17.7) |
| Tightening torque of housing screws M4 | Nm (lb·in) | 2.5 (22.1) |
| Tightening torque protective ground conductor | Nm (lb·in) | 2.5 (22.1) |
| Property class of the screws | | A4-70 |

Approved drives Approved drives are:

- PacDrive-M, MC-4
- PacDrive-3, LXM62
- PacDrive-3, LXM52/LXM32

If you have questions, contact your Schneider Electric sales office.

2.2 Motor-specific data

| SC005... | | H13 | H22 | H23.....00 | H23.....B1 |
|---|-------------------|----------|----------|------------|------------|
| Winding | | M | P | P | P |
| Technical data - general | | | | | |
| Continuous stall torque M_0 ^{1) 2)} | Nm | 0.9 | 2.0 | 2.5 | 2.5 |
| Peak torque M_{max} | Nm | 3.2 | 7.6 | 10.3 | 10.3 |
| Number of pole pairs | | 3 | 3 | 3 | 3 |
| With supply voltage $U_n = 400$ Vac | | | | | |
| Nominal speed of rotation n_N | rpm | 4000 | 6000 | 6000 | 6000 |
| Nominal torque M_N | Nm | 0.79 | 1.4 | 1.55 | 1.55 |
| Nominal current I_N | A_{rms} | 0.8 | 2.2 | 2.4 | 2.3 |
| Nominal power P_N | kW | 0.33 | 0.88 | 0.97 | 0.97 |
| Technical data - electrical | | | | | |
| Maximum current I_{max} | A_{rms} | 3.4 | 11.8 | 15.2 | 15.2 |
| Continuous stall current I_0 | A_{rms} | 0.8 | 2.9 | 3.6 | 3.6 |
| Voltage constant k_{EU-V} ³⁾ | V_{rms} | 76 | 48 | 49 | 49 |
| Torque constant k_t | Nm/A | 1.15 | 0.68 | 0.70 | 0.70 |
| Winding resistance R_{20U-V} | Ω | 37.1 | 4.2 | 2.7 | 2.7 |
| Technical data - mechanical | | | | | |
| Rotor inertia without holding brake J_M | kgcm ² | 0.13 | 0.41 | 0.58 | - |
| Rotor inertia with holding brake J_M | kgcm ² | - | - | - | 0.81 |
| Mass without holding brake m | kg | 2.2 | 6.4 | 7.1 | - |
| Mass with holding brake m | kg | - | - | - | 7.2 |
| Technical data - thermal | | | | | |
| Response threshold temperature sensor (PTC) T_{TK} | C° | 130 | 130 | 130 | 130 |

1) Conditions for performance data: Mounted to steel plate, 300 mm * 300 mm area, 20 mm thickness, centered hole.

2) M_0 = Continuous stall torque at low speed of rotation and 100% duty cycle; at speeds of rotation of < 20 rpm the continuous stall torque is reduced to 87%.

3) RMS value at 1000 rpm and 20 °C (68 °F).

| SC005... | | H32.....00 | H32.....B1 | H33 |
|---|-------------------|------------|------------|----------|
| Winding | | M | M | P |
| Technical data - general | | | | |
| Continuous stall torque M_0 ^{1) 2)} | Nm | 4.65 | 4.65 | 6.75 |
| Peak torque M_{max} | Nm | 18.3 | 18.3 | 28.3 |
| Number of pole pairs | | 4 | 4 | 4 |
| With supply voltage $U_n = 400$ Vac | | | | |
| Nominal speed of rotation n_N | rpm | 2000 | 2000 | 4000 |
| Nominal torque M_N | Nm | 4.0 | 3.85 | 3.0 |
| Nominal current I_N | A_{rms} | 2.0 | 2.0 | 3.1 |
| Nominal power P_N | kW | 0.84 | 0.81 | 1.26 |
| Technical data - electrical | | | | |
| Maximum current I_{max} | A_{rms} | 9.0 | 9.0 | 28.3 |
| Continuous stall current I_0 | A_{rms} | 2.2 | 2.2 | 6.75 |
| Voltage constant k_{EU-V} ³⁾ | V_{rms} | 146 | 146 | 77 |
| Torque constant k_t | Nm/A | 2.10 | 2.10 | 1.18 |
| Winding resistance R_{20U-V} | Ω | 8.6 | 8.6 | 1.4 |
| Technical data - mechanical | | | | |
| Rotor inertia without holding brake J_M | kgcm ² | 2.31 | - | - |
| Rotor inertia with holding brake J_M | kgcm ² | - | 2.93 | 3.22 |
| Mass without holding brake m | kg | 8.7 | - | - |
| Mass with holding brake m | kg | - | 8.8 | 10 |
| Technical data - thermal | | | | |
| Response threshold temperature sensor (PTC) T_{TK} | C° | 130 | 130 | 130 |

1) Conditions for performance data: Mounted to steel plate, 300 mm * 300 mm area, 20 mm thickness, centered hole.

2) M_0 = Continuous stall torque at low speed of rotation and 100% duty cycle; at speeds of rotation of < 20 rpm the continuous stall torque is reduced to 87%.

3) RMS value at 1000 rpm and 20 °C (68 °F).

2.3 Dimensions

2.3.1 Dimensions SC005H13

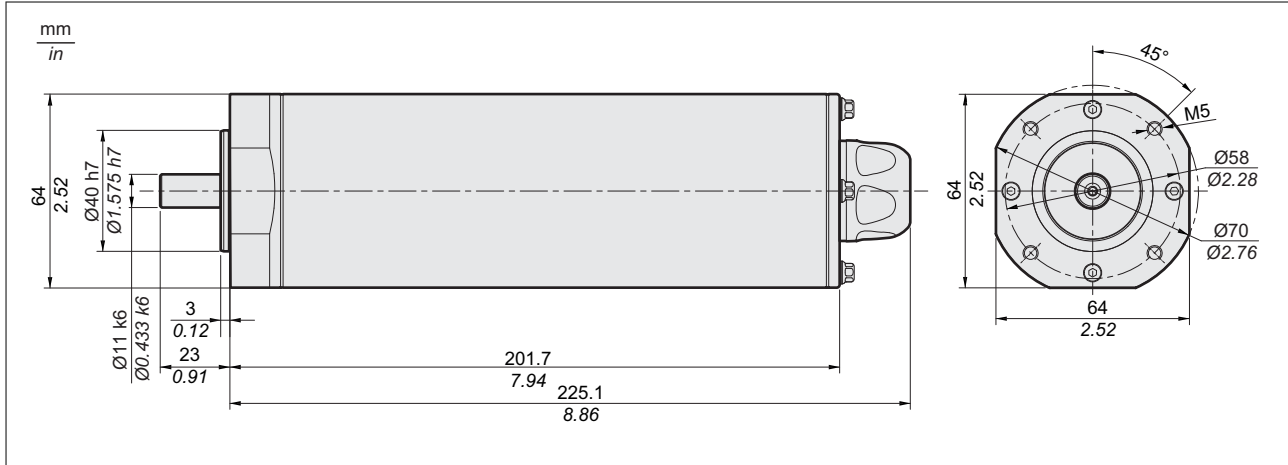


Figure 2: Dimensions SC005H13

2.3.2 Dimensions SC005H22

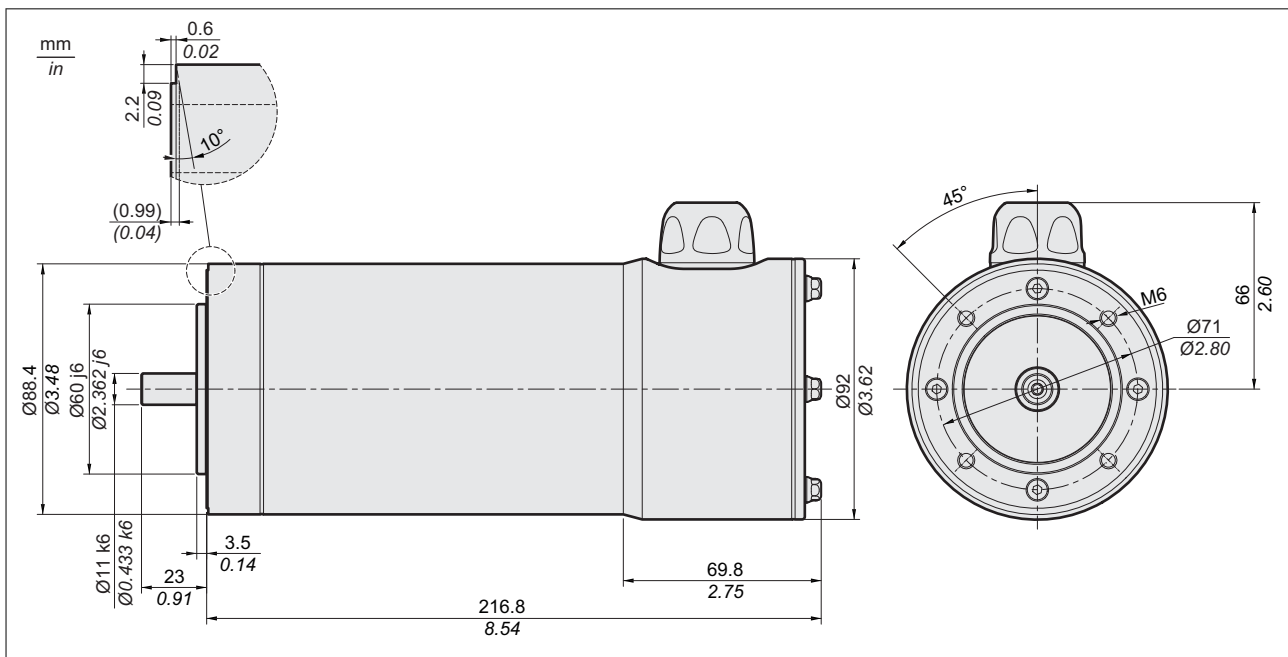


Figure 3: Dimensions SC005H22

2.3.3 Dimensions SC005H23

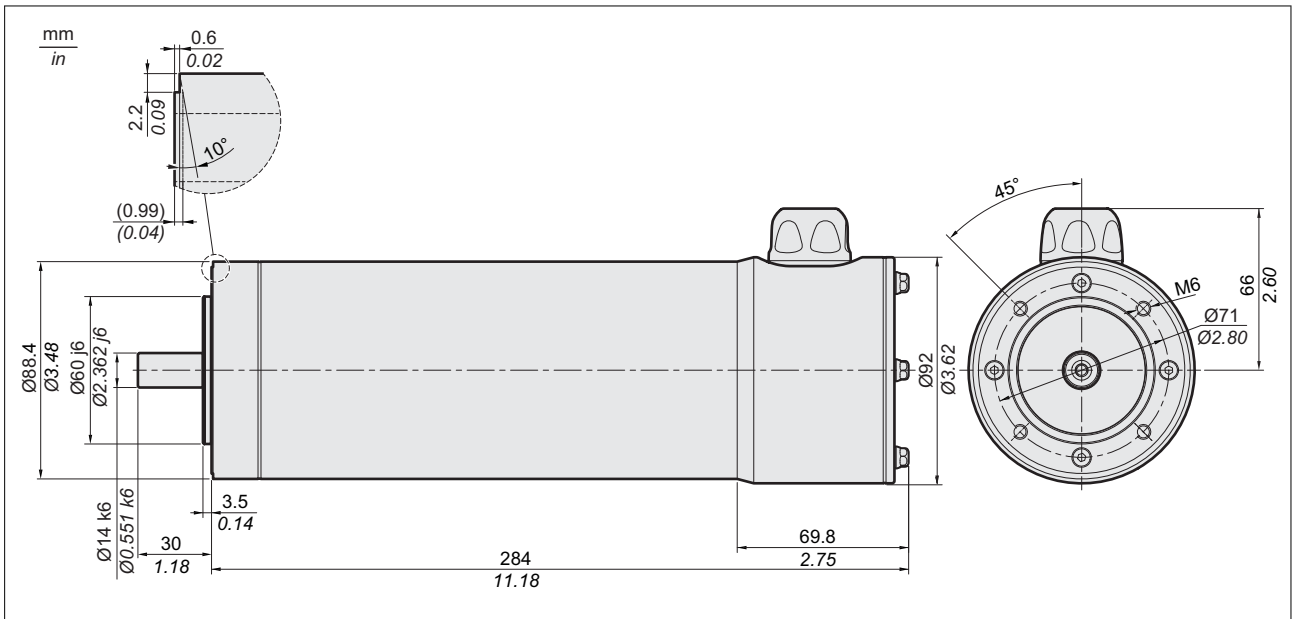


Figure 4: Dimensions SC005H23

2.3.4 Dimensions SC005H32

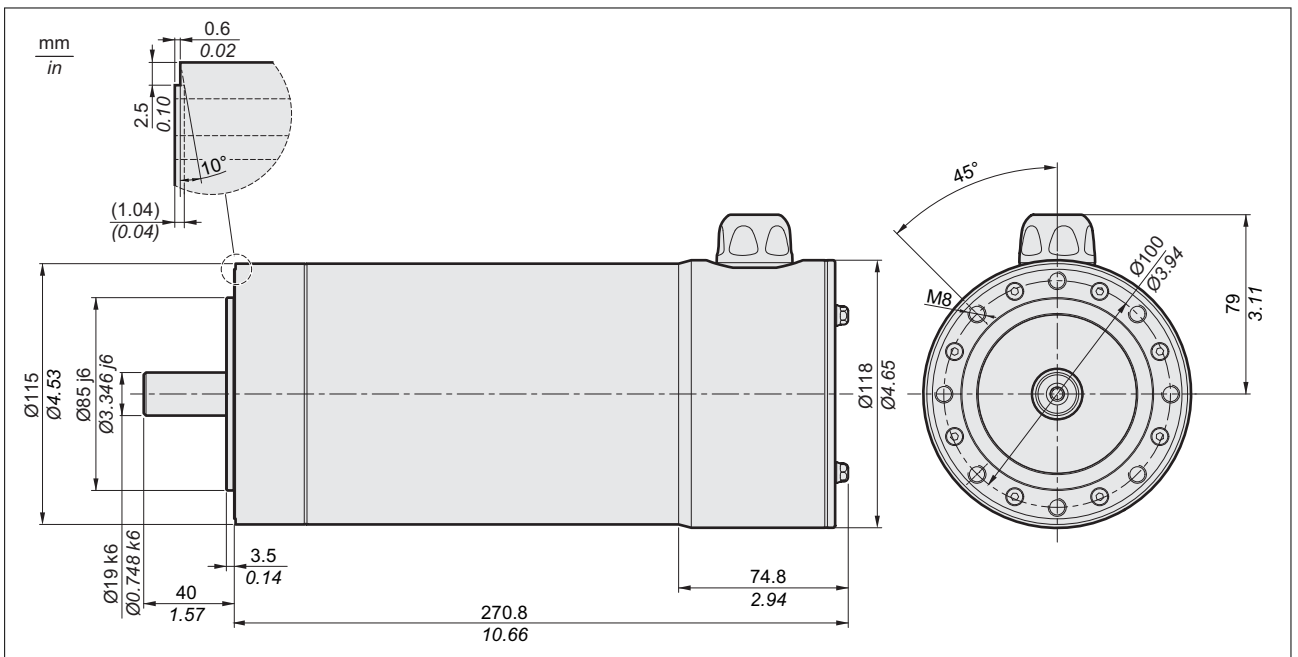


Figure 5: Dimensions SC005H32

2.4 Characteristic curves

2.4.1 Characteristic curves SC005H13

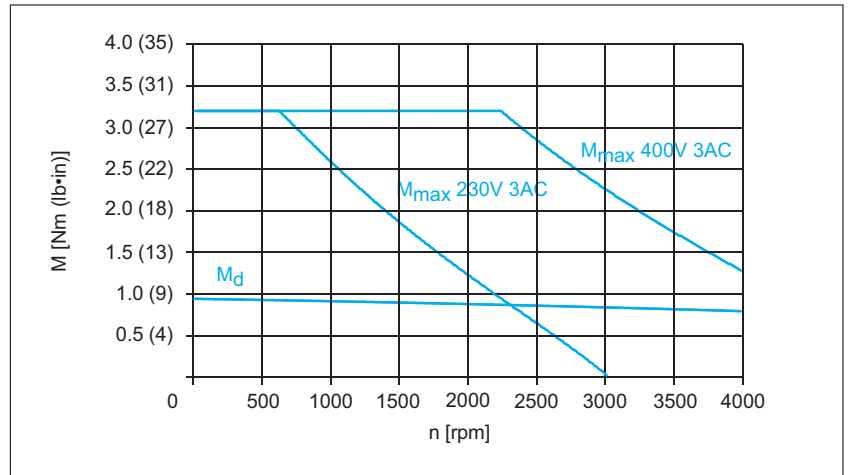


Figure 7: Characteristic curves SC005H13

2.4.2 Characteristic curves SC005H22

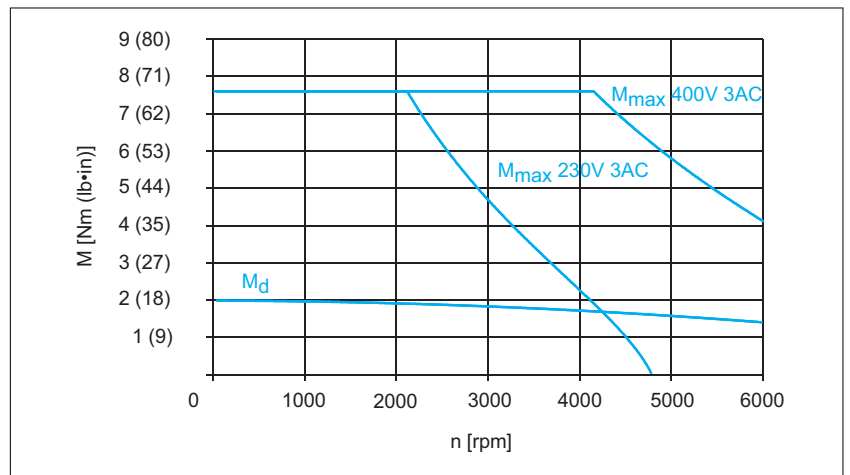


Figure 8: Characteristic curves SC005H22

2.4.3 Characteristic curves SC005H23.....00

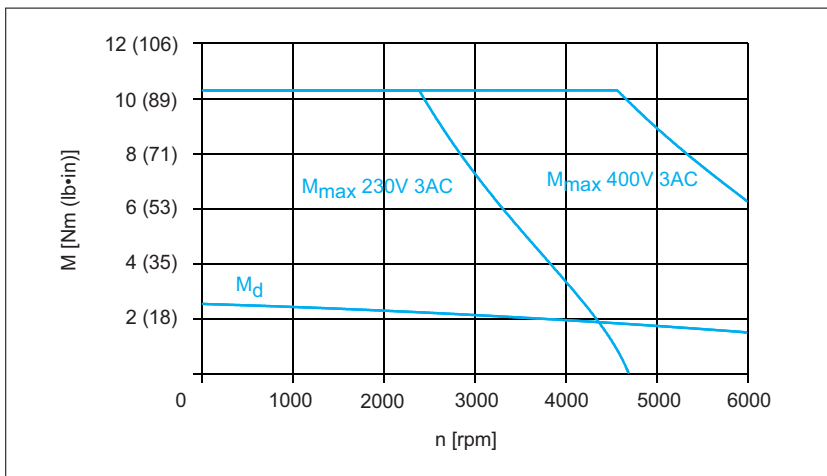


Figure 9: Characteristic curves SC005H23.....00

2.4.4 Characteristic curves SC005H23.....B1

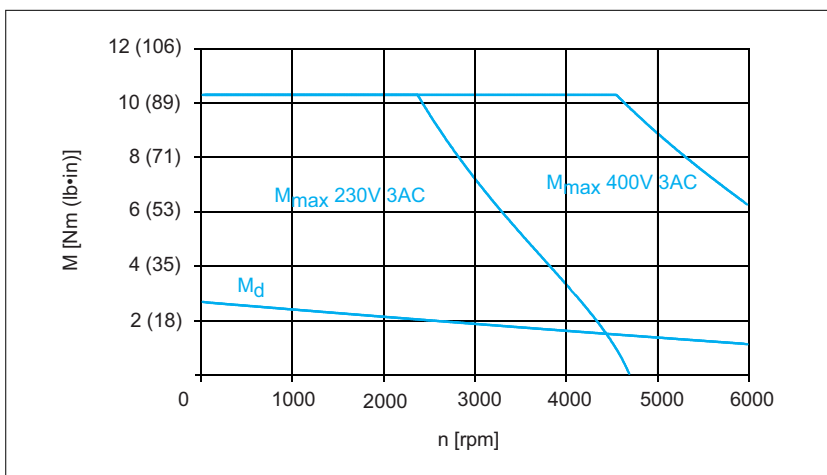


Figure 10: Characteristic curves SC005H23.....B1

2.4.5 Characteristic curves SC005H32.....00

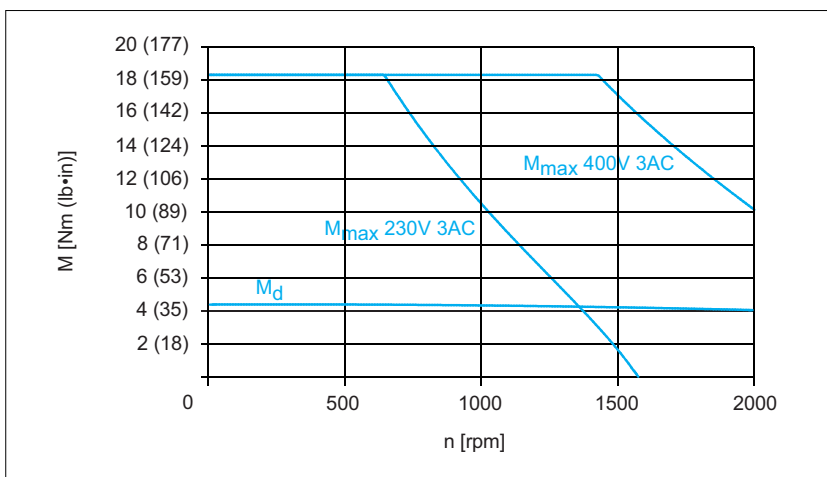


Figure 11: Characteristic curves SC005H32.....00

2.4.6 Characteristic curves SC005H32.....B1

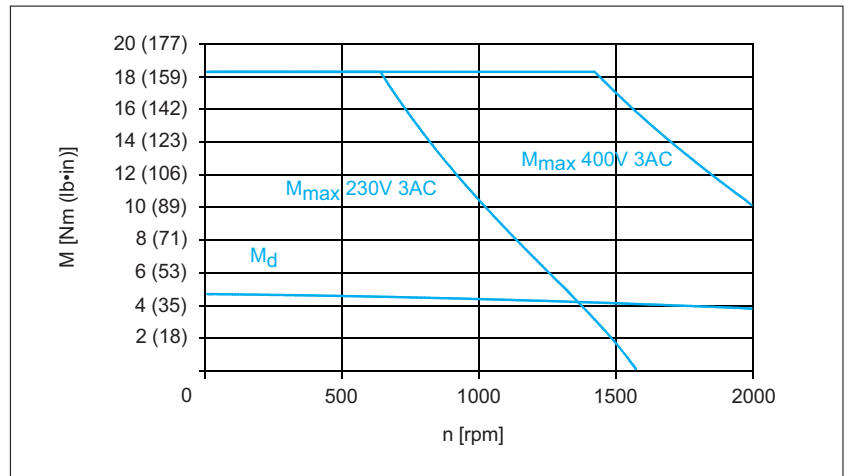


Figure 12: Characteristic curves SC005H32.....B1

2.4.7 Characteristic curves SC005H33.....B1

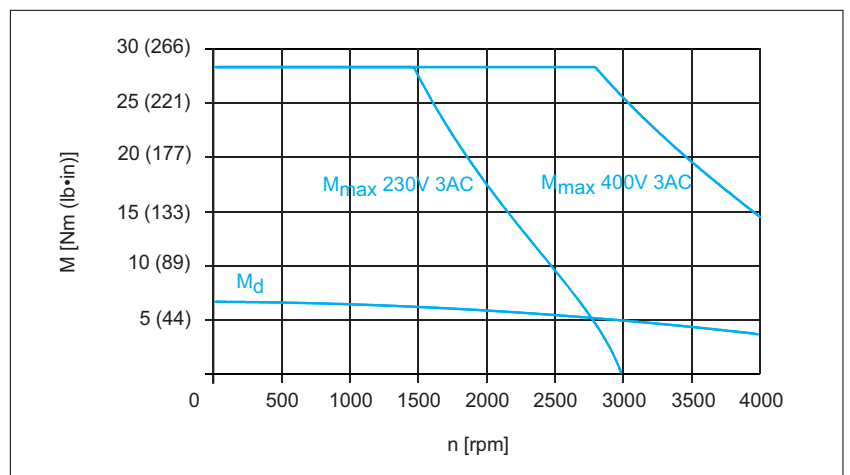


Figure 13: Characteristic curves SC005H33.....B1

2.5 Shaft-specific data

2.5.1 Force for pressing on

If the maximum permissible forces at the motor shaft are exceeded, this will result in premature wear of the bearing or shaft breakage.

| |
|---|
| ⚠ WARNING |
| UNINTENDED EQUIPMENT OPERATION DUE TO MECHANICAL DAMAGE TO THE MOTOR |
| <ul style="list-style-type: none"> • Do not exceed the maximum permissible axial and radial forces at the motor shaft. • Protect the motor shaft from impact. • Do not exceed the maximum permissible axial force when pressing components onto the motor shaft. |
| Failure to follow these instructions can result in death, serious injury, or equipment damage. |

Maximum force during pressing on

The force applied during pressing on must not exceed the maximum permissible axial force, see chapter "2.5.2 Shaft load". Applying assembly paste to the shaft and the component to be mounted reduces friction and mechanical impact on the surfaces.

If the shaft has a thread, use it to press on the component to be mounted. This way there is no axial force acting on the rolling bearing.

It is also possible to shrink-fit, clamp or glue the component to be mounted.

The following table shows the maximum permissible axial force F_A at standstill.

| SC005... | | H1· | H2· | H3· |
|---|-----------|-----------|------------|-------------|
| Maximum axial force F_A at standstill | N (lb) | 40 (9) | 80 (18) | 160 (36) |

2.5.2 Shaft load

The following conditions apply:

- The permissible force applied during pressing on must not be exceeded.
- Radial and axial limit loads must not be applied simultaneously
- Nominal bearing service life in operating hours at a probability of failure of 10% ($L_{10h} = 20000$ hours)
- Mean speed of rotation $n = 4000$ rpm
- Ambient temperature = 40 °C
- Peak torque = Duty types S3 - S8, 10% duty cycle
- Nominal torque = Duty type S1, 100% duty cycle

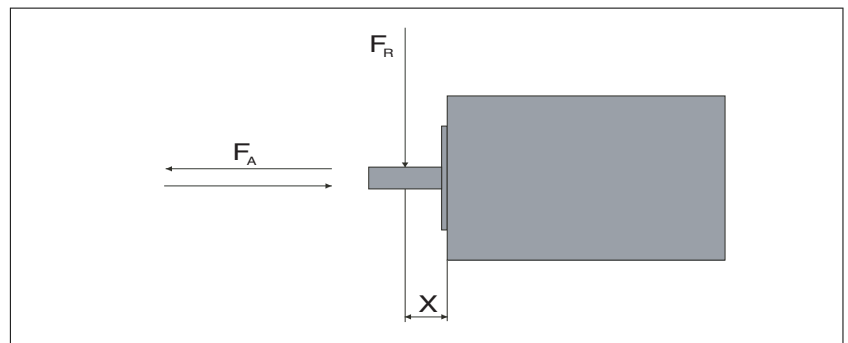


Figure 14: Shaft load

The point of application of the forces depends on the motor size:

| Motor version | | Values for "X" |
|---------------|---------|----------------|
| SC005H13 | mm (in) | 10 (0.39) |
| SC005H22 | mm (in) | 11.5 (0.45) |
| SC005H23 | mm (in) | 15 (0.59) |
| SC005H32 | mm (in) | 20 (0.76) |
| SC005H33 | mm (in) | 20 (0.76) |

The following table shows the maximum radial shaft load F_R .

| SC005... | | H13 | H22 | H23 | H32 | H33 |
|----------|--------|----------|-----------|-----------|-----------|------------|
| 1000 rpm | N (lb) | 390 (88) | 710 (160) | 730 (164) | 990 (223) | 1050 (236) |
| 2000 rpm | N (lb) | 310 (70) | 560 (126) | 580 (130) | 790 (178) | 830 (187) |
| 3000 rpm | N (lb) | 270 (61) | 490 (110) | 510 (115) | - | 73 (16) |
| 4000 rpm | N (lb) | 240 (54) | 450 (101) | 460 (103) | - | 660 (148) |
| 5000 rpm | N (lb) | - | 410 (92) | 430 (97) | - | - |
| 6000 rpm | N (lb) | - | 390 (88) | 400 (90) | - | - |

019844114092, V1.01, 02.2018

The following table shows the maximum axial shaft load F_A .

| SC005... | | H13 | H22 | H23 | H32 | H33 |
|----------|-----------|------------|-------------|-------------|-------------|-------------|
| 1000 rpm | N (lb) | 78 (18) | 142 (32) | 146 (33) | 198 (45) | 210 (47) |
| 2000 rpm | N (lb) | 62 (14) | 112 (25) | 116 (26) | 158 (36) | 166 (37) |
| 3000 rpm | N (lb) | 54 (12) | 98 (22) | 102 (23) | - | 146 (33) |
| 4000 rpm | N (lb) | 48 (11) | 90 (20) | 92 (21) | - | 132 (30) |
| 5000 rpm | N (lb) | - | 82 (18) | 86 (19) | - | - |
| 6000 rpm | N (lb) | - | 78 (18) | 80 (18) | - | - |

If the maximum permissible forces at the motor shaft are exceeded, this will result in premature wear of the bearing or shaft breakage.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION DUE TO MECHANICAL DAMAGE TO THE MOTOR

- Do not exceed the maximum permissible axial and radial forces at the motor shaft.
- Protect the motor shaft from impact.
- Do not exceed the maximum permissible axial force when pressing components onto the motor shaft.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

2.6 Options

2.6.1 Holding brake

| SC005... | | H23 | H32 | H33 |
|--|-----|------------|------|------|
| Holding torque ¹⁾ | Nm | 3.0 | 9.0 | 9.0 |
| Holding brake release time | ms | 80 | 90 | 90 |
| Holding brake application time | ms | 10 | 25 | 25 |
| Nominal voltage | Vdc | 24 +5/-15% | | |
| Nominal power (electrical pull-in power) | W | 12 | 18 | 18 |
| Maximum speed of rotation during braking of moving loads | rpm | 3000 | 3000 | 3000 |
| Maximum number of decelerations during braking of moving loads and 3000 rpm | | 500 | 500 | 500 |
| Maximum number of decelerations during braking of moving loads per hour (at even distribution) | | 20 | 20 | 20 |
| Maximum kinetic energy that can be transformed into heat per deceleration during braking of moving loads | J | 150 | 150 | 150 |

1) The holding brake is broken-in at the factory. If the holding brake is not used for an extended period of time, parts of the holding brake may corrode. Corrosion reduces the holding torque. See "*Inspecting/breaking in the holding brake*" in chapter "*7 Service, maintenance and disposal*".

For a description of the controller, see chapter "*3.5.3 Holding brake connection*".

2.6.2 Encoder

The standard motor is equipped with a SinCos encoder. The drive can access the electronic nameplate via the Hiperface interface for commissioning.

The signals meet the PELV requirements.

SKM36 Multiturn

This motor encoder measures an absolute value within 4096 revolutions at start-up and continues to count incrementally from this point.

| | |
|--|----------------------------|
| Resolution in increments | Depending on evaluation |
| Resolution per revolution | 128 sin/cos periods |
| Measuring range absolute | 4096 revolutions |
| Accuracy of the digital absolute value ¹⁾ | $\pm 0.0889^\circ$ |
| Accuracy of the incremental position | $\pm 0.0222^\circ$ |
| Signal shape | Sinusoidal |
| Supply voltage | 7 ... 12 Vdc |
| Maximum supply current | 60 mA (without load) |
| Maximum angular acceleration | 200,000 rad/s ² |

1) Depending on the evaluation through the drive, the accuracy may be increased by including the incremental position in the calculation of the absolute value. In this case, the accuracy corresponds to the incremental position.

2.7 Certifications

CERTIFICATE OF COMPLIANCE

Certificate Number 20140401-E192762
Report Reference E192762-20140328
Issue Date 2014-APRIL-01

Issued to: SCHNEIDER ELECTRIC AUTOMATION GMBH
SCHNEIDERPLATZ 1
97828 MARKTHEIDENFELD GERMANY

This is to certify that representative samples of COMPONENT - INCOMPLETE ROTATING MACHINES AND ROTATING MACHINE PARTS Brushless servo motor assembly, Series SC005

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 1004-1, Rotating Electrical Machines - General Requirements
CSA-C22.2 No. 100, Motors and Generators

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Recognized Component Marks for the U.S. and Canada should be considered as being covered by UL's Recognition and Follow-Up Service and meeting the appropriate U.S. and Canadian requirements.

The UL Recognized Component Mark for the U.S. generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark: [UL logo], may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions. The UL Recognized Component Mark for Canada consists of the UL Recognized Mark for Canada: [UL logo] and the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory.

Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

Look for the UL Recognized Component Mark on the product.

William R. Carney
William R. Carney, Director, North American Certification Programs
UL LLC



Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at www.ul.com/contactus

2.8 Declaration of conformity



EC – Declaration of Conformity

Document number / Month.Year: SH3-SC005_01 / 07.2015

We: Schneider Electric Automation GmbH
 Subsidiary of Schneider Electric (F-92500 Rueil-Malmaison)

Schneiderplatz 1
 97828 Marktheidenfeld
 Germany

Hereby declare that the products:

| | |
|---------------------------------|---|
| Trademark: | Schneider Electric  |
| Product, Type, Function: | 3 phase servo motor with stainless steel enclosure |
| Models: | SC005 series |
| Serial Number: | ZZYYXXXXXXXXX <small>ZZ: last two digits of year +10, YY: Manufacturer code; X: consecutive number</small> |

are in conformity with the requirements of the following directives and conformity was checked in accordance with the following standards:

| Directive | Harmonized Standard |
|--|--|
| DIRECTIVE 2006/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006 on the harmonisation of the laws of Member States relating to Electrical Equipment designed for use within certain voltage limits | EN 60034-1:2010 Rotating electrical machines - Part 1: Rating and performance EN 60034-5:2001 + A1:2007 Rotating electrical machines - Part 5: Degrees of protection provided by integral design of rotating electrical machines (IP code) - Classification EN 61800-5-1:2007 Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy |

It is important that the component is subject to correct installation, maintenance and use conforming to its intended purpose, to the applicable regulations and standards, to the supplier's instructions, user manual and to the accepted rules of the art.

First year of affixing CE Marking: 2014

Issued at: Marktheidenfeld - Germany, 27th July 2015


 i.A. Michael Schweizer
 Machine Solutions Certification Manager



3 Installation

DANGER

ELECTRIC SHOCK CAUSED BY INSUFFICIENT GROUNDING

- Verify compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of the entire drive system.
- Ground the drive system before applying voltage.
- Do not use conduits as protective ground conductors; use a protective ground conductor inside the conduit.
- The cross section of the protective ground conductor must comply with the applicable standards.
- Do not consider cable shields to be protective ground conductors.

Failure to follow these instructions will result in death or serious injury.

DANGER

ELECTRIC SHOCK OR UNINTENDED EQUIPMENT OPERATION

- Keep foreign objects from getting into the product.
- Verify the correct seating of seals and cable entries in order to avoid contamination such as deposits and humidity.

Failure to follow these instructions will result in death or serious injury.

Motors are very heavy relative to their size. The great mass of the motor can cause injuries and damage.

WARNING

HEAVY AND/OR FALLING PARTS

- Use a suitable crane or other suitable lifting gear for mounting the motor if this is required by the weight of the motor.
- Use the necessary personal protective equipment (for example, protective shoes, protective glasses and protective gloves).
- Mount the motor so that it cannot come loose (use of securing screws with appropriate tightening torque), especially in cases of fast acceleration or continuous vibration.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Motors can generate strong local electrical and magnetic fields. This can cause interference in sensitive devices.

⚠ WARNING

ELECTROMAGNETIC FIELDS

- Keep persons with electronic medical implants, such as pace-makers, away from the motor.
- Do not place electromagnetically sensitive devices in the vicinity of the motor.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The metal surfaces of the product may exceed 70 °C (158 °F) during operation.

⚠ WARNING

HOT SURFACES

- Avoid unprotected contact with hot surfaces.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ CAUTION

IMPROPER APPLICATION OF FORCES

- Do not use the motor as a step to climb into or onto the machine.
- Do not use the motor as a load-bearing part.
- Use hazard labels and guards on your machine to help prevent the improper application of forces on the motor.

Failure to follow these instructions can result in injury or equipment damage.

3.1 Overview of procedure

| Chapter | Page |
|---|------|
| "3.2 Electromagnetic compatibility (EMC)" | 37 |
| "3.3 Before mounting" | 40 |
| "3.4 Mounting the motor " | 43 |
| "3.5 Electrical installation" | 45 |

3.2 Electromagnetic compatibility (EMC)

The measures for electromagnetic compatibility (EMC) are intended to minimize electromagnetic interference of the device and interference caused by the device that affects the environment. Such measures include measures to reduce interference and emission as well as to increase immunity.

Electromagnetic compatibility hinges to a great extent on the individual components used in the system. The EMC measures described in this manual may help to comply with the requirements of IEC 61800-3. You must comply with all EMC regulations of the country in which the product is operated. Also, respect any special EMC regulations that may apply at the installation site (for example, residential environments or airports).

Signal interference can cause unexpected responses of the drive system and of other equipment in the vicinity of the drive system.

⚠ WARNING

SIGNAL AND EQUIPMENT INTERFERENCE

- Install the wiring in accordance with the EMC requirements described.
- Verify compliance with the EMC requirements described.
- Verify compliance with all EMC regulations and requirements applicable in the country in which the product is to be operated and with all EMC regulations and requirements applicable at the installation site.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Motor and encoder cables

In terms of EMC, motor cables are especially critical since they are particularly prone to causing interference.

When planning the wiring, take into account the fact that the motor cable must be routed separately. The motor cable must be separate from mains cables or signal cables (for example, limit switches). Use only pre-assembled cables or cables that comply with the specifications and implement the EMC measures described below.

| EMC measures | Effect |
|---|--|
| Keep cables as short as possible. Do not install unnecessary cable loops, use short cables from the central grounding point in the control cabinet to the external ground connection. | Reduces capacitive and inductive interference. |
| Ensure that there is a ground connection between the motor flange and the mounting surface at the machine (no paint, oil and grease or any insulating material between the motor flange and the mounting surface at the machine). | Reduces emissions, increases immunity. |
| Connect large surface areas of cable shields, use cable clamps and ground straps. | Reduces emissions. |
| Do not install switching elements in motor cables or encoder cables. | Reduces interference. |
| Route the motor cable separately from mains cables and signal cables (for example, for limit switches), for example by using shielding plates or by keeping the cables apart from each other at a distance of at least 20 cm (5.08 in). | Reduces mutual interference. |
| Route the motor cable and encoder cable without cutting them. ¹⁾ | Reduces emission. |

1) If a cable is cut for the installation, take appropriate measures for uninterrupted shielding (such as a metal housing) at the point of the cut. Connect a large area of the cable shield to the metal housing at both ends of the cut.



Pre-assembled motor cables with various lengths are available for the drive solutions. Contact your local sales office.

Pre-assembled connection cables (accessories)

Using pre-assembled cables helps to reduce the possibility of wiring errors. See chapter "6 Accessories and spare parts".

Equipotential bonding conductors

Potential differences can result in excessive currents on the cable shields. Use equipotential bonding conductors to reduce currents on the cable shields.

⚠ WARNING**UNINTENDED EQUIPMENT OPERATION**

- Ground cable shields for all fast I/O, analog I/O, and communication signals at a single point. ¹⁾
- Route communications and I/O cables separately from power cables.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

- 1) Multipoint grounding is permissible if connections are made to an equipotential ground plane dimensioned to help avoid cable shield damage in the event of power system short-circuit currents.

The equipotential bonding conductor must be rated for the maximum current. The following conductor cross sections can be used:

- 16 mm² (AWG 4) for equipotential bonding conductors up to a length of 200 m (656 ft)
- 20 mm² (AWG 4) for equipotential bonding conductors with a length of more than 200 m (656 ft)

3.3 Before mounting

Inspecting the product

- ▶ Verify the product version by means of the type code on the nameplate. See chapter "1.3 Nameplate" and chapter "1.4 Type code".
- ▶ Prior to mounting, inspect the product for visible damage.

Damaged products may cause electric shock or unintended equipment operation.

⚠ ⚠ DANGER

ELECTRIC SHOCK OR UNINTENDED EQUIPMENT OPERATION

- Do not use damaged products.
- Keep foreign objects (such as chips, screws or wire clippings) from getting into the product.

Failure to follow these instructions will result in death or serious injury.

Contact your local Schneider Electric sales office if you detect any damage whatsoever to the products.

Inspecting the holding brake (option)

See chapter "7.2 Maintenance", section "Inspecting/breaking in the holding brake".

Mounting surface for flange

The mounting surface must be stable, clean, deburred and low-vibration. Ensure that the mounting surface is itself grounded, and that a potential exists between the motor flange and the mounting surface.

⚠ ⚠ DANGER

ELECTRIC SHOCK CAUSED BY INSUFFICIENT GROUNDING

- Verify compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of the entire drive system.
- Ground the drive system before applying voltage.
- Do not use conduits as protective ground conductors; use a protective ground conductor inside the conduit.
- The cross section of the protective ground conductor must comply with the applicable standards.
- Do not consider cable shields to be protective ground conductors.

Failure to follow these instructions will result in death or serious injury.

- ▶ Verify that the mounting surface meets all requirements in terms of dimensions and tolerances. See chapter "2.3 Dimensions" for dimensions.

Conductor cross sections according to method of installation

The following sections describe the conductor cross sections for two methods of installation:

- Method of installation B2:
Cables in conduits or cable trunking systems
- Method of installation E:
Cables on open cable trays

| Cross section in mm ² (AWG) ¹⁾ | Current-carrying capacity with method of installation B2 in A ²⁾ | Current carrying capacity with method of installation E in A ²⁾ |
|--|---|--|
| 0.75 (18) | 8.5 | 10.4 |
| 1 (16) | 10.1 | 12.4 |
| 1.5 (14) | 13.1 | 16.1 |
| 2.5 (12) | 17.4 | 22 |
| 4 (10) | 23 | 30 |
| 6 (8) | 30 | 37 |
| 10 (6) | 40 | 52 |
| 16 (4) | 54 | 70 |
| 25 (2) | 70 | 88 |

1) See chapter "6 Accessories and spare parts" for available cables.

2) Values as per IEC 60204-1 for continuous operation, copper conductors and ambient air temperature 40°C (104 °F); see IEC 60204-1 for additional information.

Note the derating factors for grouping of cables and correction factors for other ambient conditions (IEC 60204-1).

The conductors must have a sufficiently large cross section so that the upstream fuse can trip.

In the case of longer cables, it may be necessary to use a greater conductor cross section to reduce the energy losses.

Cable specifications Using pre-assembled cables helps to reduce the possibility of wiring errors. See chapter "6 Accessories and spare parts".

The genuine accessories have the following properties:

| | | |
|--|--------------------|--|
| Cables with connectors | | FCE306...A200 FCE307...A200 FCE308...A200 |
| Cable jacket, insulation | | PUR matte gray (similar to RAL 7001) |
| Number of contacts (shielded) | | 4 x 1.5 mm ² + 2 x 2 x 0.75 mm ² + 2 x 0.34 mm ² + 3 x 2 x 0.15 mm ² |
| Cable diameter | mm (in) | 15.7 ±0.4 (0.62 ±0.1) |
| Minimum bend radius | | 5 times the cable diameter with permanently installed connection 12 times the cable diameter with flexible installation |
| Nominal voltage Power wires Signal wires | V | 1000 300 |
| Maximum orderable length | m (ft) | 10 ¹⁾ (32.8) |
| Permissible temperature range during operation | °C (°F) °C (°F) | fixed: -40 ... 80 (-40 ... 176) moving: -30 ... 80 (-22 ... 176) |

1) Contact Schneider Electric sales office for longer cables.

3.4 Mounting the motor

Electrostatic discharge to the shaft may cause incorrect operation of the encoder system and result in unanticipated motor movements and damage to the bearing.

WARNING

UNINTENDED MOVEMENT CAUSED BY ELECTROSTATIC DISCHARGE

Use conductive components such as antistatic belts or other suitable measures to avoid static charge by motion.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

If the permissible ambient conditions are not respected, external substances from the environment may penetrate the product and cause unintended movement or equipment damage.

WARNING

UNINTENDED MOVEMENT

- Verify that the ambient conditions are respected.
- Do not allow seals to run dry.
- Keep liquids from getting to the shaft bushing (for example, in mounting position IM V3).
- Do not expose the shaft sealing rings and cable entries of the motor to the direct spray of a pressure washer.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The metal surfaces of the product may exceed 70 °C (158 °F) during operation.

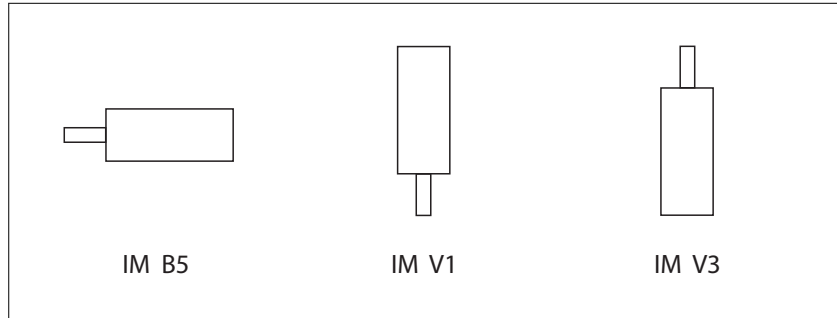
WARNING

HOT SURFACES

- Avoid unprotected contact with hot surfaces.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Mounting position The following mounting positions are defined and permissible as per IEC 60034-7:



Mounting When the motor is mounted to the mounting surface, it must be accurately aligned axially and radially and make even contact with the mounting surface. All mounting screws must be tightened with the specified tightening torque. No uneven mechanical load must be applied when the mounting screws are tightened. See chapter "2 Technical Data" for data, dimensions and degrees of protection (IP).

Mounting output components Output components such as pulleys and couplings must be mounted with suitable equipment and tools. Motor and output component must be accurately aligned both axially and radially. If the motor and the output component are not accurately aligned, this will cause runout and premature wear.

The maximum axial and radial forces acting on the shaft must not exceed the maximum shaft load values specified, see chapter "2.5.2 Shaft load".

If the maximum permissible forces at the motor shaft are exceeded, this results in premature wear of the bearing, shaft breakage or damage to the encoder.

| |
|---|
| ⚠ WARNING |
| UNINTENDED EQUIPMENT OPERATION DUE TO MECHANICAL DAMAGE TO THE MOTOR |
| <ul style="list-style-type: none">• Do not exceed the maximum permissible axial and radial forces at the motor shaft.• Protect the motor shaft from impact.• Do not exceed the maximum permissible axial force when pressing components onto the motor shaft. |
| Failure to follow these instructions can result in death, serious injury, or equipment damage. |

3.5 Electrical installation

3.5.1 Connectors and connector assignments

3.5.1.1 Motor encoder cable 1.5 mm² (PacDrive-M, MC-4)

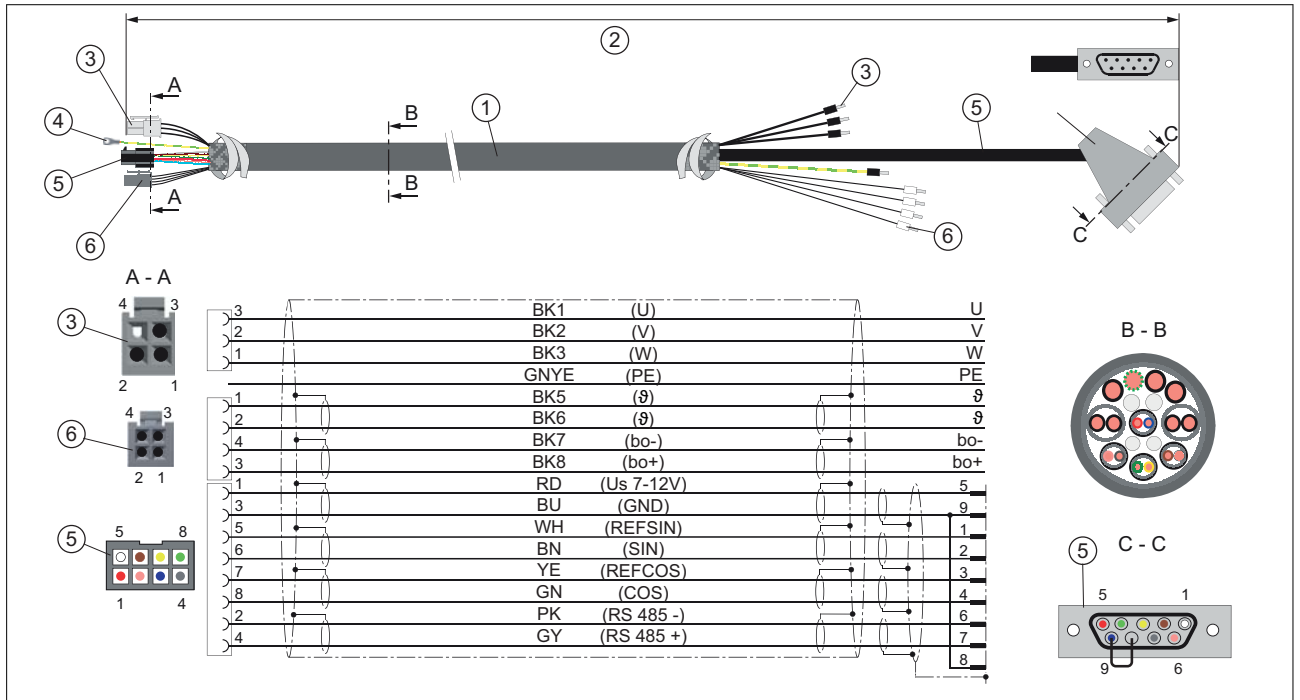


Figure 15: Motor encoder cable 1.5 mm² (PacDrive-M, MC-4)

- (1) Motor encoder cable
- (2) Order length
- (3) Motor phases
- (4) Protective ground conductor
- (5) Encoder
- (6) Temperature sensor and holding brake

3.5.1.2 Motor encoder cable 1.5 mm² (PacDrive-3, LXM62)

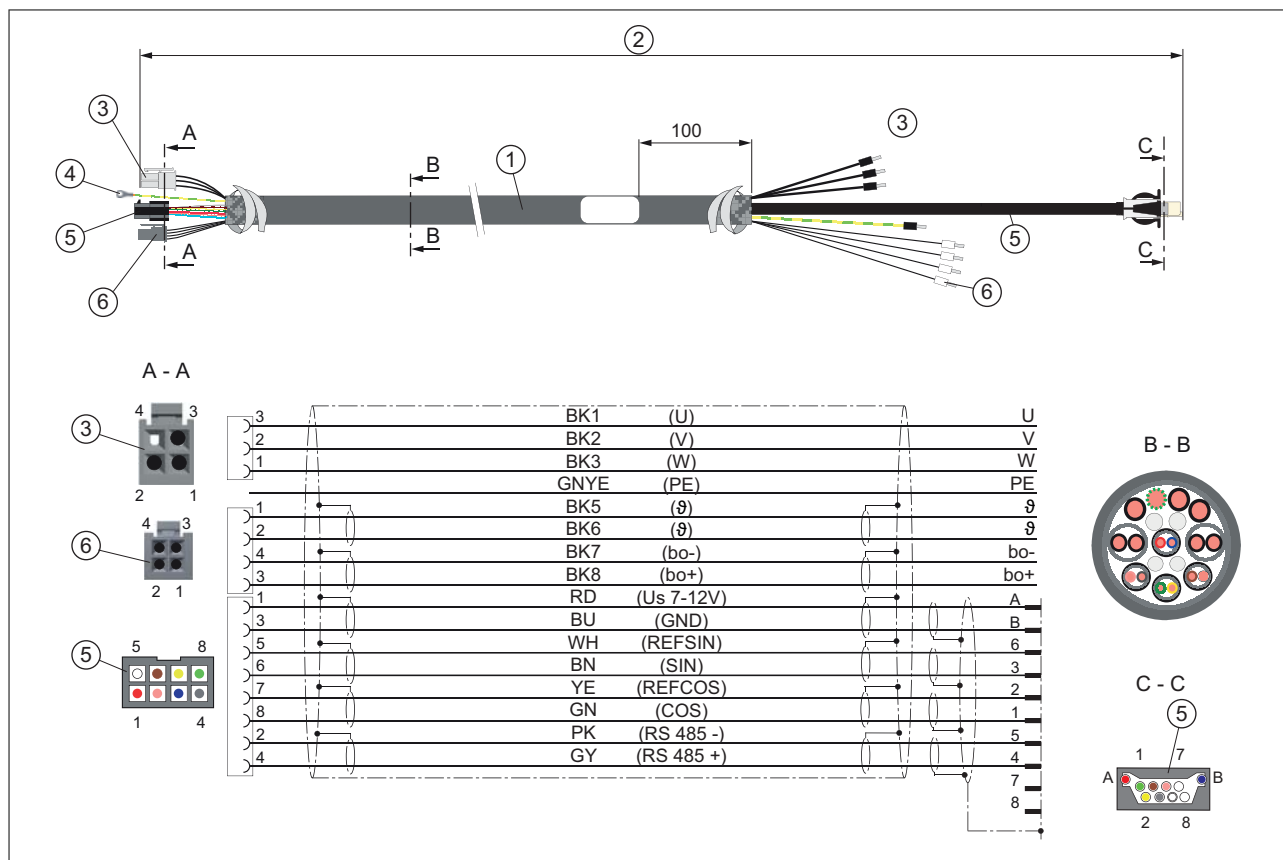


Figure 16: Motor encoder cable 1.5 mm² (PacDrive-3, LXM62)

- (1) Motor encoder cable
- (2) Order length
- (3) Motor phases
- (4) Protective ground conductor
- (5) Encoder
- (6) Temperature sensor and holding brake

3.5.1.3 Motor encoder cable 1.5 mm² (PacDrive-3, LXM52/LXM32)

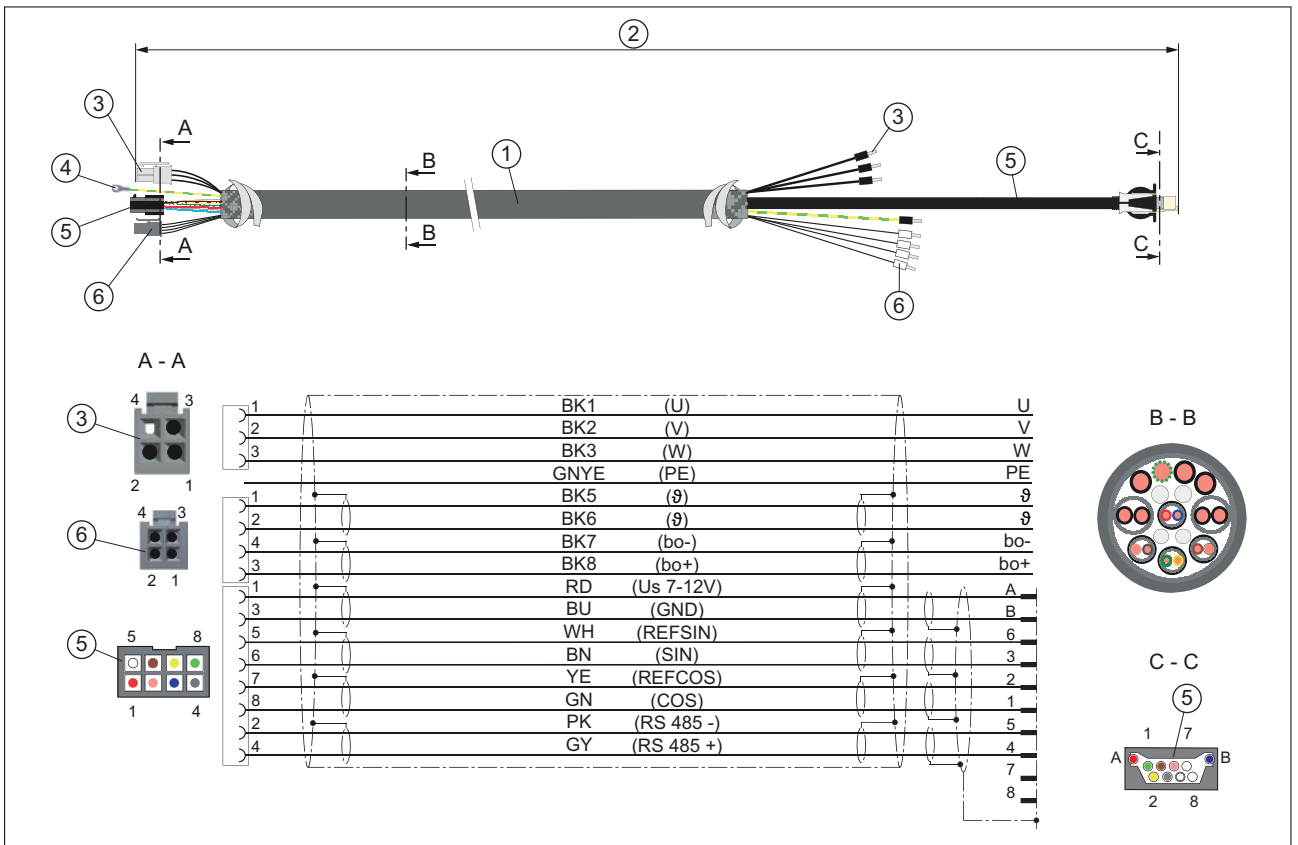


Figure 17: Motor encoder cable 1.5 mm² (PacDrive-3, LXM52/LXM32)

- (1) Motor encoder cable
- (2) Order length
- (3) Motor phases
- (4) Protective ground conductor
- (5) Encoder
- (6) Temperature sensor and holding brake

3.5.2 Power and encoder connection

High voltages may be present at the motor connection. The motor itself generates voltage when the motor shaft is rotated. AC voltage can couple voltage to unused conductors in the motor cable.

⚠ ⚠ DANGER

ELECTRIC SHOCK

- Verify that no voltage is present prior to performing any type of work on the drive system.
- Block the motor shaft to prevent rotation prior to performing any type of work on the drive system.
- Insulate both ends of unused conductors of the motor cable.
- Only touch the motor shaft or the mounted output components if all power has been disconnected.
- Verify compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.

Failure to follow these instructions will result in death or serious injury.

The motor is designed for operation via a drive. Connecting the motor directly to AC voltage will damage the motor and can cause fires.

⚠ DANGER

FIRE HAZARD DUE TO INCORRECT CONNECTION

Only connect the motor to a matching, approved drive in the way described in the present documentation.

Failure to follow these instructions will result in death or serious injury.

Drive systems may perform unintended movements if unapproved combinations of drive and motor are used. Even if motors are similar, different adjustment of the encoder system may be a source of hazards. Even if the connectors for motor connection and encoder connection match mechanically, this does not imply that the motor is approved for use.

⚠ WARNING

UNINTENDED MOVEMENT

Only use approved combinations of drive and motor.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

See chapter "2.1 General characteristics" for approved drives.

Cable gland The cable gland "Pflitsch blueglobe TRI CLEAN Plus gb 225VA tri cp" is supplied with the motor (exception: FCE200519C200).

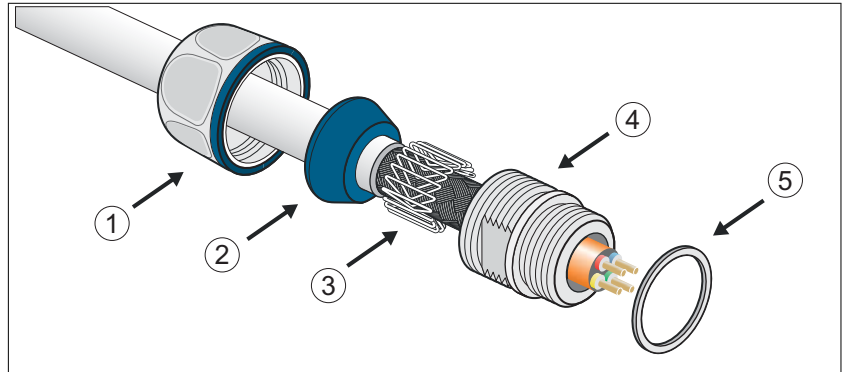


Figure 18: Cable gland

Incorrect installation of the cable may damage the insulation. Broken conductors in the cable or improperly connected connectors may promote arcing within the cable.

⚠ ⚠ DANGER

ELECTRIC SHOCK, ARC FLASH AND FIRE CAUSED BY INCORRECT INSTALLATION OF THE CABLE

- Disconnect all power before plugging in or unplugging the connectors.
- Verify correct pin assignment of the connectors according to the specifications in this chapter before connecting the cables.
- Verify that the connectors are properly inserted and locked before applying power.
- Avoid forces or movements of the cable at the cable entries.

Failure to follow these instructions will result in death or serious injury.

Procedure:

- ▶ Screw the cable gland (4) with the washer (5) into the motor. Tightening torque 15 Nm (133 lb.in).
- ▶ First, pass the connector of the encoder through the cable gland (black 2 x 4).
- ▶ Then pass the connector of the motor phases through the cable gland (white 2 x 2).
- ▶ Then pass the connector of the holding brake and the temperature sensor through the cable gland (black 2 x 2).
- ▶ Finally, pass the protective ground conductor conductor through the cable gland (green/yellow).
- ▶ Push the shield clip (3) over the cable shield.
- ▶ Push the cable further through the cable gland until the seal (2) is in contact with the cable gland.
- ▶ Tighten the union nut (1).

Keep the cable from being twisted when tightening the union nut.

Cable gland for FCE200519C200


In the case of motor version FCE200519C200, the cable gland "Pflitsch blueglobe TRI CLEAN Plus gb 220VA tri cp" is pre-assembled to the corresponding cable; it is not supplied with the motor.

Procedure:

- ▶ Screw the cable gland (4) into the motor. A washer (5) is not required.
Tightening torque 15 Nm (133 lb.in).
- ▶ Push the shield clip (3) over the cable shield.
- ▶ Push the cable further through the cable gland until the seal (2) is in contact with the cable gland.
- ▶ Tighten the union nut (1).

Keep the cable from being twisted when tightening the union nut.

Connecting the cables Incorrect installation of the cable may damage the insulation. Broken conductors in the cable or improperly connected connectors may promote arcing within the cable.

|  DANGER | |
|--|--|
| ELECTRIC SHOCK, ARC FLASH AND FIRE CAUSED BY INCORRECT INSTALLATION OF THE CABLE | |
| <ul style="list-style-type: none"> • Disconnect all power before plugging in or unplugging the connectors. • Verify correct pin assignment of the connectors according to the specifications in this chapter before connecting the cables. • Verify that the connectors are properly inserted and locked before applying power. • Avoid forces or movements of the cable at the cable entries. | |
| Failure to follow these instructions will result in death or serious injury. | |

Procedure:

- ▶ Open the housing cover.
- ▶ Connect the protective ground conductor (green/yellow). The connection is located immediately behind the housing cover.

| | | |
|---|------------|------------|
| Tightening torque protective ground conductor | Nm (lb.in) | 2.5 (22.1) |
|---|------------|------------|

- ▶ Connect the motor phases (white 2 x 2).
- ▶ Connect the encoder (black 2 x 4).
- ▶ Connect the holding brake and the temperature sensor (black 2 x 2).
- ▶ Close the housing cover.

| | | | |
|--|------------|------------|-----------------|
| SC005... | | H13 | H2-, H3- |
| Housing cover screws | | M3 | M4 |
| Tightening torque for housing cover screws | Nm (lb.in) | 2.0 (17.7) | 2.5 (22.1) |

- ▶ Connect the motor encoder cable to the drive according to the wiring diagram of the drive.
- ▶ Ground the shield to a large surface area. See the product manual of the drive for information on connecting the shield.
- ▶ If your motor is equipped with a holding brake, follow the instructions in chapter "3.5.3 Holding brake connection".

3.5.3 Holding brake connection

Applying the holding brake while the motor is running will cause excessive wear and loss of the braking force.

| |
|---|
| ⚠ WARNING |
| LOSS OF BRAKING FORCE DUE TO WEAR OR HIGH TEMPERATURE |
| <ul style="list-style-type: none"> • Do not use the holding brake as a service brake. • Do not exceed the maximum number of brake applications and the kinetic energy during braking of moving loads. |
| Failure to follow these instructions can result in death, serious injury, or equipment damage. |

See chapter "2.6.1 Holding brake" for technical data on braking while the load moves.

Releasing the holding brake can cause an unintended movement, for example, lowering of the load in the case of vertical axes.

| |
|---|
| ⚠ WARNING |
| UNINTENDED MOVEMENT |
| <ul style="list-style-type: none"> • Verify that there are no persons or obstacles in the zone of operation when performing a test of the holding brake. • Take appropriate measures to avoid damage caused by falling or lowering loads or other unintended movements. |
| Failure to follow these instructions can result in death, serious injury, or equipment damage. |

If the voltage is incorrect, the holding brake cannot be released which causes wear. If the voltage is higher than the specified voltage, the holding brake may be re-applied. If the voltage polarity is incorrect, the holding brake cannot be released.

| |
|---|
| ⚠ WARNING |
| MISOPERATION OF THE HOLDING BRAKE CAUSED BY INCORRECT VOLTAGE |
| <ul style="list-style-type: none"> • Verify that the specified voltage is available at the holding brake connection. • Use a properly rated voltage-sensing device for measuring. |
| Failure to follow these instructions can result in death, serious injury, or equipment damage. |

A motor with a holding brake requires a suitable holding brake controller which releases the brake when the power stage is enabled and locks the motor shaft when the power stage is disabled.

Cable specifications

- Minimum wire cross section: 2 * 1.0 mm² (AWG 16)
- Maximum cable length: See product manual of the drive.

4 Commissioning

DANGER

ELECTRIC SHOCK OR UNINTENDED EQUIPMENT OPERATION

- Keep foreign objects from getting into the product.
- Verify the correct seating of seals and cable entries in order to avoid contamination such as deposits and humidity.

Failure to follow these instructions will result in death or serious injury.

Drive systems may perform unanticipated movements because of incorrect connection or other errors.

WARNING

UNINTENDED MOVEMENT

- Verify proper wiring.
- Only start the system if there are no persons or obstructions in the zone of operation.
- Perform the first test runs without coupled loads.
- Only touch the motor shaft or the mounted output components if all power has been disconnected.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Drive systems may perform unintended movements if unapproved combinations of drive and motor are used. Even if motors are similar, different adjustment of the encoder system may be a source of hazards. Even if the connectors for motor connection and encoder connection match mechanically, this does not imply that the motor is approved for use.

WARNING

UNINTENDED MOVEMENT

Only use approved combinations of drive and motor.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

See chapter "2.1 General characteristics" for approved drives.

Rotating parts may cause injuries and may catch clothing or hair. Loose parts or parts that are out of balance may be ejected.

⚠ WARNING

MOVING, UNGUARDED EQUIPMENT

Verify that rotating parts cannot cause injuries or equipment damage.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The motor may move, tip and fall as a result of incorrect or insufficient mounting.

⚠ WARNING

FALLING PARTS

Mount the motor so that it cannot come loose (use of securing screws with appropriate tightening torque), especially in cases of fast acceleration or continuous vibration.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The metal surfaces of the product may exceed 70 °C (158 °F) during operation.

⚠ WARNING

HOT SURFACES

- Avoid unprotected contact with hot surfaces.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Motors can generate strong local electrical and magnetic fields. This can cause interference in sensitive devices.

⚠ WARNING

ELECTROMAGNETIC FIELDS

- Keep persons with electronic medical implants, such as pacemakers, away from the motor.
- Do not place electromagnetically sensitive devices in the vicinity of the motor.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ CAUTION**IMPROPER APPLICATION OF FORCES**

- Do not use the motor as a step to climb into or onto the machine.
- Do not use the motor as a load-bearing part.
- Use hazard labels and guards on your machine to help prevent the improper application of forces on the motor.

Failure to follow these instructions can result in injury or equipment damage.

Verifying correct installation

Prior to commissioning, verify correct installation.

- ▶ Verify proper mechanical installation.
- ▶ Verify proper electrical installation.
 - Did you connect all protective ground conductors?
 - Did you properly connect and install all cables and connectors?
 - Did you tighten the cable glands properly?
- ▶ Verify ambient conditions.
 - Does the installation meet the ambient conditions specified?
- ▶ Verify the output components.
 - Have the installed output components been balanced and accurately aligned?
- ▶ Verify the function of the holding brake.
 - Is the holding brake able to hold the maximum load?
 - Is the holding brake released prior to the start of a movement?

5 Diagnostics and troubleshooting

5.1 Mechanical problems

| Problem | Cause | Troubleshooting |
|-----------------------------|------------------------------------|--|
| Excessive heat | Overload | Reduce load |
| | Holding brake not released | Verify that the holding brake controller operates properly |
| | Heavy pollution | Clean the motor |
| Whistling or knocking noise | Rolling bearings | Contact your sales office |
| Grinding noise | Rotating output component grinds | Align output component |
| Radial oscillation | Poor alignment of output component | Align output component |
| | Output component out of balance | Balance output component |
| | Shaft bent | Contact your sales office |
| | Resonance with machine bed | Suppress resonance |
| Axial oscillation | Poor alignment of output component | Align output component |
| | Damage to the output component | Repair/replace output component |
| | Resonance with machine bed | Suppress resonance |

5.2 Electrical problems

| Problem | Cause | Troubleshooting |
|---|-----------------------------------|---|
| Motor does not start or has difficulty starting | Overload | Reduce load |
| | Unsuitable settings for the drive | Correct drive settings |
| | Cable damaged | Replace damaged cables |
| Excessive heat | Overload | Reduce power |
| Heat at the terminals or connectors | Poor contact | Tighten the terminals / connectors with the specified tightening torque |

6 Accessories and spare parts

6.1 Motor encoder cable

Motor encoder cables are available for:

- PacDrive-M, MC-4
- PacDrive-3, LXM62
- PacDrive-3, LXM52/LXM32

6.1.1 Motor encoder cable 1.5 mm² (PacDrive-M, MC-4)

| Description | Order no. |
|---|---------------|
| Motor encoder cable 2 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306020A200 |
| Motor encoder cable 2.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306025A200 |
| Motor encoder cable 3 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306030A200 |
| Motor encoder cable 3.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306035A200 |
| Motor encoder cable 4 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306040A200 |
| Motor encoder cable 4.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306045A200 |
| Motor encoder cable 5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306050A200 |
| Motor encoder cable 5.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306055A200 |
| Motor encoder cable 6 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306060A200 |
| Motor encoder cable 6.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306065A200 |
| Motor encoder cable 7 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306070A200 |
| Motor encoder cable 7.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306075A200 |
| Motor encoder cable 8 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306080A200 |
| Motor encoder cable 8.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306085A200 |
| Motor encoder cable 9 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306090A200 |
| Motor encoder cable 9.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306095A200 |
| Motor encoder cable 10 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other cable end D-SUB connector (PD-M) for encoder signal. | FCE306100A200 |

6.1.2 Motor encoder cable 1.5 mm² (PacDrive-3, LXM62)

| Description | Order no. |
|--|---------------|
| Motor encoder cable 2 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307020A200 |
| Motor encoder cable 2.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307025A200 |
| Motor encoder cable 3 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307030A200 |
| Motor encoder cable 3.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307035A200 |
| Motor encoder cable 4 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307040A200 |
| Motor encoder cable 4.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307045A200 |
| Motor encoder cable 5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307050A200 |
| Motor encoder cable 5.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307055A200 |
| Motor encoder cable 6 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307060A200 |
| Motor encoder cable 6.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307065A200 |
| Motor encoder cable 7 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307070A200 |
| Motor encoder cable 7.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307075A200 |
| Motor encoder cable 8 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307080A200 |
| Motor encoder cable 8.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307085A200 |
| Motor encoder cable 9 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307090A200 |
| Motor encoder cable 9.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307095A200 |
| Motor encoder cable 10 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE307100A200 |

6.1.3 Motor encoder cable 1.5 mm² (PacDrive-3, LXM52/LXM32)

| Description | Order no. |
|--|---------------|
| Motor encoder cable 2 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308020A200 |
| Motor encoder cable 2.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308025A200 |
| Motor encoder cable 3 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308030A200 |
| Motor encoder cable 3.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308035A200 |
| Motor encoder cable 4 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308040A200 |
| Motor encoder cable 4.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308045A200 |
| Motor encoder cable 5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308050A200 |
| Motor encoder cable 5.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308055A200 |
| Motor encoder cable 6 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308060A200 |
| Motor encoder cable 6.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308065A200 |
| Motor encoder cable 7 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308070A200 |
| Motor encoder cable 7.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308075A200 |
| Motor encoder cable 8 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308080A200 |
| Motor encoder cable 8.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308085A200 |
| Motor encoder cable 9 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308090A200 |
| Motor encoder cable 9.5 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308095A200 |
| Motor encoder cable 10 m, [(4 x 1.5 mm ²) + 2 x (2 x 0.75 mm ²) + (2 x 0.34 mm ²) + 3 x (2 x 0.15 mm ²)] shielded; motor end Molex connector, other end RJ45 connector (PD-3) for encoder signal. | FCE308100A200 |

7 Service, maintenance and disposal

7.1 Service address



If you have any questions please contact your sales office. Your sales office staff will be happy to give you the name of a customer service office in your area.

<http://www.schneider-electric.com>

Schneider Electric Automation GmbH
Schneiderplatz 1
97828 Marktheidenfeld
Germany

7.2 Maintenance

The product may only be repaired by a Schneider Electric customer service center.

Repairs cannot be made with the device installed.

Include the following points in the maintenance plan of your machine.

Connections and fastening

- ▶ Inspect all connection cables and connectors regularly for damage. Replace damaged cables immediately.
- ▶ Verify that all output elements are firmly seated.
- ▶ Tighten all mechanical and electrical threaded connections to the specified torque.

Lubricating the shaft sealing ring

In the case of motors with shaft sealing ring, lubricant must be applied to the space between the sealing lip of the shaft sealing ring and the shaft with a suitable non-metallic tool. If the shaft sealing rings are allowed to run dry, the service life of the shaft sealing rings will be significantly reduced.

Cleaning If the permissible ambient conditions are not respected, external substances from the environment may penetrate the product and cause unintended movement or equipment damage.

▲ WARNING

UNINTENDED MOVEMENT

- Verify that the ambient conditions are respected.
- Do not allow seals to run dry.
- Keep liquids from getting to the shaft bushing (for example, in mounting position IM V3).

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Clean dust and dirt off the product at regular intervals. Insufficient heat dissipation to the ambient air may excessively increase the temperature.

When using solvents or cleaning agents, verify that the cables, cable entry seals, and O-rings are not damaged.

Inspecting/breaking in the holding brake

The holding brake is broken-in at the factory. If the holding brake is not used for an extended period of time, parts of the holding brake may corrode. Corrosion reduces the holding torque.

If the holding brake does not have the holding torque indicated in the technical data, it must be broken in again.

- The motor is dismounted. The holding brake is applied.
- ▶ Measure the holding torque of the holding brake using a torque wrench.
- ▶ If the holding torque of the holding brake considerably differs from the specified values, manually rotate the motor shaft by 25 rotations in both directions. See chapter "2.6.1 Holding brake" for the values.
- ▶ Repeat the process up to 3 times, until you can restore the original holding torque.

Contact your Schneider Electric sales office if the original holding torque is not restored.

Replacing the rolling bearing

When the rolling bearing is replaced, the motor is partially demagnetized and loses power.

NOTICE

INOPERABLE EQUIPMENT

Do not replace the rolling bearing.

Failure to follow these instructions can result in equipment damage.

For all service matters, contact your Schneider Electric representative.

7.3 Replacing the motor

If you replace the motor, the absolute position of the encoder is no longer valid.

⚠ WARNING

UNINTENDED MOVEMENT DUE TO INCORRECT ABSOLUTE POSITION

Set the new absolute position of the encoder after having replaced the motor.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

- ▶ Power off all supply voltages. Verify that no voltages are present.
- ▶ Label all connections and uninstall the product.
- ▶ Note the identification number and the serial number shown on the product nameplate for later identification.
- ▶ Install the new product as per chapter "3 Installation".
- ▶ Commission the product as per chapter "4 Commissioning".

7.4 Shipping, storage, disposal

Respect the ambient conditions in chapter "2.1 General characteristics".

Shipping The product must be protected against shocks during transportation. If possible, use the original packaging for shipping.

Storage The product may only be stored in spaces where the specified permissible ambient conditions are met.
Protect the product from dust and dirt.

Disposal The product consists of various materials that can be recycled. Dispose of the product in accordance with local regulations.

Visit <http://www.schneider-electric.com/green-premium> for information and documents on environmental protection as per ISO 14025 such as:

- EoLi (Product End-of-Life Instructions)
- PEP (Product Environmental Profile)

Glossary



Terms and Abbreviations

See chapter " *Terminology Derived from Standards*" for information on the pertinent standards on which many terms are based. Some terms and abbreviations may have specific meanings with regard to the standards.

| | |
|-----------------------------|---|
| <i>Axial forces</i> | Tension or compression forces acting longitudinally on the shaft |
| <i>Centering collar</i> | Centering device at the motor flange that allows for accurate motor mounting. |
| <i>Degree of protection</i> | The degree of protection is a standardized specification for electrical equipment that describes the protection against the ingress of foreign objects and water (for example: IP 20). |
| <i>DOM</i> | Date of manufacturing: The nameplate of the product shows the date of manufacture in the format DD.MM.YY or in the format DD.MM.YYYY. For example: 31.12.11 corresponds to December 31, 2011 31.12.2011 corresponds to December 31, 2011 |
| <i>Drive system</i> | System consisting of controller, drive and motor. |
| <i>EMC</i> | Electromagnetic compatibility |
| <i>Encoder</i> | Sensor that converts a measured distance or angle into an electrical signal. This signal is evaluated by the drive to determine the actual position of a shaft (rotor) or a driving unit. |
| <i>Length</i> | In the type code, the length is defined in terms of the number of stacks. |
| <i>PELV</i> | Protective Extra Low Voltage, low voltage with isolation. For more information: IEC 60364-4-41 |
| <i>PTC</i> | Resistor with positive temperature coefficient. Resistance value increases as the temperature rises. |
| <i>Radial forces</i> | Forces that act radially on the shaft |
| <i>Size</i> | In the type code, the size is defined in terms of the flange size. |

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